



CUSTOMER SERVICE DOCUMENTATION

Professional Computers Series 200/300 Options

Models: PC 240
 PC 280
 PC 380

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Product Maintenance Manual

741-1859

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PREFACE

This document is the Product Maintenance Manual (PMM) for the Wang Series 200/300 Options, and is a companion volume to the product maintenance manuals that address the Wang PC 200/300 series Professional Computers. It contains service information for each of several options used with these computers. Each section of this manual deals with a different option, and new sections will be added to the manual as additional options become available. These additions, as well as necessary updates, will be published either as Publication Update Bulletins (PUBs) or as full revisions.

The manual is organized in accordance with Customer Service Documentation's approved PMM outline. The scope of this manual reflects the type of maintenance philosophy selected for this product.

The purpose of this manual is to provide the Wang-trained Customer Engineer (CE) with sufficient instructions to operate, troubleshoot, and repair the Series 200/300 Options.

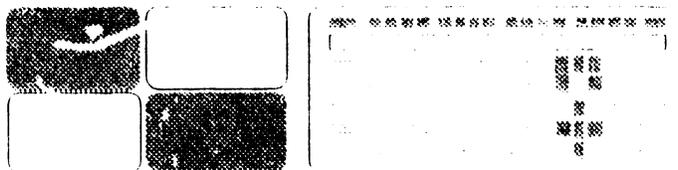
First Edition (October, 1988)

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Publication Update Bulletin

CUSTOMER SERVICE DOCUMENTATION



Date: 1/15/89

Color: Brown

Title: Professional Computer Series 200/300 Options

This PUB Affects: 741-1859
742-1859

Previous Notices: 741-1859-1

Reason For Change: This PUB adds Section 7, SC4000 Scanner Controller and Section 8, 1.44 MB Diskette Drive to the manual.

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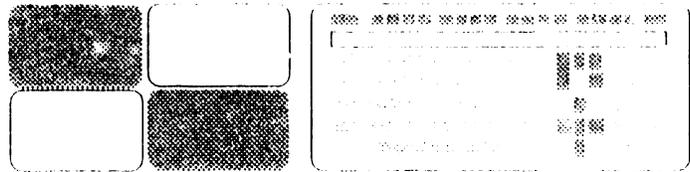
ix/x thru xv/xvi
7-1/7-2 thru 7-17/7-18
8-1/8-2 thru 8-9/blank

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Publication Update Bulletin

CUSTOMER SERVICE DOCUMENTATION



Date: 11/29/88 **Color:** Brown

Title: Professional Computers Series 200/300 Options

This PUB Affects: 741-1859
742-1859

Previous Notices: None

Reason For Change: This PUB adds Section 6 to the 200/300 Series PC Options manual.
Provides information for the 1940 Two-Page Monitor Controller.

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Section 1 Contents

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INTRODUCTION

Options Matrix

This table lists the available options for the Series 200/300 PCs, and indicates the models with which each option may be used.

<i>Options</i>	<i>PC Models</i>		
	<i>240</i>	<i>280</i>	<i>380</i>
Universal Programmable Communications Controller	X	X	X
802.3 Interface	X	X	X
1640 Controller and Driver (100 DPI)	X	X	X
MicroControl	X	X	X
1640 Controller and Driver (200 DPI)	X	X	
Two Page 1940 Monitor Controller	X	X	X
SC4000 Scanner Controller		X	X
1.44-MB Diskette Drive	X	X	X

END

Related Documentation

<i>Document Title</i>	<i>Part Number</i>
Full Page Monitor Model 1640	741-1800
Professional Computer Model PC 240	742-1808 741-1808
Professional Computer Model PC 280	742-1771 741-1771
Professional Computer Model PC 380	742-1793 741-1793
Wang Professional Computer 200/300 Series	
<ul style="list-style-type: none"> • Hardware User's Guide • Hardware Troubleshooting Guide • Installation Guide • 1640 Controller and Driver User's Guide 	
19-Inch Monitor (Model 1940)	741-1878
Document Scanner (Model SC4000)	741-1842

END

Abbreviations and Symbols Used in This Manual

<i>Symbol</i>	<i>Meaning</i>
(-3.1.2)	Refer to 3.1.2

● END Procedure is completed on this page.

END

➡NEXT Procedure is continued on next page.

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<i>Abbreviation</i>	<i>Meaning</i>
ac	Alternating Current.
AUI	Attachment Unit Interface
bit	Binary Digit.
BIT	Built In Test.
BNC	Bayonet Neutral Connector.
CGA	Color Graphics Adapter.
COM	Communications.
CPU	Central Processing Unit.
CRU	Customer Replaceable Unit.
CS	Collision Detect

->NEXT

Abbreviations and Symbols Used in This Manual

<i>Abbreviation</i>	<i>Meaning</i>
CSN	
DIP	Dual Inline Package.
DIX	Digital-Intel-Xerox
DMA	Direct Memory Access
DOS	MS-DOS Disk Operating System.
<i>e.g.</i>	<i>exempli gratia</i> (for example).
EGA	Enhanced [color] Graphics Adapter.
EN	Enable.
<i>etc.</i>	<i>et cetera</i> (and others of the same kind).
FRU	Field Replaceable Unit.
GTEK	General Terminal Emulation Kernel.
H (suffix)	Hexadecimal value.
Hex.	Hexadecimal.
<i>i.e.</i>	<i>id est</i> (that is).
INT	Interrupt.
I/O	Input/Output.
IO ADDR	Input/Output Address.
IOC	Input/Output Controller.
IOP	Input/Output Processor.
IPL	Initial Program Load.
LAN	Local Area Network.

->NEXT

Abbreviations and Symbols Used in This Manual

<i>Abbreviation</i>	<i>Meaning</i>
LED	Light Emitting Diode.
Mb/s	Megabits per second.
MDA	Monochrome Display Adapter.
MEGA	Monochrome [and] Enhanced [color] Graphics Adapter.
NS	
PC	Professional Computer.
PCA	Printed Circuit Assembly.
PCB	Printed Circuit Board.
P/N	Part Number.
PROM	Programmable Read Only Memory.
RIPL	Remote Initial Program Load.
10Base2	10 Mb/s baseband medium with maximum segment length of 200 meters (IEEE 802.3 LAN).
10Base5	10 Mb/s baseband medium with maximum segment length of 500 meters (IEEE 802.3 LAN).
TC	Telecommunications.
TI	Texas Instruments
TNC	Threaded Neutral Connector.
UAI	UPCC Applications Interface.
UPCC	Universal Programmable Communications Controller.
WLOC	Wang Local Office Connection.
WSN	Wang Systems Network.

END

SECTION 1
UNIVERSAL
PROGRAMMABLE
COMMUNICATIONS
CONTROLLER
(UPCC)

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1.1 Introduction

1.1.1 General Description

The UPCC package comprises communications and networking-related hardware and software that enable a Wang VS system to interface through a PC 280/380 (or PC AT or AT-compatible computer) to non-Wang systems. UPCC support of this multi-vendor integration concept helps Wang products function effectively in user environments that contain non-Wang equipment.

The UPCC base system is designed to operate in an IBM PC AT or AT-compatible environment. The WLOC board may be installed in any PC 280, PC 380, IBM PC AT, or AT-compatible computer that supports the IBM PC AT bus structure. Any PC280/380 or IBM PC AT, or AT-compatible computer connected to the serial IOP/IOC of a VS system can function as a UPCC.

The UPCC consists of the following hardware and software components:

- UPCC base system (comprises Wang Local Office Connection (WLOC) board and UPCC Host Access Software)
- UPCC remote control option board (Remote Initial Program Load (RIPL) board)
- VS Communications Access Software
- VS-UPCC Software Development Tools
- General Terminal Emulation Kernel

● END

1.1 Introduction

1.1.2 Hardware Components (Sheet 1 of 2)

UPCC base system hardware includes a WLOC board, which enables a PC 280/380 to connect to a VS system via a 928 link. The PC280, PC380, PC AT, or AT-compatible computer possesses functionality similar to a data link processor when the UPCC is installed.

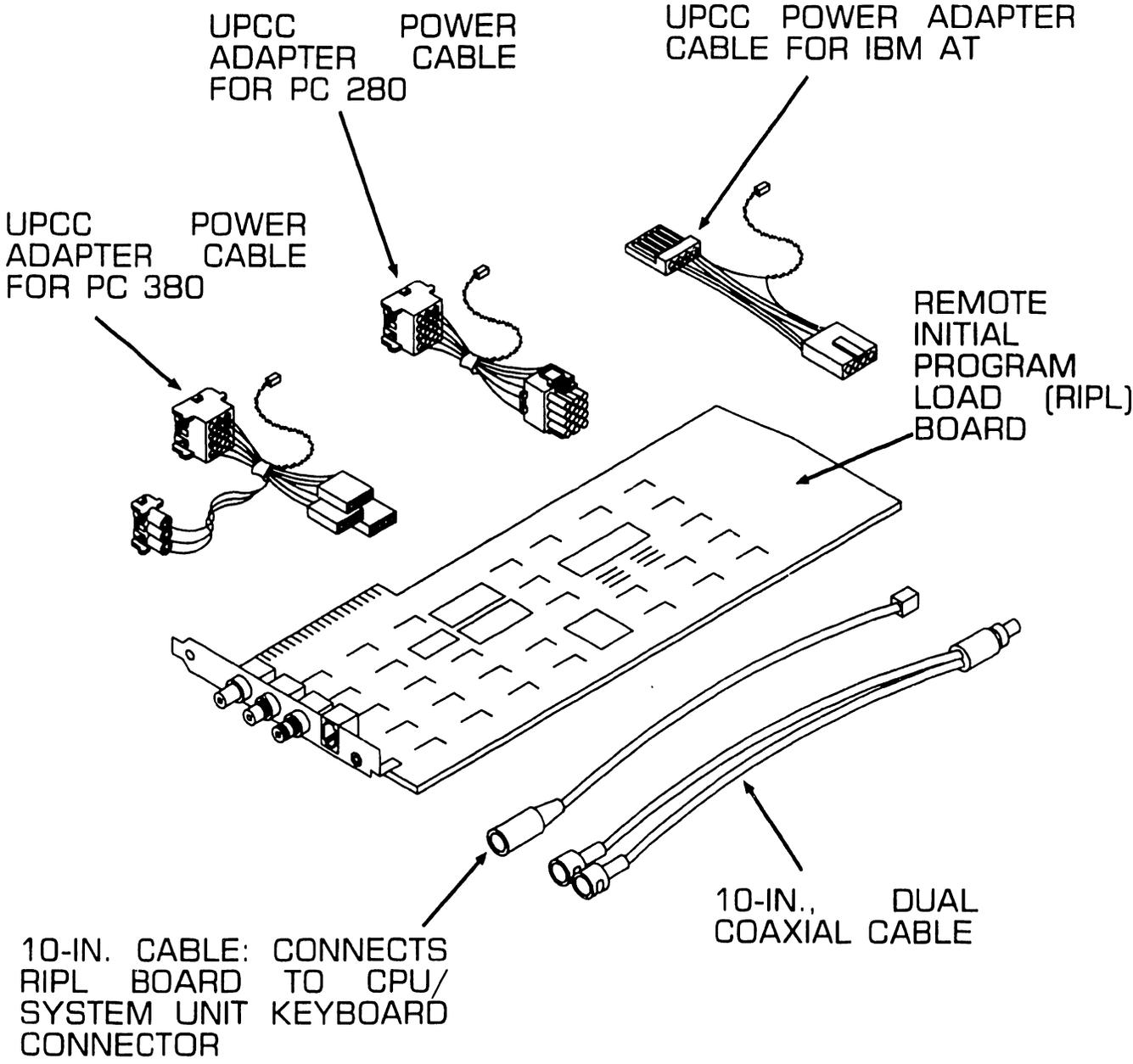
A Remote Initial Program Load (RIPL) board is available as a UPCC option (1). The RIPL board allows a VS system connected to the UPCC to remotely IPL the UPCC if the communications link between the VS and the non-Wang system fails. The RIPL board is also designed to simulate a system keyboard and pass UPCC boot PROM diagnostics, eliminating the need for connecting a keyboard to the UPCC system unit.

(1) The Wang-supplied RIPL internal power cables permit connection to the power connector of a PC280, PC380, PC AT, or AT-compatible computer. The RIPL power cables are not designed to fit any other systems.

