

# Messenger 900FS

## Spread Spectrum Serial/USB Radio

### Installation Guide



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## **Support**

If you have questions or need help with an application, we hope that you'll take advantage of our free technical support. Simply call us at:

**(530) 888-1800**

If you need to send us a fax:

**(530) 888-7017**

If you prefer e-mail (we do), especially if you want to send us a sample of a program or other files, you can e-mail us at:

**[support@iclinks.com](mailto:support@iclinks.com)**

For additional technical information including datasheets, manuals and software, visit our web site at:

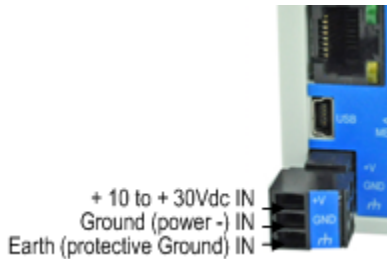
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## **Power Supply Connection**

To power the unit, use 10 to 30 VDC as shown below:



*Note: the radio cannot be powered through the USB port.*

## **Connecting via USB or RJ45/RS-232**

By default the Messenger is setup for configuration via the small USB port and communication using the RJ45 (RS-232). This can be configured by changing a switch position inside the unit. If you cannot configure the unit with a USB cable then you can use the RS-232 port instead.

You will need to remove the bottom piece to get to the switch by lifting the tabs of the case with a small screw driver.



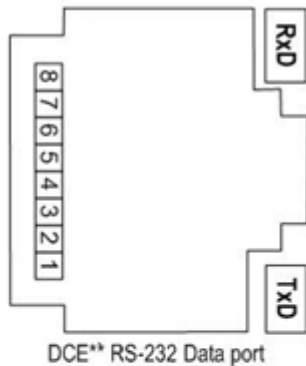
The setting is controlled by the far left switch which is up by default. Putting this switch in the down position (towards the circuit board) will allow the RJ45/RS232 connector to be used to configure the unit. The USB connector can then be used for communication. Pinnacle Series Controllers have the ability to communicate through the Messenger on either port.

### **USB Cables for Messenger Radios and Modems**

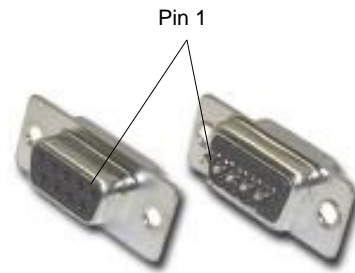
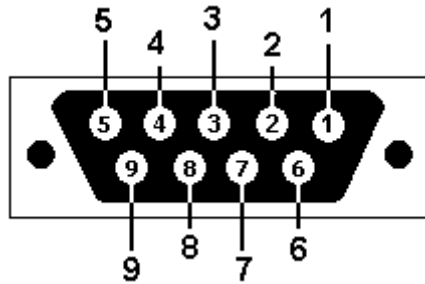
- 99-4101** USB Type A to USB Mini B – 1.5 ft. (Pinnacle or PC to Messenger)
- 99-4103** USB Type A to USB Mini B – 3 ft. (Pinnacle or PC to Messenger)
- 99-4106** USB Type A to USB Mini B – 6 ft. (Pinnacle or PC to Messenger)
- 99-4110** USB Type A to USB Mini B – 10 ft. (Pinnacle or PC to Messenger)
- 99-4115** USB Type A to USB Mini B – 15 ft. (Pinnacle or PC to Messenger)

## RS-232 Connections

The RJ45/RS232 connector is wired as follows in case you need to build a cable. Note that there are RJ45 to DB9 adapters available for purchase through ICL. The connection with the adapter just requires the adapter, an RS232 cable, and an Ethernet cable which plugs into the RJ45 port on the Messenger.



