Ethernet Network Interface Unit (EBI001)

Product Description

Revision Letter:	AA
Firmware version:	R1.0
Firmware upgrades:	The Network Interface Unit (NIU) firmware resides in FLASH memory. This firmware may be upgraded with future versions via a download from an appropriate personal computer connected to the Ethernet connector (RJ-45) on the NIU. The download uses an FTP session to the NIU.

Specifications

Ethernet IP address	Any Valid IP Address
	Default is 195.0.0.x, where x is selected on the rotary switches.
Ethernet network data rate	10Base-T or 100Base-TX, auto-negotiated
I/O data	1024 bytes maximum. Up to 512 bytes of inputs or 512 bytes of outputs.
Fault data	128 bytes maximum
Indicators (5)	Power LED indicates power OK LED indicates health of the NIU Faults LED indicates presence of faults LAN LED indicates health of Ethernet network Stat LED solid green indicates Modbus connection present, flashing Amber indicates invalid IP address
Number of I/O modules	8 I/O modules per NIU
Power Consumption	+5V@175mA, +3.3V@425mA
Protocol	Modbus Ethernet, Class 0 & 1

Overview

The Ethernet Network Interface Unit (ENIU) is an Ethernet slave module that acts as controller for a set of I/O modules. Power for module operation is provided by a power supply that installs directly on the ENIU

ENIU Physical Features

Preinstallation Check

Carefully inspect all shipping containers for damage. If any equipment is damaged, notify the delivery service immediately. Save the damaged shipping container for inspection by the delivery service. After unpacking the equipment, record all serial numbers. Save the shipping containers and packing material in case it is necessary to transport or ship any part of the system.

Quick Start Guide

1. **Install the ENIU on the DIN-rail** by simply clicking it into place.

   Note: The NIU and connecting carriers must be installed on the same section of 35mm x 7.5mm DIN-rail.

   The DIN-rail must have a conductive (unpainted) finish for proper grounding.

   (*Refer to the heading* **Module Installation** *for information about space requirements or module orientation, or if you are installing the NIU in an area of excessive vibration*).

2. **Install the Power Supply on the ENIU**.

   The latch on the power supply must be in the unlocked position.

   Align the connectors and the latch post and press the power supply module down until the two tabs on the bottom of the power supply click into place.

   Turn the latch to the locked position to secure the power supply to the top of the NIU.

   Complete the power supply wiring as described in the installation instructions provided with the Power Supply.

3. **Set the IP Address - Adjust the rotary switches** on the front of the NIU using a 2.44mm (3/32in) flat screwdriver. These switches, marked IP Address A.B.C.x / X100, X10 and X1, select the hundreds, tens, and ones digits of the last field in the Ethernet IP address. The first three fields in the IP address, A.B.C., are fixed to 195.0.0. when the unit is shipped from the factory. For the last field, select any valid address in the range 1-254. Always cycle power to the NIU after changing the switch settings.
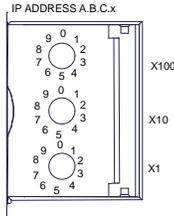
4. **Alternate Method to set Temporary IP Address using Telnet**

NOTE: This step is an alternate to Step 3 above. Be aware that the address set with this method is temporary. It will be lost if power is cycled.

a. The ENIU and the personal computer must be operational and interconnected via an Ethernet connection. At the computer's DOS command prompt, type in the following, then press the Enter key:

arp –s (IP address you want to assign to ENIU) (MAC address of the ENIU) (IP address of your computer)

FOR EXAMPLE:

arp –s 3.16.27.5 08-00-19-01-48-64 3.16.88.139

NOTE: You will not see any reply on the screen.

b. To verify that the ARP table entry was accepted, type the following at the command prompt, then press the Enter key:

arp –a

An entry matching the desired ENIU IP address ("Internet Address") and MAC address ("Physical Address") should be seen in the ARP table, with the "Type" listed as 'static.' ARP TABLE ENTRY EXAMPLE:

Internet Address	Physical Address	Type
3.16.27.5	**08-00-19-01-48-64**	**static**

c. Next, create a Telnet connection to the ENIU (Port 1) by typing in the following command at the computer's MS-DOS prompt, then pressing the Enter key:

telnet (IP Address) 1

FOR EXAMPLE: **telnet 3.16.27.5 1**

A Telnet window will appear. After several seconds, a "Connect Failed!" dialog box will appear; regardless, the ENIU will change its IP address to the one designated in the Telnet command. (NOTE: If it takes more than 15 seconds for the Connect Failed box to appear, the Telnet command probably didn't work.)

