

GFK-1055

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GE Fanuc Manual Series 90-70

Plug and Play PC Coprocessor

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GE Fanuc Automation

Programmable Control Products

Plug & Play PC[™] Coprocessor for Series 90[™] -70 PLC

User's Manual

GFK1055A

August 1995

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Warning

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.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

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

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CIMPLICITY 90-ADS	Helpmate	Series 90	Workmaster
CIMSTAR	Logicmaster		

This manual provides the information necessary to enable you to integrate a Plug & Play PC coprocessor into a wide variety of control applications. The contents of this manual include descriptions of the hardware components, installation procedures, system operation information, and maintenance information for the Plug & Play PC.

Revisions to this Manual

Changes to this manual reflect *Revision C* features of the Plug & Play PC product line. Additionally, corrections have been made where necessary. The following list describes the major revisions in this manual as compared to the previous version (GFK-1055):

- The PCMCIA hard disk provided with the system, and the backup disk (ordered separately) have 260 megabytes capacities. System setup parameters have changed accordingly (see Appendix C).
- The SETVPC utility has been improved for more reliable operation.
- The system files have been configured to provide two boot options: single hard disk and dual hard disk (see Chapter 3).
- A new DDE test utility, Driver Tester, has been provided (see Chapter 4).
- An explanation describing the use of UMBDDE and GEHCS Servers with the Plug & Play PC has been added (see appendix E).
- The new *Readme First* file contains helpful hints (See Chapter 3).
- A directory has been provided in the front of Chapter 6, “Diagnostics” for convenience in locating troubleshooting information.
- Other corrections and clarifications, including additional index entries, have been made throughout the manual as necessary.

Content of this Manual

Chapter 1. Introduction Introduces the VME-Personal Computer (VPC), explains the Plug & Play PC concept, and highlights the features of the product.

Chapter 2. Unpacking, Inspection, and Installation Describes the suggested inspection and preparation procedures and provides background information necessary for using the VPC. Unpacking the product, initial inspection, installation requirements, and installation procedures are covered.

Chapter 3. Power-up and Configuration Describes the first-time system power-up, initial system configuration, and verification of proper system operation.

Chapter 4. Operation Describes normal operation of the VPC. The Windows desktop, communications ports, and network operation are covered.

Chapter 5. Distribution Software Describes the software that is distributed with the VPC under GE Fanuc catalog number IC697PNP101. The operating systems, factory automation software, sample applications, and utility programs are covered.

Chapter 6. Diagnostics Describes VPC troubleshooting. Procedures for performing standard diagnostics are covered, as are common problems and solutions.

Appendix A. Specifications Summarizes the design, electrical, environmental, physical, and compliance specifications for the VPC Coprocessor for Series 90-70 systems. Some specifications may change depending on the peripheral cards that are installed in the PCMCIA sockets.

Appendix B. How the Plug & Play Software Components Fit Together A diagram that illustrates the relationships among the software components provided with the Plug & Play PC.

Appendix C. Defaults Reference Describes the default AT Setup, VPC Embedded Setup, CONFIG.SYS, AUTOEXEC.BAT, and SYSTEM.INI configuration settings as the VPC was configured from the factory. These files can be found in the Backup directory and should be used if you need to restore your VPC to the default settings.

Appendix D. Parallel InterLink Cable Pinouts Provides a diagram identifying pinouts for building a parallel InterLink cable.

Appendix E. Using the UMBDDE and GEHCS Servers with the Plug & Play PC Provides sample Visual Basic programs for using these drivers with the Plug & Play PC. Any program that is capable of calling a DDE server using the “APPLICATION | TOPIC | ITEM NAME” convention can be used in place of the Visual Basic Program.

Related Publications

For more information, refer to these publications:

Series 90™ -70 PLC Installation and Operation Manual (GFK-0262). This book describes the modules of a Series 90-70 PLC system, and explains system setup and operation.

Logicmaster 90-70 User's Manual (GFK-0263). Reference manual for system operators and others using the Logicmaster 90-70 software to program, configure, monitor, or control a Series 90-70 PLC and / or a remote drop.

Logicmaster 90 Software Reference Manual (GFK-0265). Reference manual which describes program structure and defines program instructions for the Series 90-70 PLC.

Host Communications Drivers for Microsoft Windows User's Manual (GFK-1026). Describes the capabilities of the Host Communications Drivers and how to use them.

GE Fanuc Product Approvals, Standards, General Specifications (GFK-0867B or later)

We Welcome Your Comments and Suggestions

At GE Fanuc automation, we strive to produce quality technical documentation. After you have used this manual, please take a few moments to complete and return the Reader's Comment Card located on the next page.

Libby Allen
Senior Technical Writer

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Chapter 1

Introduction

This chapter explains the Plug & Play PC concept and highlights the features of the VME-Personal Computer (VPC).

The Plug & Play PC Concept

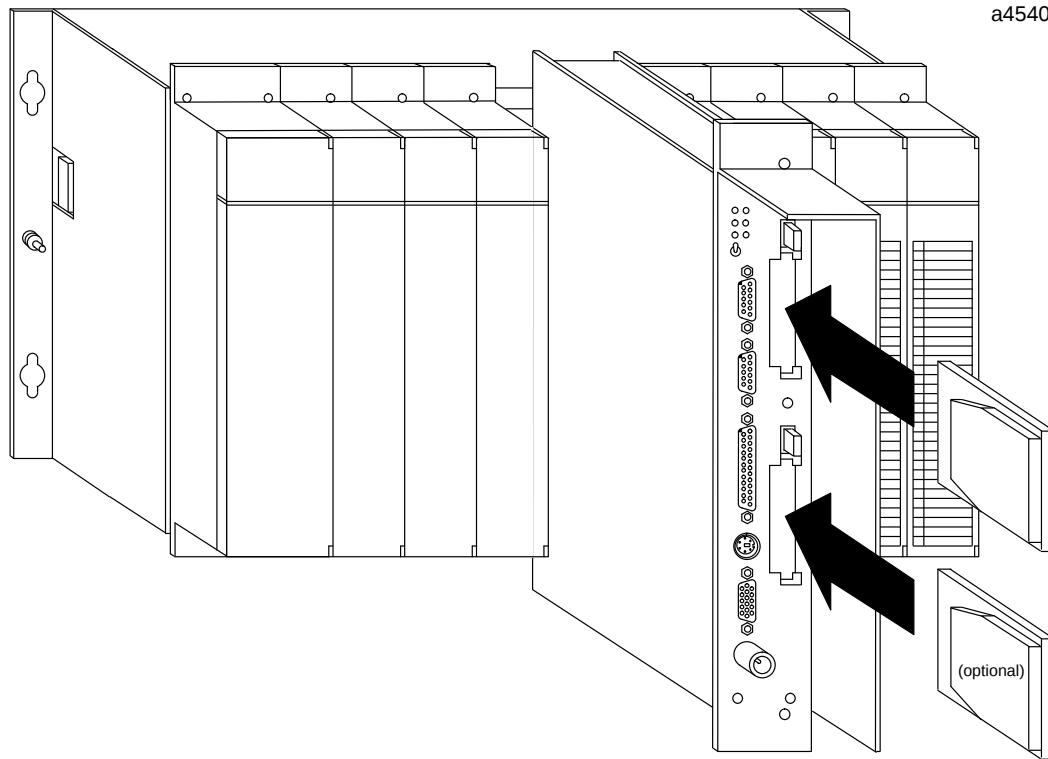
The Plug & Play concept is simple: a PLC user should be able to plug a PC / AT compatible coprocessor module into a Series 90™-70 system and, without going through the frustrating and time-consuming task of configuration required by most PC / AT modules, be ready to communicate with the PLC so that creation of relay ladder diagrams and operator interface graphics can begin without delay. The VPC is an 80486 PC / AT-compatible coprocessor that meets these requirements.

The Plug & Play PC is ready to operate with your Series 90-70 system right out of the box. Install it into your 90-70 rack, turn it on, and you're ready to go. No editing CONFIG.SYS or AUTOEXEC.BAT files, and no fiddling with AT Setup to configure memory sizes, disk drives, and communications ports as with other PC / AT systems. You don't even have to install any software: it's all on the small, tough PCMCIA (Personal Computer Memory Card International Association) hard disk card.

The Pre-Configured System

The Plug & Play PC system consists of a VPC and a PCMCIA hard disk card that comes preloaded with Microsoft® Windows™ for Workgroups™, MS-DOS™, and host communication drivers for Windows, Logimaster™ 90-70 and InfoLink™ CD-ROM. The PC configuration and applications are also preloaded.

CIMPLICITY® InTouch, GE Fanuc's user interface development and run time software is preloaded on the PCMCIA hard disk card, but is not fully enabled until the user purchases a CIMPLICITY InTouch package. The CIMPLICITY InTouch software product can be purchased separately. It is not necessary for you to re-install the purchased CIMPLICITY InTouch Software.



Plug & Play PC Installed in a 90-70 PLC Rack

PCMCIA Hard Disk Card

The PCMCIA hard disk card was developed for use with notebook and laptop PCs. (PCMCIA is an industry standard that specifies mechanical, electrical, and software interface compatibility requirements.) Because of the demands placed on notebook computers, the emphasis is on ruggedness, small size, and low power consumption, all features important in the industrial environment.

The VPC has two PCMCIA slots that can support Type I, Type II, or Type III PCMCIA cards, taking maximum advantage of memory and I/O card technology. The Type III distribution hard disk card supplied with the Plug & Play system provides operating system, application, and data storage.

Note

Hard disks having different revision levels (A, B, or C) can not be interchanged in the SOCKET B (boot drive) unless the VPC settings are modified as outlined on page 5-20.

Revision	Capacity
C	260 MB
B	131 MB
A	105 MB

Ordering Information

The Plug & Play PC product line consists of PC Coprocessors, Kits, Backup Drives, and Systems. At least one kit, which contains cables, preloaded software, user manuals and a loaded PCMCIA hard drive, is required with each coprocessor to create a functional system. A backup drive is a formatted hard drive that contains no software. At least one backup drive is recommended, per application, per site.

Series 90-70 Plug & Play PC Catalog Numbers

IC697PNP101 <i>Plug & Play System</i>	Consists of IC697VPC462 and IC697PNP111.
IC697VPC462 <i>Plug & Play PC Coprocessor</i>	VPC 462PC (486DX2 / 66, 8 Mbytes) BNC F connector for Ethernet, Keyboard adapter cable, Retainer Clamps Data Sheet for Plug & Play PC (GFK-1053) Manufacturer's MSDS for backup battery.
IC697VPC463 <i>Plug & Play PC Coprocessor</i>	VPC 463PC (486DX2 / 66, 16 Mbytes) BNC F connector for Ethernet, Keyboard adapter cable, Retainer Clamps Data Sheet for Plug & Play PC (GFK-1053), Manufacturer's MSDS for backup battery
IC697VPC464 <i>Plug & Play PC Coprocessor</i>	VPC 464PC (486DX2 / 66, 32 Mbytes) BNC F connector for Ethernet, Keyboard adapter cable, Retainer Clamps Data Sheet for Plug & Play PC (GFK-1053) Manufacturer's MSDS for backup battery
IC697PNP111 <i>Plug & Play PC Support Kit</i>	PCMCIA hard drive (loaded hard disk) DOS 6.22 or later, with Manual and backup diskettes Windows for Workgroups, version 3.11 UMBDDE driver VME DDE driver Host Communication Drivers for Windows Logicmaster 90-70, Serial Communications Version CIMPLICITY InTouch (Installed. Runs in demo mode. Requires separate purchase of CIMPLICITY InTouch with enabling key and documentation.) Parallel cable for use with InterLink Software (<i>not</i> a printer cable) RS-422 / 485 cable for use with Serial Logicmaster 90 PCMPLUS Manual (Manual for PCMCIA drivers) Windows manual and backup diskettes InfoLink CD-ROM GE Fanuc license agreement for executable software (GFJ-317) GE Fanuc registration card (GFK-0404)
IC697PNP701 <i>Backup PCMCIA Hard Drive</i>	Formatted hard disk, 260 MB capacity. No software included. Manufacturer's datasheet.

Loaded Hard Disk Contents

	B	C
Capacity (MB)	131	260

Item	Software Versions	
	Rev. B Hard Disk	Rev. C Hard Disk
MS-DOS	6.22	6.22
MS Windows for Workgroups	3.11	3.11
Logicmaster 90 Serial	5.01	6.01
GE Fanuc Host Communication drivers for VME andTCP / IP	1.07 HCT 1.03 VME 1.04TCP / IP	1.07 HCT 1.03 VME 1.04TCP / IP
SetVPC	1.04	1.05
UMBDDE driver	1.00	1.01
Phoenix PCMCIA services	2.22	3.11

CIMPLICITY InTouch Item	Software Versions		Hardware Key Required:	
	Rev. B Hard Disk	Rev. C Hard Disk	for Demo Mode	for Normal Operation
GE Fanuc CIMPLICITY InTouch	5.0	5.1	No	Yes
GE Fanuc Series 90 Fault Table Client	1.02	1.02	Yes	Yes
CIMPLICITY InTouch GEHCS DDE Server	5.0	5.1	Yes	Yes
GE Fanuc Symbol Library	2.0	2.0	No	Yes
GE Fanuc SNP DDE driver	4.05	4.05	Yes	Yes
GE Fanuc CCM DDE driver	4.0	4.0	Yes	Yes
GE Fanuc Genius driver	4.05	4.05	Yes	Yes

Where the Software and Documents are Located

Note: See Appendix B for more information about how these software components fit together.

Technical support for the PLC items listed on this page:

PLC Hotline	1-800-828-5747 (or 804-978-5747)
Internet address	PLCHOTLINE@CHO.GE.COM
Fax number	804-978-5099

Microsoft and Phoenix technical support information can be obtained from their manuals.

Items	Loaded on Hard Disk*	Tech. Support	Documentation Source
MS-DOS	Yes	Microsoft (see manuals for phone no.)	PNP package (Includes Microsoft manuals.)
MS Windows for Workgroups	Yes	Microsoft (see manuals for phone no.)	PNP package (Includes Microsoft manuals.)
Logicmaster 90 Serial	Yes	PLC Hotline	CD-ROM with PNP package
GE Fanuc Host Communication drivers for VME and TCP/IP	Yes	PLC Hotline	GFK-1026 (separate purchase required). Also discussed in this manual.
SetVPC	Yes	PLC Hotline	This manual (see "Index")
UMBDDE driver	Yes	PLC Hotline	This manual (see "Index")
Phoenix PCMCIA services	Yes	Phoenix (see manuals for phone no.)	Phoenix manual included with PNP package
VME BIOS	In VPC	PLC Hotline	This manual (see "Index")
VPC system BIOS	In VPC	PLC hotline	This manual (see "Index")

*See page 1-4 for version information.

Technical support for the items listed on this page:

CIMPLICITY Hotline	1-800-762-6498.
Internet address	HOTLINE@ALB001.DNET.GE.COM
Fax number	518-464-4613

CIMPLICITY InTouch Item	Loaded on Hard Disk	Documentation Source
GE Fanuc CIMPLICITY InTouch	Yes	See note
GE Fanuc Series 90 Fault Table Client	Yes	Included with PNP documentation.
CIMPLICITY InTouch GEHCS DDE Server	Yes	See note
GE Fanuc Symbol Library	Yes	Included with PNP documentation.
GE Fanuc SNP DDE driver	Yes	See note.
GE Fanuc CCM DDE driver	Yes	See note
GE Fanuc Genius Driver	Yes	See note
SQL (Structured Query Language)	No	See note
SPC (Statistical Process Control)	No	See note
Recipes	No	See note

Note: Obtained when you purchase software / key from CIMPLICITY distributor.

GE Fanuc Bulletin Board

In the PLC section of the GE Fanuc on-line bulletin board, there is a “Plug & Play” section. The phone number is 804-978-5458 (up to 19200 baud, 8 bits, no parity). Files on this bulletin board are provided by GE Fanuc “as-is” and no warranties apply.

Chapter 2

Unpacking, Inspection, and Installation

Unpacking, initial inspection, installation requirements, and installation procedures are covered. It is necessary to follow procedures in this chapter to ensure that the VPC is in good working order and is installed correctly.

Electrostatic Discharge Notice

Electrostatic discharge (ESD) is a major cause of electronic component failure. From the time the product is removed from the antistatic bag to the time it is properly installed in its card cage, extreme care should be taken to avoid damaging the board with static electricity. A small electrostatic discharge, imperceptible to the eye and touch, could occur without your knowing it, and could be enough to damage electronic components.

The VPC has been packaged in a static-safe bag which protects the product during shipping. Before removing the VPC from its static-safe bag, be prepared to handle it in a static-safe environment:

- You should wear a properly functioning antistatic strap and be sure that you are fully grounded. Never touch the printed circuit board, or components on the board, unless you are wearing an antistatic strap. Handle the board only by the front panel if you are not properly grounded.
- Any surface upon which you place the unprotected VPC should be static-safe, facilitated by antistatic mats if possible.
- Extra caution should be taken in cold, dry weather when static easily builds up.

Unpacking

The VPC has been carefully packaged to ensure adequate protection from the rigors of shipping. However, the possibility of shipping damage still exists. Close inspection of the shipping carton should reveal how the package was handled by the shipper. If evidence of damage or excessively rough handling is found, you should notify the shipper and your GE Fanuc distributor immediately.

Remove the VPC manuals and accessories. Only after making sure that you and your work surface are protected from ESD, carefully remove the VPC from the shipping carton.

Initial Inspection

Warning

DO NOT apply power to the board if it has visible damage. Doing so could introduce a fire or shock hazard, or cause further, possibly irreparable damage.

Once the VPC has been unpacked, you should inspect it for damage which could have occurred during shipping or unpacking. If there is damage, possibly in the form of bent component leads or loose socketed components, contact your GE Fanuc distributor for instructions. Depending on the severity of the damage, the module may need to be sent back to the factory to be repaired.

Since the VPC incorporates a number of socketed components including the CPU, memory, EthernetDC / DCconverter, and BIOS ROMs, these should be inspected to make sure they are seated fully in their sockets. If they are not, contact your factory representative for instructions. Do not disassemble these boards.

Included Items

In addition to the VPC, several accessories are included with Plug & Play products. You will want to make sure that you have the following items:

In the VPC box:

- VPC
- Keyboard adapter cable for AT to PS2 conversion
- BNC *F-type* Ethernet connector
- VPC datasheet (GFK-1053)
- Retainer clamps
- Backup battery Material Safety Data Sheet (MSDS)

In the PNP101 box:

- Loaded hard disk
- VPC-to-90-70 CPU RS-485 serial cable (5 ft.)
- Parallel InterLink cable (see Appendix D)
- Microsoft MS-DOS backup disks and manual
- *PhoenixCard® Manager Plus User's Manual*
- GE Fanuc license agreement for executable software (GFJ-317)
- Software subscription registration card for Logicmaster 90 (GFJ-0404)
- IPI document (GFK-1058)
- InfoLink CD-ROM with GE Fanuc documentation
- IPI document for Logicmaster 90

Installation Requirements

Before installing the VPC, you should make sure that your system meets the following requirements.

General Requirements

You will need a GE Fanuc Series 90-70 system, including the 90-70 rack and 100 watt power supply, with at least one free slot available for the VPC. You will also need a computer with a CD-ROM drive to access the electronic documentation for Logicmaster 90 software.

Supported Configurations*

Rack Location	Backplane Communications	
	UMBDDE (VME Read/Write)	VME DDE
CPU resident rack	2 max. per rack	2 max. per rack
2nd rack powered by CPU resident rack power supply	2 max. per rack	2 max. per rack
Expansion rack using its own power supply	2 max. per rack	not supported

*Subject to available power.

Power Requirements

Caution

It is required that the GE Fanuc 100 Watt powersupply (IC697PWR711) be used to power the rack containing the Plug & Play PCs. This power supply provides the +5, +12, and -12 volts, which are required by the Plug & Play PC. If use of the 55 Watt supply is attempted, the Plug & Play PC will lock up in the boot up screen.

Caution

If the Plug & Play PC is to be used in an environment where power cycles are likely to occur during disk access, or before Windows has been properly exited, the system should be powered using an uninterruptable power supply.

Main System Requirements

In addition to the requirements above, the following items are necessary:

- A VGA or SVGA compatible monitor. You may prefer to use one of the readily available industrially hardened VGA monitors.
- APC / AT compatible keyboard. You may prefer to use one that uses membrane switches for harsh environments. Note that some keyboards have a switch that selects either PC and PC / XT compatibility or PC / AT compatibility. If your keyboard has such a switch, be sure it is set for PC / AT compatibility.
- If a mouse is used, it **must** be a Microsoft[®] serial mouse. The unit may not work properly with a Microsoft “compatible” mouse from a different manufacturer.

Installation Procedures

Before applying power to the VPC, be sure the following installation steps are completed.

Installing in the 90-70 Rack

The following rules should be followed when installing the VPC in a 90-70 rack:

- The VPC cannot be installed in a remote rack (i.e. a rack controlled by a Remote I/O Scanner, IC697BEM733) if it is to communicate with the 90-70 CPU.
- A maximum of two VPCs can be installed in a single rack.
- The VPC must be in the same rack as the 90-70 CPU, or in a rack powered from the CPU rack's power supply.
- When using the **VME DDE driver**, there must not be any empty slots between the 90-70 CPU and the VPC.

