MICRO LAMBDA WIRELESS, INC.

YIG based Products

MLBF Series User Manual

MLBF Series, Bench Test Filter User Manual

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1.0   Introduction

This manual describes the setup and operation of the MLBF series, bench test filter. The Model and Serial numbers are located on the rear panel; they may also be displayed on the front panel via the memory recall function. Each unit has a separate, custom specification sheet for the particular model defining the filter's frequency range and RF characteristics. General operating/programming instructions are located herein.

    The CD Rom supplied with the package contains a **SetupMLBF.msi** file, when executed, will create a folder named "MLBF Support Files" on the desktop containing short cuts to the manual, documentation and programs for interfacing the product with a personal computer. This **SetupMLBF.msi** file is compatible with Windows XP, Windows Vista and Windows 7. The most current versions of these files, new offerings and filter specifications can be downloaded at our web site: http://www.microlambdawireless.com

    For interfacing with Apple or Linux PC's; The HTTP and UDP protocols can be used when connected to an Ethernet network.

2.0   Package Contents

Item	Quantity
MLBF Series Bench Test Filter	1
AC Power Cord	1
Ethernet CAT5 cable	1
USB A to USB Mini-B cable	1
CD Rom (Contains manual, quick start guide and PC software)	1
MLBF Quick Start Guide (Printed)	1

3.0   General Overview of Product Capabilities

The MLBF Series Bench Test Filter can be supplied as a wide band tunable band pass (MLBF**P**-XXXX) or band reject (MLBF**R**-XXXX) filter, covering frequency ranges between 500 MHz and 50 GHz. Frequency accuracy is improved by the use of digital calibration techniques with correction data stored in nonvolatile memory. Linearity and hysteresis errors are virtually eliminated using this technique. A simple block diagram is shown in Figure 1. This filter provides an RF input (J1) and an RF output (J2). The filter is tuned via the front panel, USB interface or the Ethernet interface.

Figure 1.
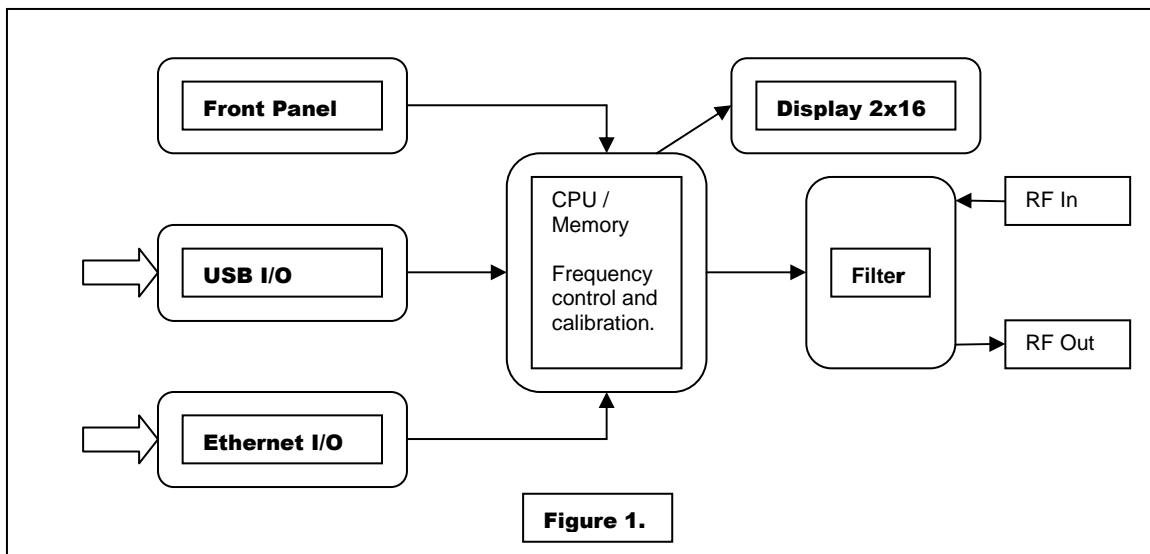
4.0   Setup and Operation

This product is designed for **LABORATORY WORKBENCH USE ONLY** and should not be subjected to humidity >95%. Use proper ESD handling procedures. Allow proper intake and venting of the fan at the rear panel of the unit. Verify that all external RF/microwave cables and components connected to the unit are in good working condition. A grounded, three socket AC power receptacle should be used to connect power to the unit. It is recommended that the front panel ON/OFF switch be used to interrupt the power to the unit, interrupting power to the unit by pulling out the AC cord may cause personal injury or damage to the unit.

Before product use, the following steps must be completed
See Figure 2 for reference.

1. Connect the AC power cable to the unit.
2. Connect the AC power cable to an appropriate 3 socket AC receptacle. The power switch will glow RED.
3. Connect the unit RF In/Out connectors to the peripheral equipment using SMA compatible connectors.
4. If required, connect the USB or Ethernet connectors to the Host PC or equivalent.
5. Turn ON the unit using the front panel power switch. The power switch will now glow GREEN. (Unit will be set to last frequency setting)
6. A 15 minute warm up is recommended before use.
7. Verify the front panel display is illuminated and displaying the current frequency setting in MHz, model number, serial number, and the fan is producing air flow at the rear panel.
8. The unit is now ready for use via the front panel control or the peripheral interfaces.
9. Note: When the AC power cable is removed from the unit, the unit will remember its current power state and store it in nonvolatile memory for recall when the AC voltage is reapplied.

