SIEMENS

Siemens Applied Automation

Advance Network Gateway (ANG)

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User's Manual
2000579-001

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Preface

Audience & Purpose

This manual is intended to introduce users to the Advance Network Gateway (ANG) unit. It includes complete instructions for proper and safe installation of the ANG by installation personnel.

Chapter Contents

The manual provides the following information:

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Advance Network Gateway	1
Installation	7
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Technical Support

Getting Help

At Siemens Applied Automation we take pride in the on going support we provide our customers. When you purchase a product you receive a detailed manual which should answer your questions; however, our technical support service provides a special “hot” line as an added source of information.

If you require assistance call:

1-800-448-8224

Before You Call

Before you call one of our technical support lines. Please have the following information available to help our representative answer your questions:

1. Unit Serial Number and Date of Installation
2. Description of problem
3. LEDs status on Communication Board

Safety Practices and Precautions

Safety First

This product has been designed and tested in accordance with IEC Publication 1010-1, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. This manual contains information and warnings which have to be followed by the user to ensure safe operation and to retain the product in a safe condition.

Terms in This Manual

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

Terms as Marked on Equipment

DANGER indicates a personal injury hazard immediately accessible as one reads the markings.

CAUTION indicates a personal injury hazard not immediately accessible as one reads the markings, or a hazard to property, including the equipment itself.

Symbols in This Manual

This symbol indicates where applicable cautionary or other information is to be found.

Symbols Marked on Equipment

DANGER - High voltage

Protective ground (earth) terminal

ATTENTION - Refer to Manual

Grounding the Product

A grounding conductor should be connected to the grounding terminal before any other connections are made.

Correct Operating Voltage

Before switching on the power, check that the operating voltage listed on the equipment agrees with the available line voltage.

Danger Arising From Loss of Ground

Any interruption of the grounding conductor inside or outside the equipment or loose connection of the grounding conductor can result in a dangerous unit. Intentional interruption of the grounding conductor is not permitted.

Safe Equipment

If it is determined that the equipment cannot be operated safely, it should be taken out of operation and secured against unintentional usage.

Use the Proper Fuse

To avoid fire hazard, use only a fuse of the correct type, voltage rating and current rating as specified in the parts list for your product. Use of repaired fuses or short circuiting of the fuse switch is not permitted.

Safety Guidelines

DO NOT open the equipment to perform any adjustments, measurements, maintenance, parts replacement or repairs until all power supplies have been disconnected.

Only a properly trained technician should work on any equipment with power still applied.

When opening covers or removing parts, exercise extreme care since "live parts or connections can be exposed".

Capacitors in the equipment can retain their charge even after the unit has been disconnected from all power supplies.

Chapter 1

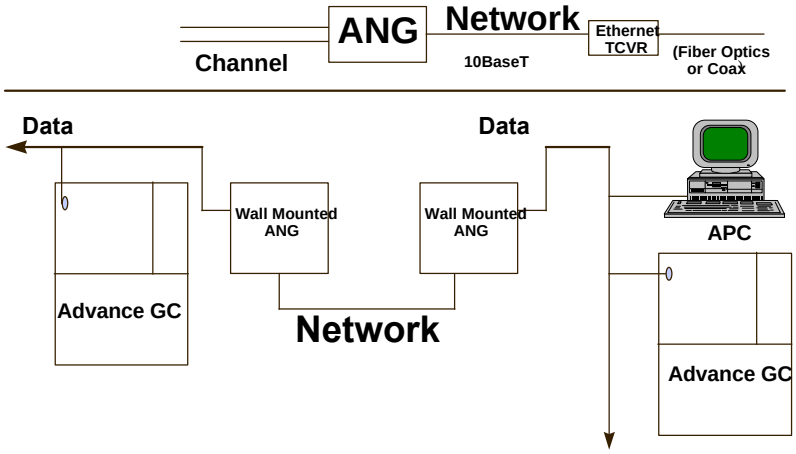
Advance Network Gateway

Introduction

Overview

The Advance Network Gateway (ANG) unit connects Siemens Applied Automation's equipment residing on a Advance Data Hiway to a high speed Ethernet communication system. The ANG is a self contained unit with its own power supply and electronics. It is available for 19-inch rack or wall mounting.

Figure 1-1
Network Gateway



Features

- High speed implementation of Advance Data Hiway using Ethernet
- Permits joining of multiple segments of standard Data Hiway
- Significantly increases communication data capacity
- Allows use of fiber optics and other Ethernet transmission media

Specifications

Media Interface

Communication Board: 10BASE-T RJ-45 STP connector

Ethernet Specifications

Data rate:	10Mbits/sec.
Maximum Cable Length	Per Ethernet Specifications
Maximum length to adapter concentrator/hub:	100m (328 ft)
Cable Type (minimum req):	AT&T D-inside wire (DIW & PDS, IBM Type 3, Category 3 or 5 data grade cabling)
Cable Characteristics:	100 Ohms nominal impedance

Data Hiway Specifications

248 Advance Units Maximum / 31 Units per Loop
8 Loops Maximum

Power (Mains) Requirement

Input Voltage
85-264 VAC, 47-63 Hz
Single Phase, Grounded Neutral
1 Ampere Maximum (<100 Watts)

Electrical Connections

Input Power
Terminal Strip for braided or solid 12 AWG ($2.5mm^2$) maximum wire size

Data Hiway
Terminal Strip for dual or single pair Data Hiway cable

Interfaces
Laptop PC RS 232: 9-pin Sub D plug
Ethernet 10BASE-T: standard RJ-45 connector

Dimensions

Rack Mounted Package Configuration
See Figure 1-2 for Outline Drawing and Dimensions

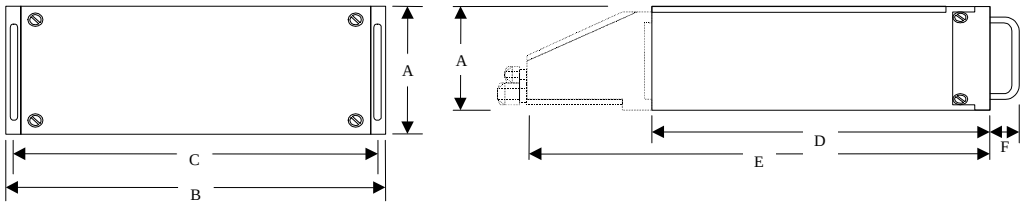
Wall-Mounted Package Configuration
See Figure 1-3 for Outline Drawing and Dimensions

Zone 1 - Wall-Mounted Package Configuration
See Figure 1-4 for Outline Drawing and Dimension

Specifications, Continued

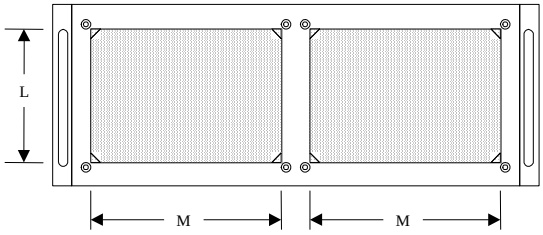
Housing, Explosion Protection, Ratings and Certifications	Wall Mounted Configuration NEMA 3 (IP-54) CSA Certified for Class I, Division 2, Group A,B,C,D CENELEC non-Ex (Air purge is not required for fire protection as indicated; however, the unit may be air purged, if desired, for additional protection from environmental elements.) Rack Mounted Configuration NEMA 2 (IP-20) CSA Certified for Class I, Division 2, Group A,B,C,D CENELEC non-Ex Zone 1 Configurations CENELEC approved EEx d IIC T6 Cortem CCA-04 enclosure Electromagnetic and Radio Frequency Compatibility and Electrical Safety CE Compliance; certified to 89/336/ECC (EMC directive) CE Compliance; certified to 73/23/EEC (Low Voltage directive) Tested per EN 61010-1 / IEC 1010-1 Housing Materials and Colors Stainless steel (1.4016); Front and top are commercial gray B (RAL 7043), housing is light gray (RAL 7035) Weight Rack/Wall: 15 kg (35 pounds) approximately Zone 1: 33 kg (73 pounds)
Ambient Installation Conditions	Operation: -18° to +50°C (0° to 122°F) 0-99% relative humidity (non-condensing) maximum 0-75% relative humidity year-round average (Purge with dry air or nitrogen if required in tropical conditions.) Must not be exposed to direct sunlight. Must be protected from rain. Storage and Transport: -25° to +65°C

Figure 1-2. Rack Mount Dimensions



Rack Mount, Front View

Rack Mount, Side View

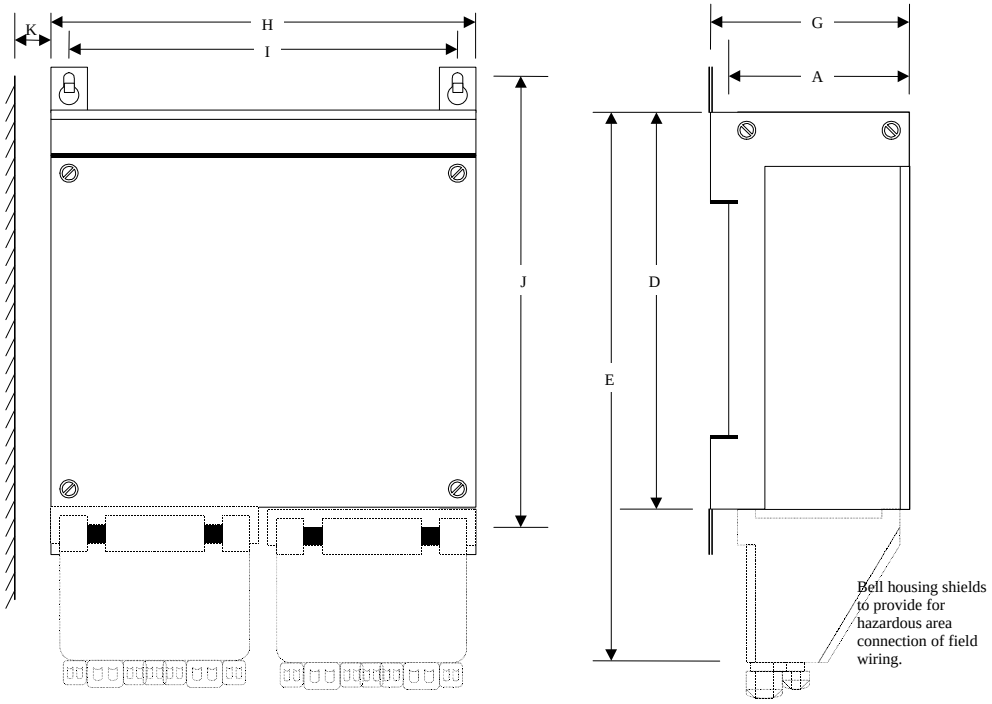


Rack Mount, Rear View

Dimension Table

Figure 1-2	Description	U.S. Inches	Metric mm
A	Rack Height	6 15/16	177
B	Rack Total Width	19	483
C	Rack Mounting Holes Spacing	18 1/4	464
D	Rack Depth of Case Only	16 1/4	413
E	Rack Depth Including Cable Housing	22 1/8	563
F	Handle Depth in Front of Rack	1 3/8	35
L	Height of Rear Access Panels	5	127
M	Width of Rear Access Panels	7 ½	190

Figure 1-3. Wall Mount Dimensions



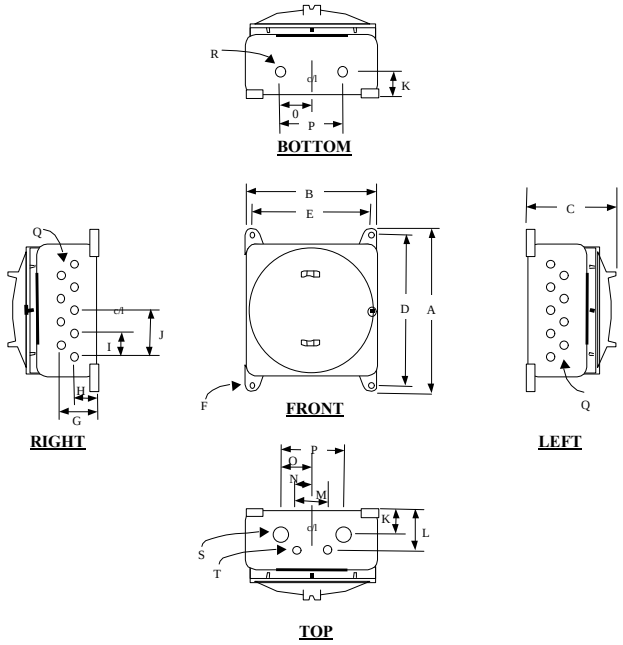
Wall Mount, Front View

Wall Mount, Left Side View

Dimension Table

Figure 1-3	Description	U.S. Inches	Metric mm
G	Wall Depth	7 13/16	199
H	Wall Width	17 1/2	444
I	Wall Mount Holes Horizontal Spacing	15 9/16	396
D	Wall Height of Case Only	16 1/4	413
E	Wall Height Including Cable Housing	22 1/8	563
J	Wall Mount Holes Vertical Spacing	17 11/16	450
K	Left Side Wall Clearance for Door Opening	2 3/8	60

