# MICRO LAMBDA WIRELESS, INC.

## YIG based Products



# MLBS Series User Manual

# MLBS Series, Bench Test Synthesizer User Manual

# Table of Contents

# 1.0   Introduction

This manual describes the setup and operation of the MLBS Series, Bench Test Synthesizer. 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 and they we be shown on the display on power-up. Each unit has a separate, custom specification sheet for the particular model defining the Synthesizer's frequency range and RF characteristics.  General operating/programming instructions are located herein.

The CD Rom supplied with the package contains a **SetupMLBS.msi** file, when executed, will create a folder named "MLBS Support Files" on the desktop containing short cuts to the manual, documentation and programs for interfacing the product with a personal computer. This **SetupMLBS.msi** file is compatible with Windows XP, Windows Vista and Windows 7. The most current versions of these files, new offerings and Synthesizer 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 |
|------|----------|
| MLBS Series Bench Test Synthesizer | 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 |
| MLBS Quick Start Guide (Printed) | 1 |

# 3.0   General Overview of Product Capabilities

The MLBS Series Bench Test Synthesizer can be supplied with frequency ranges between 600 MHz and 20 GHz, in bands ranging from very narrow to very wide. Typical, standard frequency ranges are: 0.6 to 2.5 GHz, 2.0 to 8.0 GHz, 4.0 to 16.0 GHz, 8.0 to 20.0 GHz and 2.0 to 20.0 GHz. Any custom frequency range within or crossing most of these bands can be ordered. A simple block diagram is shown in Figure 1.  An optional reference input (i.e. 10.0 MHz) is applied to (J1) Ref. Input if system frequency coherency is required. An internal OCXO reference with 1.0 ppm stability is standard. The RF output (J2) supplies the microwave frequency signal at power levels >10.0 dBm.  The Synthesizer is tuned via the front panel, USB interface or the Ethernet interface.

Figure 1.
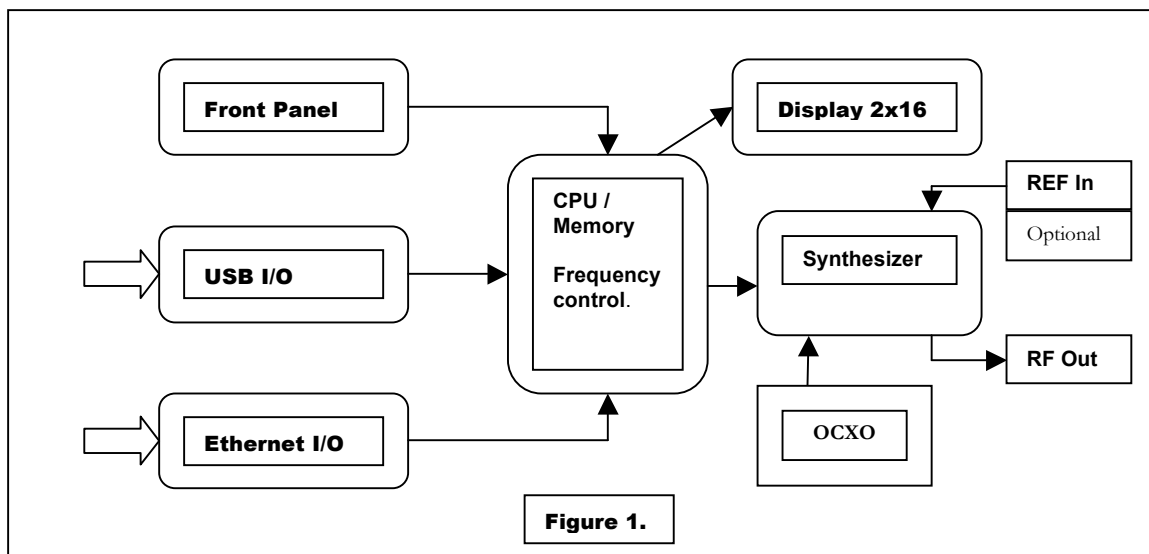
# 4.0   Setup and Operation

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 REF In / RF Out connectors to the peripheral equipment using SMA compatible connectors as required.
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 after a short warm-up. (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. The power switch LED will flash RED if the PLL is unlocked.
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 Synthesizer input module.  A fan input and output vent are also present and must be kept clear of obstructions for proper operation.