Installation Steps

Note

If the VPC is installed in an expansion rack, it must be powered from the main rack.

Note

The VPC hardware includes a plastic screw retainer on the back of each rack mounting screw. The purpose of these retainers is to prevent the screws from coming out of the VPC during shipment. Be sure to remove the screw retainers before installing the VPC in the 90-70 rack.

1. Holding the VPC by the top and bottom faceplate extensions, align the top and bottom card edges of the VPC's left circuit board with the card guide slots in the 90-70 rack.
2. Carefully slide the VPC into the slot until it stops.
3. Firmly push the VPC toward the back of the rack to ensure proper backplane connector mating. When the VPC is fully inserted, the front panel of the VPC is flush with the other front panels in your 90-70 system.
4. For permanent installations, tighten the top and bottom screws that hold the VPC in the rack.
5. When using the VME DDE driver, if the Plug & Play PC is not installed in the main PLC rack, the SYSTEM.INI file must be edited, as shown below, to contain the correct rack ID. (See page C-11 for the default SYSTEM.INI file contents.) This can be done after the system has been successfully powered up.

```
[vmesection]
```

```
vmrackid=0
```

Values for rack number are 0–7. Main rack ID=0.

Attaching a Monitor

The 15-pin VGA connector for the video monitor is located on the VPC front panel, and is labeled MONITOR. Carefully orient the cable's connector properly with the video connector on the VPC and connect them firmly.

Be careful when changing video monitors with the Plug & Play PC. If the system is changed to a higher resolution (from the default 640x480) to work with a high resolution monitor, and then the monitor is replaced with a lower resolution monitor, it will not be possible to view any screens, including the power up screen.

To correct this problem, re-connect the higher resolution display, then set the video driver to 640x480 resolution before connecting the low resolution display. This is a characteristic of most PCs, but is more likely to happen with the Plug & Play PC due to its use on the factory floor, where users may be likely to switch monitors.

Attaching a Keyboard

The miniature DIN keyboard connector is located on the VPC front panel and is directly compatible with IBM PS/2 type keyboards. If your PC / AT compatible keyboard has the normal circular DIN IBM PC-type keyboard connector you will need to use the supplied cable adapter. Plug your keyboard into the front panel connector labeled KEYBOARD before power is applied to the board.

Attaching a Mouse

Note

Use only a Microsoft® serial mouse. Use of a mouse other than a Microsoft mouse with the mouse drivers supplied by Windows will result in erratic and unpredictable lockups.

Plug your mouse into the 9-pin D connector labeled COM1.

Connecting the 90-70 Interface Cable

To use Logicmaster 90, you need to connect the 90-70 to VPC interface cable that came in your PNP101 package to the VPC and your Series 90-70 CPU. One end of the interface cable has a 9-pin D connector and the other end has a 15-pin D connector. You should plug the 9-pin end into the 9-pin D connector labeled COM2 on the VPC. The 15-pin end should plug into the 15-pin D connector labeled SERIAL PORT on your Series 90-70 CPU.

Pinout (RS-422/485) COM2 Only		
Pin	Signal	
1	NC	
2	RXD–	(RDA')
3	TXD–	(SDA)
4	TXD+	(SDB)
5	SIGND	(ground)
6	RXD+	(RDB')
7	NC	
8	NC	
9	NC	

Connecting to an Ethernet Network

Connection to an Ethernet network is not required for VPC operation. However, if you want to connect to a network, the best time to connect it is when you're connecting the other cables to the VPC. The BNC coaxial connector for Ethernet is located near the bottom of the front panel and is labeled ETHERNET. It is recommended that you use the *F-type* BNC connector that is included with the VPC for mating with the VPC. The more common *T-shaped* connector can interfere with the adjacent board and with the MONITOR connector of the VPC. The connector should have your network cable going into one male end and out of the other.

Push the unconnected female side of the F connector onto the male BNC connector on the VPC. Twist the locking mechanism on the F connector clockwise until it stops. Your F connector should now be firmly connected to the VPC. To disconnect the VPC from the network, simply twist the locking mechanism of the connector counter-clockwise and pull the connector away from the VPC.

Note

Do not disconnect either Ethernet cable from the F connector without shutting down your network. Disconnecting either cable will cause a break in the network and halt network communication. The F connector and cable assembly can be removed from the VPC without interrupting other communications.

Chapter 3

Power-up and Configuration

This chapter presents procedures for first-time system power-up, initial system configuration, and verification of proper system operation. The functions of the front panel controls, indicators, and connectors are also described.

Inserting the Boot Drive Card

Before powering-up the VPC, you must first insert the distribution boot drive (the “loaded hard disk”) into the top PCMCIA slot, labeled SOCKET B (See “VPC Front Panel” on page 3-10). To do this, first orient the boot drive card so that the connector edge is facing the PCMCIA slot, and so that the profile of the boot drive card resembles the profile of the slot cut-out on the VPC. Firmly insert the boot card into the slot until the ejector button extends out.

Caution

Do not insert or remove the boot drive card while the system is powered up. Doing so can cause loss of unsaved data.

The revision B and later VPC hardware includes clamps to hold the hard disk in the PCMCIA socket under high vibration conditions. It may be necessary to remove adjacent connectors to allow the clamps to be installed and removed.

First-Time Power-Up

Once the VPC is installed and the boot drive card is inserted, you are ready to power up the VPC for the first time. Turn on the power supply to the 90-70 rack and observe the boot process on the VPC's monitor.

Note

Do **not** power down or reboot (**Control-Alt-Delete**) while the **power up memory test** is being performed. On rare occasions, this could corrupt the CMOS setup memory, preventing the unit from powering up correctly on the next power cycle. A common symptom of this problem is the system hanging up with the message "Starting MS-DOS . . ". If your system hangs up with the above message, perform the procedure, "Recovery from 'Starting MS-DOS' Hang-up" described on page 6-9.

The Boot Process

When the VPC starts up, it will first go through an extensive set of self-diagnostics. You will see indications of the memory test and other tests as the VPC boots. After the diagnostics are complete, the VPC will start MS-DOS. When MS-DOS is running, the VPC will automatically start Microsoft Windows for Workgroups. Microsoft Windows will load and present you with the Windows desktop.

Note

The Plug & Play PC will always fail the diagnostics keyboard test, even with a functioning keyboard. This is not a cause for concern.

Multiple Boot Options

The CONFIG.SYS and AUTOEXEC.BAT files are configured for two separate boot options. When the system is booted, you will be prompted to choose one of the options.

The first option, which is designed for a *single hard disk* system, does not load the software drivers required to operate the second PCMCIA port (normally used for the backup disk). This allows additional memory for Logicmaster 90 software to operate at peak performance. (The power LED for the second drive will not light.)

The second option, which is designed for a *dual hard disk* system, loads the software drivers that enable the second PCMCIA socket to work. If you use this option, Logicmaster 90 will not operate at its highest performance level, although its performance will probably be adequate for most applications. (The power LED for the second drive will light.)

If you wish, you can select one of these options as the default for subsequent boot-ups, eliminating the multiple-option bootup. Or, you can maintain the dual boot configuration, but default to the double disk scenario. Refer to page 5-18 for instructions.

Readme First File

This file contains helpful hints for Plug & Play PC operation. To prevent this file from being displayed on each startup, follow the instructions in the file. You can then view it at any time by clicking on the **First Time Startup** icon in the **Plug & Play** program group.

Backplane Driver Options

The PNP101 software has two modes of backplane communications. The optional mode, VME DDE, communicates with a built-in PLC backplane driver. The backplane driver is available with release 5.5 or later PLC CPUs and requires a release 2 or later PNP101 package.

The default mode uses a UMBDDE that communicates with a 90-70 RLD application program which is included in the Logicmaster 90-70 folder, UMB DEMO. All 90-70 PLCs and PNP releases support this mode. If you are using the Plug & Play PC with a 90-70 CPU that does not have release 5.5 or later installed, you must use the UMBDDE mode.

Set Up Backplane Driver

When the VPC is started for the first time, you will need to perform a simple operation to set up backplane communications:

Note

You can not use the VME DDE driver unless your 90-70 CPU has release 5.5 or later installed and you have CIMPLICITY InTouch hardware key.

1. When you first power up Windows, enter the **SetVPC** program from the Plug & Play Program Group, and select the driver that you plan to use.
2. When SetVPC is running, select **UMBDDE defaults** or **VME DDE defaults** from the File menu. Confirm your selection by clicking on the **OK** button.
3. Choose **Exit** from the File menu and confirm that you want to save the changes you made by clicking **Yes**.
4. If you select UMBDDE defaults, you will need to load the UMBDDE driver from the Plug & Play program group, and also use 90-70 CPU code similar to the code used for the UMBDEMO program. This code must be part of any 90-70 CPU code used with the Plug & Play PC when it is using the UMBDDE driver.

Once this step is complete, no further setup is required. If your system has entered Microsoft Windows and the Windows desktop is showing on the monitor, the startup process has been successfully completed. (See "System Startup Verification".)

Changing the Backplane Driver Setup

The above setup, once performed, does not normally need to be changed. However, if this becomes necessary:

- Power up the VPC with the loaded hard disk installed.
- Perform steps 1–3, above.
- Accept the changes and opt to reboot the system when prompted.

If you have been using the UMBDDE driver and you are changing to the VME driver for use with CIMPLICITY InTouch, you should close the UMBDDE driver. The UMBDDE driver cannot run at the same time as the VME driver.

System Startup Verification

Note

Read the initial power-up screen before you delete it.

If your system has entered Microsoft Windows and the Windows desktop is showing on the monitor, the startup process has been successfully completed. You should see that the topmost window is titled Plug & Play and has icons for the distribution software. At this point, we ***strongly recommend*** that you back up your loaded hard drive (the boot disk) if you have not already done so (see page 3-5).

Caution

If you accidentally damage the boot-up sector of the hard disk and you do not have a backup, you must obtain a new loaded hard disk. It is *not* possible to boot from a floppy disk. This makes it very important to have a backup disk.

After backing up your hard drive, you may wish to simply explore the system or jump right into the Logicmaster 90 software, or other standard application. You can also run the VPC demo applications to learn more about its capabilities.

If you had trouble reaching this stage, be sure to check that your Series 90-70 system is functioning properly without the VPC installed. Also check that you have met all the requirements for monitor, keyboard, etc., and that you have properly inserted the boot drive card into SOCKET B before powering up the VPC.

Making a Backup Boot Disk

It can be very difficult, and is sometimes impossible to recover data on a hard disk which has “crashed”. Hard disk crashes can be caused by improper power down procedures, as described on page 3-8, and can also be caused by malfunctioning software.

Note that it is **not** possible to boot from a floppy disk with the Plug & Play PC since there is no floppy disk.

It is **very strongly recommended** that regular **backups** of the hard disk be performed to the hard disk IC697PNP701, or via InterLink to another computer. The backup process for PNP101, which is described here, creates a bootable hard disk. The InterLink method will save only data and is **not** the preferred technique.

The DOS SCANDISK function can *sometimes* be used to recover from errors, but most hard disk errors are unrecoverable.

It is recommended that you purchase IC697PNP701, on a routine basis, and make a complete bootable copy of the original hard disk, using the procedure on page 3-6.

NOTE: If you have not backed up your loaded hard disk, do this now.

Hard Disk Formatting

Note

The following procedure is not required for an IC697PNP701 disk. (It is already formatted.) Use this procedure if you have purchased a disk other than IC697PNP701.

If you are using an unformatted blank disk, it is necessary to first prepare the disk for formatting, using the FDISK command. Use the following procedure:

1. Be sure you are using a bootable 260 MB disk. This procedure will not work with the 105 MB boot disk, or the 131MB boot disk.
2. Plug the new disk into SOCKET A.
3. Boot up the VPC. When you are prompted, select the dual hard disk configuration mode
4. Go to DOS.
5. Type **PCMFDISK** at the C:> prompt.
6. From the main screen, press **ALT-M** and then **C** to create the partition.
7. Hit **ALT-S** and then **W** to write the new partition information.
8. Hit **Alt-S-X** to exit.
9. Type **FORMAT G: /S** at the C:> prompt.

Preferred Method for Backup

Before making a backup hard disk, you should first run SCANDISK from the DOS prompt (not from a DOS box under Windows). This will ensure that the master hard disk is clean, before copying it to other disks.

The following procedure can be used the FIRST time you back up your hard disk. It will take about 15 minutes for all the files to be copied. Other backup procedures, which might be better for your particular situation, are also possible.

1. Click on the Windows **File** menu and choose **Exit Windows** in the Windows Program Manager. Then click on **OK**. This returns you to the DOS prompt, C:;>.
2. Insert your backup (formatted) hard disk IC697PNP701 in drive G: "Socket A", and make sure that both the C: (SOCKET B) and G: (SOCKET A) disks are the same size. Then type:

```
C:>cd\pnputils <Enter>
c:\PNPUTILS> BCKUP1ST <Enter>
```

... and follow the instructions on the screen

3. Power down, and remove the C: (master) drive. Move the backup drive from Socket A (drive G:) to Socket B (drive C:), then power up again.
4. After entering Windows you will get a message about a corrupted swap file. Enter **Yes** to delete it. From the Main Program Group, enter the Windows Control Panel, 386 enhanced section. Go to the virtual memory section. Answer **Yes** to the question about setting the swapfile length to 0. Hit the **Change** button, then select the default swapfile, hit **Yes**, and reboot Windows.
5. At this point, you have a good backup copy of the original hard disk.

For subsequent backups, you need to backup only the files which are new. If your real time clock has been set correctly, this can be done as follows:

Insert your backup hard disk in Socket A (drive G:), then type

```
C:>cd\pnputils <Enter>
c:\PNPUTILS> BACKUP <Enter>
```

... and follow the instructions on the screen

This requires much less time than a full backup, as described above. To ensure that only recent files are backed up, you can modify the *date* in the following line in the \PNPUTILS\BACKUPBAT file:

```
C:>XCOPY C:\ G:\ /S /E /D:date
```

Alternate Backup Methods

Backing Up Using InterLink

You can use the MS-DOS InterLink utility to back up to another PC / AT or laptop computer through the LPT1 parallel port or one of the serial ports. InterLink will allow a hard or floppy disk on the other PC to appear as a DOS volume on the VPC. After configuring InterLink and connecting to the other PC, simply copy your files to the other PC's hard or floppy disk using the XCOPY command in DOS, or the File Manager utility under Windows. For information on configuring and using the InterLink facility, as well as use of the XCOPY command, refer to the *MS-DOS User's Guide*. See Chapters 4 and 5 for more information about using InterLink with the Plug & Play PC. This method does **not** create a bootable backup disk.

Caution

Do not use InterLink on the parallel port without first disconnecting the CIMPLICITY InTouch hardware key (with power off), or damage to the key will result.

Remove and insert the hardware key with POWER OFF!!!

Do not plug anything into the back of the hardware key. If you own one of these keys, you might want to tape over the back of it so that no one plugs something into it accidentally.

Backing Up to a Network

Another good method of backup, especially for data files that change daily, is to backup over a network. There are several different strategies for backing up over a network and some depend on the capabilities of your Network Operating System (NOS). The Windows for Workgroups documentation discusses the capabilities and limitations for file sharing and copying across a network. Backing up to a file server, backing up to another VPC's or PC / AT's hard disk, or having another system access your local disk and perform backups are all viable backup strategies. Refer to your Windows for Workgroups documentation or other NOS documentation for more information on sharing files and disks and doing backups over the network.

Power-Down

Note

If possible, before powering down your Plug & Play PC, be sure that all DOS and Windows applications have been closed, and that you have exited Windows. Otherwise, some information may not be written properly to hard disk and **unrecoverable** disk errors may occur.

To properly power down the VPC, assuming that you are in Windows, perform the following steps:

1. Quit or exit all open Windows applications. If you power down without quitting Windows, files with .TMP extensions will accumulate in Windows applications subdirectories. These files may need to be purged occasionally to free more disk space.
2. Choose **Exit Windows** from the Program Manager's File menu.
3. A message will appear asking you if you want to end the Windows session. Answer **YES**.
4. Once the DOS prompt (**C:\>**) appears, you can turn the system off.
5. Some critical applications cannot allow loss of data between hard disk backups. In other critical applications, it may not be practical to back up the hard disk. In some other applications, it may not be possible to exit Windows properly prior to a power shut down. For these applications, it is recommended that the 90-70 system which includes the Plug & Play PC be powered by an **uninterruptable power supply** (UPS).

The DOS SCANDISK function can sometimes be used to recover from errors caused by an unplanned power-down, but the proper course of action is to use a UPS, and to make backups of the hard disk. SCANDISK should also be run on a regular basis as a hard disk diagnostic.

Note

Do **not** power down or reboot (**Control-Alt-Delete**) while the **power up memory test** is being performed. On rare occasions, this could corrupt the CMOS setup memory, preventing the unit from powering up correctly on the next power cycle. A common symptom of this problem is the system hanging up with the message "Starting MS-DOS . . ". If your system hangs up with the above message, perform the procedure, "Recovery from 'Starting MS-DOS' Hang-up" described on page 6-9.

Removing the Boot Drive Card

Remove the boot drive card only when the system is off. After the VPC is powered down, press the PCMCIA slot ejector button in until the card is pushed part way out of the slot. Pull the card the rest of the way out of the slot and keep it in a static-safe bag or carton.

Logicmaster 90 Configuration of the VPC Card

The VPC module has been integrated into the 90-70 PLC system in such a way that communication between the VPC module and the 90-70 CPU can usually be established even if the 90-70 does not have the correct configuration information for the VPC module. However, the module should be configured as below to prevent CPU Fault Table error messages.

In the LOGICMASTER 90 configuration package, when you configure the 90-70 I/O structure, identify the VPC as a “Foreign VME Module”. Use the following procedure to accomplish this:

1. Highlight the rack / slot where the VPC is located.
2. Select vme (**F7**).
3. Select vme (**F1**).
4. Highlight ‘3RD PTY VME’ and press **ENTER**.
5. Press the down arrow button to highlight the Configuration Mode.
6. Press the **TAB** button until ‘FULL MAIL’ shows on the screen and press **ENTER**.
7. Press the down arrow button to highlight the Address.
8. If the address shown is not correct, type in the correct value for the VPC’s rack and slot location (see the table below), and then press **ENTER**.
9. Press **Esc**. You can now continue with the configuration setup.

Address Allocation for VPC Rack and Slot Locations

Rack Number	Slot Number/Address Allocation							
	2	3	4	5	6	7	8	9
0	000000	020000	040000	060000	080000	0A0000	0C0000	0E0000
1	E00000	E20000	E40000	E60000	E80000	EA0000	EC0000	EE0000
2	D00000	D20000	D40000	D60000	D80000	DA0000	DC0000	DE0000
3	C00000	C20000	C40000	C60000	C80000	CA0000	CC0000	CE0000
4	B00000	B20000	B40000	B60000	B80000	BA0000	BC0000	BE0000
5	A00000	A20000	A40000	A60000	A80000	AA0000	AC0000	AE0000
6	900000	920000	940000	960000	980000	9A0000	9C0000	9E0000
7	800000	820000	840000	860000	880000	8A0000	8C0000	8E0000

Notes: All addresses shown are in Hexadecimal format
Rack 0 is the CPU rack.

The VPC Front Panel

The following paragraphs describe the front panel of the VPC. The various ports, LED indicators, and card slots are referenced by the names printed on the front panel.

SLOT 1 LED Indicator

The SLOT 1 indicator is illuminated when the VPC is enabled as a slot one system controller. This LED should not be lit in most Series 90-70 applications, as the slot one position is reserved for the 90-70 CPU.

ENET LED Indicator

The ENET indicator is illuminated when Ethernet packets are being transmitted by the VPC. (This LED does not blink when receiving data packets).

ACTIVE LED Indicator

The ACTIVE indicator is illuminated when the 80486 CPU of the VPC is active. Although it may flicker occasionally when the CPU is waiting, it should never stay off for long if the VPC is powered up, as this is an indication that the system is locked up.

OK LED Indicator

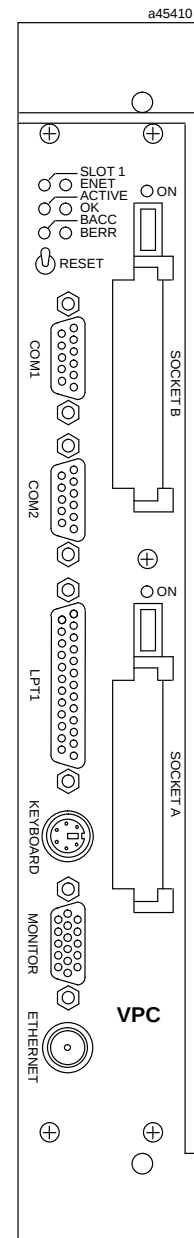
The OK indicator is illuminated when the VPC has passed all startup diagnostics successfully. This LED is also illuminated when the modeswitch is tripped and for watchdog timer pulses. The LED may go off if there is insufficient memory to load the VME DDE driver.