Figure 1-4. Zone 1 – Wall Mount



Dimension Table

Figure 1-4	Description	Metric (mm)	U.S. (inches)
A	Overall enclosure height	523	20 9/16
B	Overall enclosure width	431	16 15/16
C	Overall enclosure depth from wall mounting	271	10 11/16
D	Vertical distance between wall mounting holes	481	19
E	Horizontal distance between wall mounting holes	390	15 3/8
F	Clearance of wall mounting holes	20	13/16
G	Distance from wall to front cable entry hole (left and right)	120	4 3/4
H	Distance from wall to back cable entry hole (left and right)	76	3
I	Spacing between holes on sides (left and right)	76	3
J	Spacing from center line to outer hole on side (left and right)	153	6
K	Spacing from wall to back cable entry hole (top and bottom)	76	3
L	Spacing from wall to front cable entry hole (top and bottom)	127	5
M	Spacing between front cable entry holes (top)	102	4
N	Spacing between center line and outer cable entry hole (top)	102	4
O	Spacing between center line and outer cable entry hole (top and bottom)	51	2
P	Spacing between rear cable entry holes (top and bottom)	102	4
Q	9 threaded cable entry holes each on left and right sides	M20 x 2.5	
R	2 threaded cable entry holes on bottom	M20 x 2.5	
S	2 threaded cable entry holes on top		1-1/4 x 11 NPT
T	2 threaded cable entry holes on top		3/4 x 14 NPT

Chapter 2

Installation

Introduction

Overview

This chapter is intended for installation personnel. After completing the procedures, within this Chapter, the Advance Network Gateway will be ready for operation.

⚠Warning

Ensure that all AC Power (Mains) Specification requirements and advisories are met. Failure to do so, and operating the equipment in a manner not specified, may impair the safety protection provided by the equipment.

Installation Overview

Before beginning the installation process read through this Chapter to familiarize yourself with the installations requirements.

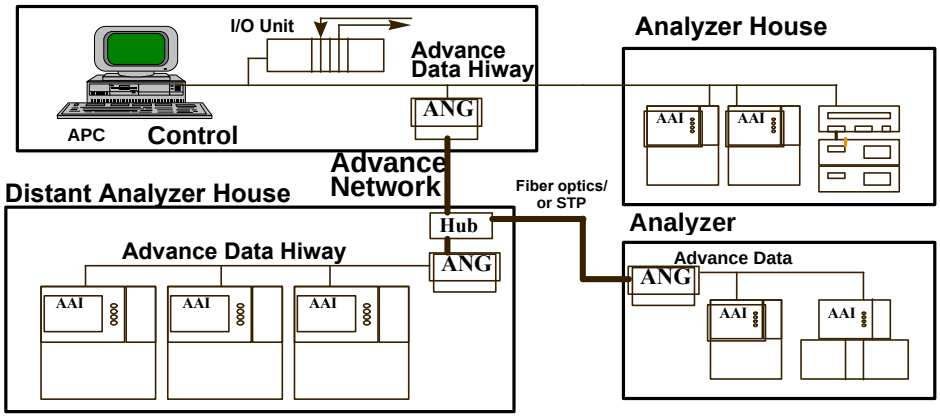
The following table provides a recommended sequence of events you should follow to ensure a safe and trouble free installation.

Topic	See Page
Unpacking and Inspection	8
Pre Installation Planning	9
Wall or Rack Mounting	12
CE Installations	13
Wiring Connections	15
AC Power (Mains) Connections	16
Data Hiway Connections	18
Ethernet Connections	21

Figure 2-2. ANG Installation

Figure 2-2 illustrates how a ANG can be used to physically extend a single loop of the Advance Data Hiway (ADH) by providing a conversion from the ADH media to Ethernet, and back to the ADH media.

All segments of the system labeled “Advance Data Hiway” are according to standard installation practices (9182 Belden cable or equivalent); see Chapter 1. Specifications; page 2.



Unpacking & Inspection

Instructions

After opening the carton containing the unit, remove the unit from the carton and inspect it for damage that my have occurred during transportation.

Points of inspection are:

- Inspect exterior of unit for dents, chipped paint, scratches, etc.
- Open unit and visually inspect interior mounted assemblies, connectors and printed circuit boards for damage.

Reporting Damage

If there is any damage, notify your local Siemens Applied Automation representative. Keep all shipping materials as evidence of damage, for carrier's inspection. Siemens Applied Automation will arrange for immediate repair or replacement:

Telephone:

Inside Oklahoma: 918-662-7430

Outside Oklahoma: 800-448-8224 toll free

Internationally: 001-918-662-7430

Pre Installation Planning

Description

This section provides information that can help you in preplanning your installation. Subsequent information includes examples of how an Advance Network Gateway (ANG) can be used to physically extend a single loop of the Advance Data Hiway (ADH) and a Fiber optic installation.

⚠Caution

Before installing the Advance Network Gateway (ANG) within an existing LAN consult with the LAN administrator. You should also adhere to all the ANG Specification requirements; see Chapter 1. Specifications; page 2.

Figure 2-1. ANG in Analyzer House

The ANG is designed for wall or 19-inch rack mounting. Figure 2-1 shows the ANG wall mounted in an analyzer house. Note that the AC Power (Mains) breaker is located in close proximity of the ANG. Also note the I/O connections to the ANG.

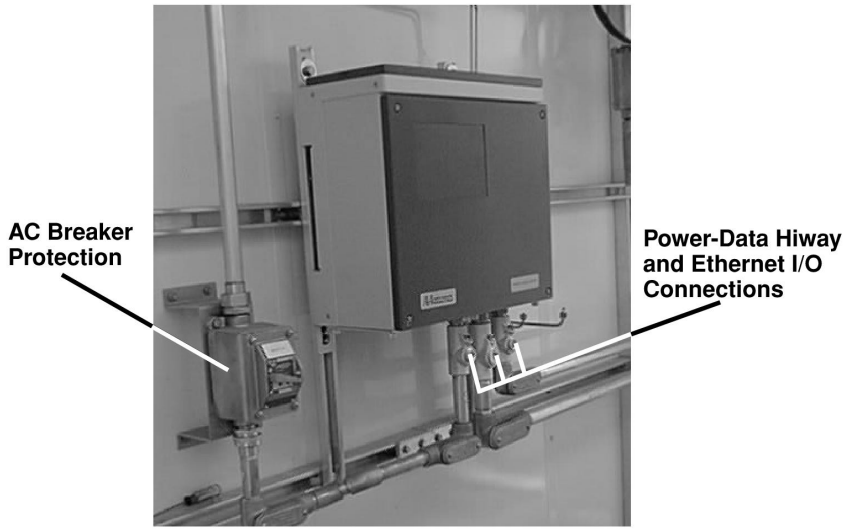
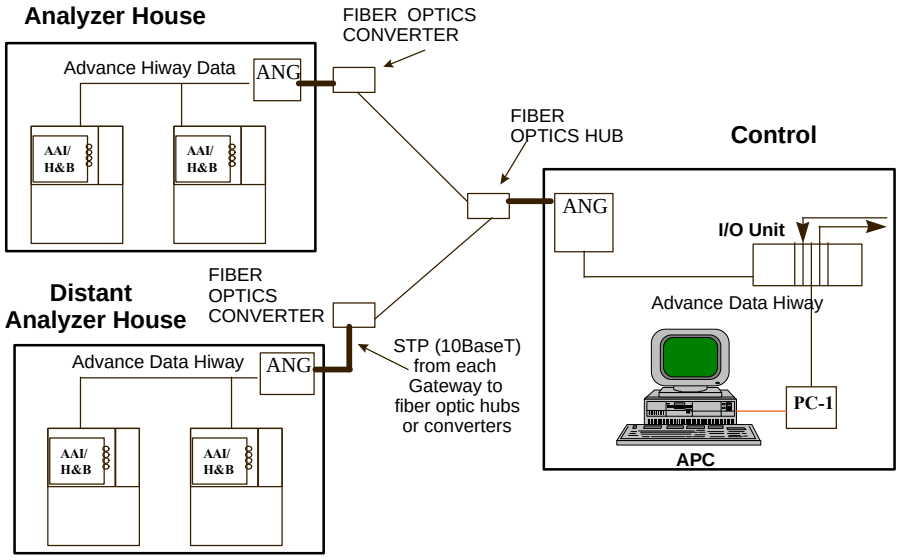


Figure 2-3. ANG Fiber Optics Installation

Figure 2-3 shows a ANG in a 10BASE-T to fiber optic installation. Fiber optic equipment including converters, hubs and interconnecting cable are not provided by Siemens Applied Automation.

As shown in Figure 2-3. multiple ANG's may be interconnected into a single large system by using appropriate Ethernet hubs.

The APC (Advance Personal Computer) must be connected to a standard segment of Advance Data Hiway via the Advance Personal Computer Interface (PCI).



Wall or Rack Mounting Installation

Instructions

The Advance Network Gateway Unit (ANG) should be:

- Installed in a location that is as free from shock and vibration.
- Protected from direct sunlight and extremes of temperature.
- It is recommended that the ANG be mounted within a shelter. This prevents ANG from being exposed to outside environmental conditions.

Package Configurations

The ANG is available in three models;

- Wall mount unit
- 19-inch rack unit
- Zone 1 wall mount.

Wall Mounting

The mounting wall must be capable of supporting the weight of the ANG; see Chapter 1., Specifications and Figures 1-2 through 1-4.

Wall Mount Unit: Use four, 5/16-inch (M8) or 3/8-inch (M10) lag bolts to mount the ANG to the wall. Mounting bolts must be secured to solid wall construction members such as studs and into the wall only. Allow adequate clearance on the left side to allow the door to swing open.

Zone 1 Wall Mount Unit: Use four, ¾ inch (M20) lag bolts to mount the NAU to the wall. Mounting bolts must be secured to solid wall construction members such as studs and into the wall only.

CE Installations

Description

This section should be used for installation sites that must conform to CE (Conformite Europeene) Certification. Typically, this does not apply to installations outside the EC unless the equipment was purchased with the explicit requirements and expectations that it shall conform to EC Electromagnetic and Radio Frequency Interference (EMI/RFI) rejection specifications.

CE Installation Kit

Available fro Siemens Applied Automation CE Installation Kit P/N 2020264-001. This kit has all the parts for all the installations referenced in this section.

Instructions

The following information pertains to CE Installation of General Purpose, Zone 1 and Division 2 Equipment. For Zone 1 Installations all cabling is terminated in the ANG Zone 1 Enclosure.

Installation with Steel Conduit

The preferred method is to route the field wiring in steel conduit. If steel conduit is used unshielded power and the signal wires can be used. The power and signal wires (Ethernet and Data Hiway) must be routed in separate conduit.

Using flexible conduit and/or armored cable is equivalent to using “steel conduit”. Flexible conduit or armored cable must have its flexible conduit and/or armoring conductivity 360-degree terminated at its entry to the ANG enclosure (or bulkhead).

Installation without Steel Conduit

If conduit is not used, the following installation practices must be used to ensure that the CE certification remains valid:

1. A shielded power cord or cable must be used for the input power wiring. The shield must be terminated at the ANG in a 360-degree termination at the enclosure (bulkhead); use Siemens AAI P/N 2015729-001 contained in the CE Installation Kit or an equivalent part. For Zone 1 Installation use Siemens AAI P/N 1311001-014 Installation Kit.

2. The Data Hiway cables shields must be terminated in a 360-degree termination at the cnlsoure (or bulkhead; use Siemens AAI P/N 2015729-001 contained CE Installation Kit or an equivalent part. For Zone 1 Installation use Siemens AAI P/N 13111001-014 Installation Kit.

