GFK-1026

GE Fanuc Manual Series 90-30

Host Drivers and Communication Configuration
Software for Windows Environments

GE Fanuc Automation

Programmable Control Products

Host Drivers and Communications Configuration Software for Windows® Environments

User's Manual

GFK-1026C *November 1998*

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Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

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Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Revisions to This Manual

The following changes have been made to this manual, GFK-1026C, as compared to the previous version, GFK-1026B:

- The Communication Configuration Utility supports modem configuration. This new feature is described in Chapter 3. Changes made to the data structures (Chapter 4) and the Host Drivers configuration file (Appendix A) to support modem configuration are also described.
- The information in Appendix B was expanded to include Class D addresses.
- Other corrections and clarifications, including index entries, were made as necessary.

Content of This Manual

This document describes the installation and use of the GE Fanuc Host Driver software, the Communication Configuration Utility (CCU), and the Communication Configuration Library (CCL).

Chapter 1. **Introduction:** Describes the capabilities of the Host Drivers and presents a system overview for each platform the drivers can run on. Also introduces the Communication Configuration Utility and the Communication Configuration Library.

Chapter 2. **Getting Started:** Explains how to install the Host Drivers and how to get started using them.

Chapter 3. **Communication Configuration Utility:** Describes the Windows executable used to manage the Host Drivers configuration file.

Chapter 4. **Communication Configuration Library:** Describes the Windows Dynamic Link Library which provides an application programming interface that can be used for managing the Host Drivers configuration file.

Appendix A. **Host Driver Database Descriptions:** Describes the content of the Host Drivers configuration file, GEF_CFG.INI.

Appendix B. **Advanced Information About IP Addresses:** Describes how to assign IP addresses, Default Gateway, and Subnet Mask.

Related Publications

GFK-0870	*Host Communications Toolkit for C/C++ Applications User's Manual*
GFK-1055	*Plug & Play Coprocessor for Series 90-70 PLC User's Manual*
GFK-1063	*Host Communications Toolkit for Visual Basic Applications User's Manual*
GFK-1246	*TCP/IP Ethernet Communications (Type 2) for the Series 90-70 PLC User's Manual*
GFK-1084	T*CP/IP Ethernet Communications for the Series 90-30 PLC User's Manual*
GFK-1186	*TCP/IP Ethernet Communications for the Series 90 PLC Station Manager Manual*
GFK-1541	*TCP/IP Ethernet Communications for the Series 90-30/70 PLC User's Manual*

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Contents

Chapter 1 Introduction

This document describes the installation and use of the GE Fanuc Host Driver software, the Communication Configuration Utility (CCU), and the Communication Configuration Library (CCL).

Host Drivers

The Host Driver software is used in conjunction with applications created using the Host Communications Toolkit (HCT) to communicate with GE Fanuc Series 90 PLCs. See the Preface for references to other manuals.

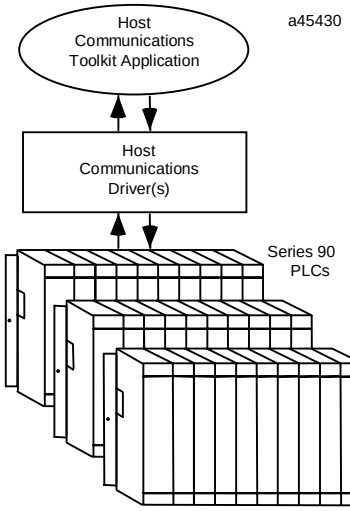


Figure 1- 1. Host Communications Drivers Overview.

The Host Drivers run in the Microsoft Windows NT® and Windows® 95 environments on a stand-alone PC.

The Host Drivers also run in the Microsoft® Windows® for Workgroups environment on two types of host platforms:

- Stand-alone PC with Windows for Workgroups.
- Plug & Play PC with Windows for Workgroups. This is a personal computer that plugs directly into the Series 90-70 VME backplane.

Stand-Alone PC Host Driver Use

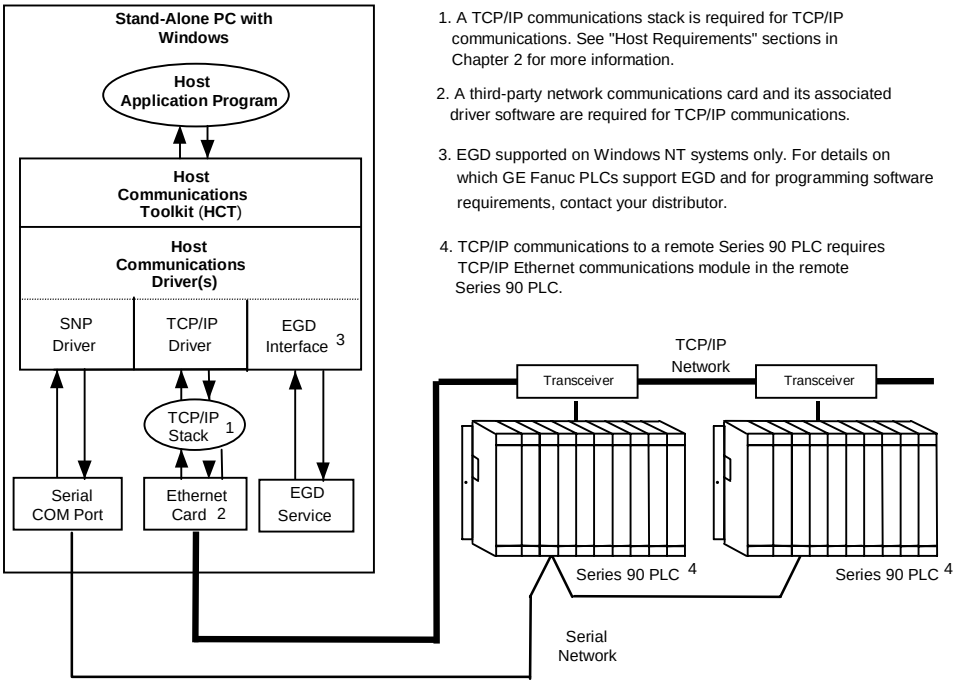


Figure 1- 2. Host Communications Drivers Running on a Stand-Alone PC with Windows 95, Windows for Workgroups, or Windows NT

Plug & Play PC Host Driver Use

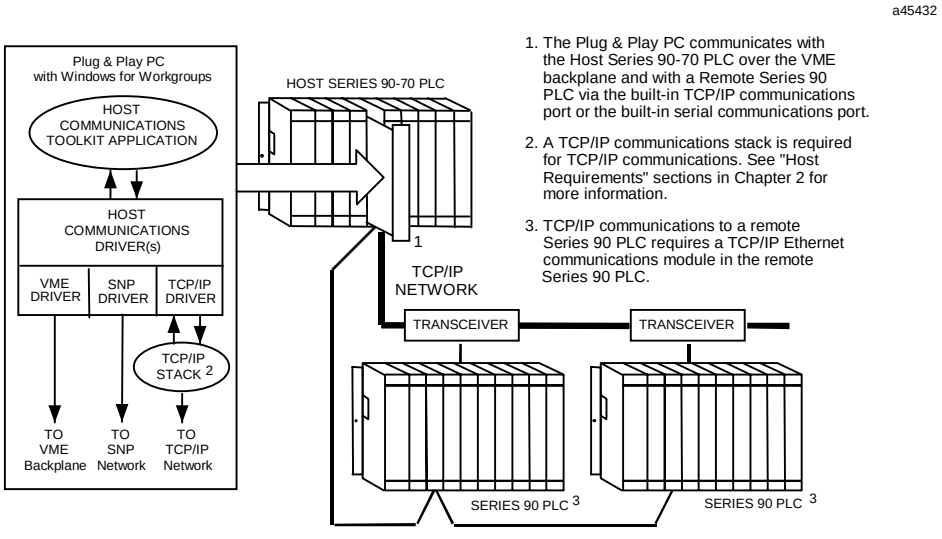


Figure 1- 3. Host Communications Drivers Running on a Plug & Play PC with Windows for Workgroups

How to Use the Drivers

The figure below describes the general steps you must perform to set up a complete system using the Host Communications Drivers.

What To Do

Before installing and using the drivers you must ensure that the host computer requirements have been met.

- For stand-alone hosts see Chapter 2, Getting Started, for system requirements.
- For the Plug-and Play PC used as a host you must install the module in the host PLC. See the Plug-and Play PC User's Manual for information.

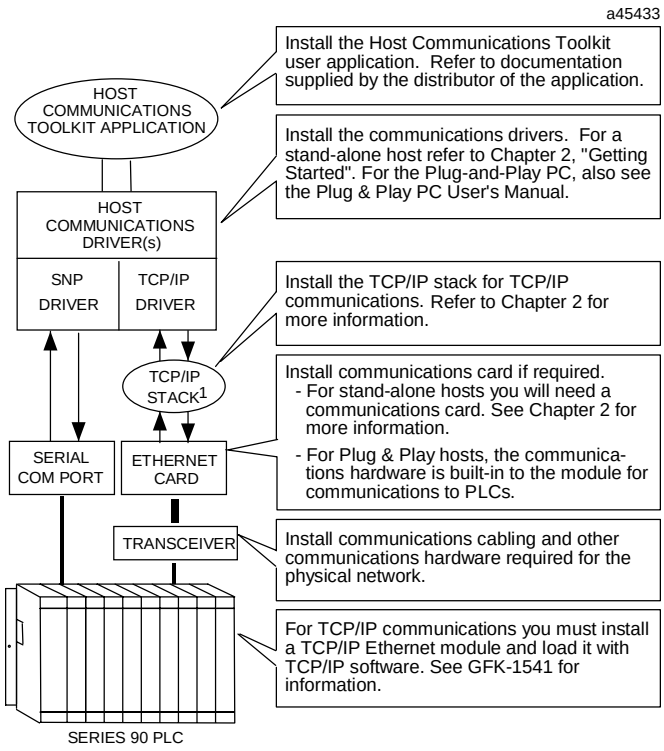


Figure 1- 4. How to Use the Host Communications Drivers

Communication Configuration Utility (CCU)

The Communication Configuration Utility is a Microsoft Windows* program used to configure and save communications parameters. The figure below shows the Devices tab of the utility which is used to configure the address and other optional information about the target PLC. There are also two other tabs for creating port configurations and configuring global parameters. See Online Help in the Communication Configuration Utility and Chapter 3 in this document for details.

*The Communication Configuration Utility runs under Windows 95 and Windows NT only.

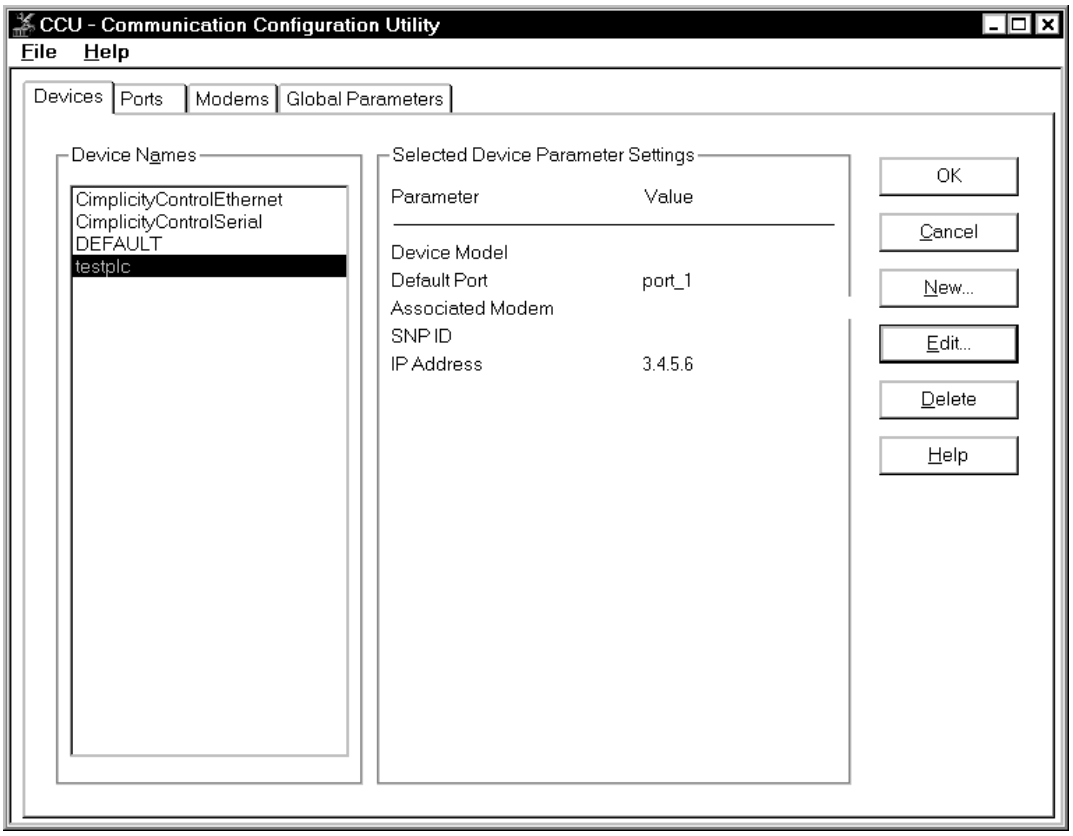


Figure 1- 5. Communication Configuration Utility Devices Tab

Communication Configuration Library (CCL)

The Communication Configuration Library is a Windows Dynamic Link Library (DLL). The CCL provides an application programming interface for the Communication Configuration Utility and Host Communications Toolkit applications to manage the configuration data in GEF_CFG.INI. See Chapter 4 for details.

