

User Guide

Integrated Frequency Counter & Power Meter



FCPM-6000RC
1 - 6000 MHz
50 Ω

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Chapter 1 – General Information

1.1 Scope of the User Guide

This User Guide provides general introduction, installation instructions and operating information for Mini-Circuits FCPM-6000RC Integrated Frequency Counter and Power Meter. For detailed instructions on specific measurement applications using Mini-Circuits measurement applications software see the [Application Measurement guide](#).

1.2 Warranty

See the Mini-Circuits website <http://www.minicircuits.com/support/ordering.html> for warranty information.

1.3 Definitions

Note: A note advises on important information you may need to ensure proper operation of the equipment. There is no risk to either the equipment or the user.

CAUTION

A caution advises about a condition or procedure which can cause damage to the equipment (no danger to users).

WARNING

A warning alerts to a possible risk to the user and steps to avoid it. DO NOT proceed until you are sure you understand the warning.

1.4 General Safety Precautions

Please observe the following safety precautions at all times when using Mini-Circuits smart FCPM-6000RC.

CAUTION

- 1. Note the maximum input power rating in the datasheet and the conditions specified for it. Exceeding these values may damage the FCPM-6000RC.**
- 2. Do not exceed the operational safe power levels for extended periods of time.**

1.5 Introduction

Traditionally, when you wanted to measure both power and frequency of a signal from electronic components or circuit boards, you'd have to connect them to a bulky and expensive bench-top spectrum analyzer, or assemble a complex setup using multiple test equipment. Not anymore. Mini-Circuits FCPM-6000RC offers a whole new approach, using a quick, simple, USB or Ethernet connection for testing both power and frequency in a compact, portable and low cost package. The FCPM-6000RC can be controlled from your PC or laptop, or run independently with readings displayed on its LCD screen.

The FCPM-6000RC includes all measurement and analysis functions Mini-circuits customers are familiar with from the PWR series power sensors and UFC-6000 Frequency counter, easy data storage, advanced data-processing capabilities, and remote operation via Ethernet. Like Mini-Circuits' other Portable Test Equipment models, the FCPM-6000RC is self-calibrating and compensates automatically for temperature. It's quick and easy to use, whether you're in the field or helping someone complete a remote test installation over the phone.



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1.6 Service and Calibration

The only user-performed service possible for the FCPM-6000RC is external cleaning of the case, screen and connectors as needed. Do not use any detergents or spray cleaning solutions to clean the FCPM unit. To clean the connectors, use an alcohol solution, and to clean the FCPM case and LCD screen, a soft, damp cloth. The recommended calibration cycle for Mini-Circuits FCPM-6000RC model is once a year. Calibration service is available from Mini-Circuits. For details; see Ordering, Pricing & Availability Information link from model page on the website.

1.7 Contact Information

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Sales / Customer Service Fax: 1-718-934-7092
sales@minicircuits.com

For regional offices and tech support see <http://www.minicircuits.com/contact/offices.html>

1.8 Technical Description

1.8.1 Features of Mini-Circuits FCPM-6000RC

- ✓ Pocket-sized portability
- ✓ Automatic frequency and Power calibration
- ✓ Automatic temperature compensation
- ✓ Synchronized Power & Frequency measurements from practically any computer.
- ✓ Effective, easy-to-use software
 - User-friendly GUI for any Windows® 32- or 64-bit computer (command-line support for Linux®, Mac support for Ethernet control)
 - Remote control via Ethernet, local control via USB, or standalone operation with no data connection
 - Multiple data display and output options, including Excel®
 - Data averaging
 - Relative measurements
 - Scheduled data recording with user defined spec limits
 - Multi-unit support (up to 24), display options, and management tools
 - Measurement Applications suite to simplify many common test scenarios
 - DLL COM objects for both ActiveX, and .NET supporting LabVIEW®, Delphi®, C++, C#, Visual Basic®, and more (see [programming handbook](#) and application note [AN-49-001](#) for details)
 - Download and install in seconds from the included CD or online from minicircuits.com.

For specific model features, performance data and graphs, outline drawing, ordering information and environmental specifications, see our catalog at:

http://www.minicircuits.com/MCLStore/ModelSearch?search_type=info&model=FCPM-6000RC



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1.8.2 Intended Applications

Mini-Circuits FCPM-6000RC model is intended for indoor use in:

- Lab and test equipment setups for both manual and automated measurements
- Remote location monitoring
- Automatic, scheduled data collection
- Evaluation of high-power, multi-port devices with built-in virtual couplers/attenuators & other software tools

The model can be used by anyone familiar with the basics of electronics measurements.

1.8.3 Conformity

Mini-Circuits FCPM-6000RC model conforms to all requirements for the following international standards:

RoHS – The models comply with EU directive for Restriction of Hazardous Substances for 6 substances.

USB 2.0 – The model meets the specifications of the Universal Serial Bus Ver. 2.0 communication standard as described by USB-IF.

USB HID – The model meets the requirements for Universal Serial Bus Human Interface Devices according to USB-IF's Device Class Definition for Human Interface Devices firmware rev. 1.11.

TCP/IP The model complies with the specifications of the Transmission Control Protocol (TCP) and Internet Protocol (IP) as defined in RFC 791 and RFC 793.

HTTP – The model supports all requirements for communicating with the Hypertext Transfer Protocol (HTTP) as defined in RFC 1945.

Telnet – The model supports all requirements for communicating with the Telnet protocol, as defined in RFC 854.

1.8.4 Supported software environments

Mini-Circuits FCPM-6000RC have been tested in the following operating systems:

32 bit systems: Windows 8, Windows 7, Windows Vista, Windows XP Windows 98

64 bit systems: Windows 8, Windows 7, Windows Vista, Linux

The FCPM-6000RC will work with almost any software environment that supports ActiveX or .Net including: C++, C#, CVI[®], Delphi[®], LabVIEW[®] 8 or newer, MATLAB[®] 7 or newer, Python, Agilent VEE[®], Visual Basic[®], AutoIT, Visual Studio[®] 6 or newer, and more

Additionally the HTTP and Telnet protocols can operate from almost any computer with a network connection.

For more information see [Mini-Circuits programming handbook](#) on our website.



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Chapter 2 – Installation and Setup

This chapter provides information on installing the operating software and setting up Mini-Circuits' FCPM-6000RC. System requirements for USB control are a computer (Pentium II or better) with support for USB HID.

For Ethernet control an Ethernet port with support for HTTP or Telnet, and a suitable power source are needed (an AC/DC power adaptor suitable for most mains power sockets is included with the FCPM-6000RC).

To run the GUI program (described in chapter 3) a Windows operating system (either 32 or 64 bits) is also needed.

2.1 Software Setup



If you have had any problems installing the software, we're here to help.

Try following these complete step-by-step instructions. If you still experience problems, give us a call at Mini-Circuits Worldwide Technical support. It's (718) 934-4500 or e-mail apps@minicircuits.com for North America, or go to minicircuits.com/contact/worldwide_tech_support.html for other regional numbers and addresses.

2.1.1 **First** save all work in progress and close any other programs that may be running.

2.1.2 **Next**, download the full CD software from minicircuits.com. Unzip the downloaded files to a temporary folder on your desktop or C: drive, then open the file folder you created and double-click the "Install" icon.

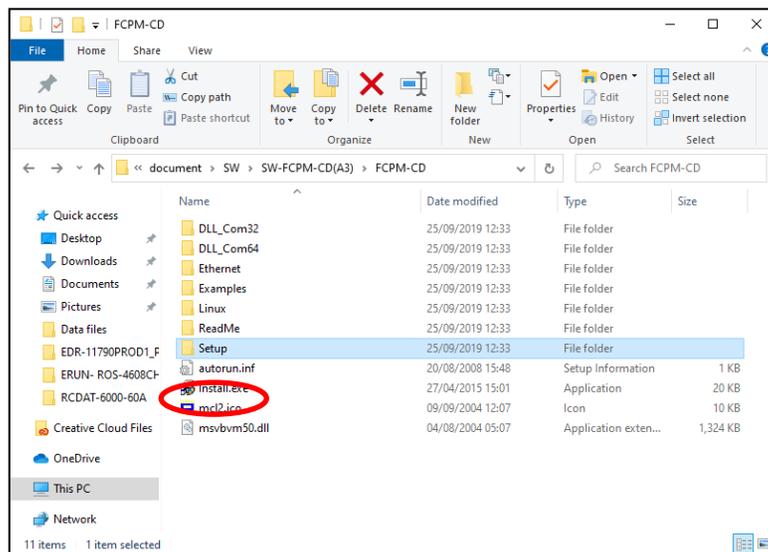


Figure 2.1.3 CD file listing window

2.1.3 **Alternatively, you may** just download and open without saving the setup files, from https://www.minicircuits.com/softwaredownload/SG_Setup.zip. Then double click on the setup.exe icon.