►NEXT

1.1 Introduction

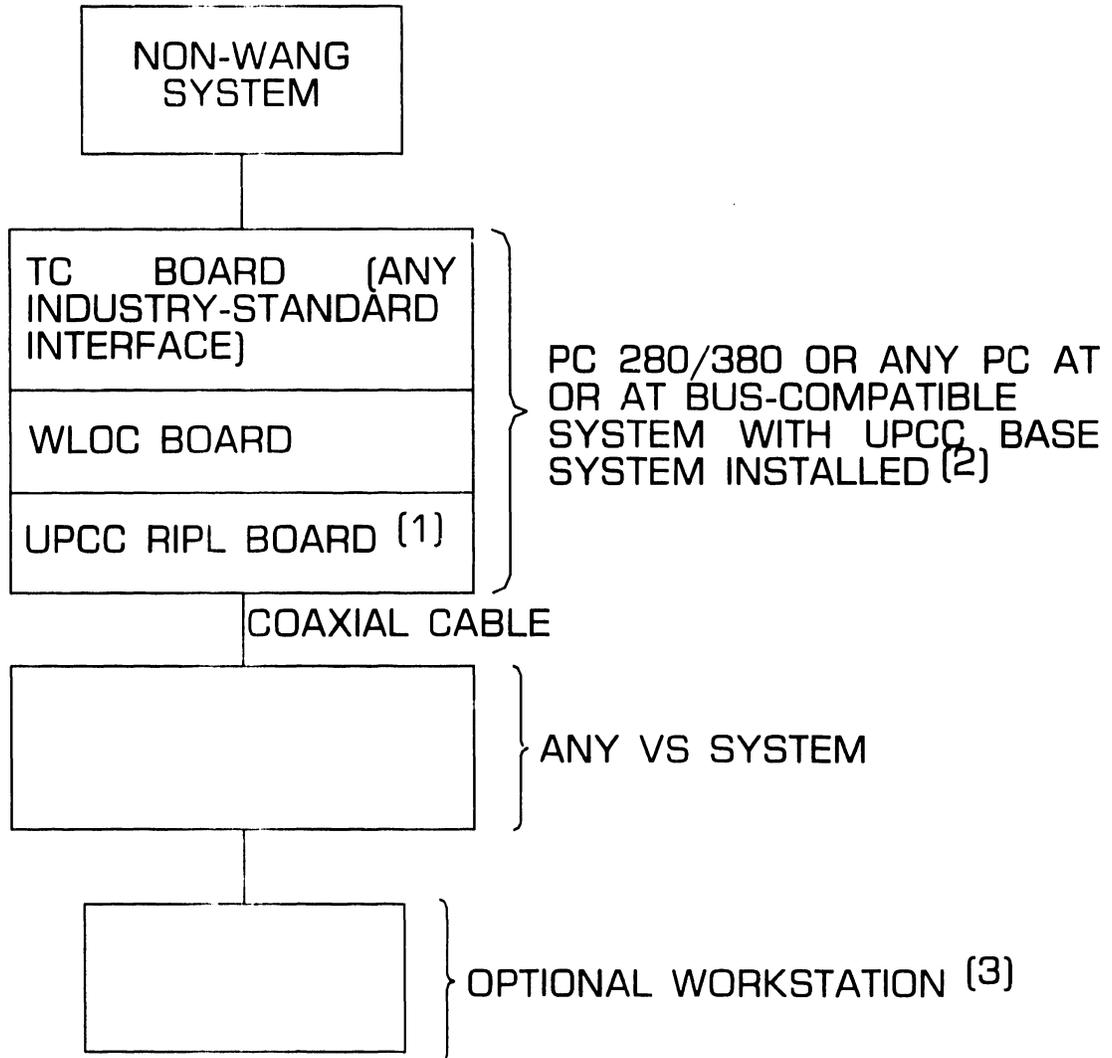
1.1.2 Hardware Components (Sheet 2 of 2)



● END

1.1 Introduction

1.1.3 UPCC Hardware Configuration



NOTES:

- (1) OPTIONAL: IF RIPL BOARD NOT PRESENT, COAXIAL CABLE CONNECTS FROM VS TO WLOC BOARD.
- (2) SYSTEM MUST CONTAIN 5.25-IN. 1.2MB FLOPPY DISKETTE DRIVE. MEMORY REQUIREMENTS WILL VARY DEPENDING ON THIRD-PARTY APPLICATION.
- (3) MUST BE A PC.

● END

1.1 Introduction

1.1.4 UPCC Software Components

- **UPCC Host Access Software:** This software package, which runs under MS-DOS Release 3.2 or PC-DOS Rel. 3.2, is part of the UPCC base system. UPCC Host Access Software contains the elements needed to support the WLOC board connection to the VS system.
- **VS Communications Access Software:** This package comprises the access software necessary to establish the link between the VS system and the UPCC. Included in this package are the Link Verification Tools. These tools test communications between the VS system and the UPCC, the PC workstation and the UPCC, and the PC workstation and the VS.
- **VS-UPCC Software Development Tools:** This package contains programs and subroutines that assist programmers who develop VS-based applications that communicate with a remote system connected to the VS via the UPCC. The UPCC Application Interface (UAI), which is part of the "tools" package, consists of subroutines that enable programmers to develop applications in the VS environment. Also included in the "tools" package are the Workstation-UAI subroutines that allow PC workstations to establish a logical connection to the foreign host system attached to the VS via the functions of the foreign terminal devices; e.g., interactive transaction processing and data entry operations. The software development tools package also contains the Interactive Test Drivers, Trace Utilities, and Debug Utilities.
- **General Terminal Emulation Kernel (GTEK):** The GTEK, which comprises VS-GTEK and PC-GTEK, establishes an environment in which programmers can design workstation microcode to control VS workstations while running terminal emulation. GTEK can support many terminal devices, and interacts with the VS Communications Access Software to establish the logical attachment of terminal devices to the foreign host system that is connected to the VS computer via the UPCC.

● END

1.1 Introduction

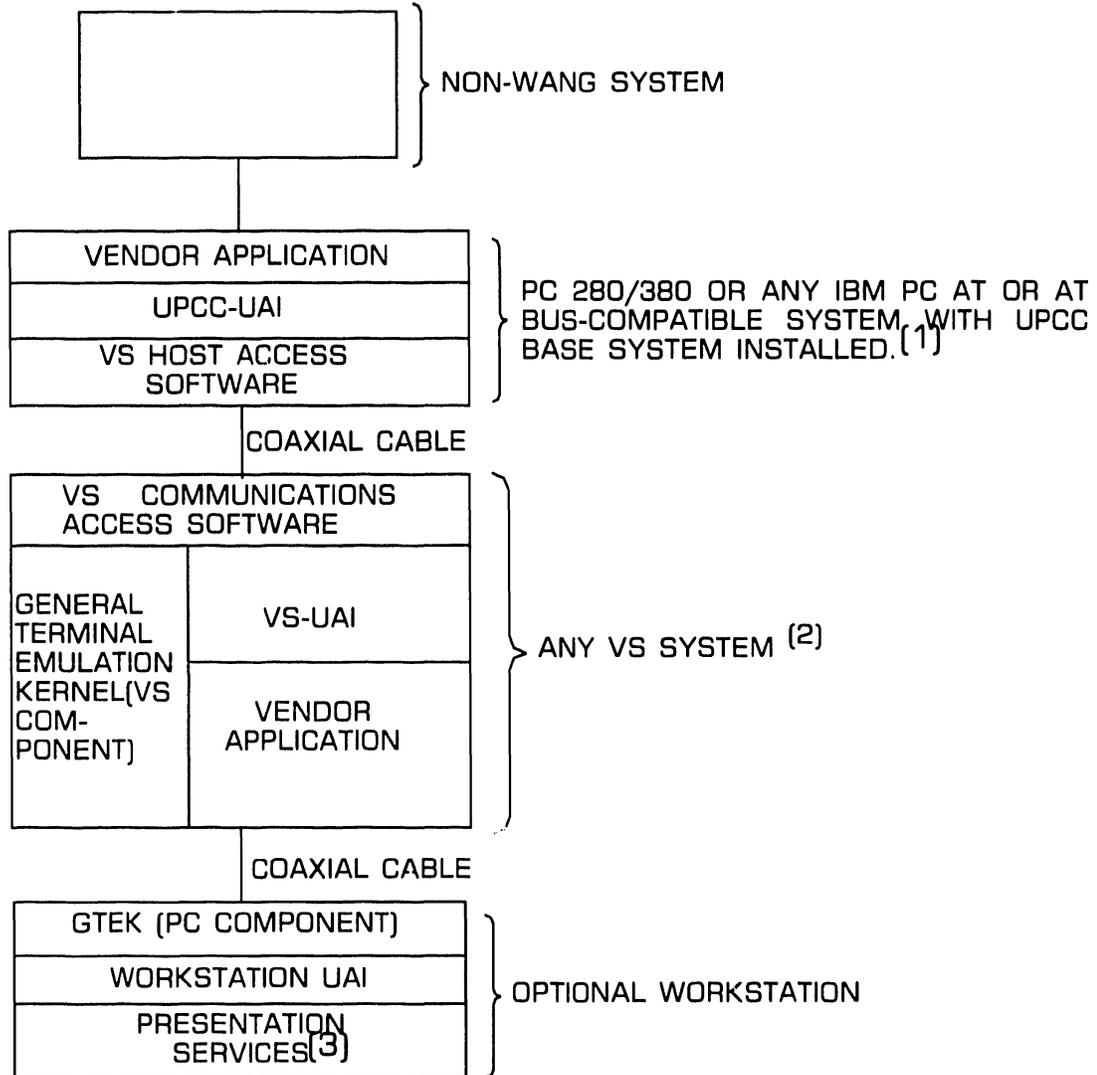
1.1.5 Required Operating Systems for Computers Connected to the UPCC

- VS 300/7000 Series: VS OS 7.12 or greater
- VS 5/6/15/65/85/100: VS OS 6.40 or greater
- Wang PC 280/380: MS-DOS 3.2 or greater
- Wang PC/APC as workstations configured with a UPCC system: MS-DOS 2.1 or greater
- IBM PC AT or compatible: PC-DOS 3.1 or greater

● END

1.1 Introduction

1.1.6 UPCC Software Configuration



NOTES:

- (1) BASE SYSTEM RUNS UNDER MS-DOS RELEASE 3.2 OR PC-DOS 3.1.
- (2) MINIMUM VS OPERATING SYSTEM (O.S.) RELEASE IS 6.40; VS300 AND VS7000 SERIES SYSTEMS REQUIRE O.S. REL. 7.12. DISK REQUIREMENTS WILL VARY DEPENDING ON NUMBER OF APPLICATIONS RUNNING AND AMOUNT OF TRANSACTIONS TO BE PROCESSED.
- (3) USER-DEVELOPED "PRESENTATION SERVICES" CONTROL KEYBOARD FUNCTIONS AND SCREEN IMAGES. THESE SERVICES ARE LINKED TO WORKSTATION UAI SUBROUTINES TO PERMIT LOGICAL ATTACHMENT OF WORKSTATION TO FOREIGN HOST SYSTEM.

● END

1.2 Settings

1.2.1 Wang Local Office Connection (WLOC) Board

Refer to the system base manual or training guide for switch setting and jumper details pertaining to the WLOC board.

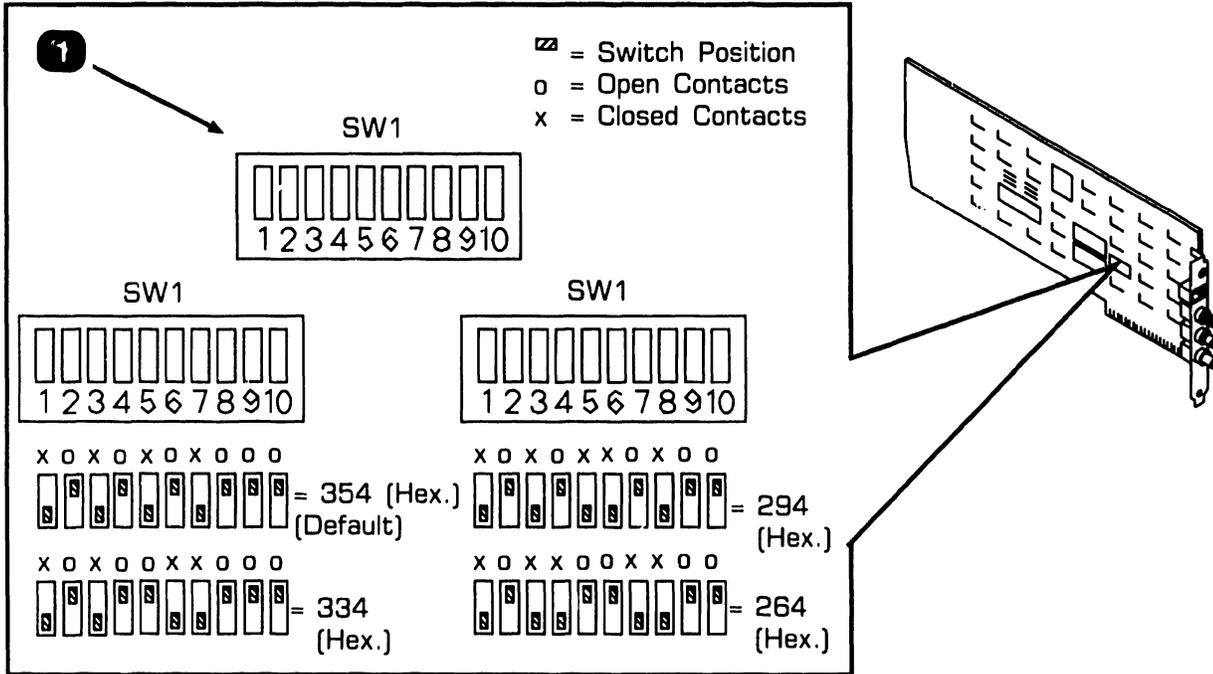
● END

1.2 Settings

1.2.2 Remote Initial Program Load (RIPL) Board

The 10-position dual in-line package (DIP) switch bank on the RIPL PCB is used to select a unique I/O address for the board. I/O address conflicts will result if two active I/O devices within the system try to access the same I/O address. To minimize this possibility, primary or "default" I/O address switch and jumper settings have been established for boards

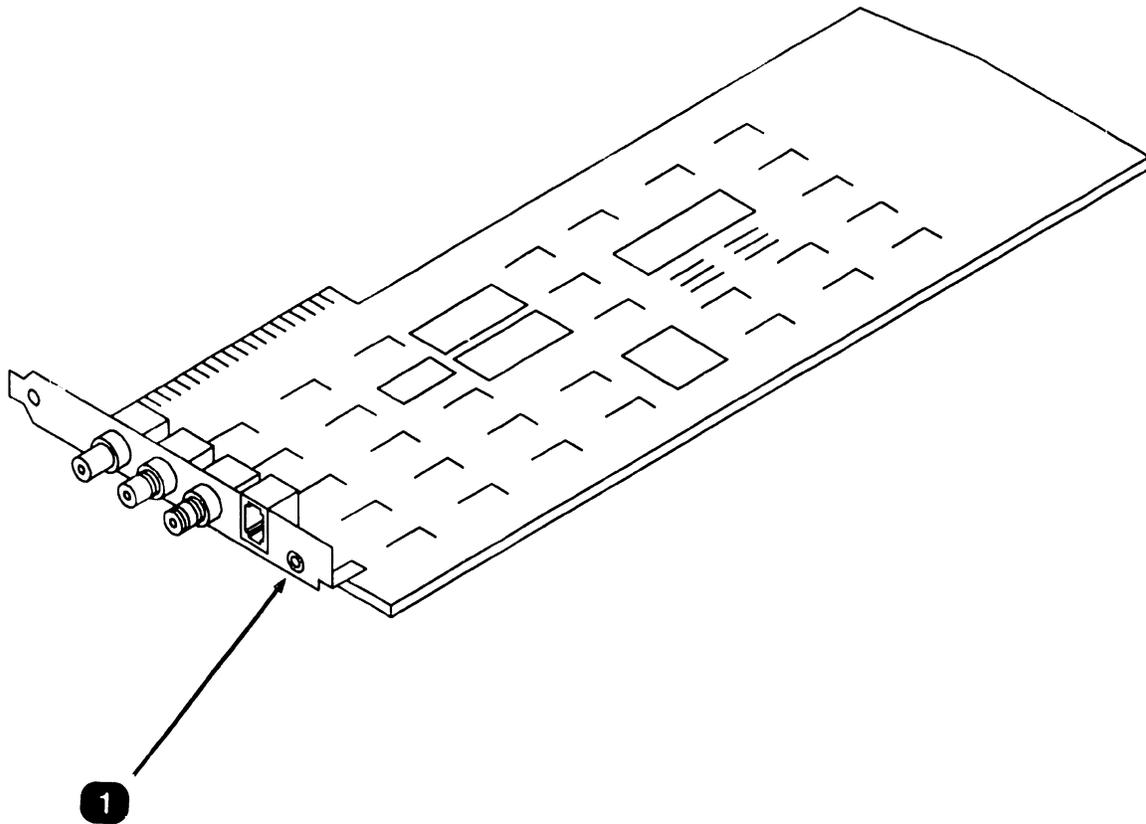
in computers containing the UPCC. Defaults represent standard settings that should always be used unless a combination of boards results in a conflict. If such a problem occurs, the I/O address of one of the conflicting devices must be reconfigured to an alternate or secondary setting.