- 1: n/c
- 2: n/c
- 3: n/c
- 4: Ground
- 5: RxD Data Out
- 6: TxD Data In
- 7: n/c
- 8: n/c



RS-232 D pinout

(view looking into front face of female connector)

DB-9S connector pinout

### RS-232 DTE Cable Typical Wiring (RJ-45 to DB-9S)

| DCE/DTE RJ-45 (8-pin) connections | DCE Function | DB-9S DTE Function | DB-9S connections |
|-----------------------------------|--------------|--------------------|-------------------|
| 4                                 | GND          | GND                | 5                 |
| 5                                 | RxD          | RxD                | 2                 |
| 6                                 | TxD          | TxD                | 3                 |

### RS-232 Cables for Messenger Radios and Modems

- 99-2201 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 1 ft. (PC/DTE device to Modem/Radio )
- 99-2202 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 2 ft. (PC/DTE device to Modem/Radio )
- 99-2203 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 3 ft. (PC/DTE device to Modem/Radio )
- 99-2205 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 5 ft. (PC/DTE device to Modem/Radio )
- 99-2207 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 7 ft. (PC/DTE device to Modem/Radio )
- 99-2210 RJ-45 to DB-9F (female) RS-232 Serial Cable Assembly, 10 ft. (PC/DTE device to Modem/Radio )

*Note: DTE refers to Data Terminal Equipment. This would be the serial port on your PC or other controller equipment. The equipment would have a DB 9 Male connection and require a DB 9*

*Female connector on the cable or have an RJ45 RS-232 D connector. DCE refers to Data Communications Equipment which in this case is an RJ45 RS-232 D connector on the Messenger 900FS. Connect shield of cable to shell of DB-9S connector. Wires not listed are “no connect” on either end.*

For Pinnacle Controllers and other RS-232 D (RJ45) serial connections, a standard Ethernet cable may be used for serial communications with the Messenger series modems.

## **Supporting Documents and Programs**

The Freewave configuration program is free, and is available here on our FTP site and can help with the configuration process:

[http://www.iclinks.com/public\\_ftp/TechSupport/Freewave/ToolSuiteCDInstall.zip](http://www.iclinks.com/public_ftp/TechSupport/Freewave/ToolSuiteCDInstall.zip)

A detailed technical reference manual with all the supported configuration for a Freewave type radio is available here:

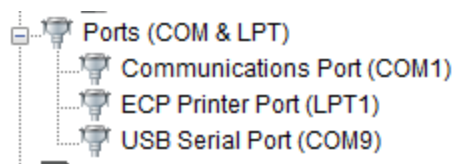
[http://www.iclinks.com/public\\_ftp/TechSupport/Freewave/MessengerFreewaveModuleTechRef.pdf](http://www.iclinks.com/public_ftp/TechSupport/Freewave/MessengerFreewaveModuleTechRef.pdf)

## **Configuring the Radio:**

### **Cable Connection and PC Interfacing:**

You can use either a USB cable which connects from your PC to the Messengers mini-USB port, or a serial cable which connects to your PC at a serial connector or USB to DB9 adapter to the Messengers RJ45 connector.

If using a USB to mini-USB cable or USB to DB9 adapter, the device should show up in the computers device manager as a ‘USB Serial Port’.



If the USB to mini-USB connection to the Messenger is not automatically detected and added to the device manager then there is a driver for Windows 64 bit and the XP Mode virtual machine and installation guide located here:

[http://www.iclinks.com/public\\_ftp/TechSupport/Special\\_Drivers](http://www.iclinks.com/public_ftp/TechSupport/Special_Drivers)

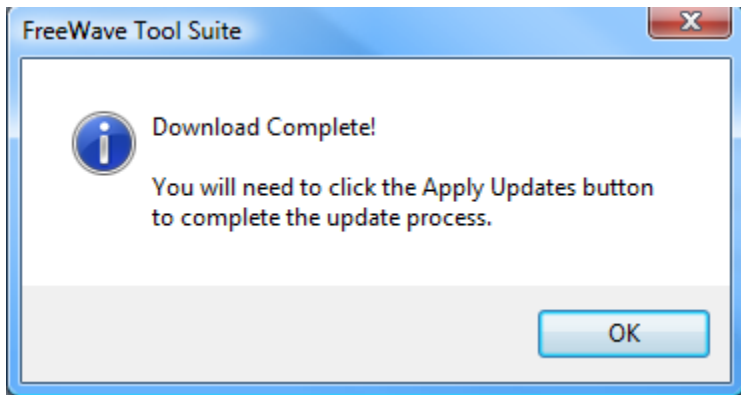
A USB to DB9 adapter may come with its own driver if it is not automatically detected.

Connect the Messenger up to your PC using a USB cable or RS232 cable. You can purchase a USB to mini-USB type cable from ICL or one can be purchased separately at vendors such as

Radio Shack, etc. The cable is the same type used on some cell phones and other mobile devices.

