

CleverLoad Calibration

CleverLoad will perform well without calibration and should be able to provide power level readings within 1dB using the default data.

To calibrate CleverLoad and improve accuracy to better than 0.25dB need the following:

1. CleverLoad calibration software
2. PICAXE programming editor
3. Counter with 10 or preferably 1milihertz resolution to set the 32,768Hz clock oscillator
4. RF signal generator capable of providing a minimum +10dBm output at 50MHz with
 - a. a 0dBm known accuracy to 0.1dB at 50MHz. for the zero dBm reference point
 - b. a 3dB attenuator accurate to 0.1dB or better or an adjustable attenuator on the signal generator output with the same precision to calibrate peaking mode.
5. High power RF source at 50MHz providing between 30 and 40dBm with a known accuracy of 0.1dB

Download the calibration software to CleverLoad

1. Start the PICAXE program editor
2. From the 'File' menu choose 'Open'
3. In the 'Open...' window navigate to the CleverLoad Calibration V1.0 program is located and double click the entry to load the program.
4. Connect the serial cable to CleverLoad
5. In the Program editor download the program to the PICAXE Processor
 - a. Click on the program editor 'PICAXE' menu item then click on Program...
 - b. The 'Downloading...' window appears followed by the 'Connecting to Hardware...' window
 - c. When the 'Connecting to Hardware...' window appears push Sw3, the switch just below the display and hold it down until the download is complete.

When loaded a splash screen will identify the Calibration load version then the main menu will appear

Set the ISL2026 clock

Set the ISL12026 clock Analog and Digital trim registers

1. Remove the top cover from CleverLoad and locate the clock oscillator test point
2. Attach a high impedance probe from the counter to the test point.
3. Navigate to the 'Clk Cal Freq' menu item and press Sw3
4. This will place you in the '
5. Navigate to the 'Analog Trim' submenu and press Sw3
6. While monitoring the frequency counter increase or decrease the ATR capacitance by pressing the Up, Sw1 or Dn, Sw2 buttons so that the counter reads as close to 32,768.000 Hz as possible
7. When the reading is as close to 32,768 as possible, press the Sw3 button. This will save the reading in EEPROM and send you back to the next 'Trim Xtal Cap' menu item Digital Trim.

Calibrate the RF measurement Subsystem

Navigate to the 'RF Power Cal' submenu and press Sw3

0dBm Cal

This procedure measures and stores a 0dBm reference count which is used as the base for all power measurements. The value is read from the RF detector output at the PICAXE A-D converter input and is stored at the 0dBmRef value during this procedure.

The '0dBm Cal' should be the first submenu item in the RF Power Cal menu, if not press the Up & Dn buttons to navigate to the '0dBm Cal' menu.

Apply 0.0dBm from the signal generator.

Press Sw3. When the '<- Apply 0.0dBm' screen appears press Sw1.

The program will return the value to be stored for 0dBm

This value is the raw PICAXE A-D count measured from the AD8362 detector output. It should typically be between 210 and 214.

PeakingGainCal

This procedure creates a scaling factor to account for for an accurate 3dB peaking gain measurement

1. Navigate the calibration menu selecting RF gain then 'PeakingGain Cal'
2. Apply 7dBm CW signal at 50MHz to CleverLoad
3. Press switch 1
4. The unit will stabilize then apply +10dBm and press switch1

HighPowerCal

This procedure creates a scaling factor to account for errors in the measurement system as the power level increases from 0dBm to +50dBm.

Navigate the CleverLoad Calibration menu selecting RF Gain then HighPowerCal

Apply a 50Mhz RF signal at between 30.0 and 40.0dBm

Press S1

The cal program will show the calculated scale factor Sf.

Review Cal Data

This menu item is used to view all calibration data.