Item	Name	Type and Function
1	Board I/O Address Select Switch SW1	10-position, dual in-line package (DIP) switch; used to select nique I/O address for RIPL board (default setting is 354 (hex.)).

● END

1.3 Controls and Indicators



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	RIPL board LED	Green LED; indicates RIPL built-in test (BIT) initiation and operational status of board.

● END

1.4 Troubleshooting

1.4.1 Tools and Test Equipment

- Two PC200/300 series diagnostic utilities are available for use when troubleshooting a computer containing the UPCC:
 - PC200/300 Series Customer Diagnostic Package (P/N 195-5738-9): Packaged with each PC 280/380 system, this diagnostic package provides the customer with the materials necessary for testing the CPU and most standard and optional system components. The package permits problem diagnosing to the customer-replaceable unit (CRU) level only.
 - PC 200/300 Support Diagnostic Package (P/N 195-5537-9): This diagnostic package isolates PC 280/380 problems to the field-replaceable unit (FRU) level and is designed as a troubleshooting tool for field service personnel. The package contains WLOC board diagnostics.

● END

1.4 Troubleshooting

1.4.2 Power-Up BIT Diagnostics

The green LED on the RIPL board serves two purposes; to show initiation of the RIPL BIT; and to indicate the board's status (i.e., whether the board is functioning properly).

RIPL board diagnostics are contained on a PROM resident on the board. When the UPCC system is powered-up, the RIPL diagnostics are initiated. During power-up, the RIPL board LED should illuminate continuously for two to three seconds. After successful BIT completion, the LED will begin blinking at a rate of one flash per half-second. LED flashing will continue as long as power to the UPCC is not interrupted and the RIPL board is functioning properly. If the LED does not enter the flashing state after completion of the BIT, the RIPL board should be replaced.

NOTE

The RIPL BIT can be run continuously by setting switch number 10 on the RIPL board switch bank SW1 to the ON position. The RIPL LED (green) will blink rapidly, indicating that the board is cycling through the BIT repeatedly. (Continuous running of the BIT might be used when testing for intermittent problems.)

● END

1.4 Troubleshooting

1.4.3 Troubleshooting Procedures (Sheet 1 of 2)

System malfunctions can sometimes be corrected by executing the basic troubleshooting procedure that follows:

1. Turn the computer containing the UPCC hardware off and then back on. This action resets and initializes the system. If the malfunction persists, proceed to the next step.
2. Check that cable connections are secure.
3. Inspect hardware for visible damage; e.g., bent pins, broken components, damaged wires, etc.
4. Check for proper switch and jumper configurations on each board in the system that contains the UPCC.
5. Bypass RIPL board (if installed) by connecting VS system serial cable to WLOC board in computer containing the UPCC. This involves the following steps:
 - a. Disconnect VS serial cable from RIPL board.
 - b. Disconnect 10-inch coaxial 928 cable from WLOC board.
 - c. Connect VS serial cable to BNC/TNC connectors on WLOC board.
6. Power-up UPCC system. If system runs correctly, replace RIPL board. If system still malfunctions, a more extensive troubleshooting approach will be necessary; refer to the next subsection.

►NEXT

1.4 Troubleshooting

1.4.3 Troubleshooting Procedures (Sheet 2 of 2)

If the basic troubleshooting strategy fails, the computer containing the UPCC hardware should be tested as a freestanding unit. Proceed as follows:

1. Power-down the UPCC system and disconnect it from the VS system.
2. Run the WLOC board diagnostics contained in the PC 200/300 Support Diagnostic Package.
3. If the WLOC board diagnostic tests satisfactorily, the UPCC computer will have to be checked more extensively. This entails initiating the other diagnostic tests in the support diagnostic package to check the system's non-UPCC hardware. (Refer to the applicable maintenance manual, training guide, diagnostic documentation, and end-user literature for specifics concerning the support diagnostic package and system-level troubleshooting procedures.)

● END

1.5 Installation

1.5.1 Tools

UPCC hardware components are customer-installable. No special tools are required to install this product.

● END

1.5 Installation

1.5.2 Slot Assignments

The boards constituting the UPCC option (WLOC and RIPL boards) can be placed in any available slots in the CPU/system unit. These UPCC boards do not have to occupy adjacent slots. The cable connecting the RIPL PCB to the WLOC board is long enough to accommodate any RIPL slot assignment in the system chassis.

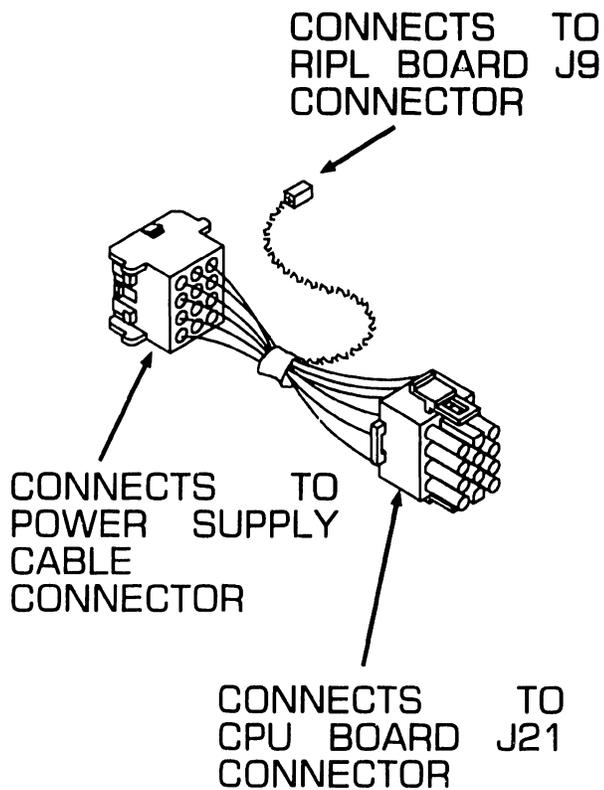
● END

1.5 Installation

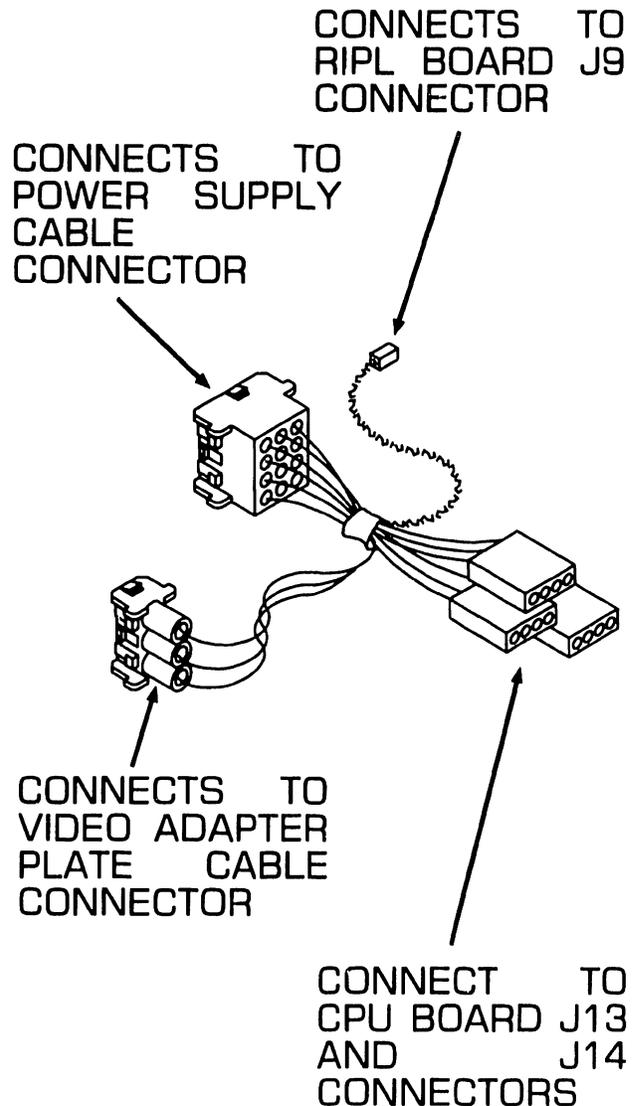
1.5.3 Internal Cable Connections (Sheet 1 of 2)

Each Wang-supplied RIPL internal power cable is labeled to indicate which CPU/system unit connector(s) the cable should be plugged into. Select the relevant cable and install it in the appropriate connector(s) in the system unit.

