Intuicom®

Wireless Ethernet Bridge
Addendum

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Note: This document contains outdated and offensive “master-slave” terminology. Within UNAVCO and in our in-house materials, we have replaced this with “Access point (AP) – Station/Endpoint (STA)”, but in manufacturer documentation and configuration software, the original usage will still remain when implemented.

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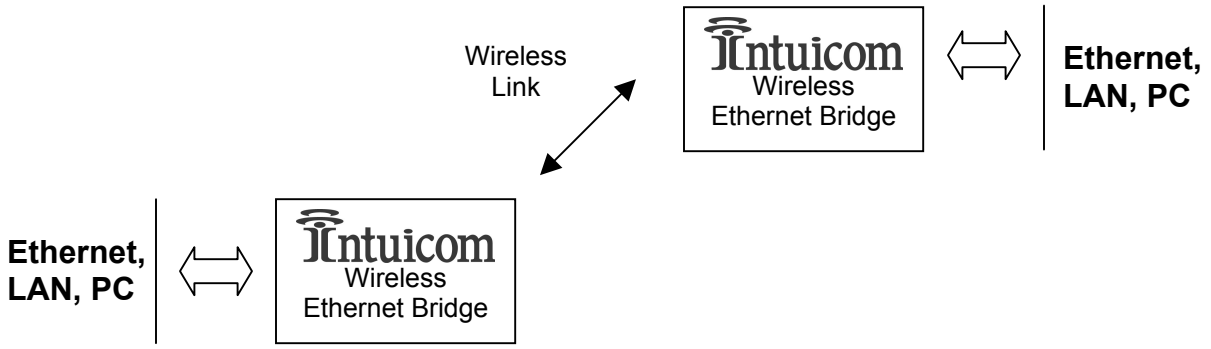
1 Overview

This is an addendum to the Intuicom Communicator II User Guide. It covers details applicable specifically to using the Intuicom Wireless Ethernet Bridge to create an Ethernet Bridge. Please use this addendum in conjunction with the Communicator II Manual. The Data Port in an Intuicom Wireless Ethernet Bridge is a 10Base-T RJ45 connector, to be used as part of an Ethernet LAN (Local Area Network).



In order to conserve the available bandwidth, Intuicom Wireless Ethernet Bridges have a MAC address filter. Each packet received by the Ethernet interface from the LAN is checked for the destination MAC address against the filter table. If the address is contained in the table, the packet is not forwarded across the radio link. If the address is unknown, or known to be across the radio link, then the packet is forwarded. An address is only added to the filter table after the Ethernet interface positively determines that the MAC address in question is not across the radio link. Each entry in the table has a lifetime of 4.5 minutes, to facilitate changing network conditions, and roaming across networks.

