



CL4490-1000

Industrial 900MHz ConnexLink

**User's Manual
Version 1.4**



**11160 THOMPSON AVE
LENEXA, KS 66219
(800) 492-2320
www.aerocomm.com
sales@aerocomm.com**

Document Information

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Limited Warranty

For a period of one (1) year from the date of purchase, AEROCOMM warrants the transceiver against defects in materials and workmanship. AEROCOMM will not honor this warranty (and this warranty will be automatically void) if there has been any:

- (1) Tampering, signs of tampering, or opening the transceiver's case.
- (2) Use of AC power adapters and cables other than those originally supplied with the transceivers.
- (3) Repair or attempt to repair by anyone other than an AEROCOMM authorized technician.

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FCC Information

FCC Notice



WARNING: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference received, including interference that may cause undesired operation.

RF Exposure/Installation Instructions



WARNING: To satisfy FCC RF exposure requirements for mobile transmitting devices, this equipment must be professionally installed such that the end user is prevented from replacing the antenna with a non-approved antenna. The end user should also be prevented from being within 20cm of the antenna during normal use with the exception of hands, feet, wrists and ankles.

The preceding statement must be included as a CAUTION statement in manuals for OEM products to alert users on FCC RF Exposure compliance.

Caution: Any change or modification not expressly approved by AeroComm could void the user's authority to operate the equipment.

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1. CL4490 RF Transceiver

The CL4490 transceiver is a Frequency-Hopping Spread Spectrum (FHSS) radio designed for license-free operation in the 900MHz ISM band. Out-of-the box, the radio sustains a standard asynchronous serial data stream between two or more radios. Housed in a compact and rugged die-cast enclosure, the radio is equipped to replace thousands of meters of serial cable with its wireless link. The radio features an RS-232 or RS-485 interface for integration into legacy data systems.

Features

- ✓ Durable Industrial grade enclosure
- ✓ Transparent operation, supports any legacy system
- ✓ Transmits around corners, through walls
- ✓ Reliable communication up to 115.2Kbps

1.1 Overview

The CL4490 uses Frequency Hopping Spread Spectrum modulation, where the units "hop" from frequency to frequency many times per second using a specific hop pattern applied to all the transceivers in the same network. A distinct hopping pattern is provided for each Channel Number, thereby allowing multiple networks to co-exist in the same area without interference.

CL4490 transceivers operate in a Point-to-Point or Point-to-Multipoint, Client-Server or Peer-to-Peer architecture. One transceiver is configured as a Server and there can be one or many Clients. To establish synchronization between transceivers, the Server emits a beacon. Upon detecting a beacon, a Client transceiver informs its Host and a RF link is established.

CL4490s implement a proprietary communication protocol to provide secure data transmissions. As it uses FHSS technology, the data remains reliable over long distances. Use of license free frequency bands ensure that the units are ready to use with no further certification requirements.

Each unit is small and easily portable for use in mobile and temporary settings as well as for fixed installations. The CL4490 configuration software enables custom configurations based on unique application requirements.

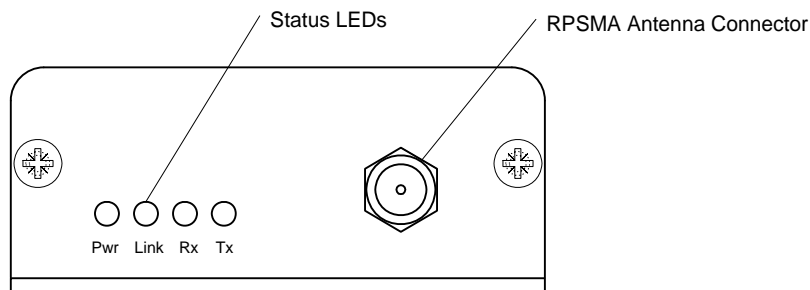
1.2 CL4490 Specification

Specifications	CL4490 - 1000
TRANSCEIVER PERFORMANCE	
Output power	1000mW
Transmission range	Up to 1500 feet (450m) indoors; Up to 20 miles (32 km) line-of-sight
Data rate	Up to 115.2 Kbps
RF Data Rate	76.8kbps fixed
Receiver Sensitivity	-100dBm typical @ 76.8kbps RF Data Rate
Power Consumption (@ 12 Vdc)	400mA
Configuration software	Easy-to-use Windows based software
NETWORKING AND SECURITY	
Frequency band, RF Technology	902 – 928, FHSS (USA); 915-928, FHSS (Australia)
Supported Network Topologies	Point-to-Point, Point-to-Multipoint
Channels	32
Security	One byte System ID. 56-bit DES encryption key.
ANTENNA	
RF Connector	RPSMA Jack
Type	1/2 Wave Dipole
ELECTRICAL	
Electrical requirements	Line voltage 100 – 120V (240V outside US);
Power supply	6-foot cable, AC power connector
ENVIRONMENTAL	
Environmental conditions	Operating temperature -40° to +80°C; 10% to 90% humidity (non-condensing)
PHYSICAL	
Dimensions	4.4 x 2.7 x 1.4 inches
Weight	6 oz (170 g)
Serial Connector	DB-9 Male (RS-232), Terminal Block (RS-485)
Serial Cord length	6 feet (183 cm)

1.3 CL4490 Interface

The CL4490 supports RS-232/RS-485 (2-wire Half Duplex) protocols. By definition, RS-485 protocol can tolerate high noise and push signals over long cable lengths. When using cables, RS-485 will communicate as far as 4000feet (1200m) and offer multi-drop capability where up to 32 nodes may be connected. RS-232 cables are suitable for distances less than 100 feet (30.5m). AeroComm wireless solutions are not subject to the cabling restrictions for distance, but either interface (RS-232 or RS-485) is available when ordering the CL4490s.

