

1395 Node Adapter Board Installation and Start-up

Specifications

Electrical:

Board power provided by Drive (+5V)
Discrete Input 24V DC or 115V AC, jumper selectable

Environmental:

Ambient Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-40° to +85°C (-40° to +185°F)
Relative Humidity	5% to 95% non-condensing
Altitude:	3,300 feet (1,000 Meters)
Firmware Version	3.xx

Communications:

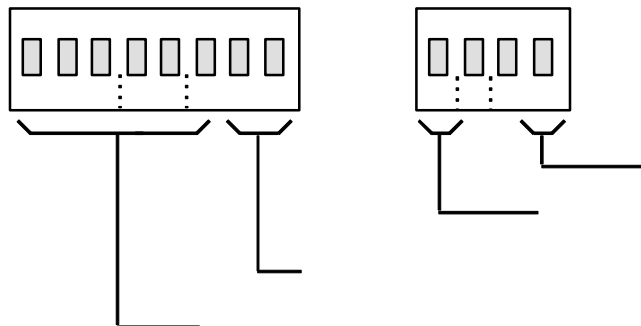
Allen-Bradley Remote I/O (RIO)
Baud Rates: 57.5 KB/ 115 KB
Rack Configurations: 1/2 to Full

This is not intended to be an all encompassing technical description of each hardware component. This document provides information to aid service personnel in:

- Identifying the Node Adapter board.
- Understanding the hardware content of the board.
- Understanding the hardware requirements necessary to interface the Node Adapter board with external devices.

General Board Description

The Node Adapter Board (Fig. 1.3) contains a smaller surface mounted board. This smaller board contains the hardware which performs the Node Adapter functions related to communication with a PLC Controller and allows for discrete type PLC Controller I/O and block transfer. Additional hardware on the board allows selection of the baud rate, the rack number and also provide an interface to the Bulletin 1395 Main Control Board. DIP switches U5 and U6 on the Node Adapter are used to select communication type, baud rate, and rack address in octal.



Switches SW1 through SW5 on U5 determine the rack address in Octal, while switches SW7 and SW8 determine the rack type. Switch SW1 on U6 determines the baud rate of the communication between the PLC Controller and the Node Adapter Board. Switch SW4 on U6 determines whether a terminating resistor is used. Switches SW2 and SW3 are not used. Refer to the Installation for switch settings.

Board Configuration

The Node Adapter Board causes the Bulletin 1395 Drive to appear as a remote I/O rack to the PLC Controller. Data transfer between the PLC Controller and Drive (at the PLC level) is the same as if the PLC Controller were transferring data to a remote I/O rack. The rack structure consists of two specific types: full or half rack. A full rack is defined as an 8 group rack, while a half rack is defined as a 4 group rack. Each group, whether in a full or half rack configuration contains 16 input and 16 output bits, which are mapped directly into the PLC Controller I/O image table. Refer to Figures 1.1 and 1.2 for further information on the full and half rack configurations.

Figure 1.1 Full Rack Configuration

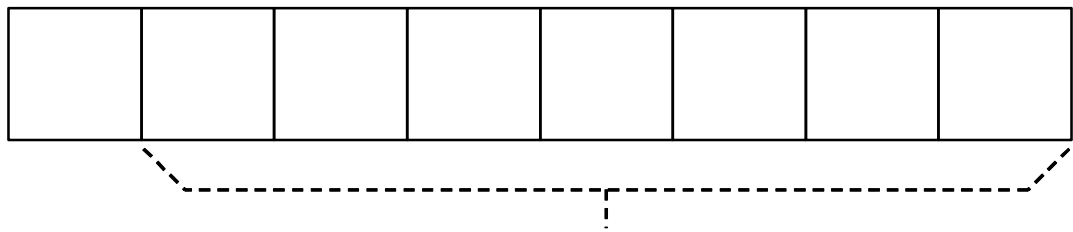
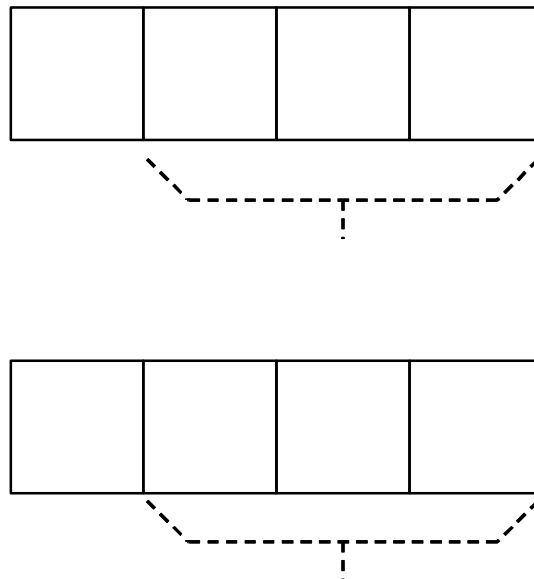


