

ICOM PCR1000

ICOM PCR1000 DRIVER

rev 3

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Overview

The PCR1000.EXE driver is compatible with the ICOM PCR1000 Communications Receiver.

The driver program completely automates the drive test, data acquisition process. The driver sets frequency and reads the S Meter level, converts the S Meter reading to calibrated values through the use of a calibration file. These readings are formatted into a log file record, one field for each entry in the Frequency List.

The record is then sent to the main Field Test 6 program, displayed and saved into the log file. This measurement process is repeated continuously, stopped only by clicking the Stop button on the receiver driver window in the lower right-hand corner of the Field Test 6 Data Acquisition screen.

Project specific settings are set in receiver setup files, <name>.REC files. Global settings, used across all projects, are saved in a file located at: C:\STI Projects\PCR1000.INI.

.REC File Structure

The driver is controlled by the contents of a receiver setup file, <name>.REC. When selected during the creation of a new project, this file is copied into the new project directory. A number, usually "0" is added to the file name as a prefix. It is this copy of the <name>.REC file in the C:\Projects\<new project> directory that is used by the new project. To edit the setup file for the current project, select [Proj Setup] then [Edit .REC]. When the Notepad window opens, select the middle control labeled *Click Here to Edit the Current Receive Setup File:* When editing is complete select *File* then *Save* to save your changes.

Caution: Once data has been acquired in a project, do not change the number of frequencies or the frequency of frequencies in the [Freq List] section. Changes in the number of frequencies will cause the current project and its database to be reset with new fields. Existing measurement data will be lost.

See Chapter 2, *Setting Up Your System*, for additional details on the <Name>.REC file.

The <name>.REC file contains three sections:

- [Compatibility]
- [Global Settings]
- [Freq List]

[Compatibility]

The [Compatibility] section must contain the name of the receiver driver with which this .REC file is compatible. For this driver there are three lines indicating compatibility which should not be changed.

File Version = 5
File Version 6 = True
Driver = PCR1000.EXE

[Global Settings]

The [Global Settings] section sets parameters that are used internally by the driver. Global Setting parameters include:

- | | |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Demod Mode=FM | Sets the demodulation mode for the receiver. Choices are:

FM, Wide FM, AM or CW.

The default value is FM. This parameter must be entered exactly as indicated. |
| IF Bandwidth=15KHZ | Sets the IF Bandwidth of the receiver. Choices are:

3KHZ, 6KHZ, 15KHZ, 50KHZ, 230KHZ.

The default is 15KHZ. This parameter must be entered exactly as indicated. |
| RF Attenuator=OFF | Turns the RF Attenuator On or Off. The default value is Off. Factory calibration tables have been generated with the attenuator Off. |
| Channel Averages = 3 | Sets the number of signal samples to take on each frequency. In this case each channel is tuned then 3 samples are taken and averaged. |
| Sweep Averages = 1 | Sets the number of times to sweep through the frequency list. In this case one pass is made through the frequency list. |

Note Regarding Sweep VS Channel Averages: The first measurement sample on a channel takes about 300 ms. Samples after the first take about 30 ms. If there are 10 frequencies in the frequency list the time to average three samples on all 10 channels is computed as follows:

$$\begin{aligned} \text{Measurement Time} &= 300 \text{ ms} * 10 \text{ ch} * 1 \text{ samp} + \\ &30 \text{ ms} * 2 \text{ samp} * 10 \text{ ch} = 3600 \text{ ms} \end{aligned}$$

Using this method, measurements are taken in channel related bursts over the distance traveled in 3.9 seconds.

You can also set Channel Averages = 1 and Sweep Averages = 3. In this case the channel samples are interleaved over the distance traveled. However, measurement time, and therefore distance traveled, is increased considerably as shown below.

Measurement Time = 300 ms * 10 ch * 3 samp = 9000 ms

[Freq List]

The [Freq List] section sets the frequencies to be tuned and measured. The format of lines in the [Freq List] section is as follows.

<Line Number>=<Name of Channel>,<Frequency in MHz>

Note: Frequencies will be tuned in line number order. Do not skip more than 20 line number values as the following lines will be ignored.

Note: Name of Channel is a text field which will be used for creating file names and database field names. These may be modified by Field Test 6 if they are not compatible.

Note: The Comma character is a delimiter and must be used only for separating the <Name of Channel> field from the <Frequency> field.

ICOM_Exmpl.REC

ICOM_Exmpl.REC is an example receiver setup file for the ICOM PCR1000 receiver.

[Compatibility]

File Version=5

File Version 6=True

driver=PCR1000.exe

[Global Settings]

Demod Mode=FM

IF Bandwidth=15KHZ

RF Attenuator=Off

Channel Averages=3

Sweep Averages=1

[Freq List]

1=WX1,162.550

2=WX2,162.400

3=WX3,162.475

4=WX4,162.425

5=WX5,162.450

6=WX6,162.500

7=WX7,162.525

PCR1000 Calibration

A calibration file is used by the PCR1000 driver to convert PCR1000 RSSI readings to dBm values.