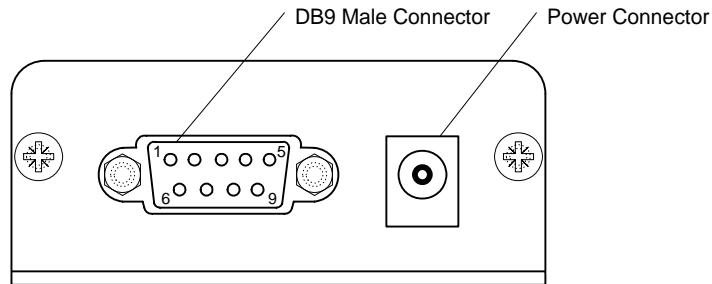
Figure 1- RS-232/RS-485 CL4490 Front View



CL4490 Status LEDs		
LED	Color	Description
Pwr	Green	On indicates that the unit is powered up.
Link	Red	On indicates the Client unit(s) and Server unit are in range of one another. Link LED remains activated on Server units. Client units activate the Link LED when in range of the Server unit.
Rx	Green	When flashing, LED indicates CL4490 unit is receiving data.
Tx	Red	When and flashing, LED indicates CL4490 unit is sending data.

RS-232 Pin Assignments

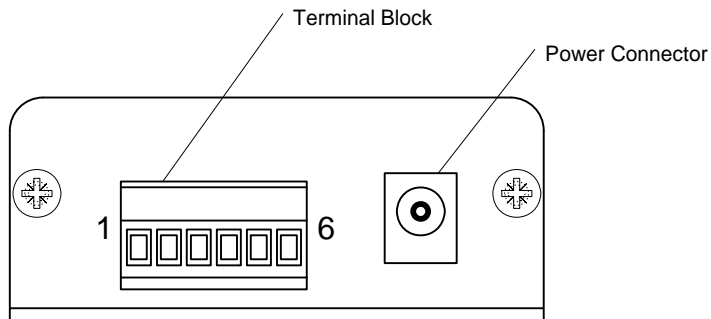
Figure 2- RS-232 CL4490 Back View



Pin	Description
NC	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS
NC	RI

RS-485 (2-wire Half Duplex) Terminal Block Pin Assignments

Figure 3- RS-485 CL4490 Back View

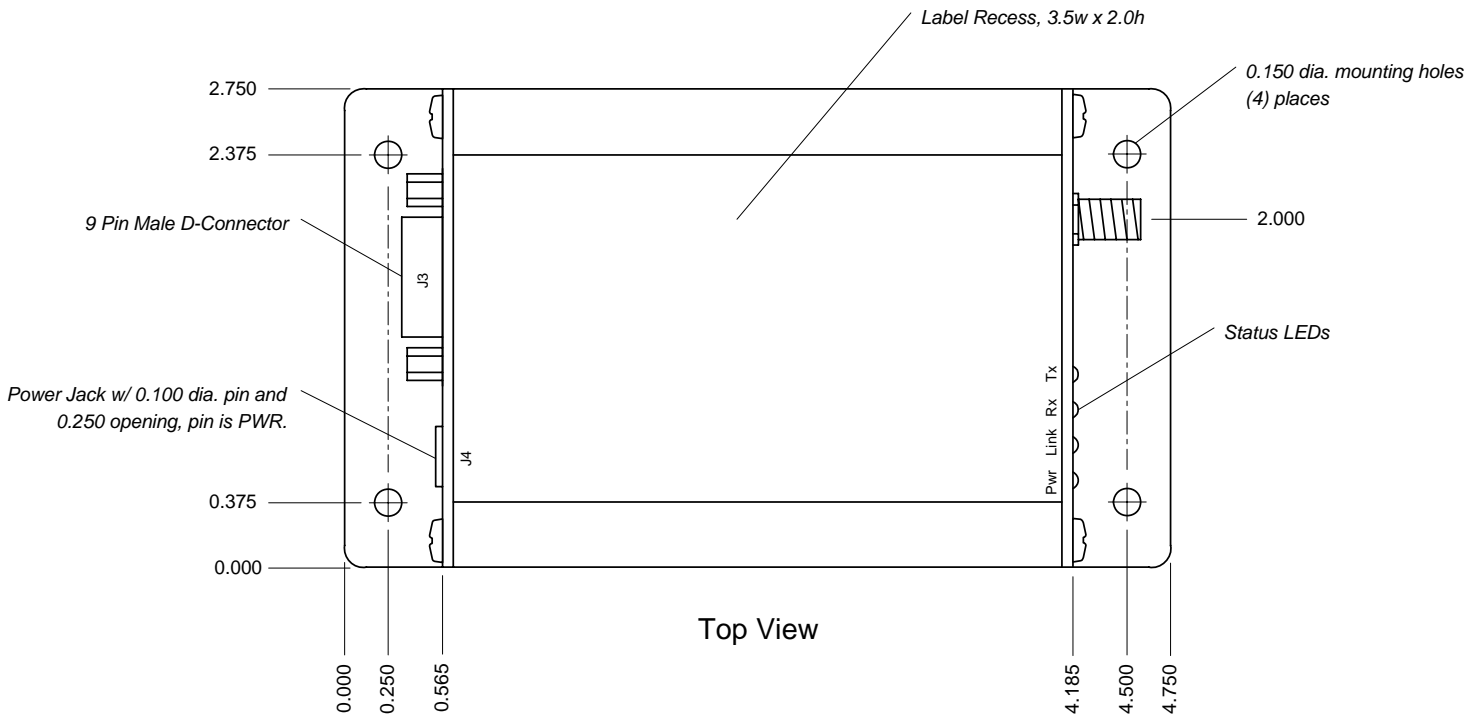
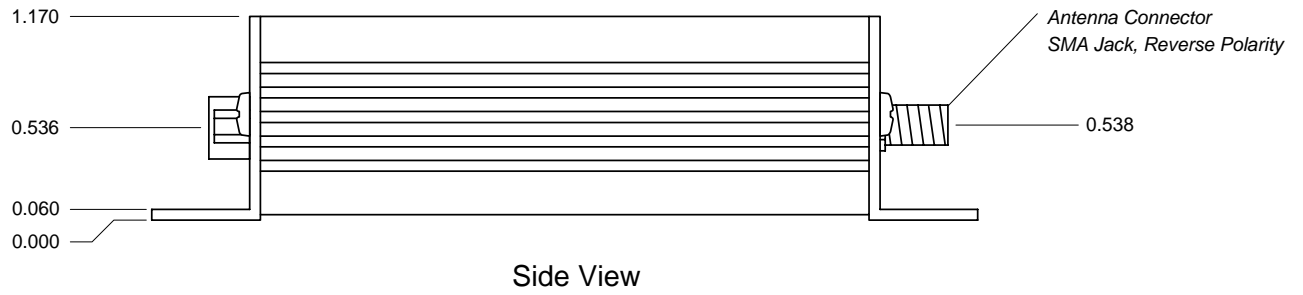


Pin	Description
1	VCC (6V-18V)(1.3 A)
2	485- (485B)
3	No Connect
4	No Connect
5	485+ (485A)
6	GND

Note: Standard power is applied through the power connector. Alternative power is available via the terminal block pins.

CL4490 Mechanical Diagram

Figure 4- CL4490 Mechanical Diagram



Note: All dimension in inches unless noted

2. Interfacing Protocol

