



## SINGLE CHIP PC AUDIO SYSTEM CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

# 92HD81

### Description

The 92HD81 single-chip audio system is a low power optimized, high fidelity, 4-channel audio codec with integrated speaker amplifier, capless headphone amplifier, and low drop out voltage regulator.

The high integration of the 92HD81 enables the smallest PCB footprint with the lowest system BOM count and cost.

The integrated high-pass filter allows for speaker protection.

The 92HD81 provides high quality HD Audio capability to notebook and business desktop PC applications.

### Features

- **4 Channels (2 stereo DACs and 2 stereo ADCs) with 24-bit resolution**
  - Supports full-duplex stereo audio and simultaneous VoIP
  - Provides a mono output
- **2W/channel stereo speaker amplifier @ 4 ohms and 4.75V**
- **Two headphone amplifiers**
  - One capless and one non-capless retaskable
- **Internal core voltage regulator**
  - 1.5V to 1.8V or 3.3V digital power supply options
- **+5 V analog power supply option**
- **Dedicated BTL high pass filter for speaker protection (RA revision only)**
- **Full HDA015-B low power support**
  - Audio inactivity transitions codec from D0 to D3 low power mode
  - Resume from D3 to D0 with audio activity in < 10 msec
  - D3 to D0 transition with < -65dB pop/click
  - Port presence detect in D3 with or without bit clock
  - Optional analog PC beep in D3
  - Additional vendor specific modes for even lower power
- **Microsoft WLP 3/4/5 premium logo compliant, as defined in WLP 3.9**
- **Dual SPDIF for WLP compliant support of simultaneous HDMI and SPDIF output**
- **Support for 1.5V and 3.3V HDA signaling**
- **Two digital microphone inputs (mono, stereo, or quad microphones)**
- **High performance analog mixer**
- **2 adjustable VREF Out pins for analog microphone bias**
- **6 analog ports with port presence detect (5 single ended, 1 BTL)**
- **Analog and digital PC Beep support**
- **Aux Audio Mode** (see orderable part numbers for support)
- **48-pad QFN RoHS packages**

## Software Support

- Intuitive TSI HD Sound graphical user interface that allows configurability and preference settings
- 12 band fully parametric equalizer
  - Constant, system-level effects tuned to optimize a particular platform can be combined with user-mode “presets” tailored for specific acoustical environments and applications
  - System-level effects automatically disabled when external audio connections made
- Dynamics Processing
  - Enables improved voice articulation
  - Compressor/limiter allows higher average volume level without resonances or damage to speakers.
- TSI Vista APO wrapper
  - Enables multiple APOs to be used with the TSI Driver
- Microphone Beam Forming, Acoustic Echo Cancellation, and Noise Suppression
- Dynamic Stream Switching
  - Improved multi-streaming user experience with less support calls
- Broad 3<sup>rd</sup> party branded software including Creative, Dolby, DTS, and SRS

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# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

### 1. DESCRIPTION

#### 1.1. Overview

The 92HD81 is a high fidelity, 4-channel audio codec compatible with the Intel High Definition (HD) Audio Interface. The 92HD81 codec provides high quality, HD Audio capability notebooks and business desktops.

The 92HD81 is designed to meet or exceed premium logo requirements for Microsoft's Windows Logo Program (WLP) 3.09 and revisions 4/5 as indicated in WLP 3.09.

The 92HD81 provides stereo 24-bit, full duplex resolution supporting sample rates up to 192kHz by the DAC and ADC. 92HD81 SPDIF outputs support sample rates of 192kHz, 176.4kHz, 96kHz, 88.2kHz, 48kHz, and 44.1kHz. 92HD81 SPDIF input supports sample rates of 96kHz, 88.2kHz, 48kHz, and 44.1kHz. Additional sample rates are supported by the driver software.

The 92HD81 supports a wide range of notebook and business desktop 4-channel configurations. The 2 independent SPDIF output interfaces provides connectivity to Consumer Electronic equipment like Dolby Digital decoders, powered speakers, mini disk drives or to a home entertainment system. Simultaneous HDMI and SPDIF output is possible.

An integrated BTL stereo amplifier is ideal for driving integrated speakers in mobile and ultra-mobile computers. For desktop computers or mobile computers using only one speaker, the BTL output stage may be configured to support a single mono speaker.

MIC inputs can be programmed with 0/10/20/30dB boost. For more advanced configurations, the 92HD81 has 3 General Purpose I/O (GPIO).

The port presence detect capabilities allow the codecs to detect when audio devices are connected to the codec. Load impedance sensing helps identify attached peripherals for easy set-up and a better user experience. The fully parametric TSI SoftEQ can be initiated upon headphone jack insertion and removal for protection of notebook speakers.

The 92HD81 operates with a 1.5V, 1.8V or 3.3V digital supply and a 5V analog supply. It can also work with 1.5V and 3.3V HDA signaling; the correct signalling level is selected dynamically based on the power supply voltage on the DVDD-IO pin.

The 92HD81 is available in a 48-pin QFN Environmental (ROHS) package.

#### 1.2. Orderable Part Numbers

|                   |                                   |
|-------------------|-----------------------------------|
| 92HD81B1X5NLGXyyX | 5V Analog, Aux Audio mode enabled |
| 92HD81B1C5NLGXyyX | 5V Analog                         |
| 92HD81B1A5NLGXyyX | OEM custom part number            |
| 92HD81B1B5NLGXyyX | OEM custom part number            |

yy = silicon stepping/revision, contact sales for current data.

Add an "8" to the end for tape and reel delivery. Min/Mult order quantity 2ku.

## 2. DETAILED DESCRIPTION

### 2.1. Port Functionality

Multi-function (Input / output) ports allow for the highest possible flexibility. 3 or 4 bi-directional ports, 2 headphone ports, and a high power BTL amplifier support a wide variety of consumer desktop and mobile system use models.

The port capabilities are as follows

- Port A supports
  - Headphone
  - Line Out
  - Line Input
  - Mic with 0/10/20/30 dB Boost and Vref\_Out
- Port B supports
  - Capless Headphone Out
  - Capless Line Out
- Port C supports
  - Line Out (not supported on TA revision, supported on RA revision)
  - Line In
  - Mic with 0/10/20/30 dB boost and Vref\_Out
- Port D supports
  - BTL stereo output
  - BTL (L+/L-) mono out
- Port E supports
  - Line Out
  - Line In
  - Mic with 0/10/20/30 dB boost
- Port F supports
  - Line Out
  - Line In
  - Mic with 0/10/20/30 dB boost
- Mono Out supports
  - Line Out

| Pins        | Port                        | Input | Output                   | Headphone | BTL | Mic Bias (Vref pin) | Input boost amp |
|-------------|-----------------------------|-------|--------------------------|-----------|-----|---------------------|-----------------|
| 28/29       | A                           | Yes   | Yes                      | Yes       |     | Yes                 | Yes             |
| 31/32       | B                           |       | Yes                      | Yes       |     |                     |                 |
| 19/20       | C                           | Yes   | Yes (not on TA revision) |           |     | Yes                 | Yes             |
| 40/41/43/44 | D                           |       | Yes                      |           | Yes |                     |                 |
| 15/16       | E                           | Yes   | Yes                      |           |     |                     | Yes             |
| 17/18       | F                           | Yes   | Yes                      |           |     |                     | Yes             |
| 27          | Mono Out                    |       | Yes                      |           |     |                     |                 |
| 48          | SPDIF_OUT0                  |       | Yes                      |           |     |                     |                 |
| 46          | SPDIF_OUT1<br>DMIC1 (CLK=2) | Yes   | Yes                      |           |     |                     | Yes             |
| 4 (CLK=2)   | DMIC0                       | Yes   |                          |           |     |                     | Yes             |

Table 1. Port Functionality

### 2.1.1. Port Characteristics

Universal (Bi-directional) jacks are supported on ports C (TA revision only, Port C is input only), E, and F. Port A is bidirectional also. Ports A and B are designed to drive 32 ohm (nominal) headphones or a 10K (nominal) load. Line Level outputs are intended to drive an external 10K load (nominal) and an on board shunt resistor of 20-47K (nominal). However, applications may support load impedances of 5K ohms and above. Input ports are 50K (nominal) at the pin.

DAC full scale outputs and intended full scale input levels are 1V rms at 5V. Line output ports and Headphone output ports on the 92HD80 codec may be configured for +3dBV full scale output levels by using a vendor specific verb.

Output ports are always on to prevent pops/clicks associated with charging and discharging output coupling capacitors. This maintains proper bias on output coupling caps even in power state D3 as long as AVDD is available. Unused ports should be left unconnected. When updating existing designs to use the 92HD80 codec, ensure that there are no conflicts between the output ports on the 92HD80 codec and existing circuitry.

| AFG Power State | Input Enable | Output Enable | Port Behavior   |
|-----------------|--------------|---------------|---|
| D0-D2           | 1            | 1             | Not allowed. Port is active as output. Input path is mute.                          |
|                 | 1            | 0             | Active - Port enabled as input  |
|                 | 0            | 1             | Active - Port enabled as output   |
|                 | 0            | 0             | Inactive -port is powered on (low output impedance) but drives silence only.        |
| D3              | -            | 0             | Inactive (lower power) - Port keeps output coupling caps charged if port uses caps. |
|                 | -            | 1             | Low power state. If enabled, Beep will output from the port                         |
| D3cold          | -            | -             | Inactive (lower power) - Port keeps output coupling caps charged if port uses caps. |
| D4              | -            | -             | Inactive (lower power) - Port keeps output coupling caps charged if port uses caps. |
| D5              | -            | -             | Off - Charge on coupling caps (if used) will not be maintained.                     |

Table 2. Analog Output Port Behavior

### 2.1.2. Vref\_Out

Ports C & A support Vref\_Out pins for biasing electret cartridge microphones. Settings of 80% AVDD, 50% AVDD, GND, and Hi-Z are supported. Attempting to program a pin widget control with a reserved or unsupported value will cause the associated Vref\_Out pin to assume a Hi-Z state and the pin widget control Vref\_En field will return a value of '000' (Hi-Z) when read.

### 2.1.3. Jack Detect

Plugs inserted to a jack on Ports A, B, C & SPDIFOUT0 are detected using SENSE\_A. Plugs inserted to a jack on Ports E,F, DMIC0, & SPDIFOUT1 are detected using SENSE\_B. Per HDA015-B, the detection circuit operates when the CODEC is in D0 - D3 and can also operate if both the CODEC and Controller are in D3 (no bus clock.) Jack detection requires that all supplies (analog and digital) are active and stable. When AVDD is not present, the value reported in the pin widget is invalid.

When the HD Audio bus is in a low power state (reset asserted and clock stopped) the CODEC will generate a Power State Change Request when a change in port connectivity is sensed and then generate an unsolicited response after the HD Audio link has been brought out of a low power state and the device has been enumerated. Per HDA015-B, this will take less than 10mS.

The following table summarizes the proper resistor tolerances for different analog supply voltages.

| AVdd Nominal Voltage (+/- 5%) | Resistor Tolerance Pull-Up | Resistor Tolerance SENSE_A/B |
|-------------------------------|----------------------------|------------------------------|
| 4.75V                         | 1%                         | 1%                           |

| Resistor | SENSE_A         | SENSE_B           |
|----------|-----------------|-------------------|
| 39.2K    | PORT A (HP0)    | PORT E            |
| 20.0K    | PORT B (HP1)    | PORT F            |
| 10.0K    | PORT C          | DMIC0             |
| 5.11K    | SPDIFOUT0       | SPDIFOUT1 (DMIC1) |
| 2.49K    | Pull-up to AVDD | Pull-up to AVDD   |

See reference design for more information on Jack Detect implementation.

#### 2.1.4. SPDIF Output

Both SPDIF Outputs can operate at 44.1kHz, 48kHz, 88.2kHz, 96kHz and 192kHz as defined in the Intel High Definition Audio Specification with resolutions up to 24 bits. This insures compatibility with all consumer audio gear and allows for convenient integration into home theater systems and media center PCs.

Per the HDA015-B ECR, the SPDIF outputs support the ability to provide clocking information even when no stream is selected for the converter, or when in a low power state. Also, as stated in the ECR, the SPDIF output ports support port presence detect.

SPDIF Outputs are outlined in tables below.

| AFG Power State | RESET#         | Output Enable | Converter Dig Enable | Stream ID | Keep Alive Enable | Pin Behavior  |
|-----------------|----------------|---------------|----------------------|-----------|-------------------|---|
| D0-D3           | Asserted (Low) | -             | -                    | -         | -                 | Hi-Z (internal pull-down enabled) immediately after power on, otherwise the previous state is retained. |

Table 3. SPDIF OUT 0 Behavior

| AFG Power State | RESET#             | Output Enable | Converter Dig Enable | Stream ID | Keep Alive Enable | Pin Behavior   |
|-----------------|--------------------|---------------|----------------------|-----------|-------------------|--|
| D0              | De-Asserted (High) | Disabled      | -                    | -         | -                 | Hi-Z (internal pull-up enabled)  |
|                 | De-Asserted (High) | Enabled       | Disabled             | -         | -                 | Active - Pin drives 0 (internal pull-down NA)                                |
|                 | De-Asserted (High) | Enabled       | Enabled              | 0         | -                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
|                 | De-Asserted (High) | Enabled       | Enabled              | 1-15      | -                 | Active - Pin drives SPDIFOut0 data (internal pull-down NA)                   |
| D1-D2           | De-Asserted (High) | Disabled      | -                    | -         | -                 | Hi-Z (internal pull-down enabled)  |
|                 | De-Asserted (High) | Enabled       | -                    | -         | 0                 | Active - Pin drives 0 (internal pull-down NA)                                |
| D3              | De-Asserted (High) | Enabled       | Enabled              | -         | 1                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
|                 |                    | Disabled      | -                    | -         | 1                 | Hi-Z (internal pull-down enabled)  |
|                 |                    | Enabled       | Enabled              | -         | 1                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
| D3cold          | -                  | -             | -                    | -         | -                 | Hi-Z (internal pull-down enabled)  |
| D4              | -                  | -             | -                    | -         | -                 | Hi-Z (port off)  |
| D5              | -                  | -             | -                    | -         | -                 | Hi-Z (port off)  |

Table 3. SPDIF OUT 0 Behavior

| AFG Power State | RESET#             | GPIO0 Enable | Input Enable | Output Enable | Converter Dig En | Stream ID | Keep Alive En | Pin Behavior  |
|-----------------|--------------------|--------------|--------------|---------------|------------------|-----------|---------------|---|
| D0-D3           | Asserted (Low)     | -            | -            | -             | -                | -         | -             | Hi-Z (internal pull-down enabled) immediately after power on, otherwise the previous state is retained. |
| D0-D3           | De-Asserted (High) | Enabled      | -            | -             | -                | -         | -             | Active - Pin reflects GPIO0 configuration (internal pull-up enabled)                                    |
| D0-D3           | De-Asserted (High) | Disabled     | Enabled      | Disabled      | -                | -         | -             | Pin functions as digital mic input (internal pull-down enabled)   |

Table 4. SPDIF OUT 1 Behavior

| AFG Power State | RESET#             | GPIO0 Enable | Input Enable | Output Enable | Converter Dig En | Stream ID | Keep Alive En                     | Pin Behavior   |
|-----------------|--------------------|--------------|--------------|---------------|------------------|-----------|-----------------------------------|--|
| D0              | De-Asserted (High) | Disabled     | Disabled     | Disabled      | -                | -         | -                                 | Hi-Z (internal pull-down enabled)  |
|                 |                    |              |              |               | Disabled         | -         | -                                 | Active - Pin drives 0 (internal pull-down NA)                                |
|                 |                    |              | -            | Enabled       | Enabled          | 0         | -                                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
|                 |                    |              |              |               | Enabled          | 1-15      | -                                 | Active - Pin drives SPDIFOut1 data (internal pull-down NA)                   |
| D1-D2           | De-Asserted (High) | Disabled     | Disabled     | Disabled      | -                | -         | -                                 | Hi-Z (internal pull-down enabled)  |
|                 |                    |              |              |               | Disabled         | -         | -                                 | Active - Pin drives 0 (internal pull-down NA)                                |
|                 |                    |              |              | Enabled       | Enabled          | -         | 0                                 | Active - Pin drives 0 (internal pull-down NA)                                |
|                 |                    |              |              |               | Enabled          | -         | 1                                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
| D3              | De-Asserted (High) | Disabled     | Disabled     | Disabled      | -                | -         | -                                 | Hi-Z (internal pull-down enabled)  |
|                 |                    |              |              |               | Disabled         | -         | -                                 | Hi-Z (internal pull-down enabled)  |
|                 |                    |              |              | Enabled       | Enabled          | -         | 0                                 | Hi-Z (internal pull-down enabled)  |
|                 |                    |              |              |               | Enabled          | -         | 1                                 | Active - Pin drives SPDIF-format, but data is zeroes (internal pull-down NA) |
| D3cold          | -                  | Disabled     | Disabled     | -             | -                | -         | Hi-Z (internal pull-down enabled) |  |
| D4              | -                  | -            | -            | -             | -                | -         | Hi-Z (port off)                   |  |
| D5              | -                  | -            | -            | -             | -                | -         | Hi-Z (port off)                   |  |

Table 4. SPDIF OUT 1 Behavior



## **2.2. Mono Output**

The MONO Output has an independent mute (see the Widget listing for details). The MONO Output derives its input from the output of the summing node after the mono mux. The following sources are available for the mono pin:

- DAC0 Output: When selected (by using port connection list), both DAC0 outputs are summed together.
- DAC1 Output: When selected (by using port connection list), both DAC1 outputs are summed together.
- Mixer Output: When selected (by using port connection list), both mixer outputs are summed together.

The stereo inputs are scaled by -6dB and then summed to provide an output that is the average of the two inputs. The full scale output at mono out is designed to be about 0dBV. It is not possible to adjust to a +3dBV output level.

## **2.3. Analog Mixer**

The mixer supports independent gain (-34.5 to +12dB in 1.5dB steps) on each input as well as independent mutes on each input. The following inputs are available:

- Port A
- Port C
- Port E
- Port F

## **2.4. ADC Multiplexers**

The 92HD80 codec implements 2 ADC input multiplexers. These multiplexers incorporate the ADC record gain function (0 to +22.5dB gain in 1.5dB steps) as an output amp and allow a preselection of one of 7 possible inputs:

- Port A
- Port C
- Port E
- Port F
- Mixer Output
- DMIC 0
- DMIC 1

## **2.5. Power Management**

The HD Audio specification defines power states, power state widgets, and power state verbs. Power management is implemented at several levels. The Audio Function Group (AFG), all converter widgets, and all pin complexes support the power state verb F05/705. Converter widgets are active in D0 and inactive in D1-D3.

The following table describes what functionality is active in each power state.

| Function                  | D0 | D1 <sup>1</sup> | D2       | D3                     | D3cold                 | Vendor Specific D4     | Vendor Specific D5 |
|---------------------------|----|-----------------|----------|------------------------|------------------------|------------------------|--------------------|
| SPDIF Outputs             | On | On              | On(idle) | On(idle) <sup>5</sup>  | Off                    | Off                    | Off                |
| Digital Microphone inputs | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| DAC                       | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| D2S                       | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| ADC                       | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| ADC Volume Control        | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| Ref ADC                   | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| Analog Clocks             | On | Off             | Off      | Off                    | Off                    | Off                    | Off                |
| GPIO pins                 | On | On              | On       | On <sup>5</sup>        | On                     | On                     | Off                |
| VrefOut Pins              | On | On              | Off      | Off                    | Off                    | Off                    | Off                |
| Input Boost               | On | On              | Off      | Off                    | Off                    | Off                    | Off                |
| Analog mixer              | On | On              | Off      | Off                    | Off                    | Off                    | Off                |
| Mixer Volumes             | On | On              | Off      | Off                    | Off                    | Off                    | Off                |
| Analog PC_Beep            | On | On              | On       | On                     | Off                    | Off                    | Off                |
| Digital PC_Beep           | On | On              | On       | On <sup>5</sup>        | Off                    | Off                    | Off                |
| Lo/HP Amps                | On | On              | On       | Low Drive <sup>2</sup> | Low Drive <sup>2</sup> | Low Drive <sup>2</sup> | Off                |
| Capless HP Amps           | On | On              | On       | Low Drive <sup>2</sup> | Low Drive <sup>2</sup> | Low Drive <sup>2</sup> | Off                |
| BTL Amp                   | On | On              | On       | Low Drive <sup>2</sup> | Off                    | Off                    | Off                |
| VAG amp                   | On | On              | On       | Low Drive <sup>3</sup> | Low Drive              | Low Drive              | Off                |
| Port Sense                | On | On              | On       | On <sup>4</sup>        | Off                    | Off                    | Off                |
| Reference Bias generator  | On | On              | On       | On                     | On                     | On                     | Off                |
| Reference Bandgap core    | On | On              | On       | On                     | On                     | On                     | Off                |
| HD Audio-Link             | On | On              | On       | On <sup>5</sup>        | Limited                | Off                    | Off                |

Table 5. Power Management

1. No DAC or ADC streams are active. Analog mixing and loop thru are supported.
2. VAG is kept active when ports are disabled or in D3/D3cold/D4. PC\_Beep is supported in D3 but may be attenuated and distorted depending on load impedance.
3. VAG is always ramped up and down gradually, except in the case of a sudden power removal. VAG is active in D2/D3 but in a low power state.
4. Both AVDD and DVDD must be available for Port Sense to operate.
5. Not active if BITCLK is not running (Controller in D3), but can signal power state change request (PME)

The D3-default state is available for HD Audio compliance. The programmable values, exposed via vendor-specific settings, are under TSI Device Driver control for further power reduction. The analog mixer, line and headphone amps, port presence detect, and internal references may be disabled using vendor specific verbs. Use of these vendor specific verbs will cause pops.

The default power state for the Audio Function Group after reset is D3.

## 2.6. AFG D0

The AFG D0 state is the active state for the device. All functions are active if their power state (if they support power management at their node level) has been set to D0.

## 2.7. AFG D1

D1 is a lower power mode where all converter widgets are disabled. Analog mixer and port functions are active. The part will resume from the D1 to the D0 state within 1 mS.

## 2.8. AFG D2

The D2 state further reduces power by disabling the mixer and port functions. The port amplifiers and internal references remain active to keep port coupling caps charged and the system ready for a quick resume to either the D1 or D0 state. The part will resume from the D2 state to the D0 state within 2mS.

## 2.9. AFG D3

The D3-default state is available for HD Audio compliance. All converters are shut down. Port amplifiers and references are active but in a low power state to prevent pops. Resume times may be longer than those from D2, but still less than 10mS to meet Intel low power goals. The default power state for the Audio Function Group after power is applied is D3.

The traditional use for D3 was as a transitional state before power was removed (D3 cold) before the system entered into standby, hibernate, or shut-down. To conserve power, Intel now promotes using D3 whenever there are no active streams or other activity that requires the part to consume full power. The system remains in S0 during this time. When a stream request or user activity requires the CODEC to become active, the driver will immediately transition the CODEC from D3 to D0. To enable this use model, the CODEC must resume within 10mS and not pop. Intel HDA ECR-15b / Low Power White paper power goals are < 30mW when analog PC\_Beep is not enabled, and < 60mW when analog PC\_Beep is enabled. (Charge pump and BTL amplifier power excluded.)

While in AFG D3, the HD Audio controller may be in a D0 state (HD Audio bus active) or in a D3 state (HD Audio bus held in reset with no Bit\_Clk, SData\_Out, or Sync activity.) The expected behavior is as follows (see the ECR15b section for more information):

| Function                          | HDA Bus active       | HDA Bus stopped   |
|-----------------------------------|----------------------|---|
| Port Presence Detect state change | Unsolicited Response | Wake Event <sup>1</sup> followed by an unsolicited response |
| GPIO state change                 | Unsolicited Response | Wake Event followed by an unsolicited response              |

1. The Port Presence detect circuit is currently dependent on a clock and must be changed to generate a wake event.

### 2.9.1. AFG D3cold

The D3cold power state is the lowest power state available that does not use vendor specific verbs. While in D3cold, the CODEC will still respond to bus requests to revert to a higher power state (double AFG reset, link reset). However, audio processing, port presence detect, and other functions are disabled. Per the HD Audio bus ECR 015b, the D3cold state is intended to be used just prior to removing power to the CODEC. Typically, power will be removed within 200mS. However, the codec may exit from the D3cold state by generating 2, back-to-back, AFG reset events. Resume time from D3cold is less than 200mS.

## 2.10. Vendor Specific Function Group Power States D4/D5

The 92HD80 introduces vendor specific power states. A vendor defined verb is added to the Audio Function Group that combines multiple vendor specific power control bits into logical power states for use by the audio driver. The 2 states defined offer lower power than the 5 existing states defined in the HD Audio specification and ECR15b. The Vendor Specific D4 state provides lower digital power consumption relative to D3cold by disabling HD Audio link responses. Vendor specific D5 further reduces power consumption on the digital supply by turning off GPIO drivers, and reduces analog power consumption by turning off all analog circuitry except for reset circuits.

States D4/D5 are not entered until D3cold has been requested. Software can pre-program the D4 or D5 state as a re-definition of how the part will behave when the D3cold power state is requested or software may enter D3cold, then set the D4 or D5. The preferred method is to request D3cold, then select D4 or D5 as desired. This will reduce the severity of pops encountered when entering D4 or D5.

Both power states require a link reset or removal of DVDD to exit.

The CODEC may pop when using these verbs and transition times to an active state (D1 or D0 for example) may take several seconds.

## 2.11. Low-voltage HDA Signaling

The 92HD80 codec is compatible with either 1.5V or 3.3V HDA bus signaling; the voltage selection is done dynamically based on the input voltage of DVDD\_IO.

DVDD\_IO is currently not a logic configuration pin, but rather provides the digital power supply to be used for the HDA bus signals.

When in 1.5V mode, the 92HD80 codec can correctly decode BITCLK, SYNC, RESET# and SDO as they operate at 1.5V; additionally it will drive SDI and SDO at 1.5V. None of the GPIOs are affected, as they always function at their nominal voltage (DVDD or AVDD).

## 2.12. Multi-channel capture

The capability to assign multiple “ADC Converters” to the same stream is supported to meet the microphone array requirements of Vista and future operating systems. Single converter streams are still supported this is done by assigning unique non zero Stream IDs to each converter. All capture devices (ADCs 0 and 1) may be used to create a multi-channel input stream. There are no restrictions regarding digital microphones.

The ADC Converters can be associated with a single stream as long the sample rate and the bits per sample are the same. The assignment of converter to channel is done using the “CnvtrID” widget and is restricted to even values. The ADC converters will always put out a stereo sample and therefore require 2 channels per converter.

The stream will not be generated unless all entries for the targeted converters are set identically, and the total number of assigned converter channels matches the value in the NmbrChan field. These are listed the “Multi-Converter Stream Critical Entries.” table.

An example of a 4 Channel Stream with ADC0 supplying channels 0&1 and ADC1 supplying channels 2 & 3 is shown below. A 4 Channel stream can be created by assigning the same non-zero stream id “Strm= N” to both ADC0 and ADC1. The sample rates must be set the same and the number of channels must be set to 4 channels “NmbrChan = 0011”.

|              |              |        |
|--------------|--------------|--------|
| ADC1 CnvtrID | (NID = 0x08) |        |
|              | [3:0]        | Ch = 2 |
| ADC0 CnvtrID | (NID = 0x07) |        |
|              | [3:0]        | Ch=0   |

Table 6. Example channel mapping

Figure 1. Multi-channel capture

|                          |           |             |                   |                    |                   |                    |
|--------------------------|-----------|-------------|-------------------|--------------------|-------------------|--------------------|
| ADC0.CnvtrID.Channel = 0 | Stream ID | Data Length | ADC0 Left Channel | ADC0 Right Channel | ADC1 Left Channel | ADC1 Right Channel |
| ADC1.CnvtrID.Channel = 2 | Stream ID | Data Length | ADC1 Left Channel | ADC1 Right Channel | ADC0 Left Channel | ADC0 Right Channel |

The following figure describes the bus waveform for a 24-bit, 48KHz capture stream with ID set to 1.

Figure 2. Multi-channel timing diagram



| ADC[1:0] Cnvtr | Bit Number | Sub Field Name | Description  |
|----------------|------------|----------------|--|
|                | [15]       | StrmType       | Stream Type (TYPE):<br>0: PCM<br>1: Non-PCM (not supported)  |
|                | [14]       | FrmtSmplRate   | Sample Base Rate<br>0= 48kHz<br>1=44.1KHz  |
|                | [13:11]    | SmplRateMultp  | Sample Base Rate Multiple<br>000=48kHz/44.1kHz or less<br>001= x2<br>010= x3 (not supported)<br>011= x4<br>100-111= Reserved |

Table 7: Multi-channel

|  |        |             |  |
|--|--------|-------------|--|
|  | [10:8] | SmplRateDiv | Sample Base Rate Divisor<br>000= Divide by 1<br>001= Divide by 2 (not supported)<br>010= Divide by 3 (not supported)<br>011= Divide by 4 (not supported)<br>100= Divide by 5 (not supported)<br>101= Divide by 6 (not supported)<br>110= Divide by 7 (not supported)<br>111= Divide by 8 (not supported) |
|  | [6:4]  | BitsPerSmpl | Bits per Sample<br>000= 8 bits (not supported)<br>001= 16 bits<br>010= 20 bits<br>011= 24 bits<br>100-111= Reserved  |
|  | [3:0]  | NmbrChan    | Number of Channels<br>Number of channels for this stream in each “sample block” of the “packets” in each “frame” on the link.<br>0000=1 channel (not supported)<br>0001 = 2 channels<br>...<br>1111= 16 channels.  |
|  | [7:4]  | Strm        | Software-programmable integer representing link stream ID used by the converter widget. By convention stream 0 is reserved as unused.  |
|  | [3:0]  | Ch          | Integer representing lowest channel used by converter.<br>0 and 2 are valid Entries<br>If assigned to the same stream, one ADC must be assigned a value of 0 and the other ADC assigned a value of 2.  |

Table 7: Mult-channel

## 2.13. Digital Microphone Support

The digital microphone interface permits connection of a digital microphone(s) to the CODEC via the DMIC0, DMIC1, and DMIC\_CLK 3-pin interface. The DMIC0 and DMIC1 signals are inputs that carry individual channels of digital microphone data to the ADC. In the event that a single microphone is used, the data is ported to both ADC channels. This mode is selected using a vendor specific verb and the left time slot is copied to the ADC left and right inputs.

The DMIC\_CLK output is controllable from 4.704Mhz, 3.528Mhz, 2.352Mhz, 1.176Mhz and is synchronous to the internal master clock. The default frequency is 2.352Mhz.

The two DMIC data inputs are reported as two stereo input pin widgets that incorporate a boost amplifier. The pin widgets are shown connected to the ADCs through the same multiplexors as the analog ports. Although the internal implementation is different between the analog ports and the digital microphones, the functionality is the same. In most cases, the default values for the DMIC clock rate and data sample phase will be appropriate and an audio driver will be able to configure and use the digital microphones exactly like an analog microphone.

To conserve power, the analog portion of the ADC will be turned off if the D-mic input is selected. When switching from the digital microphone to an analog input to the ADC, the analog portion of the

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### SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

ADC will be brought back to a full power state and allowed to stabilize before switching from the digital microphone to the analog input. This should take less than 10mS.

DMIC pin widgets support port presence detect directly using SENSE-B input.