Calibration File Database

The calibration file for a specific receiver is extracted from a calibration file database located at:

C:\STI6\PCR1K_CalFiles.DAT.

This database contains calibration files for all STI systems shipped with a PCR1000, Option 01. Each PCR1000 receiver contains a software serial number which is keyed to its individual calibration file. When the driver is first started it reads the SW SN and extracts the calibration file for that receiver. The file is a text file located at:

C:\STI Rec Files\PCR1K-<SW SN>_CalTable.TXT.

Calibration File

The calibration file is in Windows .INI file format. It contains a matrix of calibration values for more than 50 frequencies and 25 amplitudes. This matrix of values accurately characterize variations over the complete range of frequency and amplitude. Adjustments of these values should not be attempted.

A Global Adjustment parameter is located in the [Global Settings] section of this file. This value, in dB, is added to the reading from the PCR1000 in dBm and can be used to adjust the calibration of the PCR1000. See the PCR1k-<SW SN>_CalTable.TXT Example section below for its exact location in the file.

Calibration Procedure

Create a project containing a frequency of interest. The Channel Averages parameter in the .REC file should be set to 5.

Run the project and start the receiver. Let the project run for a minimum of 20 minutes.

Attach a signal at the frequency of interest at a level of exactly -90 dBm to the antenna connector of the PCR1000.

Note the level of the signal on the signals display. You can right click on the signals display bar to obtain a digital value.

Determine the amount to be added or subtracted from the measured value to obtain a correct reading of -90 dBm. This is the amount that should be added or subtracted from the value of the Global Adjustment parameter

PCR1k-<SW SN>_CalTable.TXT Example

The calibration table is a text file and can be edited with Windows Notepad or a similar text editor. Following is an example of a calibration file for the ICOM PCR1000 receiver. The file calibrates the ICOM PCR1000 RSSI or S Meter readings to dBm.

[Compatibility]

Driver=PCR1000.EXE Ver050516
PCR1000 SN=0202822
PCR ROM SN=17
STI Mount SN=C424161
Customer=STI Demo
IFBW=15KHZ

[Global Settings]

Global Adjustment=0
Amplitudes=-125,-120,-115,-110,-105,-100,-95,-90,-85,-80,-75,-70,-65,-60,-55,-50,-45,-40,-35,-30,-25,-20,-15,-10,0
Frequencies=500000,1020000,7020000,21020000,40020000,50020000,58280000,58320000,88020000,108280000,108320000,130020000,149980000,150020000,162475000,174020000,183280000,183320000,216020000,265680000,265720000,300020000,349980000,350020000,383280000,383320000,433320000,450020000,460620000,470020000,483280000,483320000,558320000,633280000,633320000,699980000,700020000,750020000,799980000,800020000,852020000,860020000,868880000,916680000,916720000,918020000,927020000,937020000,947020000,1016680000,1016720000,

[500000]

-125=0
-120=0
-115=0
-110=0
-105=67
-100=74
-95=75
-90=83
-85=92
-80=100
-75=111
-70=120
-65=133
-60=146
-55=162
-50=179
-45=198
-40=217
-35=230
-30=236
-25=240
-20=245

-15=252
-10=255
0=255

[1020000]

-125=0
-120=0
-115=0
-110=0
-105=64
-100=68

.....

other sections

.....

-25=243
-20=255
-15=255
-10=255
0=255

[1016720000]

-125=0
-120=43
-115=53
-110=64
-105=74
-100=84
-95=93
-90=102
-85=111
-80=121
-75=130
-70=140
-65=150
-60=159
-55=169
-50=180
-45=190
-40=203
-35=216
-30=230
-25=243
-20=255
-15=255
-10=255
0=255

PCR1000.INI Settings

The PCR1000.INI file contains settings for serial port setup and for measurement timing. Serial port settings in the [Comm Settings] section are maintained by the driver and do not need user adjustment.

[Global Settings]

Measurement timing settings are set in the [Global Settings] section of the PCR1000.INI file. There are two measurement timing values in this section.

Amplitude Measurement Delay, ms=250 This parameter, in milliseconds, sets the delay time between setting a frequency and measuring amplitude. The S Meter reading seems to be “Damped” and needs a small amount of time to reach a new value from the previous one.

Smaller values reduce measurement cycle time but do not allow time for the time constant of meter damping to reach a new value. The default is 250 ms.

Command Response Delay, ms=500 This parameter sets the number of milliseconds to wait for a response to a command from the PCR1000 receiver. If the response exceeds this setting an error message is displayed.

If the response is received earlier the test continues without delay. This parameter does not affect measurement time. It affects the delay before an error is displayed. The default is 500 ms.

PCR1000.INI Example

[Comm Settings]

Baud Rate=9600

Settings=n,8,1

Last Port=1

[Global Settings]

Amplitude Measurement Delay, ms=250

Command Response Delay, ms=500