NOTE: Step 4 sets a temporary IP address that will be lost if power is cycled. To set a permanent (non-volatile) address, use VersaPro 1.5 (or later) or Remote I/O Manager 1.5 (or later) software and "store" a configuration containing the correct IP address. NOTE: A device will need to be configured in the VersaPro communications setup for the temporary IP address to allow you to perform the configuration store.

5. **Connect the communications** bus to the connector on the front of the ENIU. (Refer to the heading **Bus Installation Guidelines** for detailed bus installation instructions.)

6. **Remove the connector cover on the right-hand side of the ENIU**. Do not discard this cover; you will need to install it on the last carrier. It protects the connector pins from damage and ESD during handling and use. Do not remove the connector cover on the left-hand side.

7. **Install additional modules.** Mount a module on its carrier and slide it to the left along the DIN-rail to fully engage the connector on the adjacent carrier or ENIU. Repeat for other modules, and install the connector cover (see Step 6) on the last carrier.
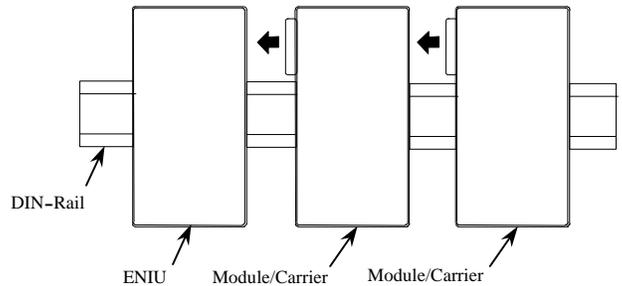
8. **Configuration.** A configuration can be stored by VersaPro or Remote I/O Manager software, or the ENIU can be autoconfigured. When power is applied to the ENIU for the very first time, the ENIU will autoconfigure the modules physically present in the I/O station, starting at Slot 1. Autoconfiguration stops at the first empty slot or faulted module. If the autoconfiguration is unsuccessful or a new autoconfiguration is required, it is necessary to first clear the existing configuration from the ENIU. This is done by powering down the ENIU, disconnecting the ENIU from the first I/O carrier, and powering up the ENIU.

Note: If the I/O station includes any additional power supplies, those power supplies must be turned on either before the ENIU Power Supply or at the same time to assure accurate autoconfiguration.

9. **Observe the Module LEDs**. The LEDs indicate the presence of power and show the operating mode and status of the ENIU.
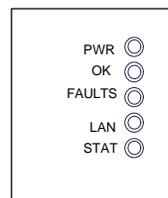

PWR	Green indicates power is applied to the NIU.
OK	Green indicates the NIU firmware is operational.
FAULTS	Amber indicates the NIU has detected a fault with itself or an I/O module. Blinking amber indicates a Fatal Fault with the NIU
LAN	Green (solid or blinking) indicates network activity, although not necessarily to this NIU.
STAT	Solid Green indicates a Modbus connection, Blinking Amber indicates invalid IP address

Ethernet Network Interface Unit (EBI001)

Module Installation _____
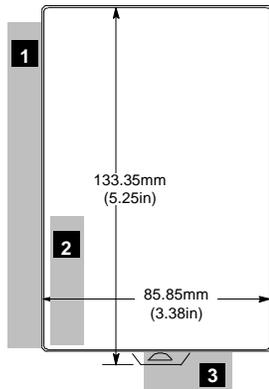
Modules must be mounted on a horizontal DIN-rail.

1. Allow sufficient finger clearance for opening NIU door.
2. Allow adequate clearance for Ethernet cable.
3. Allow adequate space for power wiring.