3. A split ferrite must be clamped to Data Hiway cables and fixed immediately to the outside of the ANG; use Siemens part number 1173000-013 ferrite contained in CE Installation Kit. This is required to meet the Conducted Immunity requirement for CE/EMC Heavy Industrial. All other CE/EMC Heavy Industrial requirements are met without the use of a ferrite clamp.

4. Shielded Ethernet cable must be used for all Ethernet connections, in and outside the GC, and coupled through the enclosure using a shielded RJ-45 coupler; use Siemens AAI part number 1183200-003 contained in CE Installation Kit. A mounting plate (Siemens part number 2020261-001) is also avaialble to accomplish this. If needed for Zone 1 installation Siemens AAI part numbers 2017984-001 and 2017985-001 are available to maintain purge. If a PG gland is used to make the 360-degree termination of the Ethernet shieled at the enclosure, the Installation Kit and other parts are not required.

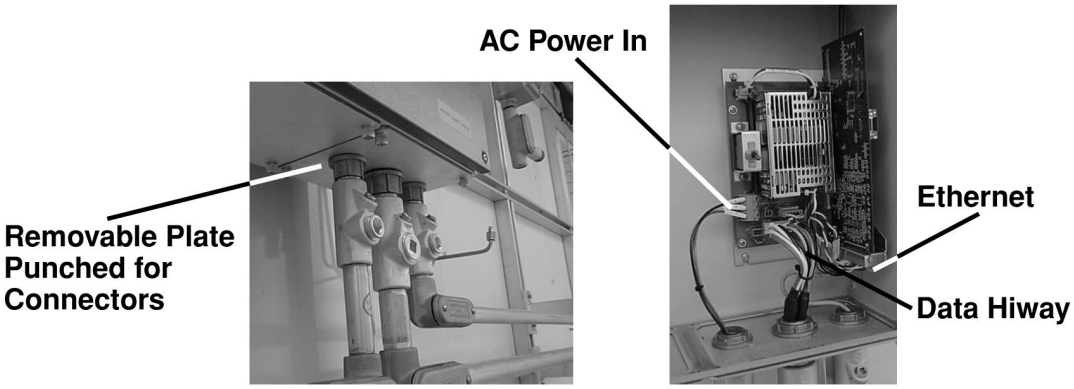
Wiring Connections

Description

Two removable wiring access plates allows all the wiring to be made through the bottom section of the ANG. The plates can be punched to accommodate conduit or cable gland connectors; see Figure 2-5.

Figure 2-5. Typical Conduit Wiring via Bottom Panel

Figure 2-5 shows the wiring for: AC Power (Mains) input, Data Hiway and Ethernet. The wiring connections shall conform to the National Electrical Code (NEC) and/or other national or local code requirements.



Types of Connections

AC Power (Mains) Connections	Page 16
Data Hiway Cable Connections	Page 18
Ethernet 10BaseT Connections	Page 21

AC Power (Mains) Connections

ANG Power Supply

The ANG Power Supply Assembly, shown in Figure 2-5, can accept 85-264 VAC, 47-63 Hz inputs without the need for setting switches or jumpers.

⚠ **WARNING**

Installation personnel shall adhere to all AC Power (Mains) Specification requirements; see Chapter 1. Specifications; page 2. Failure to do so, and operating the equipment in a manner not specified, can impair the safety protection provided by the equipment.

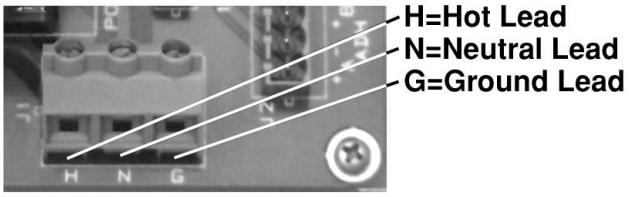
Instructions

Step	Action
1.	Shut off the primary AC Power Supply line to this location.
2.	Open the front panel of the ANG by loosening the four captive screws located on each corner; use 4mm Allen wrench.
3.	Install a 15-Ampere circuit breaker, disconnect switch or a receptacle in the power supply line or a switched receptacle near the ANG unit to make sure the unit can be completely separated from the power source. Label the breaker or receptacle box to make sure that the circuit is clearly identifiable.
4.	Remove wiring access plate; see Figure 2-5. Punch holes as required for either conduit or cable gland connectors. Install connectors and replace the plate.
5.	Route input power, in accordance with pertinent electrical codes and regulations, to ANG. Use entry point to ANG as shown in Figure 2-5.

Installation Note

To make the connections easier we have provided J1 as a removable connector. Simply grasp the top portion of the connector and pull it straight out from the base connector.

AC Power (Mains) Connections, Continued

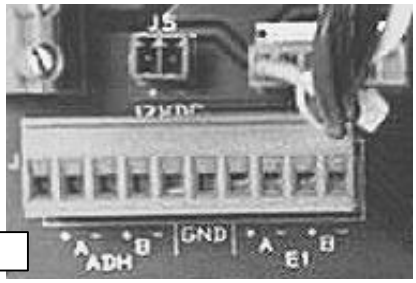
Step	Action
6.	Locate connector J1 on the Power Supply Assembly. Loosen the wire retaining screws on top of J1. Strip the insulation ¼ -inch back from each of the power supply leads. Insert each lead in the correct location, and tighten down retaining screws. 
7.	Locate the ANG chassis ground lug ⏚ and connect wire from it to the building's ground connection.
8.	Inspect all connections for shorts or loose connections.
9.	You are now ready to connect the Data Hiway cable; continue with Data Hiway Connections, page 18.

Data Hiway Connections

Description

This section provides instructions for connecting the ANG to an existing Data Hiway. Connector J2 on the Power Supply Assembly board is used for the Data Hiway connections.

Figure 2-6. Data Hiway Connector



Data Hiway Cable

The Advance Data Hiway requires a low capacitance, twin axial, 150-ohm cable. The cable can be purchased from Siemens Applied Automation. See the table below for ordering the correct cable:

Dual Channel Installation	Standard Oval Cable Siemens AAI P/N 1681000-003 (Belden P/N SSD1743)
Dual Channel Installation	Used for larger radius bends radius Siemens AAI P/N 1686002-002 (Alpha P/N 516689)
Single Channel Installation	Siemens AAI P/N 1686002-001 (Belden 9182, Alpha P/N 9283, Manhattan P/N 39240)

More Information

For technical information on the Data Hiway refer to Appendix A in the Optichrom Advance Library Set, Volume 2, Board Installation and Strapping Manual.

Instructions

Step	Action
1.	Place the ANG AC Power Supply (Mains) circuit breaker to OFF. On the ANG Power Supply Assembly place toggle ON/OFF switch to OFF. ⚠**WARNING** Placing the Power Supply Assembly toggle ON/OFF switch to OFF does not remove the main voltage to the J1 terminals. To remove all input power to the ANG, the AC Power (Mains) to the ANG needs to be shut off.
2.	Route the Data Hiway cable to the ANG in accordance with national or local electrical codes and regulations; see Figure 2-1.

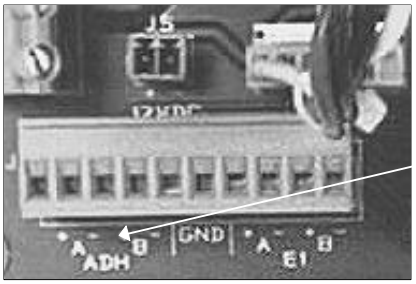
Installation Note

To make the Data Hiway connections easier we have made J2 a removable connector. Simply grasp the top portion of the connector and pull it straight out from the base connector; see Figure 2-6.

⚠**CAUTION**

Do not plug J2 into the board connector until you have set the loop and unit number; see Chapter 3. Data Communications Setup.

Instructions, continued

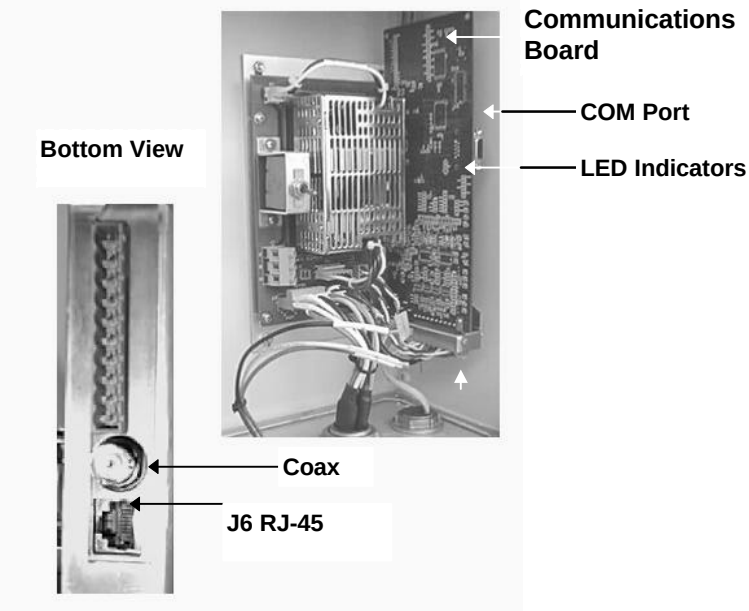
Step	Action
3.	Connect the Channel A Data Hiway cable to J2, ADH + and - terminals. Repeat for Channel B Data Hiway Cable.  **J2 ADH CONNECTIONS** Advance Data Hiway cable shields are grounded at one end only. If ground is at ANG end, use GND terminal.
4.	Perform Data Hiway Post Installation Test; refer to Appendix A. How to Test the Data Hiway.
5.	Remove J2 plug connector from board. Do Not make final connections until you have set the loop and unit number; see Chapter 3. Data Communications Setup
6.	You are now ready for the Ethernet connections; go to Ethernet Connection, page 21.

Ethernet Connections

Description

The DataNET Gateway connects to the Ethernet local area network via the RJ-45 STP connector (J6) located on the underside edge of the Communications Board.

Figure 2-7. Communications Board J2 Connector



Before You Begin

Read the following notes.

1. The 10BASE-T data cable requires a minimum of two twisted pair (transmit pair and a receive pair). Wire used should conform to the AT&T D-inside wire (DWI&PDS), or IBM Type 3 or better twisted-pair cable specifications, or Category 3 or 5 data grade cabling or better.

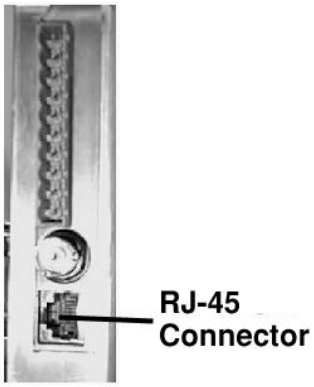
2. The maximum length of a 10BASE-T data cable can not exceed 328 feet (100 meters). Typically to increase the distance each ANG will connect to a hub or other type of repeater/medium converter.

3. The cable should be terminated at both ends with RJ-45 STP male connectors. The table below shows the RJ-45 wiring connections for the ANG end of the cable.

Pin No.	MDI Function
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

Installation

Do not perform the following procedure until you have defined the IP and Subnetmask addresses; see Chapter 3. Data Communications Setup.

Step	Action
1.	Connect the incoming Ethernet line from the Hub to the RJ-45 STP connector (J6) on the Gateway Communication Board. 
2.	Place the ANG AC Power Supply (Mains) circuit breaker to ON. On the ANG Power Supply Assembly place toggle ON/OFF switch to ON.
3.	After the ANG has been connected to a hub and both the ANG and hub have been powered on, verify the connection by looking at the LEDs visible on the top card edge of the Gateway Communication board; see page 49, Communication Board LED Indicators.

Chapter 3

Data Communications Setup

Introduction

Overview

This chapter provides maintenance personnel instructions for configuring the Advance Network Gateway (ANG). Once configured the ANG will "tunnel" Advance Data Hiway (ADH) messages across Ethernet to another ADH by way of an Advance Maxum™ Analyzer or another ANG.

Getting Started

… read through this Chapter prior to performing any procedures.

