



Features

3.475GHz

Standard 3 Wire Interface

Small layout 0.582" × 0.8"



Applications

Digital Radio Equipment
Fixed Wireless Access
Satellite Communications Systems
Base Stations
Personal Communications Systems
Portable Radios
Test Instruments
Wireless Infrastructure

The CPLL58 is a complete PLL/Synthesizer needing only an external frequency reference and supply voltages for the internal PLL (phase lock loop) and VCO (voltage controlled oscillator). The Crystek CPLL58 is programmed using a standard three line interface (Data, Clock and Load Enable).

The CPLL58 family has been initially released to cover 1GHz to 5GHz in bands. It is housed in a compact 0.582-in. × 0.8-in. × 0.15-in. SMD package which saves board space. Typical phase noise at 4GHz is -90dBc/Hz at 10KHz offset with 0dBm minimum output power.





| PERFORMANCE SPECIFICATION | MIN | TYP | MAX | UNITS |
|---|------|-------|------|--------|
| Frequency Range: | | 3.475 | | GHz |
| Step Size: | | 2500 | | KHz |
| Settling Time, to within ± 1kHz (Freq. step < 25MHz): | | 1 | | msec |
| Output Power: | 0 | +3.0 | +6.0 | dBm |
| Output Phase Noise: (See Plot Below) | | | | |
| @1KHz offset | | -85 | -80 | dBc/Hz |
| @10KHz offset | | -95 | -90 | dBc/Hz |
| @100KHz offset | | -90 | -100 | dBc/Hz |
| @1MHz offset | | -117 | -130 | dBc/Hz |
| Power Supply: | | | | |
| V1=VCO Supply | 4.75 | 5.0 | 5.25 | Volts |
| V2=PLL Supply | 2.7 | 3.0 | 3.3 | Volts |
| Supply Current: | | | | |
| I1=VCO Input Current | | 50 | | mA |
| I2=PLL Input Current | | 25 | | mA |
| Spurious Suppression | | | | dBc |
| PFDSpur | | -70 | -60 | dBc |
| Reference Feedthru | | -80 | -70 | dBc |
| Harmonic Suppression (2nd Harmonic): | | | | |
| 2nd | | -15 | -10 | dBc |
| Reference Frequency | | 10 | | MHz |
| RF Output Level | -5 | 0 | +5 | dBm |
| Input Impedance | | 100K | | Ohm |
| RF Output Impedance | | 50 | | Ohm |
| Operating Temperature Range: | -40 | | +85 | °C |