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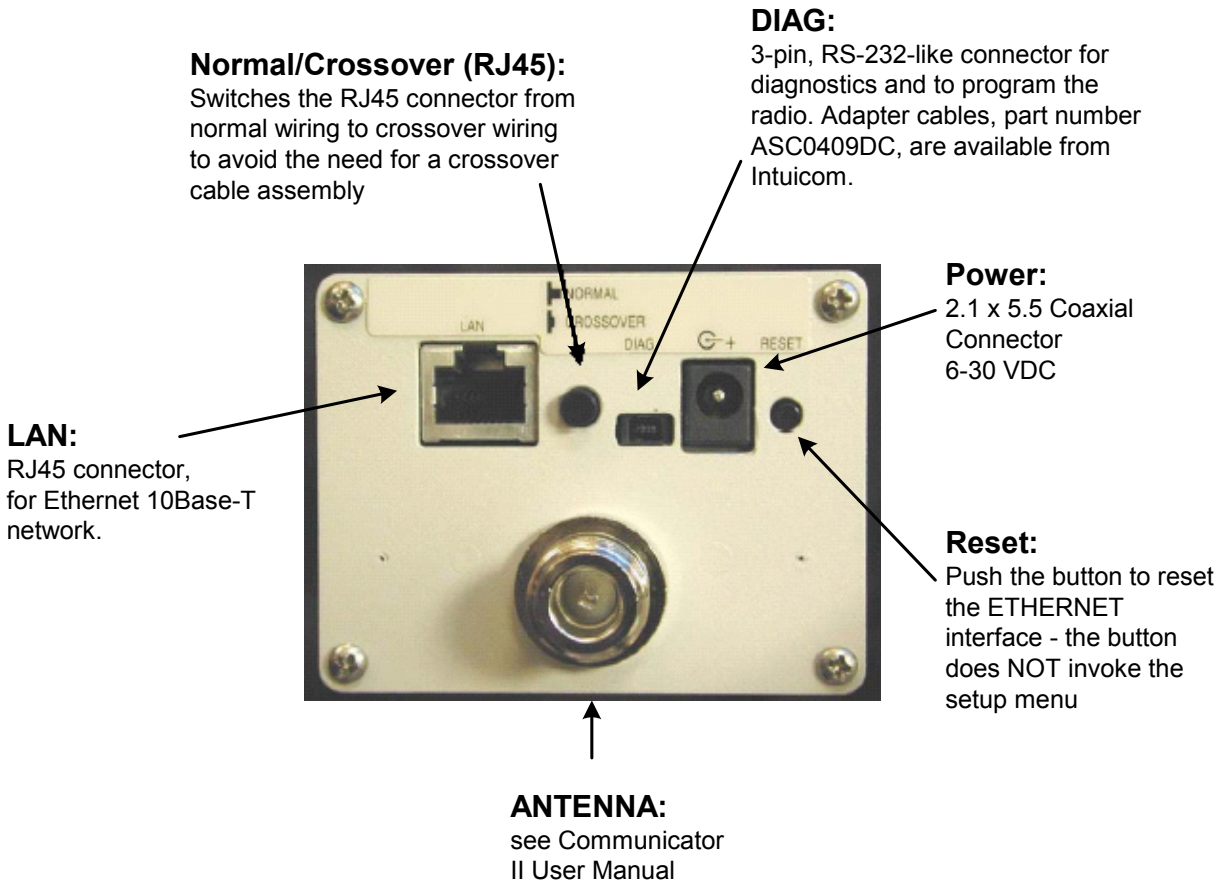
2 Back Panel



Additionally, the unit is available as a board level Class 1, Div 2 product with the following changes:

- Crossover switch is removed and hardwired in the "Normal" position.
- Power connector is replaced by a two foot long twisted wire supply line.
- A standard SMA connector replaces 'N' type antenna connector.

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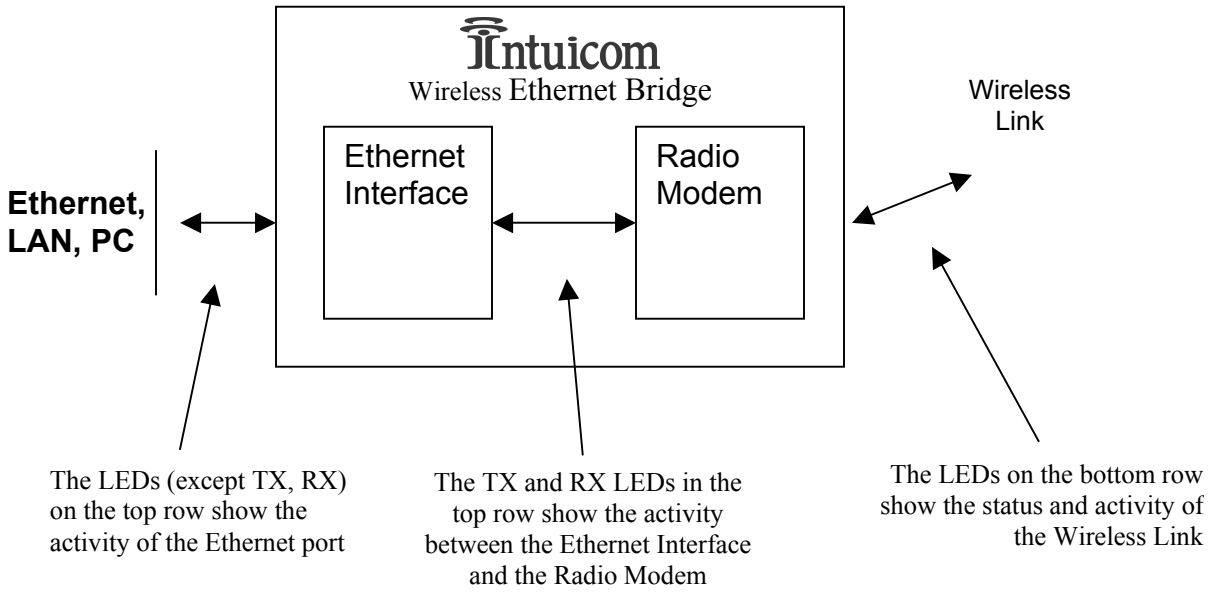
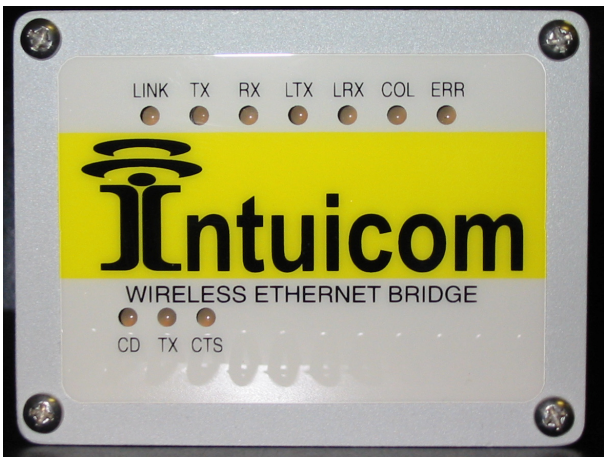
3 Front Panel