Figure 1.2 Half Rack Configuration



LED Indicators

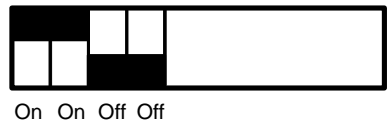
The Node Adapter board contains two LED indicators. The red Processor Fault LED will illuminate only when a processor malfunction on the Node Adapter Board has occurred. The green "OK" LED indicates the communication status between the Node Adapter Board and the PLC Controller, (Refer to Table 1.A).

Table 1.A

LED	State	Function
OK	LED Green	Normal PLC Communications
	LED Off	No communication to PLC Controller
	LED Blinking Green	PLC is in Reset/Program/Test Mode

DIP Switch Orientation DIP Switch orientation (Figure 1.3) on the Node Adapter board is as follows:
 CLOSED = "ON" = "1"
 OPEN = "OFF" = "0"

Figure 1.3 DIP Switch Orientation



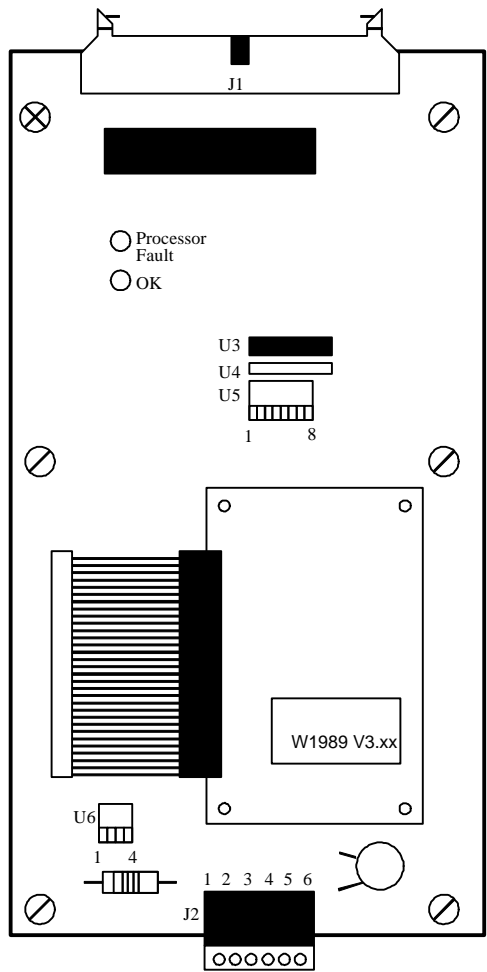
Firmware Location

The Node Adapter Board contains firmware version 3.xx (the "xx" designator may vary but does not effect information in this document). Figure 1.4 shows the physical location of the firmware chip on the small surface mount board.

Board Location

The standard mounting position for the Node Adapter board is Port B of the Drive (Right Hand) . If required, the Adapter can be mounted in Port A. Note that each port uses different parameters to store Adapter setup and configuration information.

Figure 1.4 Node Adapter Board Components



General Precautions

In addition to the precautions listed throughout this manual, the following statements which are general to the system must be read and understood.



ATTENTION: This drive may contain ESD (Electrostatic sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, *Guarding Against Electrostatic Damage or any other applicable ESD Protection Handbook.*



ATTENTION: Severe injury or death can result from electrical shock, burn, or unintended actuation of controlled equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Recommended practice is to disconnect and lock out control equipment from power sources and discharge stored energy in capacitors, if present. If it is necessary to work in the vicinity of energized equipment, the safety related work practices of NFPA 70E, *Electrical Safety Requirements for Employee Workplaces.* must be followed. **DO NOT** work alone on energized equipment!