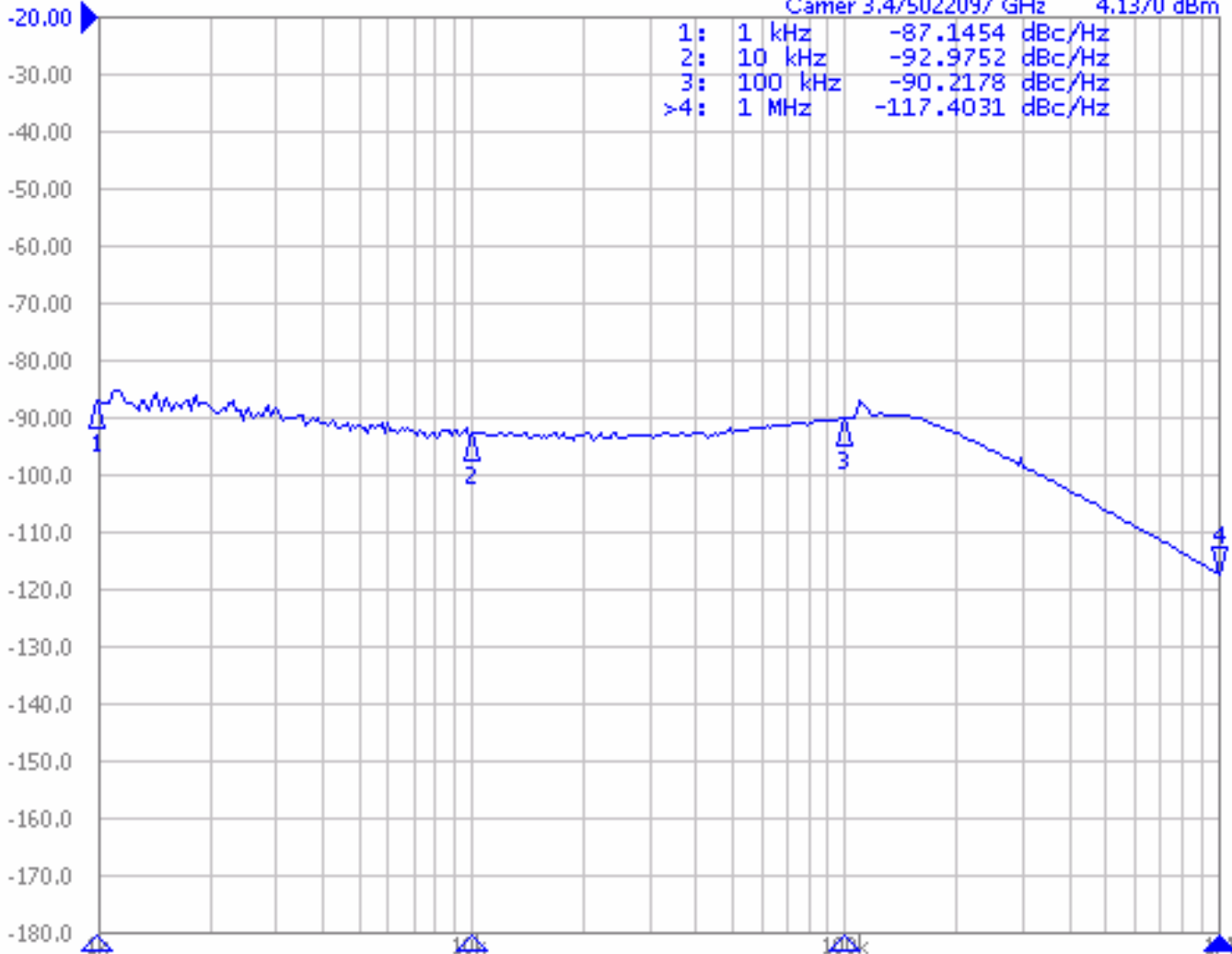


Agilent E5052A Signal Source Analyzer

Phase Noise 10.00dB/ Ref -20.00dBc/Hz

Carrier 3.475022097 GHz 4.1370 dBm

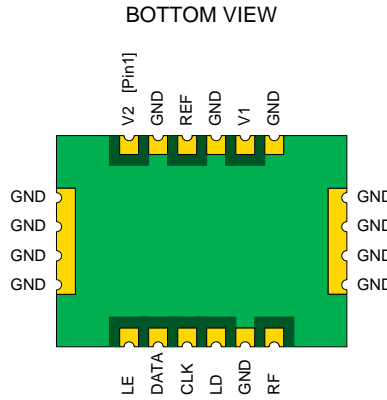
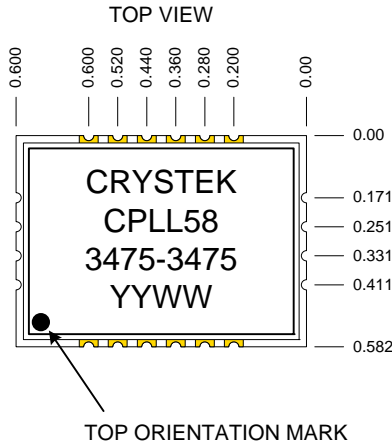
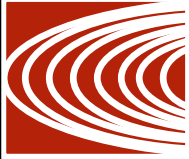
| | | |
|-----|---------|------------------|
| 1: | 1 kHz | -87.1454 dBc/Hz |
| 2: | 10 kHz | -92.9752 dBc/Hz |
| 3: | 100 kHz | -90.2178 dBc/Hz |
| >4: | 1 MHz | -117.4031 dBc/Hz |



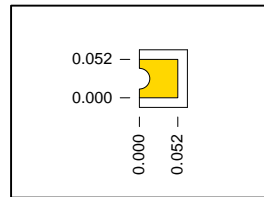
IF Gain 20dB Freq Band [300M-7GHz] LO Opt [<150kHz] 388pts