5.0   Rear Panel Connections

The rear panel of the unit is shown in Figure 2. It contains an RJ-45 plug style Ethernet connector for interfacing to a 10/100 Mbit wired LAN, a USB Mini-B connector for connection to a host PC USB port, and a standard 88-264 VAC, fused male input connector for AC power input. The fuse type is a 2 amp, 250 VAC, 5x20 mm, slow blow fuse, quantity = 2; Littlefuse part number 0213002.MRET1P or equivalent. The fuses are accessible with the line cord removed, inside the fuse tray at the bottom of the line filter input module. A fan input and output vent are also present and must be kept clear of obstructions for proper operation.

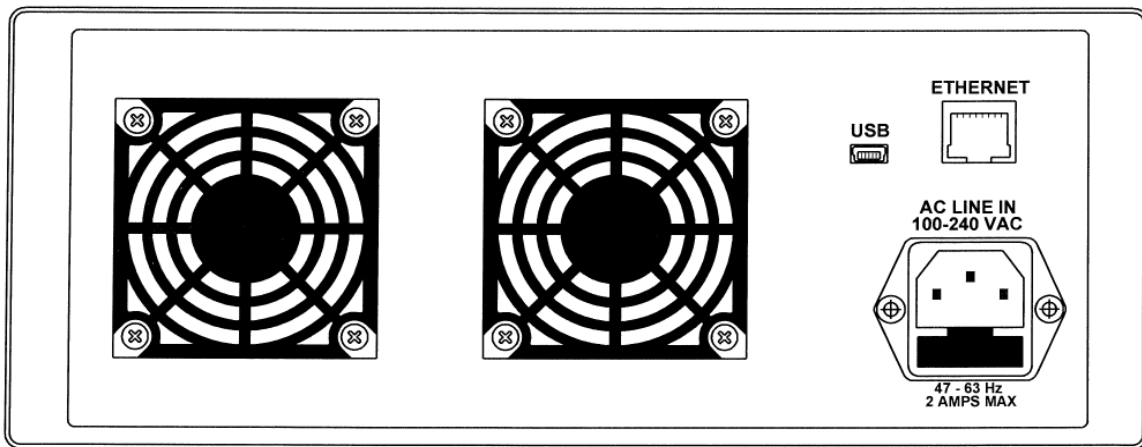The Ethernet interface is 10/100 Base-T and the USB interface is USB 1.1 and 2.0 compatible.

Figure 2

6.0   Front panel operation

The front panel of the unit contains a two line, sixteen digit per line alphanumeric display, a multi-function rotary knob, a numeric 16 key keypad, the ON/OFF power switch and the RF input and output connectors (See Figure 3.).

6.1 Display format

Under normal operation the alphanumeric display shows the current filter center frequency setting on the top display line (Line 1), the bottom display (Line 2) is blank. A cursor is positioned under one of the digits on Line 1. This cursor can be positioned using the ◄ or ► arrow keys. By pressing +/- keys or rotating the knob clockwise or counter clockwise, the user can increment or decrement the highlighted digit as required to change the frequency. Entering a new frequency via the keypad will display the numbers as they are entered on Line 2. The new frequency is selected by pressing the MHz key on the keypad. If a resolution less than 1 MHz is to be set, the decimal point must be used.
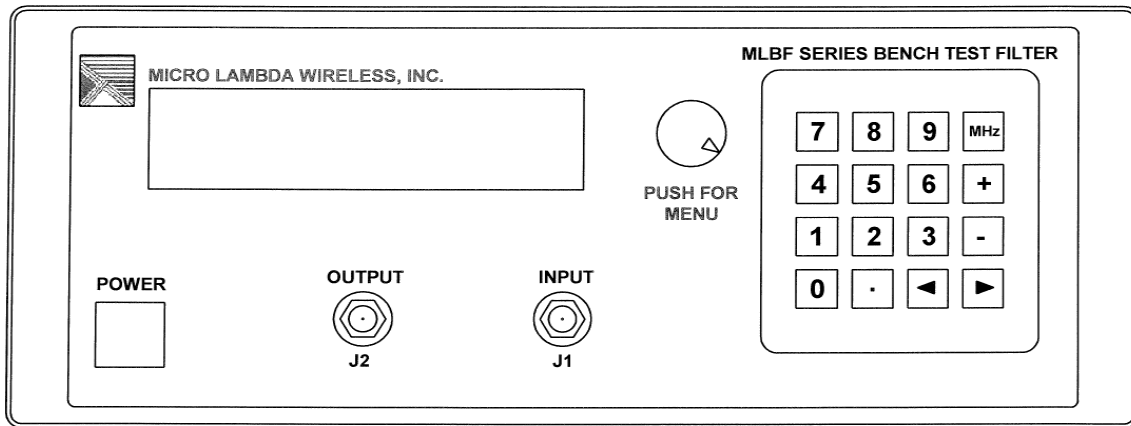
Figure 3

6.2 Keypad function

Press the ► key on the front panel to move cursor right or when in the settings menu, go to the next menu selection.
Press the ◄ key on the front panel to move cursor left, to backspace data entry, or when in the settings menu, go to the previous menu selection.
Press the **+** key on the front panel to increment cursor position or enable a menu option.
Press the **-** key on the front panel to decrement cursor position or disable a menu option.
Enter numbers and decimal point via the keyboard as needed.
The MHz key is also used as the data entry key.