The codec supports the following digital microphone configurations:

| Digital Mics | Data Sample   | ADC Conn. | Notes  |
|--------------|---|-----------|--|
| 0            | N/A   | N/A       | No Digital Microphones   |
| 1            | Single Edge   | 0, or 1   | Available on either DMIC_0 or DMIC_1<br>When using a microphone that supports multiplexed operation (2-mics can share a common data line), configure the microphone for “Left” and select mono operation using the vendor specific verb.<br>“Left” D-mic data is used for ADC left and right channels.   |
| 2            | Double Edge on either DMIC_0 or 1                                   | 0, or 1   | Available on either DMIC_0 or DMIC_1, External logic required to support sampling on a single Digital Mic pin channel on rising edge and second Digital Mic right channel on falling edge of DMIC_CLK for those digital microphones that don't support alternative clock edge (multiplexed output) capability.   |
| 3            | Double Edge on one DMIC pin and Single Edge on the second DMIC pin. | 0, or 1   | Requires both DMIC_0 and DMIC_1, External logic required to support sampling on a single Digital Mic pin channel on rising edge and second Digital Mic right channel on falling edge of DMIC_CLK for those digital microphones that don't support alternative clock edge (multiplexed output) capability. Two ADC units are required to support this configuration |
| 4            | Double Edge   | 0, or 1   | Connected to DMIC_0 and DMIC_1, External logic required to support sampling on a single Digital Mic pin channel on rising edge and second Digital Mic right channel on falling edge of DMIC_CLK for those digital microphones that don't support alternative clock edge capability. Two ADC units are required to support this configuration                       |

| Power State | DMIC Widget Enabled? | DMIC_CLK Output | DMIC_0,1       | Notes  |
|-------------|----------------------|-----------------|----------------|--|
| D0          | Yes                  | Clock Capable   | Input Capable  | DMIC_CLK Output is Enabled when either DMIC_0 or DMIC_1 Input Widget is Enabled. Otherwise, the DMIC_CLK remains Low |
| D1-D3       | Yes                  | Clock Disabled  | Input Disabled | DMIC_CLK is HIGH-Z with Weak Pull-down   |
| D0-D3       | No                   | Clock Disabled  | Input Disabled | DMIC_CLK is HIGH-Z with Weak Pull-down   |
| D4          | -                    | Clock Disabled  | Input Disabled | DMIC_CLK is HIGH-Z with Weak Pull-down   |
| D5          | -                    | Clock Disabled  | Input Disabled | DMIC_CLK is HIGH-Z with Weak Pull-down   |

Figure 3. Single Digital Microphone (data is ported to both left and right channels)



**Single Microphone not supporting multiplexed output.**



**Single "Left" Microphone, DMIC input set to mono input mode.**





Figure 4. Stereo Digital Microphone Configuration



*Note: Some Digital Microphone Implementations support data on either edge, therefore, the external mux may not be required.*

Figure 5. Quad Digital Microphone Configuration



Note: Some Digital Microphone Implementations support data on either edge, in this case the external multiplexer isn't required.

## 2.14. Analog PC-Beep

The codec does not support automatic routing of the PC\_Beep pin to all outputs when the HD-Link is in reset. Analog PC-Beep may be supported during HD-Link Reset if analog PC\_Beep is manually enabled before entering reset and the level shifters are locked. Analog PC\_Beep is mixed at the port and only ports enabled as outputs will pass PC\_Beep. Analog PC\_Beep (or a digital equivalent) must not prevent passing WLP when analog PC\_Beep is enabled. Analog PC\_Beep, when enabled, must not prevent other audio sources from playing (we must mix not mux.) An activity monitor will allow the BTL amplifier (and cap-less headphone amplifiers if possible) to remain in shutdown when the function group is in D3 until the beep pin is active and then quickly change to an active state (within 10mS) to pass the beep tone. Beeps from ICH (from Beep.sys) can have a frequency of about 37Hz to about 32KHz. Beep duration is programmable from 1mS to about 32 seconds. A typical beep under Windows XP is 500Hz or 2KHz and lasts 75ms or 150mS. Due to external XOR gates used as mixers, the idle state may be logic 0 or logic 1.

PC-Beep may be attenuated and distorted when the CODEC is in D3 depending on the load impedance seen by the output amplifier since all ports are in a low power state while in D3. Load impedances of 10K or larger can support full scale outputs but lower impedance loads will distort unless the output amplitude is reduced.

Analog PC\_Beep is not supported in D3 Cold, or the vendor specific states D4/D5.

## 2.15. Digital PC-Beep

This block uses an 8-bit divider value to generate the PC beep from the 48kHz HD Audio Sync pulse. The digital PC\_Beep block generates the beep tone on all Pin Complexes that are currently configured as outputs. The HD Audio spec states that the beep tone frequency = (48kHz HD Audio SYNC rate) / (4\*Divider), producing tones from 47 Hz to 12 kHz (logarithmic scale). Other audio sources are disabled when digital PC\_Beep is active.

It should be noted that digital PC Beep is disabled if the divider = 00h.

PC-Beep may be attenuated and distorted when the CODEC is in D3 depending on the load impedance seen by the output amplifier since all ports are in a low power state while in D3. Load impedances of 10K or larger can support full scale outputs but lower impedance loads will distort unless the output amplitude is reduced. Digital PC\_Beep requires a clock to operate and the CODEC will prevent the system from stopping the bus clock while in D3 by setting the Clock\_Stop\_OK bit to 0 to indicate that the part requires a clock.

## 2.16. Headphone Drivers

The codec implements capless headphone outputs. The Microsoft Windows Logo Program allows up to the equivalent of 100ohms in series. However, an output level of +3dBV at the pin is required to support 300mV at the jack with a 32ohm load and 1V with a 320 ohm load. Microsoft allows device and system manufactures to limit output voltages to address EU safety requirements. (WLP 3.09 - please refer to the latest Windows Logo Program requirements from Microsoft.)

The capless headphone drivers are supplied with +/-2.5V derived from AVDD. Therefore, it is possible to run the headphone supply from 5V and maintain ~60mW peak output power into 32 ohm headphones. Headphone performance will degrade if more than one port is driving a 32 ohm load.

## 2.17. EAPD

The EAPD pin (pin 47) is a dedicated, bi-directional control pin. Although named External Amplifier Power Down (EAPD) by the HD Audio specification, this pin operates as an external amplifier power up signal. The EAPD value is reflected on the EAPD pin; a 1 causes the external amplifier to power up (equivalent to D0), and a 0 causes it to power down (equivalent to D3.) When the EAPD value = 1, the EAPD pin must be placed in a state appropriate to the current power state of the associated Pin Widget even though the EAPD value (in the register) may remain 1. The default state of this pin is 0 (driving low.) The pin defaults to an open-drain configuration (an external pull-up is recommended.)

Per the HD Audio specification and ECR15b, multiple ports may control EAPD. The EAPD pin assumes the highest power state of all the EAPD bits in all of the pin complexes. The default value of EAPD is 1 (powered on), but the FG power state will override and the pin will be low. A port will request External Amp Power Up when its power state is active (FG and pin widget power state is D1 or D0) or (Analog PC\_Beep is enabled and port is enabled as an output) and the port's EAPD bit is set to 1. The state of the EAPD pin (unless configured as an input or held low by an external circuit when configured as an open drain output) will be the logical OR of the external amp power up requests from all ports.

By default, the EAPD pin also functions as the Mute#/ShutDown# input for the internal BTL amplifier. In this mode, a low value at the pin (either due to internal EAPD being 0, or to an external entity forcing the pin low) will cause the internal BTL amplifier to mute or enter a low power state depending on the amplifier configuration. (See below)

Vendor specific verbs are available to configure this pin. These verbs retain their values across link and single function group resets but are set to their default values by a power on reset:

| MODE1 | MODE0 | EAPD Pin Function | Description  |
|-------|-------|-------------------|--|
| 0     | 0     | Open Drain I/O    | Value at pin is wired-AND of EAPD bit and external signal. (default)   |
| 0     | 1     | CMOS Output       | Value of EAPD bit in pin widget is forced at pin                       |
| 1     | 0     | CMOS Input        | External signal controls internal amps. EAPD bit in pin widget ignored |
| 1     | 1     | CMOS Input        | External signal controls internal amps. EAPD bit in pin widget ignored |

| Control Flag      | Description   |
|-------------------|---|
| EAPD PIN MODE 1:0 | Defines if EAPD pin is used as input, output, or bi-directional port (Open Drain)   |
| BTL/HP SD         | 0 = Amp controlled by EAPD pin only (default) / 1 = Amp controlled by power state (pin and FG) only                         |
| BTL/HP SD MODE    | 0 = Amp will mute when disabled. / 1 = Amp will shut down (enter a low power state) when disabled (default)                 |
| BTL/HP SD INV     | 0 = AMP will power down (or mute) when EAPD pin is low (default) / 1 = Amp will power down (or mute) when EAPD pin is high. |

| BTL SD | BTL SD MODE | BTL SD INV | EAPD Pin State | Amp State   |
|--------|-------------|------------|----------------|---|
| 0      | 0           | 0          | 0              | Amplifier is mute   |
| 0      | 0           | 0          | 1              | Amplifier is active   |
| 0      | 0           | 1          | 0              | Amplifier is active   |
| 0      | 0           | 1          | 1              | Amplifier is mute   |
| 0      | 1           | 0          | 0              | Amplifier is in a low power state (default <sup>1</sup> )                                       |
| 0      | 1           | 0          | 1              | Amplifier is active   |
| 0      | 1           | 1          | 0              | Amplifier is active   |
| 0      | 1           | 1          | 1              | Amplifier is in a low power state   |
| 1      | 0           | NA         | NA             | Amplifier follows pin/function group power state and will mute when disabled                    |
| 1      | 1           | NA         | NA             | Amplifier follows pin/function group power state and will enter a low power state when disabled |

Table 8. BTL Amp Status

1.EAPD bit is set to one by default but the EAPD state is 0 after power-on reset because the function group is not in D0. The state after a single or double function group reset will be compliant with ECR15b.

| HP SD | HP SD MODE | HP SD INV | EAPD Pin State | Headphone Amp State   |
|-------|------------|-----------|----------------|---|
| 0     | 0          | 0         | 0              | Amplifier is mute   |
| 0     | 0          | 0         | 1              | Amplifier is active   |
| 0     | 0          | 1         | 0              | Amplifier is active   |
| 0     | 0          | 1         | 1              | Amplifier is mute   |
| 0     | 1          | 0         | 0              | Amplifier is in a low power state (default <sup>1</sup> )                                       |
| 0     | 1          | 0         | 1              | Amplifier is active   |
| 0     | 1          | 1         | 0              | Amplifier is active   |
| 0     | 1          | 1         | 1              | Amplifier is in a low power state   |
| 1     | 0          | NA        | NA             | Amplifier follows pin/function group power state and will mute when disabled                    |
| 1     | 1          | NA        | NA             | Amplifier follows pin/function group power state and will enter a low power state when disabled |

Table 9. Headphone Amp Enable Configuration

1.EAPD bit is set to one by default but the EAPD state is 0 after power-on reset because the function group is not in D0. The state after a single or double function group reset will be compliant with ECR15b.

| BEEP Override | EAPD Pin value <sup>1</sup>    | Description  |
|---------------|--------------------------------|--|
| 0             | Forced to low when in D2 or D3 | Follows description in HD Audio spec. External amplifier is shut down when pin or function group power state is D2 or D3 independent of value in EAPD bit. |
| 1             | Always follows EAPD bit        | Power state is ignored and EAPD pin follows EAPD bit value only to allow PC_Beep support in D2 and D3  |

Table 10. EAPD Low Power Behavior

1. When pin is enabled as Open Drain or CMOS output.

| AFG Power State | RESET#             | BEEP Override | EAPD Power State | Pin Behavior  |
|-----------------|--------------------|---------------|------------------|---|
| D0-D3           | Asserted (Low)     | -             | -                | Active low immediately after power on, otherwise the previous state is retained across FG and link reset events |
| D0              | De-Asserted (High) | -             | -                | Active - Pin reflects EAPD bit unless held low by external source.  |
| D1              | De-Asserted (High) | -             | D0-D1            | Active - Pin reflects EAPD bit unless held low by external source.  |
| D2              | De-Asserted (High) | Disabled      | D0-D2            | Pin forced low to disable external amp  |
| D2              | De-Asserted (High) | Enabled       | D0-D2            | Active - Pin reflects EAPD bit unless held low by external source.  |
| D3              | De-Asserted (High) | Disabled      | D0-D3            | Pin forced low to disable external amp  |
| D3              | De-Asserted (High) | Enabled       | D0-D3            | Active - Pin reflects EAPD bit unless held low by external source.  |
| D3cold          | De-Asserted (High) | -             | -                | Pin forced low to disable external amp  |
| D4              | De-Asserted (High) | -             | -                | Pin forced low to disable external amp  |
| D5              | De-Asserted (High) | -             | -                | Pin Hi-Z (off)  |

Table 11. EAPD Behavior

Figure 6. HP EAPD Example to be replaced by single pin for internal amp

HP AUDIO CONTROL BLOCK DIAGRAM





## 2.18. BTL Amplifier

An integrated class-AB stereo BTL amplifier is provided to directly drive 4 ohm speakers (2W @ 4.75V) or 8 ohm speakers (1W @ 4.75V). No external filter is needed for cable runs of 18" or less. An internal DC blocking filter prevents distortion when the audio source has DC content, and prevents unintentional power consumption when pausing audio playback. The amplifier may be controlled using the EAPD pin (see EAPD section.)

Using a vendor specific verb, the BTL amplifier may be configured to support a mono speaker connected to the L +/- pins. In this mode, the Left and Right audio is mixed and sent to the left output only. The right channel is turned off to conserve power.

The BTL amplifier includes thermal management circuitry. When the CODEC reaches a temperature of about 135 degrees, the output amplitude of the BTL amp is gradually lowered until the temperature falls below 135.

Maximum gain for the BTL amplifier is programmable. The following 4 gain settings relative to a nominal line output are desired: +6.5dB, +9.5dB, +14.5dB and +16.5dB. Absolute gain may vary and the suggested accuracy is +/-1.5dB. The gain is exposed in a vendor specific widget and is intended to mimic the pin programmable gain implemented in discrete BTL amplifiers commonly used in notebook computers.

## 2.19. BTL Amplifier High-Pass Filter

For mobile applications, speakers are often incapable of reproducing low frequency audio and unable to handle the maximum output power of the BTL amplifier. A high-pass filter is implemented in the DAC output path to reduce the amount of low frequency energy reaching speakers attached to the BTL amplifier. This can prevent speaker failure.

### 2.19.1. Filter Description

The high-pass filter is derived from the common biquadratic filter and provides a 12dB/octave roll-off. The filter may be programmed for a -3dB response at: 100Hz, 200Hz, 300Hz, 400Hz, 500Hz, 750Hz,

1KHz, or 2KHz. The high pass filter is enabled by default with a cut-off frequency of 300Hz. The filter may be bypassed using the associated verb (processing state verb).

The filter is implemented in digital before the Digital to Analog converter. There are 2 major consequences to implementing the filter in the digital domain:

1. All ports connected to the DAC will be affected by the high-pass filter when it is enabled.
2. Analog paths (such as when the microphone input is routed through the mixer to the BTL amplifier) are not affected.

Like the other analog inputs, PC\_Beep is not affected by the digital high-pass filter. To ensure that the speakers attached to the BTL amplifier are not harmed by low frequency audio entering the PC\_Beep input, an external filter must be implemented. Fortunately, it is common practice to implement an attenuation circuit and DC blocking capacitor at the PC\_Beep input. This attenuator/filter is easily adjusted to restrict low frequency audio. The easiest approach is to reduce the value of the DC blocking capacitor but other approaches are equally effective.

## 2.20. GPIO

### 2.20.1. GPIO Pin mapping and shared functions

| GPIO # | Pin | Supply | SPDIF In | SPDIF Out | GPIO | GPIO | GPIO | VrefOut | DMIC | VOL | Pull Up | Pull Down |
|--------|-----|--------|----------|-----------|------|------|------|---------|------|-----|---------|-----------|
| 0      | 46  | DVDD   |          | YES       | YES  |      |      |         | IN   |     |         | 50K       |
| 1      | 2   | DVDD   |          |           | YES  |      |      |         | CLK  |     |         | 50K       |
| 2      | 4   | DVDD   |          |           | YES  |      |      |         | IN   |     |         | 50K       |

### 2.20.2. SPDIF/Digital Microphone/GPIO Selection

3 functions are available on the DMIC\_1/GPIO0/SPDIFOUT1 pin (pin 46). To determine which function is enabled, the order of precedence is followed:

3. If the GPIOs are enabled, they override both SPDIF\_OUT and Digital Mics
4. If the GPIOs are not enabled through the AFG, then at reset, the pin is pulled low by an internal pull-down resistor.
5. If the port is enabled as an input, the digital microphones will be used.
6. If the port is enabled as an output, the SPDIF output will be used.
7. In the event that the port is enabled as an input and an output, the port will be an output and the Digital Mic path will be mute.

### 2.20.3. Digital Microphone/GPIO Selection

2 functions are available on the DMIC\_CLK/GPIO1 (pin 2) and the DMIC\_0/GPIO2 (pin 4) pins. To determine which function is enabled, the order of precedence is followed:

1. If GPIOs are not enabled through the AFG, then at reset, pins 2 and 4 are pulled low by an internal pull-down resistor.
2. If the GPIO 1 is enabled, the 2 DMIC pins become mute (unless programmed for GPIO or SPDIF use) and pin 2 becomes an internal pull-down. If GPIO2 is enabled through the AFG, pin 4 becomes a GPIO and is pulled low by an internal pull-down resistor.
3. If the port is enabled as an input, the digital microphones will be used.



4. If the port is not enabled as an input or if the pin is configured as a GPIO, the digital microphone path will be mute.

## **2.21. HD Audio HDA015-B support**

Although HDA015-B is not yet complete (not a DCN), the 92HD81 will implement complete support for the specification building on the support already present in previous products. ECR 15b features supported are:

- Persistence of many configuration options through bus and function group reset.
- The ability to support port presence detect in D3 even when the HD Audio bus is in a low power state (no clock.)
- Fast resume times from low power states: 1ms D1 to D0, 2ms D2 to D0, 10mS D3 to D0.
- Notification if persistent register settings have been unexpectedly reset.
- SPDIF active in D3 (required)

## **2.22. Digital Core Voltage Regulator**

The digital core operates from 1.4 to 1.98V making it compatible with 1.5V (5%) and 1.8V (10%) supply voltages. Many systems require that the CODEC use a single 3.3V digital supply, so an integrated regulator is included on die. (Parts may be ordered with the regulator disabled). The regulator uses pin 9, DVDD, as its voltage source. The output of the LDO is connected to pin 1 and the digital core. A 10uF capacitor must be placed on pin 1 for proper load regulation and regulator stability.

The digital core voltage regulator is only dependent on DVDD. DVDDIO may be either 3.3 or 1.5V and may proceed or follow DVDD in sequence. The CODEC digital logic and I/O (unless referenced to AVDD) will operate in the absence of AVDD. DVDD and AVDD supply sequencing for the application of power and the removal of power is neither defined nor guaranteed. It is common for desktop systems to supply AVDD from the system standby supply and the CODEC will tolerate, indefinitely, the condition where AVDD is active but DVDD and DVDDIO are inactive.

To prevent pops, software is expected to mute paths as close to the port as is possible when changing power states or signal topology.

## 2.23. Aux Audio Support

See Orderable Part Numbers for which codecs offer this feature.

The codec supports an auxiliary audio mode where analog audio is supported by default after power is supplied with the HD Audio bus disabled. In this mode, an analog input is routed to one of several output ports depending on jack presence detection.

### 2.23.1. General conditions in Aux Audio Mode:

- HD Audio Link is off (RST# is 0, active, and BitClk is 0, inactive. CODEC does not need to monitor BitClk to enter/exit this mode but must not depend on BitClk to operate.)
- HD Audio CODEC analog and digital supplies are active.
- Port A may be an optional headphone jack (Normal and Aux Audio Mode) or an internal microphone port (Normal Mode only)
- Port B connects to the system headphone jack.
- Port D connects to the internal speakers.
- Port E is AUX Audio out
- Port F is AUX Audio In
- The internal digital microphone clock is controlled by a source external to the CODEC and the CODEC will use the DMIC\_CLK pin as a clock input. The DMIC0 input is used to process 1 or 2 digital microphone inputs. The expected clock is 3.072MHz.
- EAPD is used to control the power state of the mixer, BTL amplifier, and headphone amplifiers. The amplifiers are off if EAPD is held low.
- Internal circuitry will delay enabling (change power state, un-mute, etc.) the output amplifiers a sufficient amount of time after the application of power or EAPD=1 to prevent pops.
- Internal circuitry will orchestrate power down (EAPD = 0) to prevent pops.
- EAPD must be forced low before removing power.
- ECR15b considerations: Clock Stop OK or similar communication will be used to prevent problems when an OS driver attempts to put the HD Audio bus controller into D3 to save power. The bus must not be placed into reset with the clock stopped or unless EAPD is forced low or D3cold has been set. The Enable bit in the Aux Audio vendor specific verb is provided so firmware or other software can disable Aux Audio support and allow stopping the HD Audio bus when an OS is in an active state. The default value of this bit is determined by a bond option and may be determined by reading the device ID. This bit only returns to its default value when a power on reset event is generated.

### 2.23.2. "Playback Path" Port Behavior

Port F (Aux Audio In) input is routed to Port D ("internal speakers"), Ports A&B (system headphone ports), and Port E (Aux Audio Out) through the analog mixer.

2.23.2.1. When Port E Aux Audio Out presence detect = 0

- Presence detect for Port E = 0 (nothing plugged in)
- Port F Aux Audio input is routed to Port A, B, or D when that port is active.
- If either Port A or Port B is in use (port presence detect = 1), Port D, internal speakers, will be inactive (off)
- The power supply for Port A and B will be active if either A or B is in use but if only one of the two ports is in use, the other may be turned off to save power.
- If neither Port A nor Port B is in use (port presence detect = 0), Port D, internal speakers, will be active and ports A and B will be inactive.
- EAPD is used to indicate if AUX Audio Mode is in use.

2.23.2.2. When Port E Aux Audio Out presence detect = 1

- Presence detect for Port E = 1 (something plugged in)
- Port F Aux Audio input is routed to Ports A, B
- Port D is disabled
- If either Port A or Port B is in use (port presence detect = 1), that port will be enabled and output the audio entering Port F.
- The power supply for Port A and B will be active if either A or B is in use but if only one of the two ports is in use, the other may be turned off to save power.
- If neither Port A nor Port B is in use (port presence detect = 0), ports A and B will be inactive and the audio on Port F will play through the dock using resources outside of the CODEC.
- EAPD is used to indicate if AUX Audio Mode is in use.



| EAPD (pin) | Aux Support Enable <sup>1</sup> | Port E detect | Port B detect | Port A detect | Port C, D, F, DMIC detect | Port D behavior         | Port B behavior         | Port A behavior         |
|------------|---------------------------------|---------------|---------------|---------------|---------------------------|-------------------------|-------------------------|-------------------------|
| 0          | NA                              | NA            | NA            | NA            | NA                        | disabled                | disabled                | disabled                |
| 1          | 0                               | NA            | NA            | NA            | NA                        | Widget controlled       | Widget controlled       | Widget controlled       |
| 1          | 1                               | 0             | 0             | 0             | NA                        | enabled (F to mix to D) | disabled                | disabled                |
| 1          | 1                               | 0             | 0             | 1             | NA                        | disabled                | disabled                | enabled (F to mix to A) |
| 1          | 1                               | 0             | 1             | 0             | NA                        | disabled                | enabled (F to mix to B) | disabled                |
| 1          | 1                               | 0             | 1             | 1             | NA                        | disabled                | enabled (F to mix to B) | enabled (F to mix to A) |
| 1          | 1                               | 1             | 0             | 0             | NA                        | disabled                | disabled                | disabled                |
| 1          | 1                               | 1             | 0             | 1             | NA                        | disabled                | disabled                | enabled (F to mix to A) |
| 1          | 1                               | 1             | 1             | 0             | NA                        | disabled                | enabled (F to mix to B) | disabled                |
| 1          | 1                               | 1             | 1             | 1             | NA                        | disabled                | enabled (F to mix to B) | enabled (F to mix to A) |

1.default value for Aux Audio Enable is determined by bond option.

### 2.23.3. "Record Path" Port Behavior

Digital Microphone input DMIC0 is used as an internal microphone port. The Digital Microphone clock pin is used as a clock input. The data on the DMIC0 pin is converted into analog audio using DAC 0 and sent to Port E (Aux Audio Out.) The expected clock input rate is 3.072MHz. Although this rate is not guaranteed, existing digital microphones are operated from about 1.5-3.2MHz. The CODEC does not provide gain for the digital microphone path in this mode and external gain of 20-30dB implemented at the output of Port E is expected for acceptable operation. Any DC offset from the digital microphone is removed by the AC coupling caps required on Port E.

If Port F presence detect = 0, this indicates that nothing is plugged into Aux Audio In and the digital microphone input is sent to port E. If Port F presence detect = 1, this indicates that an external source is plugged into the Aux Audio In. The DAC and Port E are disabled.



| EAPD (pin) | Aux Support Enable <sup>1</sup> | D Mic detect | Port F detect | Ports A, B, C, D, E detect | Port E behavior   |
|------------|---------------------------------|--------------|---------------|----------------------------|---|
| 0          | X                               | X            | X             | NA                         | disabled  |
| 1          | 0                               | X            | X             | NA                         | Widget controlled   |
| 1          | 1                               | 1            | 0             | NA                         | DMIC routed through CODEC DAC to port E. DMIC Clock provided from external source through DCLK pin. 3.072MHz typ. |
| 1          | 1                               | 1            | 1             | NA                         | CODEC DAC and Port E disabled   |

1.default value for Aux Audio Enable is determined by bond option.

**2.23.4. EAPD**

Since the Aux Audio mode overrides the default behavior but not the actual port settings when in reset, the logical state of the EAPD pin must be overridden as well. When Aux Audio mode is enabled and the part is in reset as described above, the logical state of EAPD will be 1 (External Amplifier Powered Up) unless held low by an external circuit. This ensures that audio pass-thru and analog PC\_Beep will be supported.

**2.23.5. Analog PC\_Beep**

Analog PC\_Beep may be supported in Aux Audio mode. By default, analog PC\_Beep is disabled. If the CODEC is programmed to enable analog PC\_Beep and Aux Audio mode is enabled, the next time reset is asserted, the analog PC\_Beep pin will be mixed at each of the active outputs.

**2.23.6. Firmware/Software Requirements:**

If it is desirable to stop the HD Audio bus while the CODEC is in D3 under OS control per ECR-15b, Firmware must disable the AUX Audio Mode support in the CODEC prior to loading the OS. If Aux Audio Mode is not disabled in the CODEC, the CODEC will report to the OS driver that stopping the bus clock while the CODEC is in D3 is not supported or not available.

### 3. CHARACTERISTICS

#### 3.1. Electrical Specifications

##### 3.1.1. Absolute Maximum Ratings

Stresses above the ratings listed below can cause permanent damage to the 92HD81. These ratings, which are standard values for TSI commercially rated parts, are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods can affect product reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

| Item                                  | Pin  | Maximum Rating  |
|---------------------------------------|------|---|
| Analog maximum supply voltage         | AVdd | 6 Volts   |
| Digital maximum supply voltage        | DVdd | 5.5 Volts   |
| VREFOUT output current                |      | 5 mA  |
| Voltage on any pin relative to ground |      | Vss - 0.3 V to Vdd + 0.3 V  |
| Operating temperature                 |      | 0 °C to +70 °C  |
| Storage temperature                   |      | -55 °C to +125 °C   |
| Soldering temperature                 |      | Soldering temperature information for all available in the package section of this datasheet. |

Table 12. Electrical Specification: Maximum Ratings

##### 3.1.2. Recommended Operating Conditions

| Parameter                     |  | Min.  | Typ. | Max.  | Units |
|-------------------------------|--|-------|------|-------|-------|
| Power Supplies                | DVDD_Core  | 1.4   |      | 1.98  | V     |
|                               | DVDD_IO (3.3V signaling)   | 3.135 | 3.3  | 3.465 | V     |
|                               | DVDD_IO (1.5V signaling)   | 1.418 | 1.5  | 1.583 | V     |
| Power Supply Voltage          | Digital - 3.3 V  | 3.135 | 3.3  | 3.465 | V     |
|                               | (Note: With Supply Override Enable Bit set to force 5V operation.) |       |      |       |       |
|                               | Analog - 4 V   | 3.8   | 4    | 4.2   | V     |
|                               | Analog - 4.5 V   | 4.51  | 4.75 | 4.99  | V     |
|                               | Analog - 5 V   | 4.75  | 5    | 5.25  | V     |
| Ambient Operating Temperature |  | 0     |      | +70   | °C    |
| Case Temperature              | T <sub>case</sub> (48-QFN)   |       |      | +95   | °C    |

Table 13. Recommended Operating Conditions

**ESD:** The 92HD81 is an ESD (electrostatic discharge) sensitive device. The human body and test equipment can accumulate and discharge electrostatic charges up to 4000 Volts without detection. Even though the 92HD81 implements internal ESD protection circuitry, proper ESD precautions should be followed to avoid damaging the functionality or performance.

