

# Zlinx for Wireless RS-232/RS-422 Master-Satellite, Tank Monitor, and Transaction Printer Communications

**IMPORTANT!** Syntech no longer sells Zlinx modems. Syntech now sells Digimodems. Please refer to **Product Bulletin 252** for information on how to set up Digimodem for Tank Monitor and FMU Communications.

The Zlinx Radio Modem has been tested and proven to provide satisfactory wireless communications between two FuelMaster® devices utilizing RS-232 or RS-422 communications. Examples are Master and Satellite fuel management units (FMUs), a Master FMU and a tank monitor/tank gauge, or a Master FMU and a transaction printer. Procedures for using wireless Zlinx communications to a Remote FRB are available and detailed in Product Bulletin 154.

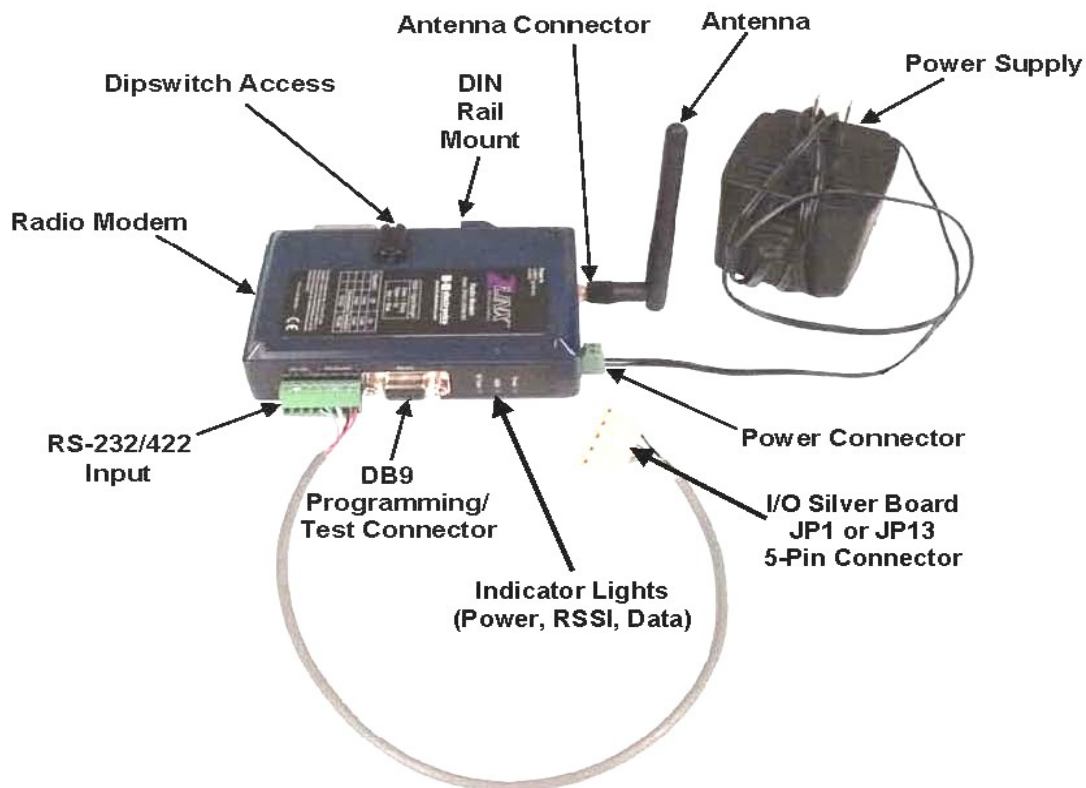


Figure 1. Zlinx Radio Mode

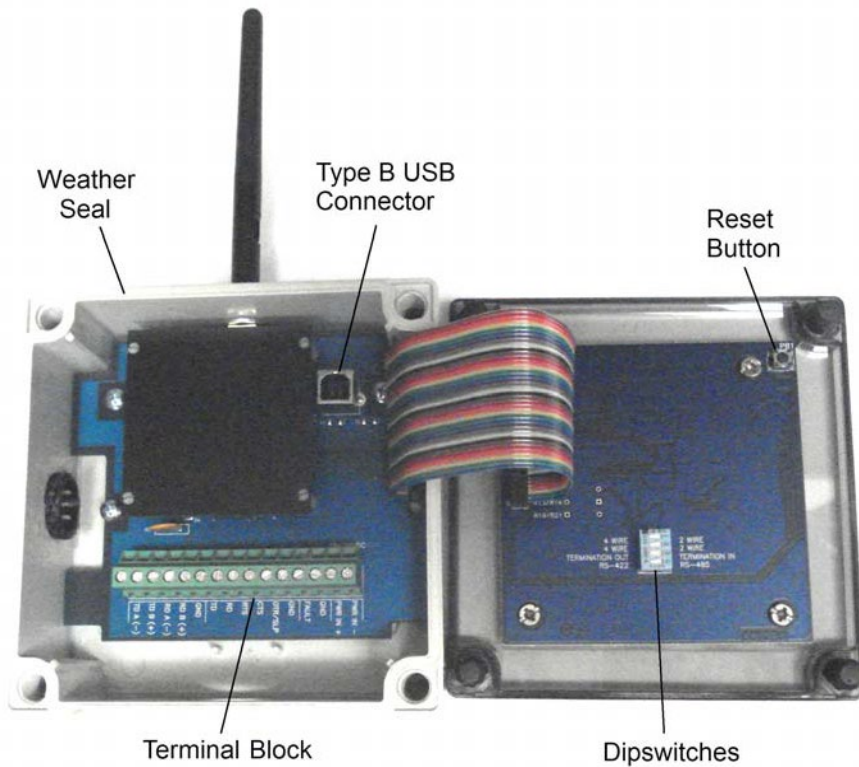
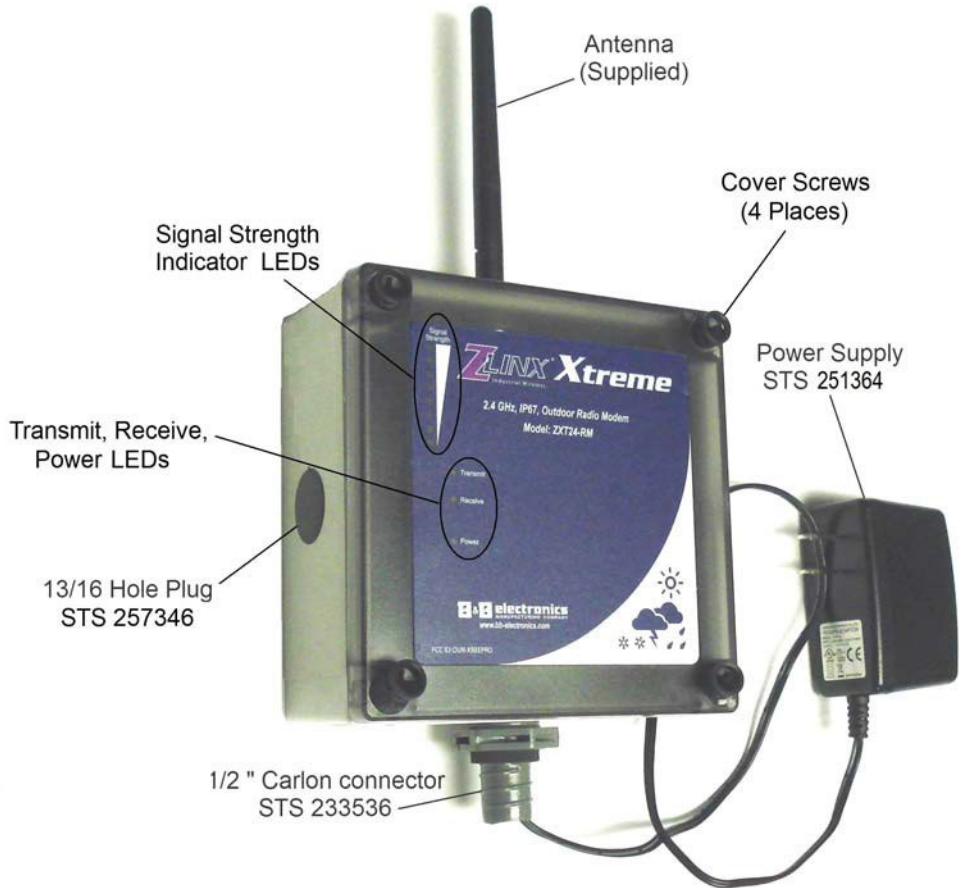