6.3 Special keypad functions

1. Displaying a nonvolatile memory location

Press the decimal point key on the keypad, the display will show R_ (for recall). Enter the desired NOVO location using the number keys and press the MHz key. The information located at the requested NOVO location will be displayed on line #2 of the front panel display. Valid NOVO locations are: 0 to 2047. See the list of NOVO locations in section 8.0, Programming.

2. Saving and recalling a user preset frequency from memory (0-99)

The user can store up to 100 preset frequencies in memory for later recall.
To save a frequency, enter a frequency on the front panel to store in memory and press MHz. Line #1 of the display will show the frequency entered and the unit will be set to this frequency. Press the MHz key again to enter the Save / Recall menu. The display will show "Save = + Recall = -". Press the "+" key to enter save mode or press the "–" key to enter recall mode. Pressing the "+" key will display on Line #2 "Save Setting ?". Enter the memory location you would like to store this frequency in (0-99). The display will show the memory location numbers as you enter them. Press the MHz key to save your frequency

in the desired location. To recall a frequency from a stored location, press the MHz key. The display will show "Recall Setting ?" on Line #1 of the display. Enter the number for the memory location you would like to recall (0-99), the numbers you have entered will be displayed on Line #2. Press the MHz key to recall the frequency setting from memory. The unit will be set to the recalled frequency. If a memory location is recalled where no frequency has been stored, the display will not change and the unit will stay at the current frequency setting. Note: The frequencies stored in memory 0 to 99 can be viewed by recalling NOVO locations 200 to 299.

6.4 Multi-function rotary knob operation

The knob, when rotated clockwise = increment; counter clockwise = decrement (equivalent to + or - key press).
Press the encoder knob on the front panel to enter the SETTINGS MENU.
Press the encoder knob again if you wish to exit the SETTINGS MENU. Upon exit, the changes made while in the settings menu mode, will be enabled.

6.5 Settings menu operation

Pressing the Multi-function knob enters the SETTINGS MENU. The following functions can be set:

1.
| Ethernet DHCP: |
| ON |

2.
| IP Address: |
| 192.168.1.48 |

3.
| Subnet Mask: |
| 255.255.255.0 |

4.
| Gateway: |
| 192.168.1.1 |

5.
| DNS1: |
| 192.168.1.1 |

6.
| DNS2: |
| 0.0.0.0 |

7.
| MAC Address: |
| 0004A31210EE |

8.
| Host Name: |
| MLBF0001 |

9.
| UDP Port: |
| 30303 |

Press the encoder knob on the front panel to enter the SETTINGS MENU.
Display #1. On the left will be visible.
Press the encoder knob again if you wish to exit the SETTINGS MENU.

Press the ► key on the front panel for the next menu selection.
Press the ◄ key on the front panel for the previous menu selection or data entry backspace.
The knob, when rotated clockwise = increment; counter clockwise = decrement.
Press the **+** key on the front panel to enable an option.
Press the **-** key on the front panel to disable an option.
Enter numbers and decimal point via the keyboard as needed.
MHz key is also used as the enter key.

Note:
1. MAC address cannot be changed.
2. Host name cannot be changed.
3. All fields can be edited via the web interface (http://(units IP Address).
4. When DHCP mode is ON, IP Address, Subnet mask, Gateway and DNS settings cannot be changed.

7.0   Controlling the MLBF using a personal computer

7.1 Installing the documentation and control software

The CD ROM supplied with the MLBF contains the file named **SetupMLBF.msi**. Execute this file to install the manual, documentation and control programs for PC interface. The setup file, when run, will create a folder named "MLBF Support Files" on the computer desktop with short cuts to the documentation and interface programs.

7.2 HTTP Control Interface

This HTTP interface is accessed using a PC running a standard web browser (IE8, Firefox 3.6). The PC must be physically connected to the same TCP/IP network as the MLBF unit and have the correct Ethernet configuration (same "IP" range and subnet mask). The Ethernet settings can be accessed through the settings menu as mentioned in the previous section. To access the MLBF unit, point your web browser to the IP address or use the host name of the unit (e.g. http://192.168.1.48 or e.g. http://MLBF0001). The **"MLBF Settings Page"** will be displayed. This web page contains general information about the unit and allows the configuration of the Ethernet settings. Also available is the function to send and receive a command to and from the unit. An example of the page is shown in Figure 4.

Links to two other web pages are available as follows: Located at the lower left of the settings page is a link to the **"MLBF Diagnostics Page".** Here you can view many of the unit's internal variables like temperature, power supply voltages, self test status, cal status, miscellaneous technical data, and contact information for Micro Lambda Wireless, Inc. Commands may also be sent to the unit from this web page. An example of the page is shown in Figure 5.