Chapter 2 Getting Started

This chapter provides instructions on how to install and get started using the Host Communications Drivers. The instructions are divided into sections based upon the target operating system:

- Section 1. Windows 95 or Windows NT
- Section 2. Windows for Workgroups

Section 1: Installation and Start-Up: Windows 95, Windows NT

Host Requirements

To be able to install and use the Host Communications Drivers to communicate with a PLC, your system must meet the following requirements.

General Requirements

- 3.5 inch 1.44 Mbyte floppy drive
- 3 Mbytes of available hard-disk space (5 Mbytes recommended)
- 16 Mbytes of RAM for 1-4 HCT sessions. 32 Mbytes of RAM for more than 4 HCT sessions.

Windows 95 Specific Requirements

- Windows 95 operating system
- IBM PC compatible with 80486 processor (Pentium recommended)

Windows NT Specific Requirements

- Windows NT version 3.51 (with service pack 5), or Windows NT version 4.0 (with service pack 1), or later
- IBM PC compatible with 80486 processor (Pentium recommended)

TCP/IP Specific Requirements

- You will need a PC network card to communicate over an Ethernet network.
- Refer to Appendix B if you need to install and set up the IP address of your PC.

Note

Both Windows 95 and Windows NT come with built-in TCP/IP stacks. Thus, unlike the Windows for Workgroups environment, no separate TCP/IP stack installation is required.

SNP Specific Requirements

- You will need a Mini Converter Kit (IC690ACC901) to convert from RS-232 to RS-485.

Installing the Host Drivers

The Host Drivers are distributed on a 3.5 inch floppy diskette.

To install the Host Drivers:

1. Close all active applications.
2. Insert the distribution diskette into Drive A.
3. Choose RUN from the Windows NT Program Manager File Menu or from the Windows 95 Start menu.
4. Type **a:\setup** at the command line and click OK.

The Host Drivers setup program will begin. Follow the instructions in the setup program to complete the installation of the drivers.

Note

The Windows 95/NT Host Drivers limit their users to no more than 128 simultaneous sessions to remote PLCs. These sessions may be any combination of up to 64 SNP and up to 64 TCP sessions, but there may be no more than 16 SNP sessions on a single COM port.

The setup program copies the following files to the Windows root director:

- **GEFHCT32.DLL** DLL containing the Host Communications Toolkit service routines.
- **GEFSRX32.DLL** DLL containing Communications Driver service routines.
- **SRXDRV.EXE** The Host Communications Driver main executable.
- **GEFTCP.DLL** DLL containing routines which provide an interface between the communications driver service routines and the Winsock interface of the third-party TCP/IP software. *(This file is installed only if you selected the TCP/IP driver during installation of the Host Drivers).*
- **GEFEGD32.DLL** DLL containing routines that support Ethernet Global Data communications
- **GEFSNP32.DLL** DLL containing routines that support Series 90 Protocol communications
- **GEFCCL32.DLL** DLL that provides an application programming interface for managing the Host Drivers configuration file
- **GEF_CFG.INI** This file contains configuration information pertaining to the remote devices with which you wish to connect. You should *not* install this file if you have an existing Host Drivers configuration file with meaningful data.

Section 2: Installation and Start-Up: Windows for Workgroups

Host Requirements

To be able to install and use the Host Communications Drivers to communicate with a PLC, your system must meet the following requirements.

General Requirements

- IBM PC Compatible with 80386 processor or higher (or Plug & Play PC)
- 3.5 inch floppy drive
- DOS 5.0 or later
- Windows for Workgroups (Windows 3.11)
- 1 Mbyte of available hard-disk space
- 8 Mbytes of RAM (16 Mbytes or more recommended)

TCP/IP Specific Requirements

- Third-party Windows sockets ("Winsock") interface software (TCP/IP stack) if you are using the TCP/IP communications driver.
- For a stand-alone PC, you will need a PC network card to communicate over an Ethernet network.

VME Specific Requirements

- Only the Plug-and Play PC can use the VME driver.

Installing the TCP/IP Communications Stack

Before installing the GE Fanuc TCP/IP Host Driver, the underlying TCP/IP communications software must first be in place. This TCP/IP software must have a Windows sockets ("Winsock") programming interface to support the communications drivers.

The Windows for Workgroups operating system comes with the right to obtain a copy of Microsoft's Winsock-compliant DLL, "Microsoft TCP/IP-32 for Windows for Workgroups." To obtain this TCP/IP software from Microsoft, you can contact them by calling Microsoft Sales at 800-426-9400 or by going to the Microsoft web site, **www.microsoft.com**

You should verify that the Winsock TCP/IP DLL is working properly by consulting Microsoft's installation and start-up documentation (*.TXT and *.HLP help files) before installing any of the HCT software products listed above. In particular, it is recommended that a PING command be successful in both directions (PC to PLC, and PLC to PC) before installing the Host

Communications Toolkit software. This will prevent confusion later on if you are certain that the underlying TCP/IP software is operational.

Installing the Host Drivers

The Host Drivers are distributed on a 3.5 inch floppy diskette.

Note

For Plug & Play PCs, the Host Drivers software is pre-installed on the PCMCIA hard disk.

To install the Host Drivers:

1. Insert the distribution diskette into Drive A.
2. Choose RUN from the Windows Program Manager File Menu.
3. Type **a:\setup** at the command line and click OK.

The Host Drivers setup program will begin. Follow the instructions in the setup program to complete the installation of the drivers.

Note

The VME Host Driver cannot be run on a standalone PC. If you install the VME driver on a stand-alone PC and allow the SYSTEM.INI file to be modified by the installation program, your PC will not boot properly. If this occurs, edit the SYSTEM.INI file and remove the line referring to the VME.386 device driver.

The setup program copies several files to the \WINDOWS root directory. These files are described below. Also, if you install the VME Host Driver (used with the Plug & Play PC only), the \WINDOWS\ SYSTEM.INI file will be updated. These files and updates are described below.

\WINDOWS root directory

- **GEF_HCT.DLL** DLL containing the Host Communications Toolkit service routines.
- **GEF_SRX.DLL** DLL containing Communications Driver service routines.
- **SRXDRV.EXE** The Host Communications Driver main executable.
- **GEF_TCP.DLL** DLL containing routines which provide an interface between the communications driver service routines and the Winsock interface of the third-party TCP/IP software. *(This file is installed only if you selected the TCP/IP driver during installation of the Host Drivers).*
- **VME.386** VME Virtual Device Driver—used only with the Plug and Play PC. *(This file is installed only if you selected the VME driver during installation of the Host Drivers).* Also, see the description of the update to the SYSTEM.INI file below.
- **GEF_CFG.INI** This file contains configuration information pertaining to the remote devices with which you wish to connect. You should *not* install this file if you have an existing Host Drivers configuration file with meaningful data.

VME Communications for the Plug & Play PC

The \WINDOWS\SYSTEM.INI file is updated upon installing the Host Drivers only if you have also chosen to install the VME Host Driver (if you choose not to let the install program update your SYSTEM.INI file, then a sample file, SAMPLE.INI, in placed in your windows root directory). The SYSTEM.INI file is divided into sections denoted by square brackets.

[386enh]

Your system will already have a section identified as [386Enh] and it will likely have a number of entries in it prior to installation of the Toolkit. If you choose to install the VME Host Driver, the following entry will be made to SYSTEM.INI.

```
DEVICE = C:\WINDOWS\VME.386
```

This entry identifies the location of the VME Virtual Device Driver installed with the Host Drivers. This example indicates that the \WINDOWS directory is on drive C. The location of your PCs \WINDOWS root directory is automatically determined upon installation of the VME Host Driver.

[VMESECTION]

This section will be added and will include the following line.

```
VMERACKID = n
```

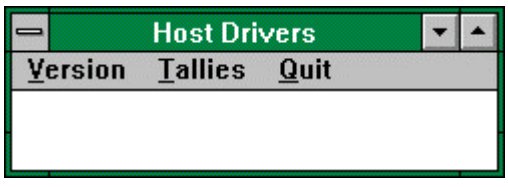
“n” is the number of the rack in which the Plug & Play PC is installed. During installation you will be able to identify the rack. The default is rack 0.

Note

If you move the Plug & Play PC from one rack to another after you install the Host Drivers, you must edit this entry to indicate the correct rack number.

Using the Host Driver Icon

The main Host Driver executable normally runs *minimized*. This means that the Host Driver program usually operates while the icon appears at the bottom of the screen. By double clicking on the Host Driver icon, the Host Driver window will appear.



The Host Driver window contains three menus:

- Version
- Tallies
- Quit

The Version Menu

To view the revision number of each underlying Host Driver, select the Version menu. (See figure below).

The Tallies Menu

The Tallies menu contains two selections:

- View
- Clear

Viewing Tallies

From the Tallies menu, choose View. A list of tallies is displayed. Refer to the table below for a description of the tallies.

Tally	Description
Conn reqs	Number of calls to HCT_connect() routine.
Discon reqs	Number of calls to HCT_disconnect() routine.
Read reqs	Number of calls to HCT_read_req() routine.
Write reqs	Number of calls to HCT _write_req() routine.
Status reqs	Number of calls to HCT_get_status() routine.
CancelMemList reqs	Number of calls to HCT_cancel_mem_list() routine.
EstabMemList reqs	Number of calls to HCT_estab_mem_list() routine.
Cancel reqs	Number of calls to HCT_cancel_request() routine.
Conn confs	Number of sessions successfully established with an HCT_connect () call.
Discon inds	Number of sessions terminated by the remote device.
Data inds	Number of messages transferring data, or responses to our data transfer requests.
Nothing Present	Received a data indication, but no data in the message.
Trans Err	Unable to retrieve data for data indication.
Unknown Resp Code	Host Driver gave unknown error code while we tried to retrieve data.
Bad InvokeID	Received data response for unknown request, or unsolicited message when no user buffer was available.
Bad HCT Event	Event code from Host Driver was invalid for a data indication.
Unknown SRX ind	Host Driver sent unknown indication.

Missing Data	Expected message length exceeds length of data actually received.

Clearing Tallies

From the Tallies menu, choose Clear. This sets all tally values to zero.

The Quit Menu

Click the Quit menu to terminate the Host Driver program, free all resources associated with it, and remove it from memory. This is not necessary during normal operation. However, if the Host Communications Drivers are not being used and system memory is required for another application, this is a means of freeing the resources being used by the Host Driver.

If there is currently a connection between a user application above the Host Driver and a remote device, an attempt to Quit the Host Driver program will result in an error message. The user application connection must be terminated before the Host Driver may be removed from memory.

Note

Host Drivers operating under Windows for Workgroups limit their users to no more than 64 simultaneous sessions to remote PLCs. These sessions can be any combination of TCP and VME sessions.

Chapter 3 Communication Configuration Utility

This chapter describes the Communication Configuration Utility (CCU). The CCU, which runs under Windows 95 and Windows NT, provides an interactive means of managing the Host Driver configuration data in the Host Driver configuration file, GEF_CFG.INI.

Configuring Communications

The Communication Configuration Utility allows you to add and edit communication parameters used by applications to establish connections to PLCs. These parameters are saved in the configuration file, GEF_CFG.INI.

The communication parameters are divided into four categories.

- **Device (PLC) Configurations.** Each device configuration includes a required address to the target PLC and other optional information. If you are connecting to PLCs over an Ethernet network, an SNP multidrop network, or through a modem, a device configuration is needed for each target PLC. See “Device (PLC) Configuration” on page 3-3.
- **PC Port Configurations.** Each port configuration includes parameter values for a PC port (COM1-4 or Ethernet) that will be used by the application initiating the connection. A single PC port can have more than one port configuration, containing different parameter values. See “PC Port Configuration” on page 3-5.
- **Global Parameter Configuration.** Specifies two timeout parameters, Connect Timeout and Request Timeout , that can be made to apply globally to all PC ports. See “Global Parameter Configuration” on page 3-7.
- **Modem Configuration.** The CCU provides modem dialing through an SNP connection. You can create modem configurations that can be included as part of a device or a port configuration. See “Modem Configuration” on page 3-9.