Figure 2. Zlinx Xtreme Radio Mode

## Equipment

A maximum of twelve RS-232/422 devices may be configured for wireless communications with this equipment. The maximum range advertised by the manufacturer is 300 feet indoors and one mile outdoors. The original equipment used for this application was the B&B Electronics ZP24D-250RM-SR Zlinx Radio Modem (see Figure 1). This model is not weather resistant. It has to be installed inside a weatherproof enclosure such as the FMU. B&B Electronics later developed the ZXT24RM (see Figure 2), a weather resistant radio modem called the Zlinx Xtreme. It is encased in a weatherproof enclosure. Where the physical appearance differs from the standard Zlinx Radio Modem, they both are programmed with the same software.

*These devices must be paired; there must be one device at the Master FMU for every device installed in a Satellite FMU, tank monitor, or transaction printer. Example: an application for three Satellite FMUs will require three devices at the Master FMU, and one device in each Satellite FMU, for a total of six. Zlinx and Zlinx Xtreme may be paired and used together.*

A power supply is not standard equipment with the Zlinx radio modems as purchased from B&B Electronics. A 12VDC, 1A power supply is provided with the Zlinx radio modem when purchased through Syntech Systems. This power supply has a short input cable and a connector that must be removed from the end of the cable. Additional wire may be spliced onto the end of the power cable if more length is needed. The power supply must plug into a 110 VAC power outlet. If the power supply must be replaced, note the polarity of the connections annotated on the side of the radio modem. The standard Zlinx has an external power connection near the antenna mount. The positive input to the connection is the terminal closest to the antenna. The positive output from the power supply can be identified by the striped wire. The Zlinx Xtreme has all connections (power, programming, and communications) to a single terminal bar inside the radio modem case.

The Zlinx Xtreme has two predrilled openings in its housing for cable entry, one in the left side and one in the bottom. Both openings are not used. Syntech provides a hole plug to cover one opening. A ½ inch Carlon connector is provided for the other opening to facilitate a connection with Liquidtite flex conduit.

The radio modem is operable in temperature ranges from -40° F to 185° F. The standard Zlinx cannot be exposed to rain or snow. As such they must be installed either inside an FMU, or in a weatherproof box attached to or in close proximity to the FMU. Neither radio modem is approved for installation in Class I Division 1 or 2 locations, so they must be installed not closer than 18 inches from a Class I Division 1 or 2 fuel dispenser, and at least 18 inches above grade level when installed within 20 feet of a Class I Division 1 or 2 fuel dispenser. The radio modem is certified by FCC, UL, and CE.

The antenna supplied with the radio modem has supported communications to 200 feet when the radio modem is installed inside an FMU cabinet. Greater distances are possible outside the FMU, or from inside a plastic enclosure. Line-of-sight must be maintained between the radios. If mounting the radio modem within the FMU cabinet does not support line-of-sight, or satisfactory signal strength cannot be achieved, refer to **Steps to Gain Line-of-Sight or Extend Range** at the end of this product bulletin for additional guidance. The introduction of the Zlinx Xtreme provided much greater mounting possibilities.

Communications quality and range are affected by signal strength. Signal strength may be improved by ensuring quality antennas and antenna cables are used, and line-of-sight is maintained. Line-of-sight will become more critical at longer distances. Reducing baud rates in the Zlinx (where possible) can also improve communications success. Many FuelMaster® applications require specific baud rates for communications.

## Syntech Part Numbers

Part Name	Part Number
Zlinx ZP24D-250RM-SR Radio Modem (standard indoor)	249912
Kit w/two Zlinx ZP24D-250RM-SR	941B0498
Zlinx Xtreme ZXT24RM	257206
Kit w/two Zlinx Xtreme ZXT24RM	941B0498A
12VDC, 1A power supply	251364 (superseded 237116)
Liquidtite ½ inch fitting (req'd w/Zlinx Xtreme)	233536
Hole Plug 13/16 inch (req'd w/Zlinx Xtreme)	257346
Outlet Box installation kit	178802A

## Modem Configuration

The Zlinx and Zlinx Xtreme share the same firmware and may be configured with the same software. These procedures are functional for both Zlinx and Zlinx Xtreme. If a procedure is unique to the standard Zlinx, it will be prefaced with (Zlinx). If a procedure is unique to Zlinx Xtreme, it will be prefaced with (Zlinx Xtreme). For all FuelMaster® applications, the dipswitches must be set to OFF, or 1) 4 WIRE, 2) 4 WIRE, 3) No termination (or TERMINATION OUT), and 4) RS-422.

**NOTE** Disconnect any prewired connectors from the green RS-232/422/485 receptacle before configuring the radio modem. It cannot be properly configured with RS-232/422/485 wires connected.

The radio modem must be configured for each application, and must be configured in matching pairs. Perform the following:

1. (Zlinx) A straight-through serial cable must be connected between a serial port on your PC, and the radio modem DB9 Programming/Test Connector (Figure 1). If your PC does not have a 9-pin serial connector, a USB/serial adapter cable must be used.
2. (Zlinx Xtreme) A straight-through USB A/B cable must be connected between a USB port on your PC, and the Type B USB Connector (Figure 2) in the Zlinx Xtreme.
3. The power supply supplied by Syntech will have an incorrect connector installed on the end of the output wires. Cut the connector off the power output wires as close to the connector as possible. The striped wire from the power supply is positive. Split the wires approximately 1 inch to separate them, then strip approximately ¼ inch of insulation from each wire.

**NOTE** It may be necessary to extend the length of the power supply output wires. Use 20AWG (or larger) stranded wire for extensions.

4. (Zlinx) The power connector pin closest to the antenna connector is the positive input. Connect the power supply wires to the radio modem Power Connector.

5. (Zlinx Xtreme) A temporary connection of the power supply is necessary to power and program Zlinx Xtreme. The final connection is performed during installation. Connect the positive, striped lead to PWR IN +. Connect the negative, unstriped lead to PWR IN-.
6. Plug the power supply into a 110 VAC power receptacle. (Zlinx) The radio modem red Power light should illuminate. (Zlinx Xtreme) The radio modem green Power light should illuminate.