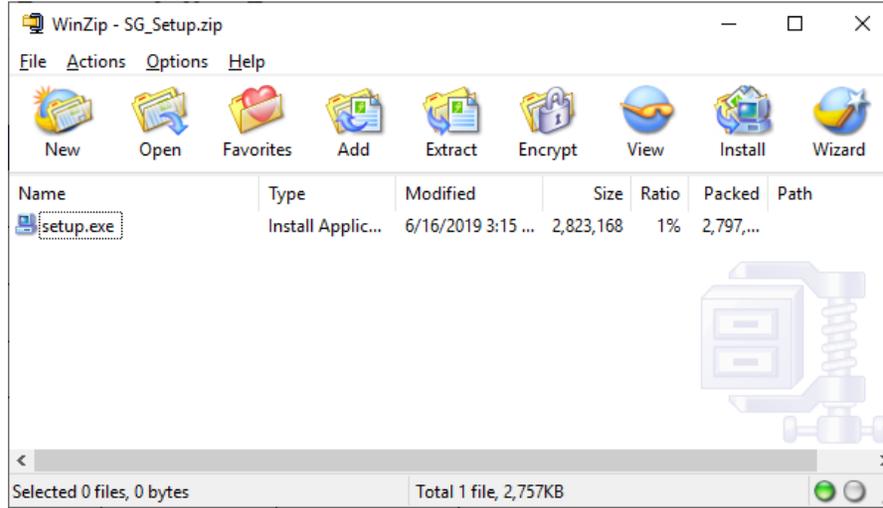


Figure 2.1.3 Setup file listing window

2.2 Installation

2.2.1 **The installer window** should now appear. Click the “Install Now” button.

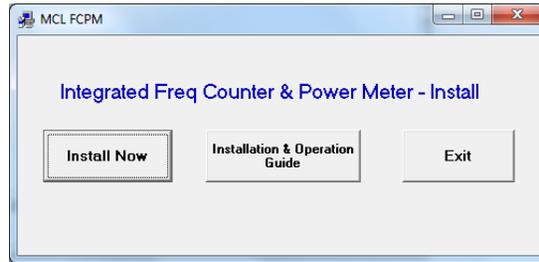


Figure 2.2.1 Installation window

2.2.2 **The installer window** will appear. Click “Next”.

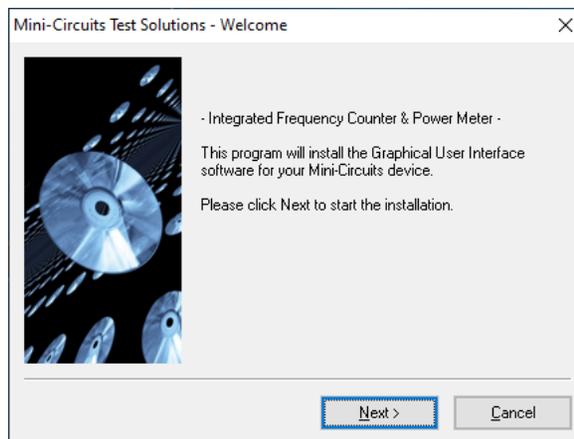


Figure 2.2.2 Installation window

2.2.3 **The license agreement** should now appear. To proceed, click “Yes” to accept the agreement.

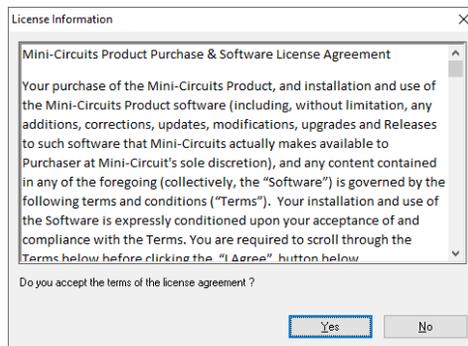


Figure 2.2.3 License agreement

2.2.4 **The installation program will install (will take a few seconds).** Click the “Exit” button to close the installer.

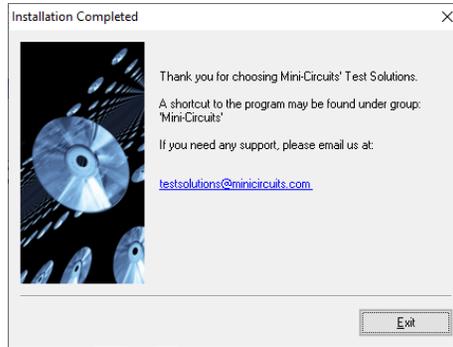


Figure 2.2.4 Installation program window

2.2.5 **The signal generator program will be** located in the C:\Program Files (x86)\Mini-Circuits\FCPM folder, with shortcuts placed on the Windows Start Menu (under Mini-Circuits -> Integrated FC & PM) and on your desktop.

2.3 FCPM-6000RC Physical Setup

2.3.1 **Align the red dot at** the FCPM-6000RC USB/LAN connection with the one on the supplied cable and press in until you hear a 'click'.



Figure 2.3.1: Plug cable into unit

CAUTION

1. Note the maximum rating power input in the datasheet and the conditions specified for it. Exceeding these values may damage the FCPM-6000RC.
2. Do not exceed the operational safe power levels for extended periods of time.

2.3.2 **For USB control**, connect the USB type B plug of the supplied cable to the computer USB port and begin testing. The RJ45 connector may remain unconnected when in USB control.

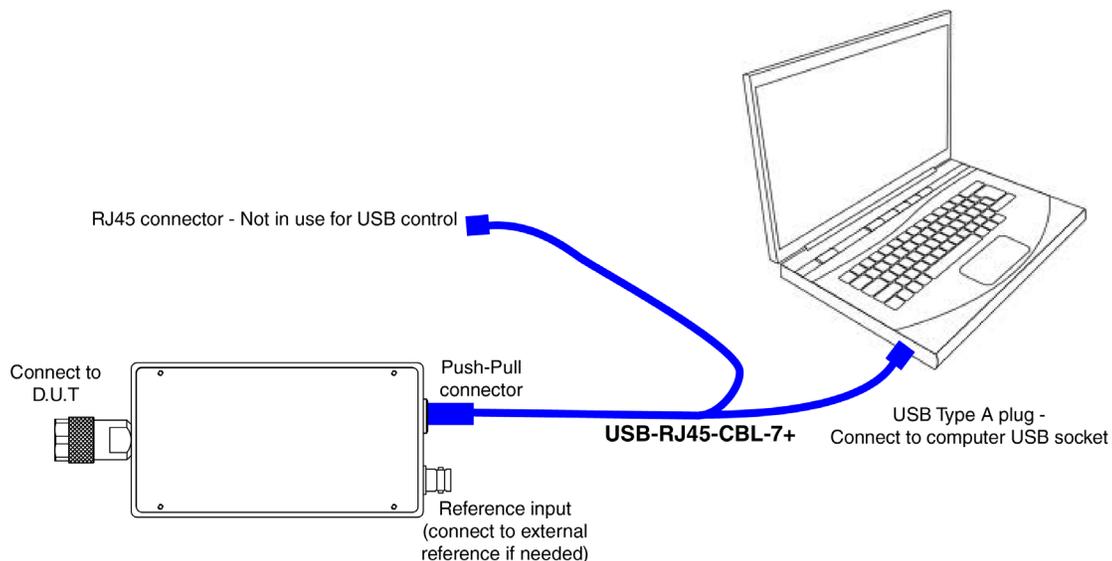


Figure 2.3.2: Connections for USB control

2.3.3 For Ethernet control using AC/DC adaptor

- Connect the USB type A plug of the 'Y' cable to the provided power adaptor and plug it in to a mains power socket, note the FCPM-6000RC's power indicator lights up.
- Connect the Ethernet plug to a network port and note FCPM-6000RC's Ethernet status indicators light up.

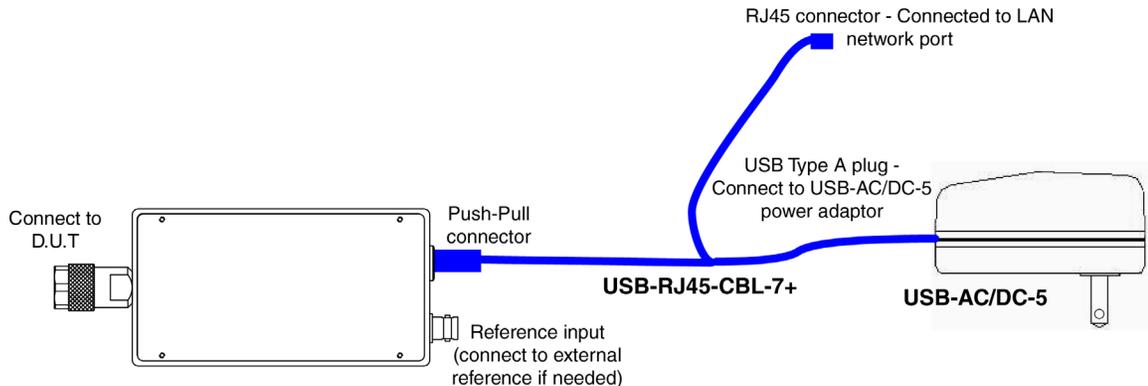


Figure 2.3.3: Connections for Ethernet control with power adaptor

2.3.4 For Ethernet control using Power Over Ethernet

- Connect your PoE splitter Data & Power socket to a network port providing DC power over Ethernet according to the instructions for the PoE splitter.
- Connect the USB plug of the 'Y' cable to the power connection of the PoE splitter (may require an adapter), note the power indicator lights up.
- Connect the RJ45 plug of the 'Y' cable to the PoE splitter's LAN socket and note the Ethernet status indicators light up.