How Device, PC Port, and Global Parameter Configurations Relate to Each Other

Once a device configuration, a PLC port configuration, a global parameters configuration (optional), and a modem configuration (optional) have been created and saved, these configurations can then be used to communicate with a PLC.

To communicate with a PLC, a device configuration and a PC port configuration must be selected. The means by which they are selected depends upon the application (Host Communications Toolkit or other application). The device configuration contains the address of the target PLC, and

the PC port configuration determines the type of PC port (serial, or Ethernet) and the specific parameter values to be used for the communication.

Two timeout parameters can be set in the global parameters configuration. These same parameters can be set in each port configuration. In some programming/configuration software, if no values exist in the port configuration for these timeout parameters, the values in the global parameters configuration can be used. HCT applications may handle global parameters differently.

Running the Communication Configuration Utility

When the Communication Configuration Utility is run, you are prompted for a password. To be able to change the configuration parameters, you must enter the password. The default password is **netutil** (all lower case). Passwords may be from 1 to 8 characters long.

To view the CCU without the ability to edit the configuration parameters, you do not need to enter the password; just click the View Only button.

Saving Your Work

To save changes without leaving the CCU, choose Save from the File menu.

Click the OK button from the Devices, Ports, Global Parameters, or Modems tab to exit the CCU. Alternatively, you can choose Exit from the File menu. You will be prompted to save your changes (if you made any). If you click Yes, the changes will be saved and CCU will be exited.

Closing Without Saving Your Work

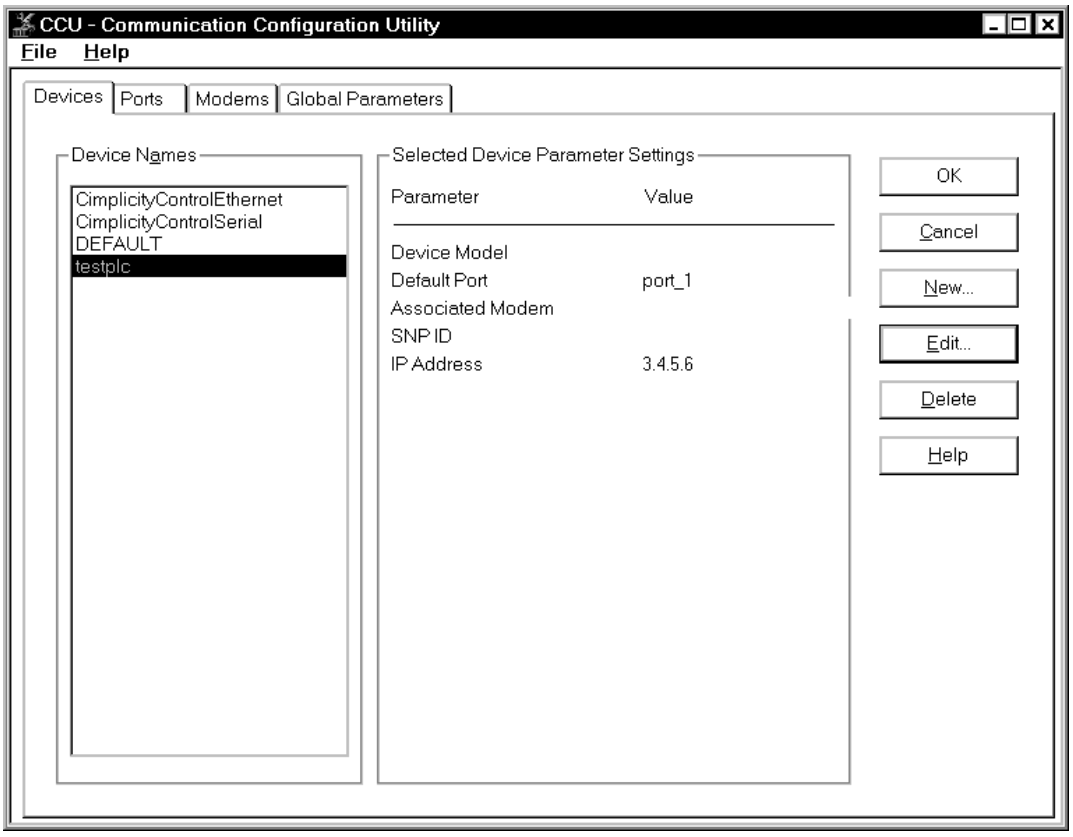
To exit the CCU without saving your work to the hard disk, choose Exit from the File menu. You will be prompted to save your changes. If you click No, CCU will be exited, but the changes will not be saved. Alternatively, you can click the Cancel button in any of the four tabs.

Printing

To print the entire contents of GEF_CFG.INI, choose Print from the File menu.

Device (PLC) Configuration

The Devices tab is shown below.



A device configuration identifies the target PLC. A device configuration includes:

- A name for the configuration (Required).
- Addresses for the PLC (At least one address required).
- The model of PLC to be connected (Optional—for documentation only).
- The Default Port selection (Optional).
- The Associated Modem selection (Optional)

The Default Port selection specifies the PC port configuration that will normally be used unless you change it.

The Associated Modem selection specifies the Modem Configuration that contains the required modem dialing information.

Only one device configuration may be required for some applications. This is the case when applications on the PC running the CCU will communicate with one or more PLCs only through a direct serial connection.

However, if applications on the PC running the CCU must connect to multiple PLCs over an SNP multidrop or TCP/IP network, you must create a device configuration for each target PLC. Up to 1000 device configurations of each address type (SNP ID or IP Address) can be created.

Adding a Device Configuration

To add a device configuration:

1. In the Communication Configuration Utility window, select the Devices tab.
2. Click the New button. The New Device dialog box appears.
3. Type the name of the device configuration in the Device Name field. (Required).
4. Click in the field next to the type of device address (SNP ID or IP Address) you want to configure and type the device address. A device configuration can contain more than one device address, but at least one device address is required. (Required)
5. Click in the Device Model field and choose the appropriate model from the drop-down list. (Optional)
6. Click in the Default Port field and choose the name of the port configuration you want to use as the default for this device configuration. The port configuration must be in the Port Names list within the Ports tab. (Optional)
7. Click in the Associated Modem field and choose the name of the modem configuration that you want to associate with this device. To create a modem configuration, go to the Modems tab. (Optional)
8. Click the OK button.

Note

To view detailed technical information about the parameters, click the Help button within the Add New Device dialog box.

Changing a Device Configuration

To change a device configuration:

1. In the Communication Configuration Utility window, select the Devices tab.
2. Select the Device configuration you want to edit from the list of Device Names
3. Click the Edit button. The Edit Device dialog box appears.
4. Click in the field next to the parameter you want to change. Some fields require you to choose from a drop-down list; others require you to type a value. Update all desired parameter values. (You cannot change the Device Name of an existing device configuration.)
5. Click the OK button.

Note

To view detailed technical information about the parameters, click the Help button within the Edit Device dialog box.

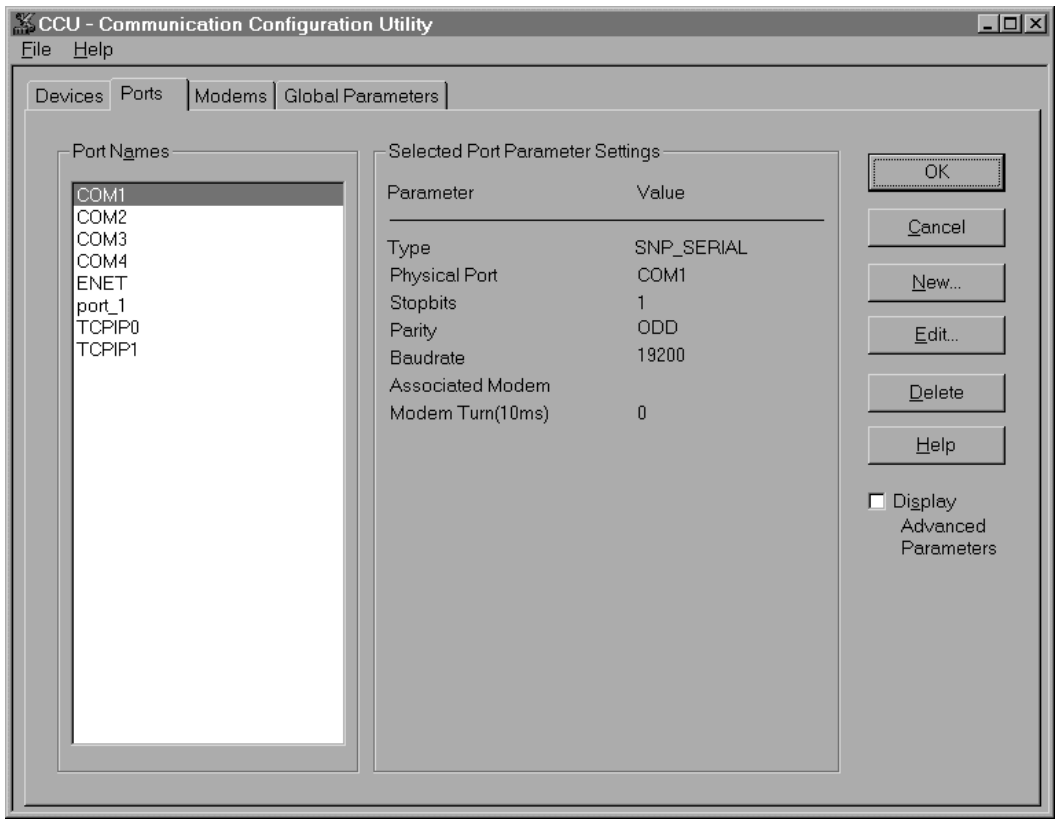
Deleting a Device Configuration

To delete a device configuration:

1. In the Communication Configuration Utility window, select the Devices tab.
2. Select the device configuration you want to delete.
3. Click the Delete button.

PC Port Configuration

The Ports tab is shown below.



A port configuration provides communications parameter values for a PC port (COM1-4 or Ethernet) that will be used by the application initiating the connection. A port configuration includes:

- A name for the configuration.
- The type of PC port to be used for the connection.
- Values for the communications parameters for the port.
- The Associated Modem selection (Optional)

Adding a PC Port Configuration

To add a PC port configuration:

1. In the Communication Configuration Utility window, select the Ports tab.
2. Click the New button. The Add New Port dialog box appears.
3. Type the name of the port configuration in Port Name field.
4. Click in the Port Type field and choose the appropriate type from the drop-down list. Only the parameters pertaining to the specified port type will be displayed. Choices are: SNP_SERIAL Settings, TCPIP_ETH Settings, and TCPIP_SLIP Settings (Serial Line IP).
5. If you choose not to use the default parameters, click in the field next to the parameter you want to change. Some fields require you to choose from a drop-down list; others require you to type a value. Update all desired parameter values.
6. To edit advanced parameters, click the Advanced>> button.
7. Click the OK button.

Note

To view detailed technical information about the parameters, click the Help button within the Add New Port dialog box.

Changing a PC Port Configuration

To change a PC port configuration:

1. In the Communication Configuration Utility window, select the Ports tab.
2. Select the port configuration you want to update from the list of Port names.
3. Click the Edit button. The Edit Port dialog box appears.
4. Click in the field next to the parameter you want to update. Some fields require you to choose from a drop-down list; others require you to type a value. Update all desired parameter values. (You cannot change the Port Name or Port Type of an existing port configuration.)
5. To edit advanced parameters, click the Advanced>> button.
6. After you have finished editing, click the OK button.

Note

To view detailed technical information about the parameters, click the Help button within the Edit Port dialog box.