Chapter Preview

This chapter provides the following information:

Topic	Page
Configuring Your PC	24
Establishing a Connection	30
Setting Network Address & Loop and Unit Numbers	33
Assigning an IP Address	37
Editing the Address Translation Table	38
Firmware Updates	43
Obtaining Diagnostics Information	45
Command Summary	47
Communication Board LED Indicators	49
Definitions	52
Ethernet Troubleshooting Guide	54
Guide to Network Health	56

Configuring Your PC

Description

The Advance Network Gateway (ANG) has a built-in utility for configuring the ANG. The Windows®95 **HyperTerminal** program which resides on most PCs can be used to access the utility. Other serial communication packages that supports the following settings can also be used.

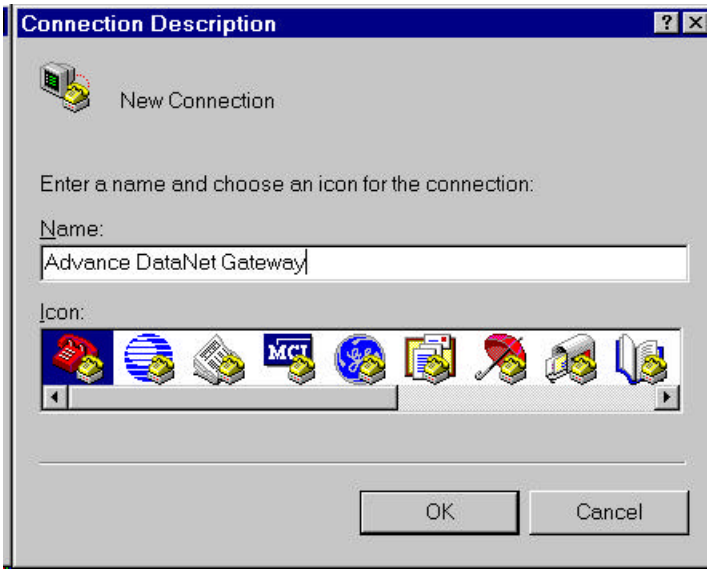
Baud rate:	57.6k baud
Data bits:	8
Parity:	none
Stop bits:	1
Flow control:	none

Instructions

The following procedure uses the Windows 95 **HyperTerminal** program, to connect to the ANG.

1. Click the Start button, and then point to the **HyperTerminal** Icon.
2. Click the **HyperTerminal** icon to start the Program.

   The **Connection Description** dialog box will open



3. In the **Name** field type in a Connection Name. Example: Advance Network Gateway.
4. In the **Icon** field select an Icon to represent the name selected.

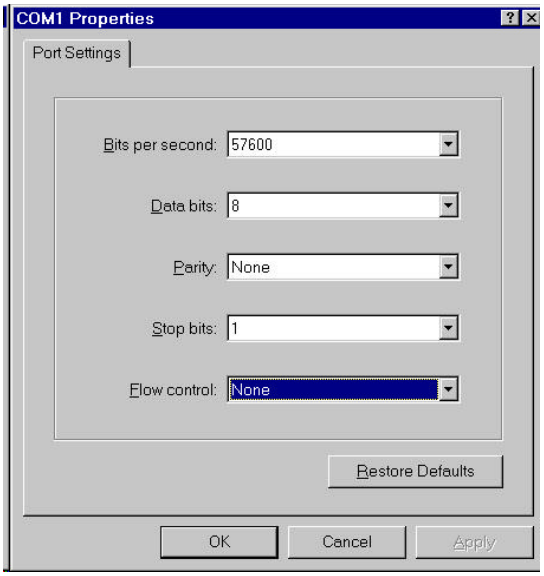
5. Click OK.

   The Connect To dialog box opens

6. From the **Connect Using** scroll list choose the COM port number you will be using on the PC to connect to the ANG configuration port.

7. Click OK to save the selection.

   The COM Properties box opens



8. Scroll each field and select the following Port Settings:

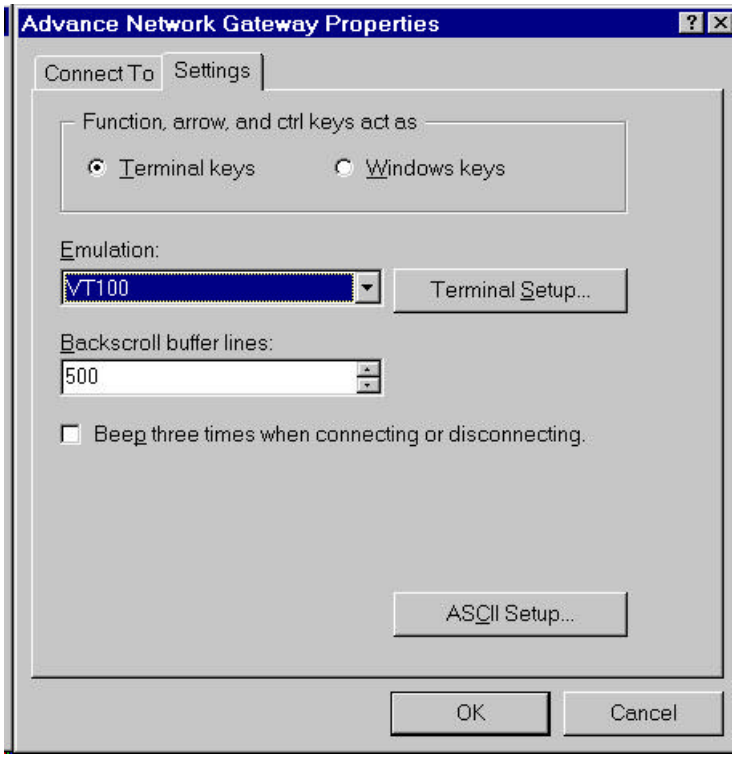
   Bits per second: 57600
   Data Bits: 8
   Parity: None
   Stop bits: 1
   Flow Control: None

9. Click OK.

   The Main Menu will appear.

10. Click File and choose Properties from the drop-down menu.

    The Advance Network Gateway Properties box will appear

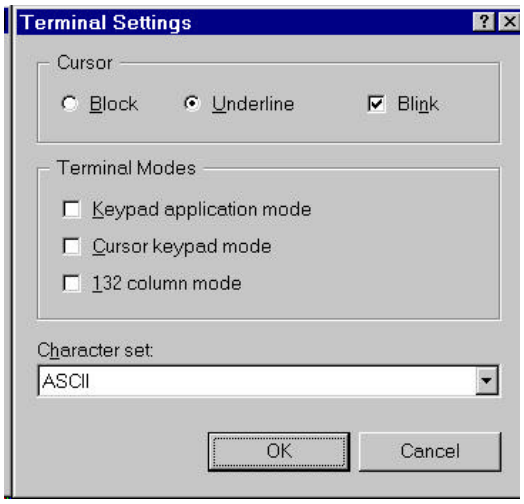


11. Click Setting tab.

12. From the **Emulation** scroll list select VT100. Do not change the default settings for the other parameters.

13. Click **Terminal Settings** button.

    The Terminal Settings dialog box will appear



14. Ensure that the following default settings are set:

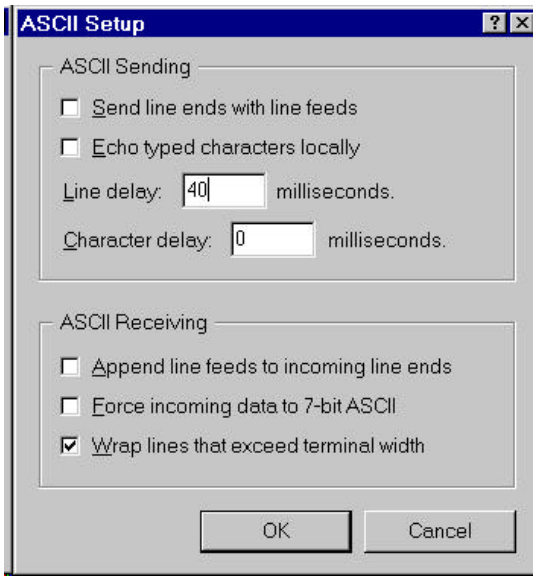
    Cursor: Underline
    Block: Blink
    Terminal Modes: none
    Character set: ASCII

15. Click Ok

    The Advance Network Gateway Properties box will appear

16. Click **ASCII Setup** button.

    The **ASCII Setup** dialog box will appear



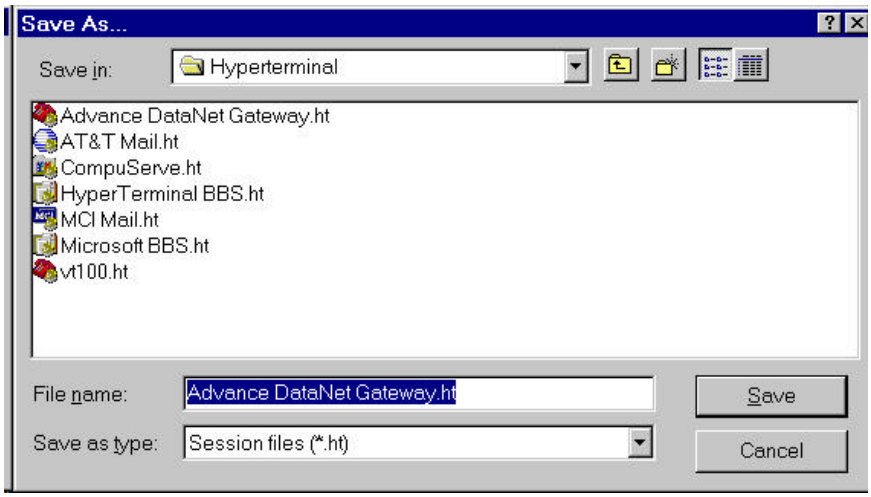
17. Change **Line Delay** value to 40 milliseconds. Use the default values for all other parameters.

18. Click OK to return to **Settings** tab.

19. Click OK to return to main menu.

20. From the Main menu select **File/Save As.**

    The **Save AS** dialog box will appear



21. Enter the short cut name. Click **Save** to complete the setup.

Your PC is now setup to connect to the ANG.

To create a shortcut to the new connection you just entered and place it on your Desktop. Select the file name entered in step 20 and click the right mouse button. From the pop-up menu select **Create Shortcut**.

Once the shortcut is created it can be moved to the Desktop. Simply click the shortcut icon and drag the icon while holding down the left mouse button. Release the mouse button to place the icon.

Establishing a Connection

Description

Once your PC is set up, as described in **Configuring Your PC,** you are ready to connect to an Advance Network Gateway (ANG).

Getting Started

… read through this Chapter prior to performing any procedures.

Before You Begin

1. Ensure that the ANG is not connected to the network by removing the RJ-45 plug from connector (J6) located on the edge of the Communications board; reference page 21.
2. Ensure that ANG is not connected to the Advance Data Hiway by removing J2 on the power supply board; see page 18.
3. Connect a standard 9-pin COM cable from the PC COM port you designated when you configured your PC (see page 24; step 6.) to the Configuration Port J2 located on the Communications Board (Figure 2-7).
4. Turn on the AC power to the ANG Power Supply board; reference page 19.

Password Protection

All programs on the ANG Communication board are password protected. This insures the data integrity of all configuration data and limits unwanted access of the User's network. To access any of the configuration or diagnostic information the user must log in using the password.

A password name can consist of any combination of alphanumeric characters. The alphanumeric name must have a minimum of five and a maximum of twenty characters. The ANG Communication board is shipped from the factory with the word "***password"*** entered as the default password name.

How to Change Password

The user can change the password name at any time. To do this login using the current password then type: "***password stand stand"***. Where the word stand is the new password entered twice to verify that it was properly entered.

How to Log Out

You may log out or close the Configuration and Diagnostic program at any time by typing: **logout**. However, the Configuration and Diagnostic program will automatically log you out after five minutes.

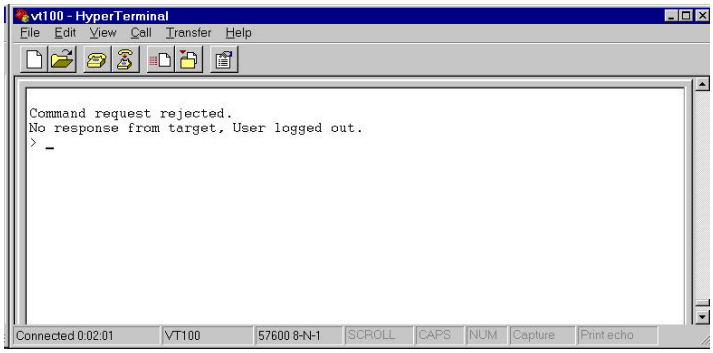
How to Log On

The following procedure assumes that the Windows 95 Hyper Terminal program residing on your PC has been configured, the ANG is operational and the PC is connected to the ANG.