Open the Freewave program.

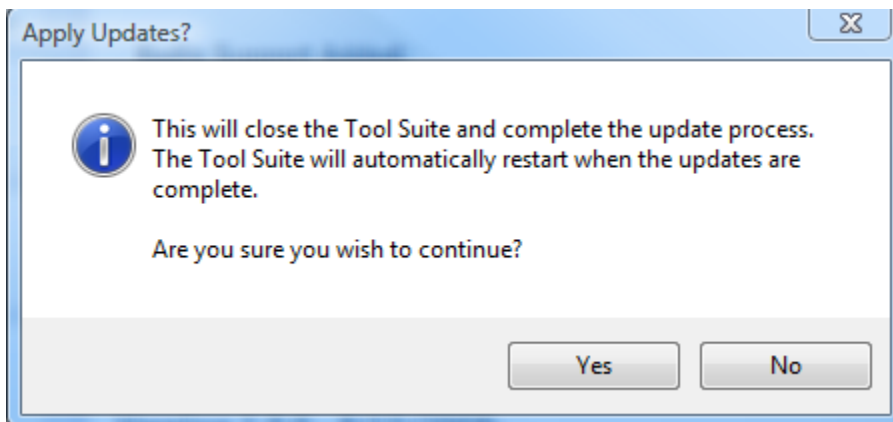
If updates are available for the Freewave program then you will be prompted to allow it to update. If this happens then wait for the updates to download and click OK to close the 'Download Complete' dialog.



Click the 'Apply Updates' button:



Then click 'Yes' to restart the program:



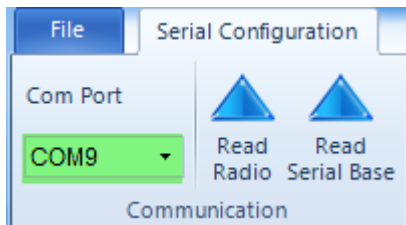
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Click the Configuration button on the left.



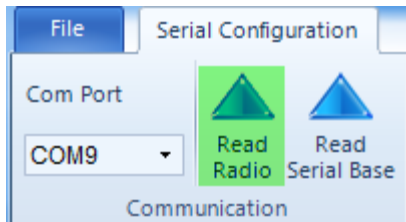
If connected with an RS232 cable, the Messenger may show up as a discovered device automatically.

Select the appropriate Com Port with the drop down selector.

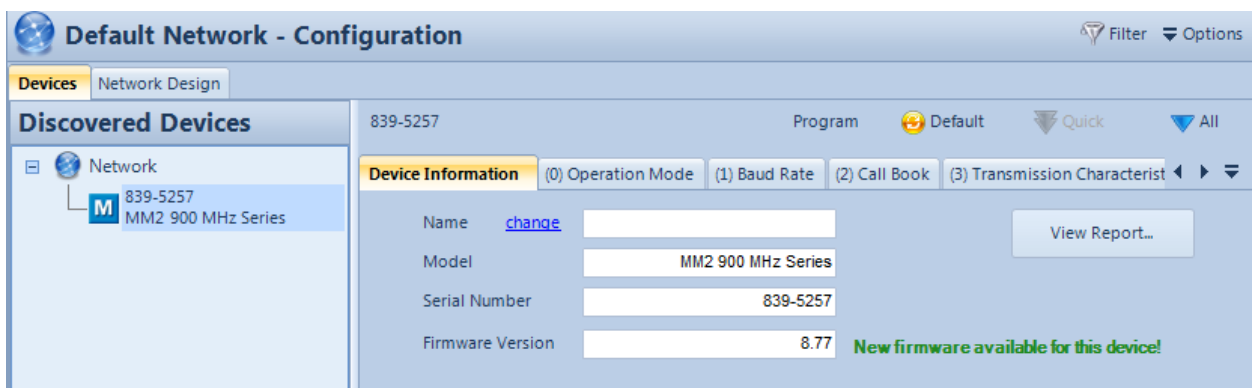


Once you can select the USB serial port from the Com Port dropdown in the Freewave program:

Click the Read Radio button.



The radio type and configuration should now be displayed in the Freewave program.



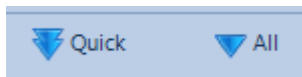
Step through the configuration tabs complete the desired configuration.