The CL4490 is a DCE (Data Communications Equipment). A DCE can be interfaced to a DTE using a straight through serial cable (the serial cable provided with the CL4490 is a straight through cable). Typically, PC's are defined as a DTE and peripherals are defined as DCE. To interface a DCE with another DCE, or a DTE with another DTE, a null modem (or a Crossover) cable is required. The null modem simply swaps pins to convert a DCE to a DTE and vice-versa. A null modem cable can be provided with the CL4490 on request.

The CL4490 transceivers support the following interface protocols

- RS-232
- RS-485 (2-wire) Half Duplex

Table 1 – DTE, DCE and Null Modem Signal Definitions

DCE Pin Number	DCE Signal Name	DCE Direction	DTE Pin Number	DTE Signal Name	DTE Direction	Null Modem Female DB9	Null Modem Male DB9
1	DCD	O	1	DCD	I	1	NC
2	TXD	O	2	RXD	I	2	3
3	RXD	I	3	TXD	O	3	2
4	DTR	I	4	DTR	O	4	6
5	GND		5	GND		5	5
6	DSR	O	6	DSR	I	6	4
7	RTS	I	7	RTS	O	7	8
8	CTS	O	8	CTS	I	8	7
9	RI	O	9	RI	I	9	NC

1.4 RS-232

RS-232 is a single ended data transmission protocol. The RS-232 signals are represented by voltage levels with respect to a system common (power / logic ground). The "idle" state (MARK) has the signal level negative with respect to common, and the "active" state (SPACE) has the signal level positive with respect to common. RS-232 has numerous handshaking lines (primarily used with modems), and also specifies a communications protocol.