The NIU with power supply attached fits into a 70mm deep enclosure.

Rated thermal specifications are based on a clearance of 5.1cm (2in) above and below the equipment and 2.54cm (1in) to the left of the NIU module.
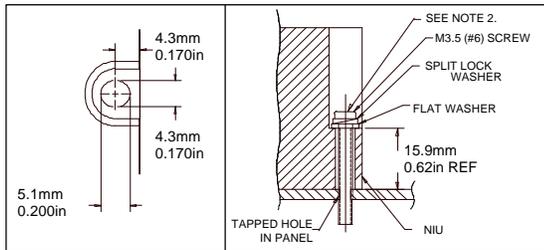
133.35mm (5.25in)

85.85mm (3.38in)

Panel-Mounting _____

For best stability, the DIN-rail should be installed on a panel using screws spaced approximately 5.24cm (6in) apart.

If excessive vibration is a factor the NIU should also be screwed down to the mounting panel.

Note 1. Tolerances are +/- 0.13mm (0.005in) non-cumulative.

Note 2. 1.1-1.4Nm (10-12 in/lbs) of torque should be applied to M3.5 (#6-32) steel screw threaded into material containing internal threads and having a minimum thickness of 2.4mm (0.093in).

4.3mm 0.170in

4.3mm 0.170in

5.1mm 0.200in

SEE NOTE 2.
M3.5 (#6) SCREW
SPLIT LOCK WASHER
FLAT WASHER
15.9mm 0.62in REF
TAPPED HOLE IN PANEL
NIU

Removing the ENIU from the DIN-rail _____

1. Turn off power to the power supply.
2. Remove the power supply module. If the ENIU is attached to the panel with a screw, remove the panel-mount screw.
3. Slide the ENIU to the left, until the connector on the ENIU's right side disengages from the next carrier.
4. Use a small flathead screwdriver to pull the DIN-rail latch downward to release it, then pull the bottom of the ENIU forward until it is free of the rail; finally, lift the ENIU off the top rail.

Bus Installation Guidelines _____

The proper cable for an Ethernet 10Base-T/100Base-TX network is a four twisted-pair, "Category 5" Ethernet cable. The following table summarizes key characteristics of the Ethernet network and cable.

Network Topology	Point-to point Ethernet 10Base-T/100Base-TX connections with no termination. "Points" can be hubs or switches. If only 2 nodes are present, a crossover cable should be used to connect them.
Point-to point distance	Maximum of 100 meters.
Medium	Four twisted-pair unshielded cable. Shielding is permissible, but not required.
Transmission Speed	10 Mbit/s (10Base-T) or 100 Mbit/s (100Base-TX)
Connector	RJ-45
Cable Type	Category 5 ("Cat 5")
Termination	No termination required

Bus Connector _____

RJ-45 Connector Pin Assignment

Pin	Signal	I/O	Description
1	Tx+	O	+Transmit output
2	Tx-	O	- Transmit output
3	Rx+	I	+ Receive input
4	FGND	-	Frame Ground
5	FGND	-	Frame Ground
6	Rx-	I	- Receive Input
7	FGND	-	Frame Ground
8	FGND	-	Frame Ground

Pin 1
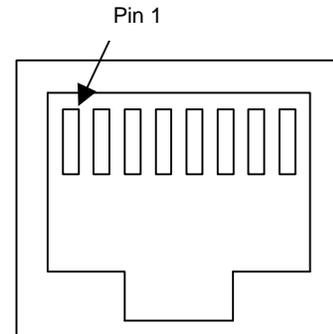
Ethernet MAC Address _____

The MAC physical address for the ENIU will be labeled on the ENIU module.

Operating Notes/Restrictions _____

For both discrete and analog Output or Mixed modules, if the ENIU loses power but the Output or Mixed modules do not lose power, the Hold Last State parameter does not work as might be expected. Upon ENIU power loss, outputs configured for Hold Last State go to the Last State value on modules that still have power. When power is restored to the ENIU, outputs go to the Default value. When communications are reestablished and the ENIU receives a Write message, outputs go to the values in the ENIU's Output Table.