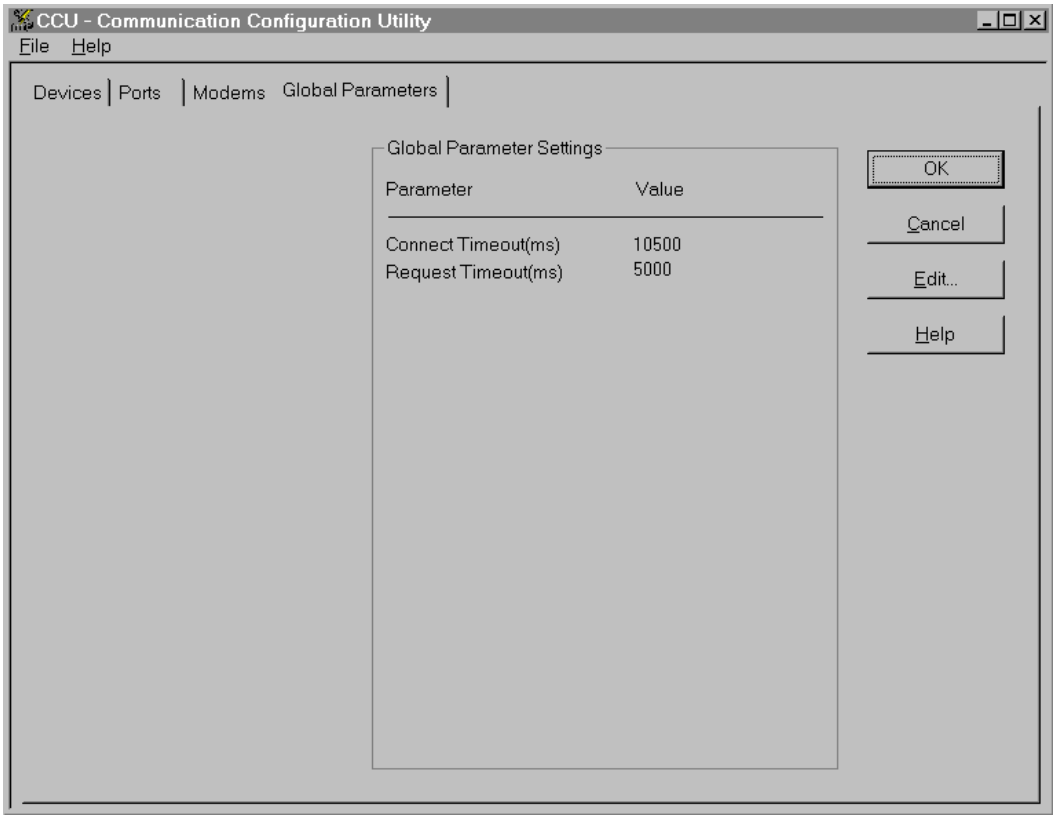
Deleting a PC Port Configuration

To delete a PC port configuration:

1. In the Communication Configuration Utility window, select the Ports tab.
2. Select the port configuration you want to delete.
3. Click the Delete button.

Global Parameter Configuration

The Global Parameters tab is shown below.



The Global Parameters configuration includes settings for Connect Timeout and Request Timeout.

- The Connect Timeout parameter specifies the timeout value when attaching to the target PLC.
- The Request Timeout parameter specifies the timeout value on transfer of data.

Configuring Global Timeouts for PC Ports

To configure global timeouts:

1. In the Communication Configuration Utility window, select the Global Parameters tab.
2. Click the Edit button.
3. For each timeout parameter you want to change, click in the field next to the timeout parameter and type the desired value.
4. Click the OK button.

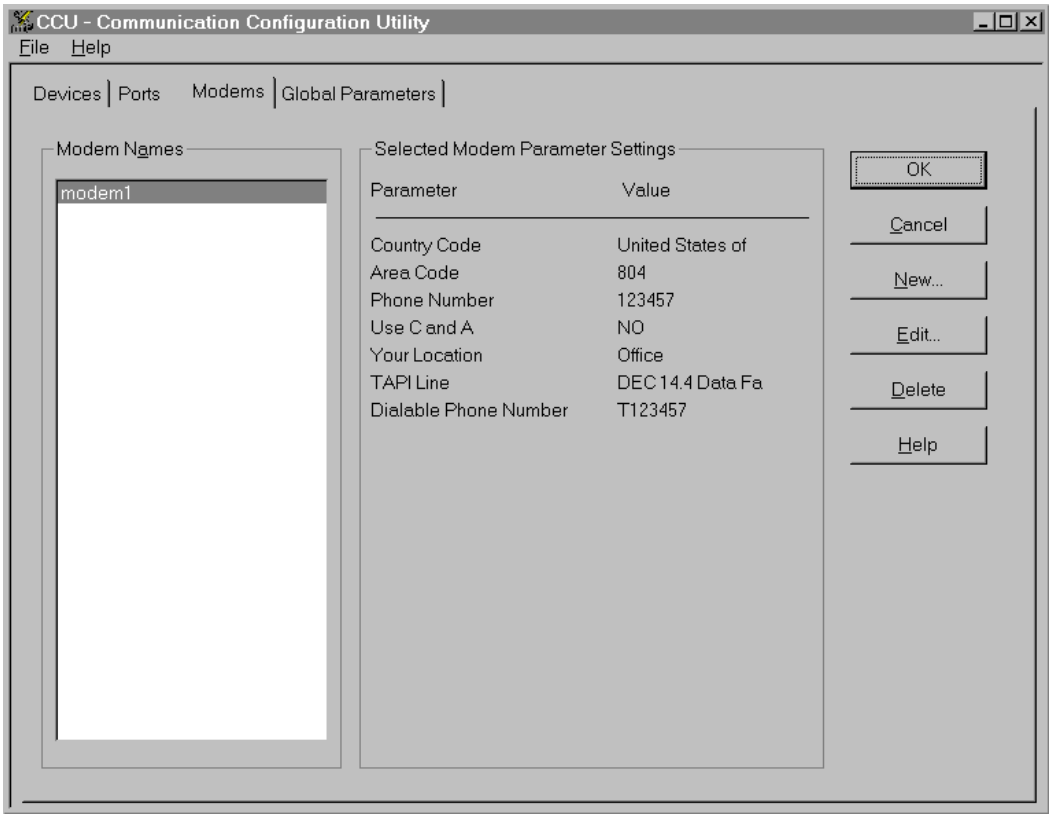
Timeout Precedence for Connect Timeout and Request Timeout

Connect Timeout and Request Timeout values can be specified globally or within a port configuration. The order of precedence is as follows.

1. If a value is specified for Connect Timeout or Request Timeout in the active PC port configuration, this value is used during communications with a PLC.
2. If no value for Connect Timeout or Request Timeout is specified in the active PC port configuration, then the global value specified in the Global Parameters configuration is used.
3. If no value for Connect Timeout or Request Timeout is specified in *either* the active PC port configuration *or* the Global Parameters configuration, the default value is used. The default value for Connect Timeout is 10500 (10.5 seconds); for Request Timeout the default is 5,000 (5 seconds).

Modem Configuration

The Modems tab is shown below:



A modem configuration includes

- A name for the configuration (required)
- Country code (required)
- Area Code
- Phone Number
- Use C and A (use Country Code and Area Code)
- Your Location (the dialing from location)
- TAPI Line (description of modem selected)
- Dialable Phone Number (the telephone number to be dialed by the modem)

Adding a Modem Configuration

To add a modem configuration:

1. In the CCU window, select the Modems tab.
2. Click the New button. The Add New Modem dialog box appears.
3. Edit the parameters in the Add New Modem dialog box and press OK. The dialog box closes and the modem configuration you added appears in the Modem Names box in the CCU window.

Editing a Modem Configuration

To edit a modem configuration:

1. In the CCU window, select the Modems tab.
2. In the Modem Names box, select the modem configuration that you want to edit.
3. Click the Edit button. The Edit Modem dialog box appears.
4. Edit the parameters in the Edit Modem dialog box and press OK. The dialog box closes and the new parameters for the modem configuration you edited appear in the Selected Modem Parameter Settings box.

Deleting a Modem Configuration

To delete a modem configuration:

1. In the CCU window, select the Modems tab.
2. In the Modem Names box, select the modem configuration that you want to delete.
3. Click the Delete button. A confirmation dialog box appears.
4. Click Yes.

Sample Device/Port Configurations

There are some device and port configurations shipped with this utility that have a specific use depending on what software application is using the CCU. These are the configurations, DEFAULT/COM1-4, ENET, and testplc/port_1.

DEFAULT/COM1-4

"DEFAULT" is the name of the device configuration intended for Direct SNP connection. It is configured to use an SNP ID of <NULL> indicating a direct connection. It is set to use COM1 at 19,200 baud, odd parity, with 1 stop bit.

Device configuration, DEFAULT, specifies the port configuration, COM1, as the default port. If COM1 is not available on your system you can change the Default Port value to COM2, COM3, or COM4.

The port configurations, COM1-COM4, can be specified as the Default Port in device configurations other than DEFAULT as well.

DEFAULT Device Configuration

The DEFAULT device configuration includes the following parameter values.

SNP ID = <NULL>

Default Port = COM1

COM1 Port Configuration

The COM1 port configuration includes the following parameter values.

Type = SNP_SERIAL

Physical Port = COM1

All other port communications parameters contain default values.

COM2 Port Configuration

The COM2 port configuration includes the following required parameter values.

Type = SNP_SERIAL

Physical Port = COM2

COM3 Port Configuration

The COM3 port configuration includes the following required parameter values.

Type = SNP_SERIAL

Physical Port = COM3

COM4 Port Configuration

The COM4 port configuration includes the following required parameter values.

Type = SNP_SERIAL

Physical Port = COM4

ENET

"ENET" is the name of a basic port configuration set up for Ethernet communications.

Type = TCPIP_ETH

testplc/port_1

"testplc" is the name of the device configuration and "port_1" is the name of the port configuration included with the CCU for use with the Host Communications Toolkit. These configurations allow you to run the sample programs included with the Host Communications Toolkit.

testplc Device Configuration

The testplc device configuration includes the following required parameter value.

IP Address = 10.X.X.X (modify this value to match the IP address of your PLC)

port_1 Port Configuration

The port_1 port configuration includes the following required parameter values.

Type = TCPIP_ETH

Chapter 4 Communication Configuration Library

This chapter describes the Communication Configuration Library (CCL). The CCL is a Windows Dynamic Link Library (DLL) which provides an application programming interface for the user program to manage the Host Driver configuration data in the Host Driver configuration file, GEF_CFG.INI. See Appendix A for a detailed description of the contents of the configuration file.

Structures Used With the CCL

This section describes the C/C++ language structures used in communicating with the Communication Configuration Library (CCL). All structure and mnemonic definitions described in this section are defined in the CCL.H include file that is supplied on the Host Drivers installation diskette.

Structures that Apply to Multiple Record Types

This section describes the structures which apply to any record type.

CCL_REC

The CCL_REC structure is a generic structure name that contains each of the possible record definitions. The format of this structure is as follows:

```
typedef union {

  CCL_PORT_REC     PortRecord;       /* Port Record    */

  CCL_PORT_REC_EX  PortRecordEx; /* Attaches modem record name to Port Record */
  CCL_DEV_REC      DeviceRecord;     /* Device Record  */
  CCL_DEV_REC_EX   DeviceRecordEx; /* Attaches modem record name to Device Record */
  CCL_GP_REC       GlobalParamRecord;    /* Global Parameter Record */
  CCL_MODEM_REC    ModemRecord;    /* Modem Record */
  } CCL_REC;
```

SEARCH_KEY_DEF

The SEARCH_KEY_DEF structure is used by the CCL_Get_List routine to allow the caller to specify parameters to filter out unwanted records. The format of this structure is as follows:

```
typedef struct {

  _TXCHAR KeyWord[2*CCL_MAX_NAME+2];

  _TXCHAR Value[2*CCL_MAX_NAME+2];

  } SEARCH_KEY_DEF;
```

Keyword The *KeyWord* string specifies a valid keyword within the communication configuration file. Refer to Appendix A for a description of all the valid keywords for each record type.

Value The *Value* string specifies a value that goes with the associated keyword string. For example, if the keyword string is “TYPE” the *Value* string might be “SNP_SERIAL”.

Port Record Structure

This section describes the CCL_PORT_REC structure, listed on page 4-3 which defines the contents of a Port record. Note that the first three fields apply to all port record types. All the other fields apply only to SNP/serial port definitions.

CCL_PORT_REC

```
typedef struct {

  _TXCHAR          RecName[2*CCL_MAX_NAME+2 ];  /* Name of port record    */
  unsigned short   PortType;                    /* Numeric port type code */
  CCL_GP_REC       GlobalParam;                 /* Port-specific timeouts */
  _TXCHAR          COMport[COM_PORT_LEN+2 ];    /* SNP COM port name      */
  _TXCHAR          ModemDialInfo[2*MODEM_INFO_LEN + 2];
  unsigned short   StopBits;
  unsigned short   Parity;
  unsigned short   BaudRate;
  unsigned long    ModemTurn;
  unsigned long    SNP_T1;
  unsigned long    SNP_T2;
  unsigned long    SNP_T3;
  unsigned long    SNP_T3p;
  unsigned long    SNP_T3pp;
  unsigned long    SNP_T4;
  unsigned long    SNP_T5;
  unsigned long    SNP_T5p;
  unsigned long    SNP_T5pp;
  unsigned short   AllowMulti;
  unsigned short   PCIMChannelId;
  _TXCHAR                 PCIMPN[PART_NUMBER_LEN + 2];
  _TXCHAR                 PCIMController[IO_ADDR_LEN +2];
  _TXCHAR                 PCIMPort[IO_ADDR_LEN + 2];
  _TXCHAR                 PCIMAddr[MEM_ADDR_LEN + 2];
  } CCL_PORT_REC;
typedef struct {
  CCL_PORT_REC            PortRecord;
  _TXCHAR                 ModemRecName[2*CCL_MAX_NAME + 2 ];
  } CCL_PORT_REC_EX;
```

Device Record Structure

This section describes the CCL_DEV_REC structure, which defines the contents of a Device record.

