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# FUSB301 Evaluation Board Users Guide

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#### Introduction

The FUSB301 is an autonomous USB Type-C controller device designed to negotiate the Type-C interface connections. This document along with the FUSB301 datasheet are a guide to using the evaluation board designed for this device.

The FUSB301 is designed to be controlled from an application processor so for demonstration purposes a microcontroller has been added to the board for convenient chip control and graphical user interface (GUI). Fairchild will supply this GUI to assist in the Evaluation of the FUSB301. If no GUI control is available the FUSB301 will boot up in UFP mode.



Figure 2 - FUSB301 Block Diagram

#### Power

The board can be powered directly from the GUI host USB connection or from bench power supplies for those that would like to alter the VDD voltage. VDDIO is tied to the VDD regulator fixed at 3.3V. Connecting jumper J5 connects the host USB VBUS to the on-board regulators. Jumpers J1 and J5 are connected by default to operate the board directly from the host USB controller VBUS. When DFP mode is entered the ID pin of the FUSB301 will go low and turn on the *FPF2411* power switch. If a bench supply is desired, removal of the J5 jumper and clip leads from the supply should be connected to J5, pin 1 and GND.



Figure 3 - FUSB301 Evaluation Board Power Configuration

There are many test points on the board for probing convenience. They are labeled on the board and schematic. There are also provisions for changing or upgrading the processor firmware. This can be done either with the 6 pin header (J3) or from a direct USB connection from the J4 host port (switch SW1 must be temporarily pressed while plugging in the USB cable to enable the bootloader (specific instructions will be included with any firmware changes). The SS\_SW pin connects to an LED (D6) and indicates the attached CC orientation.

## FUSB301 GUI Control Program

Along with the board schematic and product datasheets Fairchild will provide a GUI program to control the board operation. All of the device features can be observed or exercised from this control point. Installing the software is accomplished by running the setup.exe program provided. This install will load the required executables, binaries and Microsoft Framework files (if not already installed). The GUI is based on an HID driver (native to Windows) so loading additional drivers is not necessary. The following is a description of how to run the GUI.

	U Fairchild Mobile Solutions - (FUSB301 (Rev 1) - Type-C Autonomous	CC Detection)			
	Elle USB Device Help		_ 6 ×		
	FUSB3 Type-C Auto	301 (Rev 1) nomous CC Detection	FAIRCHILD		
	Back     State     Passed Memory     Device II       Scan     - <t< td=""><td>DBA010     Status (0x11)       018:0111     018:01111 01 : 1006 ; Nati Detectine or Peoples Connection to (0.0 00, 0000 ; NULS) and the Value of the State of th</td><td>Тре (br12) / reenut (br13) n Sink ACC_CH Sexue BC_LNA POWER_LCC DETACH DEBUG_ACC ATTACH AUDIO_ACC</td><td></td><td></td></t<>	DBA010     Status (0x11)       018:0111     018:01111 01 : 1006 ; Nati Detectine or Peoples Connection to (0.0 00, 0000 ; NULS) and the Value of the State of th	Тре (br12) / reenut (br13) n Sink ACC_CH Sexue BC_LNA POWER_LCC DETACH DEBUG_ACC ATTACH AUDIO_ACC		
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<u>File USB D</u> evice <u>H</u> elp					
General Too	FUSB301 (F Type-C Autonomous C	Rev 1)		FAIRCHI	LD
IZC Address Option Scan   Scan   Power Status   VBUS IN   VDD	Read Interrupt/ Status/Type     Device ID(0x01)       Read INT_N     VersionID [7:3]:00       Read INT_N     Revision ID [3:0]: 00       Read All     INTN : Inactive       Clear INTMASK     INTN : Inactive	Status (0x11)       001b     ORIENT[1:0] : '00b', Not Detecte       000b     VBUS_OK : '0b', VBUS is not i       BC_LVL[1:0] : '00b', Ra or Unattached       aTTACH : '0b', Unattached	d or Resolved Connection n Valid range ached UFP	Type (0x12) Inter Sink Al Source Bi POWER_ACC D DEBUG_ACC A' AUDIO_ACC	rupt (0x13) CC_CH C_LVL IETACH TTACH
Device Control					
General Control Software Scripting	DeviceLOG				
Modes (0x02) DRP + ACC DRP UFP+ACC UFP DFP+ACC DFP Configure as Upstream Facing Port	Control (0x03) DRP_TOGGLE [1:0] 35ms Unattached UFF HOST_CUR [1:0] 80uA - Default USB P( INT MASK	Manual ( 00 • UI 2/ 15ms Unattached DFP UI 01 • UI power EF	Qx04) Interm   NATT_UFP Image: Constraint of the second sec	ipt Mask(0x10) ACC_CH BC_LVL DETACH ATTACH	
Head General (0x02,0x03. 0x10)	Vrite General (Ux02, 0x03, 0x10)	IZC Heset(Write 0x01 to addr 0x05	<u></u>		
					Event Log
USB: Standard HID Connected				Device: F	USB301 Detected