1. Open Windows 95 Hyper Terminal program on your PC or double click the shortcut icon to start; See Configuring PC.

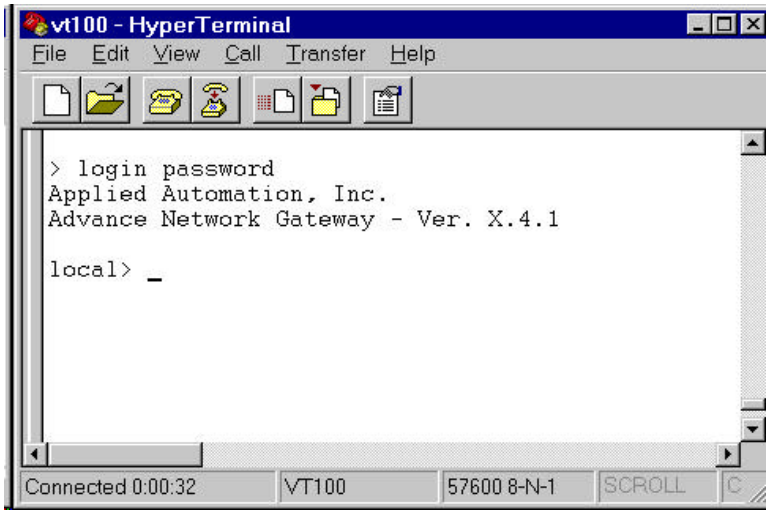
2. Press ¿ **Enter** twice

   The following dialog box appears



3. At the **>** prompt type : **login password** and press **¿ Enter.**

   The Connect Screen will appear with the log in information and the local prompt. The local prompt indicates that your are communicating with the ANG connected directly to the PC.



You are now ready to configure the Advance Network Gateway (ANG) with its own Network Address and ADH Loop and Unit Number; go to page 33.

Remote Connection Log On

If your PC is connected to the ANG configuration port you can connect to any other ANG on the same network if you know the IP address of the ANG.

1. Open Windows 95 Hpyer Terminal program on your PC or double click the shortcut icon to start; See Configuring PC.

2. Press **¿ Enter** twice, the Command Request dialog box will appear.

3. At the **>** prompt type : **login password [IP Address].**

Once the password is verified the system responds with the login information and displays the remote prompt which includes the IP address of the connected ANG.

Setting Network Address & Loop and Unit Numbers

Description

This section provides instructions to configure a Advance Network Gateway (ANG) with its own Network Address and ADH Loop and Unit Number.

Before You Begin

1. Open Windows 95 Hyper Terminal program on your PC; reference **Configuring Your PC**, page 24.
2. Connect and Log on to ANG; reference **Establishing a Connection**, page 30.

Important Definitions

Familiarize yourself with the following definitions.

type: Defaults to EN_GATEWAY and refers to the internal board configuration firmware. (The only entry currently supported is EN_GATEWAY.)

address ip: This is the 12-digit address that defines each ANG's network ID and host ID. The IP address must be assigned before the ANG is placed online to the network. Typically the customer's network administrator assigns this address. The address ip is entered in dotted decimal notation. Ex: xxx.xxx.xxx.xxx

subnetmask: Subnetting, dividing the host ID into a subnet and host ID, helps hide the details of an internal network organization to external routers. The subnetmask is used to reduce the size of routing tables and restrict broadcast messages to the subnetwork. The subnetmask is a 32-bit value containing one bits for the network and subnet ID and zero bits for the host ID. Typically the same subnet mask is used on all ANG's on a given network. Ex: 255.255.000.000.

address ethernet: This is the 48-bit unique Ethernet address. This address is assigned at manufacturing time and is not user configurable.

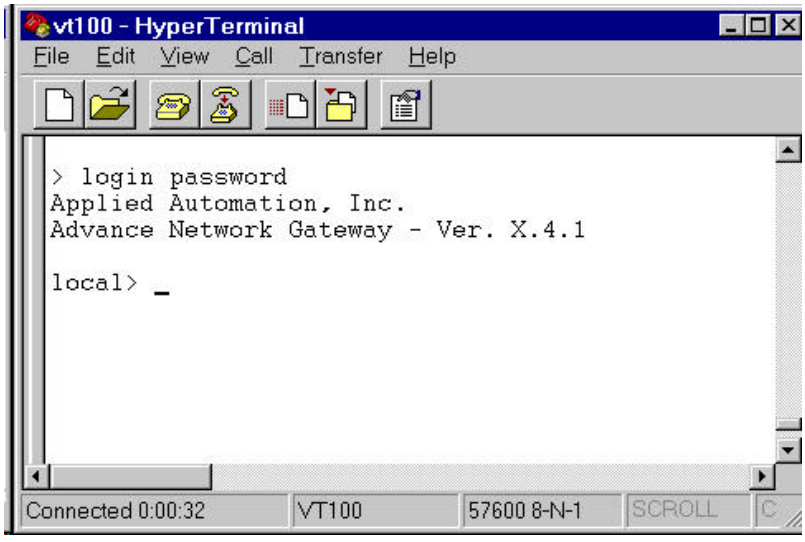
loop: Loop refers to the Advance Data Hiway (ADH) Loop number. Each ANG must be assigned a Loop number. All ADH units physically connected to the same bus as the ANG must have the same Loop number. Allowable Loop numbers range from 1 - 8.

unit:	Unit refers to the Advance Data Hiway (ADH) Unit number. Typically the ANG Unit is set to zero. If the ANG is connected to an Advance Network Interface Unit (NIU), the ANG Unit number is usually set to 1 or a number other than zero. Allowable Units numbers range from 0 - 31.
iproute:	The iproute variable defines the network path to the default router. This value may be set to zero if not used.

Instructions

1. Log on locally to the ANG

   The Connect Screen will appear with the log in information and the local prompt. The local prompt indicates that your are communicating with the ANG connected directly to the PC.



Learning Hint

Parameters entered below are not saved until the ANG is reset! Even though you are given the option to save after each entry you can make all your entries and then reset to save your entries.

2. To configure the ANG IP address, at the Local **>** prompt type:
   config address ip xxx.xxx.xxx.xxx

   Where xxx.xxx.xxx.xxx should be replaced with the 12 digit unique network address. See Assigning an IP (Internet Protocal) Address page 37.

3. Press ¿ **Enter**.

The following message appears: Configuration change verified. Type: reset - to save configuration changes

4. To save your entry, at the Local **>** prompt type: **reset**

5. To configure the ANG subnetmask, at the Local **>** prompt type: ***config netmask xxx.xxx.xxx.xxx***

   Where xxx.xxx.xxx.xxx is the subnet mask for your network. Typically, this would be 255.255.0.0 or 255.255.255.0.

6. Press ¿ **Enter**, and save your entry by typing at the Local **>** prompt: **reset.**

7. To configure the ANG Loop number, at the Local **>** prompt type: ***config loop x***

   Where x is a number in the range from 1 - 8 depending on the ADH Loop number of the Units to be connected directly to the ANG ADH bus.

8. Press ¿ **Enter**, and save your entry by typing at the Local **>** prompt: **reset**

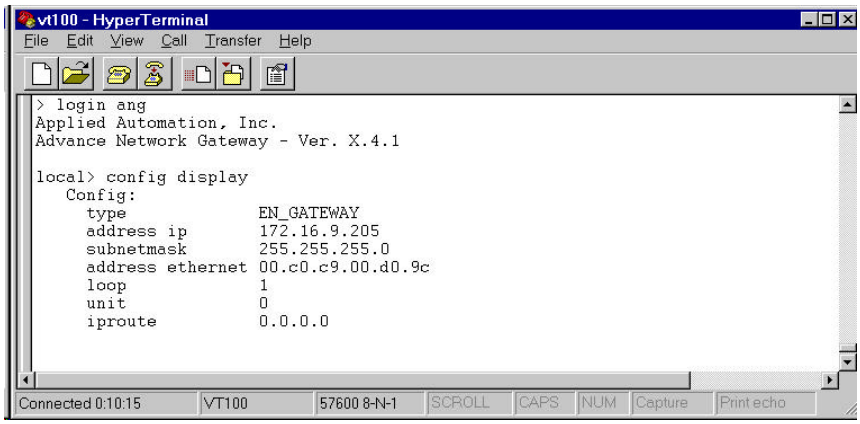
9. To configure the ANG Unit number at the Local **>** prompt type: **config unit x**

   Where x is a number in the range of 0 - 31. Typically this number is set to zero to give the ANG the top priority on its local ADH bus. If the ANG is connected to an NIU the Unit number must be in the range of 1 - 31. Note parameters are not saved until the ANG is reset.

10. Save all changes. At the Local **>** prompt Type: ***reset***

    This forces the ANG to save the Configuration Information and reboot using the new values.

    This completes all the necessary ANG Configuration. To display the current settings, type at Local **>** prompt: ***config display***



11. Connect the ANG to the Advance Data Hiway; reference page 18.

12. Connect the ANG to the network; see page 21.

Assigning an IP Address

Overview

Each Advance Network Gateway (ANG) unit on a network must be assigned an IP address. This 32-bit number defines each ANG's network ID and host ID. The IP address is assigned by the user before the Gateway is physically connected to a network.

See Setting Network Address & Loop and Unit Numbers, for instructions on how to enter the IP address.

IP Address

The IP Address consists of a 32-bit number divided into four 8-bit fields. Each field is expressed as a decimal number from 1 to 255 with each field separated by periods. This is referred to as "dotted decimal" notation. For example, 192.16.9.52 is an IP address.

How to Assign an IP Address

Ask your network administrator to assign you an IP Address, or if the ANG will be in a closed plant area and not connected to the Internet (World Wide Web) you can select an address from Table 1-1.

See Setting Network Address & Loop and Unit Numbers, for instructions on how to enter the IP address.

Table 1-1. Available IP Addresses

192.165.0.1	192.165.0.15
192.165.0.2	192.165.0.16
192.165.0.3	192.165.0.17
192.165.0.4	192.165.0.18
192.165.0.5	192.165.0.19
192.165.0.6	- 192.165.0.254
192.165.0.7	- 192.165.1.254
192.165.0.8	- 192.165.2.254
192.165.0.9	192.165.3.1 - 192.165.3.254
192.165.0.10	
192.165.0.11	
192.165.0.12	
192.165.0.13	
192.165.0.14	

Editing the Address Translation Table

Overview

The Advance Network Gateway (ANG) monitors the “local” ADH bus for messages with a “remote” destination address. The ANG determines if the message destination is “remote” by searching it’s Address Translation Table (ATT). If the destination address is located remotely, the ANG encapsulates the ADH message within the data portion of an IP packet and sends the message out the Ethernet port.

Table Description

The Address Translation Table (ATT) records all known units that reside on the Advance Data Hiway (ADH). Each record within the ATT contains an ADH Loop / Unit number and the IP address of the ANG the unit is directly connected to. The ATT records are automatically added or updated each time an ADH broadcast is received. Each ANG broadcasts every 10 minutes it’s ATT. This insures the data intgerity of all ATT tables. An uninitalized ATT is automatically updated after 10 minutes by receiving ADH broadcasts and ANG ATT broadcasts.

Important

Only Advance analyzer units broadcast on a periodic basis so it may be necessary to add other type units when a new ANG is added. An alternate method of updating the ATT is to force all ADH units to send a power-up broadcast by pressing the reset button or cycling the power.

Before You Begin

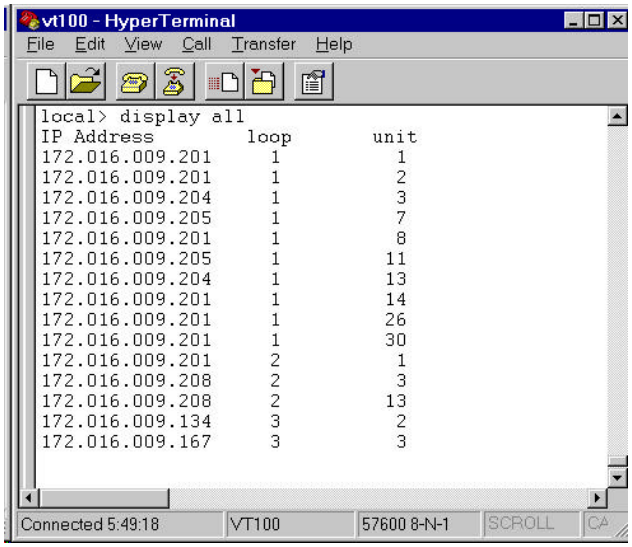
The following procedure assumes that the Windows 95 Hyper Terminal program residing on your PC has been configured, the ANG is operational and the PC is connected to the ANG.