BACC LED Indicator

The BACC indicator is illuminated when the VPC is communicating over the backplane.

BERR LED Indicator

The BERR indicator is illuminated each time the VPC encounters an error during communications over the backplane. This LED does not remain illuminated after an error is encountered.



RESET Momentary Switch

The RESET toggle switch, when depressed, causes the VPC to reset, restart, and reboot as if it had just been powered up. To reset the board, simply depress and release the switch quickly.

If the RESET switch is held down for several seconds, the OK indicator will light indicating a modeswitch has been tripped. If a modeswitch is tripped, the board configuration is reset so that critical subsystems are set up with default values that must be changed. For more information on tripping the modeswitch, refer to “Invalid Configuration” in chapter 6.

COM1 Serial Port

The COM1 serial port is an RS-232 communications port provided through a 9-pin D connector. By default it is used for a Microsoft mouse.

COM2 Serial Port

The COM2 serial port is an RS-232 and RS-422 / 485 (default) communications port provided through a 9-pin D connector. This port is normally used to connect the Series 90-70 CPU to the VPC for Logicmaster software operation.

LPT1 Parallel Port

The LPT1 parallel port is a Centronics-compatible communications port provided through a 25-pin D connector. This port is generally used for connecting to laptop computers and other PCs via InterLink, as well as to printers. Also, this port is usually used for hardware keys for protected software applications such as CIMPLICITY InTouch.

KEYBOARDPort

The KEYBOARD port is an IBM PS/2-style keyboard interface provided through a mini circular DIN connector. Using the provided PS/2 to AT keyboard adapter cable, any PC / AT compatible keyboard can be plugged in.

MONITOR Port

The MONITOR port is a VGA / SVGA compatible video monitor interface provided through a high-density 15-pin D connector. Standard VGA and Super VGA compatible monitors can be plugged in.

ETHERNETThinwire Connector

The ETHERNET port is a 10Base2 (thinwire) Ethernet interface provided through a BNC coaxial connector. A standard thinwire Ethernet network can be connected.

SOCKETA PCMCIA Card Slot

The SOCKET A card slot allows the use of PCMCIA memory and I/O cards. The slot is compatible with Type I, Type II, and Type III cards. Refer to “PCMCIA Operation” in chapter 4 for more information about using PCMCIA cards.

ON LED Indicator for Socket A

The ON indicator closest to the Socket A card slot indicates, when illuminated, that Socket A has a card inserted and is on.

SOCKETB PCMCIA Card Slot

The SOCKET B card slot allows the use of PCMCIA memory and I/O cards. The slot is compatible with Type I, Type II, and Type III cards. Socket B is primarily used for a boot device, generally the distribution hard disk card supplied with a Plug & Play system, which functions as a boot IDE hard disk.

ON LED Indicator for Socket B

The ON indicator closest to the Socket B card slot indicates, when illuminated, that Socket B has a card inserted and is on. This should be the case most of the time, since the boot drive card should be always be present in Socket B.

Retainer Clamps

These clamps can be used to hold hard disks in place in a high vibration environment.

Chapter 4

Operation

This chapter describes normal operation of the VPC. The Windows desktop, communications port, and network operation are covered.

General Operation

Windows Desktop Presentation

When your system is powered-up, the VPC will go through the boot process and then enter Microsoft Windows. Once Windows is running, you will see the Windows desktop. As shipped, the topmost window, titled **Plug & Play**, has icons for most of the distribution software packages. Other than items in the Plug & Play and CIMPLICITY InTouch 5.0 windows, all windows and icons are stock Microsoft Windows for Workgroups. The provided *Windows for Workgroups User's Manual* will guide you through Windows.

Note

Windows for Workgroups 3.11 must be run in enhanced mode on the Plug & Play PC. This is the default mode when shipped from the factory.

The First Time You Power Up

Revision B (and later) units are shipped with the UMBDDE driver default settings in the embedded setup areas. When you first power up Windows, enter the SetVPC program from the Plug & Play program group, and select the driver that you plan to use. You cannot use the VMEDDE driver unless your 90-70 CPU has release 5.5 or later installed.

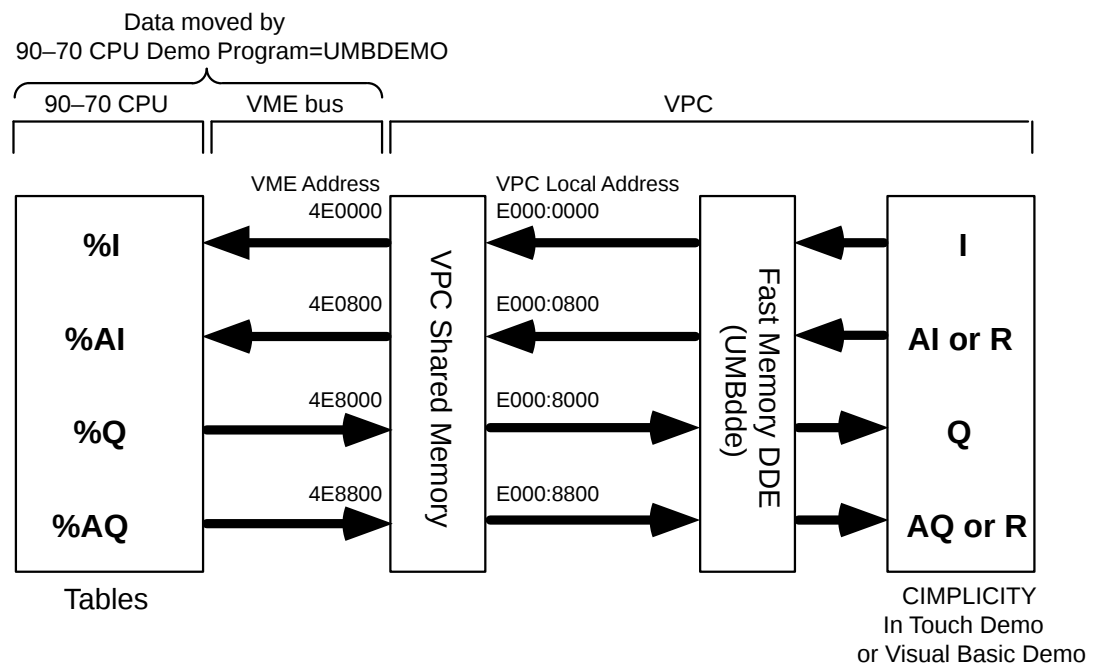
DDE Drivers

The loaded hard disk includes the VME DDE driver, as well as the UMBDDE driver which was included in earlier releases. The VME DDE driver allows CIMPLICITY InTouch access to 90-70 CPU memories without the need for associated 90-70 CPU logic. *Use of the VME DDE driver feature requires the presence of features in release 5.5 or later of the 90-70 CPU.*

The Upper Memory Block DDE Server

The Upper Memory Block (UMB) Dynamic Data Exchange (DDE) server facilitates backplane communications between the VPC and the 90-70 CPU. To set up the UMBDDE server to automatically start in Windows, copy the icon (labeled **UMBDE Driver**) to the Startup Program Group. This makes it available for use by DDE-aware applications such as CIMPLICITY InTouch.

The DDE Server effectively routes information between space in upper memory of the VPC and any Windows DDE-aware applications that request service. The 90-70 CPU can read and write data to the upper memory space of the VPC and, through the UMB DDE server, can communicate with Windows applications.



Block Diagram - UMBDDE Overview

As illustrated in the preceding figure, the 90-70 CPU discrete input values (%I), analog input values (%AI), discrete output values (%Q), and analog output values (%AQ), are mapped to shared memory on the VPC. Locations in this shared memory are accessible from both the backplane VMEbus (and thus, the 90-70 CPU), and by the local VPC processor. By default, the first discrete input, %I1, is accessed at VME address 4E0000. From the VPC, that same memory location is at local address E000:0000. The default base addresses of the other value types are shown in the figure. The UMBDDE server program simply routes the values between the shared memory of the VPC and a DDE-capable application such as CIMPLICITY InTouch.

The UMB DDE Server requires no configuration and should function with the factory defaults. Reconfiguration is **not** recommended.

UMBDDE Driver Operation Details

BCD Read/Write Function	Be aware that the BCD read and write function will produce unpredictable results if invalid BCD data is read from the 90-70 CPU via the driver, or if you attempt to send invalid BCD information to the 90-70 CPU via the driver.
DDE-related Errors	DDE-related errors, such as Visual Basic error 285, can sometimes be “tuned out” by using different UMBDDE operational parameters. Also note that the CPU containing the UMBDEMO 90-70 or a similar program needs to be running to actually transfer the data between the server and the CPU. Be sure all files are closed before you power down or press the RESET switch.
DDE-related Timeout Errors	The setting of the UMBDDE protocol parameters can have a significant effect on the number of DDE-related timeout errors. The default settings of 100mS Protocol Timer Tick, and 1000 mS Internal DDE Timer Tick sometimes result in DDE timeouts. If this occurs in your application, try lowering the DDE Timer Tick value to a lower number (e.g. 900). Also, overall DDE performance can be enhanced by lowering the Protocol Timer Tick value, but at the expense of other programs which are operating.
On-line Help	The UMBDDE driver on-line help text is provided in this manual (see page E-8). This information may be useful to those writing applications (e.g. Visual Basic, Visual C++ , Excel, Word, etc.) that use the UMBDDE driver to obtain information from the 90-70 PLC.

DDE Test Utilities

Driver Check Program

If executed, the Driver Check program will test for the presence of both the VMEDDE and UMBDDE drivers. This program works only with topics **UMBDDE** | **UMB** and **GEHCS** | **VME**, which are the default driver names used by the included demo programs.

Driver Tester

This utility can read and write data in the 90-70 CPU. Before this utility is used, either the UMBDDE driver, or the VMEDDE driver (GEHCS) must be loaded and operating. Also, the UMBDDE driver requires CPU logic to be loaded in order to operate properly.

Source code for the Driver Tester utility, written in Visual Basic, is available on the GE Fanuc Bulletin Board (see page 1-6 for instructions).

PCMCIA Operation

Note

The loaded hard disk contains files that have been optimized for use with either the 8 MB, 16 MB, or 32 MB VPC memory sizes. A loaded hard disk may not work properly if swapped between units of different sizes (105/131/260 MB). Refer to the procedure in “Embedded VPC AT Settings for Hard Disk Drives” on page 5-20.

SOCKET B is configured for ATA disk drive operation. When your VPC is operating, SOCKET B should always contain the boot disk card. This card should **not** be removed while the system is powered up. The distribution hard disk card contains a full set of drivers for common PCMCIA cards. The *PhoenixCARD Manager Plus User's Manual*, included with the VPC, fully documents the use of PCMCIA cards and the included drivers. Use it, as well as the documentation which came with the I/O or memory card, when using PCMCIA cards other than the ATA hard disk cards. Following are some additional suggestions for PCMCIA operation.

The hard disk in SOCKET A (Drive G:) can be inserted and removed with power on. However, it is necessary that you wait at least 5 seconds before removing a drive after plugging it in. You must also wait at least 5 seconds after removing a drive before plugging it back in. Detection of newly inserted drives may not be reliable depending on what else the VPC is doing. Specifically, if the VMEDDE driver is loaded, then hot insertion will not work.

Other Hard Disks or PCMCIA Devices

The Plug & Play PC has been fully tested with the hard disks which GE Fanuc supplies. Other hard disks, or other PCMCIA devices, may not work properly and are not guaranteed to work by GE Fanuc.

Note

Because of the PCMCIA drivers which are used to access the Socket A port on the Plug & Play PC, a hard drive will be misidentified as a floppy drive by some programs such as the Microsoft Virus checker. This does not affect the proper use of these programs. Since the hard drive is a removable medium, it is treated as a floppy by some of these programs.

Serial Port Operation

The VPC has two serial ports, labeled COM1 and COM2. They are also referenced from MS-DOS and Windows as COM1 and COM2. COM1 is an RS-232 compatible serial port. COM2 is not only RS-232 compatible, but can also be used in RS-422 / 485 modes. The VPC is pre-configured for COM2 RS-485 operation for use with the included Logicmaster VPC-to-90-70 cable.

The COM1 port is generally used for a Microsoft serial mouse. The COM2 port is generally used to connect to the 90-70 CPU for Logicmaster 90 software communications.

Caution

The serial and parallel ports are not isolated from VPC/Series 90-70 ground. Damage to equipment could result if equipment with a different ground potential is connected to the VPC.

Parallel Port Operation

The VPC has one parallel port, labeled LPT1 on the front panel and referenced in MS-DOS and Windows as LPT1. The parallel port is a Centronics-compatible bidirectional port provided through a 25-pin connector on the front panel.

In most VPC applications, the parallel port is used for communications with other PCs, especially laptop computers, through the MS-DOS InterLink facility. Since the VPC has no floppy disk drive for loading software, the InterLink utility allows you to use the floppy disk drive of a PC to transfer files to and from the VPC. A 5-foot InterLink cable is included in your VPC package specifically for this purpose. (See Chapter 5 for details on using the InterLink utility.)

The parallel port can also be used to connect to a parallel printer. Also, hardware keys for software packages are usually plugged into the parallel port. (The IC697PNP101 package does not include hardware keys. These are purchased as part of a software package.)

Caution

Never plug anything into the back of the hardware key. (You could tape over the back of your key so that no one will do this accidentally.)

Caution

When the CIMPLICITY InTouch hardware key is attached to the parallel port do not use InterLink or any other data transfer program which uses the parallel port. If you try this, your hardware key will be damaged, and will need to be replaced.

Remove and insert the hardware key with POWER OFF!!!

If you need a permanent hookup for both InterLink and CIMPLICITY InTouch, leave the hardware key attached to the parallel port, but use a serial InterLink cable (documentation is in the on-line DOS Help text under InterLink).

Note

Normal printing with the hardware key attached will not damage the key. However, on rare occasions, hardware keys can interfere with proper parallel port operation. Using a hardware key and a parallel printer connection simultaneously could yield improper results. If so, remove the hardware key during print operations. (The hardware key is not needed for MS-DOS or Microsoft Windows.)

The key is a physical piece of hardware, like your Plug & Play PC. If it is lost or stolen, it will not be replaced. You should insure your hardware key against loss if you think it necessary. Damaged keys will be replaced however. To replace a hardware key, call CIMPLICITY Technical Support at (800) 762-6498. Be prepared to provide information about the point count associated with the key, the CIMPLICITY InTouch product options that you may have purchased, and shipping information. Most damaged hardware keys can be replaced within 24 hours.

Network Operation

The VPC is equipped with an NE2000-compatible Ethernet adapter, which allows access to thinwire (10Base2) Ethernet through the front panel BNC. To enable operation on a network in Microsoft Windows for Workgroups, follow the instructions for configuring a network in the *Windows for Workgroups User's Manual*. Windows will say it has found an NE2000 Ethernet adapter and will ask you if you want to use it. Click **YES**. Windows will say that the adapter is on IRQ3, **which is incorrect. You will need to change the adapter interrupt to IRQ5.**

Using Ethernet With the Plug & Play PC

The Plug & Play PC is an AT-compatible computer, and a multitude of Ethernet drivers are available in the marketplace for an AT platform. The following Ethernet network drivers are included with the Plug & Play PC as part of Windows for Workgroups 3.11:

- NDIS (NE2000 compatible) – with Windows for Workgroups 3.11
- NOVELL – With Windows for Workgroups 3.11
- LANMANAGER – with With Windows for Workgroups 3.11
- TCP/IP (on the Microsoft bulletin board as “Shareware”).
- Beame and Whiteside TCP/IP (commercially available).

None of these Network drivers has been fully tested by GE Fanuc. GE Fanuc does not guarantee their operation.

Please note that the port is thinwire only. (Low cost adapters from thinwire to thickwire and 10BaseT, twisted pair are available). A BNC F connector is included with the VPC. The Ethernet port talks only to the Plug & Play PC. *Do not expect a direct connection to the PLC.* This is not a replacement for the Series 90-70 Ethernet module. An application installed in the VPC may act as a data concentrator for a remote host. Call GE Fanuc Technical Support, or refer to the GE Fanuc Bulletin Board for new information.

Installing TCP/IP Software

The VME and TCP/IP Host Drivers read a file C:\WINDOWS\GEF_CFG.INI, which contains lookup tables that relate logical names to real world addresses. These logical names are used by CIMPPLICITY InTouch, or any other application that rides on top of the Host Drivers.

As shipped with the Rev. B and later Plug & Play PC, the GEF_CFG.INI file contains the correct default values required for the demos packaged with the Plug & Play PC to work properly. The TCP/IP install program overwrites this file with one tuned for TCP/IP, which changes the VME setups.

The correct VME settings are documented in Appendix C. ***As a precaution, the following steps are recommended:***

1. Before installing TCP/IP, copy the file C:\WINDOWS\GEF_CFG.INI to the C:\BACKUP directory.
2. Then modify the files C:\PNPUTILS\BCKUP1STBAT and C:\PNPUTILS\BCKUPBAT to include the following line:

COPY C:\WINDOWS\GEF_CFG.INI C:\BACKUP\GEF_CFG.NEW

The BKUP1STBAT file and the BACKUPBAT files should be used routinely to back up your hard disk. Other files, such as CONFIG.SYS and SYSTEM.INI, are already copied to C:\BACKUP*.NEW by the batch files. Implementing this procedure will add GEF_CFG.INI to that list.

In the event of a major disaster after a new install (in this case TCP/IP), you will have the original files as C:\BACKUP\GEF_CFG.INI and will also have a fairly recent C:\BACKUP\GEF_CFG.INI.NEW.

The AUTOSET Utility

The onboard Ethernet interface of the VPC is NE2000 compatible and, therefore, should be internally supported by most network operating systems (NOS), including Windows for Workgroups. If, however, you need to configure it differently for some other NOS, the AUTOSET utility provided on the distribution disk allows automatic and custom configuration as well as diagnostic capabilities. The following paragraphs describe the functions AUTOSET can perform.

Configure New Adapter Automatically

This option detects a free address and interrupt and configures the adapter to these. If no board appears then an error message is displayed and the menu exited. If a board is enabled correctly, the user is prompted to enter the architecture mode required (**I/O Port** is the default mode). A search for a cable connection follows this, and, if thin Ethernet cabling is correctly installed then the correct cable type is selected, otherwise a menu prompting the user to enter the cable type is displayed. Finally, a menu displaying the options selected is displayed. On exiting this menu, the menu of detected adapters will be updated.

Configure New Adapter Manually

This option allows you to manually define the configuration for the Ethernet adapter to use. You can select the Ethernet base address, the interrupt IRQ used, and the I/O configuration to match requirements of other network operating systems. When this menu is selected, the automatically-determined parameters for I/O Port address, and interrupt are provided for the user as initial selections.

Change/Display Adapter Configuration

This option allows the user to change the configuration of the Ethernet adapter.

Adapter Initialization and Diagnostics

This option initializes and can perform diagnostics upon the Ethernet adapter. Ethernet diagnostics are discussed in Chapter 6.

Advanced Network Diagnostics

This option allows the user to perform further diagnostic checks on the functionality of the adapter. Ethernet diagnostics are discussed in Chapter 6.

MEMMAKER Utility

As shipped, the memory use of the VPC has been manually optimized for the applications and device drivers provided. The use of a memory optimizer such as the DOS MEMMAKER will provide **no further memory optimization** and can even reduce the amount of memory available. Therefore, it is suggested that you refrain from using MEMMAKER or other memory-freeing utility.

Chapter 5

Distribution Software

This chapter describes the software that is distributed with the VPC under GE Fanuc catalog numbers IC697PNP101 and IC697PNP111. The operating systems, factory automation software, sample applications, and utility programs are covered.

The Plug & Play PC is a bundled product, and has been optimized for use with the included software on the included hardware. This optimization involves configuration of the DOS and Windows operating characteristics, which are found in the CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, and SYSTEM.INI files. Changes to these files should *not* be made unless you have an expert grasp of the possible consequences.

- The loaded hard disk contains files that have been optimized for use with either the 8 MB, 16 MB, or 32 MB memory sizes. A loaded hard disk should be swapped between units of different sizes **only** if the default values for cache and swapfile size have been retained. The default values are optional for 8 MB units, but are **required** for 16 and 32 MB units.
- You should not try swap different sizes of hard disks (105 / 131 / 260 MB) for the boot disk on a VPC. If you do so, some files may appear to be missing, or may be corrupted. The VPC must be configured for a specific size of boot disk. It is possible to configure a VPC platform for use with any of the three sizes of hard disk as the boot disk. See page 5-20 for instructions.
- Windows for Workgroups 3.11 must be run in enhanced mode on the Plug & Play PC. This is the default mode when shipped from the factory.

Microsoft Windows

Microsoft Windows, Microsoft's industry-standard graphic user interface (GUI) operating system software, is automatically started when the VPC is powered-up. All the distribution software runs under Windows for ease-of-use and consistency across applications.

Microsoft DOS

MS-DOS is Microsoft's operating system for PC / ATs. Logicmaster 90 runs directly under MS-DOS. It is supplied because Microsoft Windows is "bootstrapped" from it, meaning that it must be running before Microsoft Windows is invoked. Exiting Microsoft Windows causes the MS-DOS prompt to be displayed. You can run any standard DOS applications and perform DOS commands. The InterLink program, which allows you to transfer files from laptop computers and other PCs to the VPC through the parallel port, is a DOS utility.