CCL_DEV_REC

```
typedef struct {

  _TXCHAR          RecName[ 2*CCL_MAX_NAME + 2 ];  /* Name of device record*/

  unsigned short   DeviceType;

  unsigned short    PCIMBusAddr;

  _TXCHAR          VMEAddr[MAX_VME_ID + 2];       /* VME address    */

  _TXCHAR          IPAddr[MAX_IP_ID + 2];         /* IP address     */

  _TXCHAR          SNPId[2*MAX_SNP_ID + 2];        /* SNP ID         */

  _TXCHAR          DefaultPort[2*CCL_MAX_NAME + 2 ];

  _TXCHAR          DeviceModel[2*MAX_MODEL_NAME + 2];

  } CCL_DEV_REC;


typedef struct {

   CCL_DEV_REC DeviceRecord;

  _TXCHAR          ModemRecName[2*CCL_MAX_NAME + 2 ];

  } CCL_DEV_REC_EX;
```

Modem Record Structure

This section describes the CCL_MODEM_REC structure, which defines the content of a modem record.

CCL_MODEM_REC

```
typedef struct {

  _TXCHAR          RecName[ 2*CCL_MAX_NAME + 2 ];  /* Name of modem record */

  _TXCHAR          ModemDialInfo[MODEM_INFO_LEN_EX + 2];

  _TXCHAR          ModemDispInfo[MODEM_INFO_LEN_EX + 2];
  _TXCHAR          ModemCountryName[MODEM_INFO_LEN_EX + 2];
  _TXCHAR          ModemAreaCode[MODEM_INFO_LEN_EX + 2];
  _TXCHAR          ModemPhoneNumber[MODEM_INFO_LEN_EX + 2];
  _TXCHAR          ModemLocation[MODEM_INFO_LEN_EX + 2];
  _TXCHAR          ModemTAPILine[MODEM_INFO_LEN_EX + 2];
  unsigned short   ModemUsedCountryAndArea;
  unsigned short   ModemDeviceID;
    } CCL_MODEM_REC;
```

Global Parameters Structure

This section describes the CCL_GP_REC structure, which defines the Global Parameters record.

CCL_GP_REC

```
typedef struct {

  unsigned long ConnectTimeout;          /* Connect timeout */
  unsigned long RequestTimeout;          /* Request timeout */
  _TXCHAR Password[ 2*MAX_PW_LEN  + 2];  /* CCU password */
    } CCL_GP_REC;
```

CCL Interface Routines for C/C++ Applications

This section describes the C/C++ calling sequence of each of the interface routines of the CCL.

CCL_Add_Record

This routine is called to add a new record to the configuration file.

```
FUNCTION_TYPE CCL_Add_Record(unsigned short    RecType,

                             CCL_REC PTR_TYPE RecInfo);
```

RecType A code indicating the record type (device, port, or global parameters) being added. The following mnemonics are the only valid record types:

PORT_REC_TYPE	Port record
DEV_REC_TYPE	Device record
GP_REC_TYPE	Global Parameters
MODEM_REC_TYPE	Modem record

RecInfo The data which defines this record.

Note

For an unused string type field, you must set the first byte of the string to '\0' (the null character). For an unused numerical type field, you must set it to the value FIELD_NOT_ASSIGNED which is defined as 0xffffffff.

Note

In the case of adding Device Names, you can optionally add one field of a record by assigning one of the following values to the Device Type field of RecInfo parameter.

SNP_SERIAL:	Adds the field with keyword SNP_ID
TCPIP_ETH, TCPIP_SLIP:	Adds the field with keyword IP_ADDR
VME_PORT:	Adds the field with keyword DEST_ADDR
ALL_DEV_TYPE:	Adds all fields which are not NULL strings in the RecInfo parameter

Return Codes

If the request was executed successfully, the value CCL_OK (0) will be returned. Otherwise the record was not inserted and one of the following error codes will be returned.

Return Code	Value (dec)	Value (hex)	Interpretation
CCL_BAD_RECTYPE	-1	FFFF FFFF	The *RecType* parameter contains an unknown record type code.
CCL_NULL_PTR	-2	FFFF FFFE	The *RecInfo* parameter contains a NULL pointer.
CCL_BAD_DEVTYPE	-3	FFFF FFFD	The *DeviceType* field of the CCL_DEV_REC structure is out of range.
CCL_DUPLICATE	-4	FFFF FFFC	The *RecName* field of the CCL_PORT_REC, CCL_MODEM_REC, or CCL_DEV_REC structure contains a name which matches an existing record.
CCL_NOT_SUPPORTED	-5	FFFF FFFB	The requested record or subfield is not supported.
CCL_RESOURCE	-6	FFFF FFFA	Could not allocate buffer
CCL_BAD_SNPID	-7	FFFF FFF9	The *SNPId* field of the CCL_DEV_REC structure is invalid.
CCL_BAD_NAME	-8	FFFF FFF8	The *RecName* field of the CCL_PORT_REC, CCL_MODEM_REC, CCL_DEV_REC structure contains a name that is not valid.
CCL_BAD_IPADDR	-9	FFFF FFF7	The *IPADDR* field of the CCL_DEV_REC structure is invalid.
CCL_BAD_VMEADDR	-10	FFFF FFF6	The *VMEADDR* field of the CCL_DEV_REC structure is invalid.
CCL_BAD_PORTTYPE	-11	FFFF FFF5	The value of the *PortType* field of the CCL_PORT_REC structure is out of range.
CCL_BAD_COMPORT	-12	FFFF FFF4	The string in the *COMport* field of the CCL_PORT_REC structure is not “COM1”, “COM2”, “COM3”, or “COM4”.
CCL_BAD_DEFAULTPORT	-13	FFFF FFF3	The *DefaultPort* field of the CCL_DEV_REC structure contains an invalid port name.
CCL_BAD_SEARCHKEY	-14	FFFF FFF2	Search key specified is invalid.
CCL_NOT_FOUND	-15	FFFF FFF1	Requested record is not found.
CCL_REQ_FAIL	-99	FFFF FF9D	CCL failed to access the configuration file.

Example #1 - Defining a Device Record

The following example code segment shows how to define a new Device Name record.

```
CCL_REC MyRecord;
  memset( (char *)MyRecord, 0, sizeof( CCL_REC ) );
  strcpy( MyRecord.DeviceRecord.RecName, “FRED” );  // Set Device Name
  MyRecord.DeviceRecord.DeviceType = TCPIP_ETH;     // Port type used
  strcpy( MyRecord.DeviceRecord.IPAddr,"10.X.X.X");
```

Note that in the above example, the *memset* call sets all bytes of the CCL_REC structure to zero. Because we do not overwrite the *VMEAdr*, *SNPId*, *DefaultPort*, *DeviceModel* fields with other data, the corresponding keywords for those fields will not be defined for this Device record.

Example #2 - Defining a Port Record

The following example code segment shows how to define a new Port Name record.

```
CCL_REC MyRecord;
  memset( (char *)MyRecord, 0xFF, sizeof( CCL_REC ) );
  strcpy( MyRecord.PortRecord.RecName, “HORTON” );  // Set Port Name
  MyRecord.PortRecord.PortType = SNP_SERIAL;        // Port type used
  strcpy( MyRecord.PortRecord.COMPort, “COM2” );    // Set COM port
  MyRecord.PortRecord.ModemDialInfo[0] = '\0';
```

Note that in the above example, the *memset* call sets all bytes of the CCL_REC structure to indicate FIELD_NOT_ASSIGNED for the numerical fields; therefore, it is important to initialize MyRecord.PortRecord.Modem Dial Info[0] to '\0' because it is an unused string type field. Because we do not overwrite the other fields with new data, the corresponding keywords for those fields will not be defined for this Port record.

Example #3 - Defining Global Parameters

The following example code segment shows how to define a new Global Parameters record.

```
CCL_REC MyRecord;
  memset( (char *)MyRecord, 0xFF, sizeof( CCL_REC ) );
  MyRecord.GlobalParamRecord.ConnectTimeout = 8500; // Connect timeout = 8.5s
  MyRecord.GlobalParamRecord.RequestTimeout = 750;  // Request timeout = 750ms
```

If the proposed Connect Timeout or Request Timeout value is greater than TIMEOUT_MAX, TIMEOUT_MAX will be stored. Likewise, if the proposed value is less than TIMEOUT_MIN, TIMEOUT_MIN will be stored.

CCL_Delete_Record

This routine is called to remove a record from the configuration file.

```
FUNCTION_TYPE CCL_Delete_Record(unsigned short    RecType,
                                unsigned short          DeviceType,
                                _TXCHAR PTR_TYPE RecName);
```

RecType A numeric code indicating what type of record is being deleted. The valid values are the same as for the *RecType* parameter of the *CCL_Add_Record()* routine.

DeviceType A numeric code indicating which field of the Device Name record is to be deleted. This parameter is ignored if the *RecType* parameter is not DEV_REC_TYPE.

RecName The record name. For a device record, this is the Device Name. (For a modem record, this is the modem name.) For a port record, this is the Port Name. For Global Parameters, this parameter is ignored and the "Global_Parameters" section is removed from the configuration file.

Note

In the case of deleting Device Name records, you can optionally delete one field or the whole record by assigning one of the following values to the *DeviceType* parameter.

SNP_SERIAL	Deletes the field with keyword SNP_ID
TCPIP_ETH, TCPIP_SLIP	Deletes the field with keyword IP_ADDR
VME_PORT	Deletes the field with keyword DEST_ADDR
ALL_DEV_TYPE	Deletes the whole record

Return Codes

If the request was executed successfully, the value CCL_OK will be returned. Otherwise the record or field was not deleted and one of the following error codes will be returned.

Return Code	Value (dec)	Value (hex)	Interpretation
CCL_BAD_RECTYPE	-1	FFFF FFFF	The *RecType* parameter contains an unknown record type code.
CCL_NULL_PTR	-2	FFFF FFFE	The *RecName* parameter contains a NULL pointer.
CCL_NOT_FOUND	-15	FFFF FFF1	The specified record name (*RecName* field) does not match a record name currently in the configuration file.
CCL_REQ_FAIL	-99	FFFF FF9D	CCL failed to access the configuration file.

CCL_Get_Record

This routine is called to retrieve a record from the configuration file. The caller specifies the record name and type as search parameters.

```
FUNCTION_TYPE CCL_Get_Record(unsigned short      RecType,
                                                 _TXCHAR PTR_TYPE      RecName,
                                                 CCL_REC PTR_TYPE      RecBuf);
```

RecType A numeric code indicating what type of record is being fetched. The valid values are the same as for the *RecType* parameter of the *CCL_Add_Record()* routine.

RecName The record name. For a device record, this is the Device Name. (For a modem record, this is the modem name.) For a port record, this is the Port Name. For Global Parameters, this parameter is ignored and the "Global_Parameters" section is retrieved.

RecBuf A pointer to a buffer which will hold the retrieved record.

Note

If a string type entry is missing in the configuration file, the corresponding field in the RecBuf will contain a NULL string. If a numerical type entry is missing in the configuration file, the corresponding field in the RecBuf will contain a field stored with the value FIELD_NOT_ASSIGNED.

Return Codes

If the request was executed successfully, the value CCL_OK will be returned. Otherwise the record or field was not retrieved and one of the following error codes will be returned.

Return Code	Value (dec)	Value (hex)	Interpretation
CCL_BAD_RECTYPE	-1	FFFF FFFF	The *RecType* parameter contains an unknown record type code.
CCL_NULL_PTR	-2	FFFF FFFE	The *RecName* or *RecInfo* parameter contains a NULL pointer.
CCL_NOT_FOUND	-15	FFFF FFF1	The specified record name (*RecName* parameter) does not match a record name currently in the configuration file.
CCL_BAD_PORTTYPE	-11	FFFF FFF5	Port type value in the configuration file is invalid.

CCL_Get_List

This routine is called to retrieve a list of record names that meet specified search criteria.

```
FUNCTION_TYPE CCL_Get_List(SEARCH_KEY_DEF PTR_TYPE      SearchKey1,
                           SEARCH_KEY_DEF PTR_TYPE      SearchKey2,
                           _TXCHAR  PTR_TYPE            NameBuf,
                           unsigned short PTR_TYPE      NumNames);
```

SearchKey1 A set of parameters to filter out unwanted records. This filter is a structure containing a keyword string (see Appendix A for valid keywords for each port type) and an optional value associated with that keyword in the configuration file. The keyword string is required, but the value is optional. If the value is omitted, merely the presence of the specified keyword includes that record.

SearchKey2 A set of parameters providing a secondary filter to records. This parameter may be a NULL pointer, indicating only the primary search key is required. If this pointer is non-NULL, the secondary keyword string must be one of the valid ones (see Appendix A for valid keywords for each port type). As with *SearchKey1*, the keyword value is optional.