ATTENTION: Potentially fatal voltages may result from usage of oscilloscope and other test equipment. The oscilloscope chassis may be at a potentially fatal voltage if not properly grounded. If an oscilloscope is used to measure high voltage waveforms, use only a dual channel oscilloscope in the differential mode with X 100 probes. It is recommended that the oscilloscope be used in the A minus B Quasi-differential mode with the oscilloscope chassis correctly grounded to an earth ground. Refer to equipment safety instructions for all test equipment before using with the 1395.



ATTENTION: The CMOS devices used on the control circuit can be destroyed or damaged by static charges. If personnel will be working near static sensitive devices, they must be appropriately grounded.

Installation

Following is a detailed step-by-step procedure for the proper installation of the Bulletin 1395 Node Adapter Board . It also contains electrical and environmental specifications . Procedures performed in this chapter include:

- Verification of proper unpacking and inspection
- Verification of proper mounting
- Verification of proper wiring

It is your responsibility to thoroughly inspect the equipment before accepting shipment from the freight company . You must take the responsibility for noting any damage . Do Not accept shipment before checking all items received against the purchase order, and noting any missing or damaged items on the freight bill . If any concealed damage is found later during unpacking, it is your responsibility to notify the freight agent . Leave the shipping container intact and request that the freight agent make a visual inspection of the shipment .

Remove all packing material from around the board, including the anti-static bag . The Node Adapter Board is a static sensitive device, and special precautions should be taken while handling the board . The circuit board can be damaged by Electrostatic Discharge. If personnel will make contact with an ESD sensitive component during installation, they must be grounded. Grounding should be accomplished with a wrist strap which is connected to an approved ground. If the board will not be installed when it is unpacked, it should be stored in a clean dry place in the anti-static bag . The storage temperature must be between 0°C (32°F) and +60°C (140°F) with a maximum humidity of 95% non -condensing, to guard against damage to temperature sensitive components of the drive .

Mounting

The Node Adapter Board is mounted on the front of the swing out panel. Two possible adapter board mounting positions are provided, depending on the port that the board will be connected . When looking at the mounting positions from the front, the right position corresponds to Port B and the left to Port A. The port used is dependent on the specific application of the drive . After determining which port the Node Adapter Board will be connected to, mount the board, using the five (5) panel screws and one (1) Phillips head screw supplied.

Configuration Overview

Connections

The 60 pin ribbon cable connector (J1) located on the Node Adapter Board, provides a means of connecting the board to the Bulletin 1395 Main Control Board port connector (J6 or J7) . The port connector used is determined by the port and the physical location of the Node Adapter Board . Main Control Board Connector J6 corresponds to Port B and J7 to Port A. The Remote I/O cable from the PLC is connected directly to the Node Adapter Board at connector J2 . If the PLC Controller is controlling only one drive, terminals 1 -3 are used. If the PLC Controller is used to control several drives, terminals 1-3 are connected to the upstream drive (or PLC Controller if the drive is the first in the network) and terminals 4-6 are connected to the downstream drive. Refer to the following procedure and Figures 1.5, 1.6.

- 1.) Connect the 60 lead ribbon cable from J1 on the Node Adapter Board to the corresponding connector on the Main Control Board.
- 2.) Connect the PLC Controller communication cable to the drive as required by the application .