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

### 3.2. 92HD81 Analog Performance Characteristics

(Tambient = 25 °C, AVdd = Supply ± 5%, DVdd = 3.3V ± 5%, AVss=DVss=0V; 20Hz to 20KHz swept sinusoidal input; Sample Frequency = 48 kHz; 0 dB = 1 VRMS, 10KΩ//50pF load, Testbench Characterization BW: 20 Hz – 20 kHz, 0 dB settings on all gain stages)

| Parameter  | Conditions  | AVdd        | Min      | Typ        | Max    | Unit   |
|--|---|-------------|----------|------------|--------|--------|
| <b>Digital to Analog Converters</b>                    |   |             |          |            |        |        |
| Resolution   |   | All         |          | 24         |        | Bits   |
| Dynamic Range <sup>1</sup> : PCM to All Analog Outputs | -60dB FS signal level   | 5V<br>4.75V | 93<br>93 | 100<br>100 | -      | dB     |
| SNR <sup>2</sup> - DAC to All Mono/Line-Out Ports      | Analog Mixer Disabled, PCM data   | 5V<br>4.75V | 95<br>95 |            |        | dB     |
| THD+N <sup>3</sup> - DAC to All Mono/Line-Out Ports    | Analog Mixer Disabled, 0/-1/-3dB FS Signal, PCM data                                    | 5V<br>4.75V | 83<br>83 |            |        | dBr    |
| SNR <sup>2</sup> - DAC to All Headphone Ports          | Analog Mixer Disabled, 10KΩ load, PCM data  | 5V<br>4.75V | 95<br>95 |            |        | dB     |
| THD+N <sup>3</sup> - DAC to All Headphone Ports        | Analog Mixer Disabled, 0/-1/-3dB FS Signal, 10KΩ load, PCM data                         | 5V<br>4.75V | 83<br>83 |            |        | dBr    |
| SNR <sup>2</sup> - DAC to All Headphone Ports          | Analog Mixer Disabled, 32Ω load, PCM data   | 5V<br>4.75V | 95<br>95 |            |        | dB     |
| THD+N <sup>3</sup> - DAC to All Headphone Ports        | Analog Mixer Disabled, 0dB FS Signal, 32Ω load, PCM data                                | 5V<br>4.75V | 68<br>68 |            |        | dBr    |
| Any Analog Input (ADC) to DAC Crosstalk                | 10KHz Signal Frequency. 0dBV signal applied to ADC, DACs idle, ports enabled as output. | All         | -65      | -          | -      | dB     |
| Any Analog Input (ADC) to DAC Crosstalk                | 1KHz Signal Frequency see above   | All         | -65      | -          | -      | dB     |
| DAC L/R crosstalk                                      | DAC to LO or HP 20-15KHz into 10KΩ load   | All         | 65       |            |        | dB     |
| DAC L/R crosstalk                                      | DAC to HP 20-15KHz into 32Ω load  | All         | 65       |            |        | dB     |
| Gain Error   | Analog Mixer Disabled   | All         |          |            | 0.5    | dB     |
| Interchannel Gain Mismatch                             | Analog Mixer Disabled   | All         |          |            | 0.5    | dB     |
| D/A Digital Filter Pass Band <sup>4</sup>              |   | All         | 20       | -          | 21,000 | Hz     |
| D/A Digital Filter Pass Band Ripple <sup>5</sup>       |   |             |          |            | 0.1    | +/- dB |
| D/A Digital Filter Transition Band                     |   | All         | 21,000   | -          | 31,000 | Hz     |
| D/A Digital Filter Stop Band                           |   | All         | 31,000   | -          | -      | Hz     |
| D/A Digital Filter Stop Band Rejection <sup>6</sup>    |   | All         | -100     | -          | -      | dB     |
| D/A Out-of-Band Rejection <sup>7</sup>                 |   | All         | -55      | -          | -      | dB     |
| Group Delay (48KHz sample rate)                        |   | All         | -        | -          | 1      | ms     |
| Attenuation, Gain Step Size DIGITAL                    |   | All         | -        | 0.75       | -      | dB     |
| DAC Offset Voltage                                     |   | All         | -        | 10         | 20     | mV     |
| Deviation from Linear Phase                            |   | All         | -        | 1          | 10     | deg.   |
| <b>Analog Outputs</b>                                  |   |             |          |            |        |        |

Table 14. 92HD81 Analog Performance Characteristics

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Parameter  | Conditions  | AVdd        | Min          | Typ        | Max | Unit         |
|--|---|-------------|--------------|------------|-----|--------------|
| Full Scale All Mono/Line-Outs                            | DAC PCM Data  | 5V<br>4.75V | 1.00<br>1.00 | -          | -   | Vrms         |
| Full Scale All Mono/Line-Outs                            | DAC PCM Data  | 5V<br>4.75V | 2.83<br>2.83 | -          | -   | Vp-p         |
| All Headphone Capable Outputs                            | 32Ω load  | 5V<br>4.75V | 40<br>40     | 60<br>60   | -   | mW<br>(peak) |
| Amplifier output impedance                               | Mono/Line Outputs<br>Headphone Outputs  | All         |              | 150<br>0.1 |     | Ohms         |
| External load Capacitance                                | Mono/Line Outputs<br>Headphone Outputs  |             |              | 220        |     | pF           |
| <b>Analog inputs</b>                                     |   |             |              |            |     |              |
| Full Scale Input Voltage                                 | 0dB Boost @4.75V<br>(input voltage required for 0dB FS output)                        | 5V<br>4.75V | 1.05         | -          | -   | Vrms         |
| All Analog Inputs with boost                             | 10dB Boost  | 5V<br>4.75V | 0.320        | -          | -   | Vrms         |
| All Analog Inputs with boost                             | 20dB Boost  | 5V<br>4.75V | 0.105        | -          | -   | Vrms         |
| All Analog Inputs with boost                             | 30dB Boost  | 5V<br>4.75V | 0.032        | -          | -   | Vrms         |
| Boost Gain Accuracy                                      |   | All         | -1           |            |     | dB           |
| Input Impedance  |   | All         | -            | 50         | -   | KΩ           |
| Input Capacitance  |   | All         | -            | 15         | -   | pF           |
| <b>Analog Mixer</b>                                      |   |             |              |            |     |              |
| Dynamic Range: PCM to All Analog Outputs                 | -60dB FS signal level Analog Beep enabled all other mixer inputs mute                 | 5V<br>4.75V | 93<br>93     |            |     |              |
| SNR <sup>2</sup> - All Line-Inputs to all Line Outputs   | All inputs unmuted, single line input driven by ATE.                                  | 5V<br>4.75V | 85<br>85     | -          |     | dB           |
| THD+N <sup>3</sup> - All Line-Inputs to all Line Outputs | 0dB Full Scale Input on one input, all others silent.                                 | 5V<br>4.75V | 65<br>65     | -          |     | dBr          |
| SNR <sup>2</sup> - DAC to All Line Outputs               | Analog Mixer Enabled, PCM data, all others inputes mute.                              | 5V<br>4.75V | 93<br>93     | -          |     | dB           |
| THD+N <sup>3</sup> - DAC to All Line-Out Ports           | Analog Mixer Enabled, 0/-1/-3dB FS signal, PCM data, all others inputes unmute/silent | 5V<br>4.75V | 83<br>83     |            |     | dBr          |
| SNR <sup>2</sup> - DAC to All Ports                      | Analog Mixer Enabled, PCM data, all others inputes unmute/silent.                     | 5V<br>4.75V | 85<br>85     | -          |     | dB           |
| THD+N <sup>3</sup> - DAC to All Ports                    | Analog Mixer Enabled, 0dB FS Signal, PCM data, all others inputes unmute/silent       | 5V<br>4.75V | 75<br>75     | -          |     | dBr          |
| Attenuation, Gain Step Size ANALOG                       |   | All         | -            | 1.5        | -   | dB           |
| <b>Analog to Digital Converter</b>                       |   |             |              |            |     |              |
| Resolution   |   | All         |              | 24         |     | Bits         |

Table 14. 92HD81 Analog Performance Characteristics



# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Parameter   | Conditions   | AVdd        | Min            | Typ      | Max    | Unit   |
|---|--|-------------|----------------|----------|--------|--------|
| Full Scale Input Voltage                              | 0dB Boost<br>(input voltage required to generate 0dBFS per AES 17)   | 5V<br>4.75V | 1.05<br>1.05   |          |        |        |
| Dynamic Range <sup>1</sup> , All Analog Inputs to A/D | High Pass Filter Enabled, -60dB FS,<br>No boost                      | 5V<br>4.75V | 86<br>86       | 92<br>92 |        | dB     |
| SNR <sup>2</sup> - All Analog Inputs to A/D           | High Pass Filter enabled   | 5V<br>4.75V | 86<br>86       | -        |        | dB     |
| Full Scale Input Voltage                              | 20dB Boost<br>(input voltage required to generate 0dBFS per AES 17)  | 5V<br>4.75V | 0.105<br>0.105 |          |        |        |
| Dynamic Range <sup>1</sup> , All Analog Inputs to A/D | 20dB Boost<br>High Pass Filter Enabled, -60dB FS                     | 5V<br>4.75V | 81<br>81       |          |        |        |
| THD+N <sup>3</sup> All Analog Inputs to A/D           | High Pass Filter enabled, -1/-3dB FS<br>signal level                 | 5V<br>4.75V | 78<br>78       |          |        | dB     |
| THD+N <sup>3</sup> All Analog Inputs to A/D           | 20dB Boost, High Pass Filter<br>enabled, -1/-3dB FS signal level     | 5V<br>4.75V | 72<br>72       |          |        | dB     |
| Analog Frequency Response <sup>8</sup>                |  | All         | 10             | -        | 30,000 | Hz     |
| A/D Digital Filter Pass Band <sup>4</sup>             |  | All         | 20             | -        | 21,000 | Hz     |
| A/D Digital Filter Pass Band Ripple <sup>5</sup>      |  | All         |                |          | 0.1    | +/- dB |
| A/D Digital Filter Transition Band                    |  | All         | 21,000         | -        | 31,000 | Hz     |
| A/D Digital Filter Stop Band                          |  | All         | 31,000         | -        | -      | Hz     |
| A/D Digital Filter Stop Band Rejection <sup>6</sup>   |  | All         | -100           | -        | -      | dB     |
| Group Delay   | 48 KHz sample rate   | All         | -              | -        | 1      | ms     |
| Any unselected analog Input to ADC Crosstalk          | 10KHz Signal Frequency   | All         | -65            | -        | -      | dB     |
| Any unselected analog Input to ADC Crosstalk          | 1KHz Signal Frequency  | All         | -65            | -        | -      | dB     |
| ADC L/R crosstalk                                     | Any selected input to ADC 20-15Khz                                   | All         | -65            |          |        | dB     |
| DAC to ADC crosstalk                                  | DAC output 0dBFS. All outputs<br>loaded. Input to ADC open. 20-15Khz | All         | -65            |          |        | dB     |
| Spurious Tone Rejection <sup>9</sup>                  |  | All         | -              | -100     | -      | dB     |
| Attenuation, Gain Step Size<br>(analog)               |  | All         | -              | 1.5      | -      | dB     |
| Interchannel Gain Mismatch ADC                        |  | All         | -              | -        | 0.5    | dB     |
| <b>Power Supply</b>                                   |  |             |                |          |        |        |
| Power Supply Rejection Ratio                          | 10kHz  | All         | -              | -60      | -      | dB     |
| Power Supply Rejection Ratio                          | 1kHz   | All         | -              | -70      | -      | dB     |
| D0 Didd <sup>10</sup>                                 | 3.3V, 1.8V, 1.5V   |             |                | 25       |        | mA     |
| D0 Aidd <sup>10</sup>                                 | 4.75V  |             |                | 60       |        | mA     |
| D0 Didd <sup>11</sup>                                 | 3.3V, 1.8V, 1.5V   |             |                | 20       |        | mA     |
| D0 Aidd <sup>11</sup>                                 | 4.75V  |             |                | 34       |        | mA     |
| D1 Didd <sup>12</sup>                                 | 3.3V, 1.8V, 1.5V   |             |                | 7        |        | mA     |

Table 14. 92HD81 Analog Performance Characteristics

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Parameter                                    | Conditions                       | AVdd | Min | Typ         | Max | Unit |
|--|----------------------------------|------|-----|-------------|-----|------|
| D1 Aidd <sup>12</sup>                        | 4.75V                            |      |     | 30          |     | mA   |
| D2 Didd                                      | 3.3V, 1.8V, 1.5V                 |      |     | 7           |     | mA   |
| D2 Aidd                                      | 4.75V                            |      |     | 15          |     | mA   |
| D3 (Beep enabled) Didd <sup>13</sup>         | 3.3V, 1.8V, 1.5V                 |      |     | 2           |     | mA   |
| D3 (Beep enabled) Aidd <sup>13</sup>         | 4.75V                            |      |     | 10          |     | mA   |
| D3 Didd <sup>13</sup>                        | 3.3V, 1.8V, 1.5V                 |      |     | 2           |     | mA   |
| D3 Aidd <sup>13</sup>                        | 4.75V                            |      |     | 5           |     | mA   |
| D3cold Didd <sup>13</sup>                    | 3.3V, 1.8V, 1.5V                 |      |     | 1           |     | mA   |
| D3cold Aidd <sup>13</sup>                    | 4.75V                            |      |     | 5           |     | mA   |
| Vendor D4 Didd                               | 3.3V, 1.8V, 1.5V                 |      |     | 0.4         |     | mA   |
| Vendor D4 Aidd                               | 4.75V                            |      |     | 5           |     | mA   |
| Vendor D5 Didd                               | 3.3V, 1.8V, 1.5V                 |      |     | 0.4         |     | mA   |
| Vendor D5 Aidd                               | 4.75V                            |      |     | 0.6         |     | mA   |
| One Stereo ADC Didd                          | 3.3V, 1.8V, 1.5V                 |      |     | 4           |     | mA   |
| One Stereo ADC Aidd                          | 4.75                             |      |     | 8           |     | mA   |
| One Stereo DAC Didd                          | 3.3V, 1.8V, 1.5V                 |      |     | 4           |     | mA   |
| One Stereo DAC Aidd                          | 4.75V                            |      |     | 6           |     | mA   |
| <b>Voltage Reference Outputs</b>             |                                  |      |     |             |     |      |
| VREFOut <sup>14</sup>                        |                                  | All  | -   | 0.5 X AVdd  | -   | V    |
| VREFOut Drive                                |                                  | All  |     | 1.6         |     | mA   |
| VREFILT (VAG)                                |                                  | All  |     | 0.45 X AVdd |     | V    |
| <b>Phased Locked Loop</b>                    |                                  |      |     |             |     |      |
| PLL lock time                                |                                  | All  |     | 96          | 200 | usec |
| PLL (or HD Audio Bit CLK) 24MHz clock jitter |                                  | All  |     | 150         | 500 | psec |
| <b>ESD / Latchup</b>                         |                                  |      |     |             |     |      |
| Latch-up                                     | As described in JESD78A Class II | All  |     | 70          |     | degC |
| ESD - Human Body Model                       | As described in JESD22-A114-B    | All  | 2K  | 3K          |     | V    |
| Charged Device Model                         | As described in JESD22-C101      | All  | 500 | 1K          |     | V    |

**Table 14. 92HD81 Analog Performance Characteristics**

1. Dynamic Range is the ratio of the full scale signal to the noise output with a -60dBFS signal as defined in AES17 as SNR in the presence of signal and outlined in AES6id, measured "A weighted" over 20 Hz to 20 kHz bandwidth
2. Ratio of Full Scale signal to idle channel noise output is measured "A weighted" over a 20 Hz to a 20 kHz bandwidth. (AES17-1991 Idle Channel Noise or EIAJ CP-307 Signal-to-noise Ratio).
3. THD+N ratio as defined in AES17 and outlined in AES6id, non-weighted, over 20 Hz to 20 kHz bandwidth. Results at the jack are dependent on external components and will likely be 1 - 2dB worse.
4. Peak-to-Peak Ripple over Passband meets  $\pm 0.125$ dB limits, 48 kHz or 44.1 kHz Sample Frequency. 1dB limit.
5. Peak-to-Peak Ripple over Passband meets  $\pm 0.125$ dB limits, 48 kHz or 44.1 kHz Sample Frequency. 1dB limit.
6. Stop Band rejection determines filter requirements. Out-of-Band rejection determines audible noise.
7. The integrated Out-of-Band noise generated by the DAC process, during normal PCM audio playback, over a bandwidth 28.8 to 100 kHz, with respect to a 1 Vrms DAC output.
8.  $\pm 1$  dB limits for Line Output & 0 dB gain, at -20dBV

- 9. Spurious tone rejection is tested with ADC dither enabled and compared to ADC performance without dither.
- 10. All functions/converters active, pin complexes enabled, two FDX streams, line (10Kohm) loads. Add 24mA analog current per stereo 32 ohm headphone.
- 11. One stereo DAC and corresponding pin widgets enabled (playback mode)
- 12. Mixer enabled
- 13. Idle measurement D3 set for minimum clicks/pops (biases and min. amps. on)
- 14. Can be set to 0.5 or 0.8 AVdd.

### 3.3. AC Timing Specs

#### 3.3.1. HD Audio Bus Timing

| Parameter       | Definition   | Symbol            | Min         | Typ   | Max         | Units |
|-----------------|--|-------------------|-------------|-------|-------------|-------|
| BCLK Frequency  | Average BCLK frequency                                 |                   | 23.997<br>6 | 24.0  | 24.002<br>4 | Mhz   |
| BCLK Period     | Period of BCLK including jitter                        | T <sub>cyc</sub>  | 41.163      | 41.67 | 42.171      | ns    |
| BCLK High Phase | High phase of BCLK                                     | T <sub>high</sub> | 17.5        |       | 24.16       | ns    |
| BCLK Low Phase  | Low phase of BCLK                                      | T <sub>low</sub>  | 17.5        |       | 24.16       | ns    |
| BCLK jitter     | BCLK jitter  |                   |             | 150   | 500         | ps    |
| SDI delay       | Time after rising edge of BCLK that SDI becomes valid  | T <sub>tco</sub>  | 3           |       | 11          | ns    |
| SDO setup       | Setup for SDO at both rising and falling edges of BCLK | T <sub>su</sub>   | 5           |       |             | ns    |
| SDO hold        | Hold for SDO at both rising and falling edges of BCLK  | T <sub>h</sub>    | 5           |       |             | ns    |

Table 15. HD Audio Bus Timing

Figure 7. HD Audio Bus Timing



**3.3.2. SPDIF Timing**

| Parameter               | Definition  | Symbol            | Min    | Typ    | Max    | Units |
|-------------------------|---|-------------------|--------|--------|--------|-------|
| SPDIF_OUT Frequency     | highest rate of encoded signal 64 times the sample rate |                   | 2.8224 | 3.072  | 12.288 | MHz   |
| SPDIF_OUT unit interval | 1/(128 times the sample rate)                           | UI                | 177.15 | 162.76 | 40.69  | ns    |
| SPDIF_OUT jitter        | SPDIF_OUT jitter  |                   |        |        | 4.43   | ns    |
| SPDIF_OUT rise time     |   | T <sub>rise</sub> |        |        | 15     | ns    |
| SPDIF_OUT fall time     |   | T <sub>fall</sub> |        |        | 15     | ns    |

Table 16. SPDIF Timing

**3.3.3. Digital Microphone Timing**

| Parameter          | Definition   | Symbol                | Min    | Typ    | Max    | Units |
|--------------------|--|-----------------------|--------|--------|--------|-------|
| DMIC_CLK Frequency | Average DMIC_CLK frequency   |                       | 1.176  | 2.352  | 4.704  | MHz   |
| DMIC_CLK Period    | Period of DMIC_CLK   | T <sub>dmic_cyc</sub> | 850.34 | 425.17 | 212.59 | ns    |
| DMIC_CLK jitter    | DMIC_CLK jitter  |                       |        |        | 5000   | ps    |
| DMIC Data setup    | Setup for the microphone data at both rising and falling edges of DMIC_CLK | T <sub>dmic_su</sub>  | 5      |        |        | ns    |
| DMIC Data hold     | Hold for the microphone data at both rising and falling edges of DMIC_CLK  | T <sub>dmic_h</sub>   | 5      |        |        | ns    |

Table 17. Digital Mic timing

**3.3.4. Class-AB BTL Amplifier Performance**

| Parameter  | Min | Typ | Max | Unit    |
|--|-----|-----|-----|---------|
| Output Power (BTL 4 ohm, 5V - Continuous Average Power))       | 2   |     |     | W       |
| Output Power (BTL 8 ohm, 5V - Continuous Average Power))       | 1   |     |     | W       |
| Amplifier Efficiency $\eta$ (4 $\Omega$ , 5V, 2W) <sup>1</sup> |     |     | 60  | %       |
| THD+N (BTL 4 or 8 ohm, 5V, FS)                                 |     |     | 1   | %       |
| Frequency Response   | 20  | -   | 20K | Hz      |
| Output voltage noise   |     | 50  |     | $\mu$ V |
| shutdown current   |     | 0.6 |     | mA      |

Table 18. Class-AB BTL Amplifier Performance

1. Amplifier efficiency includes circuits specific to the BTL amplifier audio path such as temperature limit, short circuit, and other support circuits.

### 3.3.5. Capless Headphone Supply Characteristics

| Parameter                           | Min | Typ | Max | Unit |
|-------------------------------------|-----|-----|-----|------|
| LDO idle current                    |     | 1   | 2   | mA   |
| Cap-less Headphone Amp idle current |     | 2   | 3   |      |
| Charge Pump idle current            |     | 4   | 6   | mA   |
| Charge Pump shutdown time           |     | 1   |     | mS   |
| Charge Pump start-up time           |     | 10  |     | mS   |
| Frequency                           |     | 384 |     | KHz  |
| C1/C2 cap value                     |     | 2.2 |     | uF   |

Table 19. Capless Headphone Supply

4. FUNCTIONAL BLOCK DIAGRAMS

Port C is input only on the TA revision. RA revision is output capable.



Figure 8. Functional Block Diagram

5. WIDGET INFORMATION AND SUPPORTED COMMAND VERBS



Figure 9. Widget Diagram

6. PORT CONFIGURATIONS

6.1. Suggested Desktop Configurations

Desktop 1



Desktop 3



Desktop 2



Desktop 4



Figure 10. Desktop Port Configurations



6.2. Suggested Mobile Port Configurations



Figure 11. Port Configuration

### 6.3. Pin Configuration Default Register Settings

The following table shows the Pin Widget Configuration Default settings. Mobile 3-jack implementation with 3 HP jacks in front and 2 jacks in rear. The internal speaker is redirected from the front (green) headphone jack, while the other (black) headphone jack and microphone jack may be used for RTC.

| Pin Name   | Port                | Location               | Device               | Connection       | Color      | Misc                   | Pin Name | Port |
|------------|---------------------|------------------------|----------------------|------------------|------------|------------------------|----------|------|
| PortAPin   | Connect to Jack 00b | Mainboard Front 2h     | HP Out 2h            | 1/8 inch Jack 1h | Green 4h   | Jack Detect Override=0 | 3h       | Fh   |
| PortBPin   | Connect to Jack 00b | Mainboard Front 2h     | HP Out 2h            | 1/8 inch Jack 1h | Black 1h   | Jack Detect Override=0 | 1h       | 0h   |
| PortCPin   | Connect to Jack 00b | Mainboard Front 2h     | Mic In Ah            | 1/8 inch Jack 1h | Pink 9h    | Jack Detect Override=0 | 2h       | 0h   |
| PortDPin   | Internal 10b        | NA 010000b             | Speaker 1h           | Other Analog 7h  | Unknown 0h | Jack Detect Override=0 | 3h       | 0h   |
| PortEPin*  | Connect to Jack 00b | Mainboard Rear 1h      | Line In 8h           | 1/8 inch Jack 1h | Green 4h   | Jack Detect Override=0 | 5h       | 0h   |
| PortFPin   | Connect to Jack 00b | Mainboard Rear 1h      | Line In 8h           | 1/8 inch Jack 1h | Pink 9h    | Jack Detect Override=0 | 4h       | 0h   |
| MonoOutPin | Internal 10b        | Internal 010000b       | Other Fh             | Unknown 0h       | Unknown 0h | Jack Detect Override=0 | 8h       | 0h   |
| DigOutPin0 | Connect to Jack 00b | Mainboard Rear 000001b | SPDIF Out 4h         | optical 5h       | Black 1h   | Jack Detect Override=1 | 6h       | 0h   |
| DigOutPin1 | Connect to Jack 10b | Internal 011000b       | Digital Other Out 5h | Other Digital 6h | Unknown 0h | Jack Detect Override=1 | 7h       | 0h   |
| DigMic0Pin | Internal 10b        | Internal 010000b       | Mic In Ah            | ATAPI 3h         | Unknown 0h | Jack Detect Override=0 | 4h       | 1h   |

**Table 20. Pin Configuration Default Settings**

\*Revision YB & prior, Port E configuration was device = 0h Line Out.

## 7. WIDGET INFORMATION

| Bits [39:32] | Bits [31:28]  | BITS [27:20] | BITS[19:16]     | BITS [15:0]           |
|--------------|---------------|--------------|-----------------|-----------------------|
| Reserved     | CODEC Address | NID          | Verb ID (4-bit) | Payload Data (16-bit) |

Table 21. Command Format for Verb with 4-bit Identifier

| Bits [39:32] | Bits [31:28]  | BITS [27:20] | BITS[19:8]       | BITS [7:0]           |
|--------------|---------------|--------------|------------------|----------------------|
| Reserved     | CODEC Address | NID          | Verb ID (12-bit) | Payload Data (8-bit) |

Table 22. Command Format for Verb with 12-bit Identifier

There are two types of responses: Solicited and Unsolicited. Solicited responses are provided as a direct response to an issued command and will be provided in the frame immediately following the command. Unsolicited responses are provided by the CODEC independent of any command. Unsolicited responses are the result of CODEC events such as a jack insertion detection. The formats for Solicited Responses and Unsolicited Responses are shown in the tables below. The “Tag” field in bits [31:28] of the Unsolicited Response identify the event.

| Bit [35]          | Bit [34]  | BITS [33:32] | BITS[31:0] |
|-------------------|-----------|--------------|------------|
| Valid (Valid = 1) | UnSol = 0 | Reserved     | Response   |

Table 23. Solicited Response Format

| Bit [35]          | Bit [34]  | BITS [33:32] | BITS[31:28] | BITS [27:0] |
|-------------------|-----------|--------------|-------------|-------------|
| Valid (Valid = 1) | UnSol = 1 | Reserved     | Tag         | Response    |

Table 24. Unsolicited Response Format

### 7.1. Widget List

| ID  | Widget Name | Description   |
|-----|-------------|---|
| 00h | Root        | Root Node   |
| 01h | AFG         | Audio Function Group  |
| 0Ah | Port A      | Port A Pin Widget (Capless Headphone)                                       |
| 0Bh | Port B      | Port B Pin Widget (Capless Headphone)                                       |
| 0Ch | Port C      | Port C Pin Widget (Line IN/OUT, MIC)<br>(Line IN, MIC for TA revision only) |
| 0Dh | Port D      | Port D Pin Widget (BTL output - EAPD control)                               |
| 0Eh | Port E      | Port E Pin Widget (Line IN/OUT)   |
| 0Fh | Port F      | Port F Pin Widget (Line IN/OUT, MIC)  |
| 10h | MonoOut     | MonoOut Pin Widget (output only)  |
| 11h | DigMic0     | Digital Microphone 0 Pin Widget   |
| 12h | DigMic1 Vol | Vendor Specific Widget - D-Mic1 volume                                      |
| 13h | DAC0        | Stereo Output Converter to DAC  |

Table 25. High Definition Audio Widget

| ID  | Widget Name | Description   |
|-----|-------------|---|
| 14h | DAC1        | Stereo Output Converter to DAC                      |
| 15h | ADC0        | Stereo Input Converter to ADC                       |
| 16h | ADC1        | Stereo Input Converter to ADC                       |
| 17h | ADC0Mux     | ADC0 Mux with volume and mute                       |
| 18h | ADC1Mux     | ADC1 Mux with volume and mute                       |
| 19h | Mono Mux    | Mono output source select                           |
| 1Ah | Mono Mix    | Stereo to mono conversion                           |
| 1Bh | Mixer       | Input Mixer (Input Ports, DACs, Analog PC_Beep)     |
| 1Ch | MixerOutVol | Volume control for analog mixer                     |
| 1Dh | SPDIFOut0   | Stereo Output for SPDIF_Out                         |
| 1Eh | SPDIFOut1   | Second Stereo Output for SPDIF_Out                  |
| 1Fh | Dig0Pin     | First Digital Output Pin (pin48)                    |
| 20h | Dig1Pin     | Second Digital Output Pin / DMIC Input Pin (pin 46) |
| 21h | DigBeep     | Digital PC Beep                                     |
| 22h | DAC2        | Stereo Output Converter to DAC                      |

Table 25. High Definition Audio Widget

### 7.2. Reset Key

| Abbreviation | Description  |
|--------------|--|
| POR          | Power On Reset.  |
| SAFG         | Single AFG Reset - One single write to the Reset Verb in the AFG Node.   |
| DAFG         | Double AFG Reset - Two consecutive Single AFG Resets with only idle frames (if any) and no Link Resets between.                    |
| S&DAFG       | Single And Double AFG Reset - Either one will cause reset.   |
| LR           | Link Reset - Level sensitive reset anytime the HDA Reset is set low.   |
| ELR          | Exiting Link Reset - Edge sensitive reset any time the HDA Reset transitions from low to high.                                     |
| ULR          | Unexpected Link Reset - Level sensitive reset anytime the HDA Reset is set low when the ClkStopOK indicator is currently set to 0. |
| PS           | Power State Change - Reset anytime the Actual Power State changes for the Widget in question.                                      |

### 7.3. Root (NID = 00h): VendorID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0000h              |                     |                    |                   |

| Field Name | Bits       | R/W | Default   | Reset |
|------------|------------|-----|-----------|-------|
| Vendor     | 31:16      | R   | 111Dh     | N/A   |
|            | Vendor ID. |     |           |       |
| DeviceFix  | 15:8       | R   | see below | N/A   |
|            | Device ID. |     |           |       |
| DeviceProg | 7:0        | R   | see below | N/A   |
|            | Device ID. |     |           |       |

| Device    | 92HD81B1A, 92HD81B1X<br>(Aux Mode enabled) | 92HD81B1B, 92HD81B1C |
|-----------|--|----------------------|
| Device ID | 7605h                                      | 76D5h                |

**7.3.1. Root (NID = 00h): RevID**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0002h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd         | 31:24   | R   | 00h     | N/A (Hard-coded) |
|              | Reserved.                                       |     |         |                  |
| Major        | 23:20   | R   | 1h      | N/A (Hard-coded) |
|              | Major rev number of compliant HD Audio spec.    |     |         |                  |
| Minor        | 19:16   | R   | 0h      | N/A (Hard-coded) |
|              | Minor rev number of compliant HD Audio spec.    |     |         |                  |
| RevisionFix  | 15:12   | R   | xh      | N/A (Hard-coded) |
|              | Vendor's rev number for this device.            |     |         |                  |
| RevisionProg | 11:8  | R   | xh      | N/A (Hard-coded) |
|              | Vendor's rev number for this device.            |     |         |                  |
| SteppingFix  | 7:4   | R   | xh      | N/A (Hard-coded) |
|              | Vendor stepping number within the Vendor RevID. |     |         |                  |
| SteppingProg | 3:0   | R   | xh      | N/A (Hard-coded) |
|              | Vendor stepping number within the Vendor RevID. |     |         |                  |

**7.3.2. Root (NID = 00h): NodeInfo**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0004h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| StartNID   | 23:16  | R   | 01h     | N/A (Hard-coded) |
|            | Starting node number (NID) of first function group |     |         |                  |
| Rsvd1      | 15:8   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| TotalNodes | 7:0  | R   | 01h     | N/A (Hard-coded) |
|            | Total number of nodes                              |     |         |                  |

#### 7.4. AFG (NID = 01h): NodeInfo

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0004h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StartNID   | 23:16  | R   | 0Ah     | N/A (Hard-coded) |
|            | Starting node number for function group subordinate nodes. |     |         |                  |
| Rsvd1      | 15:8   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| TotalNodes | 7:0  | R   | 19h     | N/A (Hard-coded) |
|            | Total number of nodes.                                     |     |         |                  |

##### 7.4.1. AFG (NID = 01h): FGType

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0005h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd       | 31:9   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| UnSol      | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Unsolicited response supported: 1 = yes, 0 = no.   |     |         |                  |
| NodeType   | 7:0  | R   | 1h      | N/A (Hard-coded) |
|            | Function group type:<br>00h = Reserved<br>01h = Audio Function Group<br>02h = Vendor Defined Modem Function Group<br>03h-7Fh = Reserved<br>80h-FFh = Vendor Defined Function Group |     |         |                  |

#### 7.4.2. AFG (NID = 01h): AFGCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0008h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd3      | 31:17  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| BeepGen    | 16   | R   | 1h      | N/A (Hard-coded) |
|            | Beep generator present: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd2      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| InputDelay | 11:8   | R   | Dh      | N/A (Hard-coded) |
|            | Typical latency in frames. Number of samples between when the sample is received as an analog signal at the pin and when the digital representation is transmitted on the HD Audio link. |     |         |                  |
| Rsvd1      | 7:4  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |



| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| OutputDelay | 3:0   | R   | Dh      | N/A (Hard-coded) |
|             | Typical latency in frames. Number of samples between when the signal is received from the HD Audio link and when it appears as an analog signal at the pin. |     |         |                  |