NameBuf A buffer to hold the record names (variable length, NULL-terminated ASCII strings) of all records that meet the search criteria. Each name requires up to CCL_MAX_NAME+1 bytes.

NumNames Initially this field must contain the maximum number of names (each occupying CCL_MAX_NAME+1 bytes) that will fit into the *NameBuf* buffer. Upon a successful search, this parameter will contain the number of names actually present in the *NameBuf* buffer.

Return Codes

The request was executed successfully if a non-negative value is returned. This value is the number of names found that meet the search criteria. If this value is larger than *NumNames*, the *NameBuf* buffer is too small to hold all the names.

If the return value is negative, the search was not successful for one of the following reasons:

Return Code	Value (dec)	Value (hex)	Interpretation
CCL_RESOURCE	-6	FFFF FFFA	A buffer allocation failed.
CCL_REQ_FAIL	-99	FFFF FF9D	CCL failed to access the configuration file.
CCL_NULL_PTR	-2	FFFF FFFE	The *SearchKey1*, *NameBuf*, or *NumNames* field contains a NULL pointer.
CCL_BAD_SEARCHKEY	-14	FFFF FFF2	The keyword string in *SearchKey1* or *SearchKey2* is not a valid keyword.

Example #1 - Get All Port Names

This shows how to retrieve records for all Port Name definitions.

```
#define  MAX_NAMES_ALLOWED  30  // User-specified max name count
SEARCH_KEY_DEF key1 = { {“TYPE”}, {“\0”} };
unsigned char NameBuf[ MAX_NAMES_ALLOWED * (CCL_MAX_NAME+1) ];
unsigned int NumNames = MAX_NAMES_ALLOWED;

response = CCL_Get_List(&key1, (SEARCH_KEY_DEF far *)NULL,
                        NameBuf, &NumNames );
```

Example #2 - Get All Port Records for Port COM1

This shows how to retrieve Port Name records for all ports that use “COM1”.

```
#define  MAX_NAMES_ALLOWED  10  // User-specified max name count
SEARCH_KEY_DEF key1 = { {“PORT”}, {“COM1”} };
unsigned char NameBuf[ MAX_NAMES_ALLOWED * (CCL_MAX_NAME+1) ];
unsigned int NumNames = MAX_NAMES_ALLOWED;

response = CCL_Get_List(&key1, (SEARCH_KEY_DEF far *)NULL,
                        NameBuf, &NumNames );
```

Example #3 - Get All 90-70 CPUs Reachable Through Ethernet

This shows how to retrieve Device Name records for all Series 90-70 PLCs that can be accessed via TCP/IP over Ethernet.

```
#define  MAX_NAMES_ALLOWED  25  // User-specified max name count
SEARCH_KEY_DEF key1 = { {“IP_ADDR”}, {“\0”} };
SEARCH_KEY_DEF key2 = { {“DEVICE_MODEL”}, {“9070”} };
unsigned char NameBuf[ MAX_NAMES_ALLOWED * (CCL_MAX_NAME+1) ];
unsigned int NumNames = MAX_NAMES_ALLOWED;

response = CCL_Get_List(&key1, &key2, NameBuf, &NumNames );
```

CCL_Get_Version

This routine is called to return the revision level of the CCL software. This revision string is a NULL-terminated ASCII string that may be printed by the calling program.

```
FUNCTION_TYPE CCL_Get_Version(_TXCHAR PTR_TYPE   ReturnBuf);
```

Vstring A pointer to a buffer of at least VERSION_STRING_LEN bytes in length.

Return Codes

This request returns the value CCL_OK if the operation was successful. If a NULL pointer is passed in the *Vstring* field, no copying is performed and the value CCL_NULL_PTR will be returned.

Appendix A Configuration File Description

This appendix describes the contents of the configuration file, GEF_CFG.INI. In the Windows environment, this file normally resides in the Windows root directory (such as \WINDOWS). In other environments, this file is expected to be in the same directory as your HCT executable.

On Windows 95 or Windows NT platforms, use the Communication Configuration Utility (CCU) to edit this file. On platforms other than Windows 95 or Windows NT, you must edit this file directly using an ASCII text editor.

General Record Description for the Configuration File

The configuration file is composed of a series of *port*, *device*, and *modem* records mixed in any order. It can be determined whether a record is for a port, device, or modem based upon the fields within the record. In addition, there is a *global parameters* section.

Generic Format

The generic format of a record is ...

```
[Record-Name]
<keyword#1> = <data>
<keyword#2> = <data>
     . . .
<keyword#n> = <data>

[Record-Name]
<keyword#1> = <data>
<keyword#2> = <data>
     . . .

<keyword#n> = <data>

. . . "where "Record-Name" could be a device name, a port name, a modem name,
      or "Global_Parameters".
```

Record Formation Rules

The following rules apply to all records.

- The record name (device name or port name) is enclosed within square brackets ("[" and "]"). The left bracket ("[") must be the first character on that line.
- The record name is the only data on that line.
- Immediately following the line with the record name are a series of lines with a keyword, followed by an equals sign ("="), followed by the data appropriate for that keyword.
- The order of the *keyword=data* fields is not important.

Port Records

This section describes the record format for ports. A port is a description of a physical means of accessing remote devices.

A port record contains the following information:

1. An ASCII *port name*. (required)
2. Underlying *communications type*. (required)
3. *Port-specific timeout parameters.* (optional)
4. *Port communications parameters.* (applies only to SNP)
5. Modem record name. (optional)

Port Name

The Port Name is the primary piece of information that a Host Driver user specifies to indicate over which port it wishes to communicate. The Port Name has the following characteristics:

- ASCII character string, NULL-terminated.
- String length is from one (1) to thirty-two (32) characters.
- Uses any printable ASCII character (hexadecimal codes 0x20 through 0x7E), excluding a right square bracket ("]").
- The first character must be a letter ('A' through 'Z' or 'a' through 'z').
- Port Names are not case sensitive.
- Port Names must be unique among all record names in the configuration file.

There may be multiple port records for the same physical port on the local device. In this way you can define different communications characteristics to the same physical port.

Communications Type

This field contains a string indicating what type of communications is available through this port. The TYPE keyword is used to specify one of the following port types.

Mnemonic	Communications Type
TCPIP_ETH	TCP/IP protocol over an Ethernet Local Area Network
TCPIP_SLIP	Serial Line Internet Protocol (SLIP) over an Ethernet LAN
SNP_SERIAL	SNP protocol over a serial line
VME_PORT	Full VME mailbox connection

Note

The SNP port type is available only on Windows platforms. The VME port type is only available on a Plug & Play PC.

Port-Specific Timeout Parameters

You can specify timeout parameters for *HCT_connect()* requests through this port, data transfer requests through this port, or both. See the *Timeout Precedence* section below for more information about what timeout values are used if no values are specified in this port record.

The CONNECT_TIMEOUT keyword specifies the value for the timeout on *HCT_connect()* requests. The REQUEST_TIMEOUT keyword specifies the value for the timeout on data transfer requests.

Port Communications Parameters

The only port type that has communications parameters is SNP_SERIAL. The parameters with keywords SNP_T3, SNP_T3P, SNP_T2PP, STOPBITS, PARITY, BAUDRATE, SNP_T1, SNP_T2, SNP_T4, SNP_T5, SNP_T5P, SNP_T5PP, MULTISESS, MODEM_RECORDNAME, and MODEM_TURN will be added to the record only if non-default values are assigned to them.

Port Record Keywords

This section defines the keywords that are recognized as valid for Port Records. The following table shows what keywords apply to each port type. A value of “R” means that parameter is *required* for that port type. A value of “O” means that parameter is *optional* for that port type. No letter indicates that this keyword is not valid for that port type.

Keyword	TCPIP_ETH	TCPIP_SLIP	SNP_SERIAL	VME_PORT
BAUDRATE			O	
CONNECT_TIMEOUT	O	O	O	O
MODEM_RECORDNAME			O	
MODEM_TURN			O/R*	
MULTISESS			O	
PARITY			O	
PORT			R	
REQUEST_TIMEOUT	O	O	O	O
SNP_T1			O	
SNP_T2			O	
SNP_T3			R	
SNP_T3P			R	
SNP_T3PP			R	
SNP_T4			O	
SNP_T5			O	
SNP_T5P			O	
SNP_T5PP			O	
STOPBITS			O	
TYPE	R	R	R	R

* The MODEM_TURN parameter must be present if a modem is used and must not be present if a modem is not used.

The port record keywords are listed in alphabetical order.

BAUDRATE Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the baud rate to be used on this serial COM port. The possible values for this keyword are (expressed in bits per second):

- 300 (300 bps)
- 600 (600 bps)
- 1200 (1,200 bps)
- 2400 (2,400 bps)
- 4800 (4,800 bps)
- 9600 (9,600 bps)
- 19200 (19,200 bps)

If this keyword is omitted, a baud rate of 19,200 bps is used.

CONNECT_TIMEOUT Keyword

This keyword specifies how long the Host Communications Toolkit (HCT) should wait on a blocking *HCT_connect()* call before declaring a timeout. As with the CONNECT_TIMEOUT parameter in the Global Parameters section of the configuration file, the value for this parameter ranges from 50 (50 milliseconds) to 63,000 (63 seconds). See the *Timeout Precedence* section below for more information about what timeout values are used if this field is not present in the port record.

This keyword applies to any port, regardless of the port TYPE.

MODEM_RECORDNAME

This keyword defines the modem record name to be used by the port . It is optional for ports with a TYPE of SNP_SERIAL.

Note

This value is only valid on Win32 platforms.

MODEM_TURN Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the modem turnaround time value. This is the time required for the modem to start data transmission after receiving the transmit request from the target device.

It can range from 0 to 255 counts, where one count is 10 milliseconds (0.01 seconds). If a modem is being used through this COM port, this field must be present and must have a non-zero value. If a modem is not being used, then either this keyword should not be used or the value specified must be zero. If this keyword is omitted, a value of zero (0) is assumed.

MULTISESS Keyword

Specifies whether to allow multiple sessions through the same PC port with the PLC CPU. The possible values are YES or NO. The default value is YES.

Note

The only reason to set this value to NO is to connect to Serial Communications Modules, IC697CMM711 and IC693CMM311. These modules support only a single session.

PARITY Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the parity sense to be assumed for this serial COM port. The possible values for this keyword are ODD (odd parity), EVEN (even parity), or NONE (no parity). If this keyword is omitted, odd parity is used.

PORT Keyword

This keyword is *required* for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies what local COM port is to be used to communicate with the target device. The possible values for this keyword are COM1, COM2, COM3 or COM4.

REQUEST_TIMEOUT Keyword

This keyword specifies how long the Host Communications Toolkit (HCT) should wait on a blocking data transfer before declaring a timeout. As with the REQUEST_TIMEOUT parameter in the Global Parameters section of the configuration file, the value for this parameter ranges from 50 (50 milliseconds) to 63,000 (63 seconds). See the *Timeout Precedence* section below for more information about what timeout values are used if this field is not present in the port record.

This keyword applies to any port, regardless of the port TYPE.

SNP_T1 Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T1 timer. This is the Minimum Turn-Around Time, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10 (milliseconds) is used.

SNP_T2 Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T2 timer. This is the Acknowledgment Timeout, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 3,000 (3 seconds) is used.

SNP_T3 Keyword

This keyword is required for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T3 timer. This is the Link Keep-Alive Time, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10,000 (10 seconds) is used. A value of zero (0) indicates this timeout has been disabled.

SNP_T3P Keyword

This keyword is required for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T3' timer. This is the Link Idle Timeout, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10,100 (10.1 seconds) is used. Its value should be at least 80 character times (about 100 milliseconds at 9600 bps) more than SNP_T3. A value of zero (0) indicates this timeout has been disabled.

SNP_T3PP Keyword

This keyword is required for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T3'' timer. This is the Attach Link Idle Timeout, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 65,000 (65 seconds) is used. Its value should be at least 54,900 (54.9 seconds) more than SNP_T3P. A value of zero (0) indicates this timeout has been disabled.

SNP_T4 Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T4 timer. This is the Break Processing Time, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 100 (milliseconds) is used when the modem turnaround time is zero (see the MODEM_TURN keyword) or a default value of 600 (milliseconds) is used when the modem turnaround time is non-zero.

SNP_T5 Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T5 timer. This is the Maximum Processing Time, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10,000 (10 seconds) is used.

SNP_T5P Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T5' timer. This is the Processing Timeout, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10,100 (10.1 seconds) is used. Its value should be at least 80 character times (about 100 milliseconds) more than SNP_T5.

SNP_T5PP Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the SNP T5'' timer. This is the Buffer Message Timeout, and it is specified in units of milliseconds.

If this parameter is omitted, the default value of 10,200 (10.2 seconds) is used. Its value should be at least the transmission delay (about 100 milliseconds) more than SNP_T5P.

STOPBITS Keyword

This keyword is optional for ports with a TYPE of SNP_SERIAL. It is not allowed for any other port type.