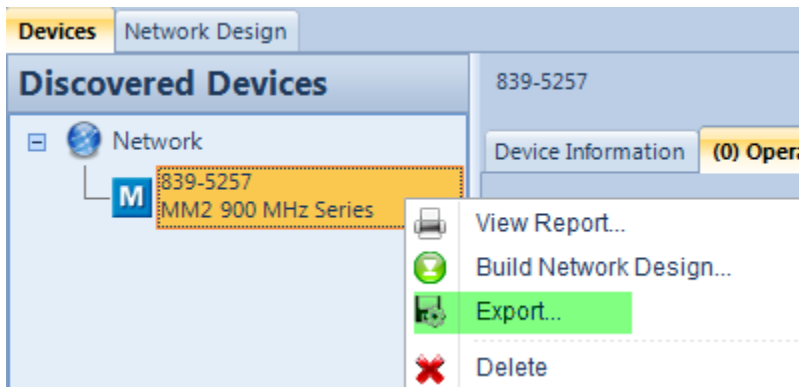
Tips:

1. When working with a pair of these radios, (in section 0, Operation Mode) one should be set to Point to Multipoint Slave (3) and the other set to Point to Multipoint Master (2), even if there only the two units in the system.
2. Modbus RTU (in section 1, Baud Rate) should be turned on (set to 1).
3. The Network ID (in section 5, Multipoint Parameters) should match between the two units.

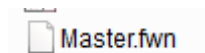
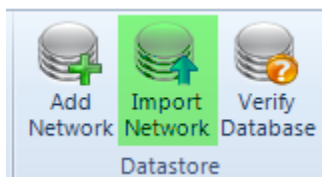
To download changes to the radio, click the 'Quick' icon to send only the last changes made or click the 'All' icon to send everything. The 'Quick' icon will be grayed out if no changes have been made.



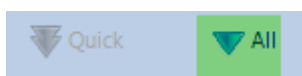
To save the radio configuration, right click the device under 'Discovered Devices' and select 'Export'.



To load an existing configuration, click the 'Import Network' icon and select an existing file.

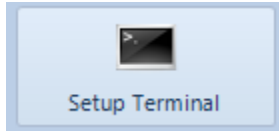


The loaded configuration can now be downloaded to the radio with the 'All' icon.



## Configuration Via the Serial Terminal

The Freewave program also has a built in serial terminal. If you are more familiar with this method then click the Setup Terminal button.



```

                                MAIN MENU
D2 ULPM Version 8.78   11-28-2011
      902 - 928 MHz
      Modem Serial Number 867-9645
      Model Code DMM2T

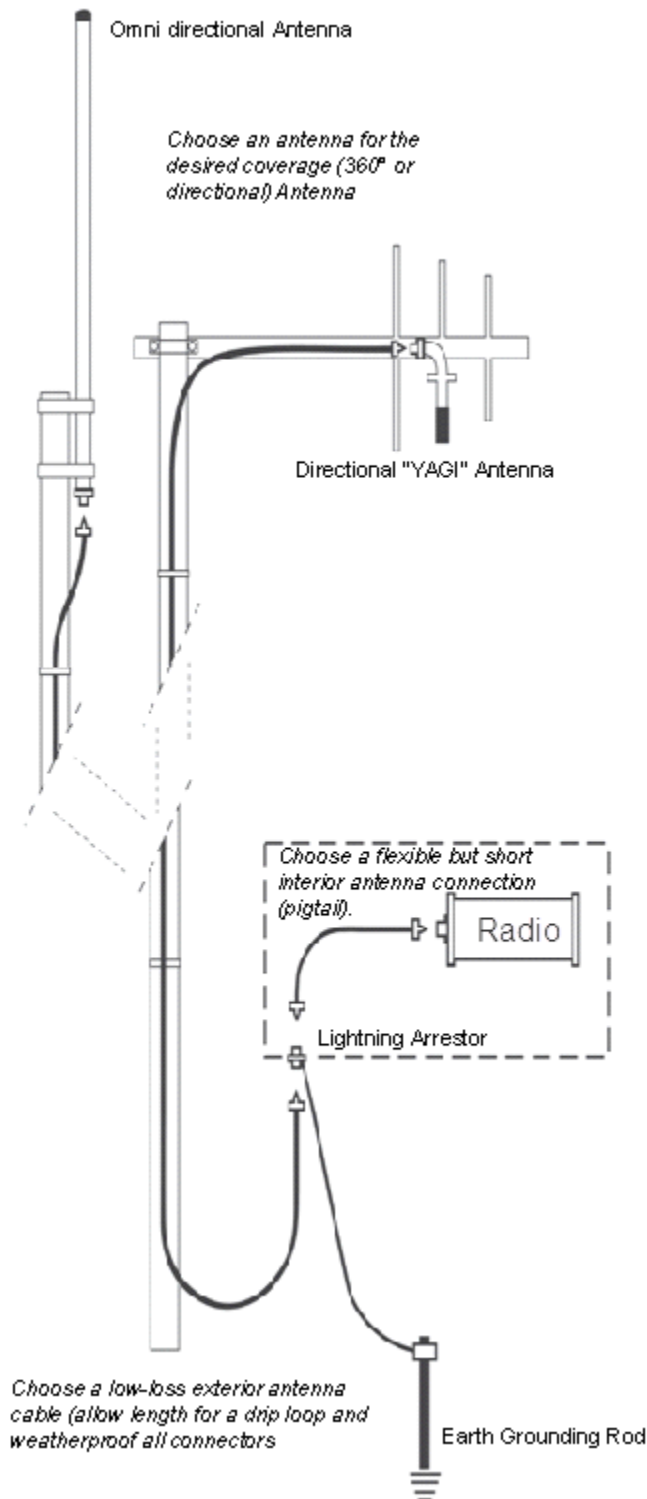
(0)  Set Operation Mode
(1)  Set Baud Rate
(2)  Edit Call Book
(3)  Edit Radio Transmission Characteristics
(4)  Show Radio Statistics
(5)  Edit MultiPoint Parameters
(6)  TDMA Menu
(8)  Chg Password
(Esc) Exit Setup

Enter Choice |
```