Using the DOS InterLink Utility

Caution

Do not use InterLink on the parallel port without first disconnecting the CIMPLICITY InTouch hardware key, or damage to the key will result.

Remove and insert the hardware key with POWER OFF!!!

Do not plug anything into the back of the hardware key. If you own one of these keys, you might want to tape over the back of it so that no one plugs something into it accidentally.

Note

If you need a permanent hookup for both InterLink and CIMPLICITY purposes, leave the hardware key attached to the parallel port, but use a *serial* InterLink cable (documentation is in the on-line DOS help text under C:>HELP INTERLINK).

Because the Plug & Play PC does not have any floppy disks built in, and you may wish to load additional software onto the Plug & Play PC, it may be necessary to use the DOS InterLink program to copy files to the Plug & Play PC from a host computer connected via the (LPT1) parallel port, and the included parallel InterLink cable. One of the serial ports can also be used instead of the parallel port, but is significantly slower than the parallel port. If the host computer's parallel port is not bidirectional, then it may be necessary to use the serial port. If this is the case, refer to the InterLink documentation in the DOS manual. You will need to make your own serial cable, if required, or purchase one commercially to use serial InterLink.

There are some things to remember about using InterLink:

- The INTERLNK.EXE program will normally be run on the Plug & Play PC. This driver is included in the PNP CONFIG.SYS file. The host computer will normally need to run the INTERSVR program. Refer to the DOS documentation for details (either hard copy documentation, or HELP INTERLNK from the DOS prompt).
- Once InterLink is running on the VPC, and INTERSVR (see DOS HELP) is running on the host computer, the host computer's disks can be accessed as D:, E:, or F: drives from the VPC. Standard DOS file commands can then be used with the host computer drives.
- It is not possible to use the DOS InterLink program directly to the SOCKET A hard disk. If necessary, use InterLink to copy programs to the SOCKET B hard disk, then use DOS copy to transfer the files to the SOCKET A drive.

- When using InterLink to install software, it is possible that the install program could modify the AUTOEXEC.BAT file on drive F: (the remote computer) instead of on drive C: (the Plug & Play computer). If this occurs, you will need to manually modify the Plug & Play PC AUTOEXEC.BAT file. It is also possible that the install program will add the wrong drive letter to the path in AUTOEXEC.BAT. For example, Logicmaster 90 will add F:\LM90 instead of C:\LM90 to the path in the AUTOEXEC.BAT file. This also needs to be changed manually, if it occurs.
- On rare occasions, when loading software—especially copy protected software—it may not be possible to install from the host computer to the Plug & Play hard disk. You have at least two options:

- First: you can try reversing the roles of the Plug & Play PC *client* (which runs INTERLNK.EXE) and the host *server* (which runs INTERSVR.EXE). You would need to add the line:

DEVICE=INTERLINK.EXE

to the host computer CONFIG.SYS file. Then, reboot both computers, and run INTERSVR.EXE from the Plug & Play computer. Finally, install the software from the host computer's floppy disk to the hard disk in the Plug & Play PC.

- Or: you may need to actually install the new software on the host computer first, then use InterLink to copy the files to the Plug & Play hard disk. **When this is the case, it is *required* that you go back and delete the files you installed on the host computer, so that you do not have any unlicensed copies of the software.**

Logicmaster 90-70

Note

When you are planning to run Logicmaster 90-70 at the same time as other applications, be sure to start Logicmaster 90-70 first. Otherwise, Logicmaster 90-70 may not have enough memory to run.

Logicmaster 90 software is GE Fanuc's ladder logic programming and configuration software for Series 90 programmable controllers. The distribution version is Logicmaster 90-70 Serial Comm for DOS which is set up to run in a DOS box under Microsoft Windows.

To start Logicmaster 90 software, simply double-click on the icon labeled **LM90** in the Plug & Play window. The Logicmaster software opens up in full screen mode and uses the whole screen. As such, you may think that Windows is no longer running. This is not the case. Logicmaster 90 actually runs in a DOS box under Windows and as soon as you exit Logicmaster 90, the Windows desktop reappears. In some cases, you may want to run Logicmaster 90 and other Windows applications simultaneously. In this case, press **ALT-ENTER** when Logicmaster 90 is loaded to present it in a window in Windows. **Note:** The mouse has no effect within Logicmaster 90, because Logicmaster 90 is really a DOS application.

Logicmaster 90 Operation

- When Logicmaster 90 is being run in a DOS box, and is re-enabled to the foreground, it may temporarily lose communications. It may take up to 40 seconds to re-establish communications.
- If the Logicmaster 90 cable from the Plug & Play serial port to the 90-70 CPU is disconnected, it may take up to 21 seconds to detect a NO COMM condition. When the cable is reconnected, it may take up to 3 seconds to clear the NO COMM condition.
- Care should be exercised when invoking DOS box programs (such as Logicmaster 90) from Windows. Sometimes a slight delay in running a program is encountered after clicking on the icon for the DOS box program. There may be a tendency to click the icon again, and accidentally invoke a second instance of the same program. If this second instance of the program is actually invoked, there may be Windows integrity errors, or other errors. If this occurs, restart Windows to correct the problem.
- If you encounter some difficulties running Logicmaster 90 under Windows, change the Logicmaster 90 serial port communication parameters for MODEM TURNAROUND TIME to 10 counts.

CIMPLICITY InTouch

CIMPLICITY InTouch software is GE Fanuc's Microsoft Windows-based user interface development software. Features like quick application development and high-speed connectivity are enhanced by the perfect match between the CIMPLICITY InTouch software and the VPC hardware. If you purchase CIMPLICITY InTouch, you will receive a hardware key that must be connected to the parallel port (LPT1) of the VPC for CIMPLICITY InTouch to work properly. You will not need to load the software again.

How to Order CIMPLICITY InTouch

CIMPLICITY InTouch software and documentation is available through authorized GE Fanuc distributors. Please contact your local distributor for ordering information.

The CIMPLICITY InTouch Hardware Key

When you purchase CIMPLICITY InTouch, you receive a hardware enabling key. This key is installed on the parallel printer port of the Plug & Play PC. The key enables the CIMPLICITY InTouch software to operate in production (non demo) mode. It also allows the DDE Servers to operate and exchange data with PLC and other physical devices. Without the key installed on the computer, CIMPLICITY InTouch operates in demo mode only for 60 minutes, and the VME DDE server does not work.

Caution

When running CIMPLICITY InTouch on the Plug & Play PC with the hardware key attached to the parallel port, *do not use InterLink or any other data transfer program which uses the parallel port.* If you try this, your hardware key will be damaged and will need to be replaced.

Remove and insert the hardware key with POWER OFF!!!

Do not plug anything into the back of the hardware key. If you own one of these keys, you might want to tape over the back of it so that no one plugs something into it accidentally.

Note

If you need a permanent hookup for both InterLink and CIMPLICITY, leave the hardware key attached to the parallel port, but use a serial InterLink cable (documentation is in the on-line DOS help text under **interlnk**).

The key is a physical piece of hardware, like your Plug & Play PC. If it is lost or stolen, it will not be replaced. You should insure your hardware key against loss if you think it necessary. Damaged keys will be replaced however. To replace a hardware key, call CIMPLICITY Technical Support at (800)762-6498. Be prepared to provide information about the point count of the key, the CIMPLICITY InTouch product options that you may have purchased, and shipping information. Most damaged hardware keys can be replaced within 24 hours.

How to load CIMPLICITY InTouch Options on the Plug & Play PC

The Plug & Play PC comes with the basic CIMPLICITY InTouch software and DDE Servers already loaded on the PC. The software runs only in demo mode until you purchase a CIMPLICITY InTouch package and install the hardware key. It is not necessary to reload the CIMPLICITY InTouch software that is already present on the PC. Simply installing the hardware key enables the software to be used in a production environment.

There are three CIMPLICITY InTouch product options that are not loaded on the PC however. These are SPC (Statistical Process Control), Recipes, and SQL (Structured Query Language):

- SPC – Allows full control of processes using statistical data. SPC charts can be integrated into standard CIMPLICITY InTouch applications.
- Recipes – Allows the creation and use of production recipes using a spreadsheet format. The recipes can be uploaded and downloaded from devices from standard CIMPLICITY InTouch applications.
- SQL – Allows CIMPLICITY InTouch to exchange data with several third party Database packages, using the SQL format.

These product options are distributed on 3.5-inch floppy disks. Since the Plug & Play PC does not contain a floppy disk drive, the software must be loaded using the DOS InterLink utility, as follows.

1. Using the InterLink cable provided with the Plug & Play PC (referred to here as the client PC), connect your Plug & Play PC's printer port (**after removing the CIMPLICITY InTouch hardware key**) to the printer port of another PC that contains a floppy drive. This second PC is referred to as the server PC.
2. The client PC is pre-configured to run the Interlink software when the PC starts. It should not be necessary to make any configuration changes on the client PC.
3. On the server PC, boot to a DOS environment, and at the command line prompt, type **intersvr**. The screen should display an information screen with information about the PC's disk drives. If it does not, check that the DOS Path variable contains DOS in the search path. Also check the DOS on-line help, which is invoked by typing **help intersvr** or **help interlnk** at the DOS prompt.
4. Place the floppy disk containing the CIMPLICITY InTouch product option in the appropriate floppy drive of the server PC.
5. From the client PC, accessing the File Manager utility should now show you more disk drives than usual. Typically the drive represented as D: on the client PC is mapped to the A: (floppy) drive on the server PC. Select from the available disk drive icons until you find the one that corresponds to the floppy drive containing the CIMPLICITY InTouch product option disk. Selecting that drive will show the contents of the floppy disk.
6. Double-click on the file named **INSTALL.EXE**. This begins the installation procedure described in the manual that comes when you buy the product option. Continue the installation procedure as prompted, until it is complete.
7. When complete, you can terminate the InterLink program on the server PC by pressing the **ALT** and **F4** keys on the keyboard of the server PC. You can then disconnect the cable connecting the two PC.

CIMPLICITY InTouch Software Icons

Icon Name	Function
InTouch	Allows you to create new CIMPLICITY InTouch applications, select existing CIMPLICITY InTouch applications, and scan drives for existing CIMPLICITY InTouch applications. You can also modify the directory list being displayed as well as create and / or edit descriptions about the application.
WindowMaker	Automatically starts CIMPLICITY InTouch in the Development environment (WindowMaker) using the last used CIMPLICITY InTouch application directory.
WindowViewer	Automatically starts CIMPLICITY InTouch in the RunTime environment (WindowViewer) using the last used CIMPLICITY InTouch application directory.
DB Dump	Database dump. A utility that allows you to create an exact copy of a current CIMPLICITY InTouch application's database in a Comma Separated Variable (.CSV) file. This file can be modified using a spreadsheet or text editor program.
DB Load	Database load. A utility that allows you to upload a database created as a .CSV file into an existing CIMPLICITY InTouch application. The database can be created "from scratch" or can be a modified DBDump file.
WWLogger	A diagnostic tool that provides current, on-line technical information used for debugging and may provide information required by CIMPLICITY Technical Support.
InTouch System Diagnostics (ISD)	A utility that provides software diagnostics about the selected CIMPLICITY InTouch application in the form of a text printout. ISD works much like the hardware diagnostics provided by Microsoft called MSD.
HistData	A utility that acts as a DDE Server for encrypted historical log files (*.LOG). HistData is used with CIMPLICITY InTouch to retrieve requested historical data from the log file and if required, converts it into a Comma Separated Variable (.CSV) file for use with spreadsheets or text editors.
HDMerge	A utility that allows the merging of two or more historical .CSV files. The program requires that the historical log files first be converted from an encrypted .LOG file to a .CSV file using the HistData utility.
DDE Server Simulator	A generic DDE Server designed to be used with CIMPLICITY InTouch as a testing or training tool only. This is NOT a true DDE Server for use in production.
GE Fanuc PLC Fault Tables	Displays the Series 90 PLC Fault Table information. It works as a client and accepts data from DDE Servers that are receiving data from a Series 90 PLC.
NetDDE	A communication utility that allows CIMPLICITY InTouch applications to share data across a network, using a variety of supported protocols.
GESNP	The GE Fanuc Series Ninety Protocol (SNP) DDE Server. It communicates with GE Fanuc Series 90 PLC's and serves data to CIMPLICITY InTouch applications.
GECCM	The GE Fanuc CCM DDE Server. It communicates with GE Fanuc PLC's and serves data to CIMPLICITY InTouch applications.
GEHCS	The GE Fanuc Host Communications DDE Server. It communicates with the GE Fanuc Host Communication software using the VME protocol and TCP / IP.
Server Startup	A help utility that provides details on how to start up several types of DDE Servers, including the servers present on the Plug & Play PC.
Genius	The GE Fanuc Genius DDE Server, which communicates with GE Fanuc PLCs and serves data to CIMPLICITY InTouch applications.

Host Communications Drivers for Windows

The CIMPLICITY InTouch software sits on top of GE Fanuc's Host Communications Drivers for Windows (IC641SWP050). The Host Communications Drivers software provides a common programming interface for all underlying software drivers that may be used to access the Series 90 PLC. For more information on the Host Communications Drivers software, refer to the *Host Communications Drivers for Microsoft® Windows™ User's Manual* (GFK-1026).

DDE Drivers

Note

To operate the VMEDDE driver, you must have a release 5.5 or later 90-70 CPU, and a CIMPLICITY InTouch hardware key.

The loaded hard disk (revision B and later) includes the VME DDE driver, as well as the UMBDDE driver which was included in earlier releases. The VME DDE driver allows CIMPLICITY InTouch access to 90-70 CPU memories without the need for associated 90-70 CPU logic.

All 90-70 CPU models support the UMBDDE driver. Some 90-70 CPUs have release 5.5 built in. Others can be upgraded. For more information about upgrades, refer to the product literature for release 5.5 CPUs.

Note

The Plug & Play PC is shipped with the GEHCS VME DDE server. If this program is also obtained from another source, and re-installed on top of the existing version, the software may notify you that some files are older than the existing copy. If the software displays the following prompt, answer **Yes**.

Retain Newer Copy?

Running the Application Demos

Warning

The Plug & Play PC demo programs provided for the 90-70 CPU are not intended for use in a real application. Do not attempt use of the demo programs on operating machinery.

Several VPC demonstrations that show the Plug & Play software in action are provided on the distribution hard disk. Two CIMPLICITY InTouch demos and a Visual Basic demo are provided.

Running the CIMPLICITY InTouch Demos

The first CIMPLICITY InTouch demo uses the UMBDDE driver to obtain information from the 90-70 CPU. The second demo uses the VME DDE driver.

The demos require that a 90-70 CPU demo program be loaded to provide loop-around data for both demos, as well as backplane communications for the UMBDDE demo.

Setting up the Series 90-70 for DDE Demos

To run the demonstration applications, you will need to download a demo program, which simulates incoming values, to the 90-70 CPU. When using the VME DDE driver, you should load the 90-70 CPU with the program VMEDEMO. When using the UMBDDE driver, you must load the UMBDEMO program.

Warning

You are about to download a new program to your 90-70 PLC. The new program will overwrite the current program, if there is one. Be sure that the PLC is not actively controlling any machinery, because downloading a new program will cause it to cease machine control.

Note: Before performing the following procedure, be sure to save the program running in the PLC, if this has not already been done.

To load the demo program, follow these steps:

1. Start the Logicmaster software by double-clicking on the Logicmaster 90 icon in the Plug & Play window.

2. When the application is running, press **F2** to enter the Logicmaster 90 Configuration Package. Press **F1** and verify that your system configuration matches that shown (CPU type, slot setups, etc.) The VPC should be configured as **3 PTY VME**. If necessary, refer to the Logicmaster documentation for more information on determining and setting your system configuration. Press **Esc** twice and press **Y** to exit the Logicmaster 90 Configuration Package menu.
3. Press **F1** to enter the Logicmaster 90 Programmer Package menu. Press **F3** for PLC Control and Status. Press **F1** for Run / Stop PLC and press **Tab** until the PLC status is STOP. Press **Enter**.
4. Press **Esc** twice to get back to the Programmer Package menu. Press **F8** for the folder menu and then press **F1** to see the list of available folders. Move the cursor to UMBDEMO or VMEDEMO and press **ENTER** to select the folder. Press **Esc** twice to return to the Programmer Package menu (or press **Shift-F9** to go directly to the Utilities menu).
5. The 90-70 CPU status (OFFLINE, MONITOR, or ONLINE) is shown in the center of the third line from the bottom of the screen. If the status is not shown as ONLINE, press **Alt-M** until ONLINE is indicated at the bottom of the screen. Press **Enter** and then press **Y** to begin downloading. As soon as the download is complete, **Store complete** will be displayed.
6. Press **Esc** twice to get back to the Programmer Package menu. Press **F3** for PLC Control and Status. Press **F1** for Run / Stop PLC and press **Tab** until the PLC status is RUN / OUTEN. Press **Enter**. (You can also change the PLC's running state by pressing **Alt-R**.)

If using the UMBDEMO program, the BACC indicator on the VPC front panel should illuminate to show that the PLC is communicating with the VPC. Otherwise the BACC LED will come on when you re-enter Windows. If not, and if the status of the PLC is STOP / FAULT, you will need to clear the fault before proceeding. Refer to your Logicmaster 90 documentation for instructions on clearing the fault condition.
7. The demo program is now running. Press **Esc** twice to get back to the Programmer Package Menu. If desired, you may press **F1** for Program Display / Edit to view the ladder logic program during execution. When the ladder logic program is displayed, you should see that the PLC is simply updating counter values.
8. Exit the Logicmaster software by pressing **Esc**, **Y**, and **Esc** again. (You can also exit from anywhere in the Logicmaster software by pressing **Ctrl-Break** followed by **Y**.)

CIMPLICITY/UMBDDE Demo

Before running this demo, the **UMBDDE driver** must be selected using the **SetVPC** utility, and then started up. Also, the 90-70 CPU program UMBDEMO must have been loaded in the 90-70 CPU.

The proper sequence is:

- Use SetVPC to select the UMBDDE driver (UMBDDE) if not already selected.
- Start up the UMBDDE driver from the Plug & Play program group.
- Start up the CIMPLICITY InTouch demo program.

Simply double-click on the **InTouch** icon (labeled **UMBDEMO**) in the Plug & Play window. If you don't have the hardware key for CIMPLICITY InTouch, it will present you with a message that states that the key is not installed. If this is the case, simply press the **Ignore** button to allow CIMPLICITY to run in demo mode.

Once the demo is running, there will be three buttons at the bottom of the screen. Pressing the first one, **View Analog Data Exchange**, brings up a window which shows four thermometers, four corresponding buttons, and some changing values. Click on one of the four buttons for AI1 through AI4 and enter in any value. This value will be provided to the 90-70 CPU, and then the VPC will receive the value and update the corresponding thermometer.

Pressing the **View Discrete Data Exchange** button brings up a window which has eight light switches and eight corresponding frowning faces. Simply click on a switch to turn it on or off. The switch state will be sent to the 90-70 CPU, and the 90-70 CPU will update the VPC, causing it to change the corresponding faces. This is basically a loopback from the 90-70 CPU.

When you are done with the demo, simply choose **Exit** from the File menu to end the demo and return to the Plug & Play window.

Note

The SetVPC utility modifies the SYSTEM.INI file to switch between the UMBDDE and VMEDDE backplane drivers. Never modify the SYSTEM.INI file manually to accomplish this.

CIMPLICITY/VME DDE Demo

To use the VME DDE driver / CIMPLICITY driver, you must purchase a CIMPLICITY InTouch package, and use the supplied hardware key. Refer to the CIMPLICITY InTouch documentation for details.

Operation is similar to the UMBDDE demo described above, except that the VMEDDEMO program must be loaded in the 90-70 CPU, the VME DDE driver must be selected using SetVPC, and you must click on the icon labeled **VME Demo**.

Running the Microsoft Visual Basic Demo

The Visual Basic Demo in the Plug & Play window provides a demonstration of VPC communications using Microsoft's Visual Basic. To run the demo, be sure the UMBDEMO Program is loaded in the 90-70 CPU, and then double-click on the icon.

The UMBDEMO CPU program is used to change data in the CPU for a more useful demo. The Visual Basic demo reads and writes directly to the backplane, and does not use the UMBDDE driver or the VMEDDE driver, but does use the UMBDEMO CPU program.

When you open the demo, you will see four buttons at the bottom of the settings window:

- Clicking **Look at I** will bring up the familiar switches for setting discrete input values.
- The **Look at Q** button will bring up the faces which correspond to the discrete input values. You can bring up both windows at once to see the changes occur.
- Selecting **Look at AI** will allow you to set analog values in AI1 through AI4. The values are sent to the CPU when the Window is closed.
- Selecting **Look at AQ** will show thermometers corresponding to the values set in AI1 through AI4, as well as the automatically incrementing counters shown in AQ5 through AQ8. Again, this is a simple loopback.

When you are done with the demo, simply choose **Close** from the main demo screen to end the demo and return to the Plug & Play window.