Figure 5- RS-232 Male/Female Connector Pin out

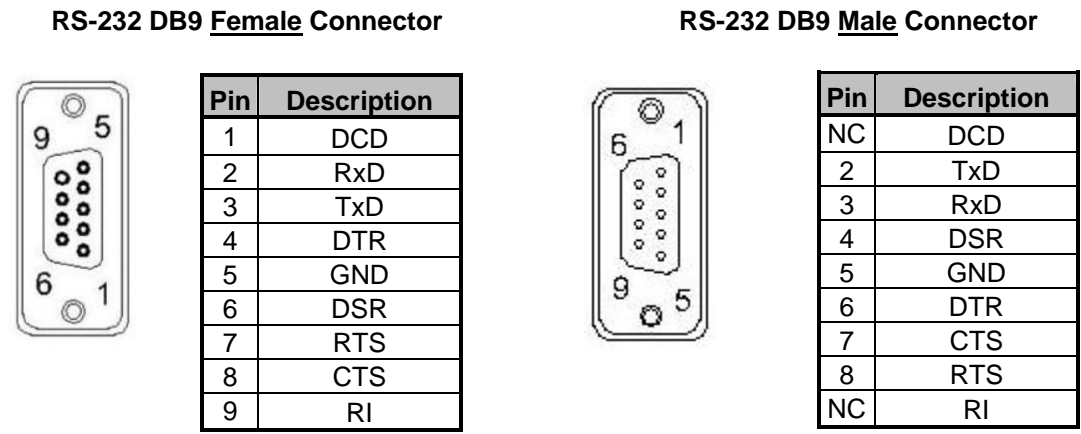


Figure 6- DCE to DTE Interface

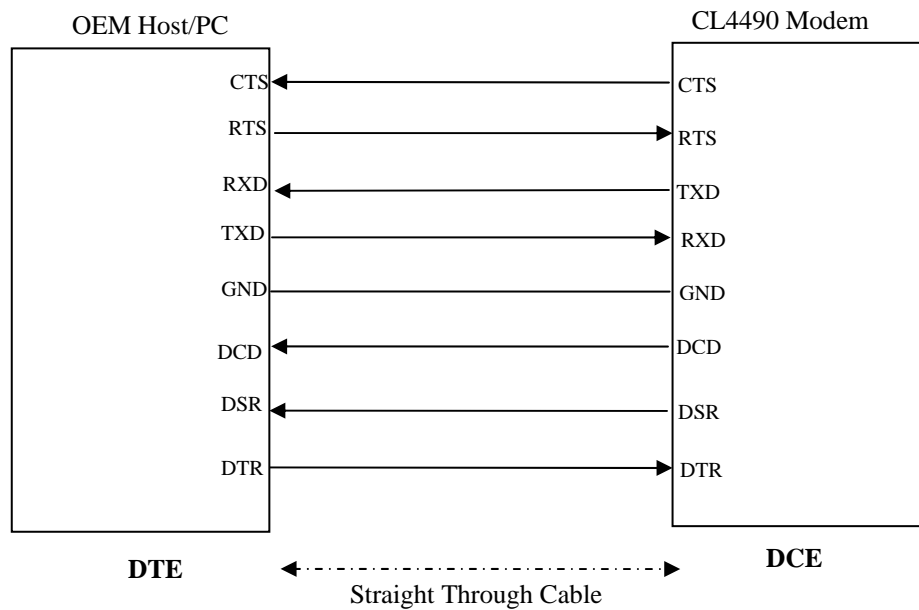
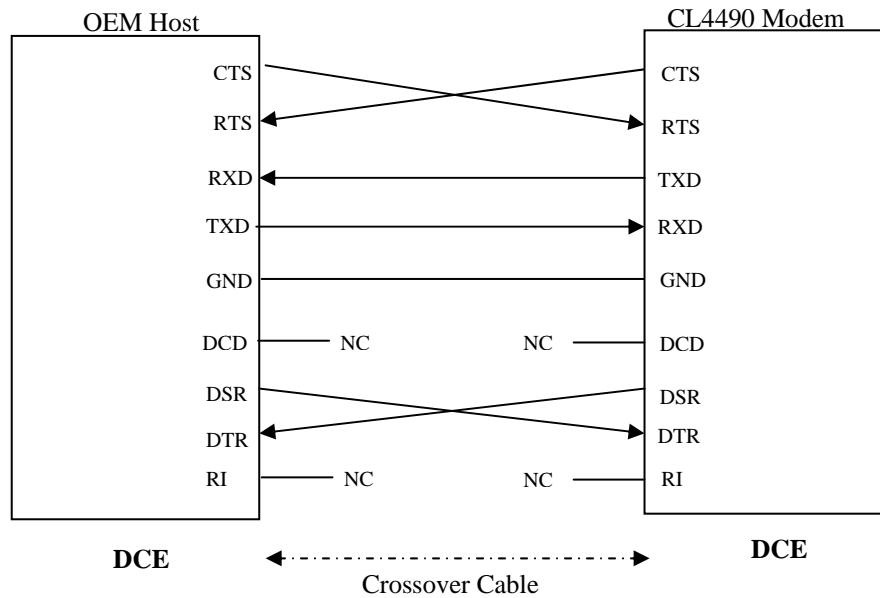


Figure 7- DCE to DCE Interface



Note: The Straight Through Cable provided with the CL4490 has female connectors on both ends and the Crossover cable has a male connector at one end and a female connector at the other end. Please use a male-to-male adapter or female-to-female adapter wherever required. Using a null modem adapter with a Crossover cable is equivalent to using a Straight Through cable.