The Intuicom Wireless Ethernet Bridge has two rows of LEDs. The bottom row of LEDs is consistent with the Communicator II transceiver and is described in that manual. The top row has seven LEDs that indicate the state of the Ethernet Interface. The Modem has two ports: the Ethernet port (the Data Port) and the radio link; and it includes two devices: an Ethernet Interface and a Radio Modem.





Top Row LED Description

LINK:	green	= the modem is connected to its LAN
TX:	green	= the modem is transmitting to another modem over the radio link
RX:	green	= the modem is receiving from another modem over the radio link
LTX:	green	= the modem is sending data to its LAN
LRX:	green	= the modem is receiving data from its LAN
COL:	red flash	= the modem saw a collision on the LAN
ERR:	red flash	= the modem saw an error on the LAN

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4 Setup

To program the modem, proceed as described in the Intuicom Communicator II User Guide, with the following exceptions:

- **Type a capital 'U' on the diagnostics port to access the setup menu.**
- You must use the diagnostic port (there's no RS232 Data Port in this modem).
- You must select the following settings:

4.1 Menu 1

This is neither the data rate of the Radio Link, nor the data rate of the Ethernet 10Base-T connection to the LAN. This just sets the protocol internal to the Wireless Ethernet Bridge, between the Ethernet Interface and the Radio Modem.

SET BAUD RATE
Modem Baud is 230400

(0) 230,400		**Must be selected** (for best throughput)
(1) 115,200		
…		
(9) 1,200		
(A) Data, Parity	0	**Must be "0"** (Default)
(B) MODBus RTU	0	**Must be "0"** (Disabled)
(C) RS232/485	0	**Must be "0"** (TTL)
(D) Setup Port	2	**Must be "2"*** (Diagnostics port used for Set-up)
(E) TurnoffDelay	0	No effect
(F) FlowControl	1	**Must be "1"** (CTS flow control)

4.2 Menu 0, Submenu F (Ethernet/IP Radio Setup)

(0) Ethernet Mode	1	**Must be set to "1"***
(1) Half/Full Duplex	0	**You may select full or half**
(2) Slave IP Stack	0	**Set to "1" if not hooked up to a hub or switch**
(3) Slave UDP Mode	0	**"1" for UDP Connect Mode**
(4) IP Address	255.255.255.255	**Used for slave radios for I.D. in UDP Connect Mode.**

***NOTE**: Once you set the "Ethernet Mode" to 1 (Menu 0, Submenu F, Item 0), you can no longer change the "Set-Up Port" (Menu1, Item D). Therefore, first change the "Set-Up Port" to "2", then change the "Ethernet Mode" to "1".