UPCC Power Adapter Cable for PC 280



UPCC Power Adapter Cable for PC 380

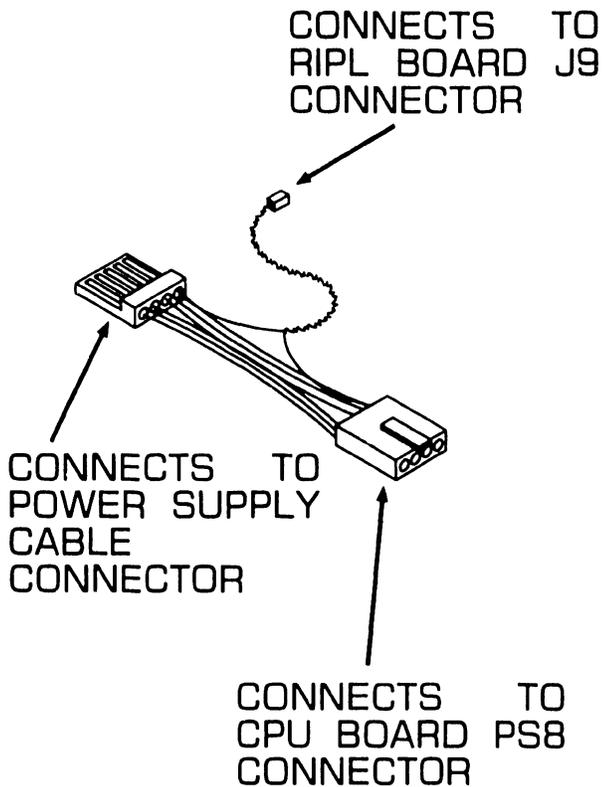


▶NEXT

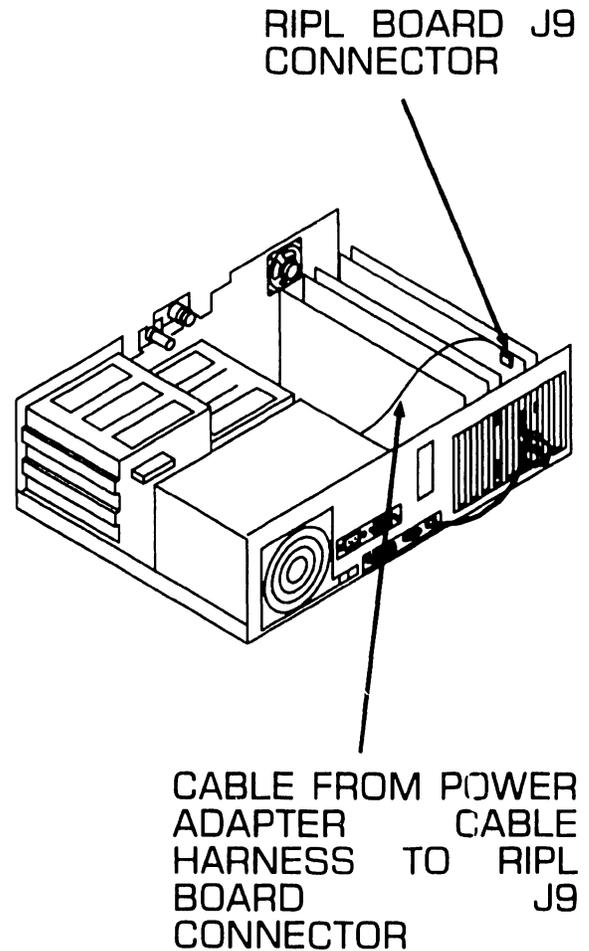
1.5 Installation

1.5.3 Internal Cable Connections (Sheet 2 of 2)

UPCC Power Adapter Cable for IBM AT



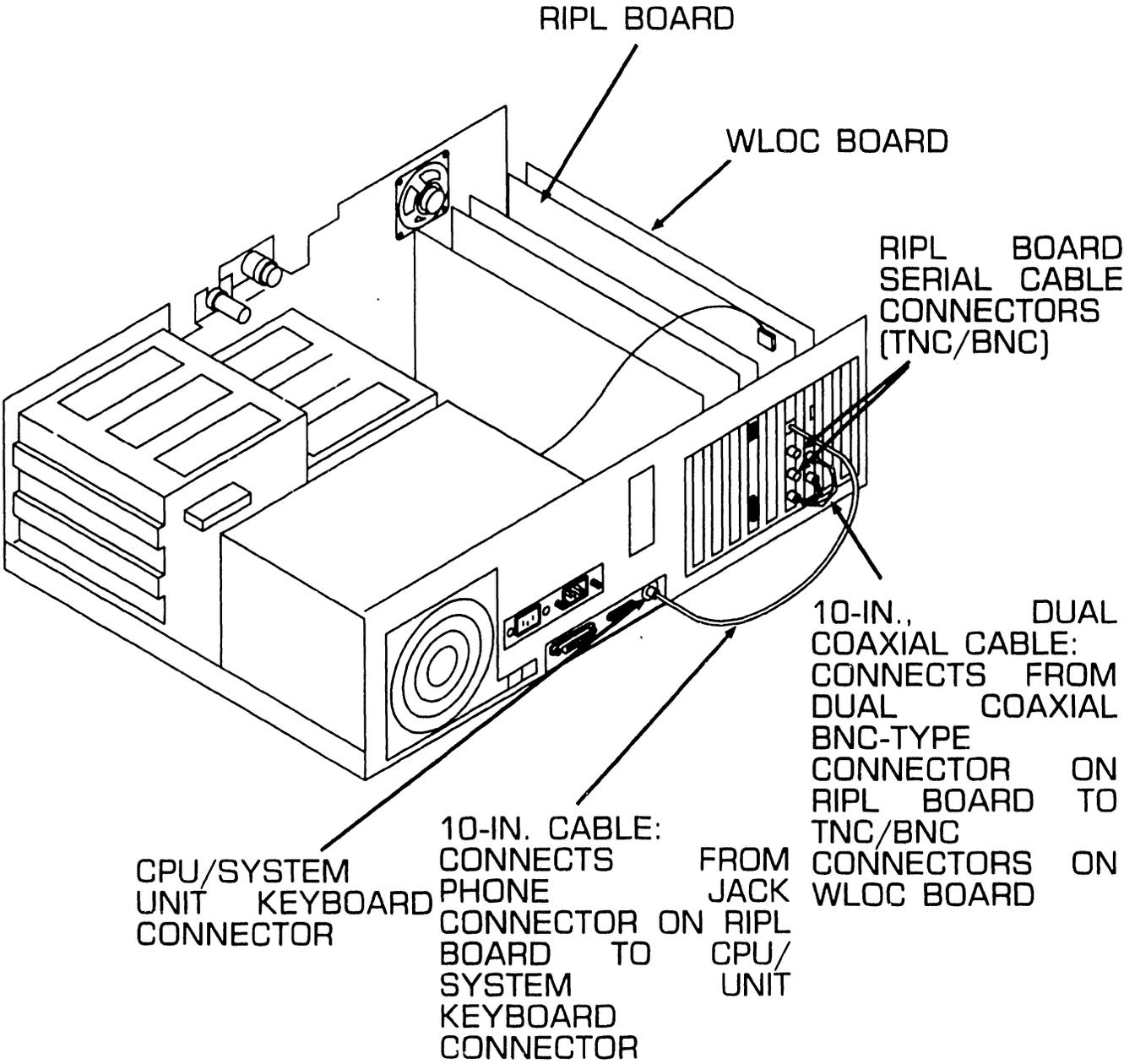
RIPL Board Internal Cabling



● END

1.5 Installation

1.5.4 External Cable Connections



● END

1.6 Parts List

- Hardware

<i>Part Number</i>	<i>Description</i>
210-8988	RIPL board
210-9454-A	WLOC board
220-0566	10-in., dual coaxial 928 cable
220-2625	UPCC power adapter cable for PC 280
220-2629	UPCC power adapter cable for PC 380
220-2591	UPCC power adapter cable for IBM AT
220-2626	10-in. cable that connects the RIPL board to CPU/system unit keyboard connector

● END

1.6 Parts List

-
- Software

<i>Part Number</i>	<i>Description</i>
195-5498-5, 195-5498-9 ⁽¹⁾	GTEK
195-5499-5, 195-5499-9 ⁽¹⁾	VS - UPCC Development Tools
195-5542-5, 195-5542-9 ⁽¹⁾	VS Communications Access Software
200-1424	UPCC Base System

(1) Numerical suffix denotes media type: "5" suffix means software supplied with 8-in. diskette (double-sided, double-density); "9" suffix means software supplied with 5.25-in. diskette (double-sided, double-density).

● END

SECTION 2
802.3
INTERFACE

802.3 INTERFACE

SECTION 2 CONTENTS

	Page
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2.3 CONTROLS AND INDICATORS	2-4
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2.5.8 Setting ROM Select Jumpers	2-22
2.5.9 Mounting Interface Board in PC	2-23
2.5.10 Installing Adapter Plate	2-24
2.5.11 Testing Interface Board	2-25

2.1 Introduction

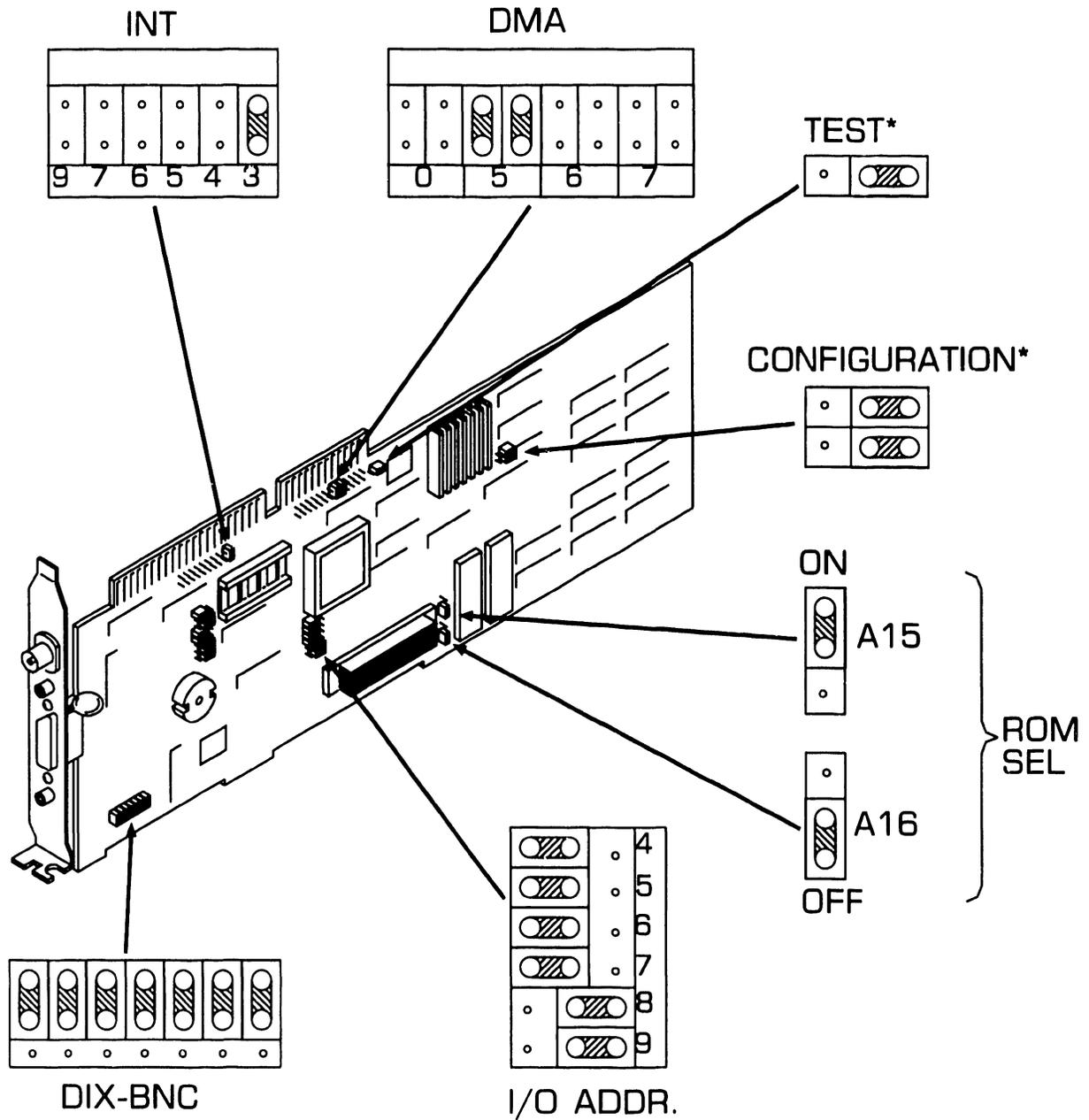
The Wang 802.3 Interface enables a Wang PC 200/300 Personal Computer System to be connected to an IEEE 802.3 compatible LAN. Once connected to an 802.3 LAN, Wang systems can communicate with other Wang systems, via a Baseband or Broadband cable plant including WangNet, using the WSN/CSN protocols, as well as to non-Wang systems with the appropriate and compatible protocols, all over the 802.3 physical media.

The 802.3 Interface discussed in this document is a 3Com EtherLink Plus (Model 3C505) board. It is to be installed in an optional board slot in the PC 200/300. The 3C505 contains an on-board transceiver that allows for direct connection to 10 Base 2 "thin wire" networks using RG-58 cable. An AUI interface connector is also provided for connection to an external transceiver on 10 Base 5 "thick wire" systems.

● END

2.2 Settings

802.3 INTERFACE

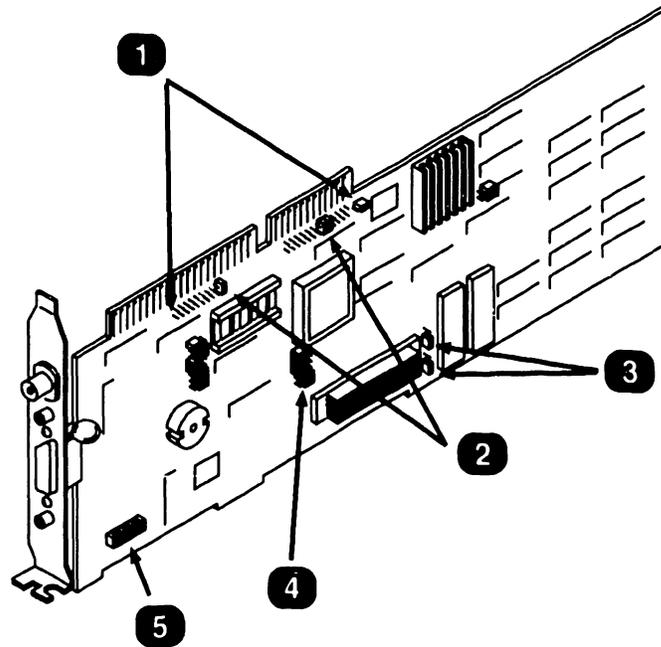


*Set as shown.

● END

2.3 Controls and Indicators (Sheet 1 of 2)

802.3 INTERFACE

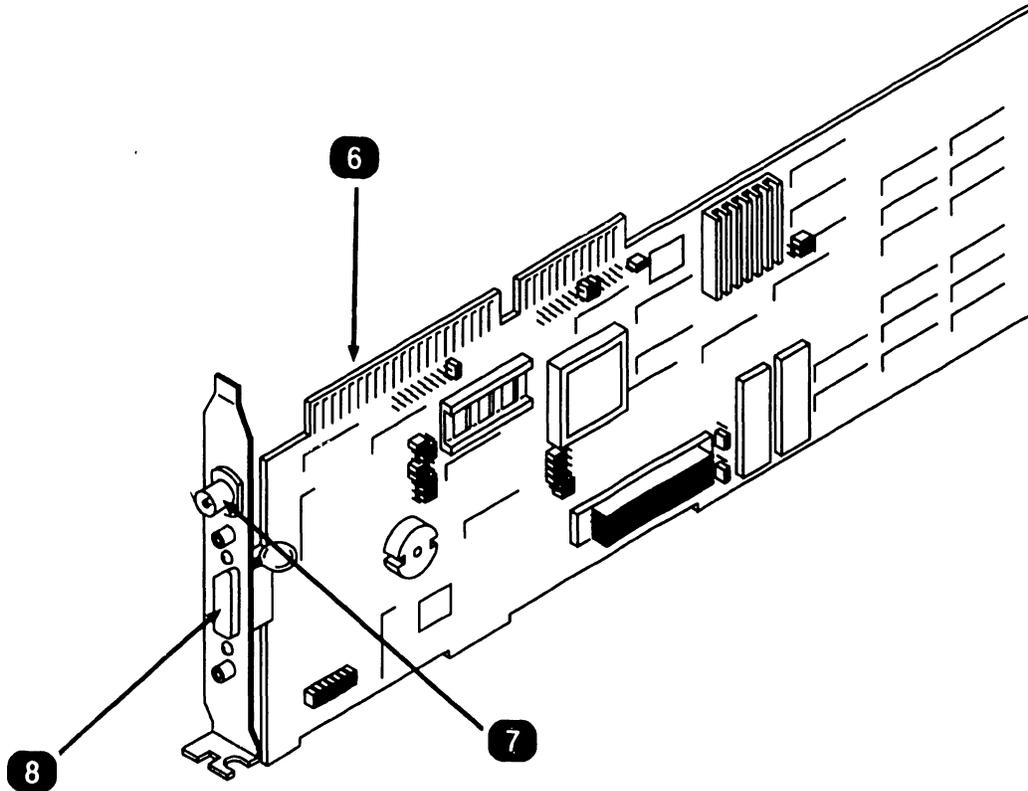


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	DMA Channel Jumpers	PC board jumpers; used to set DMA channel on which device communicates with the CPU. (▶2.5.4)
2	Interrupt Channel Jumpers	PC board jumpers; used to select channel on which board or another device is allowed to interrupt CPU. (▶2.5.5)
3	ROM Select Jumper	PC board jumpers; used to select ROM memory size. (▶2.5.8)
4	I/O Base Address Jumpers	PC board jumpers; used to select location in which information is exchanged between CPU and another device. (▶2.5.6)
5	Transceiver Select Jumper	PC board jumper block; used to select connection to either on-board transceiver (via BNC connector) or to external transceiver (via 15 pin AUI connector). (▶2.5.7)

▶NEXT

2.3 802.3 INTERFACE

Controls and Indicators (Sheet 2 of 2)



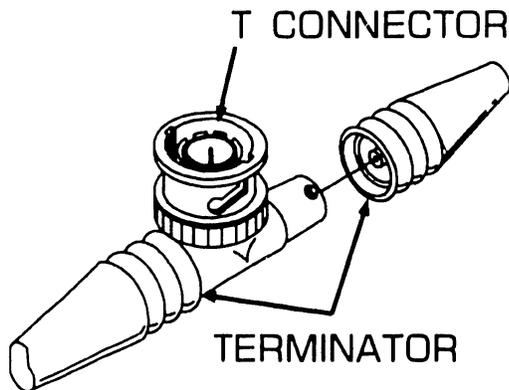
<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
6	Edge Connector	PC edge connector; plugs into mating connector on CPU system board to provide circuit required circuit connections.
7	ThinNet BNC Connector	BNC; used to make 802.3 EtherNet cable connection to the interface board when on-board transceiver is used.
8	AUI Interface Connector	15 pin type D; used to make 802.3 EtherNet connection to an external transceiver via a transceiver cable.