Phase Noise Start 1 kHz Stop 1 MHz 16/16



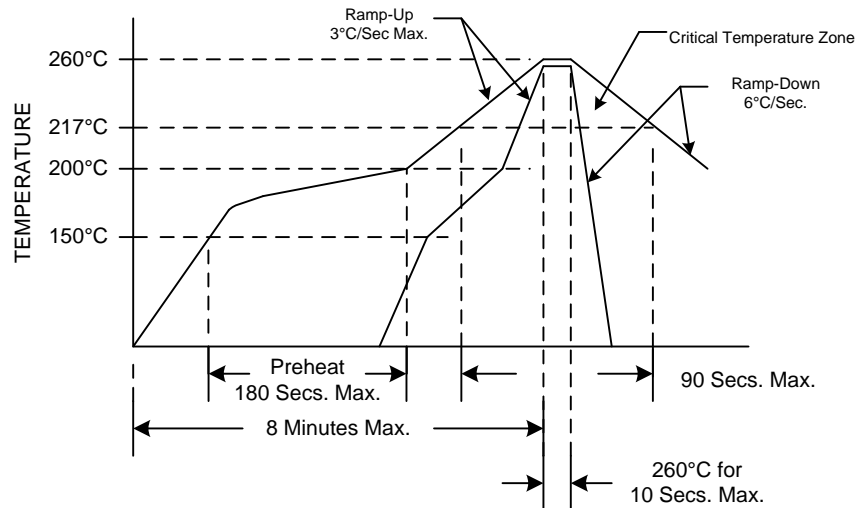


- LE = Load Enable, CMOS Input
- DATA = Serial Data Input
- CLK = Clock
- LD = Lock Detect
- REF = Reference Input
- V1 = Analog Supply Input (VCO)
- V2 = Digital Supply Input (PLL)
- RF = RF Output



Pad Detail

RECOMMENDED REFLOW SOLDERING PROFILE





ENVIRONMENTAL COMPLIANCE

| Parameter | Conditions |
|------------------------|--------------------------|
| Mechanical Shock | MIL-STD-883, Method 2002 |
| Mechanical Vibration | MIL-STD-883, Method 2007 |
| Solderability | MIL-STD-883, Method 1014 |
| Resistance to Solvents | MIL-STD-883, Method 2016 |

Programming Guide for CPLL58-XXXX

Introduction

The CPLL58 uses a simple 3 wire interface to program four internal registers. See Figure 1.

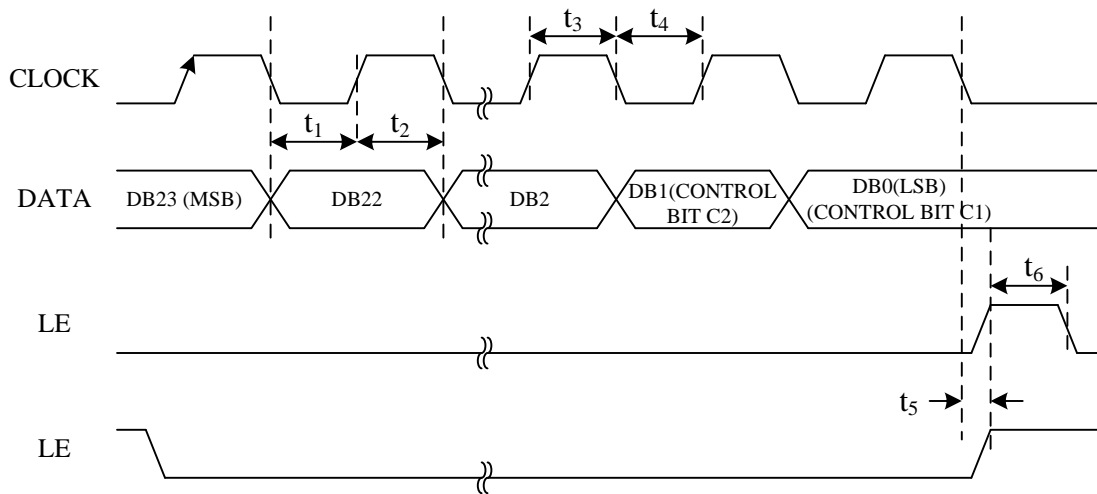


Figure 1. Timing Diagram

There are four 24 bit registers that need to be programmed. Which register is written into is simply controlled by Control Bits C1 and C2. Table I summarizes the Truth Table for Control Bits C1 and C2.

| Control Bits | | Data Latch |
|--------------|----|--------------------------------------|
| C2 | C1 | |
| 0 | 0 | R Counter |
| 0 | 1 | N Counter (A and B) |
| 1 | 0 | Function Latch (Including Prescaler) |
| 1 | 1 | Initialization Latch |

Table I. C2, C1 Truth Table



Table II shows the details of the four 24 bit registers.