The parameters here are the same as in the tabbed method with section numbers that match the tabs.

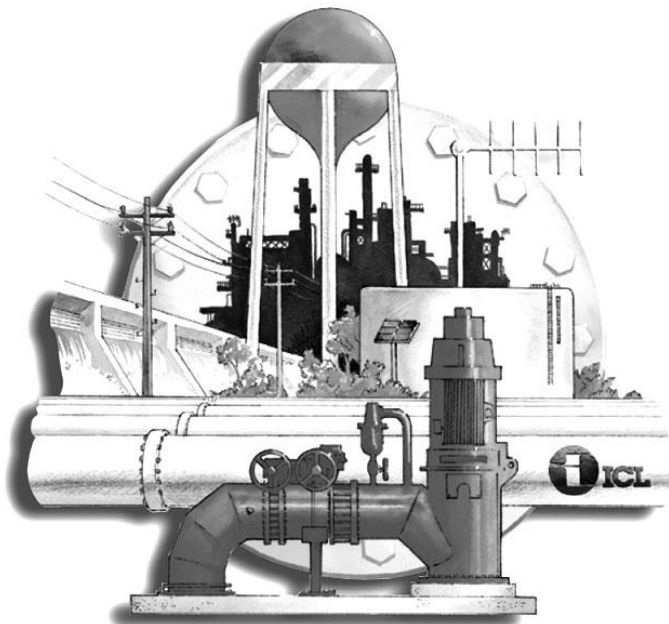
The connection should be automatic when you select the terminal, but if not, the start the connection with a combination SHIFT/U key press.

## Radio Installation



The Messenger Series radios use a female “MMCX” type antenna connector. The antenna connector and the radio status lights are located on upper side of the controller (see below).

Typically, a short, lightweight cable (such as RG-223 or LMR-200) connects between the radio antenna connector and a lightning arrestor in the panel. A lightning arrestor with dedicated ground rod is required for any outdoor installation. The lightning arrestor can also serve as a bulkhead connector to pass through the cabinet wall and transition to heavier, lower-loss type exterior antenna cables such as LMR-400 and LMR-600. These cables then connect to Yagi (directional) or Omni (Omni directional) antennas. LMR-600 cable has lower loss for longer runs. LMR-400 is cheaper and more flexible, but less than 100ft. of cable can cut the signal strength in half! Heliax has the lowest loss, but is stiff and hard to work with.



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