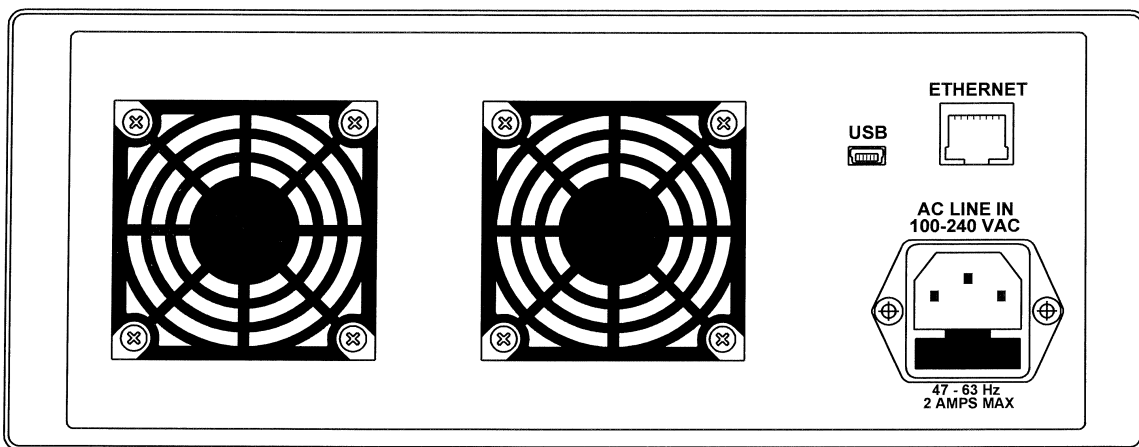The Ethernet interface is 10/100 Base-T and the USB interface is USB 1.1 and 2.0 compatible.



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 Synthesizer 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.
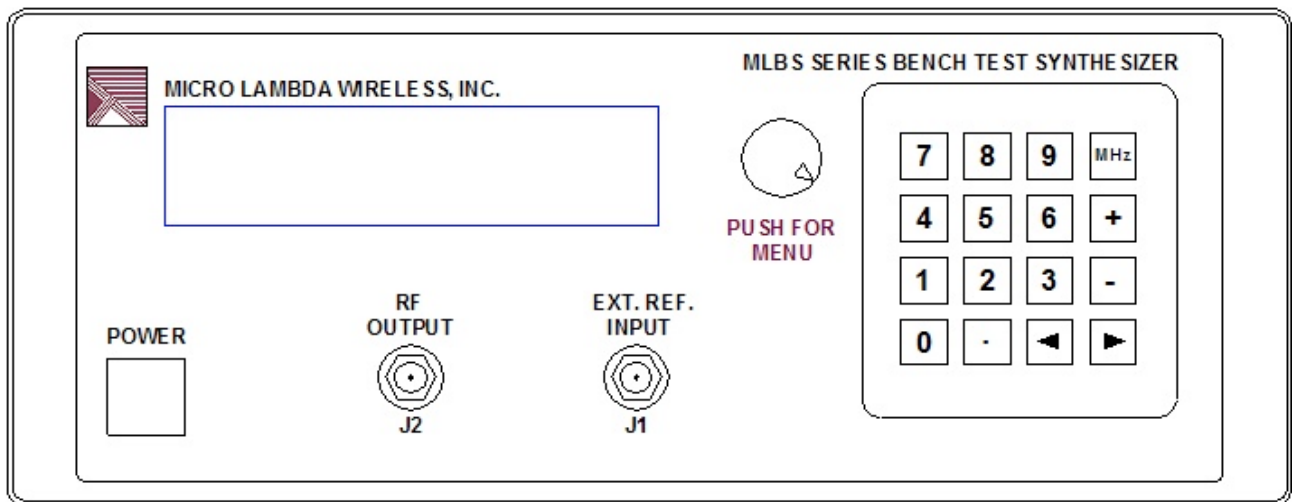
Figure 3