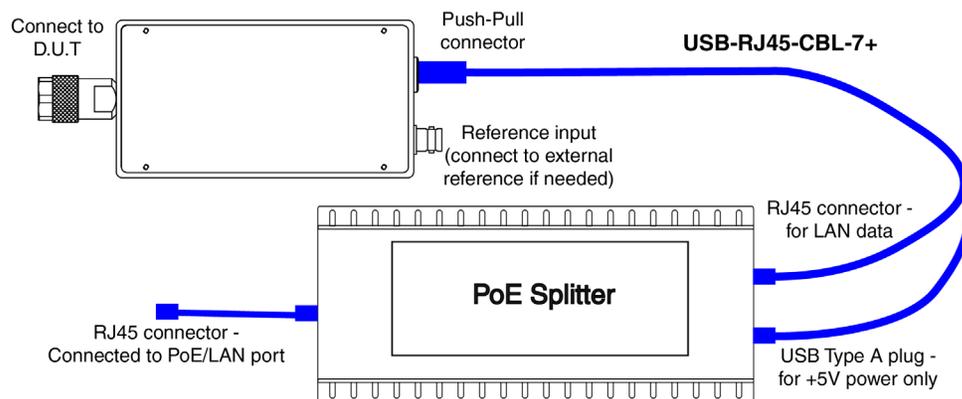


Figure 2.3.4: Connections for Ethernet control using Power Over Ethernet

Note: Using power over Ethernet requires the local network be set up to supply DC voltage in a range matching the DC input specifications of the PoE splitter used. The FCPM-6000RC cannot receive power via the Ethernet port and must use a POE splitter.

2.3.5 Using External reference

- To use the FCPM-6000RC with external reference connect a 10MHz reference signal to the FCPM's BNC port.
- The FCPM-6000RC will automatically detect the reference and switch to external reference mode.

Note: Connecting a signal other than 10MHz to the FCPM's reference in may result in measurement errors.

Chapter 3 – Using the Integrated Freq. & Power Meter

3.1 USB Interface

3.1.1 **Go to the Start Menu** and select All Programs>Mini-Circuits Integrated Freq & PM (default), or go to the other destination address you selected earlier. The “Mini-Circuits Integrated Freq & PM” icon should be waiting there for you. Click on it and get started!

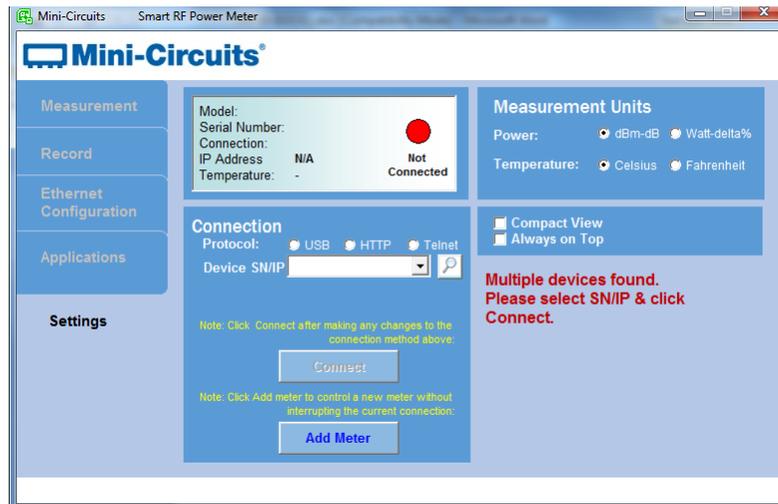


Figure 3.1.1: FCPM-6000RC Startup screen

3.1.2 **The startup allows** you to select the control method you wish to use for the FCPM-6000RC, USB or Ethernet(HTTP or Telnet) by clicking on the appropriate radio button. For USB control see below, for Ethernet control see **section 3.2**

3.1.3 **If a single FCPM-6000RC is** connected to the computer via USB, the measurement display will appear, already displaying your unit ready to start measurements.

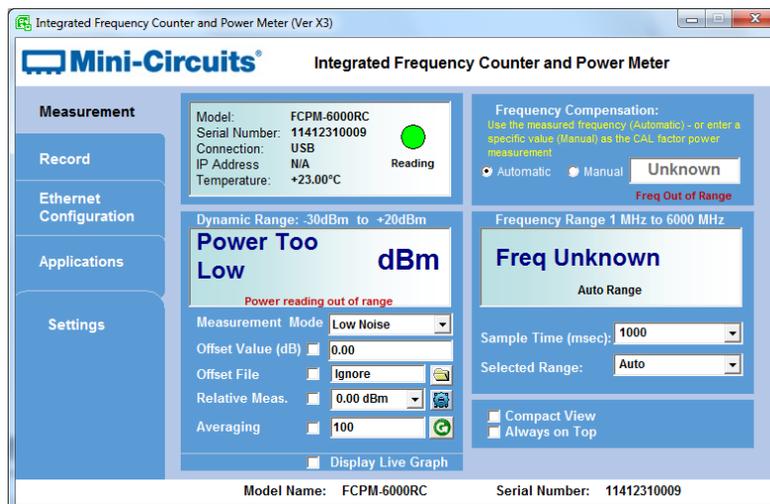


Figure 3.1.3: Measurement screen

3.1.4 **If multiple FCPM-6000RC are** connected to the computer via USB, an alert will appear on the right side of the screen notifying you multiple units were detected. Select the unit you wish to use from the S/N drop box and click "Connect". If you want to use multiple units click on "Add Meter" to open an additional window. Additional units can be added at any point up to 24 units connected *simultaneously*.

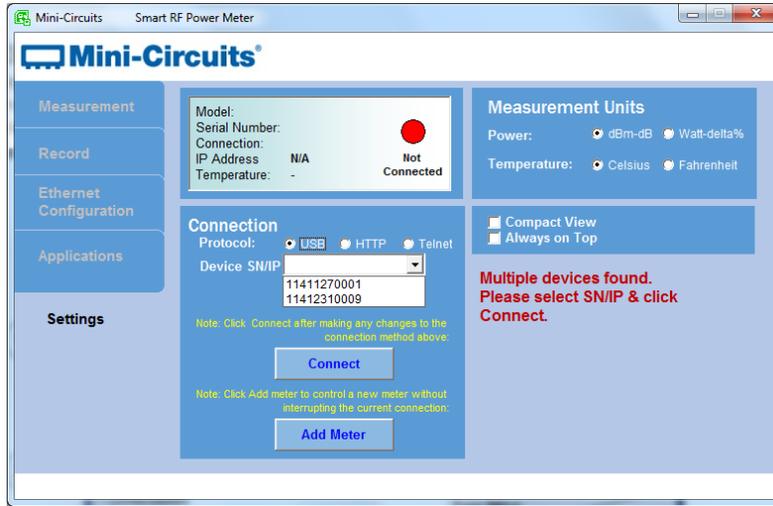


Figure 3.1.4: Unit selection screen

3.1.5 **If there's a faulty D.U.T connection,** no RF power or the power is below the sensors dynamic range 'Power Too Low' and 'Frequency unknown' notices will appear.

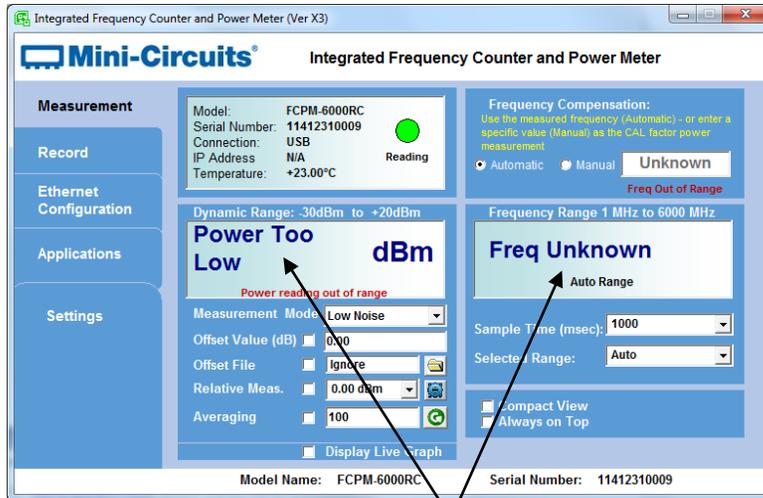


Figure 3.1.5: Signal not Found

3.1.6 **The Ethernet Configuration screen can** only be accessed in USB control. Click on the Ethernet Configuration tab on the left side of the screen, to access this. The display will shift to show the current Ethernet configuration. **Figure 3.1.6** shows the factory default of the FCPM-6000RC. If these settings fit your local network, you do not need to access the setup before connecting the FCPM-6000RC to the network.