Displaying the ATT

The Address Translation Table (ATT) can be displayed using the Configuration Management routines.

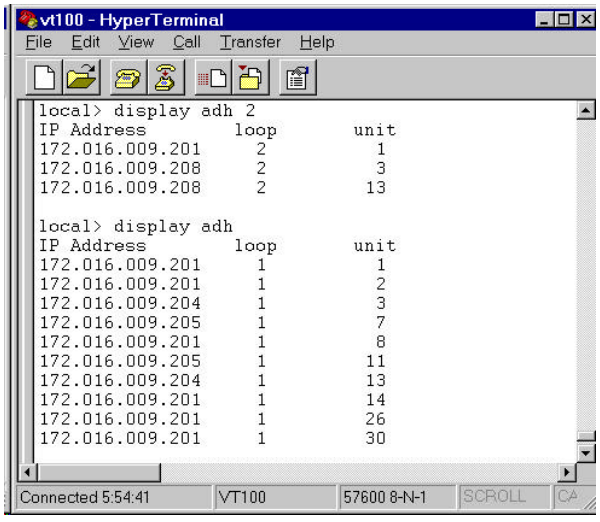
1. Log on locally to the ANG.

2. To display the entire ATT type at the Local > prompt: ***display all***



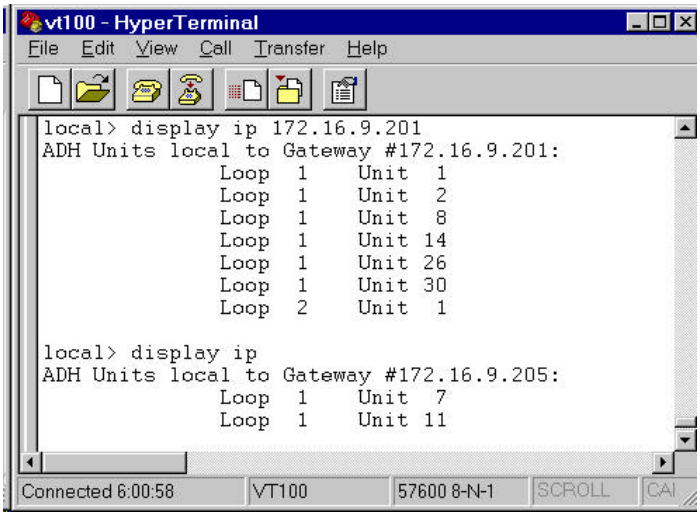
3. To display a single Loop only type: ***display adh x***

   Where ***x*** is the ADH Loop number. Allowable values are 1 - 8. If you leave off the ***x*** value then the Loop number will default to the Loop number of the local ANG.



4. To display the ATT by IP number type: ***display ip xxx.xxx.xxx.xxx***

   Where ***xxx.xxx.xxx.xxx*** is the IP address. If you leave off the IP address, the IP portion will default to the value of the local ANG. Note: 255.255.255.255 and 0.0.0.0 are not allowed.

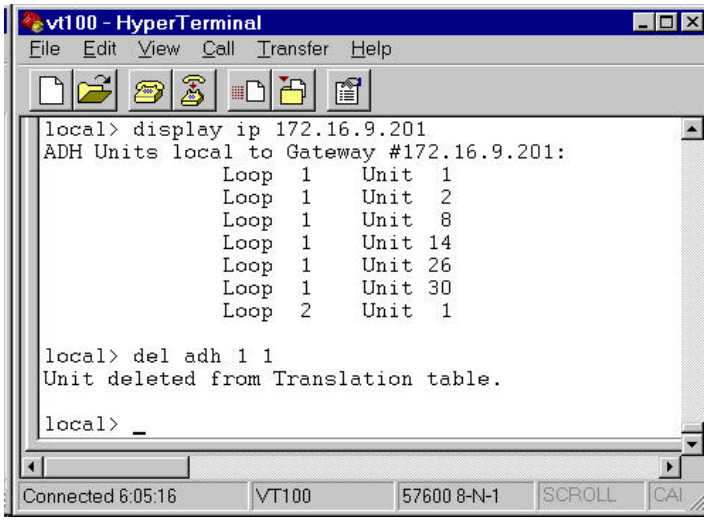


Editing the ATT

1. To delete a single entry from the ATT type: ***del adh loop unit***

   Where ***loop*** is the ADH loop number (1 - 8) and ***unit*** is the ADH unit number (1-31).

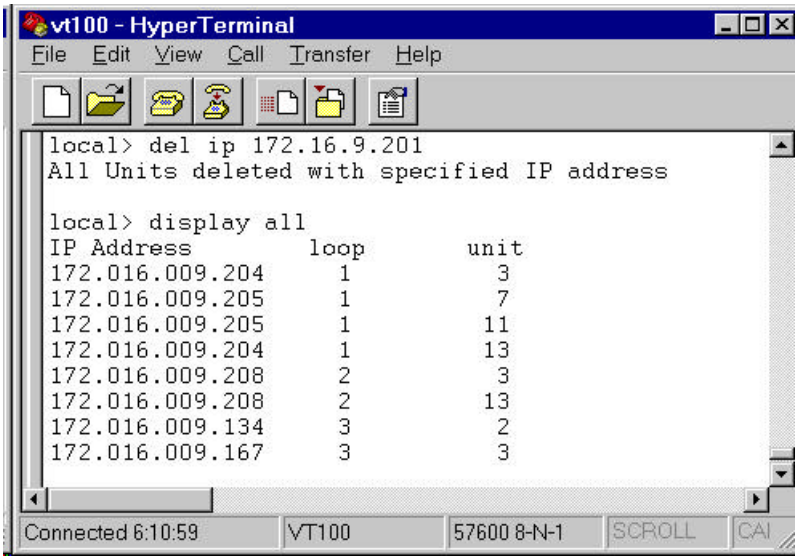
   All parameters must be specified.



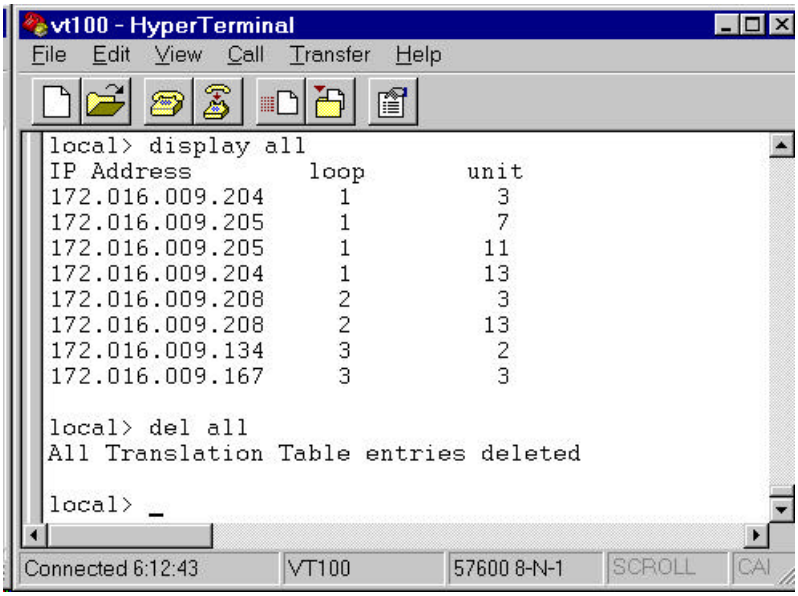
2. To delete all ATT entries associated with a single IP address type: ***del ip xxx.xxx.xxx.xxx***

   Where ***xxx.xxx.xxx.xxx*** is the IP address in dotted decimal notation.

   Note: 255.255.255.255 and 0.0.0.0 are not allowed.



3. To delete all entries in the ATT type: ***delete all***

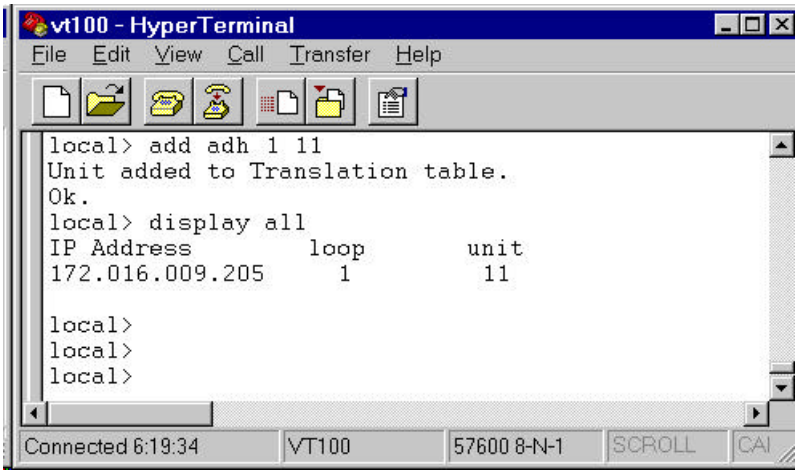


4. To add entries to the ATT type: ***add adh loop unit***

   Where ***loop*** is the ADH loop number (1 - 8) and ***unit*** is the ADH unit number (1-31).

   All parameters must be specified.

   You can only add entries that are local to the ANG. If it is not directly connected to the ADH terminals you cannot edit it.



Firmware Updates

Description

Periodically we will provide our ANG users with firmware upgrades. Perform the following instructions to down load a new ANG firmware upgrade to the Communications board. A firmware upgrade will take approximately 45 minutes.

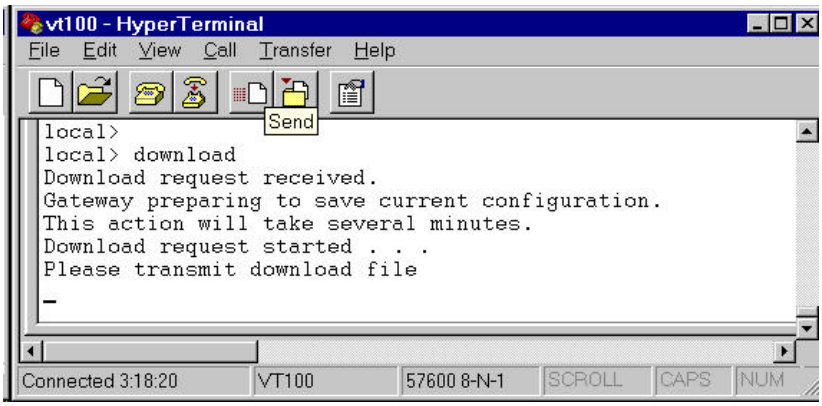
Instructions

The following procedure assumes that the Windows 95 Hyper Terminal program residing on your PC has been configured, the ANG is operational and the PC is connected to the ANG.

1. Log on to the ANG.

2. At the **>** prompt type: ***download***

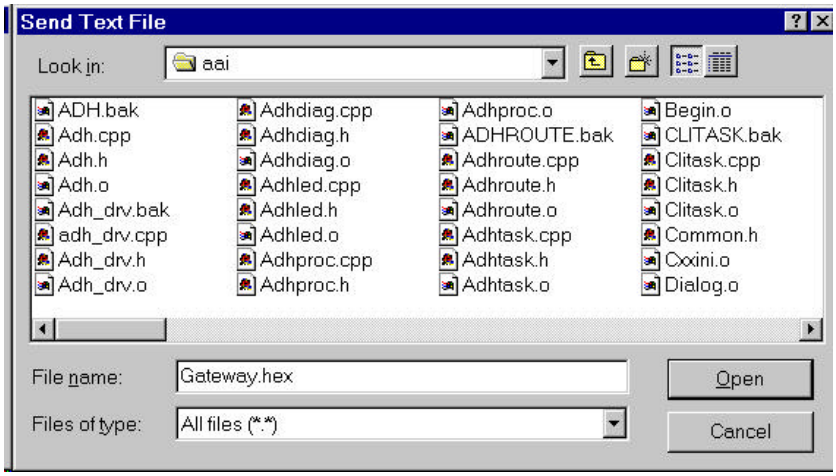
   You should see the following response on the screen. At this point the ANG Communications board is ready to receive the new firmware version.