The last web page accessible is the **"MLBF Commands List Page".** This page lists all of the commands accepted by the MLBF unit and the NOVO locations that can be read using the "R" command. The ability to send and receive commands is also available on this page. An example of the page is shown in Figure 6.

MICRO LAMBDA WIRELESS, INC.

Welcome to the MLBF0005 **Test Bench Filter Home Page.**

Firmware Version: 1.0 Oct 19 2010   **Firmware Build Time:** 12:12:24
TCP/IP Stack Version: v5.20

Personality:
Model Number: MLBFR-0502
Serial Number: 0005
Current Frequency: **1280.000** MHz
Minimum Frequency: 500.000 MHz   Minimum Temperature: 0 Deg. C
Maximum Frequency: 2000.000 MHz   Maximum Temperature: 50 Deg. C
Filter BW: 5 MHz   Filter BW Level: -30 dB   Off Res. Isolation: NA dB
Filter Loss: 2.0 dB   Filter Ripple/Spurs: 4.0 dB   Filter Limiting Level: 0.0 dB

TCP/IP Settings: **CAUTION:** Incorrect settings may cause the unit to lose network connectivity.

Save Configuration   ☑ Enable DHCP
IP Address: 192.168.1.48
Gateway: 192.168.1.1
Subnet Mask: 255.255.255.0
Primary DNS: 192.168.1.1
Secondary DNS: 0.0.0.0

MAC Address: 00:04:A3:12:1D:1E   **Note:** The above settings can be changed from the front panel.
Host Name: MLBF0005
Socket Port: 30303
Command: [_____] Send
Received: [_____]

Diagnostics Page   Commands List Page   Micro Lambda Wireless, Inc. Home Page (Internet)

Customer Support: sales@microlambdawireless.com

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Figure 4

MLBF0005   Test Bench Filter Diagnostics Page. Below are the internal readings/variables for this unit.

Press F5 to Refresh

Current Temperature: +29.4C
Highest Temperature: +33.0C
+3.0VDC Supply: +03.0V
+3.3VDC Supply: +03.3V
+5.0VDC Supply: +05.0V
+15.0VDC Supply: +15.4V
-15.0VDC Supply: -14.9V
Unit Health Status: Good
NOVO State: UNLOCKED
Last Self Test: Pass
Cal (Full) Status: Yes
Cal (Coarse) Status: Yes
Cal (Fine) Status: Yes
Cal DAC Fmin: F00
Cal DAC Fmax: E44F
Current DAC Setting: 7E47

Command: [   ] [Send]
Received: [   ]

Contact:
Micro Lambda Wireless, Inc.
46515 Landing Pkwy.
Fremont, CA 94538
Ph: (510) 770-9221
Fax: (510) 770-9213

Home Page   Commands List Page   Micro Lambda Wireless, Inc. Home Page (Internet)

Customer Support: sales@microlambdawireless.com

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Figure 5

MICRO LAMBDA WIRELESS, INC.

MLBF0005   Test Bench Filter Commands List Page. Below are the control commands this product will accept.

(Commands are NOT case sensitive, all commands sent and data received are in ASCII)