1.5 RS-485 (2-wire Half Duplex)

The RS-485 interface uses a Differential Data Transmission that can help nullify the effects of ground shifts and induced noise signals that can appear as common mode voltages on a network.

The CL4490 implements a RS-485 (2-wire Half Duplex) multi-drop interface. Typically, a RS-485 bus will consist of a master and several slaves. The nodes will have unique addresses and can send addressed packets to specific nodes. Because the bus is half duplex, no two nodes should try to talk at the same time. The CL4490 does not have a RS-485 address, therefore, it will transmit all RS-485 traffic over the RF. Conversely, as soon as a CL4490 receives a packet over the RF, it will transmit the packet over the RS-485 bus.

Note: When using RS-485 (2-wire Half Duplex), a RS-485 to RS-232 converter is required to configure the unit. AeroComm recommends a B&B Electronics 4WSD9R converter to translate RS-485 to RS-232.

1.6 Hardware Flow Control

Flow control refers to the control of data flow between the host and the CL4490. It is the method used to handle data in the transmit/receive buffer of the CL4490 interface, and determines how data flow between the host and the CL4490 is throttled. Often in serial communication, one device is capable of sending data much faster than the other can receive. Flow control allows the slower device to tell the faster device to pause and resume data transmission. (Flow control CTS and RTS are used by the CL4490 and its Host, locally – NOT over the air. Therefore, one CL4490 cannot tell the other to slow down or speed up as is mentioned above in the paragraph.)

When the RTS Enable option is selected on the Configuration Utility, the transceivers use hardware flow control to regulate data flow. While using hardware flow control, the transceiver that is ready to receive data sends a **C**lear **T**o **S**end signal to its host (or the device it is connected to). On the other hand, when a transceiver has something it wants to send to its host, it checks the state of **R**eady **T**o **S**end and if it is logic low, will send data to its host. If RTS is logic high, it will not send data to its host. These signals are sent apart from the data itself on separate wires. **Note: CTS is always enabled by default. RS-485 Interface does not support Hardware flow control.**

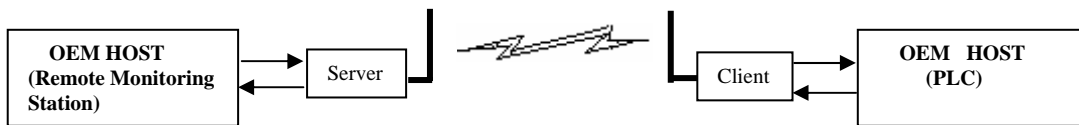
3. Network Topologies

Topology refers to the shape of a network, or the network's layout. How different nodes in a network are connected to each other and how they communicate, is determined by the network's topology. The CL4490s support a Point-to-Point and a Point-to-Multipoint network topology.

3.1 Point-to-Point

A point-to-point system is a simple arrangement consisting of just two CL4490s - a Server and a Client. Sometimes referred to as a wireless bridge, a point-to-point link replaces a single communications cable. A point-to-point link might be used to connect a PLC to a remote monitoring station.

Figure 8- Point-to-Point Network



3.2 Point-to-Multipoint

Point-to-Multipoint systems have one base station, or access point, that controls communications with all of the other wireless nodes in the network. This allows for the creation of a wireless network consisting of multiple nodes. By programming each CL4490 with a network specific Channel Number and System ID multiple networks can be created see (Fig 9).

Figure 9- Multiple Networks of Point-to-Multipoint CL4490s



Example: Channel Number = 13
System ID = 123

Example: Channel Number = 25
System ID = 256

4. CL4490/CN4490 Configuration Utility Software

AeroComm provides the easy to use CL4490/CN4490 Utility Software for programming the CL4490/CN4490. The GUI based software does not require any hardware configuration and works by itself. The software is compatible with Microsoft® Windows 95, 98, 2000, Me, NT and XP. CL4490/CN4490s are plug-and-play devices that work with minimal or no configuration.

However, users may refer to the AC4490 manual for details about the radio's operation and advanced configuration commands. The SDK Software can be used to evaluate the advanced configuration commands. The SDK Software and AC4490 manual can be found on the Connex Tools and Literature CD or on our website at <http://www.aerocomm.com/>.

Note: The users should refer to the ConnexNet manual for details about the CN4490 interface.

4.1 Installation

1. Locate the **CL4490 Configuration Utility, 900 MHz** link in the Software section on the Connex Tools & Literature CD. This software is also available at http://www.aerocomm.com/Software/Driver_CL4490_900Mhz_v.1.zip.
2. When prompted, accept the default directory or change to the desired directory where the program files will be installed.
3. When finished, a window will be displayed indicating a successful installation. Select **OK**.

4.2 CL4490/CN4490 Settings

The configuration utility can be used to configure both CL4490 and CN4490. The configuration utility defaults to CL4490 configuration when it is loaded; it can be used to configure the CN4490 by checking the CN4490 check box on the configuration page.

4.2.1 CL4490 Settings

The CL4490 **Settings** Page is shown below, as it will appear the first time the program is run.