This keyword specifies the number of stop bits to be used. The possible values are 1 (one stop bit) or 2 (two stop bits). If this keyword is omitted, one (1) stop bit is used.

TYPE Keyword

This keyword is the only required keyword for all Port Records. It defines which communications type is to be used for this port. The *data* portion is one of the mnemonics listed above in the *Communications Type* section.

Sample Port Record Entries

The following represents sample entries in the configuration file. The lines that begin with a semicolon (";") are comments placed there to help the reader.

```
;  This is the minimum specification for an SNP port without a modem

[SNP_PORT_WITHOUT_MODEM]
PORT=COM1
TYPE=SNP_SERIAL
CONNECT_TIMEOUT=10000
REQUEST_TIMEOUT=16000


;  This is the minimum specification for an SNP port with a modem

[SNP_PORT_WITH_MODEM]
PORT=COM1
TYPE=SNP_SERIAL
SNP_T5PP=10250
CONNECT_TIMEOUT=10000
REQUEST_TIMEOUT=16000
MODEM_RECORDNAME=modem1

;  This defines a TCP/IP port.

[TCP_PORT]
TYPE=TCPIP_ETH

;  This defines a SLIP port.

[SLIP_PORT]
TYPE=TCPIP_SLIP


;  This defines a VME port.

[VME_PORT]
TYPE=VME_PORT
```

Device Records

This section describes the record format for remote devices. A device is generally thought of as a Series 90 PLC. However, the user application may choose to talk to an application on another host machine that also uses a Host Driver.

A Device Record contains the following information:

1. An ASCII *device name*. [required]
2. *Addressing information*. [required]
3. *Default port name*. [optional]
4. *Device model information*. [optional]
5. Modem record name. (optional)

Device Name

The device name is the primary piece of information that Host Driver users specify to indicate to which remote device it wishes to communicate. The device name has the following characteristics:

- ASCII character string, NULL-terminated.
- String length is from one (1) to thirty-two (32) characters.
- Uses any printable ASCII character (hexadecimal codes 0x20 through 0x7E), excluding a right square bracket ("]").
- The first character must be a letter ('A' through 'Z' or 'a' through 'z').
- Device Names are not case sensitive.
- Device Names must be unique among all record names in the configuration file.

There may be only one record for a given device name.

Addressing Information

This field contains information that identifies the remote target device address.

Ethernet LAN Addressing (TCP/IP or SLIP)

If the target device is available from a Local Area Network (LAN), the addressing information is the network address. This is an Internet Protocol (IP) address, which has four subfields separated by periods. An example IP address is 10.X.X.X.

The IP_ADDR keyword is used to specify this address.

VMEbus Addressing

This address is currently fixed at 10E00000. No other value is permitted.

The DEST_ADDR keyword is used to specify this value.

SNP/Serial Addressing

If the target device is being accessed over a point-to-point serial connection, use the special value of <NULL> to denote a null SNP ID. If the target device is being accessed over a multidrop serial connection, a non-NULL SNP ID is required.

The SNP_ID keyword is used to specify this identifying value.

Default Port Name

If a single device has multiple ports that can be used to gain access to it, you may wish to specify a preference for the Host Drivers using one particular port. By using the DEFAULT_PORT keyword, you can specify the Port Name of the preferred port to use to access this target device.

Note that when connecting to this device, the caller may specify a Port Name of “DEFAULT” (all upper case) in the *HCT_connect()* call to tell the Host Drivers to use the specific port named in the device record. This also allows you to change the preferred path without changing the application source code.

If the port name specified by the DEFAULT_PORT keyword does not exist in the Host Drivers configuration file, an error will be returned if the application attempts to connect to this device using a Port Name of “DEFAULT”. Likewise, if the addressing information for this device does not match the addressing information for the default port (for example, an IP address is given, but the port is for VME communications), an error will be returned if the application attempts to connect to this device using a Port Name of “DEFAULT”.

Device Model Information

The device model field is an optional field provided to identify target PLCs by the CPU model type. The only valid values for the character string field are:

- "9070" - Series 90-70 PLC
- "9030" - Series 90-30 PLC
- "9020" - Series 90-20 PLC
- "Micro" - Series 90 Micro PLC

This field is useful for searching the configuration database with CCL for a group of target devices. Use or non-use of this field does not affect operation of the Host Communications software.

Device Record Keywords

This section defines the keywords that are recognized as valid for device records. The keywords are listed in alphabetical order.

DEFAULT_PORT Keyword

This keyword specifies the port name of an existing port record within the Host Drivers configuration file that should be used if the user application attempts to connect to this device with a port name of “DEFAULT”.

Note

If a valid port record is created with a port name of “DEFAULT,” this port record will never be used.

The *data* portion of this field must have a valid port name.

DEST_ADDR Keyword

This keyword specifies the VME mailbox destination address of the target device. This keyword is required if a port name using the VME_PORT port type is specified in the DEFAULT_PORT field.

Currently, the *data* portion of this field is required to be 10E00000.

IP_ADDR Keyword

This keyword specifies the Internet Protocol (IP) address of the target device. This keyword is required if a port name using either the TCPIP_ETH or TCPIP_SLIP port type is specified.

The *data* portion of this field must have four subfields separated by periods and with no spaces (for example, 10.X.X.X). There is no default value.

SNP_ID Keyword

This keyword specifies the SNP ID of the target device. This keyword is only used if a port name using the SNP_SERIAL port type is specified in the DEFAULT_PORT field.

The *data* portion of this field must have either an SNP ID in it or the value <NULL>.

A valid SNP ID is a string of one to seven ASCII characters from the following:

- 'A' through 'Z', 'a' through 'z' (not case sensitive)
- 'O' through '9'
- any other printable ASCII character

The first character must be alphabetic.

For direct connection to a PLC (not multidrop), use the special value of <NULL> to denote a null SNP ID.

MODEM_RECORD_NAME

This keyword defines the modem record name to be used by the device.

Sample Device Record Database Entry

The following represents sample entries in the configuration file. The lines that begin with a semicolon (";") are comments placed there to help the reader.

```
;  This device may only be accessed via TCP/IP (SLIP or Ethernet)

[dev_A]
IP_ADDR = 10.X.X.X

;  This device may only be accessed via VMEbus

[TargetApplication]
DEST_ADDR=10E00000

;  This device may only be accessed via point-to-point SNP

[SerialPLC14]
SNP_ID = <NULL>


;  This device may be accessed via multidrop SNP

[SerialPLC15]
SNP_ID=A234567

;  This device may be accessed via TCP/IP, VMEbus, or SNP multidrop

[PLCnumber53]
IP_ADDR = 10.X.X.X
DEST_ADDR=10E00000
SNP_ID=MARYLOU
DEFAULT_PORT=TargetApplication     ; Preferred port is VME
```

Modem Records

A modem record contains dialing information and is included as part of a device or a port record.

A record name (modem name) is required. The maximum length of the modem name is 32 characters. No blanks are allowed. Modem name is not case-sensitive.

Modem Name

The Modem Name is the primary piece of information that a Host Driver user specifies to indicate the modem device over which it wishes to communicate. The Modem Name has the following characteristics:

- ASCII character string, NULL-terminated.
- String length is from one (1) to thirty-two (32) characters.
- Uses any printable ASCII character (hexadecimal codes 0x20 through 0x7E), excluding a right square bracket ("]").
- The first character must be a letter ('A' through 'Z' or 'a' through 'z').
- Modem Names are not case sensitive.
- Modem Names must be unique among all record names in the configuration file.

There may be multiple records for the same physical modem. In this way you can define different communications characteristics for the same physical modem.

Modem Record Keywords

This section defines the keywords that are recognized as valid for modem records. The keywords are listed in alphabetical order.

MODEM_DIAL

The dialable phone number. (This telephone number format contains the numbers exactly as they will be dialed.)

MODEM_DISP

The phone number in displayable format.

MODEM_COUNTRYNAME

Country name is required if Use C and A is set to YES. For selections, see the modem properties in the Windows settings.

MODEM_AREACODE

Area code of the modem (dialing from location). This is required if Use C and A is set to YES.

MODEM_PHONENO

Phone number of the modem (dialing from location). This keyword is required.

MODEM_LOCATION

Optional keyword identifies the dialing from location.

MODEM_TAPILINE

Identifies the TAPI driver for the modem that is connected to the COM port used with the modem record.

MODEM_USEDCANDA

Use country and area code. Value is YES or NO. If this keyword is YES, the MODEM_COUNTRYNAME and MODEM_AREACODE keywords are required.

MODEM_DEVICEID

MODEM_DEVICEID is the 0 based index of the device in the list of modem devices in the system. The device itself is identified by MODEM_TAPILINE. In the CCU Edit/New Modem dialog box, there is a TAPI Line drop-down list box. The position of the selected modem device in this list determines the MODEM_DEVICEID.

Global Parameters

In addition to being able to configure device names and port names, you can also control timeout lengths for Host Communications Toolkit requests. This is accomplished by reserving a special record name, “Global_Parameters”, in the configuration file.

The purpose in having timeout parameters available to users through the configuration file is to allow user control over how long the HCT application waits for certain events. For some time-critical operations, the default timeout parameters may not be sufficient. For other operations you may choose either to use the HCT default timeout values or to specify timeout values for each port. See the *Timeout Precedence* section below for more information. The entire global parameters section is optional.

The two timeout parameters over which you can exercise control are:

- Connect request timeout
- General request timeout

All timeout values are expressed in milliseconds (ms). These timeout parameters apply only to HCT interface routines called with the blocking style.

Note

A timeout may occur in an HCT application when the application is communicating with a Series 90 PLC CPU and, at the same time, Logicmaster software (serial version only) is performing a load/store of a ladder program to the same CPU.

All HCT user applications should be written to retry any communications missed because of a timeout.

If a CCU user changes the CCU password from the default of "netutil", the new password will be encrypted and saved in the Global Parameters section as the value to the keyword "PASSWORD="/ The password may be from 1 to 8 characters long.

Connect Request Timeout

When you call the *HCT_connect()* routine using the blocking calling style, this parameter defines how long to wait before declaring a timeout. The default value used if this parameter is not specified is ten seconds (10,000ms). When specified within the configuration file, the minimum value allowed is 50 milliseconds (0.050 seconds) on the Windows platforms and 1,000 milliseconds (1 second) on the HP-UX 9000 and DEC platforms. The maximum value allowed is 63,000 milliseconds (63 seconds). The keyword for this timeout parameter is “CONNECT_TIMEOUT”.

For example, to specify a Connect request timeout of two seconds, the configuration file would contain:

```
[Global_Parameters]
CONNECT_TIMEOUT=2000
```

General Request Timeout

When you call HCT interface routines to issue data transfer requests for an existing session, this parameter determines how long to wait before declaring a timeout on each request. The default value used if this parameter is not specified is five seconds (5,000 ms). When specified within the configuration file, the minimum value allowed is 50 milliseconds (0.050 second) on the Windows platforms and 1,000 milliseconds (1 second) on the HP-UX 9000 and DEC platforms. The maximum value allowed is 63,000 milliseconds (63 seconds). The keyword for this timeout parameter is "REQUEST_TIMEOUT".

For example, to specify a request timeout of one and a half seconds, the configuration file would contain:

```
[Global_Parameters]
REQUEST_TIMEOUT=1500
```

Sample Global Parameter Entries

The following represents a sample entry in the configuration file for the global parameters. Although both timeout fields are specified in this example, it is acceptable to have one or the other timeout configuration parameter specified. It is also acceptable to have this entire section missing from the configuration file.

```
;  Connect timeout set to 3-1/4 seconds

;  Request timeout set to 3/4 second

[Global_Parameters]
CONNECT_TIMEOUT=3250
REQUEST_TIMEOUT=750
```

Note

When using the CCU or the CCL, you are not allowed to enter timeout values out of range. Values entered out of range to the CCU are not allowed and you must re-enter them. A value less than the minimum passed to CCL will be replaced with the minimum (50ms). A value greater than the maximum passed to the CCL will be replaced with the maximum (63 seconds).

Time Value Resolution

In the Windows environment, the actual timeout granularity is in units of milliseconds. Thus, all digits are significant.

In the HP-UX 9000 and DEC environments, the timeout granularity is in integral seconds. All values entered are rounded to the nearest second. Thus, timeout values of 1000 to 1499 are treated as a timeout value of 1,000 milliseconds (1 second) and timeout values of 2500 to 3000 are treated as a timeout value of 3,000 milliseconds (3 seconds).

Timeout Precedence

There are four methods of specifying timeout parameters for either the HCT connect request or HCT data transfer requests:

1. Specify a timeout value in the Port Name definition.
2. Specify a timeout value in the *Global_Parameters* section of the configuration file.
3. Specify a timeout value in the *HCT_Timeout* section of the configuration file. In earlier versions of the configuration file, this section name was used instead of "Global_Parameters." This is included for compatibility with older configuration files.
4. Do not specify any timeout and use the default values.

