HITACHI

L100/SJ100
Ethernet Interface
U s e r   M a n u a l
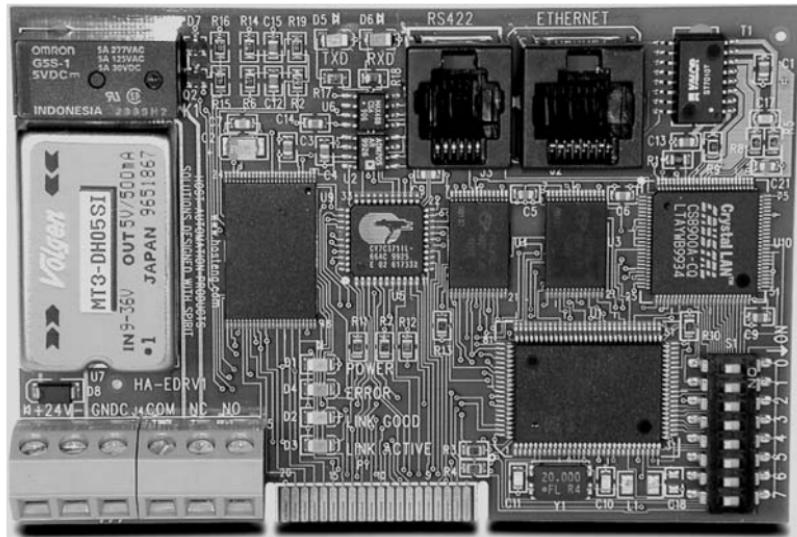
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HITACHI SJ100
ETHERNET INTERFACE
USER MANUAL

Please include the Manual Number and the Manual Issue, both shown below, when communicating with Technical Support regarding this publication.

Manual Number:	**HA-EDRV-M**
Issue:	**First Edition**
Issue Date:	**02/05/03**

Publication History		
Issue	**Date**	**Description of Changes**
First Edition	02/05/03	Original

TABLE OF CONTENTS

In This Manual...

Manual Overview

Overview of this Publication

The HA-EDRV2 User Manual describes the installation, configuration, and operation of the HA-EDRV2Ethernet Interface card.

Who Should Read This Manual

This manual contains important information for those who will install, maintain, and/or operate any HA-EDRV2 card.

Supplemental Publications

The **Ethernet Remote Master Module Manual** (H24-ERM-M) is available from **AutomationDirect** and may be useful for your application.

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When you see the "notepad" icon in the left-hand margin, the paragraph to its immediate right will be a special note.

When you see the "exclamation mark" icon in the left-hand margin, the paragraph to its immediate right will be a WARNING. This information could prevent injury, loss of property, or even death (in extreme cases).

HA-EDRV2 Overview

The Ethernet Interface for the Hitachi L100/SJ100 (HA-EDRV2) provides a low-cost, high-performance 10BaseT Ethernet link between a PLC-based Control system and a Hitachi L100/SJ100 AC Drive. The HA-EDRV2 mounts on DIN rail and communicates through cable connections to the AC drive and Ethernet hub/switch or H2(4)-ERM module.

The function of the interface is to:

- process input signals from the AC drive
- format signals to conform to the Ethernet standard
- transmit signals to the PLC controller
- receive and translate output signals from the PLC/PC-based Control software
- send the output signals to the AC drive

The control function is not performed by the interface. The control function is performed by PLC–based control system. The I/O mapping function is performed by an H2(4)-ERM module (purchased separately) and the ERM Workbench Utility which is part of the *Direct*SOFT32 PLC programming software.

Package Contents

After receiving the HA-EDRV2, please check for the following:

- Make sure that the part number indicated on the package corresponds with the part number of your order.
- Make sure that the package includes a HA-EDRV2 card, one piece of **SNAP**TRACK™, two DIN mounting clips, and one serial connection cable.
- Inspect the contents to insure they were not damaged during shipment.