**NOTE** The following modem configuration procedures were performed utilizing version 3.2.16.0 software. The software is subject to frequent changes, and may reflect different screen shots and programming procedures in later versions. The software is backward compatible to older firmware versions in the modems, but may not be forward compatible to firmware versions developed after the software. A software disk is provided with each radio modem. If a software disk is not readily available, it is recommended the B&B Electronics website be visited and the latest software be downloaded to the PC being used to configure the radio modem.

7. Find the software CD. Insert into the CD drive on your PC. It should auto-start. Follow the screen instructions to install the software. The Zlinx Radio Modem software icon (Figure 3) should appear on your desktop.

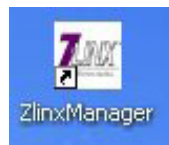


Figure 3. Zlinx Software Program Icon

8. Click on the icon to open the software program. It should open to the Zlinx Manager v3.2.16.0 window (Figure 4). Click on Radio Modem. The Zlinx Manager v3.2.16.0 - Radio Modem window will open (Figure 5).



Figure 4. Zlinx Manager v3.2.16.0 Window 1



Figure 5. Zlinx Manager v3.2.16.0 Window 2

9. In the Zlinx Manager v3.2.16.0 – Radio Modem window (Figure 5), click on the **Radio Modem Configuration** button. An Updating Database window may open while the database is updated, then the Zlinx Radio Modem window will open (Figure 6).



Figure 6. Zlinx Radio Modem Window

10. Click on the **Auto Modem Search** button. The Radio Modem Search window will open (Figure 7).

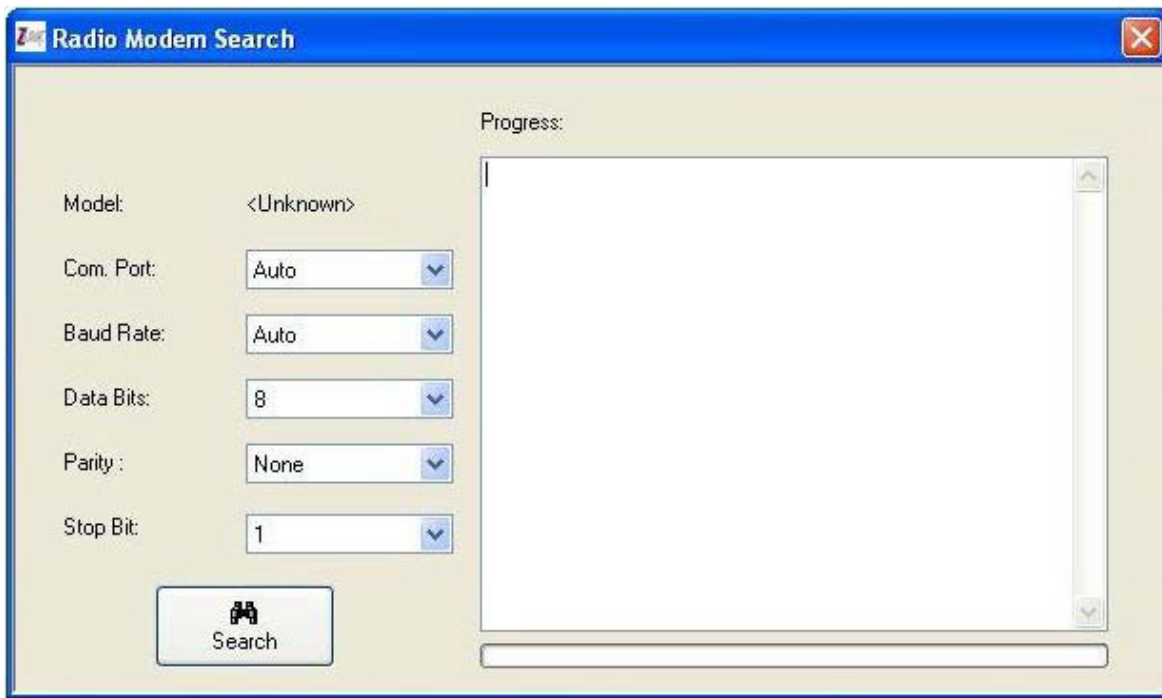


Figure 7. Radio Modem Search Window

11. Click on the **Search** button in the lower left corner of the window. The software program will search for the connection (Figure 8). The search will continue until the radio modem is found. The radio modem model, and communications parameters for the connection will be populated in the Radio Modem Search window.

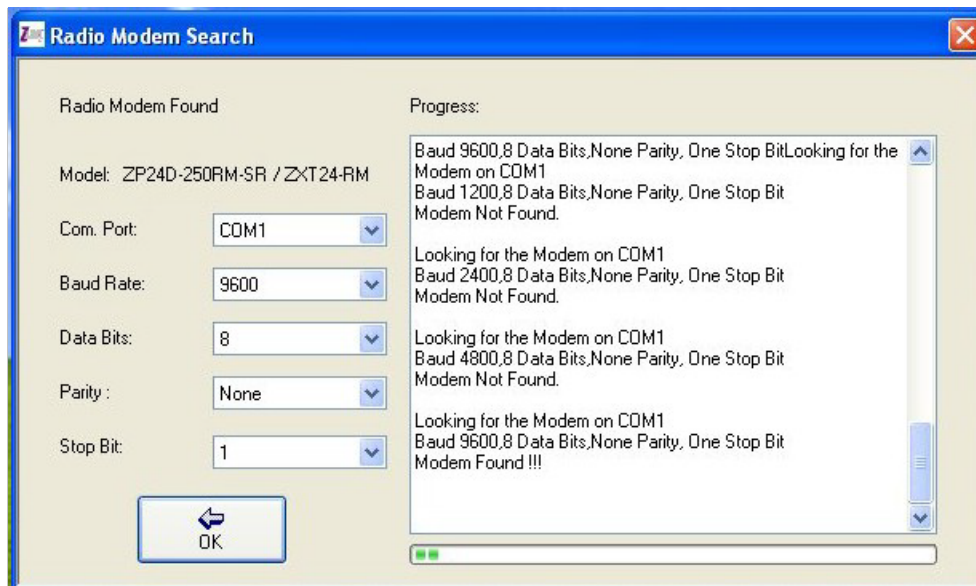


Figure 8. Radio Modem Search Results

12. Click on the **OK** button (Figure 8) to exit the Radio Modem Search window. The Zlinx Manager v3.0.0.22 - Zlinx Radio Modem, Basic Modem Settings will appear (Figure 9).

