

Operating Modes

The modem's transmit power must be set at 500mW (or lower) when using batteries to power the modem. Transmitting at 1 Watt could damage the modem.

When the PL (Power Level) parameter is set to "3" (default), the modem will transmit at 500mW. The modem supports cyclic sleep and DTR pin sleep modes for reduced power consumption.

DIP Switch Configurations

Under the battery cover are four DIP Switches that provide external control of operating modes.

Figure 2. DIP Switches (beneath the battery cover)



Table 3. DIP Switch Settings (Left = OFF, Right = ON)

Switch 1	[Config] Sets the CONFIG line low (of the embedded RF module), which is used if Digi's (formally MaxStream) X-CTU configuration utility cannot otherwise communicate with the modem. In order to force the module into configuration mode, set this switch to ON and then power cycle (turn off, then on) the modem. The modem will temporarily set its serial interface to 9600 bps, 8-N-1 and enter command mode; outputting an "OK" message. Once the "OK" is received, turn the CONFIG switch off, or the modem will enter a range test mode and generate a series of hexadecimal numbers. Note that this switch operates differently from the CONFIG switch on a Digi XT09-PK....
Switch 2	Not currently used.
Switch 3	[LEDs] Enables or disables the three LEDs to extend the battery life of the modem
Switch 4	[Power] When set to ON (Vcc High, default), the internal circuitry will be powered at 5.0 V. OFF (Vcc Low) = 3.3 V.

Advanced Configurations

The Field Modem - XT supports a wide range of networking options. To program the modem, connect the field modem to a PC using the supplied RJ-45 to DB-9 cable.

Ad Hoc Controls recommends using Digi's X-CTU Software. For configuration details, refer to the 9XTend product manual. Ensure that the PL (Power Level) parameter is not set to 4 (1000 mW transmit power) when using battery-power.

- Sleep Modes
- Advanced Networking & Addressing
- Serial & RF Interfacing
- Command Mode Options
- Diagnostics

The 9XTend OEM RF Module user manual and X-CTU Software can be downloaded from the following web page:

www.adhocelectronics.com/Products/RF-Field-Modem-XT

Thank you for evaluating the RF Field Modem!
Please contact us with your questions and/or feedback.

RF Field Modem - XT / Blue Modem - XT



Reliable, Easy-to-use

Wireless Cable Replacement

AHD0070a
Battery or Externally Powered

Starter Guide

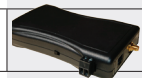
Quickly create reliable wireless links between devices

Out-of-box, the RF Field Modems come configured to provide long range RF links between devices. The steps in this guide provide a fast learning experience and showcase the range and performance of the modem.

Range Test Requirements

The following items are required to run the range test outlined in this guide. The Field Modem can be purchased with or without accessories. Two modems (each w/ accessories) are required to run this range test.

Radio Modems

RF Field Modem - XT (2)		XTX-232...	Long range radio modems (900 MHz, serial RS-232 data interface)
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Accessories

900 MHz Antenna (2)	Radiates/receives RF signals (2.1 dBi, half-wave, dipole)
Patch Cable (1)	Connects base modem to a PC
Female Adapter (2 - Black, RJ-45 <--> DB-9)	Adapts RJ-45 to DB-9 (RS-232) pin signals
Male Adapter (Gray, RJ-45 <--> DB-9) *	Adapts RJ-45 to DB-9 (RS-232) pin signals
RJ-45 Loopback Adapter (1)	For range test - Loops data back into the modem for re-transmission
Power Supply (1)	Powers base modem (9V, 110 - 120V, 0.15A)
Batteries (2)	Powers remote modem (AA, Lithium)
CD (1)	Contains documentation & testing/configuration software

* Included in the accessories kit; but is not used in this range test.

Any device that has a serial port can communicate with a field modem; however, this starter guide cites usage of a PC (Windows 2000, XP or Vista) when connecting to the base modem. A Blue Modem (Bluetooth interface) can be substituted for the RS-232 Field Modem as long as the interfacing stipulations are met [refer to the "Run Range Test" section to verify PC com port settings match the unique interfacing parameters of the Blue Modem, p3].

Range Test Setup

Install X-CTU™ Software

X-CTU is serial communications software, developed by Digi™, that will be used to run the range test. It can also be used to configure Field Modem parameters.

1. Double-click the executable file named "setup_x-ctu.exe".
This file is located on the accessories kit CD or can be downloaded from the following web page: www.AdHocElectronics.com/Products/RF-Field-Modem-XT
2. Follow the prompts of the installation screens.
3. When asked if you would like to check the web for updates, select "Yes".