HA-EDRV2 Board Layout

Relay   LED Indicators   Communication Ports

DIP Switches
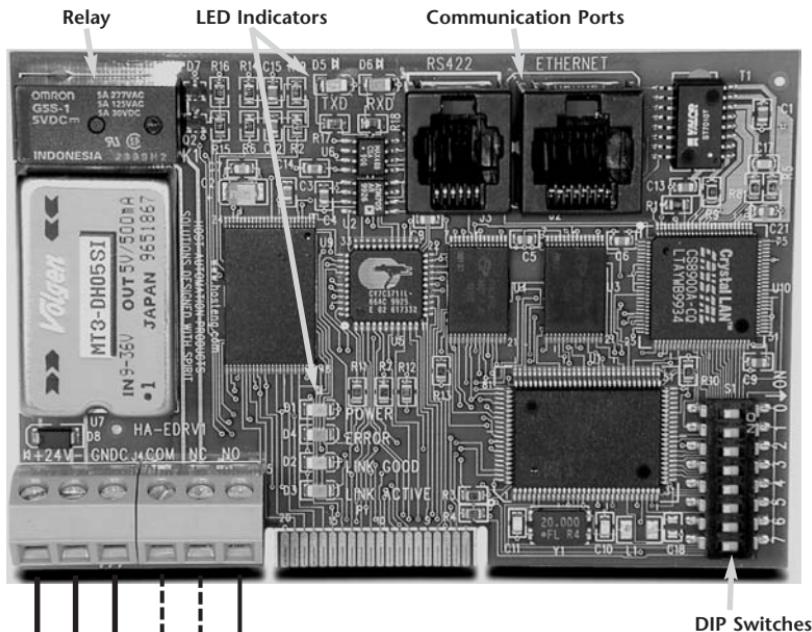
<u>Relay Terminals</u>
NO: Normally Open Terminal

NC: Normally Closed Terminal

COM: Common Terminal

<u>Relay Specifications</u>
Form C Relay

<u>Resistive Load</u>	<u>Inductive Load</u>
2A (NO)/2A (NC) @ 277VAC	0.5A@ 250VAC, cosf>=0.4
5A (NO)/3A (NC) @ 125VAC	1A@ 250VAC, cosf>=0.8
5A (NO)/3A (NC) @ 30VDC	0.8A@ 250VAC, cosf>=0.9

<u>Power Terminals</u>
Chassis or system Ground (GNDC) connection

Negative connection (–) or 0VDC

Positive connection (+) or +24VDC

Power Terminals

Power for the HA-EDRV2 is connected directly to the card using a nominal 24VDC supply (+24VDC, –0VDC). The GNDC terminal is for a chassis or system Ground.

Input Voltage

18-33 VDC with a 24VDC nominal supply

Input Current

90-135 mA

Communication Ports

Two comm ports are provided to make a connection from an Hitachi L100/SJ100 (Serial port) to an Ethernet device or network (Ethernet port).

DIP Switches

The DIP Switches are used to set the Module ID for the HA-EDRV2 card.

LED Indicators

POWER Indicator

The green POWER LED is steady on when the HA-EDRV2 is correctly powered by a 24VDC supply.

ERROR Indicator

If the HA-EDRV's red Error (ERROR) indicator is flashing or steady on, a fatal error has occurred. The error may be in the card itself, or a network problem may be causing this symptom. The ERROR indication can be caused by a faulty ground, an electrical spike or other types of electrical disturbances. Cycle power to the system to attempt clearing the error.

LINK GOOD Indicator

The green LINK GOOD LED is steady on when the HA-EDRV2 is correctly connected to an active device on the network. The LINK LED verifies that the proper cables are connected, and the card is functioning correctly. If a mismatch with the 10BaseT connections occurs this LED will not be illuminated.

LINK ACTIVE Indicator

The red LINK ACTIVE LED flashes to indicate that the card sees data travelling on the network. If any network device is sending or receiving data, the ACTIVE LED will be illuminated. In idle mode (no network traffic) this LED is OFF. During heavy communication loads this LED will be steady on.

TXD

The green TXD LED flashes to indicate that the card sees data travelling to the AC drive. During heavy communication loads, this LED will be steady on.

RXD

The green RXD LED flashes to indicate that the card sees data traveling from the AC drive. During heavy communication loads this LED will be steady on.

Setting the HA-EDRV2 Address

Each HA-EDRV2 must have an identification (ID) or address in order to be recognized on the network, and each ID must be unique. Duplicate IDs on the same network will cause unpredictable results and must be avoided.

⚠️ **WARNING: Duplicate IDs on the same network will cause unpredictable results and must be avoided.**

Setting Module ID with DIP Switches

You can use the DIP switch to set the ID to a number from one to sixty-three. Do not use ID "0" for communications.

If the DIP switch is set to a number greater than 0, the software tools are disabled from setting the ID. Again, the software tools will only allow changes to the ID if the DIP switch setting is 0 (zero, all switches OFF).

Note: The DIP switch settings are read only at power-up. You must cycle power if you change the DIP switches.