● END

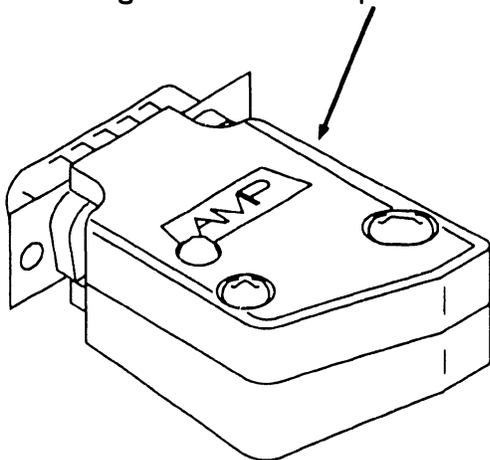
2.4 Troubleshooting

2.4.1 Requirements

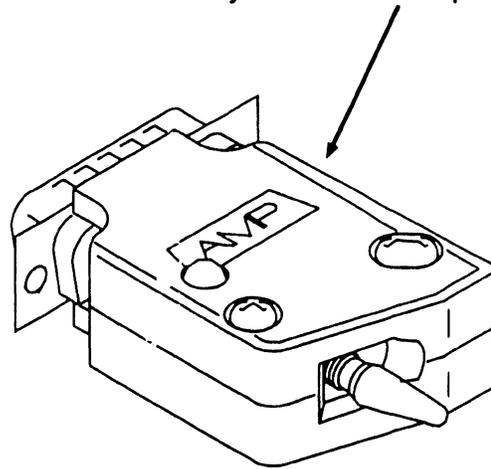
- 1 DOS operating system version 3.2 or higher.
- 2 Diagnostic software diskette.
- 3 A loopback plug assembled by connecting two BNC terminators (723-0390) to a T connector (350-2065) as shown.



- 4 A 15-pin loopback plug (721-0115) for customer only testing of the AUI port.



- 5 A 15-pin loopback plug (190-0756) for testing the Collision Detection ability of the AUI port.



- 6 Another IBM PC on the network or an EtherSeries network server that is connected to the network. The second PC will be used as an "echo server" which will exchange packets over the network with the computer under test.

● END

2.4 Troubleshooting

802.3 INTERFACE

2.4.2 User Self Diagnostics Description (Sheet 1 of 4)

The EtherLink Diagnostic supplied with system software includes a diagnostic program called 3C505.EXE. This diagnostic may be used to verify operation of the 802.3 hardware option.

The diagnostic is initiated from the DOS command level and typically takes 5 minutes to complete in a Wang PC200/300 or an IBM AT. As it runs it displays the name of the test executing and a pass count. In the event of a hardware error the test stops and an error message is displayed.

The diagnostic programs include the following tests:

- 0 Adapter self test
- 1 Preliminary test
- 2 DMA test
- 3 Packet test
- 4 Recognizer test
- 5 Active ping pong test
- 6 Passive ping pong (receive) test
- 7 NS Echo server

Tests 1-4 run in sequence. Tests 3 and 4 require a loopback plug for the test to run successfully. There are three types of loopback connector (see paragraph 2.4.1). Wang loopback plug (190-0756) has a LED and a switch. The LED indicates that 12 volts is being sent to the transceiver.

The switch is used in testing the Collision Detection ability of the 3C505 board. For proper operation of this diagnostic the "CS" switch must be disabled.

During execution of test 3 the destination address of the test packet used is incremented after each packet transmitted. Failure to use a loopback plug before initiating tests 1 -4 will result in degraded network performance and cause erroneous test results as randomly addressed packets will propagate onto the network.

Tests 5 and 7 are synchronized tests that run over the network: one node sends random data to a selected destination node that "echoes" back the data received. Test 6 is a passive monitor.

➡NEXT

2.4 Troubleshooting

802.3 INTERFACE

2.4.2 User Self Diagnostics Description (Sheet 1 of 4)

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During execution of test 3 the destination address of the test packet used is incremented after each packet transmitted. Failure to use a loopback plug before initiating tests 1 -4 will result in degraded network performance and cause erroneous test results as randomly addressed packets will propagate onto the network.

Tests 5 and 7 are synchronized tests that run over the network: one node sends random data to a selected destination node that "echoes" back the data received. Test 6 is a passive monitor.

►NEXT

2.4 Troubleshooting

2.4.2 User Self Diagnostics Description (Sheet 2 of 4)

Diagnostic Test Format Parameters

3C505 [-Ix] [-Dx] [-Bxxx] [-#] [-E] [-T]

Program Parameters

- Ix Test uses interrupt x, default (factory setting) is interrupt 3.
- Dx Test uses DMA channel x, default is DMA 1.
- Bxxx Sets base address of the EtherLink card to xxx (three HEX digits). This option should be used if the I/O address jumpers on the EtherLink card have been changed. The default value is 300 H.
- E Used with Test 5 only. Uses NS echo protocol to access remote nodes during the message exchange test. This option should be used on a Xerox NS 8000 network that has echo servers or where there is another PC with a 3Com EtherLink 3C505 running 3C505 -7 to reply to the echo request. If this option is not specified, the diagnostic will generate EtherSeries echo requests, and any EtherSeries server on the network will reply using EtherSeries protocol.
- T Specifies that the host computer is a TI Professional which requires special treatment.

►NEXT

2.4 Troubleshooting

802.3 INTERFACE

2.4.2 User Self Diagnostics Description (Sheet 3 of 4)

Test 0

Test 0 resets the adapter causing the self-test routines to be executed. These include 80186 and 82586 initialization, memory and internal and external loopback tests. The results are passed back to the host and displayed. If communication between the host and adapter cannot be established, an error message is displayed.

Test 1

Test 1 tests the interface between the host and the adapter using programmed I/O data transfers.

Test 2

Test 2 tests the interface between the host and the adapter using DMA data transfers.

Test 3

Test 3 performs a transmit test and, if successful, a loopback test. The transmit test checks for the correct status from the 82586 LAN controller following transmits. The loopback test further compares the received packets with those transmitted.

Test 4

Test 4 tests the 82586 LAN controller address matching functions. The receiver is configured to various modes; station only, multicast, broadcast, and promiscuous. In each mode, packets of differing destination address and size are transmitted and the ability of the adapter to reject or accept packets properly is tested.

Test 5

Test 5 performs packet exchange with another PC or server on the network. The PC transmits an "echo request packet" into the network. A responding server or PC will transmit the packet (echo) back to the PC under the test.

►NEXT

2.4 Troubleshooting

802.3 INTERFACE

2.4.2 User Self Diagnostics Description (Sheet 4 of 4)

Test 6

Test 6 detects legal packets on the network and counts them. This tests the adapter's receive function and provides a diagnostic tool for locating problems elsewhere on the network. The test is "passive" to the network and can be used to check the transmit capability of another PC on the network.

Test 7

Test 7 designates this PC as an "echo server" which is used to exchange packets with PCs running Test 5. The PC remains in this mode until a key is depressed.

● END

2.4 Troubleshooting

802.3 INTERFACE

2.4.3 Running 3C505.EXE Program (Sheet 1 of 3)

Running tests 1 through 4 with the BNC loopback connector.

NOTE

DIX/BNC jumper must be set to BNC position. (►2.4.2)

1. Disconnect PC from network.
2. Attach BNC loopback plug.
3. Insert DOS diskette in Drive A, start up computer and respond to prompts.
4. After replying to prompts, remove DOS diskette from Drive A and insert diagnostic diskette that contains program 3C505.EXE.
5. At DOS prompt C, type A: (CR)
6. Type the following:

3C505

NOTE

If the board has been reconfigured, type in the parameters that have been changed for the interrupt level (I), the DMA channel (D), or the base address (B) using the following format:

A 3C505 -Ix -Dx -Bxxx

As the program runs, it prints a message indicating which test is being performed and the progress. Tests 0 through 4 will run in sequence. If the board passes, the message "Your Controller Has Passed Tests!" appears. However, if an error is detected, the test stops and an error message is displayed.

►NEXT

2.4 Troubleshooting

802.3 INTERFACE

2.4.3 Running 3C505.EXE Program (Sheet 2 of 3)

Running tests 1 through 4 with the AUI loopback connector (190-0756).

NOTE

DIX/BNC jumper must be set to BNC position. (►2.4.2)

1. Insert diagnostic diskette.
2. Install loopback connector (190-0756) on AUI port of interface module.
3. Ensure "CS" switch is in collision sense position.
4. From DOS command processor set drive "A:".
5. From drive "A" enter "3C505 -lx -Dx -Bxxx"
6. Set "CS" switch to opposite position and rerun tests as above.
7. Positive indications are:
"Packet Test 1 2 Passed!"
"Your controller has passed tests!"

NOTE

A failure indication will be:
"Packet Test 1 Transmit Test Failed"
This is a positive indication that the collision detection circuit of the interface board has sensed a collision.

►NEXT

2.4 Troubleshooting

2.4.3 Running 3C505.EXE Program (Sheet 3 of 3)

Running tests 5 and 7

1. Remove loopback plug from interface board and connect PC to network.
3. If echo server is another PC with another type of 3Com EtherLink acting as echo server, use diagnostic program supplied with specific EtherLink such as 3C501. Start echo server running on this program and at DOS prompt type

NOTE

This test is run simultaneously on two PCs on the network, one being the tested unit and the other serving as an echo server. The test PC must have a 3C505 board installed.

A 3C501 -7

Next, start 3C505.EXE program running on tested PC and at DOS prompt type:

2. If echo server is either an Ether-Series network server or another PC having an EtherLink 3C505 card serving as echo server, insert 3C505.EXE diagnostic diskette in server and start program running.

3C505 -5

At DOS prompt type:
A 3C505 -7

Next, start 3C505.EXE program running on tested PC and at DOS prompt type:

3C505 -5 -E

NOTE

The parameters -lx -Dx -Bxxx must be typed in if the settings on the 3C505 board have been changed.

● END

2.4 Troubleshooting

2.4.4 Procedure When Loopback Test Fails

1. Check for proper installation of interface board and correct setting of jumpers.
-

CAUTION

Disconnect power before inserting or removing any board from the PC.

2. Ensure that DOS command format and all parameters are correct.
3. Verify that jumper settings on board are not the same as settings used on other accessory boards in PC.
4. If installation and jumpers are correct, replace board.
5. If incorrect installation or an incorrect jumper setting was found, make corrections, re-install board and run loopback tests again.
6. If board fails again, replace board.

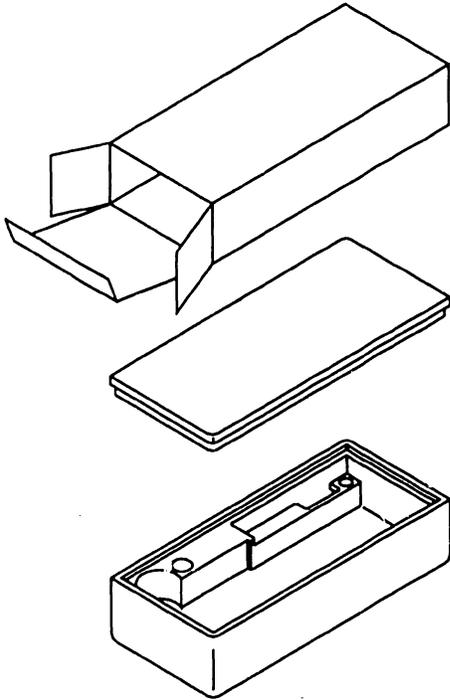
● END

2.5 Installation

802.3 INTERFACE

2.5.1 Unpacking Interface Board

① Open shipping container and remove contents.



② Check that carton contains the following items:

- 3C505 PCB
- Wang Installation Guide for 802.3 Intelligent Adapter (715-1854)
- Diagnostic Software Diskette
- An accessory package containing a T connector and an adapter plate assembly
- A plastic adapter guide (not used on Wang PC 200/300 machines)

③ Place all packing materials in container and store in a safe place.

NOTE

To prevent static electricity buildup on board, leave it in its anti-static bag until ready to install.

● END

2.5.2 Accessing Option Board Slot

1. Remove PC top/front cover.
(►Associated manual, Section 7)
2. Remove screw that secures fastening/access plate to enclosure.
3. Lift fastening/access plate out of slot.

CAUTION

Before removing the interface board from its anti-static bag, be sure to discharge any electrostatic buildup by touching the metal enclosure of the PC.