As an example for the Visual Basic programmer, the Visual Basic demo is provided, in source code form, in the VBSOURCE directory on the distribution disk.

Running the Excel Demos

An Excel® demo program is provided in the PNPUTILS directory for use with the UMBDDE driver. There are also some Excel demo programs in the CIMPLICITY InTouch directory. If you do not have Excel installed on the Plug & Play PC, but you have it installed on another PC, you can use the following procedure to run these programs. This procedure covers the use of the demo program for the UMBDDE driver.

1. Append the path statement in your autoexec.bat file on the Plug & Play PC to include F:\WINDOWS\SYSTEM. Restart your Plug & Play PC.
2. Remove the CIMPLICITY InTouch hardware key, if installed. Then, connect the InterLink cable, and start INTERSVR on the remote computer which has Excel installed.
3. Start the UMBDDE driver from the Plug & Play program group.
4. Be sure the 90-70 CPU program, UMBDEMO, is running.
5. From the Windows program manager in the Plug & Play PC, type:

RUN F:\EXCEL\EXCEL C:PNPUTILS\UMBDEMO.XLS

You should be able to see the data changing in both tabular and graph form.

6. If you load the other Excel demo programs, you may need to EDIT LINKS and change the names of the DDE Topic names to be the same as are used in the UMBDDE driver (Server name=UMBDDE, Topic name=UMB, item name (example)=AQ5.)

Note: You will need to eventually remove the F:\WINDOWS\SYSTEMreference from your path command, or your system will hang up when you remove the InterLink cable, or stop running INTERSVR on the remote computer.

Running CIMPLICITY InTouch

The Plug & Play PC loaded hard disk includes features as outlined in the software contents section at the beginning of this document.

To fully enable the non-demo features of CIMPLICITY InTouch, you must purchase CIMPLICITY InTouch and options from an authorized distributor. You will then obtain:

- The hardware key mentioned above (depending on what you purchase, the hardware key will enable different functions in the software, which is already loaded).
- CIMPLICITY InTouch Diskettes (this software is already installed in the Plug & Play PC, and does not need installed again, unless this is an upgrade, or an option not provided in the standard package).
- CIMPLICITY InTouch Documentation.
- CIMPLICITY InTouch Demo Documentation.
- GE Fanuc Series 90 Fault Table documentation and backup diskettes
- CIMPLICITY InTouch Symbol Library documentation and backup diskettes

Do not reinstall CIMPLICITY InTouch after you purchase it (unless you have purchased a later revision). Just use the hardware key to enable the software.

If you are purchasing options that were not included in the Plug & Play PC loaded hard disk already, such as Structured Query Language (SQL), Statistical Process Control (SPC), or Recipes, you must purchase the software and documentation from an authorized distributor. The software must then be installed by the Plug & Play user. These options are installed using InterLink. Refer to the InterLink section in this document, the CIMPLICITY InTouch documentation, or call the CIMPLICITY Technical Support Hotline.

Moving the GEHCS Icon to the Startup Group

The GEHCS CIMPLICITY InTouch server program calls the SRX driver to attach to the 90-70 CPU for communications. If CIMPLICITY InTouch is started up prior to the GEHCS program being started, it will offer the option of starting GEHCS, which will then attempt to start SRX automatically. With the present versions of GEHCS, SRX, and CIMPLICITY InTouch, the GEHCS program takes longer to start up than the built-in timeout period in CIMPLICITY InTouch. The net result is that you will be presented with a second opportunity to start GEHCS even though it is actually running. At this point you should hit the **cancel** button.

To avoid this problem altogether, you can start the GEHCS program prior to starting CIMPLICITY InTouch. This can be done manually, or in a production environment, it can be done by putting GEHCS in the Windows startup program group.

Compatibility Between the UMBDDE and VME Drivers

The UMBDDE driver shipped with the revision A hard disks does not support 32-bit words. The revision A UMBDDE driver supports AI and AQ (integers), I and Q (bits).

Revision B (and later revisions) support the above data types, plus the R (register) data type, which can also be used with signed 16-bit data, BCD, bit, 32-bit long, 32-bit float, and ASCII. This R type will provide compatibility with the VME server, in the event that you develop a CIMPLICITY InTouch program with the UMBDDE driver, and then transition to the VME DDE driver in the future.

With no modifications to the 90-70 CPU UMB demo program, reads to R references will come from corresponding AI references, and writes to R references will be directed to corresponding AQ references. In order to actually read and write R references in the 90-70 CPU, it is necessary to modify the 90-70 CPU demo program VME read and write instructions to access registers instead of AI and AQ memory.

VME Port Definition

When using the VME DDE driver, the CIMPLICITY InTouch program uses the definition below to pass information to the GEHCS, which reads the C:\WINDOWS\GEF_CFG.INI file. There are four sections related to use with the Plug & Play PC. These must appear as described below for the demos to work properly:

```
[VMEPLC]
DEST_ADDR = 10E00000
```

```
[VME]
TYPE = VME_PORT
```

```
[VMEPLC]
DEST_ADDR=10E00000
```

```
[testplc]
DEST_ADDR=10E00000
```

Refer to the CIMPLICITY InTouch manuals for more information.

TCP/IP Port Definition

When using the TCP/IP DDE server, CIMPLICITY InTouch uses the definition below to pass information to GEHCS, which reads the C:\WINDOWS\GEF_CFG.INI file. The GEF_CFG.INI file contains definitions for the ports and devices to be recognized by the drivers that the server uses. For the server to function, the file must have the entries described below:

```
;Ports
[TCPIP]
TYPE=TCPIP_ETH

[HCT_Timeout]
CONNECT_TIMEOUT=10000
REQUEST_TIMEOUT=175
```

In addition, for each PLC to be accessed by the server, a device name entry must be made. For example,

```
[TESTPLC]
IP_ADDR=198.211.124.222
```

The device name enclosed in [] must correspond to the PLC Address provided in the GE Fanuc Host Communications DDE Server Topic Definition dialog. The IP_ADDR for a given PLC is configured using the GSM software from GE Fanuc.

CIMPLICITY InTouch Restrictions

In the configuration menus for the GEHCS, several of the configuration settings are currently disabled.

- **Configure/Com Port Settings.** This selection applies only to serial interfaces. Since the only protocols currently implemented in the server are VME and TCP/IP, this setting is not applicable.
- **Com Port** setting in the Configure / Topic Definition dialog screen is disabled
- **SNP-Serial** setting in the Protocol Selection box is disabled.

In future releases of the GE Host Communication Server, the SNP communication protocol will be available, and the currently disabled settings will be enabled.

Other Distribution Files

Files on the distribution disk are divided into subdirectories by their purpose. The following paragraphs describe these subdirectories and other files:

SetVPC

This icon appears in the Plug & Play window and allows you to perform specific board configuration from Windows. You should rarely need to use this utility. It has online help, and a Defaults button that will return the settings to shipping defaults. SetVPC performs the same function as the embedded VPC Setup available during startup.

WINDIST Directory

This directory contains all the Windows for Workgroups distribution files. It is handy to have all of them when installing printers and other setup tasks, since the VPC has no floppy disk to load them with. However, if you need to free disk space on the distribution disk, removing this directory and the files in it will have no effect on system operation, other than requiring installation files to be provided via InterLink when performing advanced setup in Windows.

PCPLUS Directory

This directory contains all the drivers and files necessary to support many of the PCMCIA cards on the market. Hard disk cards, memory cards, and I/O cards are all supported by these drivers. They are fully documented in the *PhoenixCard Manager Plus User's Manual* that came with your VPC.

DOS Directory

This directory contains files used by the MS-DOS operating system.

WINDOWS Directory

This directory contains all the files used by the Windows operating system. The Windows configuration file, SYSTEM.INI, is in this directory.

AUTOEXEC.BAT, CONFIG.SYS, and SYSTEM.INI Configuration

These are your primary system configuration files. AUTOEXEC.BAT and CONFIG.SYS reside in the root (topmost) directory of your distribution disk, while SYSTEM.INI is in the WINDOWS directory. When you install new driver software or applications, you may be required to modify these files, or they may be modified automatically by installation programs. However, you should be aware that changing them incorrectly may cause improper operation. Rarely should you need to modify these files. The "VPC Defaults Reference" in Appendix C gives the factory default contents of these configuration files, in case you need to restore them after an incorrect modification.

Backup Directory

Copies of the AUTOEXEC.BAT, CONFIG.SYS, and SYSTEM.INI Configuration files as shipped are provided in the BACKUP directory, and have .GEF extensions. To use them, simply copy over the problematic file with the one from the BACKUP directory. Be sure to rename the replacement file to give it the correct extension.

Customizing the Plug & Play Configuration

Multiple Boot Options

The CONFIG.SYS and AUTOEXEC.BAT files are configured for two separate boot options. Every time the system is rebooted, you will be prompted to choose either the *single disk* option or the *dual hard disk* option.

- If you wish to avoid the multiple option boot-up, do one of the following procedures:

To always use the single disk option, type at the C:> prompt:

```
COPY C:\BACKUP\CONFIG.ONE C:\CONFIG.SYS  
COPY C:\BACKUP\AUTOEXEC.12 C:\AUTOEXEC.BAT.
```

To always use the dual disk option, type at the C:> prompt:

```
COPY C:\BACKUP\CONFIG.TWO C:\CONFIG.SYS  
COPY C:\BACKUP\AUTOEXEC.12 C:\AUTOEXEC.BAT.
```

- If you wish to maintain the dual boot configuration, but default to the double disk scenario, make the following change in the CONFIG.SYS file:

from: **menudefault=single,5**

to: **menudefault=double,5**

The “5” allows 5 seconds to manually reselect the boot option before the system defaults to the configuration described.

Note

The CONFIG.SYS and AUTOEXEC.BAT files as shipped in the C:\ main directory, are also included in the \BACKUP directory as CONFIG.GEF and AUTOEXEC.GEF

Optimization of Cache and Swapfile for Different VPC Platforms

The loaded hard disks are shipped with Windows setup files that configure 1 MB of cache memory and an 8 MB swapfile on disk. This default setting works with models VPC462 (8 MB memory), VPC463 (16 MB memory), and VPC 464 (32 MB memory).

If the default values (same as VPC462) are used throughout, hard disks can be swapped back and forth between the three models.

However, *if you are using the loaded hard disk with only the VPC463 or VPC464*, some performance improvements can be made by adjusting the cache size to 4 MB. This can be done in the Windows control panel under the **386 ENH** icon. Select the **Virtual Memory** button, then select **Change**. Adjust the cache size to **4096K**, then selecting **OK**, return back through the menus.

These suggested settings are shown in the following table. Depending on the programs in use on the Plug & Play PC, other values of cache and swapfile may provide better performance.

	Default	VPC462B	VPC463B	VPC464B
Cache	1 MB	1 MB	4 MB	4 MB
Swapfile	8 MB	8 MB	*	*

*Use the size that Windows recommends in the Virtual Memory window.

Restrictions on the Use of SMARTDRV

The SMARTDRV.EXE program is loaded in AUTOEXEC.BAT to enhance disk drive performance in DOS. The Windows cache size is set at 0 as in the line below:

```
c:\dos\smartdrv.exe /x /u 2048 0
```

If this number is increased on a VPC462 (8 MB), a situation may occur where not enough physical memory is available to allocate to the VPC's dual ported RAM, which communicates with the backplane. When this occurs, the OK LED will go out during the loading of Windows, and the VMEDDE driver will not work.

Embedded VPC AT Settings for Hard Disk Drives

It is possible to configure a VPC platform for use with revision A, B, or C hard disks as the SOCKET B boot disk (FIXED DISK 0). (**Note:** the Fixed Disk 1 setting should be NONE.)

To change the settings:

1. Power cycle or reboot the VPC with the old disk drive. When prompted, press **F2** to access the Setup Program.
2. Change the settings in the **VPC AT Settings** for the new disk drive. Correct CMOS settings for the boot hard disk (FIXED DISK 0) size are listed below:

For the *revision A* (105 MB) drive:

Type [User] CY:[810] HD:[15] ST:[17] LZ:[810] WP:[NONE]

For the *revision B* (131 MB) drive:

Type [User] CY:[1008] HD:[15] ST:[17] LZ:[1008] WP:[NONE]

For the *revision C* (260 MB) drive:

Type [User] CY:[936] HD:[16] ST:[34] LZ:[936] WP:[NONE]

3. Save the settings.
4. Power down and insert the new disk drive.

A fast way to select these settings is to:

1. Use the **F5 /F6** keys to select [AUTO].
2. Press **F10**.
3. Use **F5 /F6** to select [USER].
4. Press **F10, Esc**.

If you use a disk with the wrong settings, a “Fixed Disk Error,” or other disk-related error, could occur during powerup. To change to a different capacity hard disk, you must boot up with the old disk, change the settings for the new disk, then power down and insert the new disk.

If a hard disk is inserted in SOCKET A, the size is automatically detected. No reconfiguration is required to change to a different capacity disk in Socket A.

Freeing Hard Disk Space

As shipped, revision A hard disks had approximately 22 MB of space remaining, and revision B loaded hard disks have approximately 47 MB of space remaining. In the event that additional space is needed, the following steps can be used:

1. Reduce the swapfile setting to a lower number, or 0. This may have a negative effect on performance in some cases, but may not be noticeable in many other cases.
2. Delete the files in the C:\WINDIST directory (see below) which are no longer needed. This can provide about 20MB of additional space depending on how many files are erased. After Windows is up and running successfully with all printers, networks, etc. successfully installed, the files in this directory may no longer be needed.
3. Purchase the IC697PNP701 hard disk and use it in SOCKET A as an extra drive.
4. Use Ethernet to access additional files from a remote server.
5. During development of an application, CIMPLICITY InTouch creates backup files of the form ***.?bk**. After the development of an application is complete, these files can be deleted from their respective application directories.

Application Demos

The application demos can be found in the following directories:

Demo	Directory
UMBDDE	INTOUCH\WW_DEMO
VME	INTOUCH\VME_DEMO
Visual Basic	PNPUTILS

CIMPLICITY InTouch

If you don't plan to purchase CIMPLICITY InTouch, you can remove the INTOUCH directory and all CIMPLICITY InTouch application directories. Although this will yield some space, it will prevent you from running the CIMPLICITY InTouch demos.

Installing New Software

Caution

The Plug & Play PC is a bundled product, and has been optimized for use with the included software on the included hardware. This optimization involves configuration of the DOS operating characteristics, which are found in the CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, and SYSTEM.INI files. Changes to these files should *not* be made unless you have an expert grasp of the possible consequences.

When you install new software, sometimes this software automatically makes changes to some of the files below, causing inadvertent side effects on the operation or performance of programs which were previously running successfully.

If CIMPLICITY InTouch or Logicmaster 90 stops operating properly, or performance is severely hampered after installing some unrelated program, you may need to remove the offending programs and restore the original system files. The original system files are included in the loaded hard disk \BACKUP directory.

It is recommended that before installing new software, that you copy the original system files, listed below, which represent the last known good configuration to the C:\BACKUP directory as a precaution.

- C:\CONFIG.SYS
- C:\AUTOEXEC.BAT
- C:\LM90\LM90.PIF
- C:\LM90\LM90.BAT
- C:\LM90\%COM070.PSU
- C:\Windows\SYSTEM.INI
- C:\Windows\WIN.INI

When programs that adversely affect performance of Logicmaster 90 have been installed, it is possible that Logicmaster 90 will continue to operate when invoked directly from DOS, instead of from Windows via the MS-DOS prompt, or from the Windows Icon.

Chapter 6

Diagnostics

This chapter describes VPC troubleshooting. Standard diagnostics procedures, common problems, and solutions are covered. The following topics are included:

- System Diagnostics 6-2
 - Startup Diagnostics 6-2
 - Ethernet Diagnostics 6-2
- Common Problems / Solutions 6-3
 - PCMCIA Hard Disk Problems 6-3
 - Invalid Configuration 6-6
 - Screens Not Visible on Monitor 6-6
 - Communication With 90-70 CPU
Not Established or Interrupted 6-7
 - Application Timeouts 6-7
 - Data Coherency During CPU “Constant Sweep” Mode .. 6-7
 - Problems with Logicmaster 90 Operation 6-8
 - Out of Memory Error Message 6-8
 - Recovery from the “Starting MS-DOS...” Hangup 6-9
 - System Not Booting Properly / Unexpected Rebooting ... 6-9
- VPC / 90-70 CPU Mismatch Scenarios 6-10
- PLC Faults on the VPC 6-12

System Diagnostics

The VPC has comprehensive self-diagnostic capabilities. Most of them are provided in the ROM BIOS and are automatically executed during startup.

Startup Diagnostics

When the VPC is powered-up, it performs an extensive set of self-diagnostics. If you suspect a problem with the VPC, power-on the board and watch the screen carefully. If the board boots all the way into Windows without any error messages, it is unlikely you have a hardware problem.

Note

The Plug & Play PC will always fail the diagnostics keyboard test, even with a functioning keyboard. This is not a cause for concern.

Ethernet Diagnostics

If you are having problems with on-board Ethernet, or with your Ethernet network in general, built-in Ethernet diagnostics are available under MS-DOS. To run the diagnostic program, follow these steps:

1. Close all open applications and exit Windows, if applicable. Restart the VPC by toggling the front panel RESET switch.
2. As the boot process begins, be prepared to press **F8**. After the memory test is complete you will see the message: **Loading MS-DOS. . . .** Press **F8** immediately thereafter.
3. You will be asked if you want to execute each command in your CONFIG.SYS file. To each command, respond **NO**. You will then be asked if you want to process your AUTOEXEC.BAT file. Again, respond **NO**.
4. At the DOS prompt, type **CD PNPUTILS** to change your current directory.
5. Then type **AUTOSET** to run the Ethernetsetup / diagnostics program.
6. Once AUTOSET is running, choose **Diagnostics**. You should be able to observe network traffic.
7. If, after configuring your network in Windows, the network adapter doesn't seem to be working, be sure you changed the default interrupt for the network adapter from **IRQ3** to **IRQ5**.

Common Problems/Solutions

PCMCIA Hard Disk Problems

Second PCMCIA Hard Disk Disappears

If the VPC no longer recognizes the second PCMCIA hard disk after you have removed it and reinserted it and removed it again, you did not allow enough time between insertion and removal for the disk to spin up, thus confusing the software. Be sure to wait several seconds before removing a disk you just put in. A power cycle, soft reboot (**Control Alt Delete**), or quickly toggling the RESET switch should clear this condition. Generally, hard disks should be inserted and removed with the power off.

Hard Disk Error Messages

If you encounter hard disk error messages, try turning 32 BIT DISK ACCESS **OFF**. This parameter can be accessed from the Windows Control Panel (386 Enh, Virtual Memory, Change).

32 BIT FILE ACCESS should remain **ON**, since this provides much faster disk performance. These are the factory ship defaults.

Timeout Period for Missing Drive

If an attempt is made to access a nonexistent drive—for example, C:>DIR B: where the B: drive is not installed—it may take in excess of 15 seconds for DOS to return the prompt: **General failure reading drive B: - Abort, Retry, Fail?**

This is normal operation.

Hard Drive Misidentified as a Floppy Drive

Because of the PCMCIA drivers which are used to access the SOCKET A port on the Plug & Play PC, a hard drive will be misidentified as a floppy drive by some programs such as the Microsoft Virus checker. This does not affect the proper use of these programs. Since the hard drive is a removable medium, it is treated as a floppy by some of these programs.

Notes on Swapping Boot Disks

- The loaded hard disk contains files that have been optimized for use with either the 8 MB, 16 MB, or 32 MB memory sizes. A loaded hard disk should not be swapped between units of different sizes unless the default values for cache and swapfile size have been retained.
- You should not try to boot from a hard disk that has a capacity different from the capacity that the VPC is configured for. (For example, do not try to replace a 131 MB boot disk with a 260 MB disk.) If you do so, some files may appear to be missing, or may be corrupted. However, it is possible to configure a VPC platform for use a different capacity hard disk as the boot disk. See page 5-20 for instructions.

Missing Files

Lost files can result from removing a hard disk while it was being accessed for a write operation. Also, random files or groups of files can be lost if power is lost to the hard disk while a write operation is occurring. Some applications, such as the CIMPPLICITY InTouch Logger program write regularly to the disk in a background mode. Close the applications that are writing before removing disks or powering down.

Steps to recover missing files:

If you **can** boot the drive:

1. Use the Microsoft **Undelete** utility from the Applications program group. Or, after exiting Windows, try using the **UNDELETE** command from the DOS prompt.
2. If **UNDELETE** does not work, exit Windows, and from the DOS prompt, run **SCANDISK**. SCANDISK may identify the problem and fix it for you.
3. If you can't recover the files using **UNDELETE** or **SCANDISK**, try reinstalling the missing files. If these files are Windows distribution files, and you have not erased the C:\WINDIST directory, you may be able to reinstall to the C:\WINDOWS directory from C:\WINDIST. If other files are missing, or they are not Windows files, you may need to use InterLink to a host computer to reinstall the missing files (or download them via the Ethernet port).