The HA-EDRV2 DIP switch contains eight individual switches, but only six of these are active. You will find that the printed circuit board is labeled 0 (zero) through 7. The numbers on the printed circuit board indicate the power of 2 represented by each individual switch. For example, switch 0 represents 2^0 (or 1), switch 1 is 2^1 (or 2), switch 2 is 2^2 (or 4), and so on.

The ID equals the sum of the binary values of the slide switches set in the ON
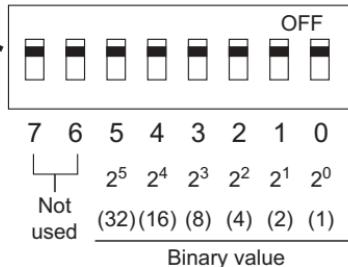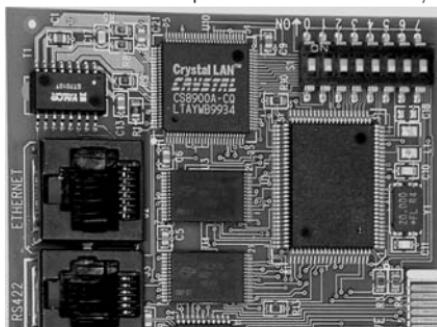
position. For example, if you set slide switches 1, 2, and 3 to the ON position, the ID will be 14. This is found by adding 8+4+2=14. The maximum value you can set on the DIP switch is 32+16+8+4+2+1=63. This is achieved by setting switches 0 through 5 to the ON position.

Network Connections

DL-205 CPU w/ H2-ERM

HA-EDRV

E-SW05-U

HA-EDRV

L100 AC Drive

SJ100 AC Drive
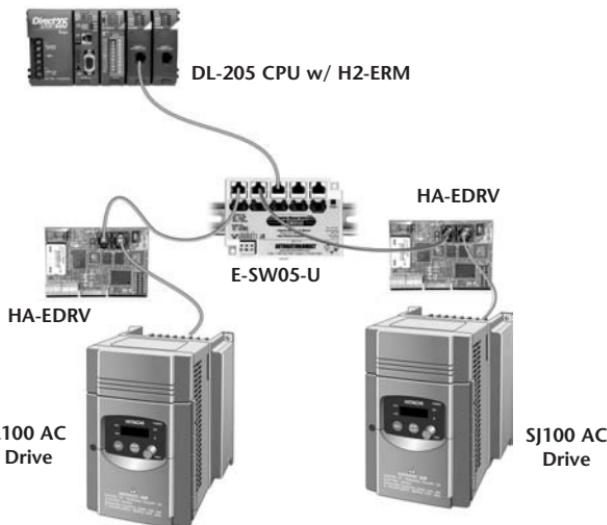
10BaseT Connections

The HA-EDRV2 has an eight-pin modular jack that accepts RJ45 connector plugs. UTP (Unshielded Twisted-Pair) cable is rated according to its data-carrying ability (bandwidth) and is given a "category" number. We strongly recommend using a category 5 cable for all Ethernet 10BaseT connections. For convenient and reliable networking, we recommend that you purchase commercially manufactured cables (cables with connectors already attached).

To connect an HA-EDRV2 to a hub, switch, or repeater, use a patch cable (sometimes called a straight-through cable). The cable used to connect an H2(4)-ERM directly to an HA-EDRV2 or to connect two hubs is referred to as a crossover cable.

Patch (Straight-through) Cable

EDRV				HUB
TD+	1	OR/WHT	OR/WHT	1 RD+
TD-	2	OR	OR	2 RD-
RD+	3	GRN/WHT	GRN/WHT	3 TD+
	4	BLU	BLU	4
	5	BLU/WHT	BLU/WHT	5
RD-	6	GRN	GRN	6 TD-
	7	BRN/WHT	BRN/WHT	7
	8	BRN	BRN	8
RJ45				RJ45

Crossover Cable

EDRV				PC
TD+	1	OR/WHT	GRN/WHT	1 TD+
TD-	2	OR	GRN	2 TD-
RD+	3	GRN/WHT	OR/WHT	3 RD+
	4	BLU	BLU	4
	5	BLU/WHT	BLU/WHT	5
RD-	6	GRN	OR	6 RD-
	7	BRN/WHT	BRN/WHT	7
	8	BRN	BRN	8
RJ45				RJ45

This diagram illustrates the standard wire positions in the RJ45 connector. We recommend all Ethernet 10BaseT cables to be Category 5, UTP cable.