## 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: |
| --- |
| MLBS0001 |

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 MLBS using a personal computer

### 7.1 Installing the documentation and control software

The CD ROM supplied with the MLBS contains the file named **SetupMLBS.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 "MLBS 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
MLBS 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 MLBS 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://MLBS0001 ). The **"MLBS 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 at the bottom of this page
direct your browser to the following web pages.

Links to two other web pages are available as follows:  Located at the lower left of the
settings page is a link to the **"MLBS 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.

The last web page accessible is the **"MLBS Commands List Page"**.  This page lists all
of the commands accepted by the MLBS 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. These commands can be used under USB control as well.

**MICRO LAMBDA WIRELESS, INC.**

# Welcome to the `MLBS0001` Bench Test Synthesizer Home Page.

**Firmware Version:** `1.0  Dec 19 2012`    **Firmware Build Time:** `15:09:45`
**TCP/IP Stack Version:** `v5.20`

**Personality:**
Model Number: `MLBS-2020B`    Serial Number: `0001`
Current Frequency: `2100.000000`  MHz  Min. Frequency: `2000`  MHz  Max. Frequency: `20000`  MHz
Frequency Resolution.: `0.000025`  MHz (Min. Step Size)
Minimum RF Level: `10.0`  dBm  Maximum RF Level: `18.0`  dBm
Minimum Temperature: `0.0`  Deg. C  Maximum Temperature: `50.0`  Deg. C

**RF Level Control Option:** `No`
Current RF Level: `N/A`  dBm  Minimum RF Level: `N/A`  dBm  Maximum RF Level: `N/A`  dBm

**Specifications:**
Spurious: `-60.0`  dBc  Harmonics: `-12.0`  dBc  Switching Speed: `6.0`  mS
Phase Noise dBc/Hz < : 100 Hz: `-70.0`    1 kHz: `-79.0`    10 kHz: `-72.0`    100 kHz: `-95.0`    1 MHz: `-125.0`

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

[ Save Configuration ]  ☑ Enable DHCP
IP Address: `192.168.1.59`
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:A3:15:84:A8`    **Note:** The above settings can be changed from the front panel.
Host Name: `MLBS0001`
Socket Port: `30303`