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4.3 Menu 3 (point to point)

RADIO PARAMETERS		
(0) FreqKey	5	
(1) Max Packet Size	*9*	Recommended: "9" (for best throughput)
(2) Min Packet Size	1	Recommended: "1" (for best throughput)
(3) Xmit Rate	1	
…		
(A) High Noise	0	
(B) MCU Speed	1	**Must be "1"** (because Baud is set at 230 K)

4.4 Menu 3 (for point to multipoint)

RADIO PARAMETERS		
(0) FreqKey	5	
(1) Max Packet Size	6	Recommended: "6" (for best throughput)
(2) Min Packet Size	3	Recommended: “3” (for best throughput)
(3) Xmit Rate	1	
…		
(A) High Noise	0	
(B) MCU Speed	1	**Must be "1"** (because Baud is set at 230 K)

4.5 Menu 5 (for point to multipoint)

MULTIPOINT PARAMETERS		
(0) Number Repeaters	1	**Must be set to "0"** (no repeaters) **or "1"** (1 repeater)
(1) Master Packet Repeat	2	**Must be set to "2"**
(2) Max Slave Retry	9	
…		
(A) Slave/Repeater		**This function is not supported and therefore should not be used with Ethernet radios**

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5 Installation

To install the modem, proceed as described in the Main Manual, with the following exceptions:

- Connect the modem to the LAN with a CAT5 RJ45 Ethernet cable.
- Use the "Normal/Crossover" switch to select the polarity of the Ethernet connection. If connecting to a switch, router or hub, select "Normal". If connecting to a NIC or a modem, select "Crossover". However, if you are using a crossover cable, then use the opposite settings of the switch.
- If required, use the top row of LEDs for troubleshooting the Ethernet Interface.

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6 Troubleshooting:

To troubleshoot the modem, proceed as described in the Main Manual. Additionally, use the top row of LEDs in this Ethernet modem as troubleshooting tools.

- No data is being passed between the LAN's. Upon power up, the Ethernet interface's MAC filtering table can become corrupted, and must be reset, or allowed to timeout. After power up, press the reset button on the back of the Intuicom Wireless Ethernet Bridge, or allow 4.5 minutes to pass and the table time to reset.

- The LINK LED is off: The Modem is not successfully connected to the LAN.
    - Make sure that the Modem is powered ON.
    - Make sure that the Ethernet device connected to the Modem is ON.
    - Make sure the Modem and the Ethernet device are connected with a good Ethernet cable.
        - Try flipping the "Normal/Crossover" switch to the opposite position. Check that the Ethernet device attached to the Modem is either set for auto-detect, or for 10BaseT.

- The TX LED stays on:
    - Data isn't going from this modem's LAN to the other modem's LAN.
    - Make sure the radio link is working (see Communicator II Manual).
    - Make sure both modems are linked to their respective LANs (the modems' LINK LEDs are on).
    - The RX LED stays on: Data isn't going between this modem and its LAN. The Ethernet device to which this modem is connected isn't receiving data.

- The COL LED flashes:
    - There are collisions on this modem's LAN.
    - This is normal when the modem's connection to the LAN is through a hub (it simply means that two Ethernet devices tried to send data through the hub at the same time). The Ethernet network is designed handle such collisions. This doesn't happen when the modem's connection to the LAN is directly through a switch, or to a NIC, or to a router.

- The ERR LED flashes:
- A data buffer is getting full.
- This typically only occurs if the settings in the radio are incorrect. This also occurs when the radio link, or the LAN link are not present. Check the radio settings, the Radio Link, and the LAN link.
- Attempt pressing the push-button on the back panel to reset the Ethernet Interface.

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7 Glossary of Terms

Wireless Ethernet Bridge:	The entire Intuicom modem, which includes a Radio Modem and an Ethernet Interface.
Ethernet Bridge:	A bridge between to Ethernet LANs, using an Ethernet modem at each end.
Radio Modem:	The radio portion of the Ethernet Modem. It communicates with other radio modems.
Ethernet Interface:	The Ethernet portion of the Ethernet Modem. It translates and filters data between the LAN and the Radio Modem.
Radio Link:	The link between Intuicom radios.
LAN:	(Local Area Network) a computer network, such as Ethernet.
Collision:	Occurs when a LAN device tries to transmit while another device is already transmitting.
NIC:	(Network Interface Card) A device that translates between a LAN and a computer, typically found inside a personal computer.
Switch:	A smart device for connecting many Ethernet devices together.
Router:	A smart device for directing the Ethernet packets from one network to another.
Hub:	A dumb device for connecting many Ethernet devices together.
Ethernet Device:	Any device that attaches to an Ethernet LAN, typically using an RJ45 connector.

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