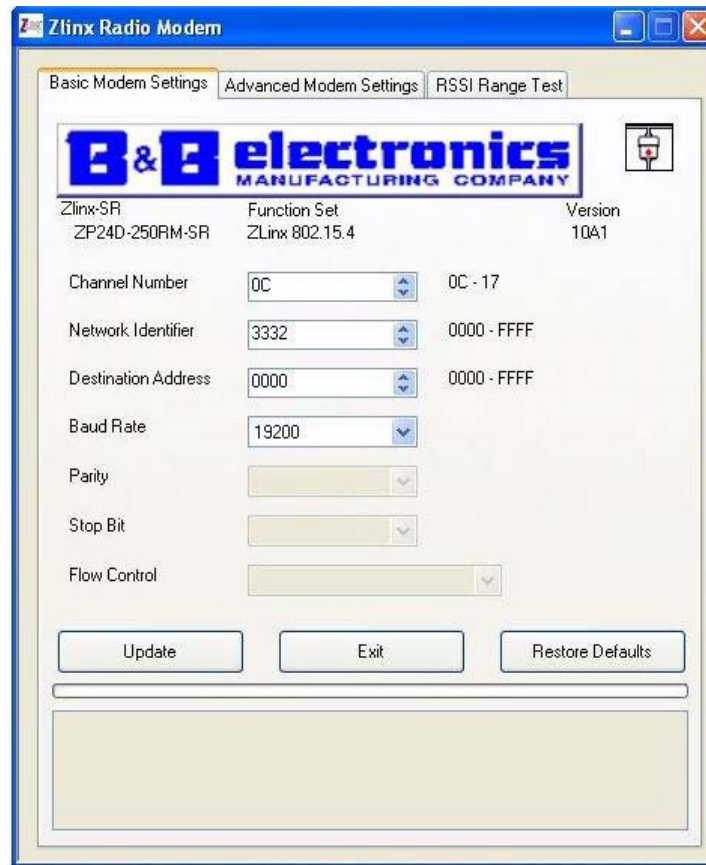


Figure 9. Zlinx Radio Modem, Basic Modem Settings

13. New Zlinx and Zlinx Xtreme directly out of the shipping box have been found configured with settings other than default settings. At this point it would be wise to click on the Restore Defaults button in the lower right of the Basic Modem Settings window. This will ensure you start with a common configuration.

**NOTE** Paired radio modems must be set to the same channel. If more than one pair of radio modems will be used as in the case of multiple satellites, each pair must be set to a different channel to prevent crosstalk. A maximum of twelve channels are possible.

14. In the box to the right of Channel Number, select a channel from 0C to 17.

**NOTE** Use the following baud rate settings to match the application:

1. FMU Plus Master-Satellite: 19,200
2. FMU Classic Master-Satellite: 4800
3. Master FMU-Tank Monitor Match the tank monitor setting
4. Master FMU - Onsite Printer: 4800
5. Master FMU - Remote FRB: 19,200

15. In the box to the right of Baud Rate, select the desired baud rate.

16. Click on the Update button. The desired channel and baud rate will be saved. A progress bar will be displayed as the changes are saved. When complete, the progress bar will disappear and Finished... will be displayed.



17. Click on the Advanced Modem Settings tab near the top of the window. The Advanced Modem Settings window will be displayed (Figure 10).

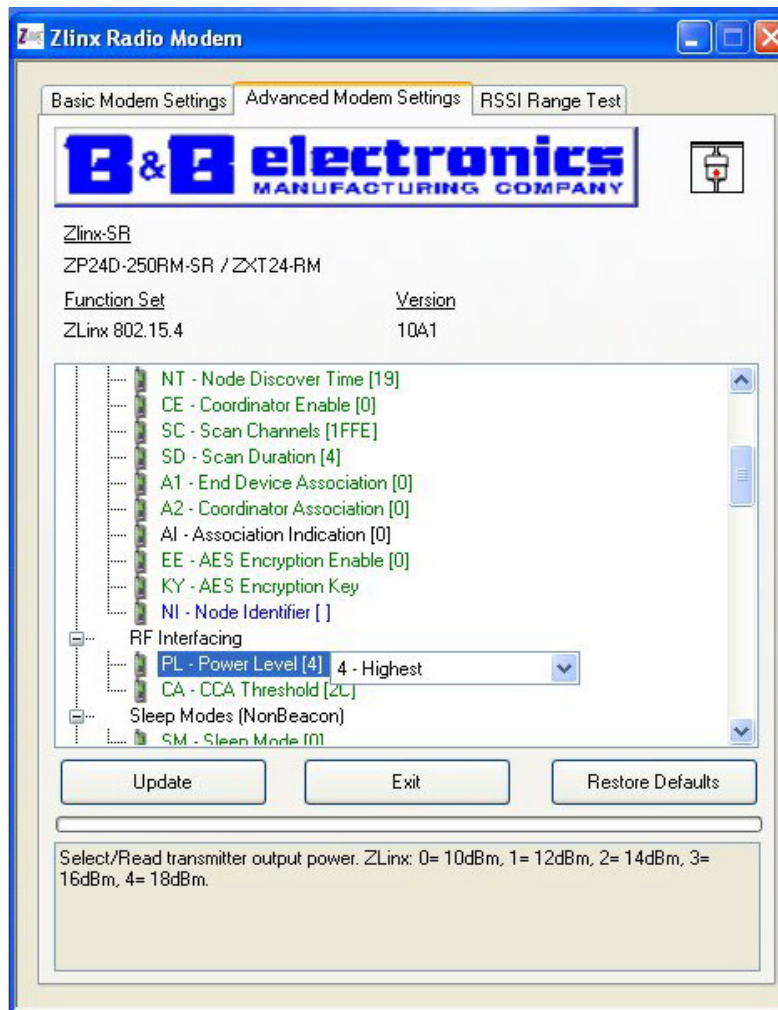


Figure 10. Zlinx Radio Modem, Advance Modem Settings

18. Scroll down to RF Interfacing. Click on **PL - Power Level**. Set to 4 - Highest for best performance.
19. Click on the **Update** button. Changes will be sent to the radio modem.
20. If configuring a second, paired Zlinx, do not leave the Advanced Modem Settings window. The second radio modem for the pair may be configured to match the configuration just performed for the first radio modem by performing the following:
- Repeat steps 1 through 6, as required, to power the paired radio modem and serially connect to the PC being used to configure the radio modems.
  - In the Advanced Modem Settings window (Figure 10) still open, click on the Update button. The paired radio modem will be configured to match the previously configured radio modem. If more than one-pair of radio modems is being configured, label each matched pair of radio modems with the channel and baud rate settings they are configured with.
21. Repeat steps 1 through 19, as required, for each new pair of radio modems to be configured.

## Range Test

**NOTE** The Range Test is performed with two units in close proximity to each other. When performing this test, the manufacturer recommends the paired radio modems have their Power Level set to 0 - Lowest. See Figure 10, Zlinx Radio Modem, Advance Modem Settings. Remember to return the Power Level setting to 4 - Highest after performing this test.

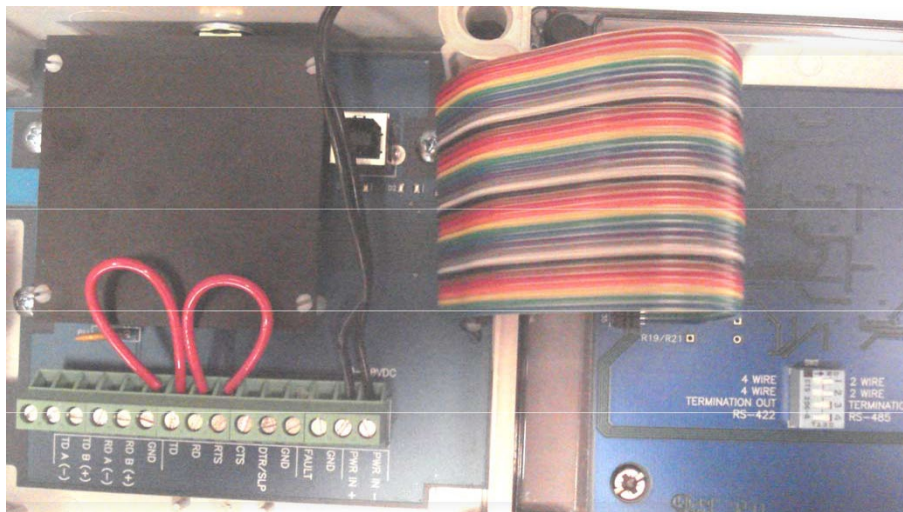
The units may be tested for paired communications before installation, or for troubleshooting. Two units with matching modem configurations must be used, one as a sending unit and the other as a receiving unit. It doesn't matter which is the sender or which is the receiver. With the following exceptions, they should be configured identically. Perform the following:

1. Install the antenna.
2. (Zlinx) On the sending unit, a straight-through serial cable must be connected between a serial port on your PC, and the radio modem DB9 Programming/Test Connector (Figure 1). If your PC does not have a serial connector, a USB/serial adapter cable must be used.
3. (Zlinx Xtreme) On the sending unit, a straight-through USB A/B cable must be connected between a USB port on your PC, and the Type B USB Connector (Figure 2) in the Zlinx Xtreme.
4. (Zlinx) The receiving unit should be configured (Figure 11). A jumper wire is installed across RD (pin 2) and TD (pin 3).