Command	Function	Command
?	Report Status, D0-D5 not used, D6 = self test, D7 = NOVO lock	Typical return = 1100000; 1 = Pass / Locked, 0 = Fail / Unlocked
DC	Set YIG control DAC directly with a 16 bit HEX number	0000-FFFF tunes YIG full range; (Example: DC7FFF = Mid band)
DI	Display personality information on lines 1 and 2 of FP display	DI, (takes 10 seconds to display all info)
DR	Display recalled NOVO memory location on FP readout, line 2	(i.e. DR0012), display firmware version and date
DT	Display current internal temperature on FP readout, line 2	DT
EP	Set Ethernet port number (Socket Port) i.e. EP30303	Number is stored in NOVO at location 108
F	Frequency (ASCII) (Dec. #)	ASCII freq in MHz: xxxxx.xxx; (example: F12345.678)
FP	Filter preset to factory settings.	Stored in PIC Internal NOVO Locations (Safe Area); (example: SP) copy to NOVO
M	Display the message on LCD display, sent following the "M" command	Example: MHave a nice day!, displays - Have a nice day!
MR	Recall a user saved frequency setting from memory (0-99)	MR25 = save frequency setting to location 25
MS	Save the current frequency setting to memory (0-99)	MS75 = recall frequency setting stored at location 75
R	Read a NOVO location (example: R1 = read serial # location)	0001
SR	Soft PIC Reset	Reset PIC, clear var, run PIC code from start; (example: SR) unit reboots
ST	Self Test	Run full self and return Pass or Fail
T	Read internal temp.	Returns ASCII chars, reading in Deg. C; (example: T, then read data)
V1	Read Power supply +3.0V	3.00V = normal; (example: V1, then read data)
V2	Read Power +3.3V	3.30V = normal; (example: V2, then read data)
V3	Read Internal +5.0V voltage	5.00V = normal; (example: V3, then read data)
V4	Read Internal +15.0V voltage	15.00V = normal; (example: V4, then read data)
V5	Read Internal -15.0V voltage	-15.00V = normal; (example: V5, then read data)
R0000	Model Number	(Example = R0001) Read "Serial Number" NOVO Location.
R0001	Serial Number	Unit's serial number
R0002	Product type: Filter / Oscillator / Synthesizer	Defines how PIC will talk to internal, connected device.
R0003	Frequency minimum	Product minimum frequency spec.
R0004	Frequency maximum	Product maximum frequency spec.
R0005	Filter BW min. in MHz	100
R0006	Filter insertion loss, max. in dB	5.0
R0007	Filter Limiting Level, RF Input min. - dBm	Filter Limiting Level
R0008	Temperature spec min. - Degrees C	Product minimum temperature spec.
R0009	Temperature spec max. - Degrees C	Product maximum temperature spec.
R0010	Highest Temp reached	The highest temperature the unit has been exposed to, in Degrees C.
R0011	NOVO State	Locked/Unlocked, Locked = Read Only.
R0012	Firmware Version & build date	1.0 Oct 15 2010
R0013	Unit Health Status - "Good" or Self test failure information	Example: Good or V5 voltage fail.
R0014	Unit Calibration Status - Yes/No	Yes
R0015	Self Test Results - Pass/Fail	Pass
R0016	Current Output Frequency setting - MHz	2000.000
R0017	Filter pass band spurs and ripple, max. in dB	2.5
R0018	Filter Off resonance isolation, min. in dB	100
R0019	Coarse DAC Fmin. cal # (Hex)	0000-FFFF
R0020	Coarse DAC Fmax. cal # (Hex)	0000-FFFF
R0021	Current Coarse DAC setting (Hex)	0000-FFFF
R0022		
R0023	Filter BW level measurement spec. in dB	(i.e. BPF = -3 dB, BRF = -40 dB)
R0024		
R0025		
R0026	Coarse Cal Status	Yes / No
R0027	Fine Cal Status	Yes / No
R0028		
R0029	TCP/IP Stack Version	v5.20
R0030	Firmware Build Time	16:30:30
....		
R0100	DHCP Status: ON / OFF	TCP/IP Ethernet protocol settings
R0101	IP address: (i.e.; 192.168.1.25)	TCP/IP Ethernet protocol settings
R0102	Subnet mask: (i.e.; 255.255.255.0)	TCP/IP Ethernet protocol settings
R0103	Gateway: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0104	DNS1: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0105	DNS2: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0106	MAC Address: (i.e. 0025F169AC1B)	TCP/IP Ethernet protocol settings
R0107	Host Name: (i.e. MLBF0001)	TCP/IP Ethernet protocol settings
R0108	UDIP Socket Port: (i.e. 30303)	TCP/IP Ethernet protocol settings
....		
200-299	User Saved / Recalled frequency setting locations, (0-99)	Frequency stored in MHz
....		
R1000-2047	DAC cal data, stored in 100 MHz increments, Fmin-100 to Fmax+100 MHz Stored in 16 bit HEX numbers (ASCII format)	

Command: [   ]   [Send]

Received: [   ]

Home Page   Diagnostics Page   Micro Lambda Wireless, Inc. Home Page (Internet)

Customer Support: sales@microlambdawireless.com

Figure 6

Note: All Non-volatile memory locations above may be recalled from the front panel and displayed on the LCD by pressing the decimal key **(.)** followed by the memory location number (leading zero's are not required). The information will be displayed on line 2 of the front panel display.