Figure 1.5 J2 Connections

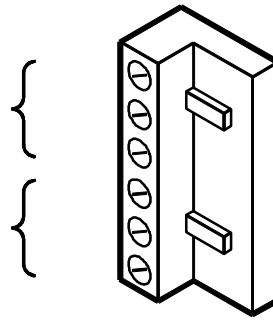
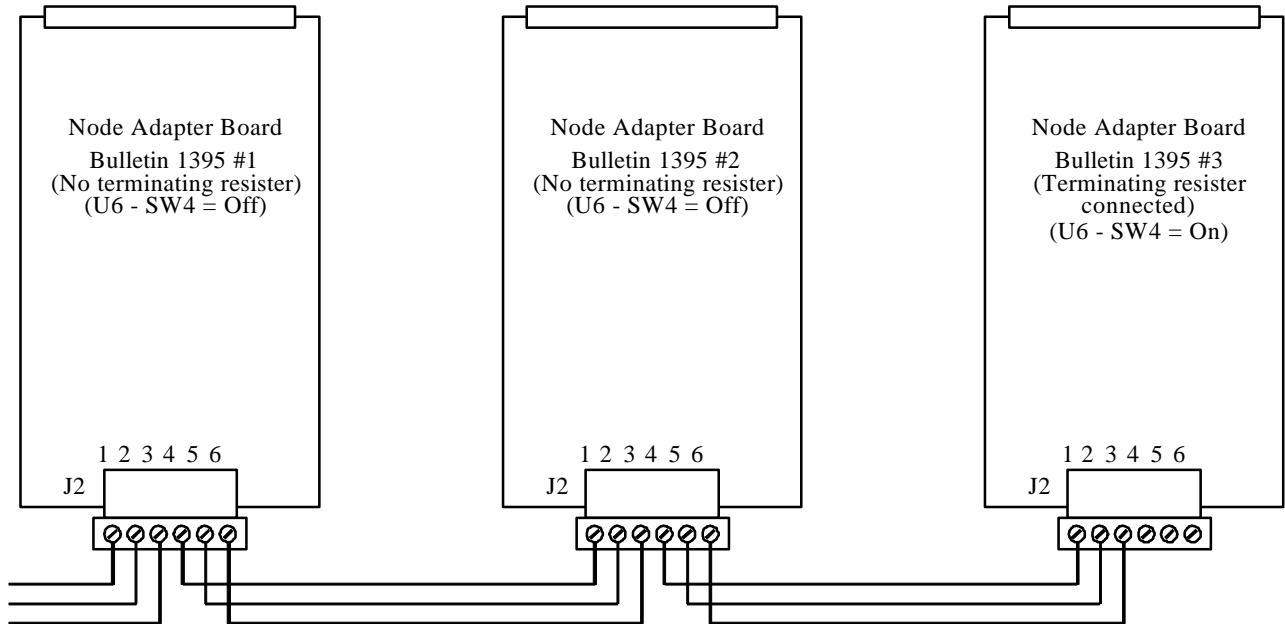


Figure 1.6 J2 Connections in a Multi-Drive System



ATTENTION: When breaking connections at Terminal J2 on any Node Adapter Board in a daisy chained system, communications will be interrupted to Nodes that are down line in the chain. Depending upon the application, a loss of control to devices connected to these nodes could cause hazardous system operation. To guard against personal injury, the system must be shut down, or local control maintained of critical devices connected to the daisy chain when making or breaking connections at J2 on any Node Adapter Board.

Switch Settings

The Node Adapter Board contains 2 DIP switches, U5 and U6 which perform several different setup functions . The first six positions of switch U5 determine the rack number (in octal) used by the PLC Controller corresponding to the drive . Any of the rack numbers listed in Table 1.B may be used. Each rack number may only be used once, therefore, in applications where several drives are connected to the same communications network (Figure 1.6) each drive must be associated with a different rack number . Switches SW7 and SW8 of U5 determine the rack configuration .

SW1 of U6 (Table 1.D) determines the communication baud rate between the PLC Controller and the Node Adapter Board. The baud rate is dependent on the specific PLC Controller hardware being used. Switch SW4 of U6 (Table 1.E) determines the termination resistor setup. In all cases, the last Node Adapter Board in the communication network must have the terminating resistor connected. In cases where only one board is used, the terminating resistor must be connected. If a daisy chain is used, only the last board in the chain will have the terminating resistor connected. All other boards in a daisy chain MUST have the resistor left NOT CONNECTED.

Refer to the following procedures and Tables 1.B through 1.E for proper switch settings.

- 1.) Determine the drive address and set the corresponding rack number using switches SW1 through SW6 (U5) and Table 1.B.
- 2.) Determine the required rack setup configuration and set switches SW7 and SW8 (U5) per Table 1.C.
- 3.) Determine the required baud rate and set switch SW1 (U6) per Table 1.D.
- 4.) Determine whether a terminating resistor is required and set switch SW4 (U6) appropriately using Table 1.E.