**Command:** [                    ]  [ Send ]
**Received:** [                    ]

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

Figure 4

### 7.3 UDP Interface program

The MLBS (Host) may be controlled remotely over an Ethernet network using the supplied "MLBS 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 MLBS 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. Sweep modes of Auto (Continuous), Single, Manual and List are available. Dwell Time is the amount of time, in milliseconds, that the unit will pause at each frequency before stepping to the next frequency. 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.
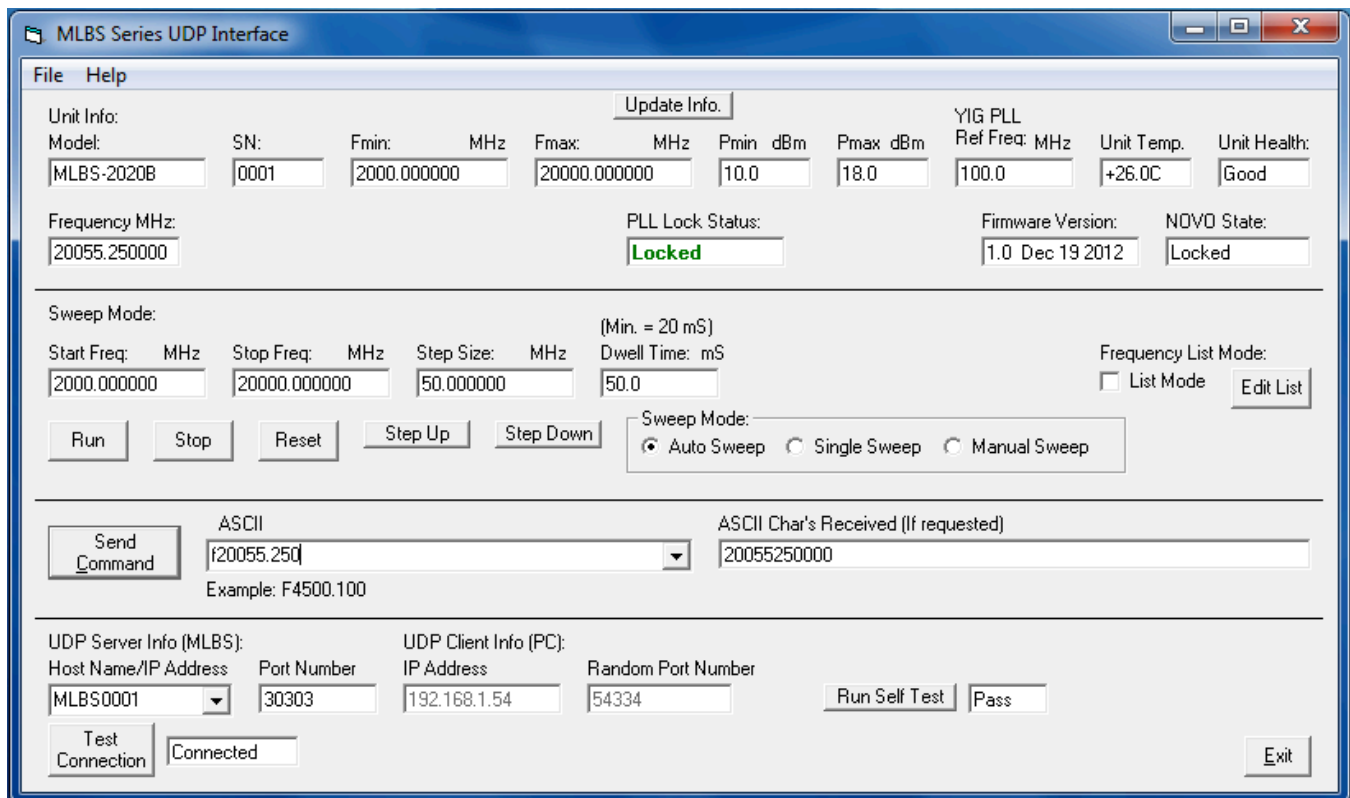