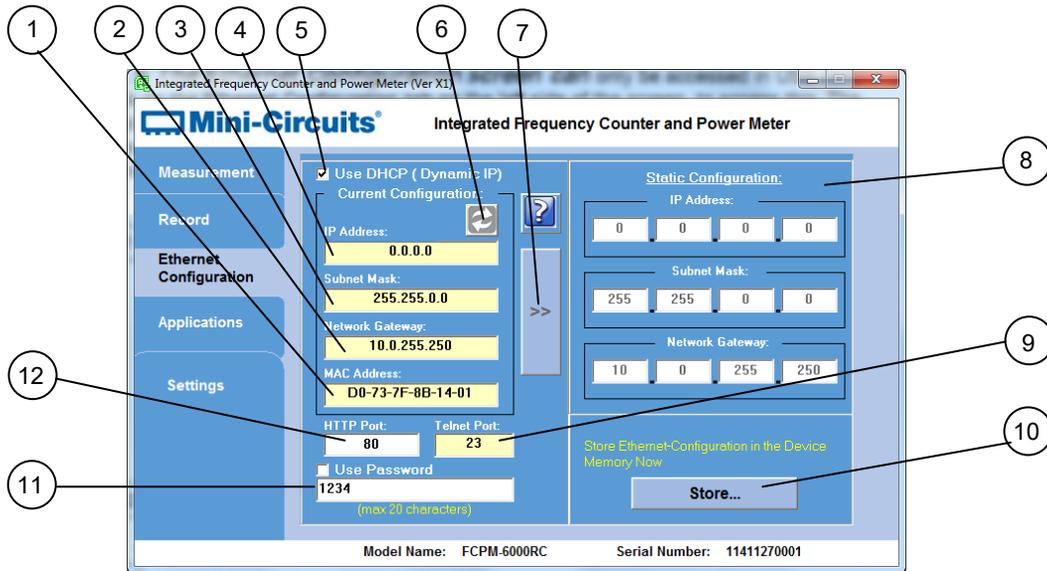


Figure 3.1.6: Ethernet Config. screen (showing factory default state)

Note: If you are using a proxy server for your LAN connections you may need to define a name for the FCPM-6000RC IP address, or disable the proxy server to connect to the FCPM-6000RC via Ethernet.

3.1.7 The Ethernet Configuration settings are:

#	Name	Description
1	MAC Address	Media Access Control Address – a unique, unchanging identifier for the FCPM unit.
2	Network Gateway	IP address of the network gateway. When DHCP is selected this is assigned by the server.
3	Subnet Mask	The Network's Subnet Mask. When DHCP is selected this is assigned by the server.
4	IP Address	The IP address of the unit in your Network. When DHCP is selected this is assigned by the server.
5	Use DHCP	When selected the FCPM will query the server for appropriate parameters with no input from the user and will disregard manually entered IP address, subnet mask and network gateway settings.
6	Refresh	Request IP address, gateway and subnet mask from the server.
7	Copy State	Copies current state of dynamic IP to static IP, not available when DHCP is selected.
8	Static Configuration	When DHCP is not selected the user must specify the values below and will not be changed by the server.
9	Telnet Port	Port to be used for Telnet communication. Cannot be changed by user
10	Store	After you've made all changes you want to click on this button to save the settings.
11	Password	If you want to limit the users able to access the FCPM-6000RC select "Use Password" and enter the desired password (up to 20 characters).
12	HTTP Port	Specify the port to use for HTTP communication with the network (default 80). Note port address does not get assigned by the server when DHCP is selected. Port 23 is reserved for Telnet communication and cannot be used.

3.1.8 After making the changes you want, click on "Store" and the changes will be saved to the smart power meter's memory. See **section 3.2** for working with Ethernet control.

3.2 Ethernet Interface

3.2.1 **After starting the GUI (section 3.1) you** select the control method you wish to use for the FCPM by clicking on the appropriate radio button. For operation with USB see **section 3.1**. For HTTP and Telnet control either select the IP address and port of the FCPM-6000RC from the drop box list, or click on the search icon to the right of IP address drop box to get the details of the units detected.

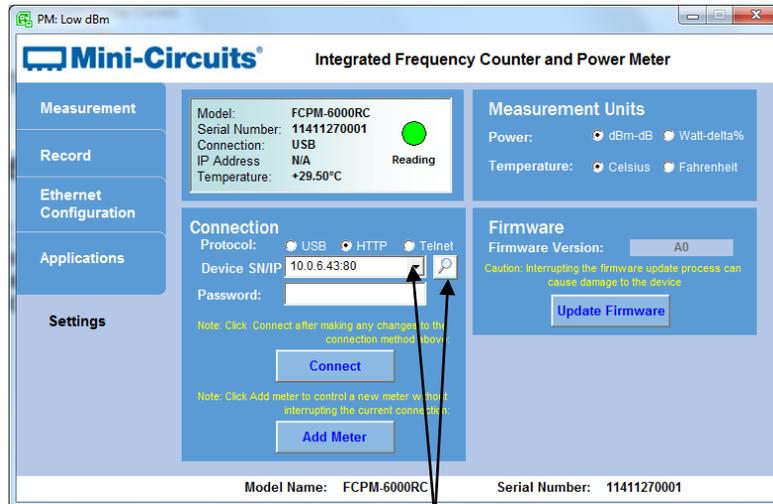


Figure 3.2.1: FCPM-6000RC Ethernet Startup screen

3.2.2 **Clicking on the search icon** will shift the display to a list of FCPM-6000RC IP addresses found and their HTTP ports on the left side of the screen, and full details of each unit on the right. Mark the IP address you wish to use and click select. The display will return to previous screen with the IP address entered in the IP address field automatically.

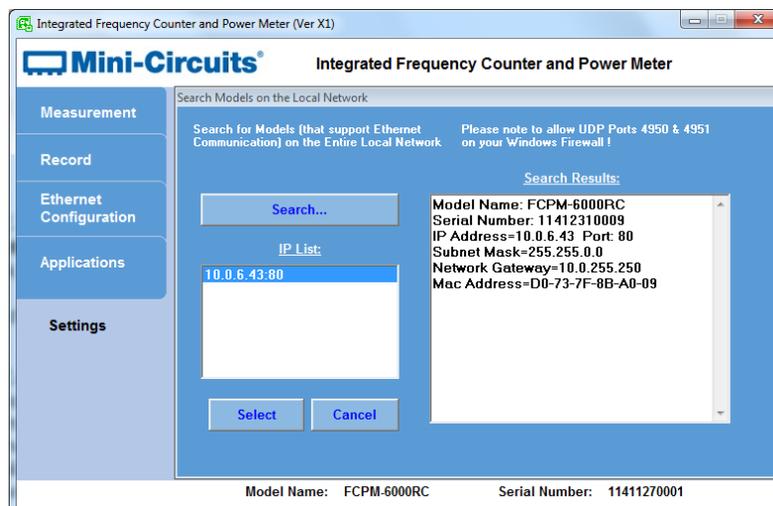


Figure 3.2.2: Ethernet IP search screen

Notes:

- 1) To refresh the list of units found click on the Search button.
- 2) The search function uses ports UDP 4950 and UDP 4951 for communication, ensure your firewall allows access to these ports.

3.2.3 **After entering the IP address**, enter your password if you set one (see **section 3.1.7**), and click start, the display will change to the measurement screen.

Note: changing Ethernet settings is only possible via USB control, see **section 3.1.6** for details.

3.2.4 **Telnet or HTTP commands can** also be used to control the FCPM-6000RC without using the GUI. Just type in the command in the address field of your Internet browser or implement a Get/Post HTTP function in your selected application (for HTTP) or establish a Telnet connection (for Telnet). A full list of the commands available and their syntax is available in Mini-Circuits programming handbook, and in a text file on the CD provided with the FCPM-6000RC, in the Ethernet directory.

Note: Depending on the browser used and your network configuration you may need to disable the proxy server for your computer, or add the FCPM's IP address to the list of addresses in the proxy server.



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3.3 Measurements Screen

This screen provides a simple and easy-to-use interface for measuring CW signals RF power and frequency with the FCPM-6000RC (See **Fig 3.3**). Both frequency and power measurement fields are constantly updated from readings taken at the rate selected by the user providing simultaneous synchronized measurements.