The top half of the window is for device and interrupt status, the tab control at the bottom is for setting up the various operating conditions of the FUSB301. After successful board connection and power up the status field should indicate the current condition of the device. If the I2CADDR pin of the device has been changed from default, clicking on the 'Scan' button will find the appropriate I2C address of the device. *Note the two green status boxes at the bottom corners, they are pink in color when not successfully connected.* 

The 'General Control' tab will default to 'UFP+ACC' mode which will allow a type-c cable to be plugged into a valid DFP or DRP device on one of the CC pins. The status box will show the connection

status. When making changes in the tab controls it is generally required to click on the 'Write General' button to actually write the changes to the device. Clicking the 'I2C Reset' will return the device to power-up state. Referring to the datasheet will help in navigation of this GUI. Clearing the INT MASK check box, then 'Write General' will enable the FUSB301/A to respond with interrupts (masking all interrupts is the power-up default).

The '**Software**' tab sets up the polling that is done to update the GUI. This polling activity can mimic what an application processor would normally do.

General Control Software Scripting DeviceLOG					
Automatic Polling					
V Automatically Poll INTN Pin Level 300 👘 ms					
Automatically Poll Interrupt' Register					
Automatically Update 'Status' Register	Automatically Update 'Type' Register				
@ACC_CH interrupt	@ACC_CH interrupt				
@BC_LVL interrupt	@BC_LVL interrupt				
@DETACH interrupt	@DETACH interrupt				
@ATTACH interrupt	@ATTACH interrupt				

The '**Scripting**' tab is a convenient way to make many changes to any of the registers. This is handy when running repetitive tasks or recalling setups. The text at the top of the frame describes the syntax for the scripts:

The 'Scripting' tab enables the use of scripts to configure the FUSB301.

The window in the left side of the tab controls the scripting. The control has the following functionality:

- Read through "**r**", "**rd**", "**read**"
- Write through "w", "wr", "write"
- Delay in milliseconds through "d", "del", "delay"
- Pause through "p", "pa", "pause"

Scripts can be added through the GUI using the 'Add' button or imported from an external file using the 'Import' button. Individual lines can be reordered through the 'Up' and 'Down' buttons, edited through the 'Edit' button, or deleted with the 'Remove' button. After achieving a desired setup, a script can also be exported to a file.

General Control Software Scripting DeviceLOG	
Command, # of Bytes, Address, Data 1, Data 2, Data 3, ; Comment	Row #, Time, Address, Data, Comment
	Add Remove Edt Up Down Import
< >	Repeat Script  Execute Script

An example script could be: w,1,0x02,0x01 ; ### Set device to DFP mode ### w=write 1 byte Address 0x02 Data 0x01 Comment

Results of an executed script are shown in the box on the right side of the tab. These results can be exported to a file.

The '**Device Log**' tab keeps track of all the interrupt activity and can be controlled and exported from this tab.



FUSB301 Evaluation Board Schematic Page 1







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