4. Discharge any static electricity and remove interface board from anti-static bag.

● END

2.5 Installation

802.3 INTERFACE

2.5.3 Jumper Setting Check

NOTE

Before installing the interface board, the configuration jumpers on the board must be checked. Different option cards in the PC cannot share the same DMA channel, Interrupt Level, or I/O Base Address. If there is a conflict between settings on the 802.3 Interface and another option board, one board must be changed. Consult documentation provided with the other board. If any jumpers are changed, the config.sys file must be modified. Refer to the Wang Professional Computer 802.3 Integrated Services Operations Guide. The following table shows the possible settings.

Possible Jumper Configurations

<i>Jumper Setting</i>	<i>Wang PC</i>	<i>PC/XT</i>	<i>PC/AT 8 Bit Slot</i>	<i>PC/AT 16 Bit Slot</i>
DMA Channel	5	1, 3	1, 3	5, 6, 7
Interrupt Channel	3	3,4,5, 6,7,9	3,4,5,6,7,9,10,11,12,14,15 (for both AT machines)	
I/O Base Address	300H-3FOH (for all machines)			

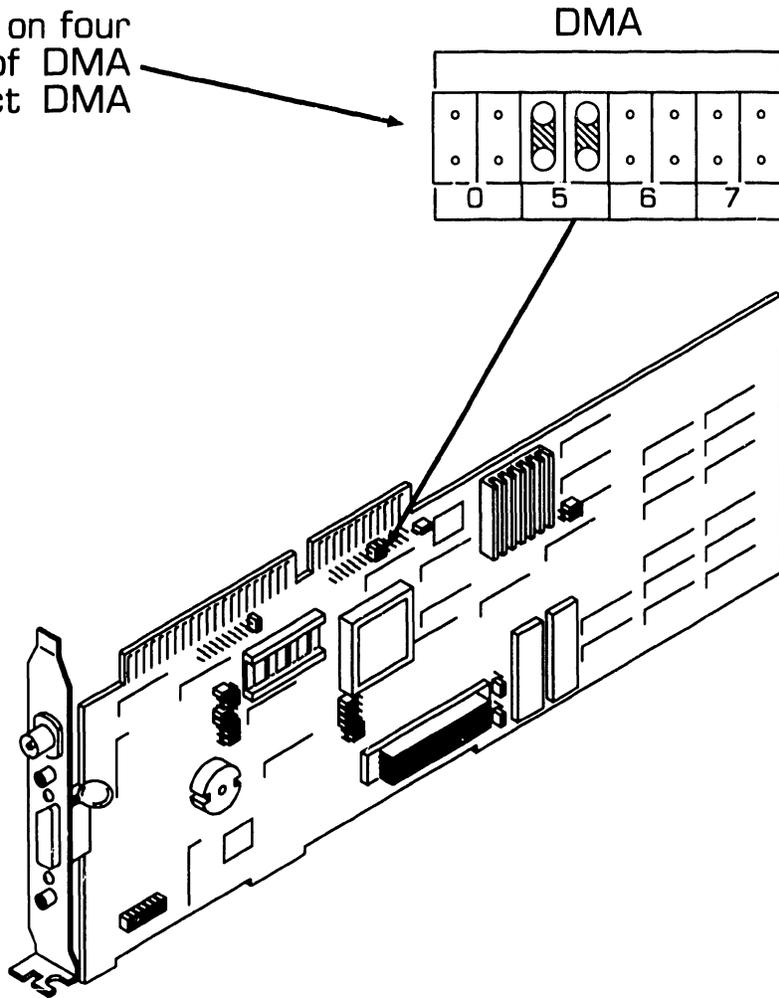
● END

2.5 Installation

802.3 INTERFACE

2.5.4 Setting DMA Channel Jumpers

- 1 Place two jumper blocks on four pins above position 5 of DMA jumper pin set to select DMA channel 5.



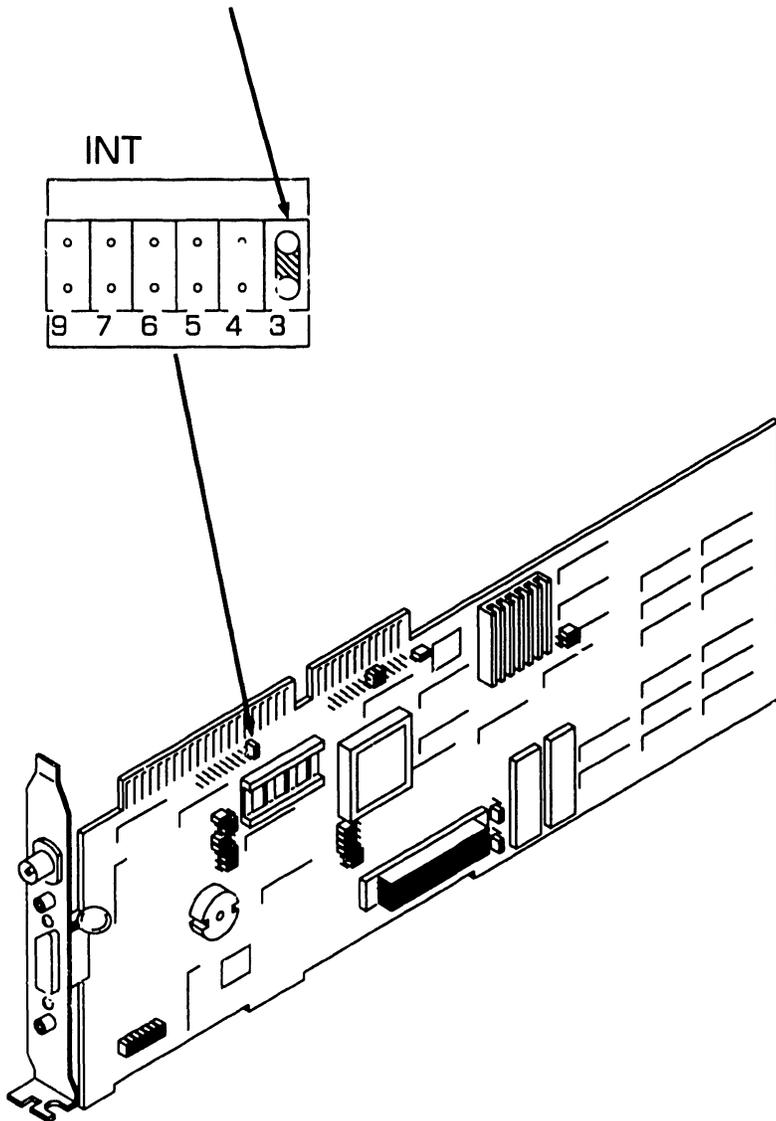
● END

2.5 Installation

802.3 INTERFACE

2.5.5 Setting Interrupt Channel Jumpers

- 1 Place one jumper block on two pins above position 3 of Interrupt jumper pin set to select Interrupt channel 3.



● END

2.5 Installation

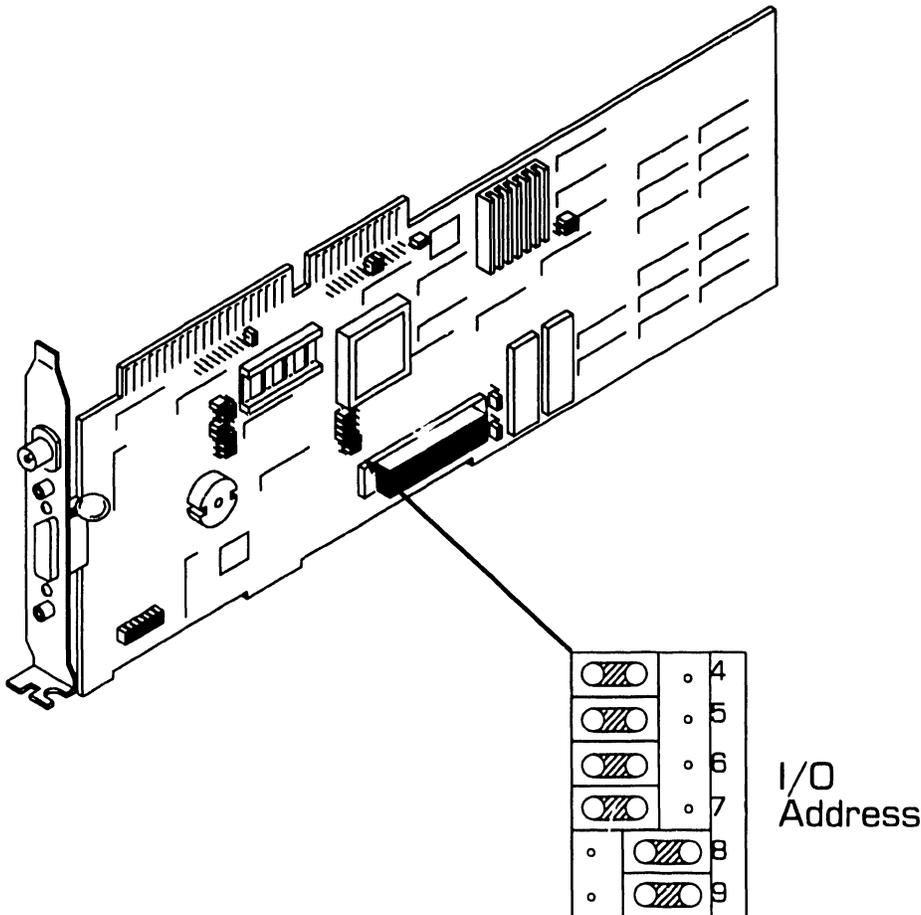
802.3 INTERFACE

2.5.6 Setting I/O Base Address Jumpers

NOTE

The I/O base address jumper set has three columns of pins. An address code logic "1" is set by placing a jumper block so that it covers a center and right column pin. A logic "0" is set by placing a jumper block so that it covers a center and left column pin. Row 9 sets the high order bit in the HEX address code.

- 1 Select address 300 by placing jumper blocks on the center and right column pins on rows 8 and 9, and on the center and left column pins on rows 4, 5, 6, and 7.



● END

2.5 Installation

802.3 INTERFACE

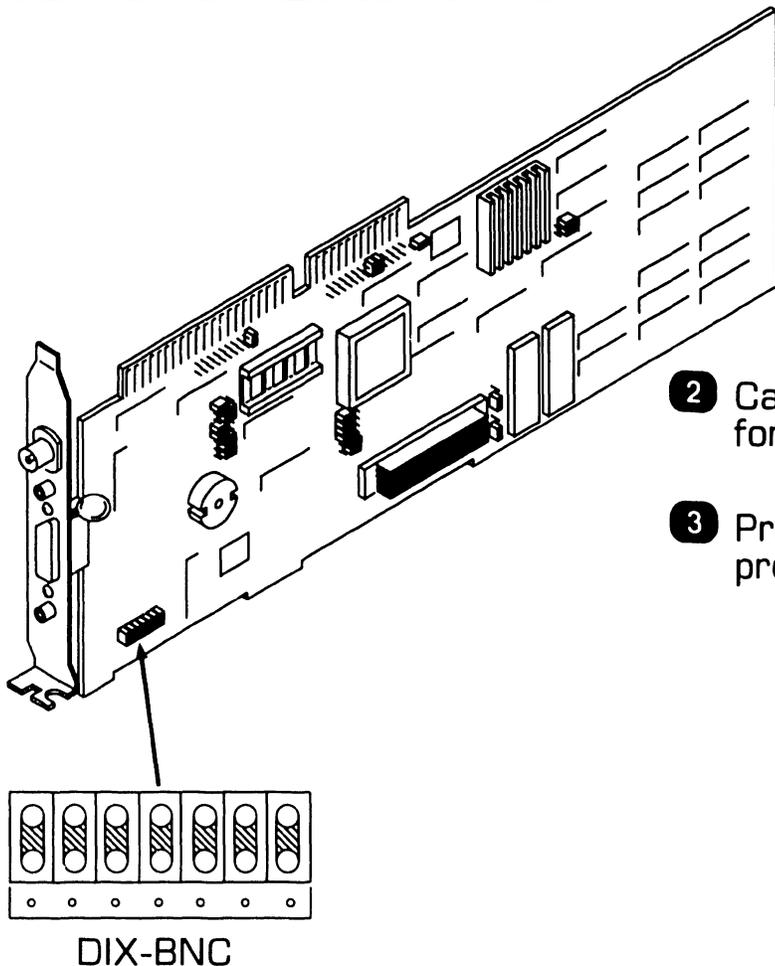
2.5.7 Setting Transceiver Select Jumper

NOTE

The transceiver select jumper is a 14-pin jumper block. The board is shipped with this jumper in the BNC position. This position selects the on-board transceiver. If an external transceiver is to be used, the jumper must be moved to the DIX position.

Proceed as follows to move the jumper block:

- 1 Pry up jumper using an integrated circuit extraction tool or standard screwdriver taking care not to bend any of the pins.



- 2 Carefully align jumper over pins for new position.
- 3 Press jumper down using even pressure to avoid bending pins.