7.3 UDP Interface program

The MLBF (Host) may be controlled remotely over an Ethernet network using the supplied "MLBF UDP interface.exe" program. Please note: Windows firewall may warn that a new program is trying to access the network, please click "Allow", to continue using the MLBF UDP interface program. The PC used to connect to the unit is considered the "Client". The unit must be physically connected to the network as mentioned in section 7.2 above. In the lower left corner of the program screen as shown in Figure 7, type in the Host name or I.P. address of the unit you wish to communicate with, also input the socket port number that your unit is set to. See section 6.5 to find the unit's network settings information. Click the "Test Connection" button and the program should connect to the unit stated and the display should read connected. On the program screen you will see some limited information about the unit. Commands may be sent to and received from the unit. The unit can also be stepped up and down in frequency using the "Step Up" and "Step Down" buttons. The frequency will increment and decrement based on the frequency shown in the step size box. This number can be changed to any valid step size within the frequency range limits of the unit. The current frequency setting is also shown. The program can be used to connect to multiple units (one at a time). As connections are made, the unit Host names will be added to the pull down list in the Host Name/IP Address box.
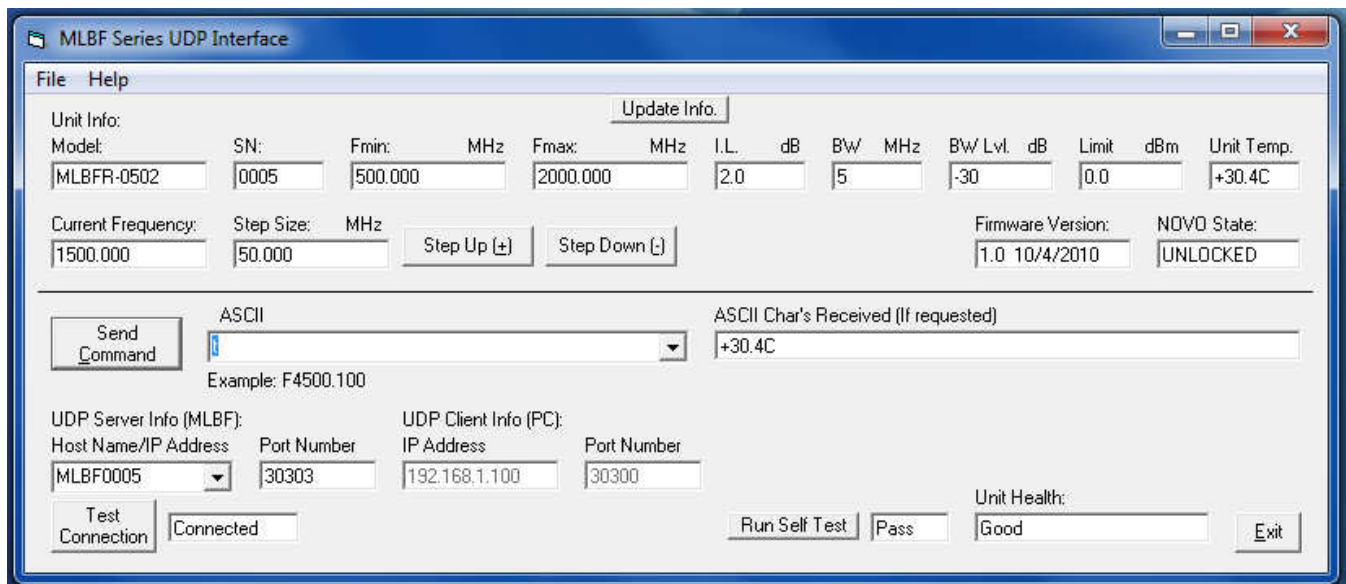
Figure 7

7.4 USB Interface program

The MLBF product, when connected using the USB interface appears as a USB HID device (Human Interface Device) to the Windows operating system. The USB HID driver is supplied with the windows operating system, and is installed automatically when the unit is connected to the PC's USB port.

    The MLBF may be controlled remotely via a USB connection using the supplied "MLBF USB interface.exe" program. A screen capture of this program is shown in Figure 8. On the program screen you will see some limited information about the unit. Commands may be sent to and received from the unit. The unit can also be stepped up and down in frequency using the "Step Up" and "Step Down" buttons, the frequency will increment and decrement based on the frequency shown in the step size box. This number can be changed to any valid step size within the frequency range limits of the unit. The current frequency setting is also shown. The program can be used to connect to multiple units; all units that are connected to the PC's USB ports will show up in the pull down list in the "Choose Unit #" box. If units are added after the program has been initiated, press the "Refresh" button to update the list.
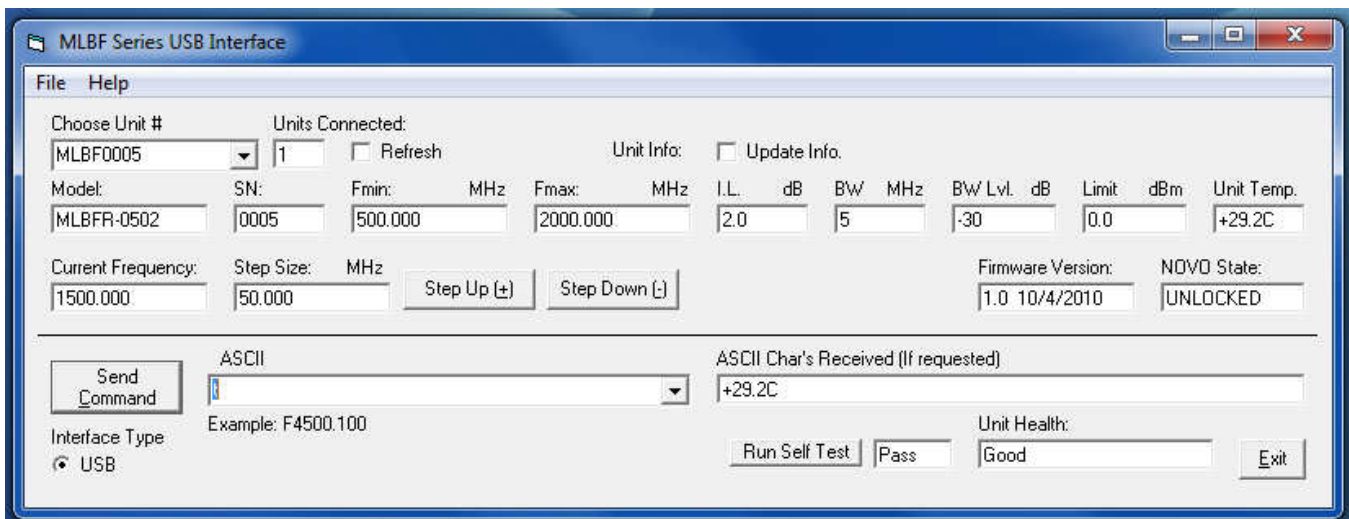
Figure 8