Hardware Setup

1. Attach antennas to both the Base & Remote Modem.
2. Assemble the female adapter (black, RJ-45 <--> female DB-9).
[Refer to Figure 1 and Table 1]
3. Connect the Base Modem to a serial (DB-9) port of a PC using the patch cable and female adapter [Figure 2].
4. Set the Base Modem's power switch to "EXT PWR"; then power the Base Modem using the included power supply.
5. Connect the RJ-45 Loopback Adapter to the Remote Modem (the loopback adapter loops the data coming out of the Remote Modem back into the modem for re-transmission).
6. Set the Remote Modem's power switch to "INT BATTERY"; then power the Remote Modem using the included batteries (AA).

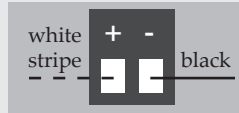


Figure 1. Wiring Diagram: Female Adapter (Black, Female RJ-45 <--> Female DB-9)

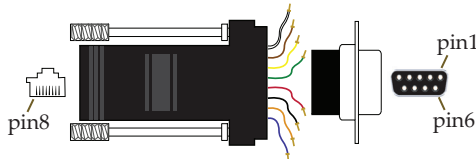


Table 1. Pinout (RJ-45 <--> DB-9 Adapter)

DB-9 Pin#	Name/Wire Color	RJ-45 Pin#
1	<- DCD* / Orange ->	2
2	<- RXD / Green ->	5
3	<- TXD / Yellow ->	6
4	<- DTR** / Black ->	3
5	<- GND / Red ->	4
6	<- DSR / Blue ->	1
7	<- RTS / White ->	8
8	<- CTS / Brown ->	7

The RI pin (pin #9 of the DB-9 connector) is not connected

* The DCD/power pin is configurable with an internal jumper to accept external 8-30 VDC power, or optionally to output the internal 3.3 V (or 5 V) power.

Refer to the guide (on the CD and on the web) for more details.

** DTR is used to enable pin sleep mode on the module, when configured.

Run Range Test

The modem's transmit power must not exceed 500mW when using batteries to power the modem. Battery-powered transmissions at 1 Watt could damage the modem. By default, the modems transmit safely at 500mW (PL parameter = 3).

Figure 2. Range Test (Basic Point-to-point RF Link)



Range Test

1. Verify power switches are correctly set [refer to Figure 3 or modem's label].
"EXT PWR" for the Base Modem
"INT BATTERY" for the Remote Modem
2. Verify field modems are powered (Power LEDs should be illuminated).
3. Launch X-CTU Software by double-clicking the X-CTU desktop icon or launching from Windows (Start --> Program Files --> Digi-MaxStream --> X-CTU).
4. Open the "PC Settings" tab [Figure 4]. Use default interface parameters*:
Baud = 9600, Flow Control = NONE, Data Bits = 8, Parity = NONE, Stop Bits = 1
5. Select the Com Port dedicated to the Base Modem [Figure 3].
Hint: Use the "Test / Query" button to test settings.
6. Open the "Range Test" tab [Figure 4]. Check the RSSI checkbox (optional) and then select the "Start" button.
7. Monitor the percentage of good RF packets received to determine the range of the wireless link in various environments.

Figure 3. Field Modem Switches, Connectors & LEDs

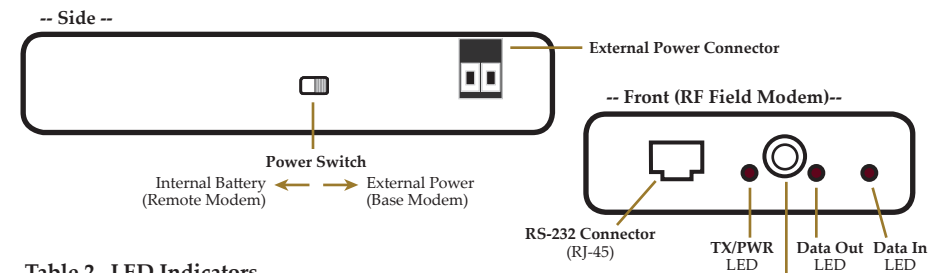


Table 2. LED Indicators

TX/PWR	(Transmit / Power) On when powered and awake, blinks briefly off during an RF transmission.
DIN	(Data In) Illuminated when data enters the radio modem through the RS-232 port.
DOUT	(Data Out) Illuminated when data leaves the radio modem through the RS-232 port.

The Blue Modem external interface is identical to that of the RF Field Modem except there is not an RS-232 (RJ-45) connector.

* Unique interfacing parameters of the Blue Modem: Baud = 230400,
Flow Control = HARDWARE,
Data Bits = 8,
Parity = NONE,
Stop Bits = 1