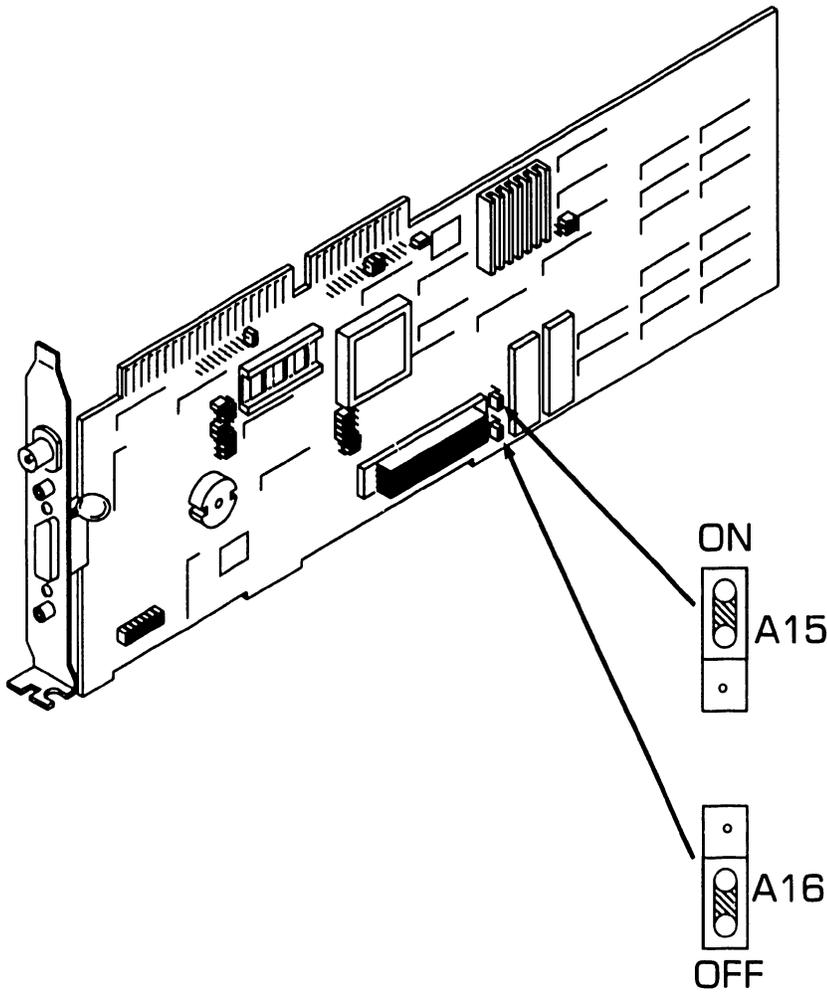
● END

2.5 Installation

802.3 INTERFACE

2.5.8 Setting ROM Select Jumper

- 1 Set ROM jumpers to 256K setting.



● END

2.5 Installation

802.3 INTERFACE

2.5.9 Mounting Interface Board in PC

CAUTION

Disconnect power to unit before inserting or removing any board.

1. Align board edge connectors with mating board sockets in PC.
2. Gently push down on board so that edge connectors firmly seat in mating sockets and board slides in grooves of card guide attached to inside front of enclosure.
3. Replace screw that secures board fastening/access plate to enclosure.
4. Secure top/front cover to enclosure.

● END

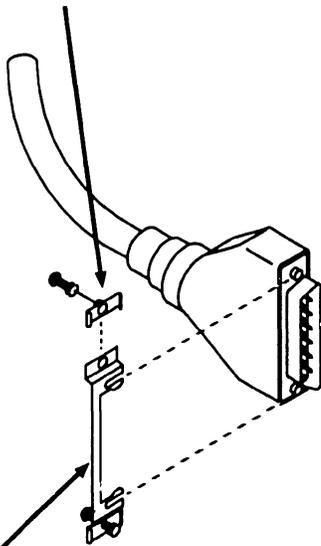
2.5 Installation

802.3 INTERFACE

2.5.10 Installing Adapter Plate

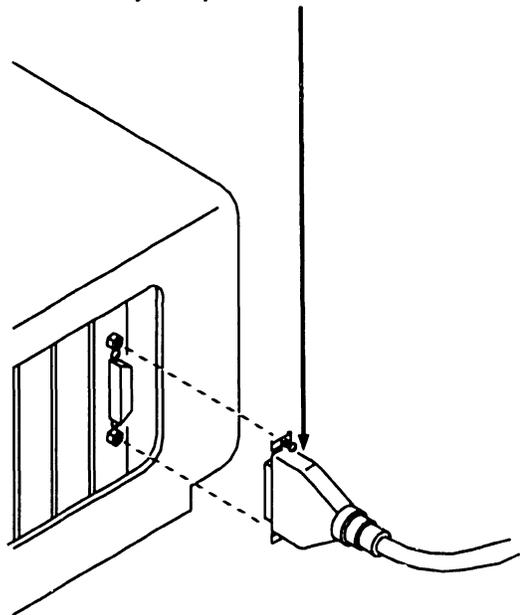
If the 802.3 Interface is being connected to a thick cable network, an adapter plate must be installed on the transceiver cable before it can be connected to the AUI connector on the 802.3 Interface. Proceed as follows to install the adapter:

- 1 Slide threaded clips on to both ends of adapter plate and insert screws into clips with small screwdriver.



- 2 Align slots in adapter plate with indents in lock posts on transceiver cable and press plate onto connector.

- 3 Plug transceiver cable with adapter plate into AUI connector on 802.3 Interface. Tighten screws on adapter plate into threaded jackposts.



● END

2.5 Installation

802.3 INTERFACE

2.5.11 Testing Interface Board

Testing the 802.3 Interface board consists of running one or more of the diagnostic programs on the diagnostic software diskette that was shipped with the board. These tests are described in paragraph 2.4.2. The tests to be run are tests 0 through 4. Test 0 is a self test that runs when the diagnostic software is initialized. Follow the procedure given in paragraph 2.4.3 for running tests 1 through 4.

● END

SECTION 3

1640

CONTROLLER

(100 DPI)

1640 CONTROLLER (100 DPI)

SECTION 3 CONTENTS

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3.1 1640 CONTROLLER (100 DPI)

Introduction

The Wang 1640 Monitor Controller supports the MON 1640 Professional Monochrome Monitor, and provides high-resolution graphics capability for the Series 200/300 Professional Computers. It can also emulate MDA and Hercules adapters, and can co-exist with CGA, EGA, and MEGA adapters.

The 1640 Controller is equipped with an industry-standard asynchronous serial port that can be used to support a mouse. The port can also be used to drive a serial printer.

The complete Wang 1640 Display System for 200/300 PCs includes:

- Wang 1640 Monitor Controller with industry-standard serial port adapter.
- Two Wang 1640 Controller software diskettes.
- Wang 1640 16 inch Professional Monochrome Monitor.

CAUTION

Do not attempt to use the 1640 controller with conventional monitors.

This section of the options manual deals only with the 1640 Full Page Monitor Controller. Service information for the 1640 Full Page Monitor appears in document 741-1800.

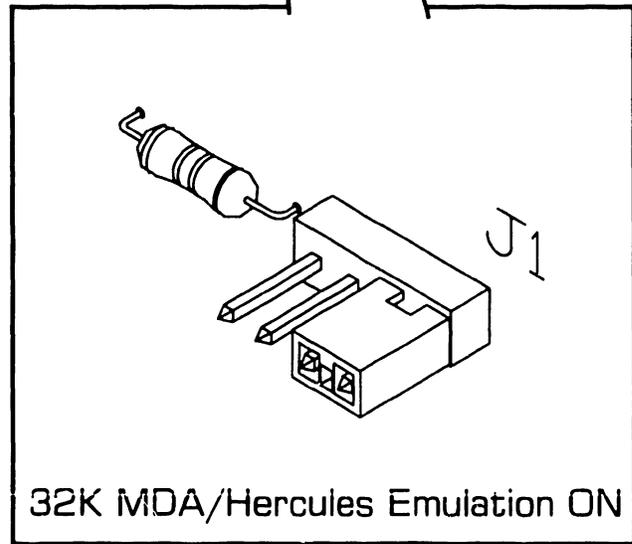
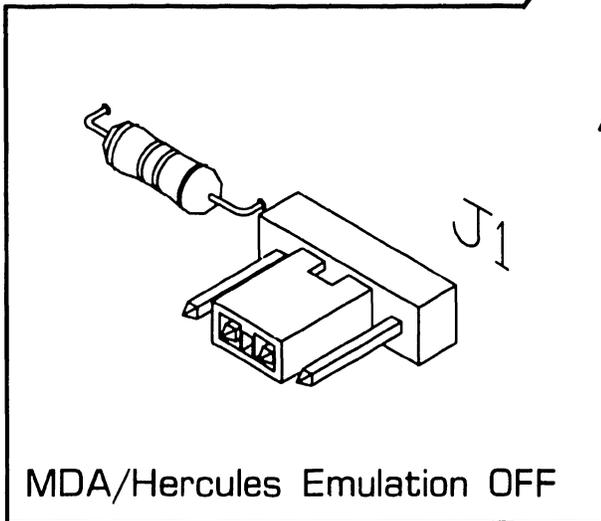
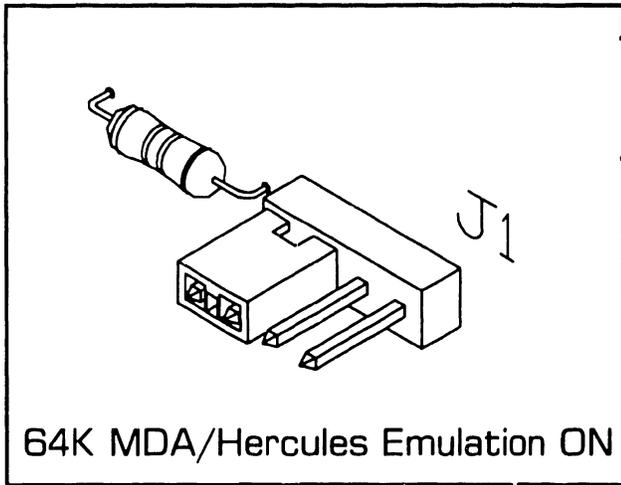
● END

3.2 1640 CONTROLLER (100 DPI)

Settings

3.2.1 MDA and Hercules Emulation

Position jumper on header J1 to set or disable MDA and Hercules emulation.



● END

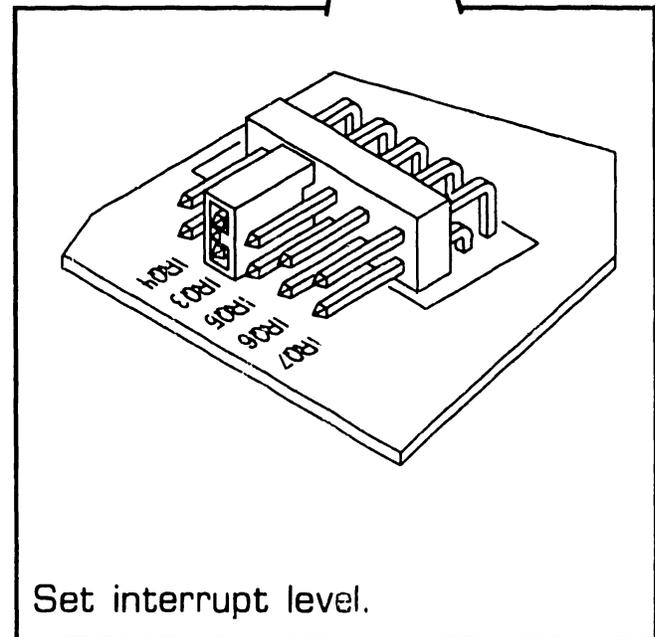
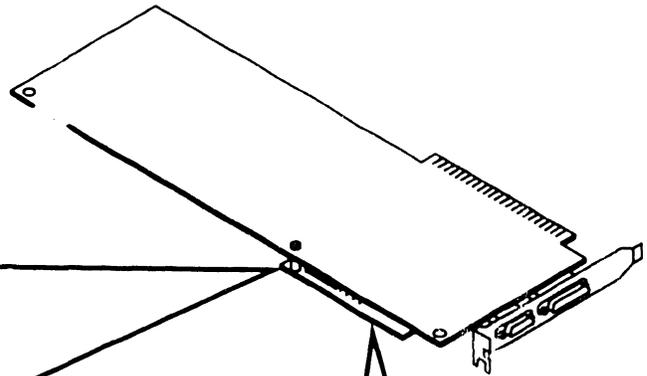
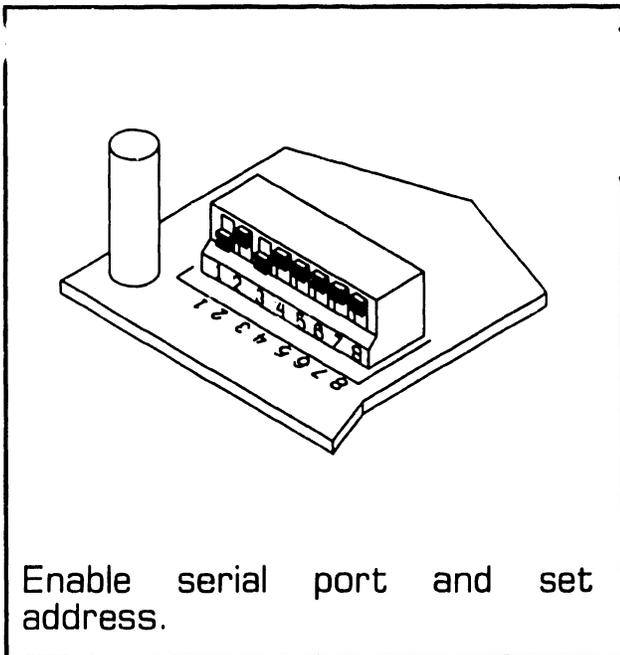
3.2 1640 CONTROLLER (100 DPI)

3.2 Settings

3.2.2 Serial Port Configuration (Sheet 1 of 2)

NOTE

Serial port address must not conflict with any other device in the PC.

