
MicroTrac Gateway to Allen-Bradley Data Highway Plus

Part No. 46S02906-0020

For use on MicroTrac Local Area Network

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INTRODUCTION

The Allen-Bradley Data Highway Plus Programmable Logic Controller (PLC) Gateway allows any drive on the MicroTrac® LAN to communicate with an Allen-Bradley PLC. **Only Numeric information can be transferred from the DSD drives to the Allen-Bradley PLC.**

HARDWARE

The Allen-Bradley DHP PLC Gateway is a self-contained 4 slot PC back plane enclosure consisting of 4 half-size XT style slots. The gateway contains the power supply and has a sheet metal cover. Installed in the gateway are three XT style (8 bit) PC compatible cards. They are:

1. A MicroTrac interface card with an ARCNET high impedance (bus configuration) BNC connector for coaxial cable. MagneTek part number 05P00090-0269.
2. An 5136-SD Direct-Link interface card to connect to the Allen-Bradley PLC Data Highway Plus network. MagneTek part number 05P00090-0336.
3. An 80188 based CPU card with 64K RAM and 64K EPROM or 128K EPROM on board. MagneTek part number 46S03159-0010 .

Setup

Each of the three cards installed in the back plane has jumpers and switches that must be set before insertion into the back plane. After insertion, certain external cable connections must be made in order for the system to function properly.

**MicroTrac
Network
Interface Card**

Install jumper plugs on E1 as shown in Table 1:

Table 1. E1 Settings

POSITION	JUMPER
TOP	YES
↓	YES
	NO
	NO
	NO
	YES
	NO
	BOTTOM

Install jumper plugs on E4 as shown in Table 2:

Table 2. E4 Settings

POSITION	JUMPER
IRQ2	NO
↓	YES
	NO
	NO
	NO
IRQ7	NO

No jumpers are installed on E3.

The node ID is set using the 8-position DIP switch, SW1. Enter the binary node ID by choosing either a "0" or "1" for each bit. The least significant bit (LSB) and the most significant bit (MSB) positions are labeled on the board. The LSB is toward the top of the board. Leaving the switch in the down position sets the switch at "0". For example, node ID 200, represented in binary form as 1100 1000, is set as shown in Table 3:

Table 3. Network Interface Card DIP Switch SW1 Settings

MSB						LSB	
UP	UP	DN	DN	UP	DN	DN	DN

The node number for the PLC gateway will normally be 200; however, check the system schematic for confirmation. Occasionally a different node number might be used.

This card may be installed into any half-size slot of the back plane.

A BNC type "T" connector is used to interconnect this board to the MicroTrac LAN's coaxial cable. A 93 ohm terminator must be placed at each end of the coaxial cable (either a BNC terminator cap or connection to a LAND port). The BNC "T" connector and 93 ohm terminator are identified below:

1. BNC "T" connector, 50 ohm impedance, MagneTek part number 05P00034-0540.
2. 93 ohm BNC terminator, MagneTek part number 05P00034-0586.

5136-SD Direct-Link Interface Card

Set the I/O port address to 250H and all interrupts to off by setting the bit switches on SW1 as shown in Table 4:

Table 4. Direct-Link Interface Card DIP Switch SW1 Settings

1	2	3	4	5	6	7	8
OFF	OFF	OFF	ON	OFF	ON	OFF	ON

The Direct-Link Interface card in the Bridge must be connected to the Direct-Link Interface card in the computer. Use two-conductor shielded cable as shown on the system schematic.



80188 Based CPU Card

Set serial port select of RS-232. This is done by installing a jumper plug on E1 on the CPU Card to connect from the center pin to the RS-232 pin.

Set I/O Channel Check to disabled. This is done by installing a jumper plug on E3 on the CPU Card to connect from the center pin to the DIS pin.

There must be a 32K static RAM chip installed in sockets RAM0 and RAM1.

There must be a 64K EPROM that contains the PLC gateway software installed into socket ROM1.

There must be a 64K EPROM installed into socket ROM0.