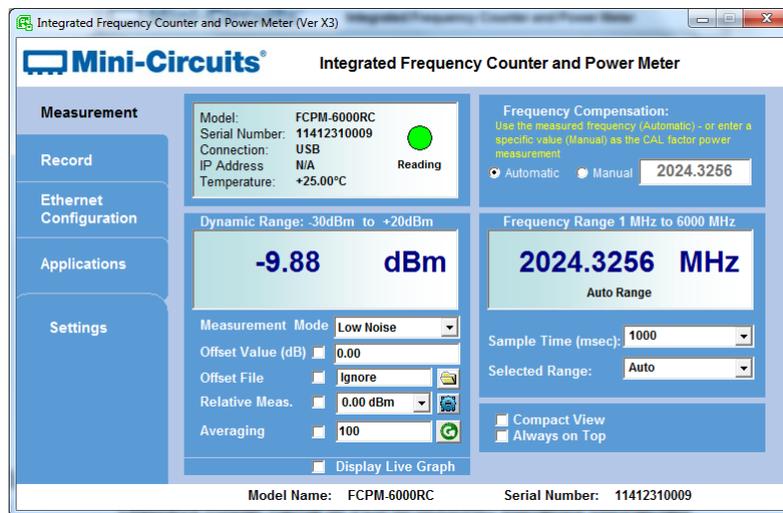


Figure 3.3: FCPM Measurements Screen

3.3.1 Model Status (Fig. 3.3)

Model	Displays model name of FCPM-6000RC currently connected.
Serial Number	Displays serial number of FCPM-6000RC currently connected.
Connection	Displays the current control method used
IP Address	Displays the IP address and port when in Ethernet (HTTP or Telnet) control
Temperature	Displays the FCPM-6000RC's internal temperature in either Celsius or Fahrenheit according to the specified settings. The FCPM-6000RC compensate automatically for any temperature variation in the 0-50°C (32-122°F) range.
Reading/ Searching/ Disconnected	Displays the status of the connection. If communication is interrupted it will change to 'Searching' for a few seconds and then 'Disconnected' if communication is not successfully re-established or back to 'Reading'

3.3.2 Power Measurement (Fig. 3.3)

Power	Displays the latest power reading in the requested format.
Measurement Mode	Select the measurement mode in which you wish to operate. "Low Noise" – 100ms typ, "Faster" – 30 ms typ.
Offset Val.	This feature allows the user to compensate for Loss or Gain in their DUT setup. A positive value compensates for a Loss, and a negative value for a Gain. Click on the check box, and enter the appropriate value (in dB) in the window to the right. Units with Firmware B0 or higher will store this value, see section XXX for details.
Offset File	Check to get offset values from a saved file. Primarily used for advanced Measurement Applications, see Measurement Applications Guide chapter 13 for details.

- Relative Meas.** Check to save your current power reading as a baseline value or select 'Table' from the drop box. To define a table click on the icon to the right of the drop box (See **section 3.5** for details). From then until unchecked, power measurements will show how DUT power varies from the specified baseline. In dBm format, relative results are given in dBc and in Watt format in %.
- Averaging** Check the averaging box and enter the number of measurements you wish to average. Individual measurements will be taken at the specified measurement speed (see section 3.3.2). When selected the FCPM-6000RC will average the power reading over the number of measurements specified in Avg. Count and display the number of measurements averaged. Clicking on the button to the left of the average count window will clear the averaged values and reset the count.
- Display Live Graph** Check to activate real-time graph of power measurement, see **section 3.4** for details.

3.3.3 Frequency compensation (Fig. 3.3)

This is the frequency used to calculate the frequency compensation (calibration factor) for power measurement. Unlike standard power meters and sensors the FCPM can calculate this automatically using the measured frequency value when set to 'Auto' (default setting). If 'Manual' is selected the FCPM will disregard the measured frequency and use instead the value entered by the user in the frequency compensation field.

3.3.4 Frequency Measurement (Fig. 3.3)

- Frequency** Displays the latest measured frequency in MHz. When frequency compensation is set to 'Auto' this value is used for the power measurement frequency compensation.
- Sample Time** The Sample time used for the Frequency Measurement. Longer sample time will produce more accurate measurement.
- Selected Range** The selected Frequency range. The default mode (Auto) will automatically shift ranges to the appropriate range for the detected signal.
- Compact View** Reduce size of window. This option is usually employed for multi-sensor setups. See **section 3.9** for details.
- Always on Top** Click to keep your FCPM-6000RC screens on top of other applications.

Note: The FCPM is always measuring both power and frequency simultaneously. Power and frequency displays are constantly being updated with the latest measurement.

3.4 Live Graph

Checking the 'Display Live Graph' box in the bottom of the measurement screen will cause a graph window (Fig. 3.4) to appear below the measurement screen showing the power measurements.

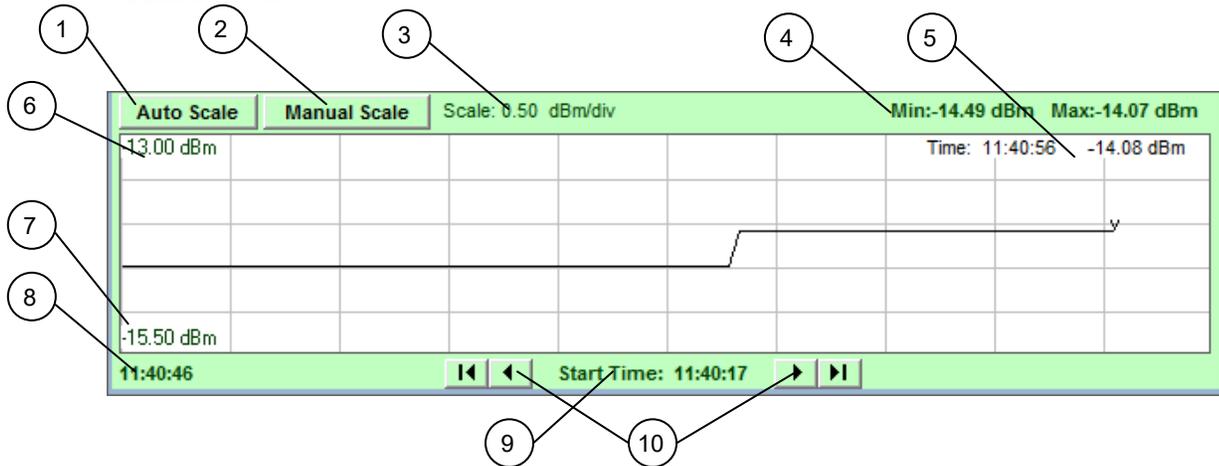


Figure 3.4: Real-Time graph

3.4.1 Live graph indicators and functions (Fig. 3.4)

#	Name	Description
1	Auto Scale	Set Y scale automatically to best display current data.
2	Manual Scale	Opens a small window to allow setting the Max value and value per div. of the Y axis. The values shown will be in the same units as those specified in the Main screen format field. Clicking on the button a second time will close the Manual Scale window.
3	Scale	Current value per division of Y axis
4	Min/Max values	Minimum and Maximum values currently displayed in graph
5	Current reading	Current time and power reading
6	Max scale	Max value of Y scale
7	Min scale	Min value of Y scale
8	Time	Start time of currently displayed graph
9	Start Time	Time at which real-time graph was started
10	Arrows	Use arrows to scroll back and forth in graph.

3.5 Relative Frequency Points Table

3.5.1 **Clicking on the icon to the right of** the Relative Meas. check box, or selecting 'Table' from the drop box when no table is defined will open the relative frequency points table shown in Fig 3.5. This table allows specifying multiple points for relative power measurements. To add a point to the table click on 'Add Relative Point' – the specified frequency with the current power reading will be added to the table. If frequency compensation is set to 'Manual' you will need to enter the relevant frequency manually before adding the point to the table.

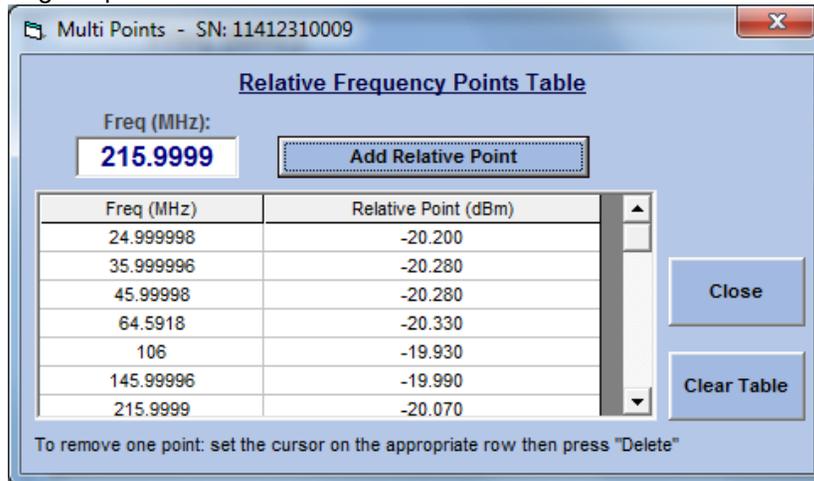


Figure 3.5.1: Relative Frequency Points Table

3.5.2 **To delete a** point click on the row you wish to delete then press the 'Delete' key. To delete all values from the table click on the 'Clear Table' button.

3.5.3 **Once you're satisfied** with the entries close the table, the main screen will now show 'TABLE' in relative measurement field. Checking the 'Relative' checkbox will change all measurements into relative measurements referenced to the values in the table. If a frequency not listed in the table is specified for measurement the FCPM GUI program will calculate the correct reference value based on interpolation of existing data points.