Figure 7

### 7.4 USB Interface program

The MLBS 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 MLBS may be controlled remotely via a USB connection using the supplied "MLBS PC 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 along with Start and Stop frequencies for sweep mode. Sweep modes of Auto (Continuous), Single, Manual and List are available. Dwell Time is the amount of time, in milliseconds, that the unit will pause at each frequency before stepping to the next frequency. 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. Sweep mode only supports connection to one unit at a time.
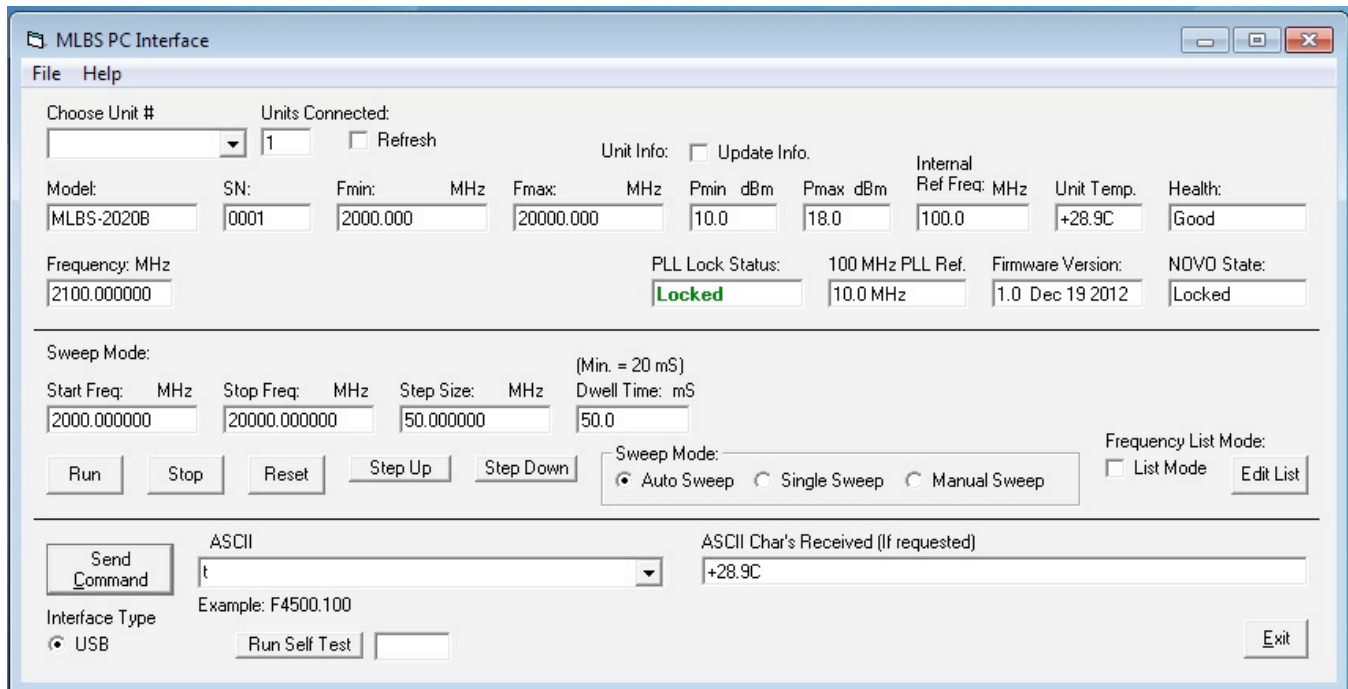


Figure 8

### 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 MLBS0005 23", this opens a telnet connection to the unit MLBS0005 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 MLBS 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). Note: All Non-volatile memory locations below 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. Example: press **(.) 0** to recall Model number.

| | Available when NOVO is locked: Commands are not case sensitive. | All Data is stored in locations and Sent / Received is in ASCII format |
|---|---|---|
| **Command** | **Function** | **Comments     (PW) = PIC writes to this or another NOVO location.** |
| **?** | **Report Status** | **D0 = 100 MHz lock, D1 = YIG PLL lock, D6 = self test, D7 = NOVO lock** |
| **""** | **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)** |
| **DI** | **Display Personality information on lines 1 and 2 (Takes 15 seconds to disp)** | **DI** |
| **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 (Socket Port); i.e. EP30303, stored at NOVO Loc. 108** | **UDP, TCP Socket Port** |
| **F** | **Frequency (ASCII) (Dec. #)** | **ASCII freq in MHz: xxxxx.xxxxxx; (example: F12345.678910)** |
| **L** | **Set Level for the RF Power control option** | **Sets the Leveling Circuit to a specific Level (L-0.5)** |