If you **can't** boot the drive:

1. If you have another bootable drive, put the bootable driver in SOCKET B and put the bad drive in SOCKET A. Try using the SCANDISK (**SCANDISK G:**) and **UNDELETE** commands on that disk. (Drive G: is the default shipping configuration for SOCKET A, the bad hard disk.)
2. If step 1 doesn't work, run the full hard disk backup (icon is in the Windows Plug & Play program group) from your backup disk to your "bad" disk. After doing this backup, run SCANDISK on both disks. Also, be sure to fix the corrupted swap file after the backup.
3. If you can't boot the drive and you don't have a backup, your only alternative is to obtain a new bootable drive. When you obtain the new drive, it may be possible to recover some of the files from the bad drive. If you send in your drive for replacement, **all** your old files will be lost.

To **avoid these problems** in the future:

1. Make sure you are using a 100 watt 90-70 power supply. The hard drives need +12V, which this power supply provides.
2. Try turning 32-bit DISK ACCESS **OFF** in the Windows Control Panel, 386 Enh, Virtual Memory screens.
3. When inserting or removing the SOCKET A hard disk with power on, wait at least 5 seconds after plugging a drive in before removing it. Also wait at least 5 seconds after removing a drive before plugging one back in.
4. Never remove or insert boot drive in SOCKET B with power on the system. If you have a revision VPC or later VPC, you might want to use the hard disk clamp to discourage people from pushing the SOCKET B ejection button to see what happens.
5. If you have unpreventable power shutdowns in your application, consider the use of an uninterruptable power supply for the 90-70/VPC. Windows does not provide any hooks to allow a graceful shutdown in the event of a power failure.
6. If the drive rattles when you shake it, there may be a permanent problem. Although the PCMCIA drives supplied with the Plug & Play PC are very rugged, they will not withstand being dropped on the floor or a hard table top. There is no way to recover data from an hard disk that has been dropped, and now rattles when you shake it. If you plan to take your hard disk out of the VPC, and transport it to other locations, purchase a PCMCIA hard drive carry case from your local computer store.
7. Do not power down, or hit the RESET switch while the VPC is performing its power-up memory check. Refer to "Recovery from the 'Starting MS-DOS . . .' Hangup" on page 6-9.
8. Make a bootable backup using a spare hard disk.

Invalid Configuration

Because the VPC is a plug and play product, you should rarely have to use AT Setup or modify your AUTOEXEC.BAT, CONFIG.SYS, or SYSTEM.INI configuration files. If you do, however, you should be aware that incorrectly modifying configuration files or setup parameters can cause the board to operate improperly, or not at all. If an invalid configuration prevents you from reaching Setup to correct the error, you will need to perform what is known as “Tripping the Modeswitch”. The Modeswitch is a device built into the VPC that causes low-level settings of the VPC to return to defaults which will ensure that you can at least reach the Setup utility to correct any faulty configuration.

To trip the modeswitch, simply hold the RESET switch down for at least five seconds. When the OK LED is illuminated, you have tripped the modeswitch successfully and the board should boot far enough for you to enter Setup upon the release of the switch. After tripping the modeswitch, follow the startup instructions again (see on “Backplane Driver Options” on page 3-3.)

When you install new software, sometimes this software automatically makes changes to some of the above files, causing inadvertent side effects on the operation or performance of programs which were previously running successfully.

If CIMPLICITY InTouch or Logicmaster 90 stops operating properly, or performance is severely hampered after installing some unrelated program, you may need to remove the offending programs and restore the original system files. The original system files are included in the loaded hard disk \BACKUP directory. If you periodically save these files, you will have a more recent backup.

Screens Not Visible on Monitor

Be careful when changing video monitors with the Plug & Play PC. If the system is changed to a higher resolution (from the default 640x480) to work with a high resolution monitor, and then the monitor is replaced with a lower resolution monitor, it will not be possible to view any screens, including the power up screen. To correct this problem, re-connect the higher resolution display, then set the video driver to 640x480 resolution prior to connecting the low resolution display. This is a characteristic of most PCs, but is more likely to happen with the Plug & Play PC due to its use on the factory floor.

VME DDE Driver Settings Corrupted

To operate properly, the VME DDE driver needs to have the **DEVICE=C:\WINDOWS\VME.386** line present (not remarked out) in the SYSTEM.INI file. In addition, the embedded AT settings in the VPC itself must be set for correct VME DDE operation. The SetVPC program sets these parameters in tandem when the VME DDE or UMBDDE drivers are selected. The SetVPC program also reads the SYSTEM.INI file to determine which driver has already been loaded.

If the SYSTEM.INI file is *manually* edited (*not* using SetVPC) to add or remove the line above, the SetVPC program may become confused, and not allow the VME DDE driver embedded settings to be set up because it thinks the VME DDE driver is already loaded. To recover from this situation, use SetVPC to select the UMBDDE driver, reboot, then reselect the VME DDE driver. **Do not edit this file manually.**

The Plug & Play PC is shipped correctly configured, but this condition may occur if another program volunteers to “set up the VME driver”, and you answer “yes”.

Communication With the 90-70 CPU Not Established or Interrupted

The VPC Module has been integrated into the 90-70 PLC system in such a way that communications between the VPC module and the 90-70 CPU can sometimes be established – even if the 90-70 does not have the correct configuration information for the VPC module. However, some combinations of configuration mismatches and other factors can prevent communication between the 90-70 CPU and the VPC. Refer to “Configuration Issues” on page 6-10 for descriptions of instances that can affect communication.

In addition to the VPC correctly configured in both the logical and physical configurations, and configured for FULL_MAIL communication, the VME DDE driver communication link between the 90-70 CPU and the VPC relies upon the operation of the FULL_MAIL driver that runs on the VPC. Because the FULL_MAIL driver is a Windows driver, FULL_MAIL communication is supported only while Windows is running on the VPC (and the FULL_MAIL driver is installed).

If the FULL_MAIL driver is not running, the 90-70 PLC logs faults against the VPC into its PLC Fault Table. Possible causes of these faults are described in “PLC Faults on the VPC”, beginning on page 6-12 .

Note

The fault contact read by the 90-70 CPU into the fault tables for the VPC is “undefined” and should not be used.

Application Timeouts

The Plug & Play VPC is normally set up to communicate over the VME backplane, using either the VME DDE driver or the UMBDDE driver, to the 90-70 CPU. If the CPU gets tied up with other activities, such as an Logicmaster 90 download from an external computer, or a redundant Genius bus switch, the 90-70 CPU may temporarily not respond to requests generated by the VPC.

After a maximum of 8 seconds, the CPU will send the VPC application a message saying that it is busy. Depending on the application running in the Plug & Play PC, this message may or may not affect operation.

Data Coherency During CPU “Constant Sweep” Mode

The 90-70 CPU has a “constant sweep” mode of operation. While this mode is active, data transmissions to and from cards in the backplane, including a Plug & Play PC, may be interrupted at unexpected times.

This may result as “non-coherent data” either in the Plug & Play PC or in the 90-70 CPU. If coherent data is required, constant sweep mode should not be used.

Problems with Logicmaster 90 Operation

- When Logicmaster 90 is running in a DOS box and is re-enabled to the foreground, it may temporarily lose communications. It may take up to 40 seconds to re-establish communications.
- Care should be exercised when invoking DOS box programs (such as Logicmaster 90) from Windows. Sometimes a slight delay in running a program is encountered after clicking on the icon for the DOS box program. There may be a tendency to click the icon again, and accidentally invoke a second instance of the same program. If this second instance of the program is actually invoked, there may be Windows integrity errors, or other errors. If this occurs, it may be necessary to re-start Windows to correct the problem.
- If the Logicmaster 90 cable from the Plug & Play serial port to the 90-70 CPU is disconnected, it may take up to 21 seconds to detect a NO COMM condition. When the cable is reconnected, it may take up to 3 seconds to clear the NO COMM condition.
- If you encounter error messages running Logicmaster 90 under Windows, be sure that the Logicmaster 90 serial port communication parameter for MODEM TURNAROUND TIME is set to 10 counts (Revision C and later). (If communication errors occur while the Plug & Play PC is being heavily used to perform multiple tasks, it may be necessary to increase this value.)
- If Logicmaster 90 is being run at the same time as other programs, start up Logicmaster 90 before other programs are started.

Out of Memory Error Message

If you are already running some Windows applications, and you try to run Logicmaster 90, when you try to load the programming package or the configuration package you may get a Logicmaster 90 message indicating that there is not enough memory to load the program. If this occurs, try loading Logicmaster 90 **before** invoking other programs.

If you get an Out Of Memory error message when running multiple Windows applications simultaneously, it may be possible to reconfigure the Plug & Play PC to allow these programs to run at the same time. You can try reducing the cache size in the Windows Control Panel as described above. This change may result in performance degradation of Windows programs, and DOS programs running under Windows, but they may allow more programs to be run at the same time under Windows.

Recovery from the “Starting MS-DOS . . .” Hangup

To avoid this problem, do not power down, or press **Control Alt Delete** while the power up memory test is being performed. On rare occasions, this may corrupt the CMOS setup memory, and the unit will not power up correctly on the next power cycle. A common symptom of this is that the system hangs up with the message “**Starting MS-DOS.....**”.

If your system hangs up with the **Starting MS-DOS . . .** message, perform the following procedure to recover from this problem.

1. Power down the system, and power it up again.
2. While the system is performing its memory test, press **F2**, and then enter the AT Setup menu.
3. Enter the Extended BIOS setup screen.
4. Change the Quick Boot selection to **NO**.
5. Save the change, and press **Esc** to leave the program.
6. The system will reboot and perform a complete diagnostic, which should clear the problem. This may take much longer than the normal boot-up process.
7. After the system has successfully booted up again, power cycle the system.
8. When the system is powering up, press **F2** and again enter the AT Setup and Extended BIOS setup screens.
9. Set the Quick Boot selection to **YES**.
10. Save this selection, and press **Esc** to leave the setup program.
11. Reboot your system. After rebooting, the system should be back to normal.

System Not Booting Properly/Unexpected Rebooting

If an Ethernet driver is active, you must physically terminate the bus, or the system will not boot properly, or may reboot unexpectedly. To work around this problem temporarily, you can start Windows without the Ethernet network by typing:

```
c:> win\n
```

VPC/90-70 CPU Mismatch Scenarios

If the VPC is not correctly configured by Logicmaster 90, the following error conditions described in scenarios 1–4, below can occur.

Note: The fault contact read by the 90-70 CPU into the fault tables for the VPC is “undefined” and should not be used.

1: Rack Location Mismatch/Communication Established

A logical configuration is stored to the 90-70 CPU and this configuration indicates that a non-VPC IOM (Intelligent Option Module) should be present in the rack location where a VPC is physically located.

After power cycling the 90-70 PLC, a system configuration mismatch fault will be logged (because the VPC was in the slot where a non-VPC module was configured). However, even with the configuration mismatch fault, the FULL_MAIL driver in the VPC will be able to establish communication with the 90-70 CPU.

Note: Types of IOMs include the following 90-70 modules: Programmable Coprocessor Module (PCM), Genius Bus Controller (GBC), Ethernet Module (EM7), Peer Subnet Module (PSM), and Communications Memory Module (CMM).

2: Rack Location Mismatch/Communication Not Established

A 90-70 logical configuration is stored to the 90-70 CPU and this configuration indicates that an I/O module is physically located where the VPC is installed. After power cycling the 90-70 PLC, a system configuration mismatch fault will be logged because the VPC was in the slot where an I/O module was configured.

In this scenario, the FULL_MAIL driver in the VPC will *not* be able to establish communication with the 90-70 CPU. If, after the power-cycle, the 90-70 CPU is in RUN mode as the VPC starts up MS Windows, the CPU will log six **Unrecognized VME Interrupt Source** faults in the PLC fault table (one fault for each time that the FULL_MAIL driver attempts to establish communication). The faults occur because the FULL_MAIL driver sends a VME interrupt to the 90-70 CPU to initiate communication.

Note: These problems will also occur if the AM code or the VME interrupt ID for the VPC is mismatched.

3: VME Offset Mismatch/Communication Working

A 90-70 PLC system containing a VPC is running and communication between the VPC and 90-70 CPU is established and working. Then a 90-70 logical configuration containing the VPC is stored from Logicmaster 90 to the 90-70 CPU. This logical configuration, with the exception of the VPC's VME offset, matches the physical configuration of the VPC.

In this situation, even though the VME offset of the new logical configuration does not match the physical configuration of the VPC, the communications link between the VPC and the 90-70 CPU will not be broken. Because the communication link between the 90-70 CPU and the VPC was present and working correctly before the new logical configuration was stored, the CPU will not break the existing communications link.

4: VME Offset Mismatch/No Communication

If the 90-70 PLC in “Scenario 3” is power cycled after the new logical configuration is stored, communication between the VPC and the 90-70 CPU will be lost.

If this happens, communication between the VPC and the 90-70 CPU can not be re-established until the VME offset mismatch is corrected, stored to the 90-70 PLC, and the 90-70 PLC is power cycled. An alternative to power cycling the 90-70 PLC is to restart the FULL_MAIL driver, and then restart the VPC. This can be done by exiting and then restarting Windows, thereby re-initializing communication with the 90-70 CPU when the FULL_MAIL driver is installed.

PLC Faults on the VPC

When the VPC is present, correctly configured in both the logical and physical configurations, and configured for FULL_MAIL communication, the communication link between the 90-70 CPU and the VPC relies upon the operation of the FULL_MAIL driver that runs on the VPC. Because the FULL_MAIL driver is a Windows driver, FULL_MAIL communication is supported only while Windows is running on the VPC (and the FULL_MAIL driver is installed).

Under certain circumstances, the 90-70 PLC logs faults against the VPC into its PLC Fault Table. Such instances are:

Reset of, Addition of, or Extra Option Module Fault

Because the VPC must be installed in the main rack (rack 0), or in an expansion rack that has same power supply as the main rack, the 90-70 CPU and the VPC always power up together. The 90-70 CPU completes its power-up sequence much faster than the VPC can execute its power-up sequence (RAM tests, start MS-DOS, start MS Windows, and install the FULL_MAIL driver). The 90-70 PLC does not log any PLC faults due to the long power-up time of the VPC. However, when the FULL_MAIL driver is initialized (MS Windows startup on the VPC), the 90-70 CPU logs a **Reset of, addition of, or extra option module** diagnostic fault into the PLC fault table.

Loss of or Missing Option Module Fault

Once communication between the 90-70 CPU and the VPC (via the FULL_MAIL driver) is established, any activity that breaks this link results in a **Loss of or missing option module** informational fault being logged into the PLC fault table. Some examples of such activity follow.

- Exiting Windows: The FULL_MAIL driver will cease running and the VPC's VME dual port memory disabled to the 90-70 CPU, resulting in a communication failure.
- Resetting the VPC (via the RESET switch or the **Control-Alt-Del** key sequence): The VME dual port memory on the VPC is disabled, resulting in loss of communication. (*Do not* press the RESET switch down too long. This will cause a MODESWITCH change, and you will need to run SETVPC again when you return to Windows. See "Invalid Configuration" on page 6-6.)
- The VPC locking up: If the VPC locks up in such a way that the FULL_MAIL driver no longer operates, the 90-70 CPU may detect a communication loss and log a module loss fault.
- Storing a logical configuration to the 90-70 CPU—even though it matches the physical configuration—when the VPC is in MS DOS (i.e. MS Windows is not active) results in a **Loss of or missing option module** fault. Again, because the FULL_MAIL driver is not running, the VPC's dual port memory is inaccessible to the 90-70 CPU.

Loss of Module Configurable Fault Action

The **Loss of or missing module** fault, when logged against the VPC, is logged as an *informational* fault. Although the 90-70 PLC can be configured to go to the stop mode on a loss of module fault, this informational fault for the VPC module will *not* cause the PLC system to stop.

Note

If the loss of the VPC module is critical to the application and therefore should stop the PLC, you must implement a “heartbeat” relationship between the VPC application program and the 90-70 CPU application program. Then, if the 90-70 CPU application detects a heartbeat failure (i.e. loss of VPC communication), it will command the 90-70 CPU to stop (Service Request #13).

Appendix Specifications

A

This appendix summarizes the design, electrical, environmental, physical, and compliance specifications for the VPC Coprocessor for Series 90-70 systems.† Some specifications may change depending on the peripheral cards that are installed in the PCMCIA sockets.

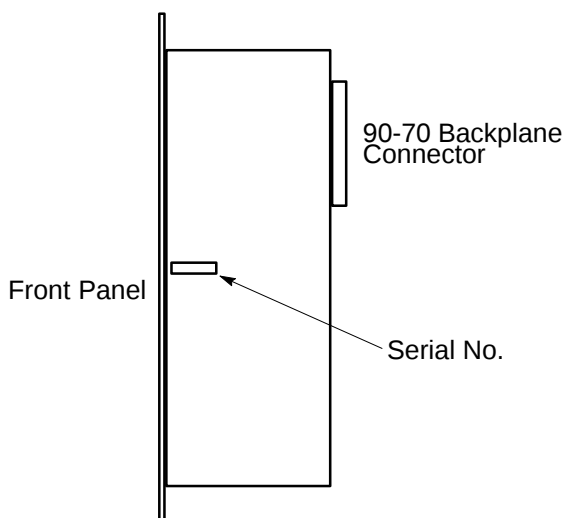
Functional Specifications

Models	VPC462,VPC463,VPC464
Description	80486PC / AT compatible coprocessor for GE Fanuc Series 90-70 systems
Hardware Compatibility	GE Fanuc Series 90-70 backplane
Processor	80486DX2 @ 66MHz
Memory VPC462 VPC463 VPC464	8 Megabytes 16 Megabytes 32 Megabytes
Configuration Jumpers	None, all software controlled configuration
BIOS Memory	256K flash for field update capability
PCMCIA Hard Drive Capacity	260 Megabytes (Rev. C) 131 Megabytes (Rev B) 105 Megabytes (Rev A)
PCMCIA Hard Drive MTBF	300,000 hours

† Refer to GFK-0867B, or later for product standards and general specifications.

Serial Number

Each VPC has several serial number labels that identify subcomponents on the unit. The serial number for the complete VPC is located as shown below.



Note: The VPC serial number is in the 0395XXX range.