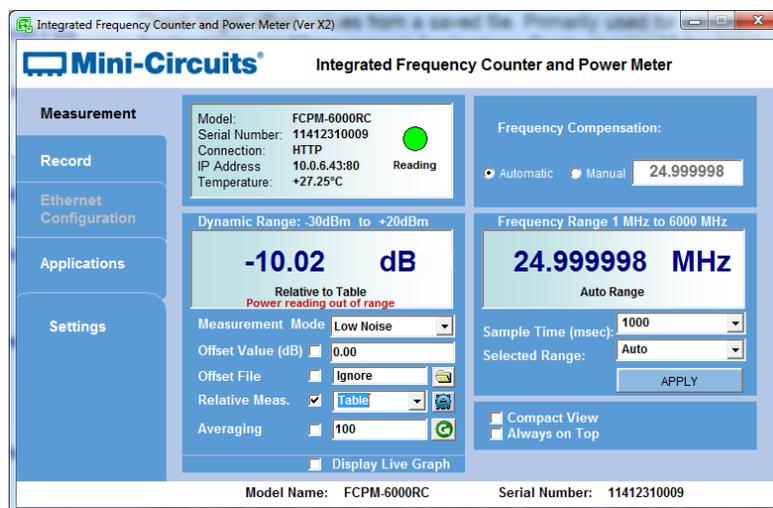


Figure 3.5.3: Measurements relative to table

3.6 Creating and using Offset Files

3.6.1 **An offset file is useful** for compensating for loss/gain in the system which are not constant over frequency. For example if you need to compensate for the loss of a transmission line between the power sensor and the D.U.T. Measurement Applications #10, Calibrating Thru-Path described in chapter 13 of the [Measurement Applications Guide](#) allows you to measure the gain/loss of the system between the power sensor and the D.U.T and automatically creates an offset file for that system.

3.6.2 **Clicking on the folder icon** below the 'Offset File' check box will open a browse window. If you have an offset file ready, select it and click OK.

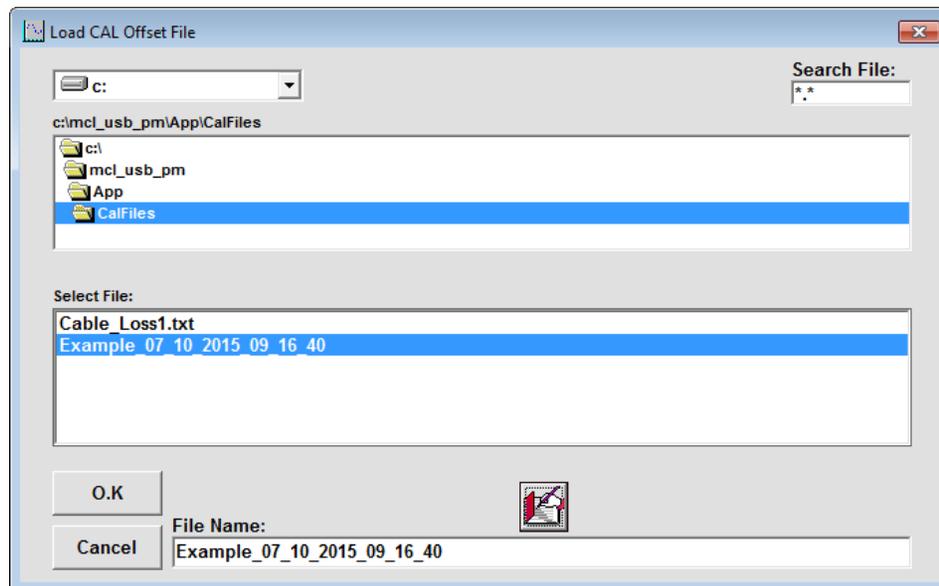


Figure 3.6.2: Offset file browse window

3.6.3 **To create an offset file manually** click on the edit icon over the file name window and a sample offset file will be created (**Fig. 3.6.3**). Replace the values in the sample file with the values you need and save the file. There is no requirement for any specific file name or suffix, however as the file is a simple text file saving it with a txt suffix to simplify future editing is recommended.

```

Example_07_10_2015_09_16_40 - Notepad
File Edit Format View Help
[! Mini-Circuits
Thru-Path Offset File
! Created Manually By ...
! Created on: Jul 10,15
!
! Please enter in the following lines pairs of MHz and dB
! Each line should contain one pair of numbers for example: 1000 10
! Frequency numbers must be sorted from the lower frequency to the upper
! The following numbers can be overwrite and then stored
1.000000 -3.00
10.000000 -3.02
100.000000 -3.10
200.000000 -3.20
300.000000 -3.30
500.000000 -3.40
1000.000000 -3.50
1500.000000 -3.60
2000.000000 -3.70
2500.000000 -3.80
3000.000000 -3.90
3500.000000 -4.00
4000.000000 -4.10
4500.000000 -4.20
5000.000000 -4.30
5500.000000 -4.40
6000.000000 -4.50

```

Figure 3.6.3: Offset file browse window

3.6.4 When creating an offset file observe the following rules:

- Any line containing an exclamation mark character (!) will be ignored. This is useful for adding notes to the file, or temporarily skipping certain points in the offset file.
- The first line in the file (other than notes) shall be "Thru-Path Offset File" (Not case sensitive).
- There shall be at least one space character between the frequency value and the loss/gain value and only a single pair of values in a line (Separator character between pairs is line feed carriage return).
- Values will be sorted by frequency from low to high
- All frequencies will be in MHz and Loss/Gain values in dB

Note: When reading frequencies between two sets of values the PWR sensor software will use linear interpolation to calculate the required offset. When reading a frequency outside the range covered by the offset file, the closest value will be used. Thus when using the example shown in **Figure 3.6.3** the offset value for 5750 MHz will be -4.45 dB and for all frequencies 6000 MHz or greater will be -4.5 dB.

3.6.5 **When the 'Offset File' option is checked**, an "Offset value: Cal file" notice will appear and the value calculated from the offset file for the frequency tested will be subtracted from the reading. If needed an additional fixed offset can be added by also checking the 'Offset Value' check box.

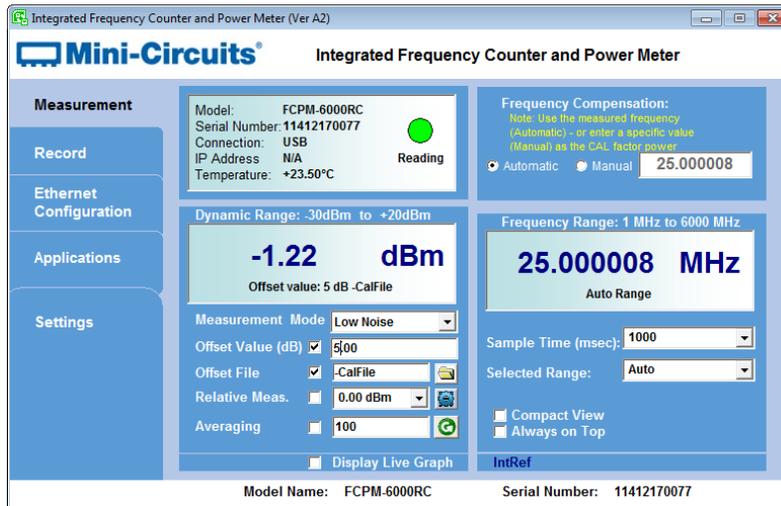


Figure 3.6.5: Offset file browse window

Note: Values in the offset file are subtracted, while values in offset value are added.

3.7 Offset value measurements in LCD screen

3.7.1 **When the 'Offset value' option is checked**, and the FCPM unit has firmware revision B0 or greater, the offset value will be saved in the memory of the unit. With units containing older firmware the offset value will only affect the readings on the PC and will not affect the LCD screen display.

3.7.2 **In units with Firmware B0 or greater** when the offset value is checked the offset value will appear on the LCD screen with an "ov" prefix (replacing the frequency range information) and the power displayed will be shown with the offset value taken into account.