| | | |
|---|---|---|
| **LR** | **Level Cal NOVO Read** | **Leveling NOVO read** |
| **MR** | **Recall a user saved frequency setting from memory location (MR25)** | **0-99, stored @ NOVO location 200-299** |
| **MS** | **Save current frequency setting of unit to memory location (MS75)** | **0-99, stored @ NOVO location 200-299** |
| **R** | **Read NOVO location (Example = R1 = read serial #)** | **returns info @ memory location requested (0-2047)** |
| **SP** | **Synthesizer preset to factory settings.** | **Copy NOVO Loc. 900-960 to 0-60** |
| **SR** | **Soft PIC Reset** | **Reset PIC, clear var. run PIC code from start; (example: SR)** |
| **ST** | **Self Test** | **Read status byte D2; 1 = Pass; (example: SR, then read data)** |
| **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 Powe +3.3V** | **3.30V = normal; (example: V2, then read data)** |
| **V3** | **Read Internal +5.0V** | **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)** |
| **R 0000** | **Model Number (Example = W0001 or R1) Write or Read Location.** | **MLBS-2080C ("W" blocked with NOVO locked.) (R/W = 16 Bytes)** |
| **R 0001** | **Serial Number ("W" command requires 4 numeric digits), R1 reads Loc. 1** | **1125** |
| **R 0002** | **Product type: Filter or Oscillator or Synthesizer** | **Defines how PIC will talk to internal, connected device** |
| **R 0003** | **Fmin, in MHz** | **2000 (unit is tunable 100.0 MHz below Fmin.)** |
| **R 0004** | **Fmax, in MHz** | **8000 (unit is tunable 100.0 MHz above Fmax.)** |
| **R 0005** | **Current YIG PLL Chip Input - Reference Frequency Setting - MHz** | **Ref# = 1 – 200 MHz (typically 100.0 MHz, OCXO)** |
| **R 0006** | **RF min, in dBm** | **10.0** |
| **R 0007** | **RF max, in dBm** | **15.0** |
| **R 0008** | **Temp min, in Deg. C** | **0** |
| **R 0009** | **Temp max, in Deg. C** | **60** |
| **R 0010** | **Highest Temp reached, in Deg. C** | **35.7C** |
| **R 0011** | **NOVO State - Locked/Unlocked** | **Locked** |
| **R 0012** | **Firmware Version & date** | **1.5 Nov 16 2011** |
| **R 0013** | **Unit Health Status – "Good" or Self test failure information** | **"Good" or "Fail V5" as example** |
| **R 0014** | **Unit Calibration Status - Yes/No** | **Yes** |
| **R 0015** | **Self Test Results - Pass/Fail** | **Pass** |

| R 0016 | Current Output Frequency setting - MHz | 2500 |
|---|---|---|
| R 0017 | Internal Xtal Setting – Int or Ext or ExtXtal | ExtXtal      (3 modes; Internal Xtal, External and External with Xtal.) |
| R 0029 | External reference freq. In MHz for 100 MHz PLL (ExtXtal mode) | i.e.: 10   = 10 MHz external reference. 1.0 MHz increments only |
| R 0031 | Customer part number, if shown on P.O. | 123-45-6789 (Shown on unit label as PN:) |
| R 0032 | Frequency resolution in MHz (or Step Size) | 0.001 = 1.0 kHz |
| R 0033 | Spurious Spec., in dBc | -60 |
| R 0034 | Harmonics Spec., in dBc | -12 |
| R 0035 | Phase Noise Spec. @ 100 Hz Offset, in dBc/Hz | -80 |
| R 0036 | Phase Noise Spec. @ 1 kHz Offset, in dBc/Hz | -95 |
| R 0037 | Phase Noise Spec. @ 10 kHz Offset, in dBc/Hz | -95 |
| R 0038 | Phase Noise Spec. @ 100 kHz Offset, in dBc/Hz | -117 |
| R 0039 | Phase Noise Spec. @ 1 MHz Offset, in dBc/Hz | -140 |
| R 0040 | Switching Speed, any step, in mS | 5.0 |
| R 0041 | TCP/IP stack version | v5.20 |
| R 0042 | Firmware build time | 16:30:30 |
| R 0043 | Level Control Option installed? | Yes / No / Fixed (mode select) If fixed, min, max and set level = same (10 dBm) |
| R 0044 | Level Control Maximum Power Limit, in dB | 10.0 |
| R 0045 | Level Control Minimum Power Limit, in dB | -10.0 |
| R 0048 | Current RF Level Setting, in dBm | 9.5 |
| R 0050 | Level Control CAL Status (Is Level option calibrated) | Yes / No |
| R 0051 | Level flatness Spec. in +/- dB (+/- 2.0 = 4.0 total) | 2.0 |
| R 0056 | Internal Synthesizer Model Number | MLSP-2020BD |
| R 0057 | Internal Synthesizer Serial Number | 2255 |
| R 0058 | MLWI Sales (Job) number | 20-0024 |
| R 0059 | MLWI Product Outline Drawing # and Revision | 201-001 A |
| .... | | |
| R 0100 | DHCP Status: ON / OFF | Static = OFF / Auto = ON TCP/IP Ethernet settings (config_dhcpchecked) |
| R 0101 | IP address: (i.e.; 192.168.1.25) | TCP/IP Ethernet protocol settings (config_ip) |
| R 0102 | Subnet mask: (i.e.; 255.255.255.0) | TCP/IP Ethernet protocol settings (config_subnet) |
| R 0103 | Gateway: (i.e.; 192.168.1.1) | TCP/IP Ethernet protocol settings |