7.5 Telnet Interface

Built into most computer operating systems is a command line interface for communicating with network peripherals; TELNET is a network protocol used on the Internet or local area networks to provide a bidirectional, interactive text-oriented communication facility via a virtual terminal connection. In the Microsoft Windows environment, Telnet is invoked via the command prompt mode (Note: In Windows 7 Telnet is not enabled by default, to enable it, go to control panel, programs and features, on the upper left of the screen select "Turn Windows features on and off", check "Telnet Client" and click OK.). At the DOS prompt type "telnet". The following information will appear:

Welcome to Microsoft Telnet Client

Escape Character is 'CTRL+]'

Microsoft Telnet>

Type ?/help for a list of Telnet commands. Using Telnet, you can send commands to the unit and receive information requested from the unit. A typical session would be: Send – "o MLBF0005 23", this opens a telnet connection to the unit MLBF0005 on port 23 (Typical comm. Port for telnet). Send – "F2000", this would set the unit to a frequency of 2000.0 MHz. Send "T", the internal temperature of the unit will be returned.

8.0   Programming

The following table describes the commands that the MLBF supports. This is a custom syntax created by Micro Lambda Wireless, Inc. All commands are sent and received in ASCII format. The commands are NOT case sensitive. These commands can be used with all forms of communication (USB, UDP, HTTP and Telnet).

Command	Function	Comment
?	Report Status, D0-D5 not used, D6 = self test, D7 = NOVO lock	Typical return = 1100000; 1 = Pass / Locked, 0 = Fail / Unlocked
DI	Display personality information on lines 1 and 2 of FP display	DI, (takes 10 seconds to display all info)
DR	Display recalled NOVO memory location on FP readout, line 2	(i.e. DR0012), display firmware version and date
DT	Display current internal temperature on FP readout, line 2	DT
EP	Set Ethernet port number (UDP, TCP Socket Port) i.e. EP30303	Number is stored in NOVO at location 108
F	Frequency (ASCII) (Dec. #)	ASCII freq in MHz: xxxxx.xxx; (example: F12345.678)
FP	Filter preset to factory settings.	Stored in PIC internal NOVO Locations (Safe Area); (example: SP) copy to NOVO
""	Display the message between the quotes on LCD display, line 1 & 2.	"Have a nice day!": Displays Have a nice day! (up to 32 characters). In HTTP – 0-9, a-z, A-Z preferred, special chars can cause display issues.
MR	Recall a user saved frequency setting from memory (0-99)	MR25 = save frequency setting to location 25
MS	Save the current frequency setting to memory (0-99)	MS75 = recall frequency setting stored at location 75
R	Read a NOVO location (example: R1 = read serial # location)	0001
SR	Soft PIC Reset	Reset PIC, clear var. run PIC code from start; (example: SR) unit reboots
ST	Self Test	Run full self and return Pass or Fail
T	Read internal temp.	Returns ASCII chars, reading in Deg. C; (example: T, then read data)
V1	Read power supply: +3.0V voltage	3.00V = normal; (example: V1, then read data)
V2	Read Power supply: +3.3V voltage	3.30V = normal; (example: V2, then read data)
V3	Read Power supply: +5.0V voltage	5.00V = normal; (example: V3, then read data)
V4	Read Power supply: +15.0V voltage	15.00V = normal; (example: V4, then read data)
V5	Read Power supply: -15.0V voltage	-15.00V = normal; (example: V5, then read data)
R0000	Model Number	(Example = R0001) Read "Serial Number" NOVO Location.
R0001	Serial Number	Unit's serial number
R0002	Product type: Filter / Oscillator / Synthesizer	Defines how PIC will talk to internal, connected device.
R0003	Frequency minimum	Product minimum frequency spec.
R0004	Frequency maximum	Product maximum frequency spec.

Command	Function	Comment
R0005	Filter BW min. in MHz	100
R0006	Filter insertion loss, max. in dB	5.0
R0007	Filter Limiting Level, RF input min. – dBm	Filter Limiting Level
R0008	Temperature spec min. – Degrees C	Product minimum temperature spec.
R0009	Temperature spec max. – Degrees C	Product maximum temperature spec.
R0010	Highest Temp reached	The highest temperature the unit has been exposed to, in Degrees C.
R0011	NOVO State	Locked/Unlocked, Locked = Read Only.
R0012	Firmware Version & build date	1.0 Oct 15 2010
R0013	Unit Health Status – "Good" or Self test failure information	Example: Good or V5 voltage fail.
R0014	Unit Calibration Status - Yes/No	Yes
R0015	Self Test Results - Pass/Fail	Pass
R0016	Current Output Frequency setting - MHz	2000.000
R0017	Filter pass band spurs and ripple, max. in dB	2.5
R0018	Filter Off resonance isolation, min. in dB	100
R0019	Coarse DAC Fmin. cal # (Hex)	0000-FFFF
R0020	Coarse DAC Fmax. cal # (Hex)	0000-FFFF
R0021	Current Coarse DAC setting (Hex)	0000-FFFF
R0022		
R0023	Filter BW level measurement spec. in dB	(i.e. BPF = -3 dB, BRF = -40 dB)
R0024		
R0025		
R0026	Coarse Cal Status	Yes / No
R0027	Fine Cal Status	Yes / No
R0028		
R0029	TCP/IP Stack Version	v5.20
R0030	Firmware Build Time	16:30:30
….		
R0100	DHCP Status: ON / OFF	TCP/IP Ethernet protocol settings
R0101	IP address: (i.e.; 192.168.1.25)	TCP/IP Ethernet protocol settings
R0102	Subnet mask: (i.e.; 255.255.255.0)	TCP/IP Ethernet protocol settings
R0103	Gateway: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0104	DNS1: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0105	DNS2: (i.e.; 192.168.1.1)	TCP/IP Ethernet protocol settings
R0106	MAC Address: (i.e. 0025F169AC1B)	TCP/IP Ethernet protocol settings
R0107	Host Name: (i.e. MLBF0001)	TCP/IP Ethernet protocol settings
R0108	UDP Socket Port: (i.e. 30303)	TCP/IP Ethernet protocol settings
….		
200-299	User Saved / Recalled frequency setting locations, (0-99)	Frequency stored in MHz
….		
R1000-2047	DAC cal data, stored in 100 MHz increments, Fmin-100 to Fmax+100 MHz	Stored in 16 bit HEX numbers (ASCII format)