| REFERENCE COUNTER LATCH | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|------|------|-----------------------|----------------|------|------|---------------------|------|--------------------------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|--------------|-------|
| RESERVED | | | LOCK DETECT PRECISION | TEST MODE BITS | | | ANTI-BACKLASH WIDTH | | 14-BIT REFERENCE COUNTER | | | | | | | | | | | | | CONTROL BITS | |
| DB23 | DB22 | DB21 | DB20 | DB19 | DB18 | DB17 | DB16 | DB15 | DB14 | DB13 | DB12 | DB11 | DB10 | DB9 | DB8 | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 |
| X | 0 | 0 | LDP | T2 | T1 | ABP2 | ABP1 | R14 | R13 | R12 | R11 | R10 | R9 | R8 | R7 | R6 | R5 | R4 | R3 | R2 | R1 | C2(0) | C1(0) |

| N COUNTER LATCH | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------|---------|----------------|------|------|------|------|------|------|------|------|------|------|-----|-----|---------------|-----|-----|-----|-----|-----|--------------|-------|
| RESERVED | | CP GAIN | 13-BIT COUNTER | | | | | | | | | | | | | 6-BIT COUNTER | | | | | | CONTROL BITS | |
| DB23 | DB22 | DB21 | DB20 | DB19 | DB18 | DB17 | DB16 | DB15 | DB14 | DB13 | DB12 | DB11 | DB10 | DB9 | DB8 | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 |
| | | G1 | B13 | B12 | B11 | B10 | B9 | B8 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | A6 | A5 | A4 | A3 | A2 | A1 | C2(0) | C1(1) |

| FUNCTION LATCH | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------|-------------------------|------------------------------|------|------|------------------------------|------|------|-----------------------|------|------|------|---------------|-----------------|----------------|-------------|----------------|-----|-----|-------------------------|---------------|--------------|-------|
| PRESCALER VALUE | | POWER-DOWN ₂ | CURRENT SETTING ₂ | | | CURRENT SETTING ₁ | | | TIMER COUNTER CONTROL | | | | FASTLOCK MODE | FASTLOCK ENABLE | CP THREE-STATE | PD POLARITY | MUXOUT CONTROL | | | POWER-DOWN ₁ | COUNTER RESET | CONTROL BITS | |
| DB23 | DB22 | DB21 | DB20 | DB19 | DB18 | DB17 | DB16 | DB15 | DB14 | DB13 | DB12 | DB11 | DB10 | DB9 | DB8 | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 |
| P2 | P1 | PD2 | CP16 | CP15 | CP14 | CP13 | CP12 | CP11 | TC4 | TC3 | TC2 | TC1 | F5 | F4 | F3 | F2 | M3 | M2 | M1 | PD1 | F1 | C2(1) | C1(0) |

| INITIALIZATION LATCH | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|------|-------------------------|------------------------------|------|------|------------------------------|------|------|-----------------------|------|------|------|---------------|-----------------|----------------|-------------|----------------|-----|-----|-------------------------|---------------|--------------|-------|
| PRESCALER VALUE | | POWER-DOWN ₂ | CURRENT SETTING ₂ | | | CURRENT SETTING ₁ | | | TIMER COUNTER CONTROL | | | | FASTLOCK MODE | FASTLOCK ENABLE | CP THREE-STATE | PD POLARITY | MUXOUT CONTROL | | | POWER-DOWN ₁ | COUNTER RESET | CONTROL BITS | |
| DB23 | DB22 | DB21 | DB20 | DB19 | DB18 | DB17 | DB16 | DB15 | DB14 | DB13 | DB12 | DB11 | DB10 | DB9 | DB8 | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 |
| P2 | P1 | PD2 | CP16 | CP15 | CP14 | CP13 | CP12 | CP11 | TC4 | TC3 | TC2 | TC1 | F5 | F4 | F3 | F2 | M3 | M2 | M1 | PD1 | F1 | C2(1) | C1(1) |

Table II. Latch Summary

When using the CPLL58 family in a synthesizer application, all four 24 bit registers need to be written into after power-up. After writing all four latches the first time, subsequent frequency step changes can be accomplished by changing the N Counter Latch only.

Specifications subject to change without notice.



Programming Crystek p/n: CPLL58-3475-3475

The following is specific programming for CPLL58-3475-3475 (3.475GHz fixed freq. with 2500KHz Step Size and 10MHz input reference frequency).

Program all three registers with the following:

R Counter Latch: 000010 H
N Counter Latch: 002B39 H
Function Latch: 9F8083 H

The above values will set the CPLL58-3475-3475 to 3.475GHz



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