Table 1.B Rack Address Switch Settings (U5)

Rack#	SW1	SW2	SW3	SW4	SW5	SW6
00	ON	ON	ON	ON	ON	ON
01	ON	ON	ON	ON	ON	X
02	ON	ON	ON	ON	X	ON
03	ON	ON	ON	ON	X	X
04	ON	ON	ON	X	ON	ON
05	ON	ON	ON	X	ON	X
06	ON	ON	ON	X	X	ON
07	ON	ON	ON	X	X	X
10	ON	ON	X	ON	ON	ON
11	ON	ON	X	ON	ON	X
12	ON	ON	X	ON	X	ON
13	ON	ON	X	ON	X	X
14	ON	ON	X	X	ON	ON
15	ON	ON	X	X	ON	X
16	ON	ON	X	X	X	ON
17	ON	ON	X	X	X	X
20	ON	X	ON	ON	ON	ON
21	ON	X	ON	ON	ON	X
22	ON	X	ON	ON	X	ON
23	ON	X	ON	ON	X	X
24	ON	X	ON	X	ON	ON
25	ON	X	ON	X	ON	X
26	ON	X	ON	X	X	ON
27	ON	X	ON	X	X	X
30	ON	X	X	ON	ON	ON
31	ON	X	X	ON	ON	X
32	ON	X	X	ON	X	ON
33	ON	X	X	ON	X	X
34	ON	X	X	X	ON	ON
35	ON	X	X	X	ON	X
36	ON	X	X	X	X	ON
37	ON	X	X	X	X	X

Important: When using the PLC 5/15 or 5/25, the following series and software revisions are required as a minimum.

	Series	Revision
PLC 5/15	B	J
PLC 5/25	A	E

X = OFF or Open

ON = Closed

Table 1.C Rack Setup Switch Settings (U5)

Description	SSW7	SW8
Full Rack Physical Rack Size = 3 Starting Quarter = 0 Last Rack = 1	X	X
Half Rack - Top (1) Physical Rack Size = 1 Starting Quarter = 2 Last Rack = 1	X	ON
Half Rack - Bottom, Last (1) Physical Rack Size = 1 Starting Quarter = 0 Last Rack = 1	ON	X
Half Rack - Bottom, Not Last Physical Rack Size = 1 Starting Quarter = 0 Last Rack = 0	ON	ON

Important: When using the PLC 5/15 or 5/25, the following series and software revisions are required as a minimum .

	Series	Revision
PLC 5/15	B	J
PLC 5/25	A	E

X = OFF or Open
ON = Closed

Table 1.D Baud Rate Setting (U6)

Baud Rate	SW1
57.6 kbps	ON
115.2 kbps	X

Table 1.E Termination Resistor Setting (U6)

Resistor	SW4
Connected	ON
Not Connected	X

Start-Up Procedures

The following provides basic procedures that are necessary to configure the drive control for Node Adapter Board use .
Procedures that will be covered include:

- Verification of proper installation and wiring .
- Verification of correct switch settings for the required application .
- Configuration of the drive control for use with a Node Adapter board .

Terminology

Configuration- The process of linking Sink to Source parameters.

Interface- The hardware and associated software required to transfer information and/or control signals from one device to another.

Parameter- Memory location used to store drive data.

Sink - Parameter used to receive data input.

Source - Parameter used as a source of data

Connection Verification

Before any attempt to configure the drive is made, the following connections and settings **MUST** be verified per installation procedures above.

- Check that the Node Adapter board is mounted in the proper location for the intended Port it will be connected to .
- Check that the 60 pin ribbon cable connector J1 is connected correctly for the location and port being used by the Node Adapter Board.
- Check that the setting of all Dip switches is correct for your application referring to Tables 4 .A through 4.D in the Installation chapter.



ATTENTION: Failure to verify connections and switch settings before configuring the drive could result in personal injury and/or equipment damage.

Example Connection Configuration

The parameters used to configure the Node Adapter board are determined by which port of the Bulletin 1395 the Node Adapter is connected to. Figure 1.7 shows a sample configuration with the Node Adapter connected to Port A. Figure 1.8 shows an example of Port B configuration. Note in particular that Port B must use 300 series parameters and Port A 400 series parameter numbers.