The screenshot shows the CL4490 Configuration Utility window. The title bar reads "CL4490 Configuration Utility". The window is divided into two main sections: "ConnexLink Settings" and "PC Settings".

ConnexLink Settings:

- Options:** A group box containing five checkboxes: RTS Enable, Modem Mode, Parity, Full Duplex, and Data Encryption. Below this group box is a "Show Defaults" button.
- Interface Baud Rate:** A dropdown menu.
- Client/Server:** A dropdown menu.
- Channel Number:** A text input field with a range of 16 - 47.
- Max Transmit Retries:** A text input field with a range of 0 - 255.
- Broadcast Attempts:** A text input field with a range of 0 - 255.
- System Identification:** A text input field with a range of 0 - 255.
- Destination Address(hex):** A 6-digit hexadecimal input field.
- Data Encryption Key:** A 6-digit key input field.

PC Settings:

- ConnexLink / ConnexNet:** Radio buttons, with "ConnexLink" selected.
- Port:** A dropdown menu showing "Communications Port (COM1)".
- Baud Rate:** A dropdown menu showing "57600".
- System Config:** A dropdown menu showing "Point-to-Multipoint".

On the right side of the PC Settings section, there are several buttons: "About", "Help", "Load File", "Save to File", "Write Radio", and "Read Radio".

4.2.1.1 ConnexLink Settings

Client/Server: Designates CL4490 type. In each network, there must be only one Server. All other CL4490 units must be programmed as Clients. The number of Clients in the network is not limited; however, if performance diminishes, consider additional RF Networks.

Interface Baud Rate: This defines the baud rate used for communicating with the CL4490 over the serial interface. The RF baud rate is fixed at 76.8 Kbps and is independent of the Interface Baud Rate. The default baud rate setting is 57600 bps unless the units have been pre-configured by AeroComm. **The Interface Baud Rate setting of the CL4490 must match the Baud Rate setting of its host device.**

Channel Number: A number that designates an independent network of CL4490 units. Up to 32 independent networks can be created. The valid range of values for this field is 16 to 47.

Max Transmit Retries (For Clients and Servers in Point-to-Point networks only): This value represents the maximum number of times a particular data packet will be transmitted unsuccessfully, or without an acknowledgement, before the CL4490 discards the packet. The default value is 16 attempts. If communication is lost and the Client's **Link** LED is on, try increasing this value in small increments until communication is reestablished.

Note: This value is always associated to Client radios and Server radios in Point to Point Mode. The valid range of values for this field is 2 to 255.

Broadcast Attempts (For Servers in Point-to-Multipoint networks only): This value represents the number of times a data packet will be transmitted by the Server CL4490. The default value is 4 attempts. If communication is lost and the Clients' **Link** LED is on, try increasing this value in small increments until communication is reestablished. The valid range of values for this field is 2 to 255

System Identification: A number from 0 to 256 that provides added security to each independent network of CL4490 units. The System ID is used in conjunction with the Channel Number and serves as an RF password to maintain secure transfers of data. The combination of the Channel Number and System ID must be unique to each network of CL4490s to establish communication. Multiple Servers in the same coverage area must be programmed with different Channel Numbers to prevent inoperability of the networks. The System ID will not prevent inoperability that occurs from locating multiple Servers with the same Channel Number in the same coverage area.

Important Note: **Separate Collocated CL4490 networks must operate on different Channel Numbers. All units in a given CL4490 network must have identical Channel Numbers and System IDs.**

Data Encryption Key: Encryption is the process of encoding an information bit stream to secure the data content. The DES algorithm is a common, simple and well-established encryption routine. An encryption key of 56 bits is used to encrypt the packet. The receiver must use the exact same key to decrypt the packet; otherwise garbled data will be produced.

Destination Address: The MAC Address of the remote CL4490 in a Point-to-Point network. Used to optimize Point-to-Point communications by utilizing RF Acknowledgement.

Firmware Version: Displays the CL4490's firmware version.

MAC Address: A unique 6 Byte, IEEE 802.3 Ethernet address assigned by AeroComm to each CL4490.

4.1.1.2 Optional Settings

Data Encryption: Enables the Data Encryption Key. All CL4490s in the same network must have the same encryption setting.

RTS Enable: Enables the Request To Send control line. When enabled, enables Hardware Flow Control. Refer to **Section 2.3 Hardware Flow Control**.

Parity: Needs to be enabled if host requires even or odd parity and 8 data bits. This is considered as 9-bit mode. **Note: Enabling Parity cuts the overall throughput into half.**

Full Duplex: This mode restricts Client radios to transmitting on odd numbered frequency hop bins and the Server to even numbered frequency hop bins. Though the RF hardware is still technically half duplex, it makes the transceiver seem full duplex. This can cause overall throughputs to be cut in half. **Note: All transceivers on the same network must have the same setting for Full Duplex.**

Modem Mode: Full modem handshaking is supported by the transceivers when Modem Mode is enabled. Modem Mode is incompatible with RS-485Interface. Enables DCD, DTR, DSR and Ring Indicator control lines.