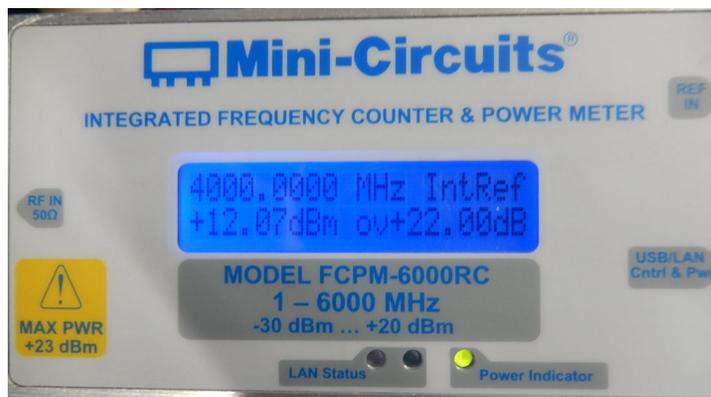


Figure 3.7.2: LCD screen with offset value in dBm

3.8 Data Record Screen

Get started by clicking the Record button on the left side of the Screen. The display will change to the Record Screen:

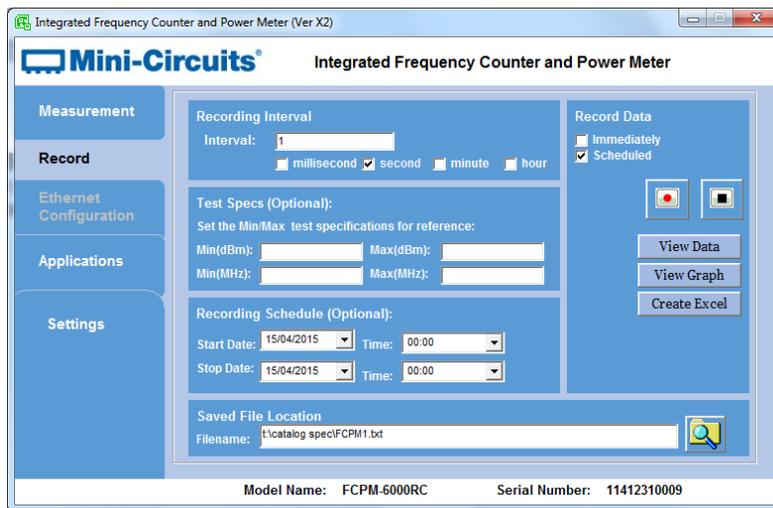


Figure 3.7: Data Record Screen

3.8.1 Center column (Fig. 3.8)

- Record Interval** Specify the interval at which data points will be recorded, from every 30ms, to 9999 hours. Make sure the measurement speed is less than the record interval for both power and Frequency – data will be recorded simultaneously for both frequency and power.
- Test Spec** If you enter specification limits in these fields data points which exceed these limits (either above or below) will be marked in the data by an asterisk (*).
- Recording Schedule** If you wish to set recording to start at a later time, and/or to stop at a specified time enter here the start and stop date and time.
- Saved File Location** Enter the path and file name where you wish to record data, there is no required file name. See **section 3.8.3** for data format.

Note: Before starting recording you must enter a file path where you have Read/write/create privileges

3.8.2 Right Column (Fig. 3.8)

- Immediately/Scheduled** Check 'Immediately' to begin recording with no delay, or 'Scheduled' to record according to the specified schedule
- Icons** Click on the icons to start or stop recording
- View Data** Open a window showing the recorded Power and Frequency data and the Test Specs for both (See section 3.8.3 for data format).
- View Graph** Open a graphical presentation of the data stored in the selected file (See section 3.8.4 for data format).
- Create Excel File** Export data in selected file to Excel file and open the new Excel file (requires Microsoft Excel to be installed on the local PC)

3.8.3 View Data

Data recorded is saved to a text file in the format shown in **Fig. 3.8.3**

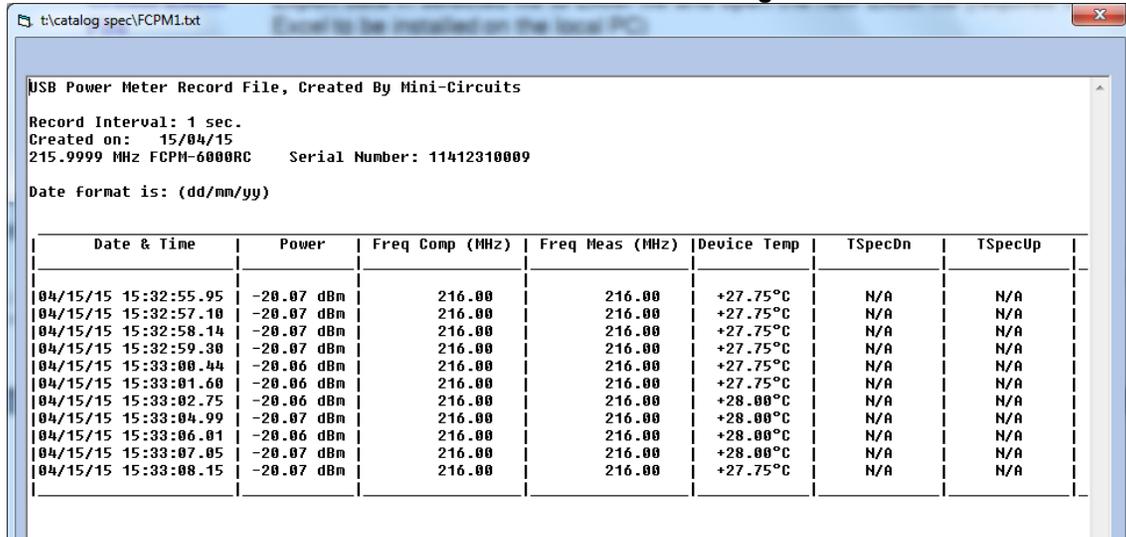


Figure 3.8.3: Data File Window

3.8.4 View Graph

Clicking on the 'View Graph' button in the data record window (**Fig 3.6**) will open a graphical presentation of the recorded data (**Fig 3.6.4**). Default presentation is of power only, using the same units as the data was recorded in, but user can select to present both power and temperature by checking 'Show temperature graph' or change the power units by clicking on the arrow next to the graph title.

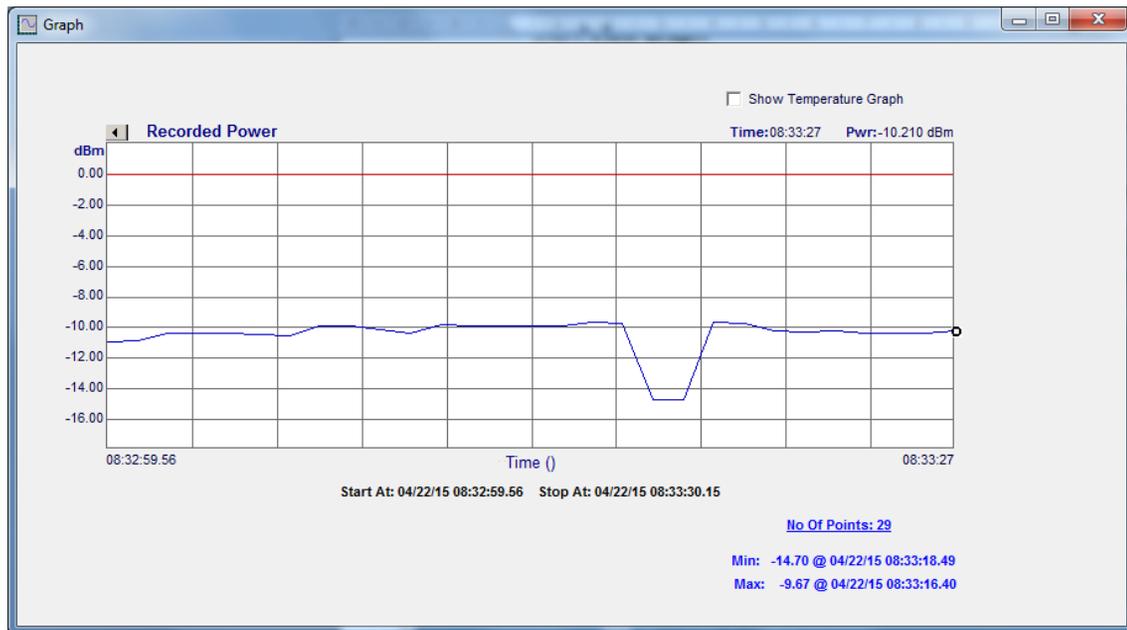


Figure 3.7.4: View Graph Window

3.8.5 Create Excel File

When exporting data to an excel file Data will initially be in format shown in Fig 3.6.5

Microsoft Excel - FCPM1.txt.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

100% 11 B

USB Power Meter Record File, Created By Mini-Circuits

1 USB Power Meter Record File, Created By Mini-Circuits

2

3 Record Interval: 1 sec.

4 Created on: 22/04/15

5 Label18 FCPM-6000RC Serial Number: 11412310009

6

7 Date format is: (dd/mm/yy)

8

9

10	Date & Time	Power	Freq Comp (MHz)	Freq Meas (MHz)	Device Temp	TSpecDn	TSpecUp	TFreqDn	TFreqUp
11									
12									
13	22/04/15 08:32:59.56	-10.90 dBm	2989.52	2989.52	+29.25-C	N/A	N/A	0	0
14	22/04/15 08:33:00.60	-10.89 dBm	2989.52	2989.52	+29.25-C	N/A	N/A	0	0
15	22/04/15 08:33:01.61	-10.38 dBm	2988.66	2988.66	+29.50-C	N/A	N/A	0	0
16	22/04/15 08:33:02.69	-10.38 dBm	2988.66	2988.66	+29.50-C	N/A	N/A	0	0
17	22/04/15 08:33:03.74	-10.37 dBm	2989.52	2989.52	+29.50-C	N/A	N/A	0	0
18	22/04/15 08:33:04.79	-10.44 dBm	2989.6	2989.6	+29.50-C	N/A	N/A	0	0
19	22/04/15 08:33:05.87	-10.52 dBm	4291.88	4291.88	+29.50-C	N/A	N/A	0	0
20	22/04/15 08:33:06.88	-9.92 dBm	4291.88	4291.88	+29.25-C	N/A	N/A	0	0
21	22/04/15 08:33:07.92	-9.91 dBm	4991.05	4991.05	+29.25-C	N/A	N/A	0	0
22	22/04/15 08:33:08.97	-10.10 dBm	5402.5	5402.5	+29.25-C	N/A	N/A	0	0

FCPM1/

Ready

Figure 3.7.5: Excel data Window

3.9 Firmware Update

3.9.1 **All FCPM units are shipped with** the latest available firmware and an update is usually not required. Mini-Circuits occasionally makes firmware update files available as a courtesy to add additional features or correct known issues. Please contact testsolutions@minicircuits.com for details.