### 7.4.3. AFG (NID = 01h): PCMCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ah              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:21   | R   | 000h    | N/A (Hard-coded) |
|            | Reserved.                                     |     |         |                  |
| B32        | 20  | R   | 0h      | N/A (Hard-coded) |
|            | 32 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B24        | 19  | R   | 1h      | N/A (Hard-coded) |
|            | 24 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B20        | 18  | R   | 1h      | N/A (Hard-coded) |
|            | 20 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B16        | 17  | R   | 1h      | N/A (Hard-coded) |
|            | 16 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B8         | 16  | R   | 0h      | N/A (Hard-coded) |
|            | 8 bit audio format support: 1 = yes, 0 = no.  |     |         |                  |
| Rsvd1      | 15:12   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                     |     |         |                  |
| R12        | 11  | R   | 0h      | N/A (Hard-coded) |
|            | 384kHz rate support: 1 = yes, 0 = no.         |     |         |                  |
| R11        | 10  | R   | 1h      | N/A (Hard-coded) |
|            | 192kHz rate support: 1 = yes, 0 = no.         |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name | Bits                                     | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| R10        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | 176.4kHz rate support: 1 = yes, 0 = no.  |     |         |                  |
| R9         | 8  | R   | 1h      | N/A (Hard-coded) |
|            | 96kHz rate support: 1 = yes, 0 = no.     |     |         |                  |
| R8         | 7  | R   | 1h      | N/A (Hard-coded) |
|            | 88.2kHz rate support: 1 = yes, 0 = no.   |     |         |                  |
| R7         | 6  | R   | 1h      | N/A (Hard-coded) |
|            | 48kHz rate support: 1 = yes, 0 = no.     |     |         |                  |
| R6         | 5  | R   | 1h      | N/A (Hard-coded) |
|            | 44.1kHz rate support: 1 = yes, 0 = no.   |     |         |                  |
| R5         | 4  | R   | 0h      | N/A (Hard-coded) |
|            | 32kHz rate support: 1 = yes, 0 = no.     |     |         |                  |
| R4         | 3  | R   | 0h      | N/A (Hard-coded) |
|            | 22.05kHz rate support: 1 = yes, 0 = no.  |     |         |                  |
| R3         | 2  | R   | 0h      | N/A (Hard-coded) |
|            | 16kHz rate support: 1 = yes, 0 = no.     |     |         |                  |
| R2         | 1  | R   | 0h      | N/A (Hard-coded) |
|            | 11.025kHz rate support: 1 = yes, 0 = no. |     |         |                  |
| R1         | 0  | R   | 0h      | N/A (Hard-coded) |
|            | 8kHz rate support: 1 = yes, 0 = no.      |     |         |                  |

### 7.4.4. AFG (NID = 01h): StreamCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Bh              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| AC3        | 2  | R   | 0h        | N/A (Hard-coded) |
|            | AC-3 formatted data support: 1 = yes, 0 = no.    |     |           |                  |
| Float32    | 1  | R   | 0h        | N/A (Hard-coded) |
|            | Float32 formatted data support: 1 = yes, 0 = no. |     |           |                  |
| PCM        | 0  | R   | 1h        | N/A (Hard-coded) |
|            | PCM-formatted data support: 1 = yes, 0 = no.     |     |           |                  |

#### 7.4.5. AFG (NID = 01h): InAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Dh              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 0h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 27h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 03h     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |

| Field Name | Bits                        | R/W | Default | Reset            |
|------------|-----------------------------|-----|---------|------------------|
| Offset     | 6:0                         | R   | 00h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB |     |         |                  |

#### 7.4.6. AFG (NID = 01h): PwrStateCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Fh              |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| EPSS        | 31  | R   | 1h      | N/A (Hard-coded) |
|             | Extended power states support: 1 = yes, 0 = no.   |     |         |                  |
| ClkStop     | 30  | R   | 1h      | N/A (Hard-coded) |
|             | D3 clock stop support: 1 = yes, 0 = no.   |     |         |                  |
| S3D3ColdSup | 29  | R   | 1h      | N/A (Hard-coded) |
|             | Codec state intended during system S3 state: 1 = D3Hot, 0 = D3Cold.<br>On YB revs & prior, this was called LPD3Sup & default was 0h |     |         |                  |
| Rsvd        | 28:5  | R   | 000000h | N/A (Hard-coded) |
|             | Reserved.   |     |         |                  |
| D3ColdSup   | 4   | R   | 1h      | N/A (Hard-coded) |
|             | D3Cold power state support: 1 = yes, 0 = no.  |     |         |                  |
| D3Sup       | 3   | R   | 1h      | N/A (Hard-coded) |
|             | D3 power state support: 1 = yes, 0 = no.  |     |         |                  |
| D2Sup       | 2   | R   | 1h      | N/A (Hard-coded) |
|             | D2 power state support: 1 = yes, 0 = no.  |     |         |                  |
| D1Sup       | 1   | R   | 1h      | N/A (Hard-coded) |
|             | D1 power state support: 1 = yes, 0 = no.  |     |         |                  |
| D0Sup       | 0   | R   | 1h      | N/A (Hard-coded) |
|             | D0 power state support: 1 = yes, 0 = no.  |     |         |                  |

**7.4.7. AFG (NID = 01h): GPIOCnt**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0011h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| GPIWake    | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Wake capability. Assuming the Wake Enable Mask controls are enabled, GPIO's configured as inputs can cause a wake (generate a Status Change event on the link) when there is a change in level on the pin. |     |         |                  |
| GPIUnsol   | 30   | R   | 1h      | N/A (Hard-coded) |
|            | GPIO unsolicited response support: 1 = yes, 0 = no.  |     |         |                  |
| Rsvd       | 29:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumGPIs    | 23:16  | R   | 00h     | N/A (Hard-coded) |
|            | Number of GPI pins supported by function group.  |     |         |                  |
| NumGPOs    | 15:8   | R   | 00h     | N/A (Hard-coded) |
|            | Number of GPO pins supported by function group.  |     |         |                  |
| NumGPIOs   | 7:0  | R   | 03h     | N/A (Hard-coded) |
|            | Number of GPIO pins supported by function group.   |     |         |                  |

**7.4.8. AFG (NID = 01h): OutAmpCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Mute       | 31                             | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 02h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 7Fh     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 7Fh     | N/A (Hard-coded) |
|            | Indicates which step is 0dB  |     |         |                  |

#### 7.4.9. AFG (NID = 01h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd3         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Function Group have been reset. Cleared by PwrState 'Get' to this Widget. |     |         |                  |
| ClkStopOK     | 9  | R   | 1h      | POR - DAFG - ULR |
|               | Bit clock can currently be removed: 1 = yes, 0 = no.   |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                    |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                    |     |         |                  |
| Act        | 6:4  | R   | 3h      | POR - DAFG - LR  |
|            | Actual power state of this widget.           |     |         |                  |
| Rsvd1      | 3  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                    |     |         |                  |
| Set        | 2:0  | RW  | 3h      | POR - DAFG - LR  |
|            | Current power state setting for this widget. |     |         |                  |

#### 7.4.10. AFG (NID = 01h): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

#### 7.4.11. AFG (NID = 01h): GPIO

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 715h              |
| Get | F1500h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd       | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| Data2      | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Data for GPIO2. If this GPIO bit is configured as Sticky (edge-sensitive) input, it can be cleared by writing "0". For details of read back value, refer to HD Audio spec. section 7.3.3.22 |     |           |                  |
| Data1      | 1   | RW  | 0h        | POR - DAFG - ULR |
|            | Data for GPIO1. If this GPIO bit is configured as Sticky (edge-sensitive) input, it can be cleared by writing "0". For details of read back value, refer to HD Audio spec. section 7.3.3.22 |     |           |                  |
| Data0      | 0   | RW  | 0h        | POR - DAFG - ULR |
|            | Data for GPIO0. If this GPIO bit is configured as Sticky (edge-sensitive) input, it can be cleared by writing "0". For details of read back value, refer to HD Audio spec. section 7.3.3.22 |     |           |                  |

#### 7.4.12. AFG (NID = 01h): GPIOEn

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 716h              |
| Get | F1600h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd       | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| Mask2      | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Enable for GPIO2: 0 = pin is disabled (Hi-Z state); 1 = pin is enabled; behavior determined by GPIO Direction control |     |           |                  |
| Mask1      | 1   | RW  | 0h        | POR - DAFG - ULR |
|            | Enable for GPIO1: 0 = pin is disabled (Hi-Z state); 1 = pin is enabled; behavior determined by GPIO Direction control |     |           |                  |
| Mask0      | 0   | RW  | 0h        | POR - DAFG - ULR |
|            | Enable for GPIO0: 0 = pin is disabled (Hi-Z state); 1 = pin is enabled; behavior determined by GPIO Direction control |     |           |                  |



**7.4.13. AFG (NID = 01h): GPIODir**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 717h              |
| Get | F1700h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Control2   | 2  | RW  | 0h        | POR - DAFG - ULR |
|            | Direction control for GPIO2: 0 = GPIO is configured as input; 1 = GPIO is configured as output |     |           |                  |
| Control1   | 1  | RW  | 0h        | POR - DAFG - ULR |
|            | Direction control for GPIO1: 0 = GPIO is configured as input; 1 = GPIO is configured as output |     |           |                  |
| Control0   | 0  | RW  | 0h        | POR - DAFG - ULR |
|            | Direction control for GPIO0: 0 = GPIO is configured as input; 1 = GPIO is configured as output |     |           |                  |

**7.4.14. AFG (NID = 01h): GPIOWakeEn**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 718h              |
| Get | F1800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| W2         | 2  | RW  | 0h        | POR - DAFG - ULR |
|            | Wake enable for GPIO2: 0 = wake-up event is disabled; 1 = When HD Audio link is powered down (RST# is asserted), a wake-up event will trigger a Status Change Request event on the link. |     |           |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| W1         | 1  | RW  | 0h      | POR - DAFG - ULR |
|            | Wake enable for GPIO1: 0 = wake-up event is disabled; 1 = When HD Audio link is powered down (RST# is asserted), a wake-up event will trigger a Status Change Request event on the link. |     |         |                  |
| W0         | 0  | RW  | 0h      | POR - DAFG - ULR |
|            | Wake enable for GPIO0: 0 = wake-up event is disabled; 1 = When HD Audio link is powered down (RST# is asserted), a wake-up event will trigger a Status Change Request event on the link. |     |         |                  |

#### 7.4.15. AFG (NID = 01h): GPIOUnsol

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 719h              |
| Get | F1900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd       | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| EnMask2    | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Unsolicited enable mask for GPIO2. If set, and the Unsolicited Response control for this widget has been enabled, an unsolicited response will be sent when GPIO2 is configured as input and changes state. |     |           |                  |
| EnMask1    | 1   | RW  | 0h        | POR - DAFG - ULR |
|            | Unsolicited enable mask for GPIO1. If set, and the Unsolicited Response control for this widget has been enabled, an unsolicited response will be sent when GPIO1 is configured as input and changes state. |     |           |                  |
| EnMask0    | 0   | RW  | 0h        | POR - DAFG - ULR |
|            | Unsolicited enable mask for GPIO0. If set, and the Unsolicited Response control for this widget has been enabled, an unsolicited response will be sent when GPIO0 is configured as input and changes state. |     |           |                  |

#### 7.4.16. AFG (NID = 01h): GPIOSticky

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 71Ah              |

**7.4.16. AFG (NID = 01h): GPIOSticky**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Get | F1A00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd       | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| Mask2      | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO2 input type (when configured as input): 0 = Non-Sticky (level-sensitive); 1 = Sticky (edge-sensitive). |     |           |                  |
| Mask1      | 1   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO1 input type (when configured as input): 0 = Non-Sticky (level-sensitive); 1 = Sticky (edge-sensitive). |     |           |                  |
| Mask0      | 0   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO0 input type (when configured as input): 0 = Non-Sticky (level-sensitive); 1 = Sticky (edge-sensitive). |     |           |                  |

**7.4.17. AFG (NID = 01h): SubID**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 723h                              | 722h                | 721h               | 720h              |
| Get | F2300h / F2200h / F2100h / F2000h |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset |
|------------|--|-----|---------|-------|
| Subsys3    | 31:24  | RW  | 00h     | POR   |
|            | Subsystem ID (byte 3)                          |     |         |       |
| Subsys2    | 23:16  | RW  | 00h     | POR   |
|            | Subsystem ID (byte 2)                          |     |         |       |
| Subsys1    | 15:8   | RW  | 01h     | POR   |
|            | Subsystem ID (byte 1)                          |     |         |       |
| Assembly   | 7:0  | RW  | 00h     | POR   |
|            | Assembly ID (Not applicable to codec vendors). |     |         |       |

**7.4.18. AFG (NID = 01h): GPIOIrty**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 770h              |
| Get | F7000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| GP2        | 2  | RW  | 1h        | POR - DAFG - ULR |
|            | GPIO2 Polarity:<br>If configured as output or non-sticky input:<br>0 = inverting<br>1 = non-inverting<br><br>If configured as sticky input:<br>0 = falling edges will be detected<br>1 = rising edges will be detected |     |           |                  |
| GP1        | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | GPIO1 Polarity:<br>If configured as output or non-sticky input:<br>0 = inverting<br>1 = non-inverting<br><br>If configured as sticky input:<br>0 = falling edges will be detected<br>1 = rising edges will be detected |     |           |                  |
| GP0        | 0  | RW  | 1h        | POR - DAFG - ULR |
|            | GPIO0 Polarity:<br>If configured as output or non-sticky input:<br>0 = inverting<br>1 = non-inverting<br><br>If configured as sticky input:<br>0 = falling edges will be detected<br>1 = rising edges will be detected |     |           |                  |

**7.4.19. AFG (NID = 01h): GPIODrive**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 771h              |
| Get | F7100h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd       | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| OD2        | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO2 Drive Mode: 0 = push-pull (drive 0 and 1); 1 = open drain (drive 0, float for 1). |     |           |                  |
| OD1        | 1   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO1 Drive Mode: 0 = push-pull (drive 0 and 1); 1 = open drain (drive 0, float for 1). |     |           |                  |
| OD0        | 0   | RW  | 0h        | POR - DAFG - ULR |
|            | GPIO0 Drive Mode: 0 = push-pull (drive 0 and 1); 1 = open-drain (drive 0, float for 1). |     |           |                  |

#### 7.4.20. AFG (NID = 01h): DMic

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 778h              |
| Get | F7800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default  | Reset            |
|------------|--|-----|----------|------------------|
| Rsvd       | 31:6   | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.  |     |          |                  |
| Mono1      | 5  | RW  | 0h       | POR              |
|            | DMic1 mono select: 0 = stereo operation, 1 = mono operation (left channel duplicated to the right channel).  |     |          |                  |
| Mono0      | 4  | RW  | 0h       | POR              |
|            | DMic0 mono select: 0 = stereo operation, 1 = mono operation (left channel duplicated to the right channel).  |     |          |                  |
| PhAdj      | 3:2  | RW  | 0h       | POR              |
|            | Selects what phase of the DMic clock the data should be latched:<br>0h = left data rising edge/right data falling edge<br>1h = left data center of high/right data center of low<br>2h = left data falling edge/right data rising edge<br>3h = left data center of low/right data center of high |     |          |                  |

| Field Name  | Bits | R/W | Default | Reset |
|---|------|-----|---------|-------|
| Rate  | 1:0  | RW  | 2h      | POR   |
| Selects the DMic clock rate:<br>0h = 4.704MHz<br>1h = 3.528MHz<br>2h = 2.352MHz<br>3h = 1.176MHz. |      |     |         |       |

#### 7.4.21. AFG (NID = 01h): DACMode

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 780h              |
| Get | F8000h              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd  | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| SDMSettleDisable  | 7    | RW  | 0h      | POR              |
| SDM wait-to-settle disable:<br>1 = at mute, the SDM switches to the mute pattern immediately<br>0 = at mute, the SDM switches to the mute pattern after settling (can take up to ~45ms) |      |     |         |                  |
| SDMCoeffSel   | 6    | RW  | 0h      | POR              |
| DAC SDM coefficient select (stages 1, 2, 3):<br>1 = 1/16, 1/2, 1/4<br>0 = 1/16, 1/4, 1/2  |      |     |         |                  |
| SDMLFHalf   | 5    | RW  | 0h      | POR              |
| DAC SDM local feedback coefficient select: 1 = 1/4096, 0 = 1/2048.  |      |     |         |                  |
| SDMLFDisable  | 4    | RW  | 0h      | POR              |
| DAC SDM local feedback disable: 1 = local feedback disabled, 0 = local feedback enabled.  |      |     |         |                  |
| InvertValid   | 3    | RW  | 0h      | POR              |
| DAC Valid Invert: 1 = 7.056MHz valid strobe is inverted, 0 = 7.056MHz valid strobe is not inverted.   |      |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name      | Bits   | R/W | Default | Reset |
|-----------------|--|-----|---------|-------|
| InvertData      | 2  | RW  | 0h      | POR   |
|                 | DAC Data Invert: 1 = 1-bit outputs are inverted, 0 = 1-bit outputs are not inverted.   |     |         |       |
| Atten6dBDisable | 1  | RW  | 0h      | POR   |
|                 | Disable built-in -6dB digital attenuation: 1 = -6dB disabled, 0 = -6dB enabled.  |     |         |       |
| Fade            | 0  | RW  | 1h      | POR   |
|                 | DAC Gain Fade Enable:<br>1 = gain will be slowly faded from old value to new value (~10ms)<br>0 = gain will jump immediately to new value. |     |         |       |

### 7.4.22. AFG (NID = 01h): ADCMode

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 784h              |
| Get | F8400h              |                     |                    |                   |

| Field Name  | Bits  | R/W | Default  | Reset            |
|-------------|---|-----|----------|------------------|
| Rsvd2       | 31:4  | R   | 0000000h | N/A (Hard-coded) |
|             | Reserved.   |     |          |                  |
| InvertValid | 3   | RW  | 0h       | POR              |
|             | ADC Valid Invert: 1 = 14.112MHz valid strobe is inverted, 0 = 14.112MHz valid strobe is not inverted. |     |          |                  |
| InvertData  | 2   | RW  | 0h       | POR              |
|             | ADC Data Invert: 1 = 1-bit inputs are inverted, 0 = 1-bit inputs are not inverted.                    |     |          |                  |
| Rsvd1       | 1:0   | R   | 0h       | N/A (Hard-coded) |
|             | Reserved.   |     |          |                  |

### 7.4.23. AFG (NID = 01h): EAPD

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 788h              |
| Get | F8800h              |                     |                    |                   |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name | Bits   | R/W | Default                     | Reset            |
|------------|--|-----|-----------------------------|------------------|
| Rsvd4      | 31:15  | R   | 00000h                      | N/A (Hard-coded) |
|            | Reserved.  |     |                             |                  |
| HPBSDInv   | 14   | RW  | 0h                          | POR              |
|            | HP Amp Shutdown Invert:<br>0 = Amp will power down (or mute) when EAPD pin is low<br>1 = Amp will power down (or mute) when EAPD pin is high |     |                             |                  |
| HPBSDMode  | 13   | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR              |
|            | HP Amp Shutdown Mode:<br>0 = Amp will mute when disabled<br>1 = Amp will enter a low power state when disabled                               |     |                             |                  |
| HPBSD      | 12   | RW  | 0h                          | POR              |
|            | HP Amp Shutdown Control Select:<br>0 = Amp controlled by EAPD pin only<br>1 = Amp controlled by power state only                             |     |                             |                  |
| Rsvd3      | 11   | R   | 0h                          | N/A (Hard-coded) |
|            | Reserved.  |     |                             |                  |
| HPASDInv   | 10   | RW  | 0h                          | POR              |
|            | HP Amp Shutdown Invert:<br>0 = Amp will power down (or mute) when EAPD pin is low<br>1 = Amp will power down (or mute) when EAPD pin is high |     |                             |                  |
| HPASDMode  | 9  | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR              |
|            | HP Amp Shutdown Mode:<br>0 = Amp will mute when disabled<br>1 = Amp will enter a low power state when disabled                               |     |                             |                  |
| HPASD      | 8  | RW  | 0h                          | POR              |
|            | HP Amp Shutdown Control Select:<br>0 = Amp controlled by EAPD pin only<br>1 = Amp controlled by power state only                             |     |                             |                  |
| Rsvd2      | 7  | R   | 0h                          | N/A (Hard-coded) |
|            | Reserved.  |     |                             |                  |



# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name | Bits  | R/W | Default                     | Reset            |
|------------|---|-----|-----------------------------|------------------|
| BTLSDInv   | 6   | RW  | 0h                          | POR              |
|            | BTL Amp Shutdown Invert:<br>0 = Amp will power down (or mute) when EAPD pin is low<br>1 = Amp will power down (or mute) when EAPD pin is high   |     |                             |                  |
| BTLSDMode  | 5   | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR              |
|            | BTL Amp Shutdown Mode:<br>0 = Amp will mute when disabled<br>1 = Amp will enter a low power state when disabled   |     |                             |                  |
| BTLSD      | 4   | RW  | 0h                          | POR              |
|            | BTL Amp Shutdown Control Select:<br>0 = Amp controlled by EAPD pin only<br>1 = Amp controlled by power state only   |     |                             |                  |
| Rsvd1      | 3:2   | R   | 0h                          | N/A (Hard-coded) |
|            | Reserved.   |     |                             |                  |
| PinMode    | 1:0   | RW  | 0h                          | POR              |
|            | EAPD Pin Mode:<br>00b = Open Drain I/O (Value at pin is wired-AND of EAPD bit and external signal)<br>01b = CMOS Output (Value of EAPD bit is forced at pin)<br>1xb = CMOS Input (External signal controls internal amps, EAPD bit ignored) |     |                             |                  |

### 7.4.24. AFG (NID = 01h): PortUse

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 7C0h              |
| Get | FC000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default                     | Reset            |
|------------|---|-----|-----------------------------|------------------|
| Rsvd       | 31:7  | R   | 0000000h                    | N/A (Hard-coded) |
|            | Reserved.   |     |                             |                  |
| Mono       | 6   | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR              |
|            | 1=power down port if not input or output enabled, 0=do not force power down based on input or output enable |     |                             |                  |

| Field Name | Bits | R/W | Default                     | Reset |
|------------|------|-----|-----------------------------|-------|
| PortF      | 5    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |
| PortE      | 4    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |
| PortD      | 3    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |
| PortC      | 2    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |
| PortB      | 1    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |
| PortA      | 0    | RW  | 0h (YC/YD)<br>1h (UA/TA/RA) | POR   |
|            |      |     |                             |       |

**7.4.25. AFG (NID = 01h): VSPwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 7D8h              |
| Get | FD800h              |                     |                    |                   |

| Field Name | Bits | R/W | Default   | Reset            |
|------------|------|-----|-----------|------------------|
| Rsvd       | 31:2 | R   | 00000000h | N/A (Hard-coded) |
|            |      |     |           |                  |

| Field Name | Bits  | R/W | Default | Reset     |
|------------|---|-----|---------|-----------|
| D5         | 1   | RW  | 0h      | POR - ELR |
|            | Vendor specific D5 power state, only entered once the part is already in D3cold (this bit must be set before the command to enter D3cold). If set, this bit overrides the D4 bit (bit 0). Includes the power savings of D4, but additionally powers down GPIO pins, the VAG amp, and the HP amps. Exits this power state via POR or rising edge of Link Reset.    |     |         |           |
| D4         | 0   | RW  | 0h      | POR - ELR |
|            | Vendor specific D4 power state, only entered once the part is already in D3cold (this bit must be set before the command to enter D3cold). If the D5 bit (bit 1) is set, this bit is overridden. Includes the power savings of D3cold, but additionally powers down the HDA interface (no responses). Exit this power state via POR or rising edge of Link Reset. |     |         |           |

#### 7.4.26. AFG (NID = 01h): AnaPort

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     | 7EDh               | 7ECh              |
| Get | FEC00h              |                     |                    |                   |

| Field Name | Bits                    | R/W | Default  | Reset            |
|------------|-------------------------|-----|----------|------------------|
| Rsvd2      | 31:7                    | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.               |     |          |                  |
| MonoPw     | 6                       | RW  | 0h       | POR              |
|            | Power down Mono Output. |     |          |                  |
| FPw        | 5                       | RW  | 0h       | POR              |
|            | Power down Port F.      |     |          |                  |
| EPw        | 4                       | RW  | 0h       | POR              |
|            | Power down Port E.      |     |          |                  |
| DPw        | 3                       | RW  | 0h       | POR              |
|            | Power down Port D.      |     |          |                  |
| CPw        | 2                       | RW  | 0h       | POR              |
|            | Power down Port C.      |     |          |                  |

| Field Name | Bits               | R/W | Default | Reset |
|------------|--------------------|-----|---------|-------|
| BPwd       | 1                  | RW  | 0h      | POR   |
|            | Power down Port B. |     |         |       |
| APwd       | 0                  | RW  | 0h      | POR   |
|            | Power down Port A. |     |         |       |

#### 7.4.27. AFG (NID = 01h): AnaBeep

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 7EEh              |
| Get | FEE0h               |                     |                    |                   |

| Field Name | Bits  | R/W | Default  | Reset            |
|------------|---|-----|----------|------------------|
| Rsvd       | 31:3  | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.   |     |          |                  |
| Gain       | 2:1   | RW  | 3h       | POR              |
|            | Analog PC Beep Gain: 0h = -24dB, 1h = -18dB, 2h = -12dB, 3h = -6dB.             |     |          |                  |
| Enable     | 0   | RW  | 0h       | POR              |
|            | Analog PC Beep Enable: 1 = Analog PC beep enabled, 0 = Analog PC beep disabled. |     |          |                  |

#### 7.4.28. AFG (NID = 01h): AnaBTL YC and YD Revisions

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     | 7F6h                | 7F5h               | 7F4h              |
| Get | FF40h               |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:30     | R   | 0h      | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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**SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name      | Bits   | R/W | Default           | Reset            |
|-----------------|--|-----|-------------------|------------------|
| TSOverHeat      | 29   | R   | 0h                | POR              |
|                 | Temperature sensing overheat indicator.  |     |                   |                  |
| TSAIgVol        | 28:24  | R   | 17h               | POR              |
|                 | Temperature sensing volume for the BTL amplifier: 00000b..11111b = Range specificity for MaxVol field.                       |     |                   |                  |
| Rsvd3           | 23:22  | R   | 0h                | N/A (Hard-coded) |
|                 | Reserved.  |     |                   |                  |
| TSOverrideReset | 21   | RW  | 0h                | POR              |
|                 | Override reset for the BTL amplifier temperature sensing circuit: set to 1 to recalculate, set back to 0 to latch the value. |     |                   |                  |
| TSOverrideVol   | 20:16  | RW  | 17h               | POR              |
|                 | Override volume for the BTL amplifier: 00000b..11111b = Range specified for MaxVol field.                                    |     |                   |                  |
| TSOverrideSel   | 15   | RW  | 0h                | POR              |
|                 | Override select for the BTL amplifier volume.  |     |                   |                  |
| Rsvd2           | 14:12  | R   | 0h                | N/A (Hard-coded) |
|                 | Reserved.  |     |                   |                  |
| TSWait          | 11:8   | RW  | 6h (YA rev)<br>0h | POR              |
|                 | Temperature sensing wait time between volume increments/decrements: 0h..Fh = 0..1.28s in 85.3ms steps.                       |     |                   |                  |
| MonoSel         | 7  | RW  | 0h                | POR              |
|                 | Mono select for the BTL amplifier: 1= mono, 0 = stereo.  |     |                   |                  |
| Rsvd1           | 6:5  | R   | 0h                | N/A (Hard-coded) |
|                 | Reserved.  |     |                   |                  |

| Field Name   | Bits | R/W | Default | Reset |
|--|------|-----|---------|-------|
| MaxVol   | 4:0  | RW  | 17h     | POR   |
| Gain setting for the BTL amplifier (temperature sensing logic will decrement from here):<br>00000 = -26.25dB:<br>00001 = -19.80dB<br>00010 = -15.80dB<br>00011 = -12.85dB<br>00100 = -10.40dB<br>00101 = -8.27dB<br>00110 = -6.35dB<br>00111 = -4.60dB<br>01000 = -2.90dB<br>01001 = -1.25dB<br>01010 = 0.35dB<br>01011 = 1.98dB<br>01100 = 3.63dB<br>01101 = 5.35dB<br>01110 = 7.19dB<br>01111 = 9.18dB<br>10000 = 9.95dB<br>10001 = 10.75dB<br>10010 = 11.58dB<br>10011 = 12.48dB<br>10100 = 13.43dB<br>10101 = 14.46dB<br>10110 = 15.57dB<br>10111 = 16.79dB<br>11000-11111 = Not valid |      |     |         |       |

**7.4.29. AFG (NID = 01h): AnaBTL UA,TA, RA Revisions**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     | 7F6h                | 7F5h               | 7F4h              |
| Get | FF400h              |                     |                    |                   |

| Field Name                        | Bits | R/W | Default | Reset            |
|-----------------------------------|------|-----|---------|------------------|
| Rsvd3                             | 31   | R   | 0h      | N/A (Hard-coded) |
| Reserved.                         |      |     |         |                  |
| TSTripHighStatus                  | 30   | R   | 0h      | POR              |
| Temp sense high trip point status |      |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name       | Bits  | R/W | Default            | Reset            |
|------------------|---|-----|--------------------|------------------|
| TSripLowStatus   | 29  | R   | 0h                 | POR              |
|                  | Temp sense low trip point status  |     |                    |                  |
| TSVolStatus      | 28:24   | R   | 00h                | POR              |
|                  | Temp sense volume status for the BTL amplifier: 00000b..11111b = Range specificity for MaxVol field.  |     |                    |                  |
| TSMuteStatus     | 23  | R   | 0h                 | POR              |
|                  | Temp sense forced mute status for the BTL amplifier.  |     |                    |                  |
| TSPwdStatus      | 22  | R   | 0h                 | POR              |
|                  | Temp sense forced powerdown status for the BTL amplifier.   |     |                    |                  |
| Rsvd2            | 21  | R   | 0h                 | N/A (Hard-coded) |
|                  | Reserved.   |     |                    |                  |
| TSOverrideReset  | 20  | RW  | 0h                 | POR              |
|                  | Override reset for the BTL amplifier temperature sensing circuit: set to 1 to recalculate, set back to 0 to latch the value.  |     |                    |                  |
| TSOverrideSel    | 19  | RW  | 0h                 | POR              |
|                  | Override select for the BTL amplifier volume. Use MaxVol[4:0] and TSOverrideReset directly to drive analog  |     |                    |                  |
| TSTestMode       | 18  | RW  | 0h                 | POR              |
|                  | Temp sense test mode select, 0=normal operation, 1=sensor will trip at ambient temperature.   |     |                    |                  |
| TSForcePwd       | 17  | RW  | 0h (UA)<br>1h (TA) | POR              |
|                  | Temp sense force powerdown select<br>0=BTL will not be muted and powered down even if it is still overheating when the volume is 0h<br>1=BTL will be muted and powered down even if it is still overheating when the volume is 0h |     |                    |                  |
| TSInstantCutMode | 16  | RW  | 0h                 | POR              |
|                  | Temp sense instant cut mode<br>0=Two trip points used to smoothly adjust the volume<br>1=One single trip point used to set volume to wither 0 or max value (TI mode)  |     |                    |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| TSWait      | 15:12  | RW  | 3h      | POR   |
|             | Temperature sensing wait time between volume increments<br>0h = 2ms (polling at 2ms)<br>1h = 4ms (polling at 4ms)<br>2h = 8ms (polling at 8ms)<br>3h = 16ms (polling at 16ms)<br>4h = 32ms (polling at 16ms)<br>5h = 64ms (polling at 16ms)<br>6h = 128ms (polling at 16ms)<br>7h = 256ms (polling at 16ms)<br>8h = 512ms (polling at 16ms)<br>9h = 1.024s (polling at 16ms)<br>Ah = 2.048s (polling at 16ms)<br>Bh = 4.096s (polling at 16ms)<br>Ch = 8.192s (polling at 16ms)<br>Dh = 16.384s (polling at 16ms)<br>Eh = 32.768s (polling at 16ms)<br>Fh = 65.536s (polling at 16ms). |     |         |       |
| TSTripSplit | 11:10  | RW  | 0h      | POR   |
|             | Temp sense split setting, determines how many degrees above the low point the high point is set:<br>0h = 15 Degrees C<br>1h = 30 Degrees C<br>2h = 45 Degrees C<br>3h = 60 Degrees C.  |     |         |       |
| TSTripShift | 9:8  | RW  | 02h     | POR   |
|             | Temp sense shift setting, determines where the low point is set:<br>0h = 110 Degrees C<br>1h = 125 Degrees C<br>2h = 140 Degrees C<br>3h = 155 Degrees C   |     |         |       |
| Rsvd1       | 7:6  | R   | 0h      | NA    |
|             | Reserved   |     |         |       |
| MonoSel     | 5  | RW  | 0h'     | POR   |
|             | Mono select for the BTL amplifier, 1=mono, 0=stereo  |     |         |       |



| Field Name   | Bits | R/W | Default | Reset |
|--|------|-----|---------|-------|
| MaxVol   | 4:0  | RW  | 0Fh     | POR   |
| Gain setting for the BTL amplifier (temperature sensing logic will decrement from here):<br>00000 = -26.25dB:<br>00001 = -19.80dB<br>00010 = -15.80dB<br>00011 = -12.85dB<br>00100 = -10.40dB<br>00101 = -8.27dB<br>00110 = -6.35dB<br>00111 = -4.60dB<br>01000 = -2.90dB<br>01001 = -1.25dB<br>01010 = 0.35dB<br>01011 = 1.98dB<br>01100 = 3.63dB<br>01101 = 5.35dB<br>01110 = 7.19dB<br>01111 = 9.18dB<br>10000 = 9.95dB<br>10001 = 10.75dB<br>10010 = 11.58dB<br>10011 = 12.48dB<br>10100 = 13.43dB<br>10101 = 14.46dB<br>10110 = 15.57dB<br>10111 = 16.79dB<br>11000-11111 = Not valid |      |     |         |       |