Figure 1.7 Configuration Example for Node Adapter Connected to Port A of Bulletin 1395

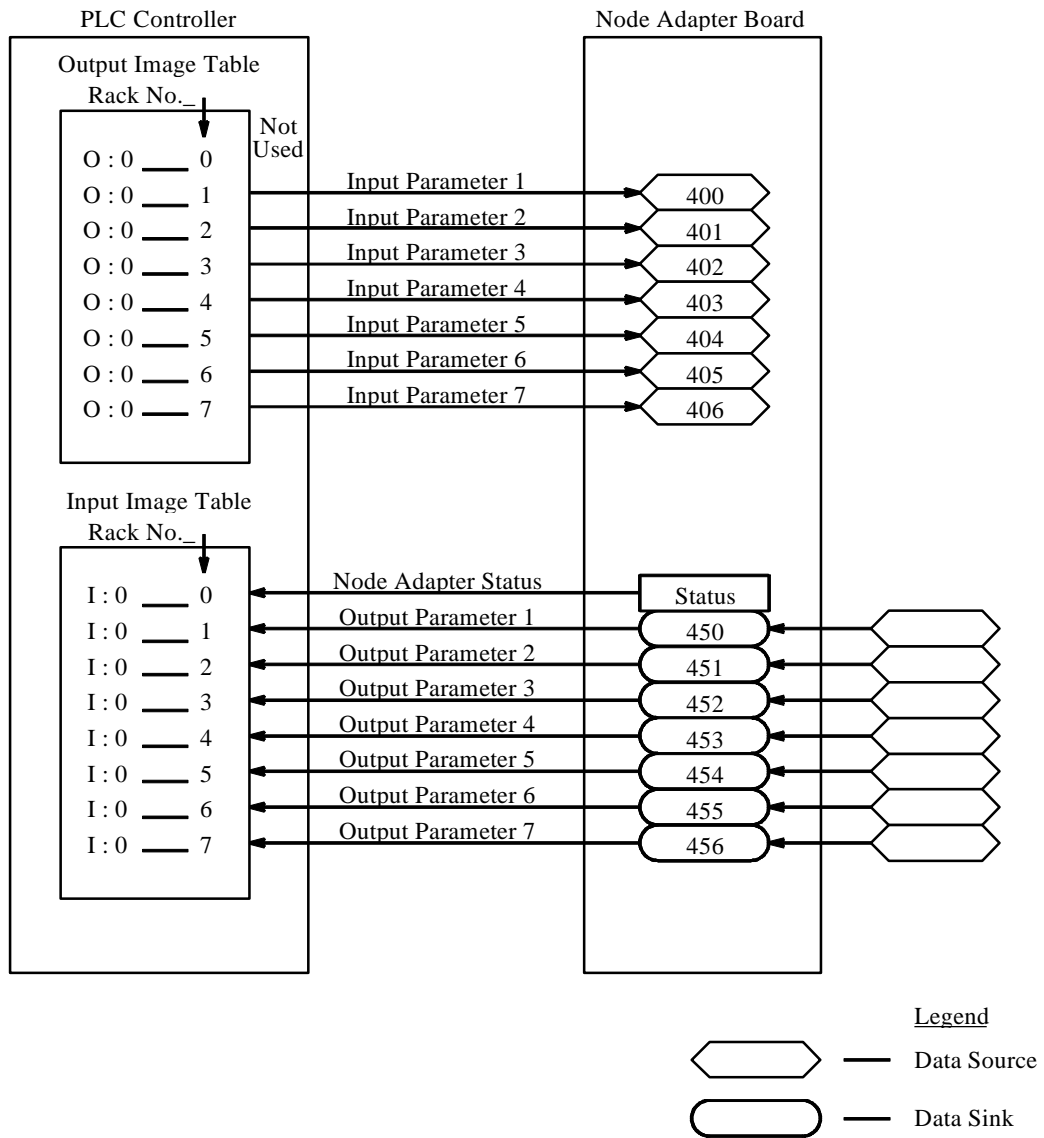


Figure 1.8 Configuration Example for Node Adapter Connected to Port B of Bulletin 1395