3.9.2 **The FCPM-6000RC GUI** must be started in USB control (See section 3.1) to allow Firmware upgrade. When in USB control, go to the "Settings" tab. You will note the Firmware section on the right side of the screen. "Firmware version" is an indicator showing the unit's current firmware revision. To start the upgrade process click on the "Update Firmware" button

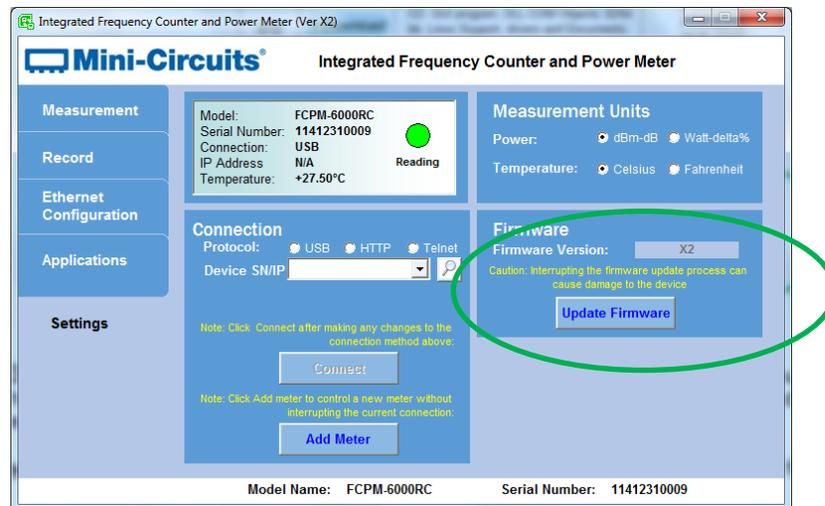


Figure 3.8.2: Firmware section in Settings

CAUTION

A power interruption, to either the computer or the FCPM-6000RC while the firmware is being updated may cause the firmware to be corrupted. It is therefore recommended to only update the firmware while the computer is connected to an Uninterruptible Power Supply (UPS).

3.9.3 **Clicking on the 'Update Firmware' will open a browse** window to the firmware directory under the path you selected when installing the GUI program (See **Fig. 3.8.3**). Navigate to where you saved your firmware file, select the firmware version you wish to install and click 'O.K'.

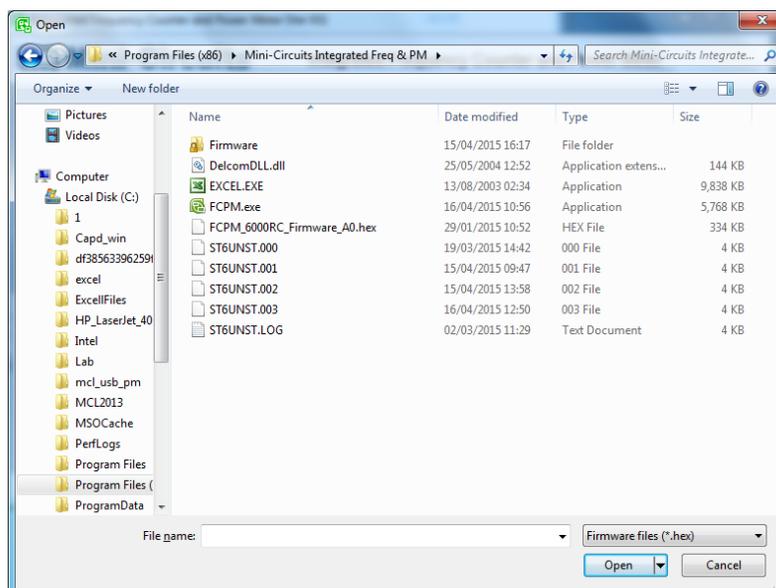


Figure 3.8.3: Firmware - Browse Window

3.9.4 **The selected file will be installed in the FCPM-6000RC.** The process will take up to a minute.

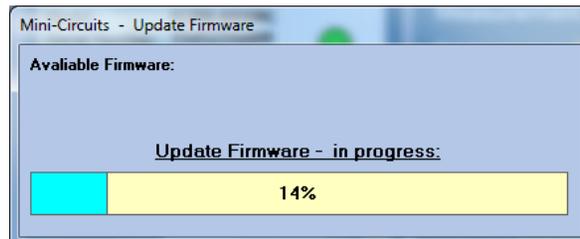


Figure 3.8.4: Firmware - Progress Bar Window

3.9.5 **After the firmware has updated** an alert will appear. Click 'OK' to shut down the FCPM program and restart automatically.

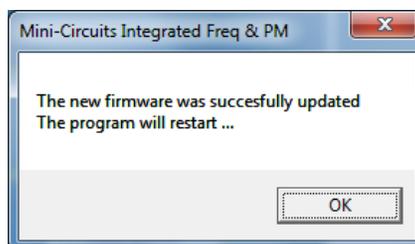


Figure 3.8.5: Firmware - Successful Update

3.10 Compact View

3.10.1 **Checking 'Compact View'** in the bottom right corner of the main screen will cause the screen to shrink to the compact view display. In compact view the program displays power measurement, measurement units, FCPM-6000RC S/N, and the frequency entered but you must return to main screen to change any parameters.

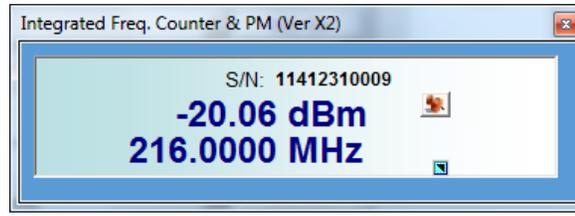


Figure 3.9.1: Compact view window

3.11 Measurement units

3.11.1 **Power allows changing** the units displayed from the factory default of dBm (dB when in relative measurements) to linear units μ W, mW, W (with certain offset values) and % when in relative measurement. Units with firmware B0 or newer will also change the power displayed on the LCD screen. In older units the LCD screen will remain in dBm regardless of the setting.

3.11.2 **Temperature allows changing** the units displayed temperature units between Celsius and Fahrenheit.

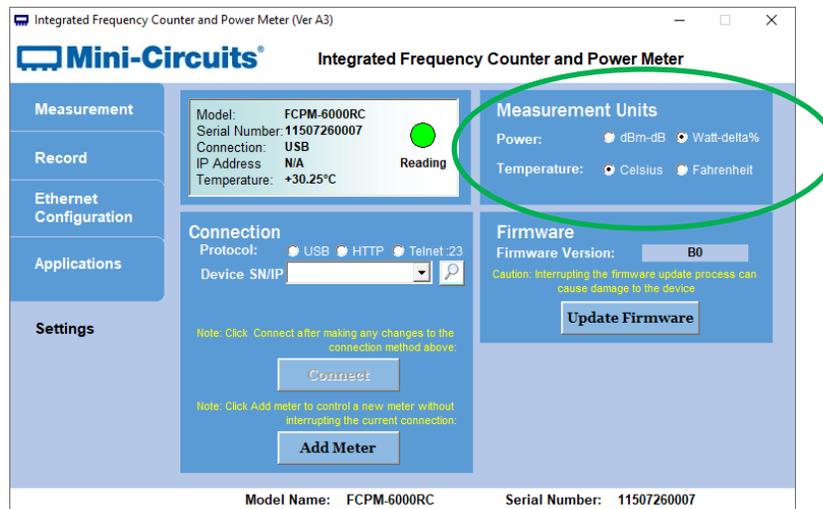


Figure 3.11: Measurement units in Settings

Chapter 4 – Revision History

Revision OR (Jun 25, 2015):

- Initial release of the user guide.

Revision A (Dec 12, 2019):

- Added new section on measurement unit configuration.
- Updated installation and firmware update sections.
- Added instructions on creation of offset files manually and LCD indicator.
- Clarified both power and frequency measurements performed constantly and recorded simultaneously.