Figure 11. Range Test Setup (Zlinx Receiving Unit)

5. (Zlinx Xtreme) The receiving unit should be configured (Figure 12). A jumper wire is installed across RD and TD, and another jumper across CTS and RTS. Also, in the receiving unit, dipswitches 1 and 2 must be turned on.



**Figure 12. Range Test Setup (Zlinx Xtreme Receiving Unit)**

6. (Zlinx) On both the sending and receiving units, connect the power supply wires to the radio modem Power Connector.
7. (Zlinx Xtreme) On both the sending and receiving units, connect the power supply positive, striped lead to PWR IN +. Connect the negative, unstriped lead to PWR IN-.
8. Plug the power supply into a 110 VAC power receptacle. (Zlinx) The radio modem red Power light should illuminate. (Zlinx Xtreme) The radio modem green Power light should illuminate.
9. Click on the **icon** to open the software program. It should open to the Zlinx Manager v3.2.16.0 window as shown in Figure 4. Click on Radio Modem. The Zlinx Manager v3.2.16.0 - Radio Modem window will open (refer back to Figure 5).
10. In the Zlinx Manager v3.2.16.0 - Radio Modem window, click on the **Radio Modem Configuration** button. The Zlinx Radio Modem window will open (refer back to Figure 6).
11. Click on the **Auto Modem Search** button. The Radio Modem Search window will open (refer back to Figure 7).
12. Click on the **Search** button in the lower left corner of the window. The software program will search for the connection as shown in Figure 8. The search will continue until the radio modem is found. The radio modem model, and communications parameters for the connection will be populated in the Radio Modem Search window.
13. Click on the **OK** button (refer back to Figure 8) to exit the Radio Modem Search window. The Zlinx Radio Modem, Basic Modem Settings will appear as shown in Figure 9.
14. Click on the **RSSI Range Test** tab near the top of the window. The RSSI Range Test window will be displayed (Figure 13).

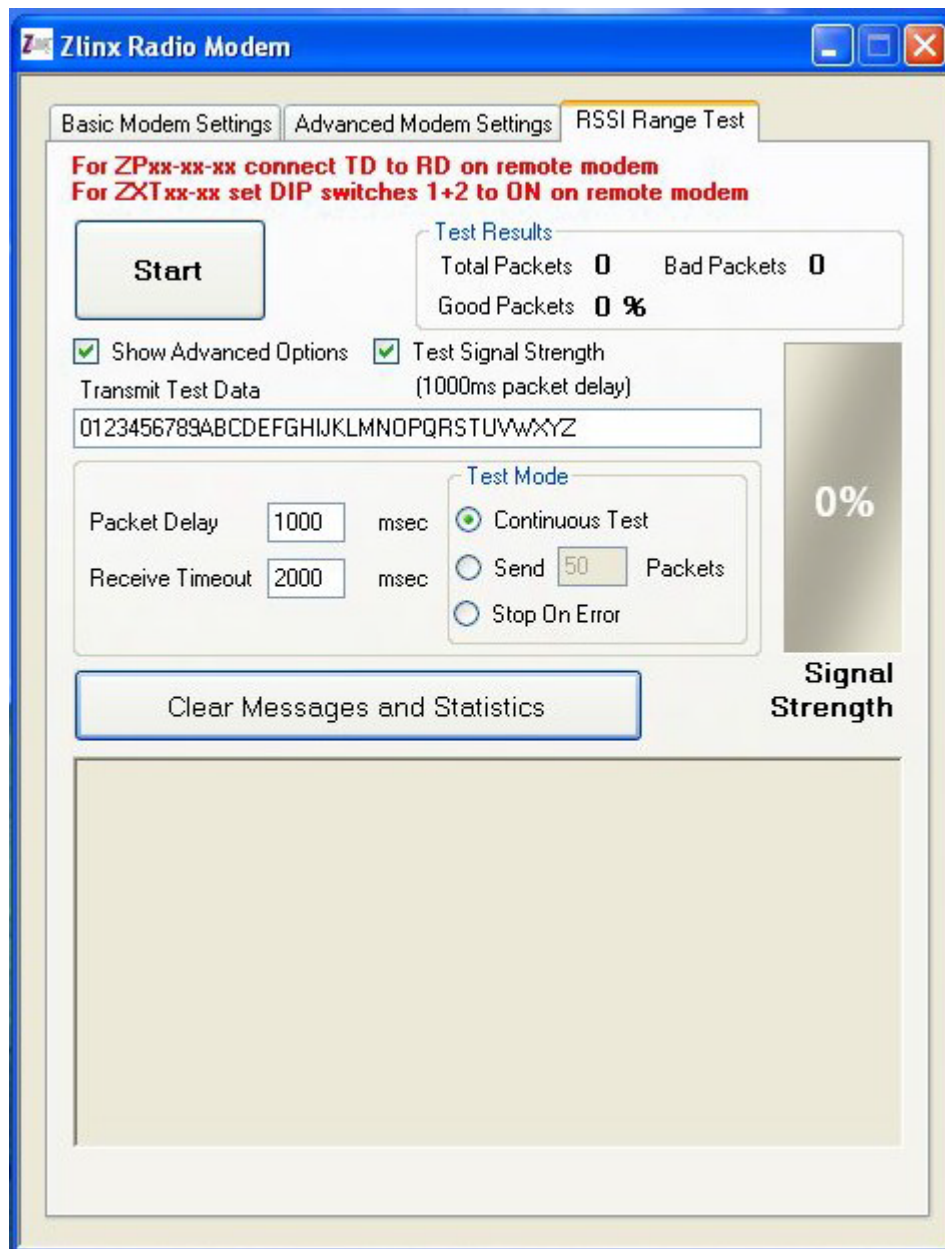


Figure 13. RSSI Range Test Window

15. Click on the Start box in the upper left corner of the window. The RSSI Range Test will start and be displayed (Figure 14).
16. The RSSI Range Test will continue until the Stop box is clicked on. The Test Results box should reflect 0 Bad Packets, and 100% Good Packets. (Zlinx) Check the RSSI status LED on the sending unit. As the test is being performed, the status LED will illuminate in different colors to indicate signal strength. A green LED indicates the strongest signal. A yellow LED is OK. A red LED indicates a weak signal. No LED indicates no signal and no transmission between the two devices. (Zlinx Xtreme) Check the Signal Strength LEDs. The more LEDs are illuminated, the better the signal strength.