**7.4.30. AFG (NID = 01h): AnaCapless**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     | 7FAh                | 7F9h               | 7F8h              |
| Get | FF800h              |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset            |
|---|-------|-----|---------|------------------|
| Rsvd  | 31:26 | R   | 00h     | N/A (Hard-coded) |
| Reserved.   |       |     |         |                  |
| VRegSCDet   | 25    | R   | 0h      | POR              |
| Capless regulator short circuit detect indicator. |       |     |         |                  |

**92HD81****SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name                | Bits   | R/W | Default                     | Reset |
|---------------------------|--|-----|-----------------------------|-------|
| ChargePumpSCDet           | 24   | R   | 0h                          | POR   |
|                           | Capless charge pump short circuit detect indicator.  |     |                             |       |
| VRegSel                   | 23:20  | RW  | 4h (YC/YD)<br>3h (UA/TA/RA) | POR   |
|                           | Capless regulator output voltage multiply ratio.   |     |                             |       |
| VRegSCRstB                | 19   | RW  | 0h                          | POR   |
|                           | Capless regulator short circuit detect reset: 0 = short circuit detect disabled, 1 = short circuit detect enabled.   |     |                             |       |
| VRegGndShort              | 18   | RW  | 0h                          | POR   |
|                           | Ground the capless regulator output.   |     |                             |       |
| VRegPwd                   | 17   | RW  | 0h                          | POR   |
|                           | Capless regulator powerdown.   |     |                             |       |
| ChargePumpSCRstB          | 16   | RW  | 0h                          | POR   |
|                           | Capless charge pump short circuit detect reset: 0 = short circuit detect disabled, 1 = short circuit detect enabled. |     |                             |       |
| ChargePumpHiZ             | 15   | RW  | 0h                          | POR   |
|                           | Hi-Z the capless charge pump outputs.  |     |                             |       |
| ChargePumpPwd             | 14   | RW  | 0h                          | POR   |
|                           | Capless charge pump powerdown.   |     |                             |       |
| ChargePumpSplyDetOverride | 13   | RW  | 1h (YA rev)<br>0h           | POR   |
|                           | Capless charge pump supply detect override.  |     |                             |       |
| ChargePumpFreqBypass      | 12   | RW  | 1h<br>0h (YB rev)           | POR   |
|                           | Capless charge pump frequency reg bypass.  |     |                             |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits | R/W | Default | Reset |
|---|------|-----|---------|-------|
| ChargePumpClkRate   | 11:8 | RW  | 8h      | POR   |
| Capless charge pump clock rate:<br>0000b = 800.0kHz (24MHz/30)<br>0001b = 750.0kHz (24MHz/32)<br>0010b = 706.9kHz (24MHz/34)<br>0011b = 666.7kHz (24MHz/36)<br>0100b = 631.6kHz (24MHz/38)<br>0101b = 600.0kHz (24MHz/40)<br>0110b = 571.4kHz (24MHz/42)<br>0111b = 545.5kHz (24MHz/44)<br>1000b = 800.0kHz (24MHz/30)<br>1001b = 857.1kHz (24MHz/28)<br>1010b = 923.1kHz (24MHz/26)<br>1011b = 1.000MHz (24MHz/24)<br>1100b = 1.091MHz (24MHz/22)<br>1101b = 1.200MHz (24MHz/20)<br>1110b = 1.333MHz (24MHz/18)<br>1111b = 1.500MHz (24MHz/16) |      |     |         |       |
| ChargePumpClkDiv  | 7:5  | RW  | 4h      | POR   |
| Capless charge pump analog clock divider:<br>001b = No divide<br>010b = Divide by 2, 50% duty cycle<br>100b = Divide by 4, 50% duty cycle<br>110b = Divide by 2, 75% duty cycle<br>011b = Divide by 4, 75% duty cycle<br>111b = Divide by 4, 87.5% duty cycle<br>Other values undefined   |      |     |         |       |
| ChargePumpClkSel  | 4    | RW  | 0h      | POR   |
| Capless charge pump clock select: 0 = ring oscillator, 1 = charge pump clock defined by AFGCaplessChargePumpClkRate[3:0] field below.   |      |     |         |       |
| PadGnd  | 3    | RW  | 0h      | POR   |
| Ground the output pad of the capless amplifiers.  |      |     |         |       |
| InputGnd  | 2    | RW  | 0h      | POR   |
| Ground the input to the capless output amplifiers.  |      |     |         |       |
| Reserved  | 1    | R   | 0h      | POR   |
| Revisions YC & prior was capless headphone amplifier gain. This bit is no longer needed..   |      |     |         |       |
| AntiPopBypass   | 0    | RW  | 0h      | POR   |
| Revision YC & prior was capless headphone gain. This bit has been repurposed for Anti-Pop bypass..  |      |     |         |       |

**7.4.31. AFG (NID = 01h): Reset**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 7FFh              |
| Get | FFF00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd1      | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Execute    | 7:0   | W   | 00h     | N/A (Hard-coded) |
|            | Function Reset. Function Group reset is executed when the Set verb 7FF is written with 8-bit payload of 00h. The codec should issue a response to acknowledge receipt of the verb, and then reset the affected Function Group and all associated widgets to their power-on reset values. Some controls such as Configuration Default controls should not be reset. Overlaps Response. |     |         |                  |

**7.4.32. AFG (NID = 01h): AuxAudio**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 774h              |
| Get | F7400h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| MixerPwD   | 1  | RW  | 0h        | POR              |
|            | Aux Audio Moder mixer powerdown: 0 = Mixer enabled during Aux Audio Mode, 1 = Mixer forced powered down during Aux Audio Mode. |     |           |                  |
| Enable     | 0  | RW  | 1h        | POR              |
|            | Aux Audio Mode select: 0 = Aux Audio disabled, 1 = Aux Audio enabled during HDA Link Reset.                                    |     |           |                  |

## 7.5. PortA (NID = 0Ah): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 4h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 1h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

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| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.5.1. PortA (NID = 0Ah): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Rsvd2      | 31:17                          | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved.                      |     |         |                  |
| EapdCap    | 16                             | R   | 1h      | N/A (Hard-coded) |
|            | EAPD support: 1 = yes, 0 = no. |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| VrefCntrl   | 15:8   | R   | 17h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 1h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 1h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.5.2. PortA (NID = 0Ah): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.5.3. PortA (NID = 0Ah): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

### 7.5.4. PortA (NID = 0Ah): InAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |



| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

#### 7.5.5. PortA (NID = 0Ah): InAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

#### 7.5.6. PortA (NID = 0Ah): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

**7.5.7. PortA (NID = 0Ah): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.5.8. PortA (NID = 0Ah): PinWCntrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| HPhnEn     | 7   | RW  | 0h      | POR - DAFG - ULR |
|            | Headphone amp enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled.   |     |         |                  |
| InEn       | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| Rsvd1      | 4:3   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| VRefEn     | 2:0   | RW  | 0h      | POR - DAFG - ULR |
|            | Vref selection (See VrefCntrl field of PinCap parameter for supported selections):<br>000b= HI-Z<br>001b= 50%<br>010b= GND<br>011b= Reserved<br>100b= 80%<br>101b= 100%<br>110b= Reserved<br>111b= Reserved |     |         |                  |

**7.5.9. PortA (NID = 0Ah): UnsolResp**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:8      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled.                 |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

#### 7.5.10. PortA (NID = 0Ah): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

#### 7.5.11. PortA (NID = 0Ah): EAPDBTLLR

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default   | Reset            |
|------------|-----------|-----|-----------|------------------|
| Rsvd2      | 31:2      | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved. |     |           |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| EAPD       | 1  | RW  | 1h      | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |         |                  |
| Rsvd1      | 0  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |

**7.5.12. PortA (NID = 0Ah): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name       | Bits  | R/W | Default | Reset |
|------------------|---|-----|---------|-------|
| PortConnectivity | 31:30   | RW  | 0h      | POR   |
|                  | Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |     |         |       |
| Location         | 29:24   | RW  | 02h     | POR   |
|                  | Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |     |         |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| Device  | 23:20 | RW  | 2h      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |       |     |         |       |
| ConnectionType  | 19:16 | RW  | 1h      | POR   |
| Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |       |     |         |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 4h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 0h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | 3h      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | Fh      | POR   |
|             | Sequence.  |     |         |       |

### 7.6. PortB (NID = 0Bh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Type   | 23:20 | R   | 4h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 0h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |
| ConnList   | 8     | R   | 1h      | N/A (Hard-coded) |
| Connection list present: 1 = yes, 0 = no.  |       |     |         |                  |
| UnSolCap   | 7     | R   | 1h      | N/A (Hard-coded) |
| Unsolicited response support: 1 = yes, 0 = no.   |       |     |         |                  |
| ProcWidget   | 6     | R   | 0h      | N/A (Hard-coded) |
| Processing state support: 1 = yes, 0 = no.   |       |     |         |                  |
| Stripe   | 5     | R   | 0h      | N/A (Hard-coded) |
| Striping support: 1 = yes, 0 = no.   |       |     |         |                  |
| FormatOvrd   | 4     | R   | 0h      | N/A (Hard-coded) |
| Stream format override: 1 = yes, 0 = no.   |       |     |         |                  |



| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| AmpParOvrd  | 3    | R   | 0h      | N/A (Hard-coded) |
| Amplifier capabilities override: 1 = yes, no.           |      |     |         |                  |
| OutAmpPrsnt   | 2    | R   | 0h      | N/A (Hard-coded) |
| Output amp present: 1 = yes, 0 = no.                    |      |     |         |                  |
| InAmpPrsnt  | 1    | R   | 0h      | N/A (Hard-coded) |
| Input amp present: 1 = yes, 0 = no.                     |      |     |         |                  |
| Stereo  | 0    | R   | 1h      | N/A (Hard-coded) |
| Stereo stream support: 1 = yes (stereo), 0 = no (mono). |      |     |         |                  |

### 7.6.1. PortB (NID = 0Bh): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:17 | R   | 0000h   | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| EapdCap  | 16    | R   | 1h      | N/A (Hard-coded) |
| EAPD support: 1 = yes, 0 = no.   |       |     |         |                  |
| VrefCntrl  | 15:8  | R   | 00h     | N/A (Hard-coded) |
| Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |       |     |         |                  |
| Rsvd1  | 7     | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.                 |     |         |                  |
| InCap       | 5  | R   | 0h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.                        |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.                       |     |         |                  |
| HdphDrvCap  | 3  | R   | 1h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.                |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.           |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no. |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.              |     |         |                  |

### 7.6.2. PortB (NID = 0Bh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

**7.6.3. PortB (NID = 0Bh): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

**7.6.4. PortB (NID = 0Bh): ConSelectCtrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

**7.6.5. PortB (NID = 0Bh): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

#### 7.6.6. PortB (NID = 0Bh): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| HPhnEn     | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Headphone amp enable: 1 = enabled, 0 = disabled. |     |         |                  |

| Field Name | Bits                                      | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |         |                  |
| Rsvd1      | 5:0                                       | RW  | 00h     | N/A (Hard-coded) |
|            | Reserved.                                 |     |         |                  |

### 7.6.7. PortB (NID = 0Bh): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled.                 |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

### 7.6.8. PortB (NID = 0Bh): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

### 7.6.9. PortB (NID = 0Bh): EAPDBTLLR

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd2      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| EAPD       | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |           |                  |
| Rsvd1      | 0  | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |

### 7.6.10. PortB (NID = 0Bh): ConfigDefault

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

**92HD81**

**SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 0h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack)                   |       |     |         |       |
| Location  | 29:24 | RW  | 02h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved                                |       |     |         |       |
| Device  | 23:20 | RW  | 2h      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other |       |     |         |       |

**92HD81**

**SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name     | Bits  | R/W | Default | Reset |
|----------------|---|-----|---------|-------|
| ConnectionType | 19:16   | RW  | 1h      | POR   |
|                | Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |     |         |       |
| Color          | 15:12   | RW  | 1h      | POR   |
|                | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other  |     |         |       |
| Misc           | 11:8  | RW  | 0h      | POR   |
|                | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override  |     |         |       |
| Association    | 7:4   | RW  | 1h      | POR   |
|                | Default association.  |     |         |       |
| Sequence       | 3:0   | RW  | 0h      | POR   |
|                | Sequence.   |     |         |       |



### 7.7. PortC (NID = 0Ch): WCap

Port C is input only on the TA revision. RA revision is output capable

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 4h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| UnSolCap    | 7   | R   | 1h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.          |     |         |                  |
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.7.1. PortC (NID = 0Ch): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Rsvd2      | 31:17                          | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved.                      |     |         |                  |
| EapdCap    | 16                             | R   | 1h      | N/A (Hard-coded) |
|            | EAPD support: 1 = yes, 0 = no. |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| VrefCntrl   | 15:8   | R   | 17h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 1h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.7.2. PortC (NID = 0Ch): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.7.3. PortC (NID = 0Ch): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

### 7.7.4. PortC (NID = 0Ch): InAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

### 7.7.5. PortC (NID = 0Ch): InAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

### 7.7.6. PortC (NID = 0Ch): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

**7.7.7. PortC (NID = 0Ch): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.7.8. PortC (NID = 0Ch): PinWCntrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:7  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled.   |     |         |                  |
| InEn       | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| Rsvd1      | 4:3   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| VRefEn     | 2:0   | RW  | 0h      | POR - DAFG - ULR |
|            | Vref selection (See VrefCntrl field of PinCap parameter for supported selections):<br>000b= HI-Z<br>001b= 50%<br>010b= GND<br>011b= Reserved<br>100b= 80%<br>101b= 100%<br>110b= Reserved<br>111b= Reserved |     |         |                  |

### 7.7.9. PortC (NID = 0Ch): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| En         | 7   | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicted response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

#### 7.7.10. PortC (NID = 0Ch): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

#### 7.7.11. PortC (NID = 0Ch): EAPDBTLLR

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd2      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| EAPD       | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |           |                  |



| Field Name | Bits | R/W | Default | Reset            |
|------------|------|-----|---------|------------------|
| Rsvd1      | 0    | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |      |     |         |                  |

**7.7.12. PortC (NID = 0Ch): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 0h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |       |     |         |       |
| Location  | 29:24 | RW  | 02h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |       |     |         |       |

**92HD81****SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| Device  | 23:20 | RW  | Ah      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |       |     |         |       |
| ConnectionType  | 19:16 | RW  | 1h      | POR   |
| Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |       |     |         |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 9h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 0h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | 2h      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | 0h      | POR   |
|             | Sequence.  |     |         |       |

### 7.8. PortD (NID = 0Dh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Type   | 23:20 | R   | 4h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 0h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |
| ConnList   | 8     | R   | 1h      | N/A (Hard-coded) |
| Connection list present: 1 = yes, 0 = no.  |       |     |         |                  |
| UnSolCap   | 7     | R   | 0h      | N/A (Hard-coded) |
| Unsolicited response support: 1 = yes, 0 = no.   |       |     |         |                  |
| ProcWidget   | 6     | R   | 0h      | N/A (Hard-coded) |
| Processing state support: 1 = yes, 0 = no.   |       |     |         |                  |
| Stripe   | 5     | R   | 0h      | N/A (Hard-coded) |
| Striping support: 1 = yes, 0 = no.   |       |     |         |                  |
| FormatOvrd   | 4     | R   | 0h      | N/A (Hard-coded) |
| Stream format override: 1 = yes, 0 = no.   |       |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| AmpParOvrd  | 3    | R   | 0h      | N/A (Hard-coded) |
| Amplifier capabilities override: 1 = yes, no.           |      |     |         |                  |
| OutAmpPrsnt   | 2    | R   | 0h      | N/A (Hard-coded) |
| Output amp present: 1 = yes, 0 = no.                    |      |     |         |                  |
| InAmpPrsnt  | 1    | R   | 0h      | N/A (Hard-coded) |
| Input amp present: 1 = yes, 0 = no.                     |      |     |         |                  |
| Stereo  | 0    | R   | 1h      | N/A (Hard-coded) |
| Stereo stream support: 1 = yes (stereo), 0 = no (mono). |      |     |         |                  |

### 7.8.1. PortD (NID = 0Dh): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:17 | R   | 0000h   | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| EapdCap  | 16    | R   | 1h      | N/A (Hard-coded) |
| EAPD support: 1 = yes, 0 = no.   |       |     |         |                  |
| VrefCntrl  | 15:8  | R   | 00h     | N/A (Hard-coded) |
| Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |       |     |         |                  |
| Rsvd1  | 7     | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |

| Field Name   | Bits | R/W | Default | Reset            |
|--|------|-----|---------|------------------|
| BalancedIO   | 6    | R   | 1h      | N/A (Hard-coded) |
| Balanced I/O support: 1 = yes, 0 = no.                 |      |     |         |                  |
| InCap  | 5    | R   | 0h      | N/A (Hard-coded) |
| Input support: 1 = yes, 0 = no.                        |      |     |         |                  |
| OutCap   | 4    | R   | 1h      | N/A (Hard-coded) |
| Output support: 1 = yes, 0 = no.                       |      |     |         |                  |
| HdphDrvCap   | 3    | R   | 0h      | N/A (Hard-coded) |
| Headphone amp present: 1 = yes, 0 = no.                |      |     |         |                  |
| PresDtctCap  | 2    | R   | 0h      | N/A (Hard-coded) |
| Presence detection support: 1 = yes, 0 = no.           |      |     |         |                  |
| TrigRqd  | 1    | R   | 0h      | N/A (Hard-coded) |
| Trigger required for impedance sense: 1 = yes, 0 = no. |      |     |         |                  |
| ImpSenseCap  | 0    | R   | 0h      | N/A (Hard-coded) |
| Impedance sense support: 1 = yes, 0 = no.              |      |     |         |                  |

### 7.8.2. PortD (NID = 0Dh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd  | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| LForm   | 7    | R   | 0h      | N/A (Hard-coded) |
| Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |      |     |         |                  |
| ConL  | 6:0  | R   | 03h     | N/A (Hard-coded) |
| Number of NID entries in connection list.   |      |     |         |                  |

**7.8.3. PortD (NID = 0Dh): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

**7.8.4. PortD (NID = 0Dh): ConSelectCtrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

**7.8.5. PortD (NID = 0Dh): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

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| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

### 7.8.6. PortD (NID = 0Dh): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:7      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |



| Field Name | Bits                                      | R/W | Default                     | Reset            |
|------------|---|-----|-----------------------------|------------------|
| OutEn      | 6   | RW  | 1h (YC/YD)<br>0h (UA/TA/RA) | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |                             |                  |
| Rsvd1      | 5:0                                       | R   | 0h                          | N/A (Hard-coded) |
|            | Reserved.                                 |     |                             |                  |

### 7.8.7. PortD (NID = 0Dh): EAPDBTLLR

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd2      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| EAPD       | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |           |                  |
| Rsvd1      | 0  | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |

### 7.8.8. PortD (NID = 0Dh): ConfigDefault

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

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| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 2h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack)                   |       |     |         |       |
| Location  | 29:24 | RW  | 10h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved                                |       |     |         |       |
| Device  | 23:20 | RW  | 1h      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other |       |     |         |       |

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| Field Name     | Bits  | R/W | Default | Reset |
|----------------|---|-----|---------|-------|
| ConnectionType | 19:16   | RW  | 7h      | POR   |
|                | Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |     |         |       |
| Color          | 15:12   | RW  | 0h      | POR   |
|                | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other  |     |         |       |
| Misc           | 11:8  | RW  | 1h      | POR   |
|                | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override  |     |         |       |
| Association    | 7:4   | RW  | 3h      | POR   |
|                | Default association.  |     |         |       |
| Sequence       | 3:0   | RW  | 0h      | POR   |
|                | Sequence.   |     |         |       |

## 7.9. PortE (NID = 0Eh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 4h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 1h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

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| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.9.1. PortE (NID = 0Eh): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Rsvd2      | 31:17                          | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved.                      |     |         |                  |
| EapdCap    | 16                             | R   | 1h      | N/A (Hard-coded) |
|            | EAPD support: 1 = yes, 0 = no. |     |         |                  |

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| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| VrefCntrl   | 15:8   | R   | 00h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 1h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.9.2. PortE (NID = 0Eh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.9.3. PortE (NID = 0Eh): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

### 7.9.4. PortE (NID = 0Eh): InAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

### 7.9.5. PortE (NID = 0Eh): InAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

### 7.9.6. PortE (NID = 0Eh): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |



**7.9.7. PortE (NID = 0Eh): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.9.8. PortE (NID = 0Eh): PinWCntrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits                                      | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:7                                      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                                 |     |         |                  |
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |         |                  |
| InEn       | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| Rsvd1      | 4:0                                       | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                 |     |         |                  |

### 7.9.9. PortE (NID = 0Eh): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled.                 |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

### 7.9.10. PortE (NID = 0Eh): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |

**7.9.10. PortE (NID = 0Eh): ChSense**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.9.11. PortE (NID = 0Eh): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd2      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| EAPD       | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |           |                  |
| Rsvd1      | 0  | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |

**7.9.12. PortE (NID = 0Eh): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

**92HD81**

**SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name  | Bits  | R/W | Default                   | Reset |
|---|-------|-----|---------------------------|-------|
| PortConnectivity  | 31:30 | RW  | 0h                        | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack)                   |       |     |                           |       |
| Location  | 29:24 | RW  | 01h                       | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved                                |       |     |                           |       |
| Device  | 23:20 | RW  | 8h<br>0h (YB rev & prior) | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other |       |     |                           |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name     | Bits  | R/W | Default                   | Reset |
|----------------|---|-----|---------------------------|-------|
| ConnectionType | 19:16   | RW  | 1h                        | POR   |
|                | Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |     |                           |       |
| Color          | 15:12   | RW  | 4h                        | POR   |
|                | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other  |     |                           |       |
| Misc           | 11:8  | RW  | 0h                        | POR   |
|                | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override  |     |                           |       |
| Association    | 7:4   | RW  | 4h<br>5h (YB rev & prior) | POR   |
|                | Default association.  |     |                           |       |
| Sequence       | 3:0   | RW  | 1h<br>0h (YB rev & prior) | POR   |
|                | Sequence.   |     |                           |       |

## 7.10. PortF (NID = 0Fh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 4h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 1h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

## 92HD81

### SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

#### 7.10.1. PortF (NID = 0Fh): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Rsvd2      | 31:17                          | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved.                      |     |         |                  |
| EapdCap    | 16                             | R   | 1h      | N/A (Hard-coded) |
|            | EAPD support: 1 = yes, 0 = no. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| VrefCntrl   | 15:8   | R   | 00h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 1h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.10.2. PortF (NID = 0Fh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |



| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.10.3. PortF (NID = 0Fh): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

### 7.10.4. PortF (NID = 0Fh): InAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

#### 7.10.5. PortF (NID = 0Fh): InAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

#### 7.10.6. PortF (NID = 0Fh): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:2                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 1:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

**7.10.7. PortF (NID = 0Fh): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.10.8. PortF (NID = 0Fh): PinWCntrl**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:7  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled.   |     |         |                  |
| InEn       | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled.  |     |         |                  |
| Rsvd1      | 4:3   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| VRefEn     | 2:0   | RW  | 0h      | POR - DAFG - ULR |
|            | Vref selection (See VrefCntrl field of PinCap parameter for supported selections):<br>000b= HI-Z<br>001b= 50%<br>010b= GND<br>011b= Reserved<br>100b= 80%<br>101b= 100%<br>110b= Reserved<br>111b= Reserved |     |         |                  |

#### 7.10.9. PortF (NID = 0Fh): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

**7.10.10. PortF (NID = 0Fh): ChSense**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.10.11. PortF (NID = 0Fh): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd2      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| EAPD       | 1  | RW  | 1h        | POR - DAFG - ULR |
|            | EAPD control: 1 = set EAPD pin to 1 (powered) up if this pin is powered up, 0 = set EAPD pin to 0. |     |           |                  |

| Field Name | Bits | R/W | Default | Reset            |
|------------|------|-----|---------|------------------|
| Rsvd1      | 0    | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |      |     |         |                  |

**7.10.12. PortF (NID = 0Fh): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 0h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |       |     |         |       |
| Location  | 29:24 | RW  | 01h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |       |     |         |       |

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| Field Name     | Bits  | R/W | Default | Reset |
|----------------|---|-----|---------|-------|
| Device         | 23:20   | RW  | 8h      | POR   |
|                | Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |     |         |       |
| ConnectionType | 19:16   | RW  | 1h      | POR   |
|                | Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |     |         |       |

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| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 9h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 0h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | 4h      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | 0h      | POR   |
|             | Sequence.  |     |         |       |



## 7.11. MonoOut (NID = 10h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 4h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

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| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 0h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.11.1. MonoOut (NID = 10h): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Rsvd2      | 31:17                          | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved.                      |     |         |                  |
| EapdCap    | 16                             | R   | 0h      | N/A (Hard-coded) |
|            | EAPD support: 1 = yes, 0 = no. |     |         |                  |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| VrefCntrl   | 15:8   | R   | 00h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 0h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 0h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.11.2. MonoOut (NID = 10h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.11.3. MonoOut (NID = 10h): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                          | R/W | Default | Reset            |
|------------|-------------------------------|-----|---------|------------------|
| ConL3      | 31:24                         | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.            |     |         |                  |
| ConL2      | 23:16                         | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.            |     |         |                  |
| ConL1      | 15:8                          | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.            |     |         |                  |
| ConL0      | 7:0                           | R   | 1Ah     | N/A (Hard-coded) |
|            | MonoMix Summing widget (0x1A) |     |         |                  |

### 7.11.4. MonoOut (NID = 10h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

#### 7.11.5. MonoOut (NID = 10h): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits                                      | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:7                                      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                                 |     |         |                  |
| OutEn      | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |         |                  |

| Field Name | Bits | R/W | Default | Reset            |
|------------|------|-----|---------|------------------|
| Rsvd1      | 5:0  | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |      |     |         |                  |

**7.11.6. MonoOut (NID = 10h): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 1h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |       |     |         |       |
| Location  | 29:24 | RW  | 00h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |       |     |         |       |

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| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| Device  | 23:20 | RW  | Fh      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |       |     |         |       |
| ConnectionType  | 19:16 | RW  | 0h      | POR   |
| Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |       |     |         |       |

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| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 0h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 0h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | Fh      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | 0h      | POR   |
|             | Sequence.  |     |         |       |

### 7.12. DMic0 (NID = 11h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |



# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Type   | 23:20 | R   | 4h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| DigitalStrm  | 9     | R   | 0h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |
| ConnList   | 8     | R   | 0h      | N/A (Hard-coded) |
| Connection list present: 1 = yes, 0 = no.  |       |     |         |                  |
| UnsolCap   | 7     | R   | 1h      | N/A (Hard-coded) |
| Unsolicited response support: 1 = yes, 0 = no.   |       |     |         |                  |
| ProcWidget   | 6     | R   | 0h      | N/A (Hard-coded) |
| Processing state support: 1 = yes, 0 = no.   |       |     |         |                  |
| Stripe   | 5     | R   | 0h      | N/A (Hard-coded) |
| Striping support: 1 = yes, 0 = no.   |       |     |         |                  |
| FormatOvrd   | 4     | R   | 0h      | N/A (Hard-coded) |
| Stream format override: 1 = yes, 0 = no.   |       |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| AmpParOvrd  | 3    | R   | 0h      | N/A (Hard-coded) |
| Amplifier capabilities override: 1 = yes, no.           |      |     |         |                  |
| OutAmpPrsnt   | 2    | R   | 0h      | N/A (Hard-coded) |
| Output amp present: 1 = yes, 0 = no.                    |      |     |         |                  |
| InAmpPrsnt  | 1    | R   | 1h      | N/A (Hard-coded) |
| Input amp present: 1 = yes, 0 = no.                     |      |     |         |                  |
| Stereo  | 0    | R   | 1h      | N/A (Hard-coded) |
| Stereo stream support: 1 = yes (stereo), 0 = no (mono). |      |     |         |                  |

### 7.12.1. DMic0 (NID = 11h): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:17 | R   | 0000h   | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| EapdCap  | 16    | R   | 0h      | N/A (Hard-coded) |
| EAPD support: 1 = yes, 0 = no.   |       |     |         |                  |
| VRefCntrl  | 15:8  | R   | 00h     | N/A (Hard-coded) |
| Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |       |     |         |                  |
| Rsvd1  | 7     | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |

| Field Name   | Bits | R/W | Default | Reset            |
|--|------|-----|---------|------------------|
| BalancedIO   | 6    | R   | 0h      | N/A (Hard-coded) |
| Balanced I/O support: 1 = yes, 0 = no.                 |      |     |         |                  |
| InCap  | 5    | R   | 1h      | N/A (Hard-coded) |
| Input support: 1 = yes, 0 = no.                        |      |     |         |                  |
| OutCap   | 4    | R   | 0h      | N/A (Hard-coded) |
| Output support: 1 = yes, 0 = no.                       |      |     |         |                  |
| HPhnDrvCap   | 3    | R   | 0h      | N/A (Hard-coded) |
| Headphone amp present: 1 = yes, 0 = no.                |      |     |         |                  |
| PresDtctCap  | 2    | R   | 1h      | N/A (Hard-coded) |
| Presence detection support: 1 = yes, 0 = no.           |      |     |         |                  |
| TrigRqd  | 1    | R   | 0h      | N/A (Hard-coded) |
| Trigger required for impedance sense: 1 = yes, 0 = no. |      |     |         |                  |
| ImpSenseCap  | 0    | R   | 0h      | N/A (Hard-coded) |
| Impedance sense support: 1 = yes, 0 = no.              |      |     |         |                  |