4.1.1.3 PC Settings

Port: Serial communications port of the PC connected to the CL4490 unit.

Baud Rate: Must equal the Interface Baud Rate setting of the CL4490 unit that is about to be programmed.

System Config: Type of CL4490 network to be configured. Valid choices are **Point-to-Point** (one Server and one Client) or **Point-to-Multipoint** (one Server and multiple Clients).

Attention: When setting up a Point-to-Point network the Server's Destination address must be set to the Client's MAC Address.

4.1.1.4 Programming the CL4490 units

1. Connect a CL4490 unit to the serial communications port on the PC.
2. Connect the power supply to the CL4490 unit. Make sure the **Pwr** LED is on.
3. Start the CL4490 Configuration Utility.
4. Select the COM Port that is connected to the CL4490 unit on the PC Settings section.
5. Select the Interface Baud Rate of the CL4490 unit. All CL4490 units are shipped with a default rate of 57600 (unless units have been pre-configured to match specific serial settings). If the Interface Baud Rate of the CL4490 unit is changed as described in **Section 4.2 Changing CL4490 Settings**, then PC Setting Baud Rate must be set to the same Baud Rate to allow proper programming of the units.
6. Select the System Configuration for the CL4490 network, **Point-to-Point** (one Server and one Client) or **Point-to-Multipoint** (one Server and multiple Clients).
7. Select **Read Radio** to display the current settings of the CL4490 unit.
8. Change desired settings.
9. After all changes have been made, select **Write Radio** to save the changes.
10. Cycle Power to the unit after all changes has been saved. This will set the CL4490 unit to its normal mode of operation.

Note: The Show Defaults button can be used to display the default Radio settings.

4.2.2 CN4490 Settings

The CN4490 **Settings** Page is shown below, as it will appear the first time when the CN4490 check box is checked.

The screenshot shows the 'CN4490 Configuration Utility' window. It is divided into two main sections: 'ConnexNet Settings' and 'PC Settings'.
ConnexNet Settings:
- **Options:** A group box containing four unchecked checkboxes: 'Modem Mode', 'Parity', 'Full Duplex', and 'Data Encryption'. Below this is a 'Show Defaults' button.
- **Client/Server:** A dropdown menu.
- **Channel Number:** A text box with 'Range: 16 - 47'.
- **Max Transmit Retries:** A text box with 'Range: 0 - 255'.
- **Broadcast Attempts:** A text box with 'Range: 0 - 255'.
- **System Identification:** A text box with 'Range: 0 - 255'.
- **Destination Address(hex):** A series of six small text boxes.
- **Data Encryption Key:** A series of six small text boxes.
- **RF Delivery:**, **Firmware Version:**, and **MAC Address:** labels.
PC Settings:
- Two radio buttons: 'ConnexLink' (unselected) and 'ConnexNet' (selected).
- **IP Address:** A text box with '192 . 168 . 0 . 11'.
- **Port:** A text box with '2101'.
- **System Config:** A dropdown menu with 'Point-to-Point' selected.
- Buttons on the right: 'About', 'Help', 'Load File', 'Save to File', 'Write Radio', and 'Read Radio'.

4.2.2.1 CN4490 Settings

Client/Server: Designates CN4490 type. In each network, there must be only one Server. All other CN4490 units must be programmed as Clients. The number of Clients in the network is not limited; however, if performance diminishes, consider additional RF Networks.

Channel Number: A number that designates an independent network of CN4490 units. Up to 32 independent networks can be created. The valid range of values for this field is 16 to 47.

Max Transmit Retries (For Clients and Servers in Point-to-Point networks only): This value represents the maximum number of times a particular data packet will be transmitted unsuccessfully, or without an acknowledgement, before the CN4490 discards the packet. The default value is 16 attempts. If communication is lost and the Client's **Link** LED is on, try increasing this value in small increments until communication is reestablished.

Note: This value is always associated to Client radios and Server radios in Point to Point Mode. The valid range of values for this field is 2 to 255.

Broadcast Attempts (For Servers in Point-to-Multipoint networks only): This value represents the number of times a data packet will be transmitted by the Server ConnexLink. The default value is 4 attempts. If communication is lost and the Clients' **Link LED** is on, try increasing this value in small increments until communication is reestablished. The valid range of values for this field is 2 to 255.

System Identification: A number from 0 to 256 that provides added security to each independent network of CN4490 units. The System ID is used in conjunction with the Channel Number and serves as an RF password to maintain secure transfers of data. The combination of the Channel Number and System ID must be unique to each network of CN4490 to establish communication. Multiple Servers in the same coverage area must be programmed with different Channel Numbers to prevent inoperability of the networks. The System ID will not prevent inoperability that occurs from locating multiple Servers with the same Channel Number in the same coverage area.

Important Note: Separate Collocated CN4490 networks must operate on different Channel Numbers. All units in a given CN4490 network must have identical Channel Numbers and System IDs.

Data Encryption Key: Encryption is the process of encoding an information bit stream to secure the data content. The DES algorithm is a common, simple and well-established encryption routine. An encryption key of 56 bits is used to encrypt the packet. The receiver must use the exact same key to decrypt the packet; otherwise garbled data will be produced.