HA-EDRV to Hitachi L100/SJ100 Connection

A serial connection cable (2 ft. in length) is provided with the HA-EDRV2 to make a RS-422 connection with a Hitachi L100/SJ100 AC drive.

Setting the Hitachi L100/SJ100 Parameters

The following parameters need to be set in the Hitachi SJ100 in order to operate properly with the HA-EDRV interface card.

A01: 02 – Frequency source setting determined by Function F01 setting.

A02: 02 – Run command source is set by run key on keypad or remote operator.

Note: The previous list of parameter settings are the minimum required to communicate with a Hitachi L100/SJ100 through a HA-EDRV interface card. There may be other parameters that need to be set to meet the needs of your application.

Connecting the HA-EDRV to an ERM Module

The HA-EDRV interface card can be added to any H2(4)-ERM module using the ERM Workbench Utility. For more details on selecting and configuring slaves for the ERM module, see CHAPTER 4 of the H24-ERM-M.

Reserved PLC Memory for the HA-EDRV

Once the HA-EDRV is added the ERM module, 8 DWORD inputs and 2 DWORD outputs are mapped back to the PLC. The assigned PLC addresses are shown in the ERM Workbench Utility.
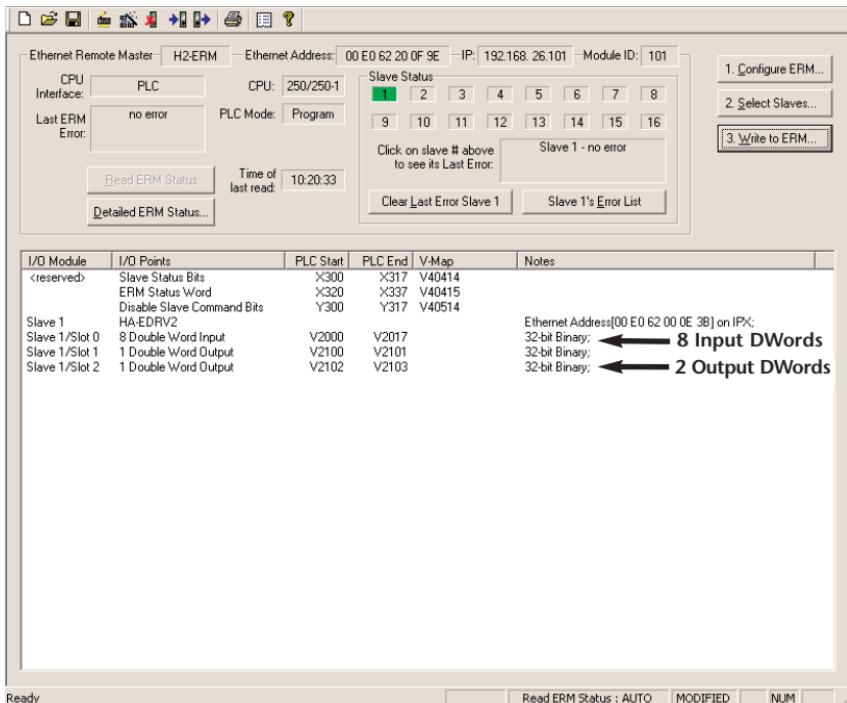
Input/Output Word Map

The Input and Output DWORDS for the HA-EDRV are mapped to specific parameters and functions in the Hitachi L100/SJ100 AC drives. The following tables show the Input and Ouput DWORDS and their functions.

Input Word Map		
Input Word	**Parameter Reference**	**Function**
1	D1	Output Frequency Monitor
2	D2	Output Current Monitor
3	D3	Rotation Direction Monitor
4	D4	Process Variable (PV), PID Feedback Monitor
5	D5	Intelligent Input Terminal Status
6	D6	Intelligent Output Terminal Status
7	D7	Scaled Output Frequency Monitor
8	O21	Trip Indicator (if bit 0 is set)

Output Word Map		
Output Word	**Parameter Reference**	**Function**
1	O1	Run Mode [0=Stop, 1=Forward, 2=Reverse]
2	F1	Output Frequency Setting

When a drive trip occurs, Input DWORD 8 (O21) will go to 1. To reset the trip, write Output DWORD 1 (O1) to a zero to stop/reset the drive.

Troubleshooting

Troubleshooting help for the ERM module and its slaves is available in CHAPTER 6 of the Ethernet Remote Master User Manual (H24-ERM-M).

HA-EDRV2-M