### 7.12.2. DMic0 (NID = 11h): InAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name   | Bits | R/W | Default   | Reset            |
|--|------|-----|-----------|------------------|
| Rsvd1  | 31:2 | R   | 00000000h | N/A (Hard-coded) |
| Reserved.  |      |     |           |                  |
| Gain   | 1:0  | RW  | 0h        | POR - DAFG - ULR |
| Amp gain step number (see InAmpCap parameter pertaining to this widget). |      |     |           |                  |

### 7.12.3. DMic0 (NID = 11h): InAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |

**7.12.3. DMic0 (NID = 11h): InAmpRight**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

**7.12.4. DMic0 (NID = 11h): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd1      | 3:2  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                    |     |         |                  |
| Set        | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|            | Current power state setting for this widget. |     |         |                  |

#### 7.12.5. DMic0 (NID = 11h): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits                                     | R/W | Default  | Reset            |
|------------|--|-----|----------|------------------|
| Rsvd2      | 31:6                                     | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.                                |     |          |                  |
| InEn       | 5  | RW  | 0h       | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled. |     |          |                  |
| Rsvd1      | 4:0                                      | R   | 00h      | N/A (Hard-coded) |
|            | Reserved.                                |     |          |                  |

#### 7.12.6. DMic0 (NID = 11h): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled. |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

### 7.12.7. DMic0 (NID = 11h): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

### 7.12.8. DMic0 (NID = 11h): ConfigDefault

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name       | Bits  | R/W | Default | Reset |
|------------------|---|-----|---------|-------|
| PortConnectivity | 31:30   | RW  | 2h      | POR   |
|                  | Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |     |         |       |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name | Bits  | R/W | Default | Reset |
|------------|---|-----|---------|-------|
| Location   | 29:24   | RW  | 10h     | POR   |
|            | Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved                                |     |         |       |
| Device     | 23:20   | RW  | Ah      | POR   |
|            | Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other |     |         |       |

**92HD81**

**SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name     | Bits  | R/W | Default | Reset |
|----------------|---|-----|---------|-------|
| ConnectionType | 19:16   | RW  | 3h      | POR   |
|                | Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |     |         |       |
| Color          | 15:12   | RW  | 0h      | POR   |
|                | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other  |     |         |       |
| Misc           | 11:8  | RW  | 1h      | POR   |
|                | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override  |     |         |       |
| Association    | 7:4   | RW  | 4h      | POR   |
|                | Default association.  |     |         |       |
| Sequence       | 3:0   | RW  | Eh      | POR   |
|                | Sequence.   |     |         |       |



## 7.13. DMic1Vol (NID = 12h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| Rsvd2       | 31:24  | R   | 00h     | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| Type        | 23:20  | R   | Fh      | N/A (Hard-coded) |
|             | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay       | 19:16  | R   | 0h      | N/A (Hard-coded) |
|             | Number of sample delays through widget.  |     |         |                  |
| Rsvd1       | 15:12  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| SwapCap     | 11   | R   | 0h      | N/A (Hard-coded) |
|             | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl    | 10   | R   | 1h      | N/A (Hard-coded) |
|             | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| DigitalStrm | 9  | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList    | 8  | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnsolCap    | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.13.1. DMic1Vol (NID = 12h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

**7.13.2. DMic1Vol (NID = 12h): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                      | R/W | Default | Reset            |
|------------|---------------------------|-----|---------|------------------|
| ConL3      | 31:24                     | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.        |     |         |                  |
| ConL2      | 23:16                     | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.        |     |         |                  |
| ConL1      | 15:8                      | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.        |     |         |                  |
| ConL0      | 7:0                       | R   | 20h     | N/A (Hard-coded) |
|            | Dig1Pin Pin widget (0x20) |     |         |                  |

**7.13.3. DMic1Vol (NID = 12h): InAmpLeft**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

**7.13.4. DMic1Vol (NID = 12h): InAmpRight**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd1      | 31:2   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| Gain       | 1:0  | RW  | 0h        | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |           |                  |

### 7.13.5. DMic1Vol (NID = 12h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

## 7.14. DAC0 (NID = 13h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 0h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | Dh      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 1h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 0h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.14.1. DAC0 (NID = 13h): Cnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits                                      | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16                                     | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.                                 |     |         |                  |
| StrmType     | 15  | R   | 0h      | N/A (Hard-coded) |
|              | Stream type: 1 = Non-PCM, 0 = PCM.        |     |         |                  |
| FrmtSmpIRate | 14  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name    | Bits  | R/W | Default | Reset            |
|---------------|---|-----|---------|------------------|
| SmplRateMultp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv   | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1         | 7   | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| BitsPerSmpl   | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|               | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved   |     |         |                  |
| NmbrChan      | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|               | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.   |     |         |                  |

### 7.14.2. DAC0 (NID = 13h): ProcState (RA revision only)

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 703h              |
| Get | F0300h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd       | 31:2   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| DACHPFByp  | 1:0  | RW  | 1h      | POR - DAFG - ULR |
|            | Processing State: 00b= bypass the DAC HPF ("off"), 01b-11b= DAC HPF is enabled ("on" or "benign"). |     |         |                  |

#### 7.14.3. DAC0 (NID = 13h): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Gain       | 6:0   | RW  | 7Fh     | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

#### 7.14.4. DAC0 (NID = 13h): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd       | 31:8      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |



| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Mute  | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted.                                       |      |     |         |                  |
| Gain  | 6:0  | RW  | 7Fh     | POR - DAFG - ULR |
| Amp gain step number (see OutAmpCap parameter pertaining to this widget). |      |     |         |                  |

#### 7.14.5. DAC0 (NID = 13h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd4  | 31:11 | R   | 000000h | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SettingsReset  | 10    | R   | 1h      | POR - DAFG - ULR |
| Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |       |     |         |                  |
| Rsvd3  | 9     | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Error  | 8     | R   | 0h      | POR - DAFG - ULR |
| Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |       |     |         |                  |
| Rsvd2  | 7:6   | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Act  | 5:4   | R   | 3h      | POR - DAFG - LR  |
| Actual power state of this widget.   |       |     |         |                  |
| Rsvd1  | 3:2   | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Set  | 1:0   | RW  | 3h      | POR - DAFG - LR  |
| Current power state setting for this widget.   |       |     |         |                  |

**7.14.6. DAC0 (NID = 13h): CnvtrID**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                        |
| Ch         | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                        |

**7.14.7. DAC0 (NID = 13h): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd2      | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| SwapEn     | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Swap enable: 1 = L/R swap enabled, 0 = L/R swap disabled. |     |           |                  |
| Rsvd1      | 1:0   | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.14.8. DAC0 (NID = 13h): ProclIndex (RA revision only)**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 782h              |

**7.14.8. DAC0 (NID = 13h): ProclIndex (RA revision only)**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Get | F8200h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:3  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| CoeffIndex | 2:0   | RW  | 2h      | POR - DAFG - ULR |
|            | Processing Coeff selection.<br>0 = -3db response at 100Hz<br>1 = -3db response at 200Hz<br>2 = -3db response at 300Hz<br>3 = -3db response at 400Hz<br>4 = -3db response at 500Hz<br>5 = -3db response at 750Hz<br>6 = -3db response at 1000Hz<br>7 = -3db response at 2000Hz |     |         |                  |

**7.15. DAC1 (NID = 14h): WCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 0h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| Delay       | 19:16   | R   | Dh      | N/A (Hard-coded) |
|             | Number of sample delays through widget.                     |     |         |                  |
| Rsvd1       | 15:12   | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.   |     |         |                  |
| SwapCap     | 11  | R   | 1h      | N/A (Hard-coded) |
|             | Left/right swap support: 1 = yes, 0 = no.                   |     |         |                  |
| PwrCntrl    | 10  | R   | 1h      | N/A (Hard-coded) |
|             | Power state support: 1 = yes, 0 = no.                       |     |         |                  |
| Dig         | 9   | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog). |     |         |                  |
| ConnList    | 8   | R   | 0h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.                   |     |         |                  |
| UnSolCap    | 7   | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.              |     |         |                  |
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.                  |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                          |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                    |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.               |     |         |                  |
| OutAmpPrsnt | 2   | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                        |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                         |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono).     |     |         |                  |

**7.15.1. DAC1 (NID = 14h): Cnvtr**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16   | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.   |     |         |                  |
| StrmType     | 15  | R   | 0h      | N/A (Hard-coded) |
|              | Stream type: 1 = Non-PCM, 0 = PCM.  |     |         |                  |
| FrmtSmplRate | 14  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz.   |     |         |                  |
| SmplRateMltp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv  | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1        | 7   | R   | 0h      | N/A (Hard-coded) |
|              | Reserved.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| BitsPerSmpl | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|             | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved |     |         |                  |
| NmbrChan    | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|             | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.                           |     |         |                  |

**7.15.2. DAC1 (NID = 14h): ProcState (RA revision only)**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 703h              |
| Get | F0300h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd       | 31:2   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| DACHPFByp  | 1:0  | RW  | 1h      | POR - DAFG - ULR |
|            | Processing State: 00b= bypass the DAC HPF ("off"), 01b-11b= DAC HPF is enabled ("on" or "benign"). |     |         |                  |

**7.15.3. DAC1 (NID = 14h): OutAmpLeft**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Gain       | 6:0   | RW  | 7Fh     | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

#### 7.15.4. DAC1 (NID = 14h): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Gain       | 6:0   | RW  | 7Fh     | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

#### 7.15.5. DAC1 (NID = 14h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:11     | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 3h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

### 7.15.6. DAC1 (NID = 14h): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                        |
| Ch         | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                        |



**7.15.7. DAC1 (NID = 14h): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd2      | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| SwapEn     | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Swap enable: 1 = L/R swap enabled, 0 = L/R swap disabled. |     |           |                  |
| Rsvd1      | 1:0   | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.15.8. DAC1 (NID = 14h): ProclIndex (RA revision only)**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 782h              |
| Get | F8200h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:3  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| CoeffIndex | 2:0   | RW  | 2h      | POR - DAFG - ULR |
|            | Processing Coeff selection.<br>0 = -3db response at 100Hz<br>1 = -3db response at 200Hz<br>2 = -3db response at 300Hz<br>3 = -3db response at 400Hz<br>4 = -3db response at 500Hz<br>5 = -3db response at 750Hz<br>6 = -3db response at 1000Hz<br>7 = -3db response at 2000Hz |     |         |                  |

## 7.16. DAC2 (NID = 22h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | Fh      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 0h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 0h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 0h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.16.1. DAC2 (NID = 22h): Cnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits                                      | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16                                     | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.                                 |     |         |                  |
| StrmType     | 15  | R   | 0h      | N/A (Hard-coded) |
|              | Stream type: 1 = Non-PCM, 0 = PCM.        |     |         |                  |
| FrmtSmpIRate | 14  | R   | 0h      | N/A (Hard-coded) |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz. |     |         |                  |

| Field Name    | Bits  | R/W | Default | Reset            |
|---------------|---|-----|---------|------------------|
| SmplRateMultp | 13:11   | R   | 0h      | N/A (Hard-coded) |
|               | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv   | 10:8  | R   | 0h      | N/A (Hard-coded) |
|               | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1         | 7   | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| BitsPerSmpl   | 6:4   | R   | 0h      | N/A (Hard-coded) |
|               | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved   |     |         |                  |
| NmbrChan      | 3:0   | R   | 0h      | N/A (Hard-coded) |
|               | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.   |     |         |                  |

### 7.16.2. DAC2 (NID = 22h): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA00h               |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Gain       | 6:0   | R   | 00h     | N/A (Hard-coded) |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

### 7.16.3. DAC2 (NID = 22h): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Gain       | 6:0   | R   | 00h     | N/A (Hard-coded) |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

### 7.16.4. DAC2 (NID = 22h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:11     | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| SettingsReset | 10   | R   | 0h      | N/A (Hard-coded) |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | N/A (Hard-coded) |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 0h      | N/A (Hard-coded) |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | R   | 0h      | N/A (Hard-coded) |
|               | Current power state setting for this widget.   |     |         |                  |

### 7.16.5. DAC2 (NID = 22h): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Strm       | 7:4  | R   | 0h      | N/A (Hard-coded) |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                  |
| Ch         | 3:0  | R   | 0h      | N/A (Hard-coded) |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                  |

**7.16.6. DAC2 (NID = 22h): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd2      | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| SwapEn     | 2   | R   | 0h        | N/A (Hard-coded) |
|            | Swap enable: 1 = L/R swap enabled, 0 = L/R swap disabled. |     |           |                  |
| Rsvd1      | 1:0   | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.17. ADC0 (NID = 15h): WCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits      | R/W | Default | Reset            |
|--|-----------|-----|---------|------------------|
| Rsvd2  | 31:24     | R   | 00h     | N/A (Hard-coded) |
|  | Reserved. |     |         |                  |
| Type   | 23:20     | R   | 1h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |           |     |         |                  |

**92HD81****SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| Delay       | 19:16   | R   | Dh      | N/A (Hard-coded) |
|             | Number of sample delays through widget.                     |     |         |                  |
| Rsvd1       | 15:12   | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.   |     |         |                  |
| SwapCap     | 11  | R   | 0h      | N/A (Hard-coded) |
|             | Left/right swap support: 1 = yes, 0 = no.                   |     |         |                  |
| PwrCntrl    | 10  | R   | 1h      | N/A (Hard-coded) |
|             | Power state support: 1 = yes, 0 = no.                       |     |         |                  |
| Dig         | 9   | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog). |     |         |                  |
| ConnList    | 8   | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.                   |     |         |                  |
| UnSolCap    | 7   | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.              |     |         |                  |
| ProcWidget  | 6   | R   | 1h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.                  |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                          |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                    |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.               |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                        |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                         |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono).     |     |         |                  |



**7.17.1. ADC0 (NID = 15h): ConLst**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

**7.17.2. ADC0 (NID = 15h): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| ConL3      | 31:24                          | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL2      | 23:16                          | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL1      | 15:8                           | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL0      | 7:0                            | R   | 17h     | N/A (Hard-coded) |
|            | ADC0Mux Selector widget (0x18) |     |         |                  |

## 7.17.3. ADC0 (NID = 15h): Cnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16   | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.   |     |         |                  |
| StrmType     | 15  | R   | 0h      | N/A (Hard-coded) |
|              | Stream type: 1 = Non-PCM, 0 = PCM.  |     |         |                  |
| FrmtSmplRate | 14  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz.   |     |         |                  |
| SmplRateMltp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv  | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1        | 7   | R   | 0h      | N/A (Hard-coded) |
|              | Reserved.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| BitsPerSmpl | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|             | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved |     |         |                  |
| NmbrChan    | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|             | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.                           |     |         |                  |

#### 7.17.4. ADC0 (NID = 15h): ProcState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 703h              |
| Get | F0300h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| HPFOCDIS   | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | HPF offset calculation disable. 1 = calculation disabled; 0 = calculation enabled.                 |     |         |                  |
| Rsvd1      | 6:2  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| ADCHPFByp  | 1:0  | RW  | 1h      | POR - DAFG - ULR |
|            | Processing State: 00b= bypass the ADC HPF ("off"), 01b-11b= ADC HPF is enabled ("on" or "benign"). |     |         |                  |

#### 7.17.5. ADC0 (NID = 15h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 3h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

#### 7.17.6. ADC0 (NID = 15h): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's. |     |         |                        |

| Field Name   | Bits | R/W | Default | Reset                  |
|--|------|-----|---------|------------------------|
| Ch   | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
| Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |      |     |         |                        |

### 7.18. ADC1 (NID = 16h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:24 | R   | 00h     | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Type   | 23:20 | R   | 1h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | Dh      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| Dig         | 9   | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog). |     |         |                  |
| ConnList    | 8   | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.                   |     |         |                  |
| UnSolCap    | 7   | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.              |     |         |                  |
| ProcWidget  | 6   | R   | 1h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.                  |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                          |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                    |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.               |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                        |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                         |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono).     |     |         |                  |

### 7.18.1. ADC1 (NID = 16h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

**7.18.2. ADC1 (NID = 16h): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                  | R/W | Default | Reset            |
|------------|-----------------------|-----|---------|------------------|
| ConL3      | 31:24                 | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.    |     |         |                  |
| ConL2      | 23:16                 | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.    |     |         |                  |
| ConL1      | 15:8                  | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.    |     |         |                  |
| ConL0      | 7:0                   | R   | 18h     | N/A (Hard-coded) |
|            | ADC1Mux widget (0x18) |     |         |                  |

**7.18.3. ADC1 (NID = 16h): Cnvtr**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name    | Bits  | R/W | Default | Reset            |
|---------------|---|-----|---------|------------------|
| Rsvd2         | 31:16   | R   | 0000h   | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| StrmType      | 15  | R   | 0h      | N/A (Hard-coded) |
|               | Stream type: 1 = Non-PCM, 0 = PCM.  |     |         |                  |
| FrmtSmplRate  | 14  | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate: 1 = 44.1kHz, 0 = 48kHz.   |     |         |                  |
| SmplRateMultp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv   | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1         | 7   | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| BitsPerSmpl   | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|               | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved   |     |         |                  |
| NmbrChan      | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|               | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.   |     |         |                  |



**7.18.4. ADC1 (NID = 16h): ProcState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 703h              |
| Get | F0300h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| HPFOCDIS   | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | HPF offset calculation disable. 1 = calculation disabled; 0 = calculation enabled.                 |     |         |                  |
| Rsvd1      | 6:2  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| ADCHPFByp  | 1:0  | RW  | 1h      | POR - DAFG - ULR |
|            | Processing State: 00b= bypass the ADC HPF ("off"), 01b-11b= ADC HPF is enabled ("on" or "benign"). |     |         |                  |

**7.18.5. ADC1 (NID = 16h): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Error      | 8   | R   | 0h      | POR - DAFG - ULR |
|            | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state. |     |         |                  |
| Rsvd2      | 7:6   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Act        | 5:4   | R   | 3h      | POR - DAFG - LR  |
|            | Actual power state of this widget.  |     |         |                  |
| Rsvd1      | 3:2   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Set        | 1:0   | RW  | 3h      | POR - DAFG - LR  |
|            | Current power state setting for this widget.  |     |         |                  |

#### 7.18.6. ADC1 (NID = 16h): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                        |
| Ch         | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                        |

#### 7.19. ADC0Mux (NID = 17h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

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| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| Rsvd2       | 31:24  | R   | 00h     | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| Type        | 23:20  | R   | 3h      | N/A (Hard-coded) |
|             | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay       | 19:16  | R   | 0h      | N/A (Hard-coded) |
|             | Number of sample delays through widget.  |     |         |                  |
| Rsvd1       | 15:12  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| SwapCap     | 11   | R   | 1h      | N/A (Hard-coded) |
|             | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl    | 10   | R   | 1h      | N/A (Hard-coded) |
|             | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| DigitalStrm | 9  | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList    | 8  | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnsolCap    | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |
| ProcWidget  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.   |     |         |                  |
| Stripe      | 5  | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.   |     |         |                  |

| Field Name   | Bits  | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| FormatOvrd   | 4   | R   | 0h      | N/A (Hard-coded) |
|              | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParamOvrd | 3   | R   | 1h      | N/A (Hard-coded) |
|              | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt  | 2   | R   | 1h      | N/A (Hard-coded) |
|              | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt   | 1   | R   | 0h      | N/A (Hard-coded) |
|              | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo       | 0   | R   | 1h      | N/A (Hard-coded) |
|              | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

#### 7.19.1. ADC0Mux (NID = 17h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 07h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

#### 7.19.2. ADC0Mux (NID = 17h): ConLstEntry4

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0204h              |                     |                    |                   |

| Field Name | Bits                            | R/W | Default | Reset            |
|------------|---------------------------------|-----|---------|------------------|
| ConL7      | 31:24                           | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.              |     |         |                  |
| ConL6      | 23:16                           | R   | 0Ah     | N/A (Hard-coded) |
|            | Port A Pin widget (0x0A)        |     |         |                  |
| ConL5      | 15:8                            | R   | 12h     | N/A (Hard-coded) |
|            | DMic1Vol Selector widget (0x12) |     |         |                  |
| ConL4      | 7:0                             | R   | 11h     | N/A (Hard-coded) |
|            | DMic0 Pin widget (0x11)         |     |         |                  |

### 7.19.3. ADC0Mux (NID = 17h): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                        | R/W | Default | Reset            |
|------------|-----------------------------|-----|---------|------------------|
| ConL3      | 31:24                       | R   | 1Bh     | N/A (Hard-coded) |
|            | Mixer Summing widget (0x1B) |     |         |                  |
| ConL2      | 23:16                       | R   | 0Fh     | N/A (Hard-coded) |
|            | Port F Pin widget (0x0F)    |     |         |                  |
| ConL1      | 15:8                        | R   | 0Eh     | N/A (Hard-coded) |
|            | Port E Pin widget (0x0E)    |     |         |                  |
| ConL0      | 7:0                         | R   | 0Ch     | N/A (Hard-coded) |
|            | Port C Pin widget (0x0C)    |     |         |                  |

### 7.19.4. ADC0Mux (NID = 17h): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 05h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 0Fh     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 00h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB  |     |         |                  |

### 7.19.5. ADC0Mux (NID = 17h): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name | Bits                                | R/W | Default | Reset            |
|------------|-------------------------------------|-----|---------|------------------|
| Rsvd2      | 31:8                                | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |
| Mute       | 7                                   | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted. |     |         |                  |
| Rsvd1      | 6:4                                 | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Gain  | 3:0  | RW  | 0h      | POR - DAFG - ULR |
| Amp gain step number (see OutAmpCap parameter pertaining to this widget). |      |     |         |                  |

#### 7.19.6. ADC0Mux (NID = 17h): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd2   | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Mute  | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted.                                       |      |     |         |                  |
| Rsvd1   | 6:4  | R   | 0h      | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Gain  | 3:0  | RW  | 0h      | POR - DAFG - ULR |
| Amp gain step number (see OutAmpCap parameter pertaining to this widget). |      |     |         |                  |

#### 7.19.7. ADC0Mux (NID = 17h): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name                       | Bits | R/W | Default   | Reset            |
|----------------------------------|------|-----|-----------|------------------|
| Rsvd                             | 31:3 | R   | 00000000h | N/A (Hard-coded) |
| Reserved.                        |      |     |           |                  |
| Index                            | 2:0  | RW  | 0h        | POR - DAFG - ULR |
| Connection select control index. |      |     |           |                  |

**7.19.8. ADC0Mux (NID = 17h): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.19.9. ADC0Mux (NID = 17h): EAPDBTLLR**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |



| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd2      | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| SwapEn     | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Swap enable: 1 = L/R swap enabled, 0 = L/R swap disabled. |     |           |                  |
| Rsvd1      | 1:0   | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

### 7.20. ADC1Mux (NID = 18h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits                                    | R/W | Default | Reset            |
|--|---|-----|---------|------------------|
| Rsvd2  | 31:24                                   | R   | 00h     | N/A (Hard-coded) |
|  | Reserved.                               |     |         |                  |
| Type   | 23:20                                   | R   | 3h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |   |     |         |                  |
| Delay  | 19:16                                   | R   | 0h      | N/A (Hard-coded) |
|  | Number of sample delays through widget. |     |         |                  |
| Rsvd1  | 15:12                                   | R   | 0h      | N/A (Hard-coded) |
|  | Reserved.                               |     |         |                  |

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| Field Name   | Bits  | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| SwapCap      | 11  | R   | 1h      | N/A (Hard-coded) |
|              | Left/right swap support: 1 = yes, 0 = no.                   |     |         |                  |
| PwrCntrl     | 10  | R   | 1h      | N/A (Hard-coded) |
|              | Power state support: 1 = yes, 0 = no.                       |     |         |                  |
| DigitalStrm  | 9   | R   | 0h      | N/A (Hard-coded) |
|              | Digital stream support: 1 = yes (digital), 0 = no (analog). |     |         |                  |
| ConnList     | 8   | R   | 1h      | N/A (Hard-coded) |
|              | Connection list present: 1 = yes, 0 = no.                   |     |         |                  |
| UnsolCap     | 7   | R   | 0h      | N/A (Hard-coded) |
|              | Unsolicited response support: 1 = yes, 0 = no.              |     |         |                  |
| ProcWidget   | 6   | R   | 0h      | N/A (Hard-coded) |
|              | Processing state support: 1 = yes, 0 = no.                  |     |         |                  |
| Stripe       | 5   | R   | 0h      | N/A (Hard-coded) |
|              | Striping support: 1 = yes, 0 = no.                          |     |         |                  |
| FormatOvrđ   | 4   | R   | 0h      | N/A (Hard-coded) |
|              | Stream format override: 1 = yes, 0 = no.                    |     |         |                  |
| AmpParamOvrđ | 3   | R   | 1h      | N/A (Hard-coded) |
|              | Amplifier capabilities override: 1 = yes, no.               |     |         |                  |
| OutAmpPrsnt  | 2   | R   | 1h      | N/A (Hard-coded) |
|              | Output amp present: 1 = yes, 0 = no.                        |     |         |                  |
| InAmpPrsnt   | 1   | R   | 0h      | N/A (Hard-coded) |
|              | Input amp present: 1 = yes, 0 = no.                         |     |         |                  |
| Stereo       | 0   | R   | 1h      | N/A (Hard-coded) |
|              | Stereo stream support: 1 = yes (stereo), 0 = no (mono).     |     |         |                  |

### 7.20.1. ADC1Mux (NID = 18h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 07h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

**7.20.2. ADC1Mux (NID = 18h): ConLstEntry4**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0204h              |                     |                    |                   |

| Field Name | Bits                            | R/W | Default | Reset            |
|------------|---------------------------------|-----|---------|------------------|
| ConL7      | 31:24                           | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.              |     |         |                  |
| ConL6      | 23:16                           | R   | 0Ah     | N/A (Hard-coded) |
|            | Port A Pin widget (0x0A)        |     |         |                  |
| ConL5      | 15:8                            | R   | 12h     | N/A (Hard-coded) |
|            | DMic1Vol Selector widget (0x12) |     |         |                  |
| ConL4      | 7:0                             | R   | 11h     | N/A (Hard-coded) |
|            | DMic0 Pin widget (0x11)         |     |         |                  |

**7.20.3. ADC1Mux (NID = 18h): ConLstEntry0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                        | R/W | Default | Reset            |
|------------|-----------------------------|-----|---------|------------------|
| ConL3      | 31:24                       | R   | 1Bh     | N/A (Hard-coded) |
|            | Mixer Summing widget (0x1B) |     |         |                  |
| ConL2      | 23:16                       | R   | 0Fh     | N/A (Hard-coded) |
|            | Port F Pin widget (0x0F)    |     |         |                  |
| ConL1      | 15:8                        | R   | 0Eh     | N/A (Hard-coded) |
|            | Port E Pin widget (0x0E)    |     |         |                  |
| ConL0      | 7:0                         | R   | 0Ch     | N/A (Hard-coded) |
|            | Port C Pin widget (0x0C)    |     |         |                  |

#### 7.20.4. ADC1Mux (NID = 18h): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 05h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 0Fh     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |

| Field Name                  | Bits | R/W | Default | Reset            |
|-----------------------------|------|-----|---------|------------------|
| Offset                      | 6:0  | R   | 00h     | N/A (Hard-coded) |
| Indicates which step is 0dB |      |     |         |                  |

### 7.20.5. ADC1Mux (NID = 18h): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd2   | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Mute  | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted.                                       |      |     |         |                  |
| Rsvd1   | 6:4  | R   | 0h      | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Gain  | 3:0  | RW  | 0h      | POR - DAFG - ULR |
| Amp gain step number (see OutAmpCap parameter pertaining to this widget). |      |     |         |                  |

### 7.20.6. ADC1Mux (NID = 18h): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name                          | Bits | R/W | Default | Reset            |
|-------------------------------------|------|-----|---------|------------------|
| Rsvd2                               | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.                           |      |     |         |                  |
| Mute                                | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted. |      |     |         |                  |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd1      | 6:4   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Gain       | 3:0   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

#### 7.20.7. ADC1Mux (NID = 18h): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default   | Reset            |
|------------|----------------------------------|-----|-----------|------------------|
| Rsvd       | 31:3                             | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |           |                  |
| Index      | 2:0                              | RW  | 0h        | POR - DAFG - ULR |
|            | Connection select control index. |     |           |                  |

#### 7.20.8. ADC1Mux (NID = 18h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Error      | 8   | R   | 0h      | POR - DAFG - ULR |
|            | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state. |     |         |                  |
| Rsvd2      | 7:6   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Act        | 5:4   | R   | 3h      | POR - DAFG - LR  |
|            | Actual power state of this widget.  |     |         |                  |
| Rsvd1      | 3:2   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Set        | 1:0   | RW  | 0h      | POR - DAFG - LR  |
|            | Current power state setting for this widget.  |     |         |                  |

#### 7.20.9. ADC1Mux (NID = 18h): EAPDBTLLR

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ch              |
| Get | F0C00h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| Rsvd2      | 31:3  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |
| SwapEn     | 2   | RW  | 0h        | POR - DAFG - ULR |
|            | Swap enable: 1 = L/R swap enabled, 0 = L/R swap disabled. |     |           |                  |
| Rsvd1      | 1:0   | R   | 0h        | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

#### 7.21. MonoMux (NID = 19h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 3h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |
| ProcWidget | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Processing state support: 1 = yes, 0 = no.   |     |         |                  |
| Stripe     | 5  | R   | 0h      | N/A (Hard-coded) |
|            | Striping support: 1 = yes, 0 = no.   |     |         |                  |



| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.21.1. MonoMux (NID = 19h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 03h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.21.2. MonoMux (NID = 19h): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                               | R/W | Default | Reset            |
|------------|------------------------------------|-----|---------|------------------|
| ConL3      | 31:24                              | R   | 00h     | N/A (Hard-coded) |
|            | DAC2 Converter widget (0x22)       |     |         |                  |
| ConL2      | 23:16                              | R   | 1Ch     | N/A (Hard-coded) |
|            | MixerOutVol Selector widget (0x1C) |     |         |                  |
| ConL1      | 15:8                               | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14)       |     |         |                  |
| ConL0      | 7:0                                | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13)       |     |         |                  |

### 7.21.3. MonoMux (NID = 19h): ConSelectCtrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 701h              |
| Get | F0100h              |                     |                    |                   |

| Field Name | Bits                             | R/W | Default  | Reset            |
|------------|----------------------------------|-----|----------|------------------|
| Rsvd       | 31:2                             | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.                        |     |          |                  |
| Index      | 1:0                              | RW  | 0h       | POR - DAFG - ULR |
|            | Connection select control index. |     |          |                  |