3. From the Main Menu bar click on **Transfer**.

4. Click on **Send Text File.**

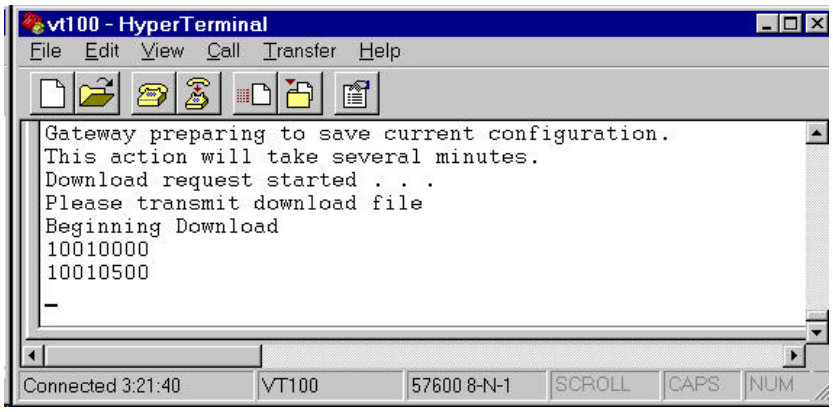
   The Send Text File dialog box will appear.



5. Under **Files of type** select All files (*.*).

6. Under **File name** type in the upgrade version file name (Gateway.hex).

   This will start the down loading of the files. Once the download has begun the block numbers will be displayed as they are transmitted. The upload will take approximately 45 minutes to complete.



Obtaining Diagnostics Information

Description

You can access the following Diagnostic information from an Advance Network Gateway (ANG).

- Ethernet Network Status
- ADH Channels Status
- Error Log

Before You Begin

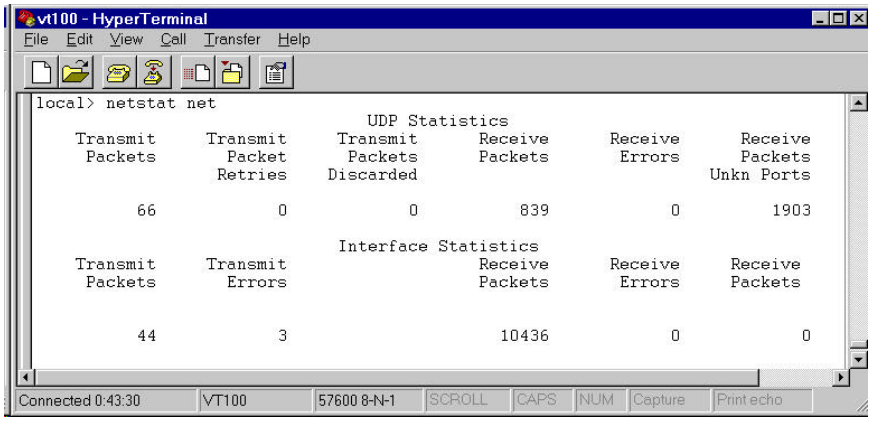
The following procedures assumes that the Windows 95 Hyper Terminal program residing on your PC has been configured, the ANG is operational, the PC is connected to the ANG and you have logged on.

Ethernet Network Information

To display current Ethernet network diagnostic information:

1. Log on to the ANG.
2. At the **>** prompt type: ***netstat net***

   The UDP and Interface Statistics screen will appear. The display shows the number of packets received and transmitted and the number of errors detected.

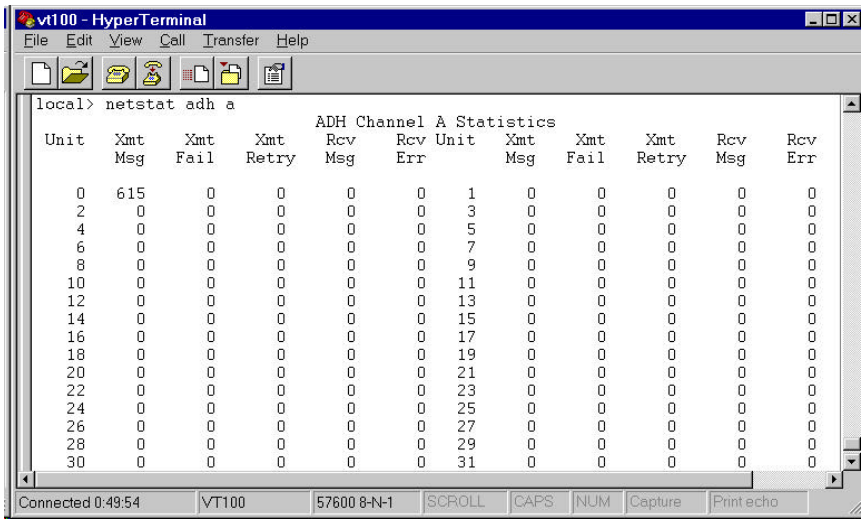


ADH Channel Information

To display the current diagnostic information for the ADH channels:

1. Log on to the ANG
2. At the **>** prompt type: ***netstat adh (a or b)***.

   The display shows the number of packets received, transmitted and the number of errors detected for each of the 31 units on the assigned loop.

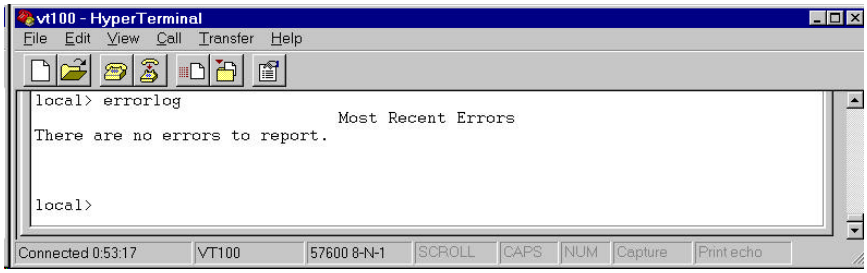


Error Log

To display an error log specific to each ANG:

1. Log on to the ANG
2. At the **>** prompt type: ***errorlog***

   The Most Recent Error log screen appears.



Command Summary

Description

This section summarizes the command syntax for the Advance Network Gateway (ANG) software.

---

add

Adds an ADH Unit to the Address Translation Table
format: ***add adh loop unit***
Where ***loop*** is a number in the range 1 - 8.
Where ***unit*** is a number in the range 1 - 31.

config

This command permits configuration of the ANG
format: ***config display***
format: ***config type EN_GATEWAY***
format: ***config address ip xxx.xxx.xxx.xxx***
Where ***xxx.xxx.xxx.xxx*** is the IP address.
format: ***config address ethernet xx.xx.xx.xx.xx.xx***
Where ***xx.xx.xx.xx.xx.xx*** is the Ethernet address.
format: ***config loop x***
Where ***x*** is a number in the range 1-8.
format: ***config unit x***
Where ***x*** is a number in the range 1-31.
format: ***config iproute xxx.xxx.xxx.xxx***
Where ***xxx.xxx.xxx.xxx*** is the IP address.
format: ***config netmask xxx.xxx.xxx.xxx***
Where ***xxx.xxx.xxx.xxx*** is the IP address.

del

Deletes the specified ADH Unit from the Address Translation Table
format: ***del all***
format: ***del adh loop unit***
Where ***loop*** is a number in the range 1 - 8.
Where ***unit*** is a number in the range 1 - 31.
format: ***del ip xxx.xxx.xxx.xxx***
Where ***xxx.xxx.xxx.xxx*** is the IP address.

display

Generates display of the specified ADH Unit(s) from the ATT
format: ***display all***
format: ***display adh loop unit***
Where ***loop*** is a number in the range 1 - 8.
Where ***unit*** is a number in the range 1 - 31.
loop & ***unit*** are optional parameters
no options defaults to this ANG loop
loop only displays all Units in specified loop
loop unit displays specified ADH unit
format: ***display ip xxx.xxx.xxx.xxx***
Where ***xxx.xxx.xxx.xxx*** is the optional IP address.
no option defaults to this ANG IP

Command Summary, Continued

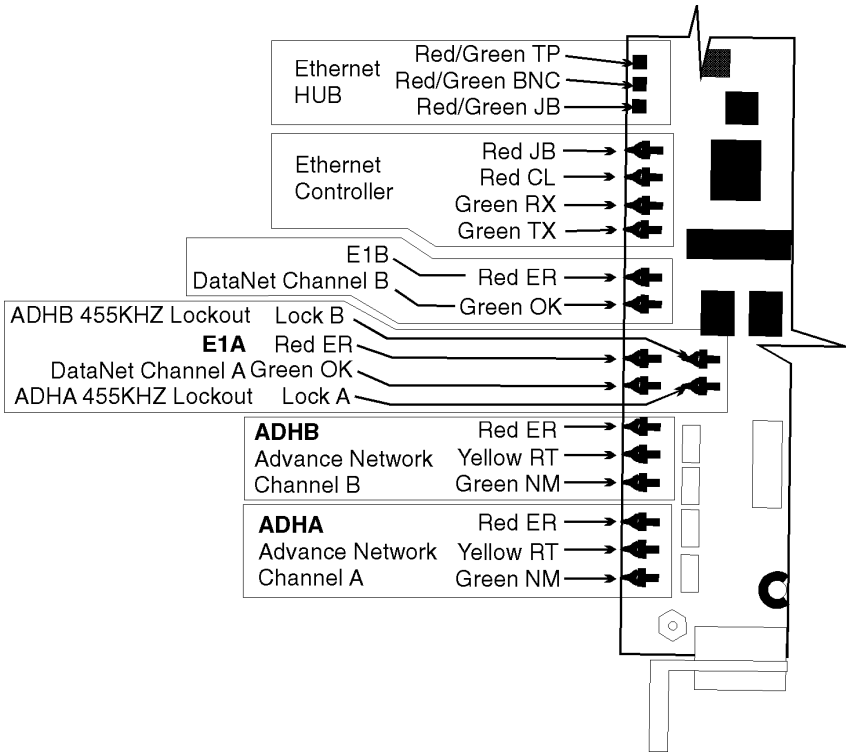
download	This command starts download of ANG firmware (used for upgrades) format: ***download***
errorlog	Generates and displays error log format: ***errorlog***
login	Permits User access to display and configuration commands format: ***login password***
logout	Permits a User to end a User session format: ***logout*** Note: The user is automatically logged out after 5 minutes
password	Permits a User to alter the User password The password is case-sensitive and can be up to 20 alphanumeric characters long. No pass format: ***password stand stand*** Where ***stand*** is the new User supplied password
reset	Reboots the ANG and saves all configuration parameters format: ***reset***

Communication Board LED indicators

Description

This section provides maintenance personnel with information on how to use the Communication Board LEDs for troubleshooting the Advance Network Gateway (ANG).

Communications Board LEDs



Communication Board LED Indicators, Continued

ADHA and ADHB -

The ADHA and ADHB LEDs indicate board status and ANG's error conditions for Channel A and Channel B. During reset all of the LED's will blink for ½ second while the board goes through self test. If an error is detected during the self-test period the Red FAULT LED will remain on and the Yellow WARN LED will blink the detected error code. NOTE: on the Channel A ADHA LED's will display FAULT codes. Use the following table to determine the error condition:

NUMBER of Blinks	Type of Error	Corrective Action
1	RAM FAILURE	Replace board
2	FLASH FAILURE	Reload firmware or replace board
3	ETHERNET FAILURE	Replace board
4	DataNet FAILURE	Replace board
6	DUPLICATE IP	Change board IP address
8	WRONG LOOP	Change Loop number
10	DUPLICATE UNIT NUMBER	Change Unit number

IMPORTANT

FAULT errors can only be cleared with a board reset.

During normal operation the Green LED for ADHA or ADHB will blink to indicate either receive or transmit activity on the ANG channel. If a message retry is sent the Yellow LED will blink.

LOCKA and LOCKB -

If either of the LOCKA or LOCKB LED's is on the board must be reset. This is indication that the board left the 455Khz Line Contention signal on for more than +/- 2.3 seconds.

E1A / E1B OK ER -

This lights are used to indicate ANG status and activity. The Green LED will blink whenever a message is received or transmitted on the respective channel. The Red LED will blink if an error has occurred on the channel.