Destination Address: The MAC Address of the remote CN4490 in a Point-to-Point network. Used to optimize Point-to-Point communications by utilizing RF Acknowledgement.

Firmware Version: Displays the CN4490's firmware version.

RF Delivery: Displays the CN4490 RF delivery mode. RF delivery mode is broadcast if the System Config is set to point to multipoint, is addressed otherwise.

MAC Address: A unique 6 Byte, IEEE 802.3 Ethernet address assigned by AeroComm to each CN4490.

4.2.2.2 Optional Settings

Data Encryption: Enables the Data Encryption Key. All CN4490s in the same network must have the same encryption setting.

Parity: Needs to be enabled if host requires even or odd parity and 8 data bits. This is considered as 9-bit mode. **Note: Enabling Parity cuts the overall throughput into half.**

Full Duplex: This mode restricts Client radios to transmitting on odd numbered frequency hop bins and the Server to even numbered frequency hop bins. Though the RF hardware is still technically half duplex, it makes the transceiver seem full duplex. This can cause overall throughputs to be cut in half. **Note: All transceivers on the same network must have the same setting for Full Duplex.**

Modem Mode: Needs to be enabled if Email Alerts need to be generated refer to section 7.4 Email Alerts for details.

4.2.2.3 PC Settings

IP Address: IP Address of the CN4490 unit.

Port: Port number of the CN4490 unit, the Port number is always 2101.

System Config: Type of CN4490 network to be configured. Valid choices are **Point-to-Point** (one Server and one Client) or **Point-to-Multipoint** (one Server and multiple Clients).

Attention: When setting up a Point-to-Point network the Server's Destination address must be set to the Client's MAC Address.

4.2.2.4 Programming the CN4490 units

1. Connect the CN4490 unit to the network.
2. Connect the power supply to the CN4490 unit. Make sure the **Pwr** LED is on.
3. Start the CN4490 Configuration Utility.
4. Select TCP/IP Select on the PC Settings Frame.
5. Enter the IP Address of the CN4490 that needs to be configured.
6. Select the System Configuration for the CN4490 network, **Point-to-Point** (one Server and one Client) or **Point-to-Multipoint** (one Server and multiple Clients).
7. Select **Read Radio** to display the current settings of the CN4490 unit.
8. Change desired settings.
9. After all changes have been made, select **Write Radio** to save the changes.

Note: The Show Defaults button can be used to display the default Radio settings.

5. Troubleshooting

Problem	Solution	
	CL4490	CN4490
Read Radio displays error message: "Radio not responding."	<ol style="list-style-type: none"> 1. Make sure the PC Settings are right. See Section 4.2.3 PC Settings. 2. Make sure the CL4490 unit uses the right serial cable. Refer to Section 2.1 RS-232. 3. If any other program that is using the same COM port as CL4490 is open, close that program and try to read the radio again. 4. Reset the radio by cycling power after each unsuccessful Read. 	<ol style="list-style-type: none"> 1. Make sure the PC Settings are right. See Section 7.2.3 PC Settings. 2. Make sure the CN4490 unit uses the right Ethernet cable. Refer to Section 2.2 LAN Port. 3. If any other program that is using the same LAN port as CN4490 is open, close that program and try to read the radio again. 4. Reset the radio by cycling power after each unsuccessful Read.
Write Radio displays error message: "Radio not responding."	<ol style="list-style-type: none"> 1. Cycle power to the radio. 2. Read the radio and make desired changes and then Write the radio. 	<ol style="list-style-type: none"> 1. Cycle power to the radio. 2. Read the radio and make desired changes and then Write the radio.
Garbled Data received.	<ol style="list-style-type: none"> 1. Check Data Encryption Standard settings. 	<ol style="list-style-type: none"> 1. Check Data Encryption Standard settings.
Client's Link LED does not come on.	<ol style="list-style-type: none"> 1. Make sure the unit is connected to power. 2. Cycle power to the radio. 	<ol style="list-style-type: none"> 1. Make sure Server CN4490 unit is powered up. 2. Cycle power to the radio.
Link LED is on, but data does not get transmitted or received.	<ol style="list-style-type: none"> 1. Make sure the CL4490 unit(s) is connected to the correct COM Port. 2. Check the COM port settings for correct Baud Rate, Parity and either Hardware or No Flow Control. Units can have transmission errors with Flow Control set to Xon/Xoff. 3. Try increasing the Maximum Transmit Attempts (for Clients) and/or Broadcast Attempts (for Servers) values in small increments until communication is established. 4. Connect a Null Modem adapter between the Client and its host device. 5. Check the Destination Address setting. 	<ol style="list-style-type: none"> 1. Make sure the CN4490 unit(s) IP Address is right. 2. Try increasing the Maximum Transmit Attempts (for Clients) and/or Broadcast Attempts (for Servers) values in small increments until communication is established. 3. Check the Destination Address setting.

If these troubleshooting tips do not resolve the problem, please call our toll free number at (800) 492-2320, extension 228. Technical support hours are Monday through Friday, 8:00 am to 5:00 pm Central Standard Time.