8.1 HTTP/HTML Variables

Many of the internal variables can be accessed through the HTTP/HTML protocol. Below is a list of these variables for reference:

Command	HTML variable name	Read/Write?	Notes
?	status	Read	Report Status, D0-D5 not used
T	temp	Read	Internal temperature
V1	volt1	Read	Read power supply: +3.0V voltage
V2	volt2	Read	Read Power supply: +3.3V voltage
V3	volt3	Read	Read Power supply: +5.0V voltage
V4	volt4	Read	Read Power supply: +15.0V voltage
V5	volt5	Read	Read Power supply: -15.0V voltage
R0000	model	Read	Model Number
R0001	serial	Read	Serial Number
R0002	product	Read	Product type: Filter / Oscillator / Synthesizer
R0003	minimum	Read	Frequency minimum
R0004	maximum	Read	Frequency maximum
R0005	bw	Read	Filter BW min. in MHz
R0006	il	Read	Filter insertion loss, max. in dB
R0007	limitlvl	Read	Filter Limiting Level, RF input min. – dBm
R0008	tempmin	Read	Temperature spec min. – Degrees C
R0009	tempmax	Read	Temperature spec max. – Degrees C
R0010	hitemp	Read	Highest Temp reached
R0011	novostate	Read	NOVO State
R0012	firmver	Read	Firmware Version & build date
R0013	health	Read	Unit Health Status – "Good" or Self test failure information
R0014	cal	Read	Unit Calibration Status - Yes/No
R0015	selftest	Read	Self Test Results - Pass/Fail
R0016	frequency	Read	Current Output Frequency setting - MHz
R0017	ripple	Read	Filter pass band spurs and ripple, max. in dB
R0018	isolation	Read	Filter Off resonance isolation, min. in dB
R0019	dacfmin	Read	Coarse DAC Fmin. cal # (Hex)
R0020	dacfmax	Read	Coarse DAC Fmax. cal # (Hex)
R0021	dac	Read	Current Coarse DAC setting (Hex)
R0023	bwlevel	Read	Filter BW level measurement spec. in dB
R0026	coarsecal	Read	Coarse Cal Status
R0027	finecal	Read	Fine Cal Status
R0029	version	Read	TCP/IP Stack Version
R0030	builddate	Read	Firmware Build Time
R0100	config_dhcpchecked	Read	DHCP Status: ON / OFF
R0101	config_ip	Read	IP address: (i.e.; 192.168.1.25)
R0102	config_subnet	Read	Subnet mask: (i.e.; 255.255.255.0)
R0103	config_gw	Read	Gateway: (i.e.; 192.168.1.1)
R0104	config_dns1	Read	DNS1: (i.e.; 192.168.1.1)
R0105	config_dns2	Read	DNS2: (i.e.; 192.168.1.1)
R0106	config_mac	Read	MAC Address: (i.e. 0025F169AC1B)
R0107	config_hostname	Read	Host Name: (i.e. MLBF0001)
R0108	socketport	Read	UDP Socket Port: (i.e. 30303)
	cmd (=)	Write	Send any of the commands in table from section 8.0
	receive	Read	Receive data from unit after requesting data

9.0 Technical Support

For Technical support please contact:

Micro Lambda Wireless, Inc.
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Fremont, CA 94538
Ph: (510) 770-9221
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Email: sales@microlambdawireless.com

You can visit our website at http://www.microlambdawireless.com for updated information, specifications and downloads.

10.0 Warranty

Seller warrants for a period of twelve (12) months from the date of original shipment that the products will be free from defects in material and workmanship and design (if of Micro Lambda Wireless, Inc. design) and will be in conformity with applicable specifications and drawings and all other contractual requirements. However, this warranty shall not apply to any product which that has been subjected to misuse, misapplication, accident, improper installation, neglect, unauthorized repair, alteration, adjustment, inundation or fire. See the complete warranty and return policy document number 201-005 Rev- at our website at http://www.microlambdawireless.com.