Communication Board LED Indicators, Continued

Ethernet Controller -

The Green TX LED blinks whenever a message is transmitted on the Ethernet channel. The Green RX LED blinks whenever a message is received on the Ethernet channel. The Red CL LED indicates there was a collision on the Ethernet. Note: collisions are a normal occurrence on an Ethernet network. The Red JB LED indicates that the Ethernet controller has determined that the transmitter has remained on for longer than allowed and indicates a possible hardware problem.

10BaseT / 10Base2 Ethernet HUB -

The bi-colored LED's marked CF, BNC, and TP are used as indicators for the Ethernet HUB. The HUB provides the 10BaseT and 10Base2 ports. The LED's indicate the following information.

CF Steady Green indicates a FIFO error
Steady Red indicates a Collision on the HUB ports
(Receiving on one port while transmitting another)

BNC Blinking Red indicates a packet is being transmitted.
Blinking Green indicates a packet is being received.
Alternating Red/Green indicates the 10Base2 port is Partitioned Out (Disabled).

TP Steady Green indicates the 10BaseT port is receiving the Link Integrity Pulse (Keep Alive signal)
Blinking Red indicates a packet is being transmitted.
Blinking Green indicates a p[acket is being received.
Steady Red indicates the Polarity is reversed on the 10BaseT port.
Alternating Red/Green indicates the 10BaseT port is Partitioned Out (Disabled).

Definitions

Overview

This section defines important Terms.

Advance Network Gateway

The Advance Network Gateway (ANG) is a wall- (or rack-) mounted unit that is self contained with power supply and all electronics. It provides internal field termination points to connect standard Advance Data Hiway cable “on one side” and Ethernet 10BaseT cabling (Unshielded Twisted Pair) “on the other side”. The Gateway unit requires 120 VAC power wired directly to it.

Ethernet

A data link level protocol comprising the OSI model’s bottom two layers. It is a broadcast networking technology that can use several different physical media, including twisted-pair cable and coaxial cable. Ethernet usually used CSMA/CD. TCP/IP is commonly used with Ethernet networks.

Collisions

The result of two or more LAN stations attempting to use the same transmission medium at the same time. Collisions are a normal occurrence on Ethernet. A properly functioning Ethernet will experience a relative small percentage of collisions. Typically the collision rate should be less than 5% of the available bandwidth. Most collisions occur during the preamble portion of the frame. Most Ethernet controllers automatically retry, up to 15 times, any packet that has a collision during transmission. (except for Late Collisions)

CRC - Cyclic Redundancy Check

CRC is a method to detect errors. A number is derived from the data that will be transmitted. By recalculating the CRC at the remote end and comparing it to the value originally transmitted, the receiving node can detect errors.

DataNET

The name “DataNET” is used by Siemens Applied Automation to mean the high speed communication system inclusive of our application software.

Data Hiway

The term “Data Hiway” refers to the Advance Optichrom Network. The Advance Network Gateway and DataNET Gateway are used to bridge the Advance Optichrom network and the Advance DataNET network.

Definitions, Continued

Late Collision	A Late Collision is one that occurs after the first 64 bytes in a frame or packet. Since the smallest Ethernet frame (packet) is 64 bytes in length, late collisions will not be detected on small packets. Ethernet controllers do not retransmit packets with late collisions resulting in lost packets. Late Collisions usually appear as a bad FCS frame. The only time a late collision can be detected on a 10BaseT network is when the detecting device is transmitting at the same time.
FCS - Frame Check Sequence Error	The CRC (Cycle Redundancy Check) remainder transmitted at the end of a frame. An FCS error is a legal sized Ethernet frame with a bad frame check sequence.
Ghosts	Ghosts are energy on the cable that appears to be a frame, but does not have a valid beginning of frame pattern (start delimiter 10101011). Ground loops and other wiring problems cause some repeaters to believe that a frame is being received. Since the repeater is only reacting to an AC voltage riding on the cable, there is not a valid frame to pass along. The repeater, however, transmits this energy along the network. This may be a jam pattern or a very long preamble. Ghosts events consume bandwidth and can slow down a network. Ghosts are the result of network elements reacting to noise. The effect of noise on network wiring is indeterminate. Some network devices will react while others will not. Ghosts cause random events and can be hard to correct.
Jabber	The term Jabber refers to an Ethernet frame that is greater than the maximum legal size. (greater than 1518 bytes) Many 10BaseT HUBS will partition a port that is jabbering.

Ethernet Troubleshooting Guide

The most common problems associated with the Ethernet and how to correct them are given in the table below.

Fault	Probable Cause
Collisions	Excessive collisions are most often caused by a physical media problem such as: 1. missing or incorrect terminators (10Base2) 2. impedance discontinuities (such as defective connectors, cable stubs, crushed cables, incorrect cable types) 3. defective network interface cards (NIC) 4. too many network devices on a single collision domain
Late Collisions	Causes of Late Collisions are faulty NIC card or a network that is physically too long. A network is physically too long, if the end-to-end signal propagation time is greater than the minimum legal sized frame (about 57.6 microseconds or ~58 bit times) 1. cable lengths in excess of the maximum permitted for the cable type 2. faulty connectors or improper cabling 3. excessive numbers of repeaters between network devices 4. defective Ethernet transceivers or defective network interface cards (NIC)
FCS Error	An FCS error can be caused by a faulty NIC or driver, cabling, hub or induced noise. A Late Collision can result in an FCS error. Possible causes (listed by highest probability): 1. Late Collision 2. Faulty Cable/Connectors 3. Induced noise 4. Faulty NIC or HUB

Ethernet Troubleshooting Guide, Continued

Fault	Probable Cause
Jabber Error	Jabbering can be caused by faulty NIC or driver, cabling, or grounding problems Possible causes (listed by highest probability): 1. Faulty Cable/Connectors 2. Ground problem - Induced noise 3. Faulty NIC or HUB
Ghosts Error	Possible causes (listed by highest probability): 1. Poor grounding 2. Improper cable routing

Recommendations for Network Health

There are no magic numbers for good, or bad, network parameters (such as: utilization and collisions). The parameters that are acceptable for a healthy network are determined by many variables.

1. Utilization should average less than 40%. If you have extended peaks of greater than 70% you may want to investigate the causes and consider configuration changes to lower the average utilization. Generally, the greater the number of stations the lower the acceptable utilization threshold.

2. The collision rate should be less than 5%. Be wary of large bursts of collisions (greater than 20%); this can be an indicator of severe cabling or component problem.

3. Bad FCS errors, late collisions, jabbers, and ghosts should be rare occurrences and should be investigated when they become repetitive. These error conditions are typically a result of some kind of problem with the cabling and/or network configuration.

4. Excessive broadcast traffic adversely affects all stations on the network. Investigate nodes that are transmitting many broadcasts for possible reconfiguration. The average broadcast frame rate should be less than 5%.

Chapter 4

Parts Catalog

Introduction

Overview

This chapter provides maintenance personnel with a list of replaceable parts and assemblies for the Advance Network Gateway (ANG). Subsequent information includes how to remove and replace the replacement part or assemblies.

How to Place an Order

Parts can be ordered from:

Siemens Applied Automation
Customer Service Order Entry
500 W. Highway 60
Bartlesville, Oklahoma 74003
918-662-7370

To ensure an immediate response to your request, you should provide the following:

- Purchase order number. If ordering by phone, a confirming P.O. should be sent.
- Address where the parts are to be shipped.
- Address where the invoice is to be sent.
- Siemens Applied Automation part numbers as listed.
- Quantity needed of each part.
- Equipment Serial number or project number of the system (especially for warranty related orders).
- Preferred method of shipment.

Available Parts

Description

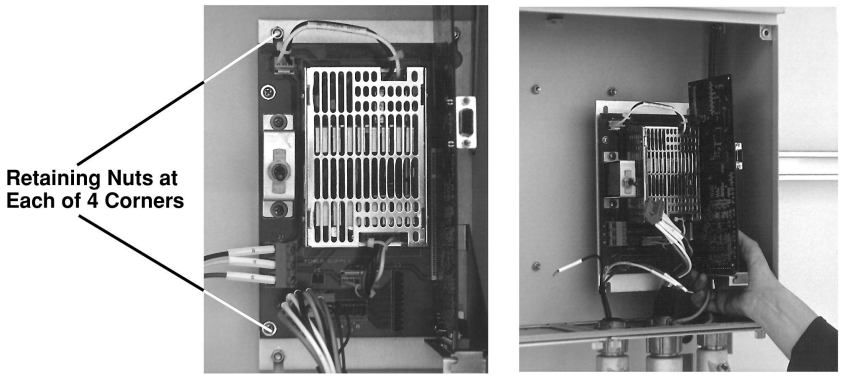
The available ANG assemblies and parts, with their applicable part number are shown below.

Part Description	Ordering Number
ANG Cable/Connector Kit	2020100-001
Optima Enclosure Hardware Kit	2020101-001
PCBA, E1/ADH Comm	2017568-801
Power Supply, Base Assembly	2015849-801

Power Supply Assembly Removal

Instructions

The following procedure removes the power supply assembly from the ANG enclosure.



Step	Action
1.	Open the front panel of the ANG by loosening the four captive screws located on each corner; use 4mm Allen wrench.
2.	Shut off the primary AC Power Supply line to this location. Place Power Supply toggle switch to OFF. ⚠ **WARNING** Placing the Power Supply Assembly toggle On/Off switch to OFF does not remove the main voltage to the J1 terminals. To remove all input power to the ANG, the AC Power (Mains) to the ANG needs to be shut off.
3.	Remove J1 Power Input Connector and J2 Data Hiway Connector from board mounted connectors.
4.	Remove the 4 retaining nuts securing the Power Supply Assembly to the ANG.
5.	Remove Ethernet connection from the RJ-45 STP connector (J2) on the Gateway Communication Board.
6.	Lift the Power Supply Assembly up and out of the ANG.
7.	The Communication Board can now be removed from the Assembly.

Appendix A

Data Hiway Testing

How to Test the Data Hiway

Post Installation Test

The following test procedure tests the Channel A and Channel B Data Hiway cable connections. These test procedures insures that the signal lines are correctly installed.

Referenced testing points are CH A and CH B (+) and negative (-) and shield ground termination's.

Test Equipment

The following test equipment is required to test continuity of installed Data Hiway Channel A and Channel B signal lines:

- 9 Vdc battery, with connector leads and clips
- Digital Volt Ohm Meter (DVM) or equivalent
- 10K ohm resistor, with leads and clips

Measuring Signal Line Continuity

Data Hiway channel A and channel B + and - signal line continuity can be checked by performing the following procedures. Devices can be operating on the Data Hiway when making continuity checks. Perform the check for each device connected to the Data Hiway.

Do not skip testing any devices connected to the Data Hiway. Check at the incoming termination's on the I/O chassis, the Termination Boards in the Analyzer Electronics enclosures, LINC units, and any other Data Hiway devices. Typical problems are reverse polarity, poor contacts on wiring terminals, opens, shorts and cross channel wiring. Every point in the Data Hiway wiring should be carefully checked to ensure correct wiring.

Step	Procedure
1.	Connect the positive lead of the 9-volt battery through the 10K ohm resistor to Channel A(+) terminal and connect the negative lead of the battery to the Channel A (-) terminal at any connection point on the Data Hiway.
2.	Using DVM measure for 9.0 Vdc across Channel A (+) and Channel A (-).
3.	Repeat steps 1 and 2 for Channel B.

Measuring Shield Continuity

Data Hiway shield lead continuity can be checked by performing the following procedures:

Ground Data Hiway cable shields at only one end of each segment. This practice reduces ground loop noise.

Step	Procedure
1.	With Data Hiway communicating with connected Nodes, temporarily disconnect Channel A shield lead from ground.
2.	Connect 10K ohm resistor to disconnected shield and connect battery positive (+) lead to resistor. Resistor should be in series with the battery. Connect battery negative (-) lead to unit ground.
3.	Connect DVM positive (+) lead to channel A and connect shield and negative (-) to unit ground. Measured voltage potential should be 9 Vdc.
4.	If 9 Vdc is not measured, the channel A shield line is grounded at another point; correct problem.
5.	Reconnect channel A and shield lead.
6.	Repeat steps 1 through 5 for Channel B.
7.	Repeat steps 1 through 6 for each shield ground point on the Data Hiway cable.

Siemens Applied Automation
500 W. Highway 60, Bartlesville, OK 74003
Phone 918-662-7000, Fax 918-662-7052