General

Normally the PLC gateway will be mounted and wired on a MagneTek drive panel. However, the gateway can be mounted remotely by the customer. In this case, special consideration must be given to the 120 VAC power source for the gateway power supply. **DO NOT** plug the gateway power cord directly into a wall outlet. Instead, use an isolation transformer and tie one side of the secondary to the nearest earth ground (the steel structure of the building is usually a good choice). The ground studs on the MicroTrac drive panels or cabinets must also be connected directly to a solid earth ground in order to assure that the gateway enclosure and the drive panels are at the same potential. Otherwise, erratic operation of the MicroTrac LAN system may occur.

SOFTWARE The EPROMs on the CPU card contain a software program that is fixed (i.e. not changeable on a job-to-job basis), and is transparent to the user. The software allows communication between MicroTrac drives and the Allen-Bradley Data Highway Plus network via the NUMO PAC block which outputs numeric data from the DSD drives to PLC block transfer reads (BTRs).

OPERATION The PLC gateway, when connected to the Allen-Bradley Data Highway Plus cable, can be treated as if it were an Allen-Bradley PLC5 at station address 4 on the network. The gateway provides access to file number N11 for other PLCs on the Data Highway Plus Network.

The channel and sub channel numbers used by the NUMO PAC block define the item number in DHP file N11. The item number equals the channel number times ten (10) plus the sub channel number:

$$(\text{Channel Number} * 10) + \text{Sub channel Number} = \text{File offset}$$

For example, to address item 113 in file N11, the NUMO PAC block would use channel 11 and sub channel 3, i.e. $(11 * 10) + 3 = 113$. To address item 241, the NUMO PAC block would use channel 24 and sub channel 1, i.e. $(24 * 10) + 1 = 241$.

The node number used by the PAC block to address the PLC gateway is usually 200, as discussed in the previous section describing the Network Interface card setup.

Each Numeric data item uses one 16 bit word in the PLC file. The word is presented to the DHP network as a two's complement binary number (also called a signed integer). These numbers can range from +32767 to -32768. These integer values might have an assumed fixed location for a decimal point. Since the number transferred to or from the PLC is an integer, not an integer plus a fraction, there must be some way of determining where the decimal point is to be located. In the numeric PAC block NUMO, this is accomplished by the DP (decimal point) parameter. For example, if the integer transferred from the PAC block to the PLC has a range of +32.767 to -32.768, the DP parameter for that PAC NUMO block must be specified as three (3).

PLC Gateway Status

The PLC gateway status is displayed on the four (4) character alphanumeric display that is mounted on the CPU card.

The following is a list of the different status messages that may be displayed and their meanings:

<u>DISPLAY</u>	<u>MEANING</u>
PUP	Initial power-up is OK.
WAIT	PLC communication speed not yet determined.
57KB	PLC communication speed is 57.6K baud..
115K	PLC communication speed is 115.2K baud.
ENOA	Error in Numeric Output Allocation.
ELIA	When the PLC gateway receives a logical input allocation message, this error message could appear because the internal allocation table is full and cannot handle another allocation. The allocation table has room for 1024 allocations. A logical allocation uses 1 element in the table.
EPMA	Port or Memory Address Error in loading software into 5136-SD interface card. This is caused by a missing or improperly installed card or improper switch settings on the 5136-SD interface card.
EZ80	Z80 microprocessor on the 5136-SD interface card did not start up properly. Probable cause would be a defective 5136-SD Interface card.
ENMI	Non-Maskable Interrupt Error on CPU card. Probable cause could be electrical noise (EMI) near the PLC gateway chassis.

MicroTrac Network Interface Card

The interface card has two LEDs which indicate the following:

Red – Indicates activity is present on this node. Should be blinking or steady.

Green – Indicates that a token ring has been formed. Should be on (blinking or steady).

5136-SD Direct-Link Interface Card

This card has two LEDs which indicate the following:

Red – Should blink on power-up, then fo off and remain off.

Green – Blinkd whenever a message is sent to PLC. Should either blink or remain steady as long as communication with the PLC is maintained.

Hub Card

On large systems, a multi-port expansion Hub card may be present in the gateway card rack as a fourth card. If it is present, its LEDs signify the following:

Red Light (at Each Port) – Indicates activity for each individual port. If an active cable is connected to a port, the red light should be on.

Yellow – Indicates network configuration. Should be on only when network configuration is changed (i.e. adding a node) or on power-up.

Red – Indicates total network activity.