### 7.21.4. MonoMux (NID = 19h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:11     | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.22. MonoMix (NID = 1Ah): WCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Type   | 23:20 | R   | 2h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 0h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |
| ConnList   | 8     | R   | 1h      | N/A (Hard-coded) |
| Connection list present: 1 = yes, 0 = no.  |       |     |         |                  |
| UnSolCap   | 7     | R   | 0h      | N/A (Hard-coded) |
| Unsolicited response support: 1 = yes, 0 = no.   |       |     |         |                  |
| ProcWidget   | 6     | R   | 0h      | N/A (Hard-coded) |
| Processing state support: 1 = yes, 0 = no.   |       |     |         |                  |
| Stripe   | 5     | R   | 0h      | N/A (Hard-coded) |
| Striping support: 1 = yes, 0 = no.   |       |     |         |                  |
| FormatOvrd   | 4     | R   | 0h      | N/A (Hard-coded) |
| Stream format override: 1 = yes, 0 = no.   |       |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| AmpParOvr   | 3    | R   | 0h      | N/A (Hard-coded) |
| Amplifier capabilities override: 1 = yes, no.           |      |     |         |                  |
| OutAmpPrsnt   | 2    | R   | 0h      | N/A (Hard-coded) |
| Output amp present: 1 = yes, 0 = no.                    |      |     |         |                  |
| InAmpPrsnt  | 1    | R   | 0h      | N/A (Hard-coded) |
| Input amp present: 1 = yes, 0 = no.                     |      |     |         |                  |
| Stereo  | 0    | R   | 0h      | N/A (Hard-coded) |
| Stereo stream support: 1 = yes (stereo), 0 = no (mono). |      |     |         |                  |

### 7.22.1. MonoMix (NID = 1Ah): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd  | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| LForm   | 7    | R   | 0h      | N/A (Hard-coded) |
| Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |      |     |         |                  |
| ConL  | 6:0  | R   | 01h     | N/A (Hard-coded) |
| Number of NID entries in connection list.   |      |     |         |                  |

### 7.22.2. MonoMix (NID = 1Ah): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| ConL3      | 31:24                          | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL2      | 23:16                          | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL1      | 15:8                           | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.             |     |         |                  |
| ConL0      | 7:0                            | R   | 19h     | N/A (Hard-coded) |
|            | MonoMux Selector widget (0x19) |     |         |                  |

### 7.22.3. MonoMix (NID = 1Ah): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd1      | 3:2  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                    |     |         |                  |
| Set        | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|            | Current power state setting for this widget. |     |         |                  |

### 7.23. Mixer (NID = 1Bh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits                                      | R/W | Default | Reset            |
|--|---|-----|---------|------------------|
| Rsvd2  | 31:24                                     | R   | 00h     | N/A (Hard-coded) |
|  | Reserved.                                 |     |         |                  |
| Type   | 23:20                                     | R   | 2h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |   |     |         |                  |
| Delay  | 19:16                                     | R   | 0h      | N/A (Hard-coded) |
|  | Number of sample delays through widget.   |     |         |                  |
| Rsvd1  | 15:12                                     | R   | 0h      | N/A (Hard-coded) |
|  | Reserved.                                 |     |         |                  |
| SwapCap  | 11  | R   | 0h      | N/A (Hard-coded) |
|  | Left/right swap support: 1 = yes, 0 = no. |     |         |                  |
| PwrCntrl   | 10  | R   | 1h      | N/A (Hard-coded) |
|  | Power state support: 1 = yes, 0 = no.     |     |         |                  |

# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| Dig         | 9   | R   | 0h      | N/A (Hard-coded) |
|             | Digital stream support: 1 = yes (digital), 0 = no (analog). |     |         |                  |
| ConnList    | 8   | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.                   |     |         |                  |
| UnSolCap    | 7   | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.              |     |         |                  |
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.                  |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                          |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                    |     |         |                  |
| AmpParOvrd  | 3   | R   | 1h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.               |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                        |     |         |                  |
| InAmpPrsnt  | 1   | R   | 1h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                         |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono).     |     |         |                  |

### 7.23.1. Mixer (NID = 1Bh): InAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Dh              |                     |                    |                   |



# 92HD81

## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 05h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 1Fh     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 17h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB  |     |         |                  |

### 7.23.2. Mixer (NID = 1Bh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 06h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

## 7.23.3. Mixer (NID = 1Bh): ConLstEntry4

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0204h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| ConL7      | 31:24   | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.  |     |         |                  |
| ConL6      | 23:16   | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.  |     |         |                  |
| ConL5      | 15:8  | R   | 0Ah     | N/A (Hard-coded) |
|            | Port A Pin widget (0x0A). Uses InAmpLeft5/InAmpRight5 controls.     |     |         |                  |
| ConL4      | 7:0   | R   | 14h     | N/A (Hard-coded) |
|            | DAC1 Converter widget (0x14). Uses InAmpLeft4/InAmpRight4 controls. |     |         |                  |

## 7.23.4. Mixer (NID = 1Bh): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| ConL3      | 31:24   | R   | 13h     | N/A (Hard-coded) |
|            | DAC0 Converter widget (0x13). Uses InAmpLeft3/InAmpRight3 controls. |     |         |                  |
| ConL2      | 23:16   | R   | 0Fh     | N/A (Hard-coded) |
|            | Port F Pin widget (0x0F). Uses InAmpLeft2/InAmpRight2 controls.     |     |         |                  |
| ConL1      | 15:8  | R   | 0Eh     | N/A (Hard-coded) |
|            | Port E Pin widget (0x0E). Uses InAmpLeft1/InAmpRight1 controls.     |     |         |                  |
| ConL0      | 7:0   | R   | 0Ch     | N/A (Hard-coded) |
|            | Port C Pin widget (0x0C). Uses InAmpLeft0/InAmpRight0 controls.     |     |         |                  |

**7.23.5. Mixer (NID = 1Bh): InAmpLeft0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 360h              |
| Get | B2000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.6. Mixer (NID = 1Bh): InAmpRight0**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 350h              |
| Get | B0000h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.7. Mixer (NID = 1Bh): InAmpLeft1**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 361h              |
| Get | B2001h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.8. Mixer (NID = 1Bh): InAmpRight1**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 351h              |
| Get | B0001h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.9. Mixer (NID = 1Bh): InAmpLeft2**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 362h              |
| Get | B2002h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.10. Mixer (NID = 1Bh): InAmpRight2**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 352h              |
| Get | B0002h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.11. Mixer (NID = 1Bh): InAmpLeft3**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 363h              |
| Get | B2003h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.12. Mixer (NID = 1Bh): InAmpRight3**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 353h              |
| Get | B0003h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.13. Mixer (NID = 1Bh): InAmpLeft4**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 364h              |
| Get | B2004h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.14. Mixer (NID = 1Bh): InAmpRight4**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 354h              |
| Get | B0004h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.15. Mixer (NID = 1Bh): InAmpLeft5**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 365h              |
| Get | B2005h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |

**7.23.16. Mixer (NID = 1Bh): InAmpRight5**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 355h              |
| Get | B0005h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Mute       | 7  | RW  | 1h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                      |     |         |                  |
| Rsvd1      | 6:5  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Gain       | 4:0  | RW  | 17h     | POR - DAFG - ULR |
|            | Amp gain step number (see InAmpCap parameter pertaining to this widget). |     |         |                  |



**7.23.17. Mixer (NID = 1Bh): PwrState**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.24. MixerOutVol (NID = 1Ch): WCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 3h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 0h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 0h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 1h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |
| ProcWidget | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Processing state support: 1 = yes, 0 = no.   |     |         |                  |
| Stripe     | 5  | R   | 0h      | N/A (Hard-coded) |
|            | Striping support: 1 = yes, 0 = no.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvrd  | 3   | R   | 1h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

#### 7.24.1. MixerOutVol (NID = 1Ch): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

#### 7.24.2. MixerOutVol (NID = 1Ch): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                        | R/W | Default | Reset            |
|------------|-----------------------------|-----|---------|------------------|
| ConL3      | 31:24                       | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.          |     |         |                  |
| ConL2      | 23:16                       | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.          |     |         |                  |
| ConL1      | 15:8                        | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.          |     |         |                  |
| ConL0      | 7:0                         | R   | 1Bh     | N/A (Hard-coded) |
|            | Mixer Summing widget (0x1B) |     |         |                  |

### 7.24.3. MixerOutVol (NID = 1Ch): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 05h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 1Fh     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |

| Field Name                  | Bits | R/W | Default | Reset            |
|-----------------------------|------|-----|---------|------------------|
| Offset                      | 6:0  | R   | 1Fh     | N/A (Hard-coded) |
| Indicates which step is 0dB |      |     |         |                  |

#### 7.24.4. MixerOutVol (NID = 1Ch): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| Rsvd2   | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Mute  | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted.                                       |      |     |         |                  |
| Rsvd1   | 6:5  | R   | 0h      | N/A (Hard-coded) |
| Reserved.   |      |     |         |                  |
| Gain  | 4:0  | RW  | 1Fh     | POR - DAFG - ULR |
| Amp gain step number (see OutAmpCap parameter pertaining to this widget). |      |     |         |                  |

#### 7.24.5. MixerOutVol (NID = 1Ch): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name                          | Bits | R/W | Default | Reset            |
|-------------------------------------|------|-----|---------|------------------|
| Rsvd2                               | 31:8 | R   | 000000h | N/A (Hard-coded) |
| Reserved.                           |      |     |         |                  |
| Mute                                | 7    | RW  | 1h      | POR - DAFG - ULR |
| Amp mute: 1 = muted, 0 = not muted. |      |     |         |                  |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd1      | 6:5   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Gain       | 4:0   | RW  | 1Fh     | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

#### 7.24.6. MixerOutVol (NID = 1Ch): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

## 7.25. SPDIFOut0 (NID = 1Dh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:24  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Type       | 23:20  | R   | 0h      | N/A (Hard-coded) |
|            | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Delay      | 19:16  | R   | 4h      | N/A (Hard-coded) |
|            | Number of sample delays through widget.  |     |         |                  |
| Rsvd1      | 15:12  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| SwapCap    | 11   | R   | 0h      | N/A (Hard-coded) |
|            | Left/right swap support: 1 = yes, 0 = no.  |     |         |                  |
| PwrCntrl   | 10   | R   | 1h      | N/A (Hard-coded) |
|            | Power state support: 1 = yes, 0 = no.  |     |         |                  |
| Dig        | 9  | R   | 1h      | N/A (Hard-coded) |
|            | Digital stream support: 1 = yes (digital), 0 = no (analog).  |     |         |                  |
| ConnList   | 8  | R   | 0h      | N/A (Hard-coded) |
|            | Connection list present: 1 = yes, 0 = no.  |     |         |                  |
| UnSolCap   | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Unsolicited response support: 1 = yes, 0 = no.   |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvr   | 4   | R   | 1h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvr   | 3   | R   | 1h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.25.1. SPDIFOut0 (NID = 1Dh): PCMCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ah              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:21   | R   | 000h    | N/A (Hard-coded) |
|            | Reserved.                                     |     |         |                  |
| B32        | 20  | R   | 0h      | N/A (Hard-coded) |
|            | 32 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B24        | 19  | R   | 1h      | N/A (Hard-coded) |
|            | 24 bit audio format support: 1 = yes, 0 = no. |     |         |                  |



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| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| B20        | 18  | R   | 1h      | N/A (Hard-coded) |
|            | 20 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B16        | 17  | R   | 1h      | N/A (Hard-coded) |
|            | 16 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B8         | 16  | R   | 0h      | N/A (Hard-coded) |
|            | 8 bit audio format support: 1 = yes, 0 = no.  |     |         |                  |
| Rsvd1      | 15:12   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                     |     |         |                  |
| R12        | 11  | R   | 0h      | N/A (Hard-coded) |
|            | 384kHz rate support: 1 = yes, 0 = no.         |     |         |                  |
| R11        | 10  | R   | 1h      | N/A (Hard-coded) |
|            | 192kHz rate support: 1 = yes, 0 = no.         |     |         |                  |
| R10        | 9   | R   | 0h      | N/A (Hard-coded) |
|            | 176.4kHz rate support: 1 = yes, 0 = no.       |     |         |                  |
| R9         | 8   | R   | 1h      | N/A (Hard-coded) |
|            | 96kHz rate support: 1 = yes, 0 = no.          |     |         |                  |
| R8         | 7   | R   | 1h      | N/A (Hard-coded) |
|            | 88.2kHz rate support: 1 = yes, 0 = no.        |     |         |                  |
| R7         | 6   | R   | 1h      | N/A (Hard-coded) |
|            | 48kHz rate support: 1 = yes, 0 = no.          |     |         |                  |
| R6         | 5   | R   | 1h      | N/A (Hard-coded) |
|            | 44.1kHz rate support: 1 = yes, 0 = no.        |     |         |                  |
| R5         | 4   | R   | 0h      | N/A (Hard-coded) |
|            | 32kHz rate support: 1 = yes, 0 = no.          |     |         |                  |
| R4         | 3   | R   | 0h      | N/A (Hard-coded) |
|            | 22.05kHz rate support: 1 = yes, 0 = no.       |     |         |                  |
| R3         | 2   | R   | 0h      | N/A (Hard-coded) |
|            | 16kHz rate support: 1 = yes, 0 = no.          |     |         |                  |

| Field Name | Bits                                     | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| R2         | 1  | R   | 0h      | N/A (Hard-coded) |
|            | 11.025kHz rate support: 1 = yes, 0 = no. |     |         |                  |
| R1         | 0  | R   | 0h      | N/A (Hard-coded) |
|            | 8kHz rate support: 1 = yes, 0 = no.      |     |         |                  |

### 7.25.2. SPDIFOut0 (NID = 1Dh): StreamCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Bh              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| AC3        | 2  | R   | 1h        | N/A (Hard-coded) |
|            | AC-3 formatted data support: 1 = yes, 0 = no.    |     |           |                  |
| Float32    | 1  | R   | 0h        | N/A (Hard-coded) |
|            | Float32 formatted data support: 1 = yes, 0 = no. |     |           |                  |
| PCM        | 0  | R   | 1h        | N/A (Hard-coded) |
|            | PCM-formatted data support: 1 = yes, 0 = no.     |     |           |                  |

### 7.25.3. SPDIFOut0 (NID = 1Dh): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

| Field Name | Bits                           | R/W | Default | Reset            |
|------------|--------------------------------|-----|---------|------------------|
| Mute       | 31                             | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no. |     |         |                  |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 00h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 00h     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 00h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB  |     |         |                  |

### 7.25.4. SPDIFOut0 (NID = 1Dh): Cnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits                                      | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16                                     | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.                                 |     |         |                  |
| FrmtNonPCM   | 15  | RW  | 0h      | POR - DAFG - ULR |
|              | Stream type: 1 = Non-PCM, 0 = PCM.        |     |         |                  |
| FrmtSmplRate | 14  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz. |     |         |                  |

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| Field Name    | Bits  | R/W | Default | Reset            |
|---------------|---|-----|---------|------------------|
| SmplRateMultp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv   | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1         | 7   | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| BitsPerSmpl   | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|               | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved   |     |         |                  |
| NmbrChan      | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|               | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.   |     |         |                  |

### 7.25.5. SPDIFOut0 (NID = 1Dh): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name | Bits                                | R/W | Default | Reset            |
|------------|-------------------------------------|-----|---------|------------------|
| Rsvd2      | 31:8                                | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |
| Mute       | 7                                   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted. |     |         |                  |
| Rsvd1      | 6:0                                 | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |

#### 7.25.6. SPDIFOut0 (NID = 1Dh): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name | Bits                                | R/W | Default | Reset            |
|------------|-------------------------------------|-----|---------|------------------|
| Rsvd2      | 31:8                                | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |
| Mute       | 7                                   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted. |     |         |                  |
| Rsvd1      | 6:0                                 | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |

#### 7.25.7. SPDIFOut0 (NID = 1Dh): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:11     | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 3h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

### 7.25.8. SPDIFOut0 (NID = 1Dh): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                        |
| Ch         | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                        |

## 7.25.9. SPDIFOut0 (NID = 1Dh): DigCnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set | 73Fh                | 73Eh                | 70Eh               | 70Dh              |
| Get | F0E00h / F0D00h     |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:24   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| KeepAlive  | 23  | RW  | 0h      | POR - DAFG - ULR |
|            | Keep Alive Enable: 1 = clocking information maintained during D3, 0 = clock information not required during D3. |     |         |                  |
| Rsvd1      | 22:15   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| CC         | 14:8  | RW  | 00h     | POR - DAFG - ULR |
|            | CC: Category Code.  |     |         |                  |
| L          | 7   | RW  | 0h      | POR - DAFG - ULR |
|            | L: Generation Level.  |     |         |                  |
| PRO        | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | PRO: Professional.  |     |         |                  |
| AUDIO      | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | /AUDIO: Non-Audio.  |     |         |                  |
| COPY       | 4   | RW  | 0h      | POR - DAFG - ULR |
|            | COPY: Copyright.  |     |         |                  |
| PRE        | 3   | RW  | 0h      | POR - DAFG - ULR |
|            | PRE: Preemphasis.   |     |         |                  |
| VCFG       | 2   | RW  | 0h      | POR - DAFG - ULR |
|            | VCFG: Validity Config.  |     |         |                  |
| V          | 1   | RW  | 0h      | POR - DAFG - ULR |
|            | V: Validity.  |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| DigEn   | 0    | RW  | 0h      | POR - DAFG - ULR |
| Digital enable: 1 = converter enabled, 0 = converter disable. |      |     |         |                  |

### 7.26. SPDIFOut1 (NID = 1Eh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:24 | R   | 00h     | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Type   | 23:20 | R   | 0h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 4h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 1h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |



| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ConnList    | 8   | R   | 0h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.               |     |         |                  |
| UnSolCap    | 7   | R   | 0h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.          |     |         |                  |
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvrd  | 4   | R   | 1h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvrd  | 3   | R   | 1h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.26.1. SPDIFOut1 (NID = 1Eh): PCMCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ah              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:21     | R   | 000h    | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| B32        | 20  | R   | 0h      | N/A (Hard-coded) |
|            | 32 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B24        | 19  | R   | 1h      | N/A (Hard-coded) |
|            | 24 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B20        | 18  | R   | 1h      | N/A (Hard-coded) |
|            | 20 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B16        | 17  | R   | 1h      | N/A (Hard-coded) |
|            | 16 bit audio format support: 1 = yes, 0 = no. |     |         |                  |
| B8         | 16  | R   | 0h      | N/A (Hard-coded) |
|            | 8 bit audio format support: 1 = yes, 0 = no.  |     |         |                  |
| Rsvd1      | 15:12   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.                                     |     |         |                  |
| R12        | 11  | R   | 0h      | N/A (Hard-coded) |
|            | 384kHz rate support: 1 = yes, 0 = no.         |     |         |                  |
| R11        | 10  | R   | 1h      | N/A (Hard-coded) |
|            | 192kHz rate support: 1 = yes, 0 = no.         |     |         |                  |
| R10        | 9   | R   | 0h      | N/A (Hard-coded) |
|            | 176.4kHz rate support: 1 = yes, 0 = no.       |     |         |                  |
| R9         | 8   | R   | 1h      | N/A (Hard-coded) |
|            | 96kHz rate support: 1 = yes, 0 = no.          |     |         |                  |
| R8         | 7   | R   | 1h      | N/A (Hard-coded) |
|            | 88.2kHz rate support: 1 = yes, 0 = no.        |     |         |                  |
| R7         | 6   | R   | 1h      | N/A (Hard-coded) |
|            | 48kHz rate support: 1 = yes, 0 = no.          |     |         |                  |
| R6         | 5   | R   | 1h      | N/A (Hard-coded) |
|            | 44.1kHz rate support: 1 = yes, 0 = no.        |     |         |                  |
| R5         | 4   | R   | 0h      | N/A (Hard-coded) |
|            | 32kHz rate support: 1 = yes, 0 = no.          |     |         |                  |

| Field Name | Bits                                     | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| R4         | 3  | R   | 0h      | N/A (Hard-coded) |
|            | 22.05kHz rate support: 1 = yes, 0 = no.  |     |         |                  |
| R3         | 2  | R   | 0h      | N/A (Hard-coded) |
|            | 16kHz rate support: 1 = yes, 0 = no.     |     |         |                  |
| R2         | 1  | R   | 0h      | N/A (Hard-coded) |
|            | 11.025kHz rate support: 1 = yes, 0 = no. |     |         |                  |
| R1         | 0  | R   | 0h      | N/A (Hard-coded) |
|            | 8kHz rate support: 1 = yes, 0 = no.      |     |         |                  |

### 7.26.2. SPDIFOut1 (NID = 1Eh): StreamCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Bh              |                     |                    |                   |

| Field Name | Bits   | R/W | Default   | Reset            |
|------------|--|-----|-----------|------------------|
| Rsvd       | 31:3   | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.  |     |           |                  |
| AC3        | 2  | R   | 1h        | N/A (Hard-coded) |
|            | AC-3 formatted data support: 1 = yes, 0 = no.    |     |           |                  |
| Float32    | 1  | R   | 0h        | N/A (Hard-coded) |
|            | Float32 formatted data support: 1 = yes, 0 = no. |     |           |                  |
| PCM        | 0  | R   | 1h        | N/A (Hard-coded) |
|            | PCM-formatted data support: 1 = yes, 0 = no.     |     |           |                  |

### 7.26.3. SPDIFOut1 (NID = 1Eh): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 00h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 00h     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1).                       |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 00h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB  |     |         |                  |

### 7.26.4. SPDIFOut1 (NID = 1Eh): Cnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 2h                |
| Get | A0000h              |                     |                    |                   |

| Field Name   | Bits                                      | R/W | Default | Reset            |
|--------------|---|-----|---------|------------------|
| Rsvd2        | 31:16                                     | R   | 0000h   | N/A (Hard-coded) |
|              | Reserved.                                 |     |         |                  |
| FrmtNonPCM   | 15  | RW  | 0h      | POR - DAFG - ULR |
|              | Stream type: 1 = Non-PCM, 0 = PCM.        |     |         |                  |
| FrmtSmpIRate | 14  | RW  | 0h      | POR - DAFG - ULR |
|              | Sample base rate: 1 = 44.1kHz, 0 = 48kHz. |     |         |                  |

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| Field Name    | Bits  | R/W | Default | Reset            |
|---------------|---|-----|---------|------------------|
| SmplRateMultp | 13:11   | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate multiple:<br>000b= x1 (48kHz/44.1kHz or less)<br>001b= x2 (96kHz/88.2kHz/32kHz)<br>010b= x3 (144kHz)<br>011b= x4 (192kHz/176.4kHz)<br>100b-111b Reserved   |     |         |                  |
| SmplRateDiv   | 10:8  | RW  | 0h      | POR - DAFG - ULR |
|               | Sample base rate divider:<br>000b= Divide by 1 (48kHz/44.1kHz)<br>001b= Divide by 2 (24kHz/20.05kHz)<br>010b= Divide by 3 (16kHz/32kHz)<br>011b= Divide by 4 (11.025kHz)<br>100b= Divide by 5 (9.6kHz)<br>101b= Divide by 6 (8kHz)<br>110b= Divide by 7<br>111b= Divide by 8 (6kHz) |     |         |                  |
| Rsvd1         | 7   | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.   |     |         |                  |
| BitsPerSmpl   | 6:4   | RW  | 3h      | POR - DAFG - ULR |
|               | Bits per sample:<br>000b= 8 bits<br>001b= 16 bits<br>010b= 20 bits<br>011b= 24 bits<br>100b= 32 bits<br>101b-111b= Reserved   |     |         |                  |
| NmbrChan      | 3:0   | RW  | 1h      | POR - DAFG - ULR |
|               | Total number of channels in the stream assigned to this converter:<br>0000b-1111b= 1-16 channels.   |     |         |                  |

### 7.26.5. SPDIFOut1 (NID = 1Eh): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA00h               |                     |                    |                   |

| Field Name | Bits                                | R/W | Default | Reset            |
|------------|-------------------------------------|-----|---------|------------------|
| Rsvd2      | 31:8                                | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |
| Mute       | 7                                   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted. |     |         |                  |
| Rsvd1      | 6:0                                 | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |

#### 7.26.6. SPDIFOut1 (NID = 1Eh): OutAmpRight

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 390h              |
| Get | B8000h              |                     |                    |                   |

| Field Name | Bits                                | R/W | Default | Reset            |
|------------|-------------------------------------|-----|---------|------------------|
| Rsvd2      | 31:8                                | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |
| Mute       | 7                                   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted. |     |         |                  |
| Rsvd1      | 6:0                                 | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.                           |     |         |                  |

#### 7.26.7. SPDIFOut1 (NID = 1Eh): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd4      | 31:11     | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 3h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

#### 7.26.8. SPDIFOut1 (NID = 1Eh): CnvtrID

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 706h              |
| Get | F0600h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset                  |
|------------|--|-----|---------|------------------------|
| Rsvd       | 31:8   | R   | 000000h | N/A (Hard-coded)       |
|            | Reserved.  |     |         |                        |
| Strm       | 7:4  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Stream ID: 0h = Converter "off", 1h-Fh = valid ID's.                             |     |         |                        |
| Ch         | 3:0  | RW  | 0h      | POR - S&DAFG - LR - PS |
|            | Channel assignment ("Ch" and "Ch+1" assigned as a pair, for a stereo converter). |     |         |                        |

## 7.26.9. SPDIFOut1 (NID = 1Eh): DigCnvtr

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set | 73Fh                | 73Eh                | 70Eh               | 70Dh              |
| Get | F0E00h / F0D00h     |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:24   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| KeepAlive  | 23  | RW  | 0h      | POR - DAFG - ULR |
|            | Keep Alive Enable: 1 = clocking information maintained during D3, 0 = clock information not required during D3. |     |         |                  |
| Rsvd1      | 22:15   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| CC         | 14:8  | RW  | 00h     | POR - DAFG - ULR |
|            | CC: Category Code.  |     |         |                  |
| L          | 7   | RW  | 0h      | POR - DAFG - ULR |
|            | L: Generation Level.  |     |         |                  |
| PRO        | 6   | RW  | 0h      | POR - DAFG - ULR |
|            | PRO: Professional.  |     |         |                  |
| AUDIO      | 5   | RW  | 0h      | POR - DAFG - ULR |
|            | /AUDIO: Non-Audio.  |     |         |                  |
| COPY       | 4   | RW  | 0h      | POR - DAFG - ULR |
|            | COPY: Copyright.  |     |         |                  |
| PRE        | 3   | RW  | 0h      | POR - DAFG - ULR |
|            | PRE: Preemphasis.   |     |         |                  |
| VCFG       | 2   | RW  | 0h      | POR - DAFG - ULR |
|            | VCFG: Validity Config.  |     |         |                  |
| V          | 1   | RW  | 0h      | POR - DAFG - ULR |
|            | V: Validity.  |     |         |                  |



| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| DigEn   | 0    | RW  | 0h      | POR - DAFG - ULR |
| Digital enable: 1 = converter enabled, 0 = converter disable. |      |     |         |                  |

### 7.27. Dig0Pin (NID = 1Fh): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:24 | R   | 00h     | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| Type   | 23:20 | R   | 4h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 1h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |

| Field Name  | Bits  | R/W | Default | Reset            |
|-------------|---|-----|---------|------------------|
| ConnList    | 8   | R   | 1h      | N/A (Hard-coded) |
|             | Connection list present: 1 = yes, 0 = no.               |     |         |                  |
| UnSolCap    | 7   | R   | 1h      | N/A (Hard-coded) |
|             | Unsolicited response support: 1 = yes, 0 = no.          |     |         |                  |
| ProcWidget  | 6   | R   | 0h      | N/A (Hard-coded) |
|             | Processing state support: 1 = yes, 0 = no.              |     |         |                  |
| Stripe      | 5   | R   | 0h      | N/A (Hard-coded) |
|             | Striping support: 1 = yes, 0 = no.                      |     |         |                  |
| FormatOvrd  | 4   | R   | 0h      | N/A (Hard-coded) |
|             | Stream format override: 1 = yes, 0 = no.                |     |         |                  |
| AmpParOvrd  | 3   | R   | 0h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.           |     |         |                  |
| OutAmpPrsnt | 2   | R   | 0h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.                    |     |         |                  |
| InAmpPrsnt  | 1   | R   | 0h      | N/A (Hard-coded) |
|             | Input amp present: 1 = yes, 0 = no.                     |     |         |                  |
| Stereo      | 0   | R   | 1h      | N/A (Hard-coded) |
|             | Stereo stream support: 1 = yes (stereo), 0 = no (mono). |     |         |                  |

### 7.27.1. Dig0Pin (NID = 1Fh): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:17     | R   | 0000h   | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| EapdCap     | 16   | R   | 0h      | N/A (Hard-coded) |
|             | EAPD support: 1 = yes, 0 = no.   |     |         |                  |
| VrefCntrl   | 15:8   | R   | 00h     | N/A (Hard-coded) |
|             | Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |     |         |                  |
| Rsvd1       | 7  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.   |     |         |                  |
| InCap       | 5  | R   | 0h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.  |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.   |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.  |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.   |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no.   |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.  |     |         |                  |

### 7.27.2. Dig0Pin (NID = 1Fh): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

### 7.27.3. Dig0Pin (NID = 1Fh): ConLstEntry0

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                              | R/W | Default | Reset            |
|------------|-----------------------------------|-----|---------|------------------|
| ConL3      | 31:24                             | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL2      | 23:16                             | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL1      | 15:8                              | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL0      | 7:0                               | R   | 1Dh     | N/A (Hard-coded) |
|            | SPDIFOut0 Converter widget (0x1D) |     |         |                  |

### 7.27.4. Dig0Pin (NID = 1Fh): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

#### 7.27.5. Dig0Pin (NID = 1Fh): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits                                      | R/W | Default  | Reset            |
|------------|---|-----|----------|------------------|
| Rsvd2      | 31:7                                      | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.                                 |     |          |                  |
| OutEn      | 6   | RW  | 0h       | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |          |                  |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd1      | 5:0       | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

### 7.27.6. Dig0Pin (NID = 1Fh): UnsolResp

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled.                 |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

### 7.27.7. Dig0Pin (NID = 1Fh): ChSense

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset |
|------------|---|-----|---------|-------|
| PresDtct   | 31  | R   | 0h      | POR   |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |         |       |

| Field Name | Bits | R/W | Default   | Reset            |
|------------|------|-----|-----------|------------------|
| Rsvd       | 30:0 | R   | 00000000h | N/A (Hard-coded) |
| Reserved.  |      |     |           |                  |

### 7.27.8. Dig0Pin (NID = 1Fh): ConfigDefault

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 0h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |       |     |         |       |
| Location  | 29:24 | RW  | 1h      | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |       |     |         |       |

**92HD81****SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| Device  | 23:20 | RW  | 4h      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |       |     |         |       |
| ConnectionType  | 19:16 | RW  | 5h      | POR   |
| Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |       |     |         |       |



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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 1h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 1h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | 6h      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | 0h      | POR   |
|             | Sequence.  |     |         |       |

### 7.28. Dig1Pin (NID = 20h): WCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd2      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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## SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Type   | 23:20 | R   | 4h      | N/A (Hard-coded) |
| Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |       |     |         |                  |
| Delay  | 19:16 | R   | 0h      | N/A (Hard-coded) |
| Number of sample delays through widget.  |       |     |         |                  |
| Rsvd1  | 15:12 | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| SwapCap  | 11    | R   | 0h      | N/A (Hard-coded) |
| Left/right swap support: 1 = yes, 0 = no.  |       |     |         |                  |
| PwrCntrl   | 10    | R   | 1h      | N/A (Hard-coded) |
| Power state support: 1 = yes, 0 = no.  |       |     |         |                  |
| Dig  | 9     | R   | 1h      | N/A (Hard-coded) |
| Digital stream support: 1 = yes (digital), 0 = no (analog).  |       |     |         |                  |
| ConnList   | 8     | R   | 1h      | N/A (Hard-coded) |
| Connection list present: 1 = yes, 0 = no.  |       |     |         |                  |
| UnSolCap   | 7     | R   | 1h      | N/A (Hard-coded) |
| Unsolicited response support: 1 = yes, 0 = no.   |       |     |         |                  |
| ProcWidget   | 6     | R   | 0h      | N/A (Hard-coded) |
| Processing state support: 1 = yes, 0 = no.   |       |     |         |                  |
| Stripe   | 5     | R   | 0h      | N/A (Hard-coded) |
| Striping support: 1 = yes, 0 = no.   |       |     |         |                  |
| FormatOvrd   | 4     | R   | 0h      | N/A (Hard-coded) |
| Stream format override: 1 = yes, 0 = no.   |       |     |         |                  |

| Field Name  | Bits | R/W | Default | Reset            |
|---|------|-----|---------|------------------|
| AmpParOvrd  | 3    | R   | 0h      | N/A (Hard-coded) |
| Amplifier capabilities override: 1 = yes, no.           |      |     |         |                  |
| OutAmpPrsnt   | 2    | R   | 0h      | N/A (Hard-coded) |
| Output amp present: 1 = yes, 0 = no.                    |      |     |         |                  |
| InAmpPrsnt  | 1    | R   | 0h      | N/A (Hard-coded) |
| Input amp present: 1 = yes, 0 = no.                     |      |     |         |                  |
| Stereo  | 0    | R   | 1h      | N/A (Hard-coded) |
| Stereo stream support: 1 = yes (stereo), 0 = no (mono). |      |     |         |                  |