Physical Characteristics

Dimensions	singleSeries 90-70 slot width 3.94 cm W. x 29.21 cm H. x 21.84 cm D. (1.55" W. x 11.5" H. x 8.6" D.)
Construction	multiple multi-layer printed circuits assembled as module
Weight	884.1g, no drives

Power Requirements

Power Required max. max. max., no drives max., one drive max., two drives	IC697PWR711 +5VDC $\pm 5\%$ @ 3.8A -12VDC $\pm 5\%$ @ 15mA +12VDC $\pm 5\%$ @ 250mA +12VDC $\pm 5\%$ @ 610mA +12VDC $\pm 5\%$ @ 970mA
Battery	RAYOVAC BR2335 Coin Cell or equivalent

Interface Characteristics

PC/AT Bus

System Clock Rate	8MHz, fixed
-------------------	-------------

Serial Interfaces

Number	2
Label	COM1, COM2
DOS / Windows reference	COM1, COM2
Compatibility	IBM PC
Interface type	(non-isolated) COM1: RS-232 COM2: RS-232 / 422 / 485
Signals provided	RxD, TxD, RTS, CTS, DSR, DTR, DCD, RI
Connector	DB9P

Pinout (RS-232) COM 1/2

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	SIGND
6	DSR
7	RTS
8	CTS
9	RI

Pinout (RS-422/485) COM2 Only

Pin	Signal
1	NC
2	RXD– (RDA')
3	TXD– (SDA)
4	TXD+ (SDB)
5	SIGND (ground)
6	RXD+ (RDB)
7	NC
8	NC
9	NC

Parallel Interface

Number	1
Label	LPT1
DOS / Windows reference	LPT1
Compatibility	Centronicsparallel
Interface	Bufferedparallel
Connector	DB25S

Pinout

Pin	Signal	Pin	Signal
1	STROBE–	10	ACK–
2	PD0	11	BUSY
3	PD1	12	PE
4	PD2	13	SLCT
5	PD3	14	AUTOFD–
6	PD4	15	ERROR–
7	PD5	16	INIT–
8	PD6	17	SLCTIN–
9	PD7	18–25	GND

Keyboard Interface

Compatibility	IBMPC / AT
Connector	6-pincircular mini-DIN (PS / 2style), standard PC / AT cable adapter provided

Pinout

Pin	Signal
1	KBDAT
2	NC
3	GND
4	VCC
5	KBCLK
6	NC

Video Interface

Compatibility	IBM Video Graphics (VGA) Super VGA Graphics (SVGA)
DisplaysSupported	VGA / SVGA
Connector	High-density 15-pin D
Video Memory	1MB of high speed VRAM
Capability max, non-interlaced max, interlaced	1024 x 768, 256 colors 1280 x 1024, 16 colors

Pinout

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	NC
13	HSYNC
14	VSYNC
15	NC

Ethernet Interface

Type	IEEE802.3 10Base2 (thinwire)
Connector	Front panel BNC
Software Interface	NE2000compatible
DriverCompatibility	NDIS

PCMCIA Interface

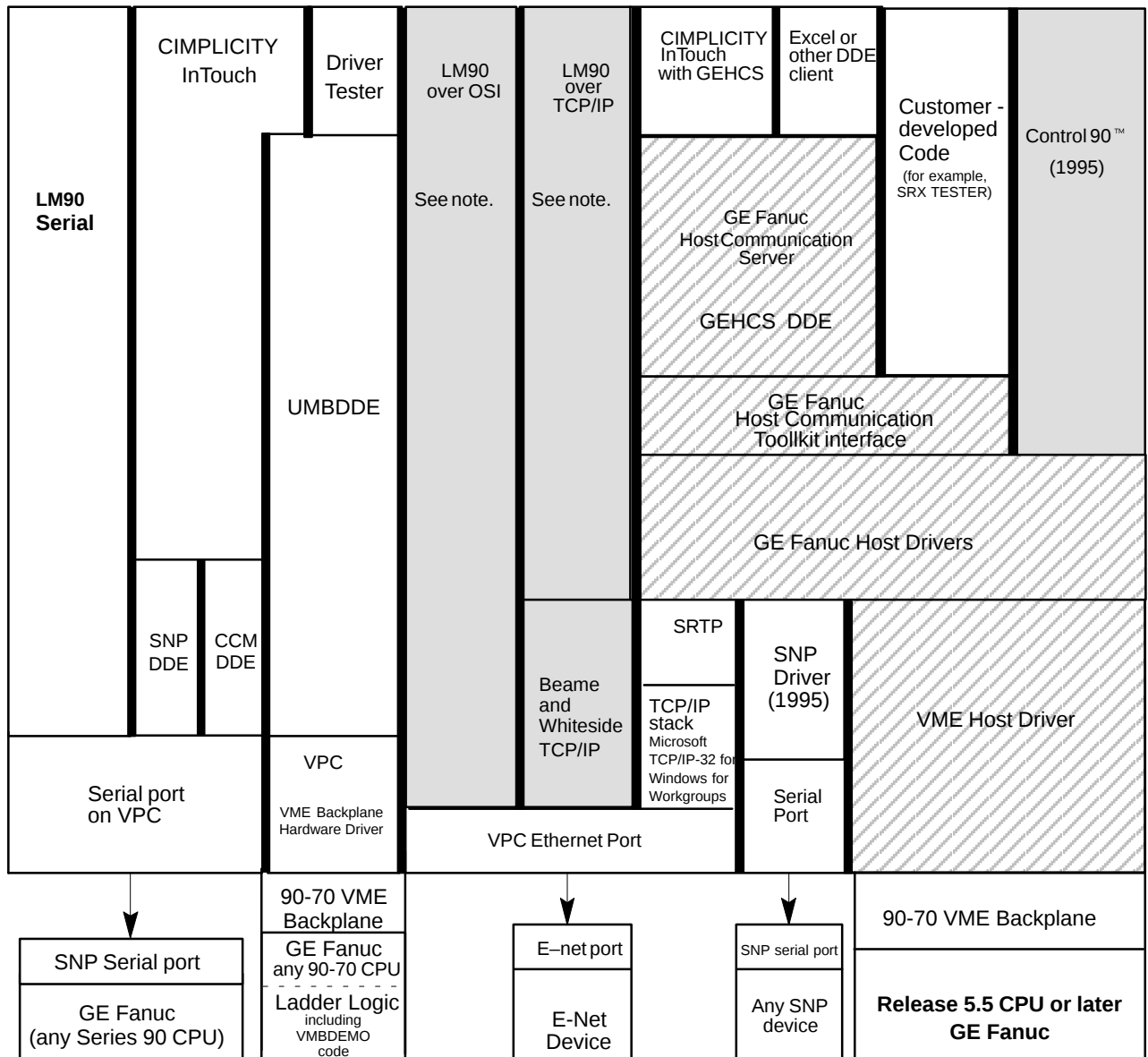
Sockets	2
Compatibility	PCMCIA Type I, Type II, or Type III (Marked A and B. B is the boot drive and emulates IDE using the ATA specification.)

VMEbus Interface

Capability	Master, slave, and system controller
Data Size	16 bit
Mailboxes	16, 64KB each
Byte Swapping	Programmable, preconfigured for 90-70 operation

Appendix B How the Plug & Play Software Components Fit Together

A valid configuration consists of blocks over other blocks. You cannot cross a vertical line.



 = Software that is not provided with Rev. B Plug & Play PC
  = VMEDDE components

Note: Use of these items on the Plug & Play PC requires substantial changes to configuration files. These changes conflict with the default configuration settings (optimized for CIMPLICITY InTouch operation under Windows, and Logicmaster 90 Serial under DOS and Windows).

Appendix *Defaults Reference*

C

This appendix describes the default AT Setup, VPC Embedded Setup, CONFIG.SYS, AUTOEXEC.BAT, and SYSTEM.INI configuration settings as the VPC was configured from the factory. These files can be found in the Backup directory and should be used if you need to restore your VPC to the default settings.

Note:The factory default settings for revision A, B, and C units are shown. Do not change these settings. Changing them will cause improper operation of the VPC.

VPC AT Settings

AT Settings

Current Date []

Current Time []

[640K] System Memory

8M [7168K] Extended Memory – **for VPC462**

16M [15360K] Extended Memory – **for VPC463**

32M [31744K] Extended Memory – **for VPC464**

Internal COMA: [COM1, 3F8H]

Internal COMB: [COM2, 2F8H]

Internal LPT1: [LPT1, 3BCH]

(For the 105 MB Hard disk – rev A)

Diskette Drive 0: [Not installed]

(For the 131 MB Hard disk – rev B)

Diskette Drive 0: [1.44MB, 3 1/2]

(For the 260 MB Hard disk – rev C)

Diskette Drive 0: [??????????]

Diskette Drive 1: [Not installed]

(For the 105 MB Hard disk – rev A)

Fixed Disk 0: Type [User] CY:[810] HD:[15] ST:[17] LZ:[810] WP:[NONE]

(For the 131 MB Hard disk – rev B)

Fixed Disk 0 : Type [User] CY:[1008] HD:[15] ST:[17] LZ:[1008] WP:[NONE]

(For the 260 MB Hard disk – rev C)

Fixed Disk 0 : Type [User] CY:[936] HD:[16] ST:[34] LZ:[936] WP:[NONE]

Fixed Disk 1: Type [None]

Video System: [EGA / VCA]

Power up speed: [Fast]

BIOS Shadow: [System in RAM]

[Video in RAM]

Internal Floppy: [Enabled]

Internal IDE: [Disabled]

System Memory Cache: [On]

Extended BIOS Features

Auto-park Disk: [No]

Quick Boot: [Yes]

Screen Saver: [Disabled]

Keyboard Click: [No]

Keyboard Rate: [22 / Sec]

Keyboard Delay: [3 / 4 Sec]

Numlock Boot State: [Auto]

Embedded VPC Settings

Note

Do not change these settings. Doing so will cause improper operation of the VPC.

System Settings (F2):

System Controller = Off
Arbitration = PRI
Bus Request = BR(3)
Bus Release = RWD
Bus Timeout = 64
PCMCIA boot = Yes
SYSFAIL to VMEbus = No
SYSRESET to VMEbus = No
COM2 Driver = RS485

Interrupt Settings (F3):

All = No
VME Interrupts Enable = No
Handle VME Interrupts 1 = No
Handle VME Interrupts 2 = No
Handle VME Interrupts 3 = No
Handle VME Interrupts 4 = No
Handle VME Interrupts 5 = No
Handle VME Interrupts 6 = No
Handle VME Interrupts 7 = No

Slave Settings (F4):

A16 Slave Enable = No
A16 Base VME Address = See notes on page C-5.
A24 Slave Enable = See notes on page C-5.
A24 Slave Swap = M32
A24 Slave AM = 39 (NonPriv Data)
A24 Slave Window Size = 64K
A24 Slave VME Base = 4E0000
A24 Slave PC Base = 0E0000
E000 UMB = See notes on page C-5.

Notes Concerning Embedded Settings

The items identified on page C-4 may change depending on conditions.

The product is **shipped** with the following settings:

A16 Base VME Address = 1000 A24 Slave Enable = YES E000 UMB = Shared RAM with VME

These settings result from the configuration which is used during factory testing. The SetVPC program must be used to set one of the normal operating modes as described below.

After the VPC is up and running Windows, if the **UMBDDE DRIVER** is selected in the SetVPC program, the settings will be as follows:

A16 Base VME Address = depends on slot that VPC is installed in. A24 Slave Enable = YES E000 UMB = Shared RAM with VME
--

If the SetVPC program selects the **VME DDE DRIVER**, the settings will be changed by SetVPC as follows:

A16 Base VME Address = depends on slot that VPC is installed in. A24 Slave Enable = YES E000 UMB = TSR Availability

If you hit **F2** during a power cycle, enter the embedded VPC setup program, and then hit **F9** (*NOT* recommended, even though the key is identified as DEFAULT SETTINGS), the settings will be:

A16 Base VME Address = depends on slot that VPC is installed in. A24 Slave Enable = NO E000 UMB = Shared RAM with VME

If this occurs, it is necessary to change the settings to the correct values for use with the appropriate driver. *Note that normal operating settings are those identified above as VME DDE DRIVER, and UMBDDE DRIVER.*

Note

The SetVPC utility modifies the SYSTEM.INI file to switch between the UMBDDE and VMEDDE backplane drivers. Never modify the SYSTEM.INI file manually to accomplish this.

System Files

These files have been copied to the C:\BACKUP directory on the hard disk. You might want to periodically copy current versions of these files to this directory as a security precaution.

Setup files changed for revision B (compared to revision A):

- C:\Config.sys
- C:\Autoexec.bat
- C:\LM90\LM90.PIF
- C:\LM90\LM90.AT
- C:\LM90\%COM070.PSU
- C:\Windows\System.ini
- C:\Windows\Win.ini

Setup files changed for revision C (compared to revision B):

- C:\Config.sys
- C:\Autoexec.bat
- GDF_CFG.INI

CONFIG.SYS File Contents

Revision C Hard Disk:

```
[menu]
menuitem=single, Single Hard Disk System & Optimal LM90 operation
menuitem=double, Double Hard Disk System
menudefault=single,5

[single]
DEVICE=C:\DOS\HIMEM.SYSTESTMEM:OFF
DEVICE=C:\DOS\EMM386.EXERAMHIGHSCAN I=B000-B7FF 1024 X=C800-CCFF X=E000-EFFF
BUFFERS=10,0
FILES=30
DOS=UMB
LASTDRIVE=H
FCBS=4,0
DOS=HIGH
STACKS=0,0
DEVICEHIGH/L:0;2,9424 S=C:\DOS\INTERLNK.EXE
DEVICEHIGH/L:1,12048 C:\DOS\SETVER.EXE
DEVICEHIGH/L:1,4560 C:\WINDOWS\IFSHLP.SYS

[double]
DEVICE=C:\DOS\HIMEM.SYSTESTMEM:OFF
DEVICE=C:\DOS\EMM386.EXE NOEMS I=B000-B7FF X=C800-CCFF X=E000-EFFF
BUFFERS=10,0
FILES=30
DOS=HIGH,UMB
LASTDRIVE=H
STACKS=0,0
DEVICEHIGH/L:0;1,9424 S=C:\DOS\INTERLNK.EXE
DEVICEHIGH/L:1,12048 C:\DOS\SETVER.EXE
DEVICEHIGH=C:\PCMPPLUS\CNFIGNAM.EXEDEFAULT
DEVICEHIGH/L:1,16656 C:\PCMPPLUS\PCMSS.EXE
DEVICEHIGH/L:2,42176 C:\PCMPPLUS\PCMG.S.EXE
DEVICEHIGH/L:2,10784 C:\PCMPPLUS\PCMAA.SYS
DEVICEHIGH/L:1,4560 C:\WINDOWS\IFSHLP.SYS

[common]
```

Revision B Hard Disk:

The CONFIG.SYS file has been modified from rev. A to rev. B to provide additional memory space to allow for the SMARTDRV program to operate, and for Logicmaster 90 to operate in an optimal fashion. This results in improved hard disk performance when running under DOS, or when a DOS program is running under Windows in a DOS box. Both the order of the statements, and the parameters listed are significant.

Note: Italicized comments give the purpose of each line and are not in the file.

DEVICE=C:\DOS\HIMEM.SYS/TESTMEM:OFF	<i>Used by Windows; TEST-MEM is OFF to speed up the boot process</i>
DEVICE=C:\DOS\EMM386.EXE NOEMS I=B000-B7FF X=C800-C8FF X=E000-EFFF	
<i>Used to load DOS and TSRs into high memory; no expanded page frame is used; allow TSRs to reside in the MONO memory space; exclude area which PCMCIA card services uses; exclude area used by shared RAM and UMBs</i>	
BUFFERS=10,0	<i>DOS buffers</i>
FILES=30	<i>DOS file handles</i>
DOS=HIGH,UMB	<i>Load DOS high and enable EMM386 to load TSRs high</i>
LASTDRIVE=H	<i>Set DOS last drive</i>
STACKS=0,0	
DEVICEHIGH/L:0;1,9424 S=C:\DOS\INTERLNK.EXE	
DEVICEHIGH/L:1,12048 C:\DOS\SETVER.EXE	
DEVICEHIGH/L:1,16656 C:\PCMPPLUS\PCMSS.EXE/S0=1	<i>PCMCIA socket services</i>
DEVICEHIGH/L:2,42176 C:\PCMPPLUS\PCMS.EXE/IRQ=12/ADDR=C8	
DEVICEHIGH/L:2,10784 C:\PCMPPLUS\PCMAA.SYS	<i>PCMCIA AATA device driver</i>
DEVICEHIGH/L:1,4560 C:\WINDOWS\IFSHLP.SYS	<i>Windows for Workgroups network driver</i>

Revision A Hard Disk:

DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\HIMEM.SYS/TESTMEM:OFF
DEVICE=C:\DOS\EMM386.EXE NOEMS I=B000-B7FF X=C800-C8FF X=E000-EFFF
BUFFERS=20,0
FILES=30
DOS=UMB,HIGH
LASTDRIVE=Z
DEVICEHIGH/L:1,4560 C:\WINDOWS\IFSHLP.SYS
DEVICEHIGH/L:1,16656 C:\PCMPPLUS\PCMSS.EXE/S0=1
DEVICE=C:\PCMPPLUS\PCMS.EXE/IRQ=12/ADDR=C8
DEVICEHIGH/L:1,10784 C:\PCMPPLUS\PCMAA.SYS
DEVICE=C:\DOS\INTERLNK.EXE

AUTOEXEC.BAT File Contents

Revision C Hard Disk:

@ECHO OFF
PROMPT\$P\$G
PATH
C:\PCMPILUS;C:\WINDOWS;C:\DOS;C:\PNPUTILS;C:\LM90
SETTEMP=C:\DOS
c:\dos\smartdrv.exe /x /u20480
goto %config%
:single
cls
type: \backup \single.txt
copyc:\backup \single.txt \backup \whichcfg.txt
wait 5
cls
goto end
:double
cls
type: \backup \double.txt
copyc:\backup \double.txt \backup \whichcfg.txt
wait 5
cls
:end
WIN

Revision B Hard Disk:

The autoexec.bat file has been modified to load SMARTDRV on power up. With the “2048 1024” settings, Smartdrv will provide DOS applications with a 2MB disk buffer. When Windows applications are running, the buffer available for DOS applications may be reduced to 1MB.

Note: Italicized comments give the purpose of each line and are not in the file.

@ECHO OFF	<i>Do not display this file as it runs</i>
PROMPT \$p\$g	<i>Set prompt to show drive, path, and '>'</i>
PATH %WINDIR%;C:\DOS;C:\PNPUTILS;C:\LM90	<i>Set pathlist</i>
SET TEMP=C:\DOS	<i>Set TEMP environment variable</i>
C:\DOS\SMARTDRV 2048 1024 /x	<i>Load Smartdrv with a 2MB buffer, which Windows can reduce to 1 MB if required. The /x switch turns off write caching.</i>
WIN	<i>Automatically run Windows</i>

Revision A Hard Disk:

@ECHO OFF
PROMPT \$p\$g
PATH %WINDIR%;C:\DOS;C:\PNPUTILS;C:\LM90
SET TEMP=C:\DOS
WIN

SYSTEM.INI File Contents

Note: Comments in italics in the table below give the purpose of each line and are not in the file.

The following is added to [386Enh] section for all revisions:

;	
; *** Plug & Play Begin	
;	
;device=*vcd	<i>Standard vxd replaced...</i>
device=pcmvcd.386	<i>withpcmvcd.386device driver</i>
PCMCIACom4=TRUE	<i>PCMCIA COM port used by modem cards</i>
COM4BASE=2E8	<i>PCMCIA COM port base address used by modem cards</i>
EMMExclude=C800-C8FF	<i>Exclude Windows from using PCMCIA UMB area</i>
EMMExclude=E000-EFFF	<i>Exclude Windows from using shared RAM UMB area</i>
LocalLoadHigh=TRUE	<i>Allow UMBs to be available locally to each virtual machine. This must be set true to allow Logicmaster 90 to run in a DOS box in Windows</i>
;	
; *** Plug & Play End	
;	
device=c:\windows\vme.386	<i>VMEhost driver. This is related to the VME DDE driver. If the VME driver is not being used, this line must be remarked out. The SetVPC normally remarks and unremarks this line when the different driver defaults are selected in the Windows SetVPC program. Do not modify this line manually.</i>

Other Changes to System Files

Revision B and Later

WIN.INI

The background “wallpaper” selection has been turned off to provide additional working memory.

%COM070.PSU

This file, which is accessed from the Logicmaster 90 “Programmer mode and Setup” and “PLC Communications Serial Port Setup” menus, was changed to include a “MODEM TURNAROUND TIME” of 10 counts. This improves Logicmaster 90 reliability when running in an environment with Windows tasks running in the background. Performance does not degrade perceptibly, so it is recommended that this 10 count setting be maintained. After ensuring the 10 count setting, SAVE the new information using the **F7** key, then exit the menu.

LM90.DAT

This file determines where the Logicmaster 90 communication driver loads. With the default settings provided in the other configuration files, sufficient “DOS” memory is available to load the driver there. The factory default for this loading mode is “DOS”. This selection is accessed from the “Logicmaster 90 Setup Package”, and “PLC Communication Options” menus. The setting for DRIVER MEMORY AREA, should always be DOS. For this setting to be effective, the F10 SAVE SETUP FILE key must be pressed after exiting the PLC Communication Option menu.

LM90.PIF

The setting for “DETECT IDLE TIME” has been changed to “not checked”. This keeps Logicmaster 90 active in a DOS box even though no keyboard input has been made recently. Also, the settings for EMS and XMS memory required and desired have been changed to EMS – 0 required, 0 desired. XMS – 0 required, 1024 desired. The Logicmaster 90 program icon in the Plug & Play program group has been setup to use the LM90.PIF file in the Logicmaster 90 directory. If you ever upgrade Logicmaster 90 to another revision, the Logicmaster 90 installation program may copy a new LM90.PIF into the Logicmaster 90 directory. You may want to copy over the new LM90.PIF with the old one in the \BACKUP directory if it works better.

Demos

Revision A units were shipped with a Visual Basic demo, and a CIMPLICITY InTouch demo. Both of these demos used the UMBDDE driver to obtain information from the 90-70 CPU, which needs to run a companion program at the same time. Revision B (and later) units add another CIMPLICITY InTouch demo which uses the VME DDE driver. This demo is located in the Plug & Play program group. To use this demo, you must purchase a CIMPLICITY InTouch package, and use the supplied hardware key. Refer to the CIMPLICITY InTouch documentation for details.

Other File Changes

The following factory test files were removed from the C:\backup directory:

CURRLSTTXT
DIFEBAT

The SetVPC program was also improved to fix bugs and be more user friendly.

Revision C and Later

Modem Turnaround Time

The Logicmaster 90 “MODEM TURNAROUND TIME field has been changed from 10 to 0. This will improve Logicmaster 90 performance. If communication errors occur while the Plug & Play PC is being heavily used to perform multiple tasks, you may need to increase this value.

VME DDE Defaults

The C:\WINDOWS\GEF_CFG.INI file now includes the following lines. The new lines provide proper operation with the DDE “application / topic” items that are used for all the included demo programs

```
[VME]
TYPE=VME_POR T

[PORT_1]
TYPE=VME_POR T

[VMEPLC]
DEST_ADDR=10E00000

[testplc]
DEST_ADDR=10E00000
```

Appendix *Cabling Information*

D

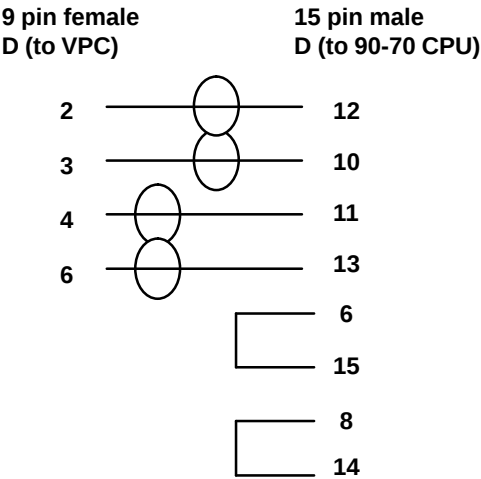
InterLink Cable

The InterLink cable included with the PNP101 is an RS-485 serial cable, intended for connecting from the VPC to the 90-70 CPU. This cable is *NOT the same as a parallel printer cable although they may appear to be identical*. On revision B (and later) units, the cable has a label identifying it as an InterLink Cable. Documentation for a serial InterLink cable is provided in the DOS on-line help under interlnk.