The above list represents the precedence order for timeout value specifications. Thus, a timeout value specified in a port name definition will be the timeout value used whenever that port is used. If no timeout value is specified in the port name definition being used but a timeout value is specified in the *Global_Parameters* section, the *Global_Parameters* value will be used. If no timeout value is in either the port definition or the *Global_Parameters* section, a value in the *HCT_Timeout* section will be used. If no timeout value is specified anywhere in the configuration file, the default value will be used.

```
;  Serial line port definition for COM port COM1

[SNP_PORT_COM1]
TYPE = SNP_SERIAL
PORT = COM1
REQUEST_TIMEOUT = 8500     ; Port-specific request timeout = 8.5 sec

;  Serial line port definition for COM port COM2

[SNP_PORT_COM2]
TYPE = SNP_SERIAL
PORT = COM2
CONNECT_TIMEOUT = 11000     ; Port-specific connect timeout = 11 sec

[Global_Parameters]
CONNECT_TIMEOUT = 9000     ; Connect timeout = 9 sec
```

With the above configuration file, users of port SNP_PORT_COM1 would use a connect timeout value of 9 seconds (no port-specific connect timeout, Global Parameters section specifies 9 seconds) and a request timeout value of 8.5 seconds (port-specific request timeout).

Users of port SNP_PORT_COM2 would use a connect timeout of 11 seconds (port-specific connect timeout) and a request timeout of 5 seconds (no port-specific request timeout, no request timeout specified in the "Global_Parameters" section, and no "HCT_Timeout" section).

Appendix B Assigning IP Addresses

This appendix gives an overview of IP addresses, gateways, and subnet masks.

IP Addresses

Each TCP/IP *host* on a network must have a unique *IP Address*. There may be other hosts on the network that are not involved with communications to the PC, but no matter what its function, each TCP/IP host must have its own *IP Address*. It is the *IP Address* that identifies the host on the IP network (or system of connected networks).

The *IP Address* is 32 bits long and has a *netid* part and a *hostid* part. All normal operating hosts on an IP network must have a Class A, B, or C address. The class of a network determines how an *IP address* is formatted:

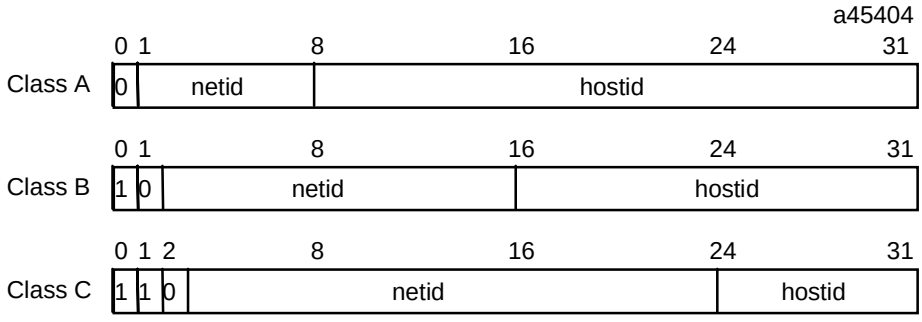


Figure B- 1. IP Address Format for Network Classes A, B, C

Each host on the same physical network must have an *IP Address* of the same class and must have the same netid. Each host on the same network must have a different *hostid* thus giving it a unique *IP Address.*

IP addresses are written as four decimal integers separated by periods where each integer gives the value of one byte of the IP address. For example, the 32-bit IP address

00000011 00010000 00010010 00101111

is written as

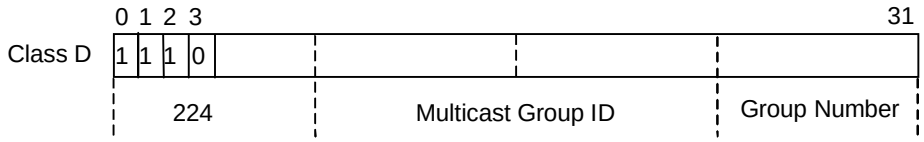
3.16.18.47

You can distinguish the class of an IP address from the first integer in its dotted-decimal IP address as follows.

Range of first integer	Class
0 - 127	A
128 - 191	B
192 - 223	C
224 - 239	D*
240 - 255	Reserved

Class D Addresses

Class D addresses are used to support IP Multicasting. The figure below illustrates the general format of Class D addresses.



For the HCT, the following conditions must be met:

- The first byte of the multicast address must equal 224
- The fourth byte (group number) must be between 1 and 32. See “CONFIG_PARAMS” in Chapter 3 for a description of this structure.

For GE Fanuc Automation PLCs, the default value is 224.0.7.X, where X is an integer value from 1 to 32. If the default multicast address conflicts with one in use, you will need to change the address on the PLC. Refer to “Configuring a Station” in the *TCP/IP Ethernet Communications (Type 2) for the Series 90-70 PLC Users Manual*, GFK-1246, for more information.

Examples of valid multicast addresses are 224.0.7.1 and 224.0.7.32.

Gateways

Gateways (also known as routers) connect individual physical networks into a system of networks. When a host needs to communicate with a host on another network, a gateway transfers the data between the two networks.

The following figure shows gateway G connecting Network 1 with Network 2.

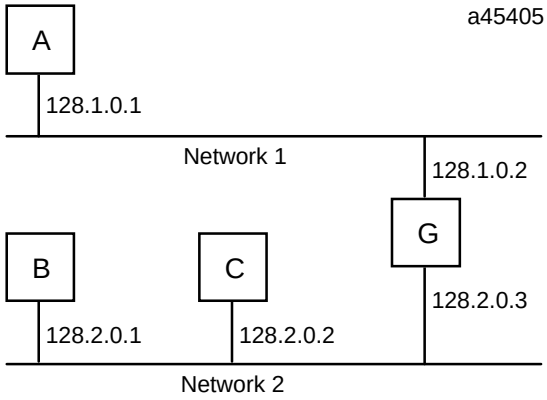


Figure B- 2. Connecting Two Networks with a Gateway

When host B with IP address 128.2.0.1 communicates with host C, it knows from C's IP address that C is on the same network. In our Ethernet environment it can then resolve C's IP address to a MAC address (via ARP) and communicate with C directly.

When host B communicates with host A, it knows from A's IP address that A is on another network (the *netids* are different). In order to send data to A, B must have the IP address of the gateway connecting the two networks. In this example, the gateway's IP address on Network 2 is 128.2.0.3.

Note that the gateway has two IP addresses (128.1.0.2 and 128.2.0.3). Hosts on Network 1 must use the first and Hosts on Network 2 must use the second. To be usable, a host's gateway must be addressed using an IP address with a *netid* matching its own.

Subnets

Subnet addressing is an extension of the IP address scheme that allows a site to use a single netid for multiple physical networks. Routing outside of the site continues as usual by dividing the IP address into a netid and a hostid via the class. Inside a site the *subnet mask* is used to re-divide the IP address into a custom netid portion and hostid portion.

Consider taking Network 2 (a Class B network) in the previous example and adding another physical network. Selecting the following subnet mask would add two additional *netid* bits allowing for four physical networks:

11111111 11111111 11000000 00000000 = 255.255.192.0

In effect, two bits of the Class B *hostid* have been used to extend the *netid*.

The new configuration would be:

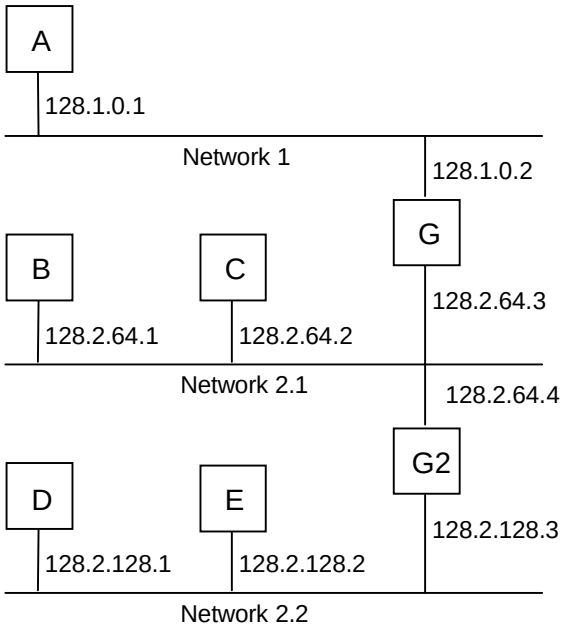


Figure B- 3. Network Configuration Using a Subnet Mask

A second network with Hosts D and E has been added. Gateway G2 connects Network 2.1 with Network 2.2. Hosts D and E will use Gateway G2 to communicate with hosts not on Network 2.2. Hosts B and C will use Gateway G to communicate with hosts not on Network 2.1. When B is communicating with D, G (the configured Gateway for B) routes the data from B to D through G2.

Setting Up the IP Address of Your PC

Each TCP/IP *host* on a network must have a unique *IP address*. A PC running TCP/IP is such a host. There may be other hosts on the network that are not involved with communications to the PC, but regardless of their function each TCP/IP host must have its own IP address.

To establish this IP address for your PC, follow the instructions for your PC's Windows operating system.

IP Address Setup on Windows 95

1. From the *Start* menu select *Settings*, then select *Control Panel*.
2. Run *Network* from the *Control Panel* folder.
3. Select the *Configuration* tab.
4. From the list of items to be configured, select the one that starts with "TCP/IP ->", followed by the name of your PC Ethernet card (such as Western Digital, 3Com, etc.).
5. To allow your PC's IP address to be determined by a network server, select the "Obtain an IP address automatically" button. This will set your PC's IP address and Subnet Mask for you.
6. To enter your own addressing information, select the "Specify an IP address" button. Then enter your IP address and Subnet Mask in the indicated fields.
7. Regardless of how your IP address and Subnet Mask were specified, you may select the *Gateway* tab if you wish to enter a Default Gateway address.

IP Address Setup on Windows NT

1. Run *Control Panel* from the *Main* program group in *Program Manager*.
2. Run *Network* from the *Control Panel* program group.
3. Under the "Installed Network Software:" list, double click "TCP/IP Protocol".
4. To allow your PC's IP address to be determined by a network server, select the "Enable Automatic DHCP Configuration" checkbox. This will set your PC's IP address, Subnet Mask, and Default Gateway for you.
5. To enter your own addressing information, make sure the "Enable Automatic DHCP Configuration" checkbox is not selected. Then enter your IP address, Subnet Mask, and Default Gateway in the indicated fields.

IP Address Setup on Windows for Workgroups

1. Run *Windows Setup* from the *Main* program group in *Program Manager*.
2. Select *Change Network Settings* from the *Options* menu of the *Windows Setup* window.

   This gets you to the *Network Setup* window. From this window you can get to other windows to do the following:

   - Select the Microsoft Windows Network (ver. 3.11) if it has not already been done. (Press the *Network* button.)
   - Select the PC Network Adapter installed in your PC if it has not already been done. (Press the *Drivers* button to get to the *Network Drivers* window.)
   - Select the Microsoft TCP/IP protocol described in Chapter 2. (Press the *Drivers* button to get to the *Network Drivers* window.)

3. Once all three of these are set up correctly, press the *Drivers* button to get to the *Network Drivers* window.
4. From the *Network Drivers* window, select (single click) the Microsoft TCP/IP protocol and then click on the *Setup* button. This displays the window you may use to configure your addressing information.
5. To allow your PC's IP address to be determined by a network server, select the "Enable Automatic DHCP Configuration" checkbox. This will set your PC's IP address, Subnet Mask, and Default Gateway for you.
6. To enter your own addressing information, make sure the "Enable Automatic DHCP Configuration" checkbox is not selected. Then enter your IP address, Subnet Mask, and Default Gateway in the indicated fields.

Defining Your Own IP Address

The values for these parameters (Default Gateway, IP Address, and Subnet Mask) should be assigned by the person in charge of the network (the network administrator). TCP/IP network administrators are familiar with these parameters. It is important that these parameters are correct, otherwise the PC may be unable to communicate on the network and/or network operation may be corrupted.

However, if you have a simple *isolated* network with no gateways, ignore the settings for the Default Gateway and Subnet Mask. You can use the following range of values for the assignment of local IP addresses:

IP Address
10.0.0.1
10.0.0.2
10.0.0.3
...
10.0.0.255

Note

If the isolated network is ever connected to another network, the IP addresses 10.0.0.1 through 10.0.0.255 must not be used. The IP addresses must be assigned so that they are compatible with the connected network

Determining if an IP Address Has Already Been Used

It is very important not to duplicate IP addresses. To determine if you have configured your station with an address that has already been used, disconnect the station in question from the LAN, then try a PING command to that IP address from another station. If you get an answer to the PING, then the chosen IP address is already in use.

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