During the Range Test the power level on both units was reduced to the lowest setting. The signal strength will be reduced. After the power level is restored to the highest setting, signal strength will be improved. Other factors which will improve signal strength are:

- a. ensure the two units are within line-of-sight of each other, and

- b. move the units closer together. Placing an indoor unit outside an FMU in a plastic enclosure is a much better choice than adapting external antennas. Plastic enclosures have little or no effect on signal strength. Metal enclosures will weaken signal strength. Zlinx radio modems installed inside an FMU have been effective to 200 feet. Any distance beyond 200 feet may require the standard Zlinx radio modem to be moved into a plastic enclosure, or traded for the Zlinx Xtreme.

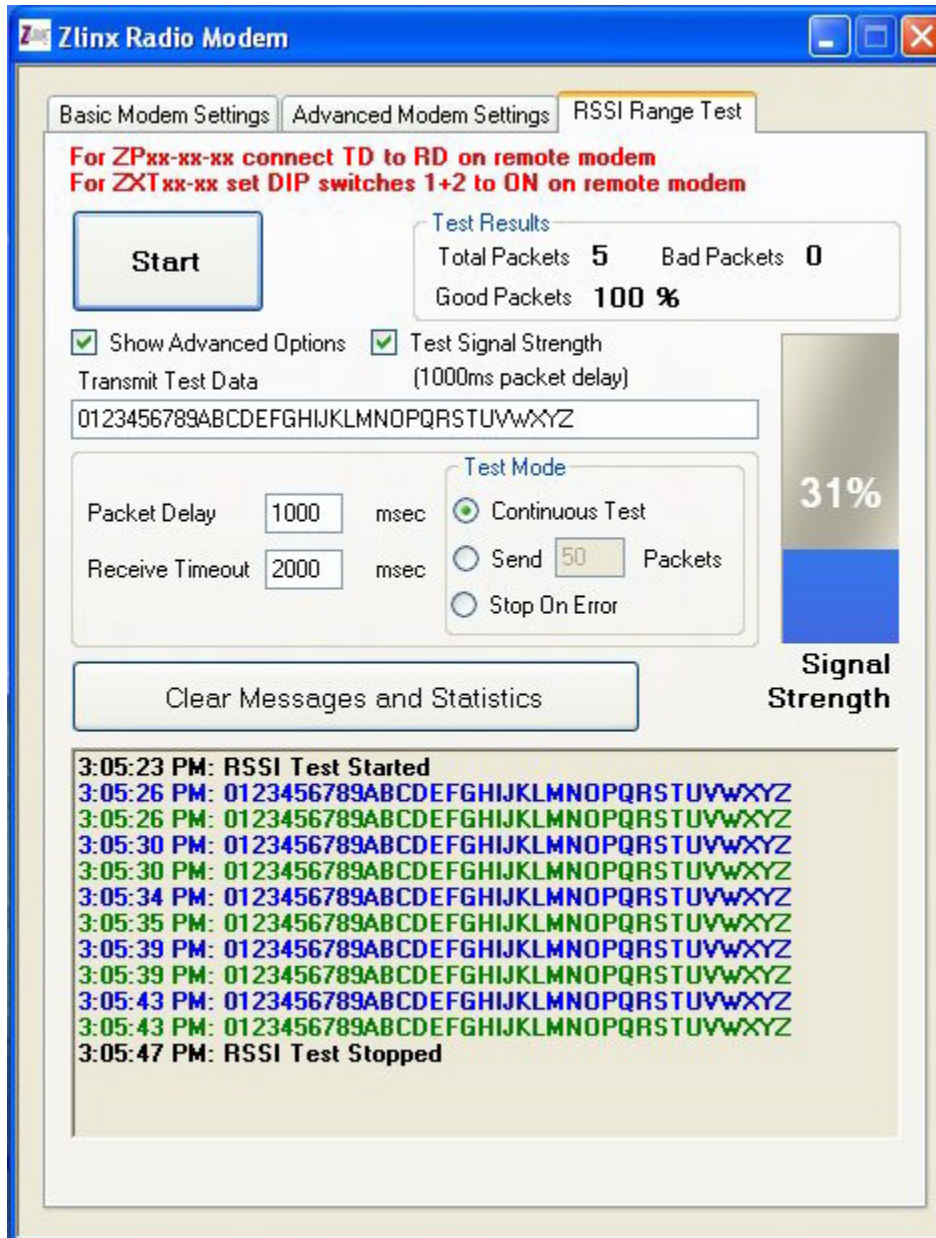


Figure 14. RSSI Range Test Results

- 17. When the Range Test is complete, disconnect power from the radio modems, remove any jumpers and, if applicable, reset dipswitches 1 and 2 on Zlinx Xtreme to off.

## Installation

Space constraints and location relative to the paired radio modems are key to successful communications. The standard Zlinx must be installed inside the FMU or another weatherproof enclosure. Check space constraints early when planning the installation. Additional space may be necessary depending upon the application. Remember, using the radio modem requires one modem for each end of the transmitted signal. For Master-Satellite communications, a modem is required in the Master for each satellite, and one modem in each Satellite.

Physical dimensions of the standard Zlinx radio modems are 1.2 inches wide x 3.3 inches deep x 4.7 inches high. They are designed and recommended by the manufacturer for mounting on a DIN rail. Each radio modem requires its own power. Power supplies are provided with radio modems purchased from Syntech. If mounted inside an FMU, an outlet must be installed to plug in the power supplies, and a cable must be routed from the radio modem to the I/O Silver Board Satellite or Tank Monitor connectors. If the sending and receiving radio modems are installed within the FMU cabinet, and separated over 200 feet, more range may be achieved by mounting the Zlinx radio modem outside the FMU in a weatherproof plastic enclosure, and routing the communications and power cables back to the FMU. The Zlinx Xtreme has the advantage of being weatherproof, so it is not constrained to the FMU. Where it is larger (5-1/8W x 5-1/8H x 2-3/8D) by not much, it need not be constrained inside the FMU or inside an aftermarket enclosure. See Steps to Gain Line-of-Sight or Extend Range at the end of this bulletin.

**NOTE** FMUs manufactured after December 2012 have a 110VAC electrical outlet in the upper cabinet in front of the FMU mainboard. Installation of an outlet box may not be necessary in these FMUs.

## Installing an Outlet Box

Outlets to plug in each power supply for each radio modem must be available. These procedures provide for installation of an outlet box on a conduit nipple below the electrical access compartment where the Pedestal I/O Board is located. Some have installed it in the upper cabinet. Wherever it is installed, it must allow for the power supply to plug into the outlet box on one end and the radio modem on the other end.

Materials needed are an outlet box, GFI receptacle, conduit nipple, conduit locknuts, conduit bushing, and appr 2 feet each of black, white, green 14 AWG THHN wire.



Figure 15. Outlet Box Installation

**NOTE** It will not matter which access hole is selected for mounting the outlet box. It might be preferable to install the outlet box after all other conduit have been installed.

Perform the following (Figure 15):

**CAUTION** Injury to personnel and damage to equipment may occur if not followed. Ensure FMU power is turned off at the power source (i.e. circuit breaker) before proceeding with this task. Removing power at the FMU Power Switch will not remove power from wires which must be handled.