### 7.28.1. Dig1Pin (NID = 20h): PinCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Ch              |                     |                    |                   |

| Field Name   | Bits  | R/W | Default | Reset            |
|--|-------|-----|---------|------------------|
| Rsvd2  | 31:17 | R   | 0000h   | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |
| EapdCap  | 16    | R   | 0h      | N/A (Hard-coded) |
| EAPD support: 1 = yes, 0 = no.   |       |     |         |                  |
| VrefCntrl  | 15:8  | R   | 00h     | N/A (Hard-coded) |
| Vref support:<br>bit 7 = Reserved<br>bit 6 = Reserved<br>bit 5 = 100% support (1 = yes, 0 = no)<br>bit 4 = 80% support (1 = yes, 0 = no)<br>bit 3 = Reserved<br>bit 2 = GND support (1 = yes, 0 = no)<br>bit 1 = 50% support (1 = yes, 0 = no)<br>bit 0 = Hi-Z support (1 = yes, 0 = no) |       |     |         |                  |
| Rsvd1  | 7     | R   | 0h      | N/A (Hard-coded) |
| Reserved.  |       |     |         |                  |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| BalancedIO  | 6  | R   | 0h      | N/A (Hard-coded) |
|             | Balanced I/O support: 1 = yes, 0 = no.                 |     |         |                  |
| InCap       | 5  | R   | 1h      | N/A (Hard-coded) |
|             | Input support: 1 = yes, 0 = no.                        |     |         |                  |
| OutCap      | 4  | R   | 1h      | N/A (Hard-coded) |
|             | Output support: 1 = yes, 0 = no.                       |     |         |                  |
| HdphDrvCap  | 3  | R   | 0h      | N/A (Hard-coded) |
|             | Headphone amp present: 1 = yes, 0 = no.                |     |         |                  |
| PresDtctCap | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Presence detection support: 1 = yes, 0 = no.           |     |         |                  |
| TrigRqd     | 1  | R   | 0h      | N/A (Hard-coded) |
|             | Trigger required for impedance sense: 1 = yes, 0 = no. |     |         |                  |
| ImpSenseCap | 0  | R   | 0h      | N/A (Hard-coded) |
|             | Impedance sense support: 1 = yes, 0 = no.              |     |         |                  |

### 7.28.2. Dig1Pin (NID = 20h): ConLst

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F000Eh              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd       | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| LForm      | 7   | R   | 0h      | N/A (Hard-coded) |
|            | Connection list format: 1 = long-form (15-bit) NID entries, 0 = short-form (7-bit) NID entries. |     |         |                  |
| ConL       | 6:0   | R   | 01h     | N/A (Hard-coded) |
|            | Number of NID entries in connection list.   |     |         |                  |

7.28.3. *Dig1Pin (NID = 20h): ConLstEntry0*

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0200h              |                     |                    |                   |

| Field Name | Bits                              | R/W | Default | Reset            |
|------------|-----------------------------------|-----|---------|------------------|
| ConL3      | 31:24                             | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL2      | 23:16                             | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL1      | 15:8                              | R   | 00h     | N/A (Hard-coded) |
|            | Unused list entry.                |     |         |                  |
| ConL0      | 7:0                               | R   | 1Eh     | N/A (Hard-coded) |
|            | SPDIFOut1 Converter widget (0x1E) |     |         |                  |

7.28.4. *Dig1Pin (NID = 20h): PwrState*

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |

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| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Error      | 8   | R   | 0h      | POR - DAFG - ULR |
|            | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state. |     |         |                  |
| Rsvd2      | 7:6   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Act        | 5:4   | R   | 3h      | POR - DAFG - LR  |
|            | Actual power state of this widget.  |     |         |                  |
| Rsvd1      | 3:2   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Set        | 1:0   | RW  | 0h      | POR - DAFG - LR  |
|            | Current power state setting for this widget.  |     |         |                  |

### 7.28.5. Dig1Pin (NID = 20h): PinWCntrl

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 707h              |
| Get | F0700h              |                     |                    |                   |

| Field Name | Bits                                      | R/W | Default  | Reset            |
|------------|---|-----|----------|------------------|
| Rsvd2      | 31:7                                      | R   | 0000000h | N/A (Hard-coded) |
|            | Reserved.                                 |     |          |                  |
| OutEn      | 6   | RW  | 0h       | POR - DAFG - ULR |
|            | Output enable: 1 = enabled, 0 = disabled. |     |          |                  |
| InEn       | 5   | RW  | 0h       | POR - DAFG - ULR |
|            | Input enable: 1 = enabled, 0 = disabled.  |     |          |                  |
| Rsvd1      | 4:0                                       | R   | 00h      | N/A (Hard-coded) |
|            | Reserved.                                 |     |          |                  |

7.28.6. *Dig1Pin (NID = 20h): UnsolResp*

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 708h              |
| Get | F0800h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 31:8   | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| En         | 7  | RW  | 0h      | POR - DAFG - ULR |
|            | Unsolicited response enable (also enables Wake events for this Widget): 1 = enabled, 0 = disabled.                 |     |         |                  |
| Rsvd1      | 6  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Tag        | 5:0  | RW  | 00h     | POR - DAFG - ULR |
|            | Software programmable field returned in top six bits (31:26) of every Unsolicited Response generated by this node. |     |         |                  |

7.28.7. *Dig1Pin (NID = 20h): ChSense*

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 709h              |
| Get | F0900h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default   | Reset            |
|------------|---|-----|-----------|------------------|
| PresDtct   | 31  | R   | 0h        | POR              |
|            | Presence detection indicator: 1 = presence detected; 0 = presence not detected. |     |           |                  |
| Rsvd       | 30:0  | R   | 00000000h | N/A (Hard-coded) |
|            | Reserved.   |     |           |                  |

**7.28.8. Dig1Pin (NID = 20h): ConfigDefault**

| Reg | Byte 4 (Bits 31:24)               | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|-----------------------------------|---------------------|--------------------|-------------------|
| Set | 71Fh                              | 71Eh                | 71Dh               | 71Ch              |
| Get | F1F00h / F1E00h / F1D00h / F1C00h |                     |                    |                   |

| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| PortConnectivity  | 31:30 | RW  | 2h      | POR   |
| Port connectivity:<br>0h = Port complex is connected to a jack<br>1h = No physical connection for port<br>2h = Fixed function device is attached<br>3h = Both jack and internal device attached (info in all other fields refers to integrated device, any presence detection refers to jack) |       |     |         |       |
| Location  | 29:24 | RW  | 18h     | POR   |
| Location<br><br>Bits [5..4]:<br>0h = External on primary chassis<br>1h = Internal<br>2h = Separate chassis<br>3h = Other<br><br>Bits [3..0]:<br>0h = N/A<br>1h = Rear<br>2h = Front<br>3h = Left<br>4h = Right<br>5h = Top<br>6h = Bottom<br>7h-9h = Special<br>Ah-Fh = Reserved              |       |     |         |       |



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| Field Name  | Bits  | R/W | Default | Reset |
|---|-------|-----|---------|-------|
| Device  | 23:20 | RW  | 5h      | POR   |
| Default device:<br>0h = Line out<br>1h = Speaker<br>2h = HP out<br>3h = CD<br>4h = SPDIF Out<br>5h = Digital other out<br>6h = Modem line side<br>7h = Modem handset side<br>8h = Line in<br>9h = Aux<br>Ah = Mic in<br>Bh = Telephony<br>Ch = SPDIF In<br>Dh = Digital other in<br>Eh = Reserved<br>Fh = Other         |       |     |         |       |
| ConnectionType  | 19:16 | RW  | 6h      | POR   |
| Connection type:<br>0h = Unknown<br>1h = 1/8" stereo/mono<br>2h = 1/4" stereo/mono<br>3h = ATAPI internal<br>4h = RCA<br>5h = Optical<br>6h = Other digital<br>7h = Other analog<br>8h = Multichannel analog (DIN)<br>9h = XLR/Professional<br>Ah = RJ-11 (modem)<br>Bh = Combination<br>Ch-Eh = Reserved<br>Fh = Other |       |     |         |       |

| Field Name  | Bits   | R/W | Default | Reset |
|-------------|--|-----|---------|-------|
| Color       | 15:12  | RW  | 0h      | POR   |
|             | Color:<br>0h = Unknown<br>1h = Black<br>2h = Grey<br>3h = Blue<br>4h = Green<br>5h = Red<br>6h = Orange<br>7h = Yellow<br>8h = Purple<br>9h = Pink<br>Ah-Dh = Reserved<br>Eh = White<br>Fh = Other |     |         |       |
| Misc        | 11:8   | RW  | 1h      | POR   |
|             | Miscellaneous:<br>Bits [3..1] = Reserved<br>Bit 0 = Jack detect override   |     |         |       |
| Association | 7:4  | RW  | 7h      | POR   |
|             | Default association.   |     |         |       |
| Sequence    | 3:0  | RW  | 0h      | POR   |
|             | Sequence.  |     |         |       |

**7.29. DigBeep (NID = 21h): WCap**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0009h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd3      | 31:24     | R   | 00h     | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

| Field Name  | Bits   | R/W | Default | Reset            |
|-------------|--|-----|---------|------------------|
| Type        | 23:20  | R   | 7h      | N/A (Hard-coded) |
|             | Widget type:<br>0h = Out Converter<br>1h = In Converter<br>2h = Summing (Mixer)<br>3h = Selector (Mux)<br>4h = Pin Complex<br>5h = Power<br>6h = Volume Knob<br>7h = Beep Generator<br>8h-Eh = Reserved<br>Fh = Vendor Defined |     |         |                  |
| Rsvd2       | 19:4   | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |
| AmpParOvr   | 3  | R   | 1h      | N/A (Hard-coded) |
|             | Amplifier capabilities override: 1 = yes, no.  |     |         |                  |
| OutAmpPrsnt | 2  | R   | 1h      | N/A (Hard-coded) |
|             | Output amp present: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd1       | 1:0  | R   | 0h      | N/A (Hard-coded) |
|             | Reserved.  |     |         |                  |

### 7.29.1. DigBeep (NID = 21h): OutAmpCap

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    |                   |
| Get | F0012h              |                     |                    |                   |

| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Mute       | 31   | R   | 1h      | N/A (Hard-coded) |
|            | Mute support: 1 = yes, 0 = no.   |     |         |                  |
| Rsvd3      | 30:23  | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| StepSize   | 22:16  | R   | 17h     | N/A (Hard-coded) |
|            | Size of each step in the gain range: 0 to 127 = .25dB to 32dB, in .25dB steps. |     |         |                  |

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| Field Name | Bits   | R/W | Default | Reset            |
|------------|--|-----|---------|------------------|
| Rsvd2      | 15   | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| NumSteps   | 14:8   | R   | 03h     | N/A (Hard-coded) |
|            | Number of gains steps (number of possible settings - 1). |     |         |                  |
| Rsvd1      | 7  | R   | 0h      | N/A (Hard-coded) |
|            | Reserved.  |     |         |                  |
| Offset     | 6:0  | R   | 03h     | N/A (Hard-coded) |
|            | Indicates which step is 0dB                              |     |         |                  |

### 7.29.2. DigBeep (NID = 21h): OutAmpLeft

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 3A0h              |
| Get | BA000h              |                     |                    |                   |

| Field Name | Bits  | R/W | Default | Reset            |
|------------|---|-----|---------|------------------|
| Rsvd2      | 31:8  | R   | 000000h | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Mute       | 7   | RW  | 0h      | POR - DAFG - ULR |
|            | Amp mute: 1 = muted, 0 = not muted.                                       |     |         |                  |
| Rsvd1      | 6:2   | R   | 00h     | N/A (Hard-coded) |
|            | Reserved.   |     |         |                  |
| Gain       | 1:0   | RW  | 1h      | POR - DAFG - ULR |
|            | Amp gain step number (see OutAmpCap parameter pertaining to this widget). |     |         |                  |

### 7.29.3. DigBeep (NID = 21h): PwrState

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 705h              |
| Get | F0500h              |                     |                    |                   |

| Field Name    | Bits   | R/W | Default | Reset            |
|---------------|--|-----|---------|------------------|
| Rsvd4         | 31:11  | R   | 000000h | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| SettingsReset | 10   | R   | 1h      | POR - DAFG - ULR |
|               | Indicates if any persistent settings in this Widget have been reset. Cleared by PwrState 'Get', or a 'Set' to any Verb in this Widget. |     |         |                  |
| Rsvd3         | 9  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Error         | 8  | R   | 0h      | POR - DAFG - ULR |
|               | Error indicator: 1 = cannot enter requested power state, 0 = no problem with requested power state.                                    |     |         |                  |
| Rsvd2         | 7:6  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Act           | 5:4  | R   | 3h      | POR - DAFG - LR  |
|               | Actual power state of this widget.   |     |         |                  |
| Rsvd1         | 3:2  | R   | 0h      | N/A (Hard-coded) |
|               | Reserved.  |     |         |                  |
| Set           | 1:0  | RW  | 0h      | POR - DAFG - LR  |
|               | Current power state setting for this widget.   |     |         |                  |

**7.29.4. DigBeep (NID = 21h): Gen**

| Reg | Byte 4 (Bits 31:24) | Byte 3 (Bits 23:16) | Byte 2 (Bits 15:8) | Byte 1 (Bits 7:0) |
|-----|---------------------|---------------------|--------------------|-------------------|
| Set |                     |                     |                    | 70Ah              |
| Get | F0A00h              |                     |                    |                   |

| Field Name | Bits      | R/W | Default | Reset            |
|------------|-----------|-----|---------|------------------|
| Rsvd       | 31:8      | R   | 000000h | N/A (Hard-coded) |
|            | Reserved. |     |         |                  |

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| Field Name   | Bits | R/W | Default | Reset           |
|--|------|-----|---------|-----------------|
| Divider  | 7:0  | RW  | 00h     | POR - DAFG - LR |
| Enable internal PC-Beep generation. Divider == 00h disables internal PC Beep generation and enables normal operation of the codec. Divider != 00h generates the beep tone on all Pin Complexes that are currently configured as outputs. The HD Audio spec states that the beep tone frequency = (48kHz HD Audio SYNC rate) / (4*Divider), producing tones from 47 Hz to 12 kHz (logarithmic scale). |      |     |         |                 |

8. PINOUTS

8.1. Pin Assignment

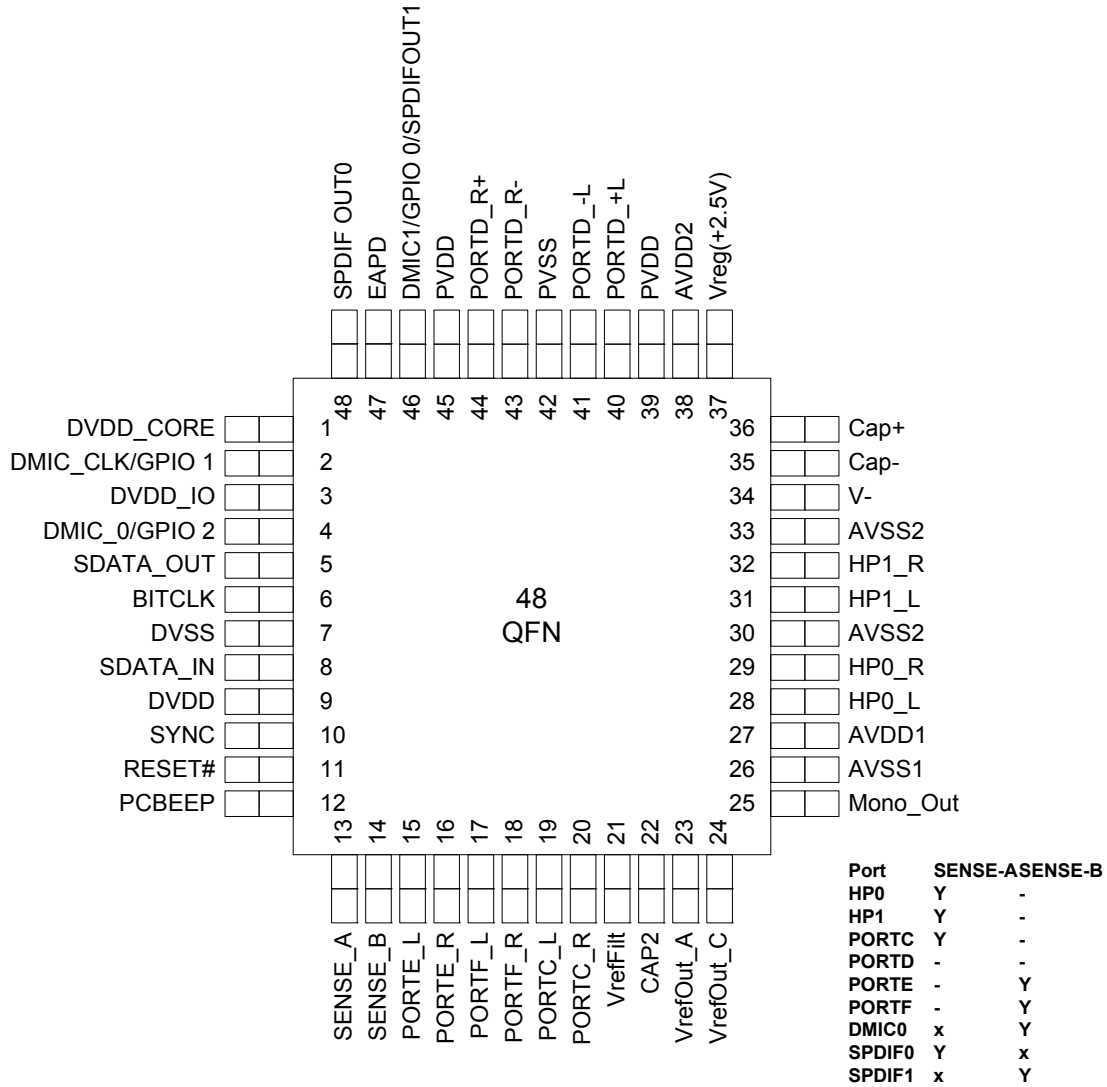


Figure 12. Pin Assignment

## 8.2. Pin Table for 48-pin QFN

| Pin Name       | Pin Function  | I/O          | Internal Pull-up/Pull-down                              | 48 pin location |
|----------------|---|--------------|---|-----------------|
| DVDD_CORE      | 1.5V Digital Core Regulator Filter Cap              | O(Digital)   | None  | 1               |
| DMIC_CLK/GPIO1 | Digital Mic Clock Output/GPIO1                      | I/O(Digital) | Pull-Up 50k with GPIO or Pull-down 50k with Digital Mic | 2               |
| DVDD_IO        | Reference Voltage (1.5V or 3.3V)                    | I(Digital)   | None  | 3               |
| DMIC0/GPIO2    | Digital Mic 01 Input/GPIO2                          | I/O(Digital) | Pull-Up 50k with GPIO or Pull-down 50k with Digital Mic | 4               |
| SDATA_OUT      | HD Audio Serial Data output from controller         | I/O(Digital) | None  | 5               |
| BITCLK         | HD Audio Bit Clock                                  | I(Digital)   | None  | 6               |
| DVSS           | Digital Ground                                      | I(Digital)   | None  | 7               |
| SDATA_IN       | HD Audio Serial Data Input to controller            | O(Digital)   | None  | 8               |
| DVDD           | Digital Vdd= 3.3V                                   | I(Digital)   | None  | 9               |
| SYNC           | HD Audio Frame Sync                                 | I(Digital)   | None  | 10              |
| RESET#         | HD Audio Reset                                      | I(Digital)   | None  | 11              |
| PCBEEP         | PC Beep   | I(Analog)    | None  | 12              |
| SENSE_A        | Jack insertion detection Ports A,B,C,SPDIF0         | I(Analog)    | None  | 13              |
| SENSE_B        | Jack insertion detection Ports E,F, Mono, SPDIF1    | I(Analog)    | None  | 14              |
| PORTE_L        | Port E Left   | I/O(Analog)  | None  | 15              |
| PORTE_R        | Port E Right  | I/O(Analog)  | None  | 16              |
| PORTF_L        | Port F Left   | I/O(Analog)  | None  | 17              |
| PORTF_R        | Port F Right  | I/O(Analog)  | None  | 18              |
| PORTC_L        | Port C Left   | I/O(Analog)  | None  | 19              |
| PORTC_R        | Port C Right  | I/O(Analog)  | None  | 20              |
| VREFFILT       | Analog Virtual Ground                               | O(Analog)    | None  | 21              |
| CAP2           | Reference filter Cap                                | O(Analog)    | None  | 22              |
| VREFOUT-A      | Reference Voltage out drive (intended for mic bias) | O(Analog)    | None  | 23              |
| VREFOUT-C      | Reference Voltage out drive (intended for mic bias) | O(Analog)    | None  | 24              |
| Mono_Out       | Mono output   | O(Analog)    | None  | 25              |
| AVSS1          | Analog Ground                                       | I(Analog)    | None  | 26              |
| AVDD1          | Analog Vdd  | I(Analog)    | None  | 27              |
| PORTA_L (HP0)  | Port A Output Left                                  | I/O(Analog)  | None  | 28              |
| PORTA_R (HP0)  | Port A Output Right                                 | I/O(Analog)  | None  | 29              |
| AVSS           | Analog Ground                                       | I(Analog)    | None  | 30              |
| PORTB_L (HP1)  | Port B Output Left                                  | I/O(Analog)  | None  | 31              |
| PORTB_R (HP1)  | Port B Output Right                                 | I/O(Analog)  | None  | 32              |
| AVSS           | Analog Ground                                       | I(Analog)    | None  | 33              |
| V-             | Negative analog supply                              | O(Analog)    | None  | 34              |

Table 26. Pin Table



**92HD81****SINGLE CHIP PC AUDIO SYSTEM, CODEC+SPEAKER AMPLIFIER+CAPLESS HP+LDO**

| Pin Name                 | Pin Function                                     | I/O                         | Internal Pull-up/Pull-down                                      | 48 pin location |
|--------------------------|--|-----------------------------|---|-----------------|
| CAP-                     | Chargepump cap -                                 | O(Analog)                   | None  | 35              |
| CAP+                     | Chargepump cap +                                 | O(Analog)                   | None  | 36              |
| VREG                     | Linear Regulator Output (2.5V) filter cap        | O(Analog)                   | None  | 37              |
| AVDD2                    | Analog Supply for VREG                           | I(Analog)                   | None  | 38              |
| PVDD                     | Analog Supply for Class-AB amp                   | I(Analog)                   | None  | 39              |
| PORTD_+L                 | BTL amp Left +                                   | O(Analog)                   | None  | 40              |
| PORTD_-L                 | BTL amp Left -                                   | O(Analog)                   | None  | 41              |
| PVSS                     | Analog Ground                                    | I(Analog)                   | None  | 42              |
| PORTD_R-                 | BTL amp Right -                                  | O(Analog)                   | None  | 43              |
| PORTD_R+                 | BTL amp Right +                                  | O(Analog)                   | None  | 44              |
| PVDD                     | Analog Supply for Class-D amp                    | I(Analog)                   | None  | 45              |
| DMIC1/GPIO/<br>SPDIFOUT1 | Digital Microphone input, SPDIF Output, or GPIO0 | I/O(Digital)                | Pull-up 60K with GPIO<br>Pull-down 60K with DMIC<br>or SPDIFOUT | 46              |
| EAPD                     | EAPD   | I/O (Open<br>Drain Digital) | Pull-up 60K   | 47              |
| SPDIFOUT0                | SPDIF0   | O(Digital)                  | 60K internal pull-down  | 48              |

**Table 26. Pin Table**

9. PACKAGE OUTLINE AND PACKAGE DIMENSIONS

Package dimensions are kept current with JEDEC Publication No. 95Solder Reflow Profile

9.1. 48-Pad QFN Package



Figure 13. 48QFN Package Diagram

9.2. Standard Reflow Profile Data

Note: These devices can be hand soldered at 360 °C for 3 to 5 seconds.

**FROM:** IPC / JEDEC J-STD-020C “Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices” (www.jedec.org/download).

| Profile Feature   | Pb Free Assembly                                 |
|---|--|
| Average Ramp-Up Rate ( $T_{s_{max}} - T_p$ )  | 3 °C / second max                                |
| Preheat: Temperature Min ( $T_{s_{min}}$ )<br>Temperature Max ( $T_{s_{max}}$ )<br>Time ( $t_{s_{min}} - t_{s_{max}}$ ) | 150 °C<br>200 °C<br>60 - 180 seconds             |
| Time maintained above: Temperature ( $T_L$ )<br>Time ( $t_L$ )  | 217 °C<br>60 - 150 seconds                       |
| Peak / Classification Temperature ( $T_p$ )   | See “Package Classification Reflow Temperatures” |
| Time within 5 °C of actual Peak Temperature ( $t_p$ )   | 20 - 40 seconds                                  |
| Ramp-Down rate  | 6 °C / second max                                |
| Time 25 °C to Peak Temperature  | 8 minutes max                                    |

Note: All temperatures refer to topside of the package, measured on the package body surface.

Table 27. Standard Reflow Profile



Figure 14. Solder Reflow Profile

**10. DISCLAIMER**

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## 11. DOCUMENT REVISION HISTORY

| Revision | Date              | Description of Change   |
|----------|-------------------|---|
| 0.5      | January 25, 2008  | Initial release   |
| 0.9      | May 9, 2008       | Added widget details.Integrated addendum sections into datasheet.   |
| 0.91     | May 27, 2008      | Removed low voltage part number, as not needed as the DVD_IO pin dynamically selects low voltage (1.5V) or normal (3.3V) HDA bus signaling based on what voltage is on the pin  |
| 0.92     | August 6, 2008    | <p>YA revision and beyond updates</p> <ul style="list-style-type: none"> <li>• BTL amp gain settings added to Section 2.18, "BTL Amplifier"</li> <li>• Corrected tables in Section 2.17, "EAPD"</li> <li>• Widget Changes in AFG (NID = 01h) <ul style="list-style-type: none"> <li>• AFGEAPD changed to have separate control bits for BTL, HP-A and HP-B</li> <li>• AFGAnaPort Verb changed to remove the GSMark control, and to provide Ports A and B with one power down control each, as opposed to each having a HP power down and a line-out power down</li> <li>• AFGAnaBeep Verb changed to add more flexible modes of operation</li> <li>• AFGAnaBTL Verb changed to add MaxVol field and remove +6db control. Other fields shifted a bit to maintain logical grouping</li> </ul> </li> </ul> <p>AFGAnaCapless Verb changed for new charge pump clock controls, as well as new test bits required by the analog</p> |
| 0.93     | October 2, 2008   | <p>Corrected Mic Boost Voltages in Section 3.2</p> <p>Updated to include Aux mode Section 2.22, "Aux Audio Support (92HD81B1X only)", widget controls added at Chapter 7.4.32, "AFG (NID = 01h): AuxAudio"</p> <p>corrected part number mappings Section 1.2, "Orderable Part Numbers"</p> <p>corrected device ID mappings Section 7.3.1, "Root (NID = 00h): RevID"</p>   |
| 0.94     | October 27, 2008  | <p>Updated 3 widget default values for YB revision</p> <p>Chapter 7.4.28, "AFG (NID = 01h): AnaBTL YC and YD Revisions" TS Wait BITs 11:8, default 6h to 0h</p> <p>Chapter 7.4.30, "AFG (NID = 01h): AnaCapless" ChargePumpFreqBypass BIT 12 default 1h to 0h</p> <p>Chapter 7.4.30, "AFG (NID = 01h): AnaCapless" ChargePumpSplyDetOverride BIT 13 default 1h to 0h</p>  |
| 0.95     | December 10, 2008 | Corrected conflicting pin naming on pins 43 and 44.   |
| 0.96     | January 9, 2009   | <p>Updated for the YC revision</p> <p>Chapter 7.4.6, "AFG (NID = 01h): PwrStateCap" The LPD3Sup bit was renamed and default was changed</p> <p>Chapter 7.4.30, "AFG (NID = 01h): AnaCapless" ChargePumpFreqBypass BIT 12 default changed</p> <p>Chapter 7.9.12, "PortE (NID = 0Eh): ConfigDefault" and Chapter 6.3, "Pin Configuration Default Register Settings" Configuration default change</p>  |
| 0.97     | January 12,2009   | <p>Updated for the WA revision</p> <p>Chapter 7.4.30, "AFG (NID = 01h): AnaCapless" ChargePumpFreqBypass BIT 12 default changed, changed m3dB field name to "Reserved" and changed p6dB field name to "AntiPopBypass."</p>  |
| 0.98     | March 5, 2009     | <p>Removed WA items.</p> <p>Please note YD revision has no changes in documentation from YC. All YC notes apply to YD.</p> <p>Removed 3.3V Analog option. Contact TSI for more information.</p>   |

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| Revision | Date           | Description of Change  |
|----------|----------------|--|
| 0.985    | April 2009     | Added UA widget changes<br>All vendor defined widgets are now reset on POR except VSPwrState<br>Chapter 7.4.23, "AFG (NID = 01h): EAPD" AFGEAPDxxxSDMode defaults were changed to 1<br>Chapter 7.4.24, "AFG (NID = 01h): PortUse" AFGPortUse defaults were changed to 1<br>Chapter 7.4.29, "AFG (NID = 01h): AnaBTL UA Revision" AFGAnaBTL Verb updated and rearranged<br>Chapter 7.4.30, "AFG (NID = 01h): AnaCapless" AFGAnaCaplessVRegSel definition changed, and default changed from 4h to 2h<br>Chapter 7.8.6, "PortD (NID = 0Dh): PinWCntrl" PortDPinWCntrlOutEn bit default changed to 0<br>Chapter 7.4.26, "AFG (NID = 01h): AnaPort" RTZCon[2:0] field removed from the AFGAnaDAC Verb. HPILimit[1:0] field removed from the AFGAnaSply Verb. p6dB and m3dB bits removed from the AFGAnaCapless Verb, AntiPopBypass bit added to bit 0 of that Verb. |
| 0.986    | September 2009 | Indicated that all UA widget comments also apply to the TA revision.   |
| 0.987    | November 2009  | TA revision, Port C for Input use only.  |
| 0.99     | October 2010   | SA revision, Port C is input and output. BTL/SD_Mode default changed. High pass filter feature added (description and widgets to control DAC0/1 ProcState and ProclIndex), updated datasheet formatting to new style. ECR15B references changed to HDA015-B.   |
| 0.995    | January 2011   | Updated SA revision comments for RA revision.  |
| 1.0      | October 2014   | Released in TSI Format   |

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