Pinouts:

1	1
2	15
3	13
4	12
5	10
6	11
10	5
11	6
12	4
13	3
15	2
25	25
H	H (shell)

VPC to CPU Cable Connections



Appendix *E* Using the UMBDDE and GEHCS Servers

This chapter provides a discussion of the use of the UMBDDE and GEHCS servers with the Plug & Play PC. Examples using Visual Basic programs are provided. The UMBDDE driver help text is provided at the end of the chapter.

The use of the Host Communication Toolkit to access 90-70 PLC table data is also discussed.

Using the UMBDDE Driver

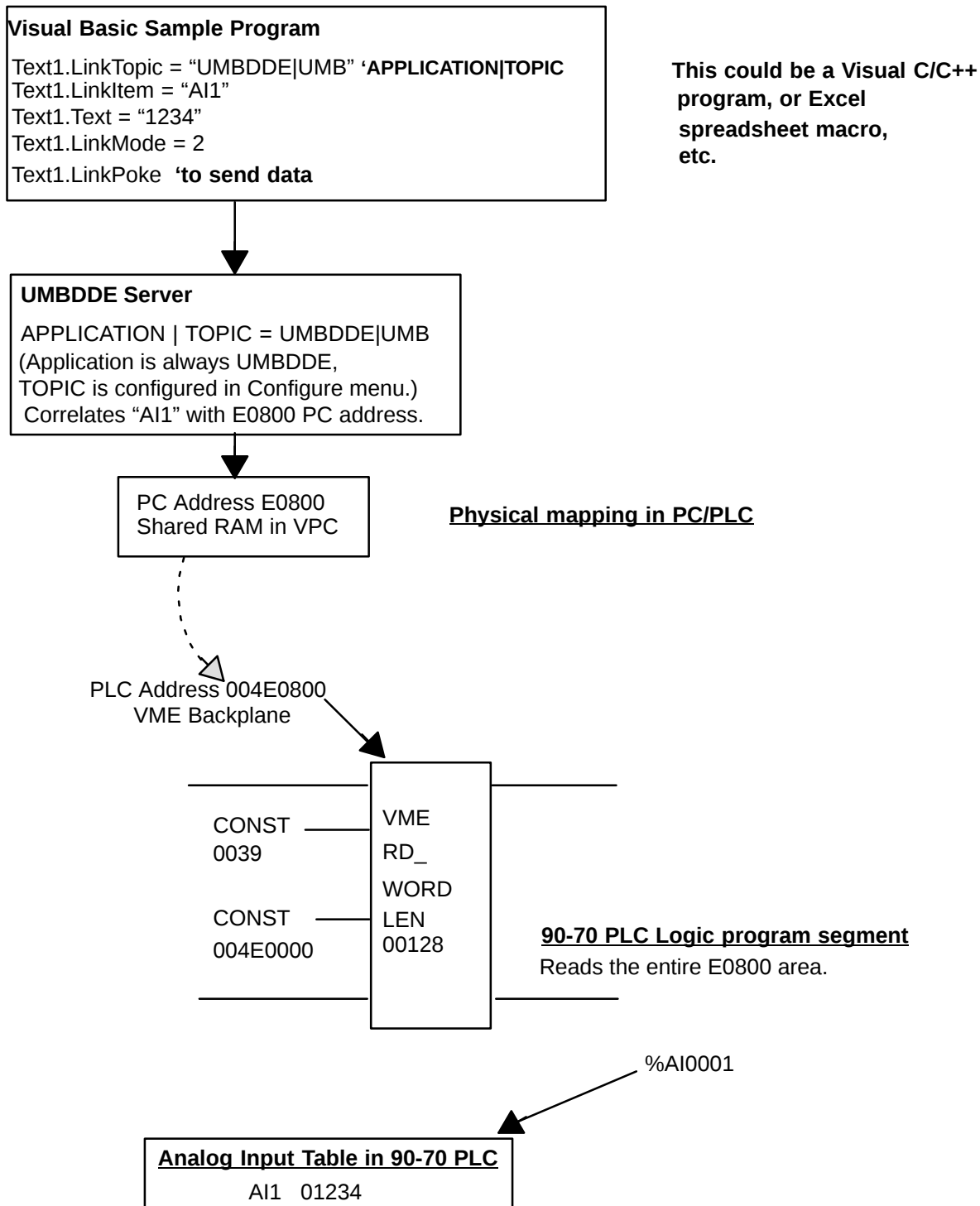
In the example shown on page E-2, a Visual Basic program is using the UMBDDE driver to write the value +1234 to %AI1 in the 90-70 PLC. The default settings for the UMBDDE driver have been used. In this example, the Visual Basic program could be replaced with a Visual C/C++ program, an Excel Spreadsheet, a Word document, CIMPLICITY InTouch, or any other program capable of calling a DDE server using the **APPLICATION | TOPIC! ITEM NAME** convention.

The list of Item names that are supported by the UMBDDE driver are shown in the UMBDDE Help text (from the on-line UMBDDE Help menu).

To use the server, follow these steps:

1. Be sure the UMBDDE Defaults have been selected in the SetVPC program. You must allow your computer to reboot after this selection.
2. Be sure that the Plug & Play PC is configured by Logicmaster 90 as a 3rd party card with Configuration mode = NONE.
3. You must be running a 90-70 CPU logic program that has the essential elements of the UMBDEMO program (supplied with the Plug & Play PC).
4. Be sure the PLC is in RUN mode.
5. You must start up the UMBDDE driver, either by putting it in the Windows **startup** group, and then restarting Windows, or by manually double clicking on the UMBDDE Driver Icon.
6. The Visual Basic, C/C++, Excel, or other program must then call the UMBDDE driver using the conventions of that language or application. Refer to the specific documentation for that application.
7. A hardware key is not required when using this approach. In addition, this approach works with all 90-70 CPU models.

A sample application using this approach is available on the GE Fanuc bulletin board.



The table below shows the correlation between the DDE Item name used in the Visual Basic program and the PC Shared RAM address that is accessed. The UMBDDE defaults are shown, and work correctly with the 90-70 CPU UMBDEMO logic program. Note that writes and reads from the **%R** item type are actually mapped to **%AI** and **%AQ**. The **%R** item type was added to provide compatibility with the GEHCS VME backplane server.

Note

The default values in the UMBDDE I/O configuration screen must NOT be changed. It is possible to remap the DDE Item name to PC Address correlation, but that is not recommended. Only under **veryexceptional** circumstances should these values be changed, and then only in conjunction with support from GE Fanuc.

Visual Basic DDE Item Name	Default UMBDDE PC address accessed (not including offset)	Read / Write From VB or C / C++ Program
%I	E0000	Write only
%AI	E0800	Write only
%Q	E8000	Read only
%AQ	E8800	Read only
%R (write to)	E0800	Write only
%R (read from)	E8800	Read only

Note

Only one Plug & Play PC in a system can use the UMBDDE driver. If you need to use more than one Plug & Play PC in a system, you must use the GEHCS VME Backplane driver described on page E-5.

Note

When using the UMBDDE driver, or the GEHCS driver, it may be necessary to implement a *heartbeat* function. The discussion that follows applies to the UMBDDE driver, but a similar situation also exists for the GEHCS driver.

Immediately after a power cycle, the 90-70 CPU will probably start running sooner than the VPC module, the UMBDDE driver, and the application using the UMBDDE driver. Data that the 90-70 CPU reads from the %AI area will **not** be valid until the UMBDDE driver and its host application are running. Parts of the CPU logic program that require data from the UMBDDE driver must be interlocked so that the data is not used if the UMBDDE driver is not running. Also, data that the CPU sends to the %AQ area for the UMBDDE application will not be used correctly until the UMBDDE driver is running. The exact method of accomplishing proper operation depends on the details of the 90-70 / Plug & Play PC application.

A simple method, which might be used for non-critical applications, is to defer operation of the 90-70 Logic program for a fixed time period, and then assume the UMBDDE is up and running with its application.

Another way to accomplish this is to create a program segment in the 90-70 logic that writes the current real time “seconds” to the UMBDDE using VME Write. A Visual Basic or Visual C / C++ program would read this value (perhaps every second, or every half second) and reflect it back to the %AQ area, which the logic program reads. (You would need the Visual Basic or Visual C / C++ program to run continuously while the UMBDDE is operating.) The logic program would compare the seconds it sent with the seconds it received back. If the two numbers are different by more than a preset value, the UMBDDE driver is not yet running, and data from the UMBDDE should not be used, nor should data be sent to it with the expectation that it will be used correctly.

Using the GEHCS VME Backplane Server

The GEHCS driver was designed for use with CIMPLICITY InTouch, but it can be used to achieve high speed interaction between the 90-70 CPU and Plug & Play PC applications. **A CIMPLICITY InTouch hardware key is REQUIRED for operation. In addition, 90-70 CPU release 5.5 must be installed in your PLC.**

In the example on page E-6, a Visual Basic program is using the GEHCS driver to read the value from %R2 in the 90-70 PLC. The default settings for the GEHCS driver have been used. In this example, the Visual Basic program could be replaced with a Visual C/C++ program, an Excel Spreadsheet, a Word document, CIMPLICITY InTouch, or any other program capable of calling a DDE server using the convention:

APPLICATION | TOPIC ITEMNAME .

The list of **Item names** that are supported by the GEHCS driver are shown in the GEHCS Help text (from the on-line GEHCS Help menu).

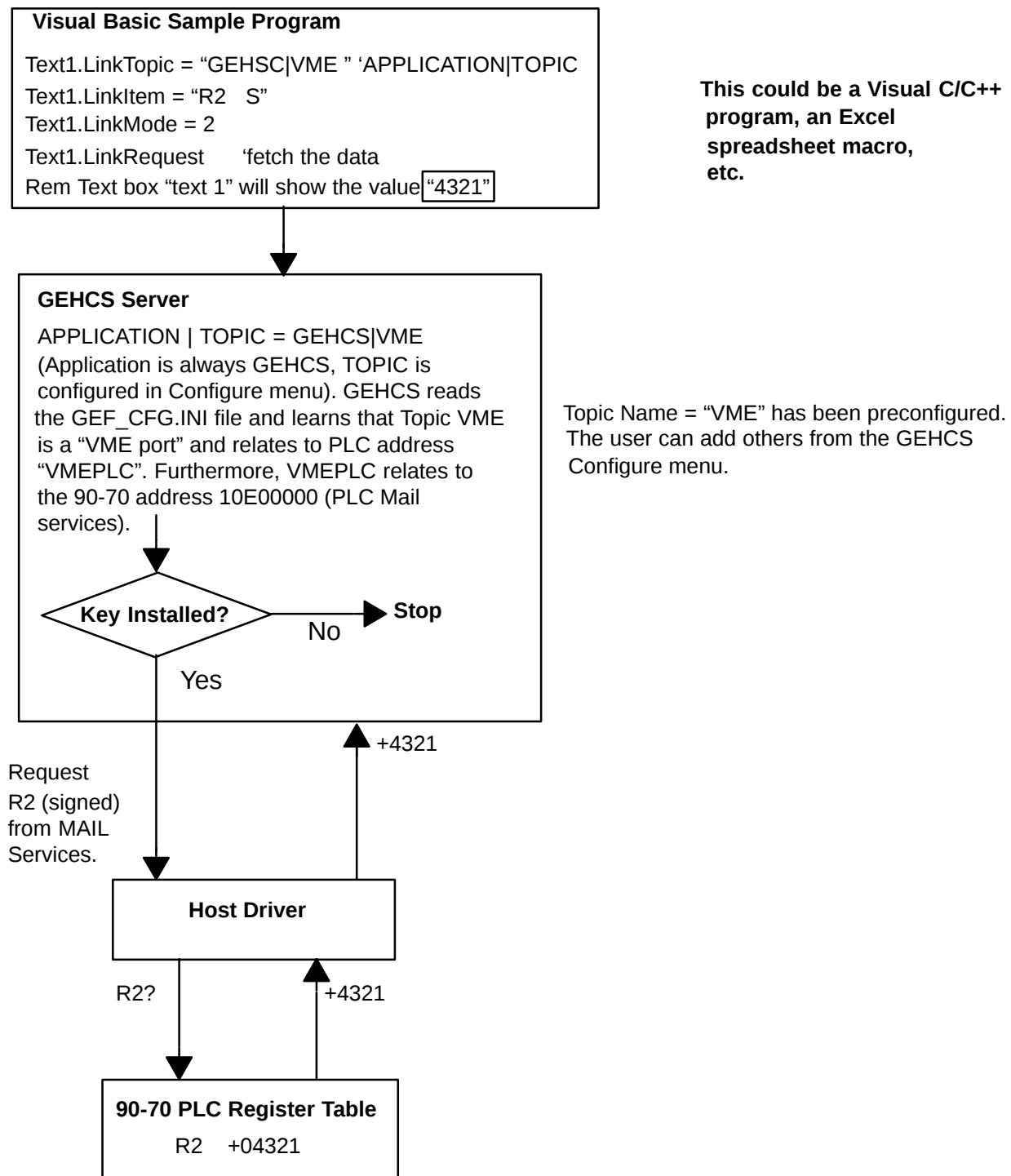
To use the server, the following conditions must be met:

1. Be sure the VME Defaults have been selected in the SetVPC program. You must allow your computer to reboot after this selection.
2. Your 90-70 CPU must be release 5.5 or later.
3. Be sure that the Plug & Play PC module is configured as a 3rd party VME card with FULL MAIL services.
4. Ensure that a CIMPLICITY InTouch Hardware key is installed.
5. You must start up the GEHCS driver, either by putting it in the Windows “**startup**” group and then restarting Windows, or by manually double clicking on the GEHCS Driver Icon.
6. The Visual Basic, C/C++, Excel, or other program must call the GEHCS driver using the conventions of that language or application. Refer to the specific documentation for that application.

A sample application using this approach is available on the GE Fanuc bulletin board.

Note

See the discussion on page E-4 about implementation of a *heartbeat* function. It may be necessary to implement this for the GEHCS driver.



Accessing 90-70 PLC Data Using the Host Communication Toolkit

IC641SWP052 Host Communication Toolkit for C / C++ Applications

IC641SWP055 Host Communication Toolkit for VisualBasic Applications

The 90-70 PLC table data can be accessed using either the GEHCS server (a CIMPLICITY InTouch key is required), or via the lower level Host Driver / VME server using your own Visual Basic, or Visual C / C++ program in conjunction with the GE Fanuc Host Communications Toolkit. Using the Host Communication Toolkit, other services such as fault table access, date and time, RUN / STOP control, etc. are also available.

(The *SRX Tester* program is an example of this.)

To use the Host Driver / VME driver make sure the following conditions are met:

1. Be sure the VME Defaults have been selected in the SetVPC program. You must allow your computer to reboot after this selection.
2. Your 90-70 CPU must be release 5.5 or later.
3. Be sure that the Plug & Play PC module has been configured by Logicmaster 90 as a 3rd party VME card with FULL MAIL services.
4. The Host Communications Toolkit – GE Fanuc part number IC641SWP055 (Visual Basic Toolkit) or IC641SWP052 (C / C++ toolkit) can be used to create an application that calls Host Driver / VME directly. (Sample source and executable programs are provided with these part numbers.)
5. To make the sample programs work properly, it is necessary to ensure that the GEF_CFG.INI file contains the lines:

```
[testplc]
DEST_ADDR = 10e00000

[PORT_1]
TYPE = VME_PORT
```

Or, the sample code can be changed to use the names already contained in the GEF_CFG.INI file.

Notes

Additional information is available in GFK-1063 (Visual Basic) and GFK-0870 (C / C++).

A hardware key is not required to use this approach.

UMBDDE Driver Help Text

Note: The help text from the UMBDDE driver is reproduced here for your convenience.

UMBDDE

The DDE Server for the GE Fanuc Series 90-70 PLC

UMBDDE is a standard DDE server developed especially for applications using the GE Fanuc Series 90-70 PLC. The following options are available in the two pull down menus to customize the server to meet your DDE requirements:

In the Configure menu:

[IO Configuration](#)

[DDE Server Operational Parameters](#)

[Debug Messages](#)

In the Help menu:

[Help Index](#)

[Using Help](#)

[About](#)

IO Configuration

Selecting this option enables you to configure the following parameters:

Topic Name: This is the DDE topic name for used for DDE conversation.

UMB Segment: This option selects the upper memory block (UMB) segment address to use for data transfer. The allowable choices are C0000, D0000, or E0000 hex.

Analog or Register: This option configures the offsets and block size within the UMB space for Analog (AI and AQ) and Register (R) values. Register values map to AI and AQ values in the following manner: Writes to a R value will map to the corresponding AI offset. Reads from an R value will map to the corresponding AQ offset. R values are unsigned 16-bit integers just like AI and AQ values unless overridden by a type suffix. The following type suffixes are available:

[Real Numbers](#)

[Signed Numbers](#)

[BCD Numbers](#)

[Discrete Points](#)

[Long Integer Numbers](#)

[32-bit Floating Point Numbers](#)

[ASCII String Items](#)

Discrete: This option configures the offsets and block size within the UMB space for Discrete (I and Q) values.

Going from left to right, the 3 boxes per line stand for the following:

Box 1 is the name of the DDE label mapped to the offset (Box 2). This value must be a positive, non-zero number.

Box 2 is the UMB address for the data field. This is the same as saying the byte offset from the UMB Segment listed above.

Box 3 is the number of individually accessible data units.

Use caution when altering the OFFSET and WORDS (POINTS) parameters. Careless setting of these values can result in data overlapping and corruption, boundary overflow, and inefficient usage of available space.

Update Interval: This is the time in milliseconds between data refreshes by the server.

When all IO Configurations are complete, select the OK button to save these settings. Select the CANCEL button to close the window without making and parameter changes. Selecting the DEFAULT button sets all the IO settings to their factory default settings.

DDE Server Operational Parameters

Selecting this menu option will allow you to configure the following settings:

Protocol Timer Tick: This is the timer tick value in milliseconds for the DDE protocol used by this server.

Internal DDE Timer Tick: This is the internal DDE timer tick value in milliseconds.

DDE Block Size: This is the maximum size in bytes of a single DDE block transfer.

When all DDE server operational parameters are set, select the OK button to save these settings. Select the CANCEL button to close the window without making and parameter changes. Selecting the DEFAULT button sets all the DDE server operational parameters to their factory default settings.

Debug Messages

Choosing this option will select or deselect the debug messages. When this option is selected (checked), debug messages are sent to WWlogger, which is an error / message logging program that compliments WonderWare InTouch software. Deselecting (unchecking) this option disables all debug messages.

Help Index

Selecting this option will open the on-line help you are reading now.

Using Help

Selecting this option will open Windows “How to Use Help” on-line help.

About

Selecting this option will display release information about this application.

Real Numbers

Registers are normally assumed to be integer variables. The user can cause the Server to convert register values to floating point by appending an “R” to the register name. For example:

R950 R

This will cause the Server to convert the 16-bit register value to floating point before sending it to the DDE Client (**CIMPLICITY InTouch.**) Don’t use this notation with **CIMPLICITY InTouch** unless the **CIMPLICITY InTouch** tagname definition specifies “DDE Real.”

Signed Numbers

A register can be interpreted as a signed 16-bit value with a range of -32,768 to 32,767 by adding a blank space then **S** following item name. For example:

R100 S

BCD Numbers

A BCD (Binary Coded Decimal) register can be handled correctly by adding a blank space, then **(BCD)** following the item name. For example:

R4087 (BCD)

This will cause the DDE Server to convert the register contents from BCD to binary before sending it to the client application. It will convert values from binary to BCD before sending to the PLC.

Discrete Points

Individual bits in registers can be used as discrete tagnames in **CIMPLICITY InTouch** by entering the item name in the following format:

Rnn:b

This will cause the DDE Server to extract bit *b* (0-15) of the register *nn*. The value will be returned to **CIMPLICITY InTouch** as a discrete.

Examples:

R1:0	–Least significant bit of R1.
R1:15	–Most significant bit of R1.
R10:3	–Bit 3 of R10.

Long Integer Numbers

A pair of registers can be interpreted as a long integer (or double precision integer) by adding a blank space, then an **L** after the item name. For example:

R601 L

This notation causes the DDE Server to treat R601 and R602 as a signed 32-bit number with R601 being the least significant half.

32-Bit Floating Point Numbers

A pair of registers can be interpreted as a floating point number by adding a blank space then an **F** to the item name for lower numbered register of the pair. For example:

R1001 F

This notation causes the DDE Server to treat R1001 and R1002 as an IEEE 32-bit floating point number.

ASCII String Items

A series of consecutive registers can be treated as an ASCII character string by adding a blank space, then an **M** after the item name. For example:

R101–R150 M

This item name indicates that registers R101 through R150 contain a string of 100 ASCII characters. Each register contains 2 characters with the low order byte first. A zero byte in any register will be treated as the end of string.

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