1. Remove AC power from the FMU at its circuit breaker.
2. Unlock and open the FMU pedestal and upper cabinet doors.
3. Loosen the retaining screws and remove the upper and lower electrical access panels in the pedestal.
4. Insert one end of the conduit nipple into the outlet box. Secure with locknuts.
5. Find an unused access hole in the bottom of the electrical access compartment matching the size of your conduit nipple. Remove the plastic hole plug.
6. Insert the other end of the conduit nipple into the selected access hole. Secure with locknuts and install a conduit bushing to protect the wires.

**CAUTION** Damage to equipment may occur if not followed. Ensure the outlet box is connected to wires exiting the AC surge protection so the equipment plugged into the outlet box has surge protection.

1. Disconnect the wirenut connections for the black (hot) and white (neutral) wires exiting the two-wire harness on the back of the surge panel. Connect the black and white wires for the outlet box into these connections. Connect the green wire to the ground lug at the bottom of the electrical access compartment.
2. Route the black, white, and green wires for the outlet box through the conduit nipple into the outlet box.
3. Follow the manufacturer's instructions for connecting the GFI receptacle, and connect the wires to the receptacle.
4. Mount the receptacle in the outlet box and install the outlet box cover.
5. Repeat steps 4 through 10 as necessary, for additional outlet boxes.

## Install in an FMU for Master-Satellite Communications

The master and satellite FMUs are configured alike. Perform the following:

1. Remove AC power from the FMU at its circuit breaker.
2. Unlock and open the FMU upper cabinet and pedestal doors.
3. Loosen the retaining screws and remove the upper and lower electrical access panels in the pedestal.
4. Verify the FMUs are equipped for master-satellite communications:
  - a. Verify jumper(s) are installed as required on the Satellite I/O Control Board S1 SATELLITES INSTALLED JUMPERS position.
  - b. Verify a 209023-ribbon cable is installed in J5/J6 SATELLITE CONNECTORS on the Satellite I/O Control Board, as required.

- c. Verify an I/O Silver Board is installed with applicable JP1 through JP8 satellite connectors, and JP9 and/or JP10 209023 ribbon cable connectors.

**NOTE** Install Zlinx Xtreme as though it is a weatherproof accessory box as referenced in step 2.

5. Determine a suitable mounting location for Zlinx. If sufficient space is not available within the FMU, a weatherproof accessory box must be installed outside, and either on the FMU or within close proximity of the FMU. The accessory box does not require heating, but it must protect the radio modem from rain and snow. Cables must be routed from the radio modem to the FMU. Consider visibility of the LEDs on the radio modem.
6. Affix the radio modem to its mount location. (Zlinx) The manufacturer recommends DIN rail mounting. Industrial grade Velcro may be more convenient.
7. Route a two twisted pair communications cable with drain from the radio modem to the I/O Silver Board. A cable with 22AWG conductors such as Belden 8723 is adequate for this application.
8. Connect the communications cable from the radio modem to the I/O Silver Board as follows (connections are the same for Master and Satellite FMUs):

Zlinx	Zlinx Xtreme	I/O Silver Board JP1
TDB+	TD B (+)	IN+
TDA-	TD A (-)	IN-
COM	GND	GND
RDB+	RD B (+)	OUT+
RDA-	RD A (-)	OUT-

9. Route the power supply cable from the outlet box connection to the radio modem, and connect the power connector to the radio modem. (Zlinx Xtreme) Connect the power wires to the terminal bar, positive to PWR IN +, and negative to PWR IN -.
10. Repeat steps 2 through 6 for each radio modem to be installed, in each FMU.
11. Turn the FMU power switch ON for each FMU. (Zlinx) The red power LED on each radio modem should illuminate. (Zlinx Xtreme) The green power LED on each radio should illuminate. The master FMU should initialize and show active satellites for each connected satellite. Satellite FMUs should initialize and be ready for use. (Zlinx) The green RSSI LED should be illuminated, and the green RF Data light should be flashing. (Zlinx Xtreme) The green Transmit and Receive LEDs, and multiple Signal Strength LEDs should be illuminated. If these conditions do not exist, try resetting power on each FMU. If the radio modems still do not communicate, call Syntech’s Customer Satisfaction Center at 800-888-9136, ext. 1500, for assistance.



## Install in a Master FMU for Tank Monitor Communications

Perform the following for the master FMU installation (see Install the Zlinx radio modem in or near a tank monitor as follows: for installation at the tank monitor):

1. Remove AC power from the FMU at its circuit breaker.
2. Unlock and open the FMU upper cabinet and pedestal doors.
3. Loosen the retaining screws and remove the upper and lower electrical access panels in the pedestal.
4. Verify the FMUs are equipped for tank monitor communications:
  - a. Verify jumper(s) are installed as required on the Satellite I/O Control Board at positions S2 and S3, TMU SELECT, and both jumpers are in the appropriate RS232 or RS422 positions.
  - b. Verify a 201839-ribbon cable is installed in J4, TANK MONITOR on the Satellite I/O Control Board, as required.
  - c. Verify an I/O Silver Board is installed with applicable JP13 and JP14 receptacles, and a 190977 5-pin terminal block is installed in JP13.
  - d. Verify the E1-E2 trace is cut/not cut, as required, for RS232/RS422.

**NOTE** Install Zlinx Xtreme as though it is a weatherproof accessory box as referenced in step 2.

5. Determine a suitable mounting location. If sufficient space is not available within the FMU, a weatherproof accessory box must be installed outside, and either on the FMU or within close proximity of the FMU. The accessory box does not require heating, but it must protect the radio modem from rain and snow. Cables must be routed from the radio modem to the FMU. Consider visibility of the indicator lights on the radio modem.
6. Affix the radio modem to its mount location. (Zlinx) The manufacturer of the radio modem recommends DIN rail mounting. Industrial grade Velcro may be more convenient.
7. Route a three-conductor communications cable from the radio modem to the I/O Silver Board.
8. Connect the communications cable from the radio modem to the I/O Silver Board as follows:

Zlinx	Zlinx Xtreme	I/O Silver Board JP13
RD	RD	IN+
COM	GND	GND
TD	TD	OUT-

9. Route the power supply cable from the outlet box connection to the radio modem, and connect the power connector to the radio modem. (Zlinx Xtreme) Connect the power wires to the terminal bar, positive to PWR IN +, and negative to PWR IN -.

## Install the Zlinx radio modem in or near a tank monitor as follows:

1. Verify the tank monitor power switch is off.
2. Verify an RS-232 input/output board is installed in the tank monitor.
3. Determine a suitable mounting location for the radio modem. Connection to the tank monitor will be to an RS-232 port in the control panel. Most control panels are mounted indoors, so weatherproofing should not be a factor. The radio modem does not require heating, but the standard Zlinx must be protected from rain and snow (not so for the Zlinx Xtreme). Consider visibility of the indicator lights on the radio modem when selecting a mounting location.
4. Affix the radio modem to its mount location. The manufacturer of the radio modem recommends DIN rail mounting for the standard Zlinx. Industrial grade Velcro may be more convenient. Zlinx Xtreme may be mounted outdoors with an RS232 cable run from Zlinx Xtreme to the tank monitor.
5. Route a three-conductor communications cable from the radio modem to the RS-232 port of the tank monitor.
6. Most tank monitors utilize pins 2 (transmit), 3 (receive), and 7 (ground) for RS-232 communications. Connect the communications cable from the radio modem to the tank monitor as follows:

Zlinx	Zlinx Xtreme	Tank Monitor RS-232 Port
RD	RD	3
COM	GND	7
TD	TD	2

- a. Route the power supply cable from an outlet connection to the radio modem, and connect the power connector to the radio modem. (Zlinx Xtreme) Connect the power wires to the terminal bar, positive to PWR IN +, and negative to PWR IN -.
7. Turn the FMU and tank monitor power switches ON. (Zlinx) The red power LED on each radio modem should illuminate. (Zlinx Xtreme) The green power LED on each radio should illuminate. (Zlinx) The green RSSI LED should be illuminated, and the green RF Data light should be flashing. (Zlinx Xtreme) The green Transmit and Receive LEDs, and multiple Signal Strength LEDs should be illuminated. If these conditions do not exist, try resetting power on each FMU. If the radio modems still do not communicate, try reversing Zlinx connections from RD to TD. If they still do not communicate, call Syntech's Customer Satisfaction Center at 800-888-9136, ext. 1500, for assistance.