| | | (config_gw) |
|---|---|---|
| R 0104 | DNS1: (i.e.; 192.168.1.1) | TCP/IP Ethernet protocol settings (config_dns1) |
| R 0105 | DNS2: (i.e.; 192.168.1.1) | TCP/IP Ethernet protocol settings (config_dns2) |
| R 0106 | MAC Address: (i.e. 0025F169AC1B) | TCP/IP Ethernet protocol settings (config_mac) |
| R 0107 | Host Name (i.e.; MLBF0001) | TCP/IP Ethernet protocol settings (config_hostname) |
| R 0108 | Socket Port (i.e.; 30303) | TCP/IP UDP, TCP, Telnet Ethernet protocol settings (socketport) |
| .... | | |
| R 200-299 | User Save / Recall Frequency setting locations (100 Total) | Frequency stored in MHz (ASCII), save and recall using MS & MR commands |

## 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, D2-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: Synthesizer / Oscillator / Synthesizer |
| R0003 | minimum | Read | Frequency minimum |
| R0004 | maximum | Read | Frequency maximum |
| R0006 | rfmin | Read | RF min, in dBm |
| R0007 | rfmax | Read | RF max, in dBm |
| R0008 | tempmin | Read | Temp min, in Deg. C |
| R0009 | tempmax | Read | Temp max, in Deg. C |
| R0010 | hitemp | Read | Highest Temp reached, in Deg. C |
| R0011 | novostate | Read | NOVO State - Locked/Unlocked |
| R0012 | firmver | Read | Firmware Version & 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 |
| R0029 | version | Read | TCP/IP Stack Version |
| R0030 | builddate | Read | Firmware Build Time |
| R0032 | freqres | Read | Frequency resolution in MHz (or Step Size) |
| R0033 | spurs | Read | Spurious Spec., in dBc |
| R0034 | harmonics | Read | Harmonics Spec., in dBc |
| R0035 | pn100 | Read | Phase Noise Spec. @ 100 Hz Offset, in dBc/Hz |
| R0036 | pn1k | Read | Phase Noise Spec. @ 1 kHz Offset, in dBc/Hz |
| R0037 | pn10k | Read | Phase Noise Spec. @ 10 kHz Offset, in dBc/Hz |
| R0038 | pn100k | Read | Phase Noise Spec. @ 100 kHz Offset, in dBc/Hz |
| R0039 | pn1m | Read | Phase Noise Spec. @ 1 MHz Offset, in dBc/Hz |
| R0040 | speed | Read | Switching Speed, any step, in mS |
| R0041 | version | Read | TCP/IP stack version |
| R0042 | builddate | Read | Firmware build time |
| R0043 | lvlopt | Read | Level Control Option installed? |
| R0044 | lvlmin | Read | Level Control Maximum Power Limit, in dB |
| R0045 | lvlmax | Read | Level Control Minimum Power Limit, in dB |
| 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. MLBS0001) |
| 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.
46515 Landing Pkwy.
Fremont, CA  94538
Ph: (510) 770-9221
Fax: (510) 770-9213

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.