## Install in a Master FMU for Transaction Printer Communications

Perform the following for the master FMU installation (see **Install the Zlinx radio modem in or near a transaction printer as follows:** for installation at the transaction printer):

1. Remove AC power from the FMU at its circuit breaker.
2. Unlock and open the FMU upper cabinet and pedestal doors.
3. Loosen the retaining screws and remove the upper and lower electrical access panels in the pedestal.

**NOTE** Install Zlinx Xtreme as though it is a weatherproof accessory box as referenced in step 2.

4. Determine a suitable mounting location for Zlinx. If sufficient space is not available within the FMU, a weatherproof accessory box must be installed outside, and either on the FMU or within close proximity of the FMU. The accessory box does not require heating, but it must protect the radio modem from rain and snow. Cables must be routed from the radio modem to the FMU. Consider visibility of the indicator lights on the radio modem.
5. Affix the radio modem to its mount location. (Zlinx) The manufacturer of the radio modem recommends DIN rail mounting. Industrial grade Velcro may be more convenient.
6. Route a three-conductor communications cable from the radio modem to J3, EXTERNAL, on the Pedestal I/O Board and connect as follows:

Zlinx	Zlinx Xtreme	J3, EXTERNAL
RD	RD	BLU (RX)
COM	GND	ORG (GND)
TD	TD	YEL (TX)

7. Route the power supply cable from the outlet box connection to the radio modem, and connect the power connector to the radio modem. (Zlinx Xtreme) Connect the power wires to the terminal bar, positive to PWR IN +, and negative to PWR IN -.

## Install the Zlinx radio modem near a transaction printer

1. Verify the transaction printer power switch is off.

**NOTE** Transaction printers receive an RS232 connection from the FMU. An RS232 serial connection may be optional equipment for some printers.

2. If applicable, verify an RS-232 serial option is installed in the printer.
3. Determine a suitable mounting location for the radio modem. Connection to the printer will usually be to a DB25 serial connector. Transaction printers are mounted indoors, so weatherproofing will not be a factor. The radio modem does not require heating, but the standard Zlinx must be protected from rain and snow (not so for the Zlinx Xtreme). If the printer is not located in the line-of-sight of the FMU, an RS232 cable may be routed from the printer to the Zlinx location. Consider visibility of the indicator lights on the radio modem when selecting a mounting location.
4. Affix the radio modem to its mount location. The manufacturer of the radio modem recommends DIN rail mounting for the standard Zlinx. Industrial grade Velcro may be more convenient. Zlinx Xtreme may be mounted outdoors with an RS232 cable run from Zlinx Xtreme to the tank monitor.
5. Route a three-conductor communications cable from the radio modem to the serial connector of the printer.
6. Most printers utilize pins 2 (transmit), 3 (receive), and 7 (ground) for RS-232 communications. Connect the communications cable from the radio modem to the printer as follows:

Zlinx	Zlinx Xtreme	Printer DB25 Connector
RD	RD	3
COM	GND	7
TD	TD	2

7. Route the power supply cable from the outlet box connection to the radio modem, and connect the power connector to the radio modem.
8. Turn the FMU and printer power switches ON. (Zlinx) The red power LED on each radio modem should illuminate. (Zlinx Xtreme) The green power LED on each radio should illuminate. (Zlinx) The green RSSI LED should be illuminated, and the green RF Data light should be flashing. (Zlinx Xtreme) The green Transmit and Receive LEDs, and multiple Signal Strength LEDs should be illuminated. If these conditions do not exist, try resetting power on each FMU. If the radio modems still do not communicate, try reversing the RD and TD connections either on Zlinx or on the printer. If the radio modems still do not communicate, call Syntech's Customer Satisfaction Center at 800-888-9136, ext. 1500, for assistance.

## Steps to Gain Line-of-Sight or Extend Range

Line-of-sight, or extended range with Zlinx radio modems may be achieved through either of two options: custom antenna mounts, or remotely locating the Zlinx radio modems in weatherproof plastic boxes. Custom antenna mounts are available from B&B Electronics with antenna cable lengths to 50 feet. You can easily spend \$200 on an external antenna and 50-foot antenna cable for one Zlinx modem. A more practical solution may be mounting the Zlinx radio modem in a weatherproof plastic enclosure, and routing RS-232/422 cables and DC power cables to the enclosure. The power supply cable may be extended as far as any RS-232/422 communications cable, and the two of them may be run in the same conduit or enclosure. RF reception through a plastic enclosure will be much better than through the metal FMU cabinet. Secure the Zlinx radio modem inside the enclosure. Industrial grade Velcro may be a good choice for this application. Consider your mounting location to determine if it will be necessary to run a conduit to the enclosure for cable protection.

## Troubleshooting

If you have configured either of the Zlinx radio modems as described in this bulletin, and they will not communicate, one of the many optional settings may be mistakenly turned on. With a laptop or PC connection to the Zlinx, go to either the Basic Modem Settings, or Advanced Modem Settings tab, and click on the Restore Defaults button. You will have to reprogram the Zlinx with the desired configuration settings, but it will clear any undesirable setting that may prevent communications.

If you are attempting to program a Zlinx, and the setting changes won't save, first try exiting the Zlinx and the Zlinx software, then re-open the software and re-connect to the Zlinx. Try the setting changes again. If they don't save, try reloading the software with the disk provided with the Zlinx. There is an option to repair the software. This should be sufficient to correct the problem.

If you are attempting a serial connection to the indoor (blue) Zlinx, and it won't connect, remove the green 8 pin connector next to the DB9. It may be preventing the serial cable connector from seating in the DB9 on the Zlinx.

**TIP**

If any questions arise, contact Syntech Systems, Inc.'s Customer Satisfaction Center (CSC) at 1-800-888-9136, ext. 2, or email [support@myfuelmaster.com](mailto:support@myfuelmaster.com).

## Change Log

Date	Description
10/21/2008	Original
12/2/2014	<p>Other revisions have occurred that were not documented.</p> <p>Step 13 on page 7 was added to restore defaults before beginning Modem Configuration</p> <p>This revision added the Troubleshooting procedures on this page.</p> <p>This revision added Bookmarks to the Adobe pdf file to simplify finding topics in the bulletin.</p>
10/12/2020	<p>Reformatted/Rebranded</p> <p>Minor Grammar fixes.</p>
03/26/2021	<p>Added note prior to introduction which explains Syntech no longer sells the Zlinx modem. See PB 252 for recommended replacement.</p>