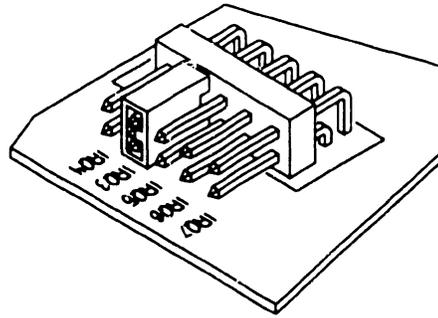
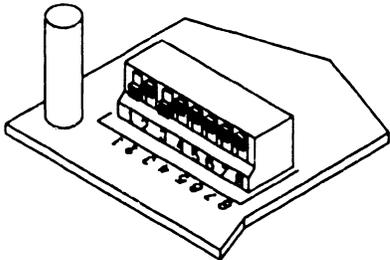


▶ NEXT

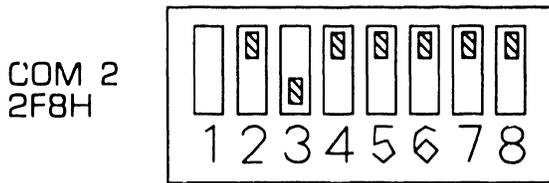
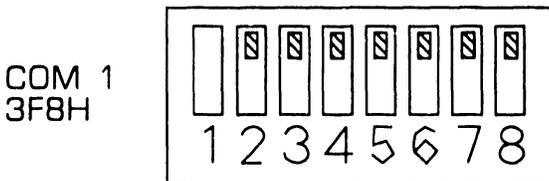
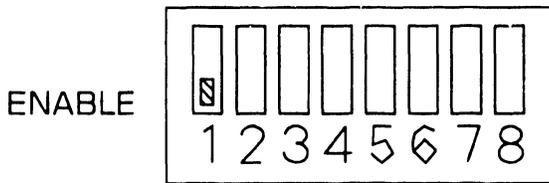
3.2 1640 CONTROLLER (100 DPI)

3.2 Settings

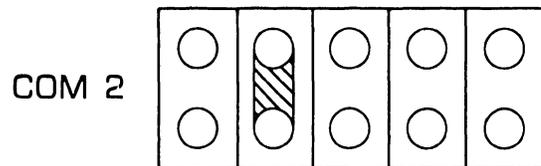
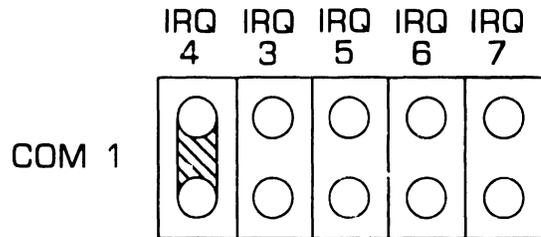
3.2.2 Serial Port Configuration (Sheet 2 of 2)



S S S S S S S
 E A A A A A A A
 N 9 8 7 6 5 4 3



2 F 8



= SWITCH POSITION

● END

3.3 1640 CONTROLLER (100 DPI)

3.3 Operation

Operation of the 1640 Controller depends upon the system configuration. Refer to the *1640 Controller and Driver User's Guide* for this information.

● END

3.4 1640 CONTROLLER (100 DPI)

Troubleshooting

Troubleshooting for this product is by diskette-based diagnostic utility only.

The WANGDIAG.EXE file is supplied on *Full-Page-1640 Driver Diskette #2*. It may also have been installed on the hard disk. Complete instructions for installing and running the Full-Page-1640 board diagnostics are in the *1640 Controller and Driver User's Guide*.

Field repair is by unit replacement. No other field repairs are authorized.

● END

3.5 1640 CONTROLLER (100 DPI)

Replaceable Parts

<i>Item</i>	<i>Part Number</i>	<i>Name</i>
1	725-3824	1640 Full Page Monitor Controller

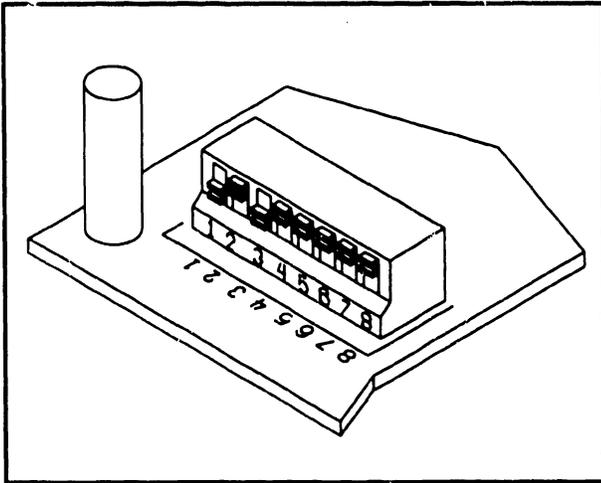
● END

3.6 1640 CONTROLLER (100 DPI)

3.6 Installation

3.6.1 Communications Port

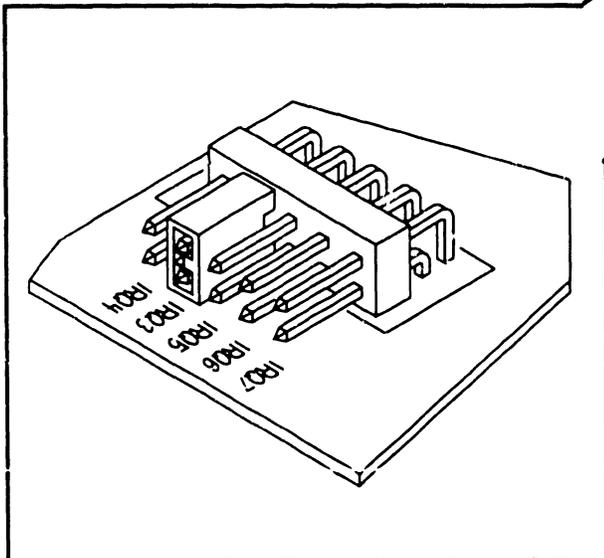
- 1 ENABLE or DISABLE asynchronous communications port. (▶3.2.2)



NOTE

Serial port address must not conflict with any other device in the PC.

- 2 If enabled, set communications port address and interrupt level for COM1, COM2, etc. (▶3.2.2)

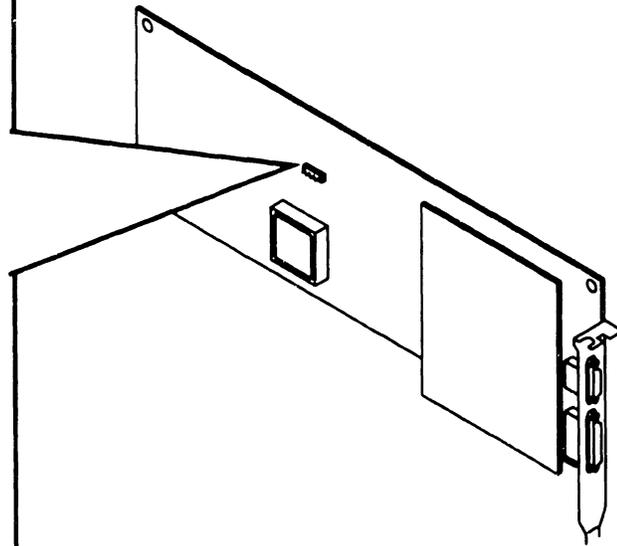
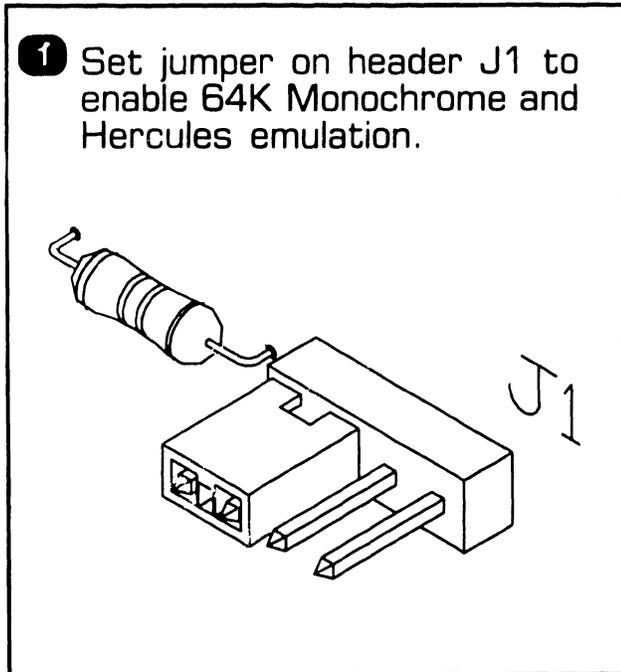


● END

3.6 1640 CONTROLLER (100 DPI)

3.6 Installation

3.6.2 Single Monitor Systems



- 2 Physically install board in any 8-bit or 16-bit expansion slot. (▶741-1771)
- 3 Set monitor type switch or jumper on PC motherboard for *Monochrome*. (▶741-1771)
- 4 Run SETUP utility to configure the display controller. Specify *Monochrome*.

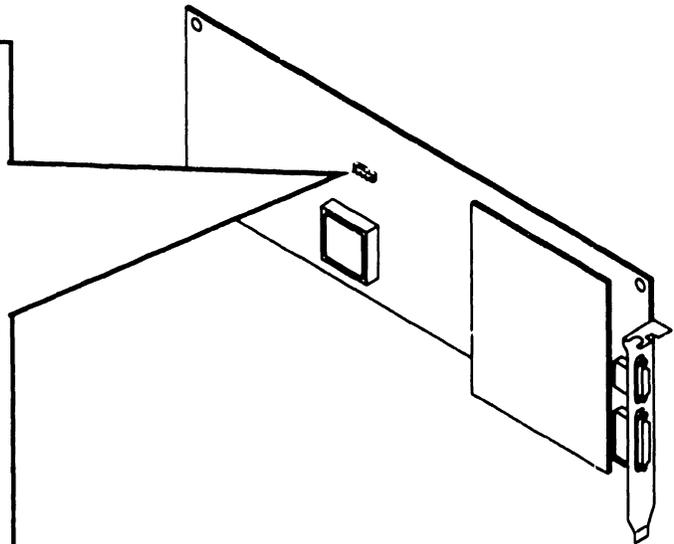
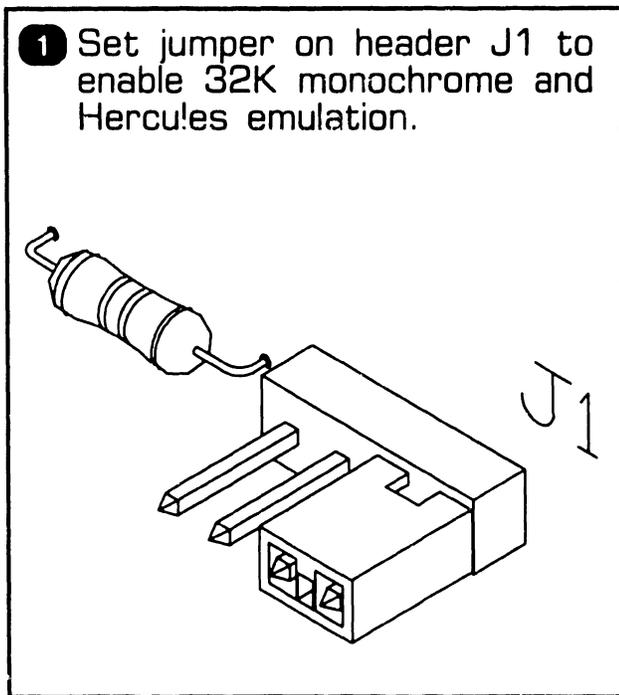
● END

3.6 1640 CONTROLLER (100 DPI)

3.6 Installation

3.6.3 Dual Monitor Systems (Sheet 1 of 4)

- 1640 as Primary Display.



- 2** Physically install 1640 controller in any 8-bit or 16-bit expansion slot. (▶741-1771)

▶NEXT

3.6 1640 CONTROLLER (100 DPI)

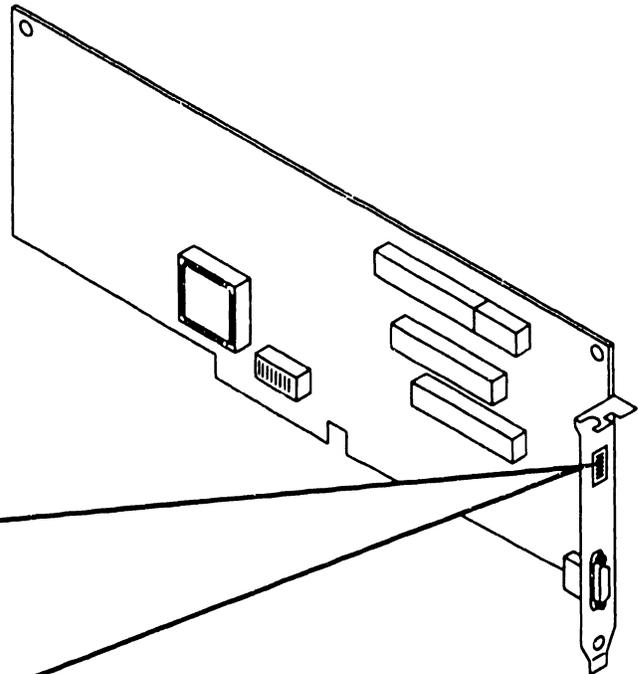
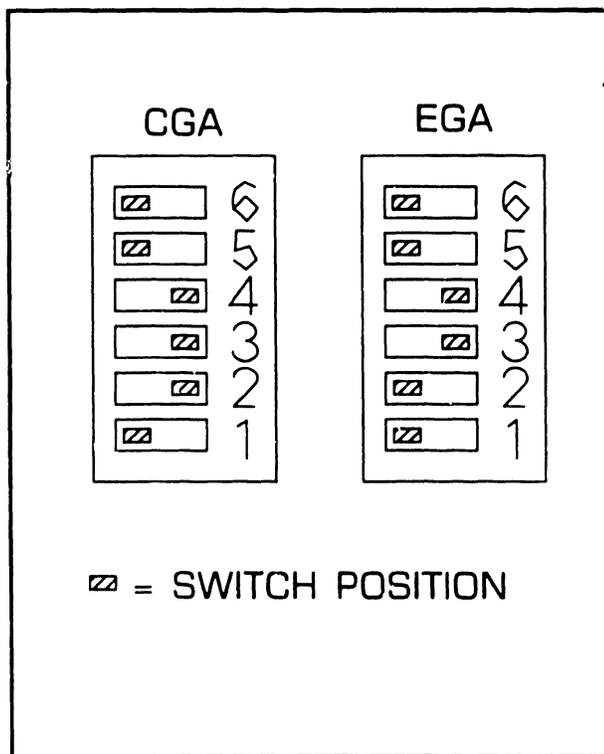
3.6 Installation

3.6.3 Dual Monitor Systems (Sheet 2 of 4)

NOTE

Illustrations on this page refer to MEGA monitor controller.

- 3 Set MEGA (secondary) controller switches for 80x25 Color Display (CGA), or 350 line Enhanced Display (EGA). (➡741-1771)



- 4 Run SETUP utility to configure the display controller. Specify **EGA**. (➡Wang Professional Computer 200/300 Series Installation Guide)

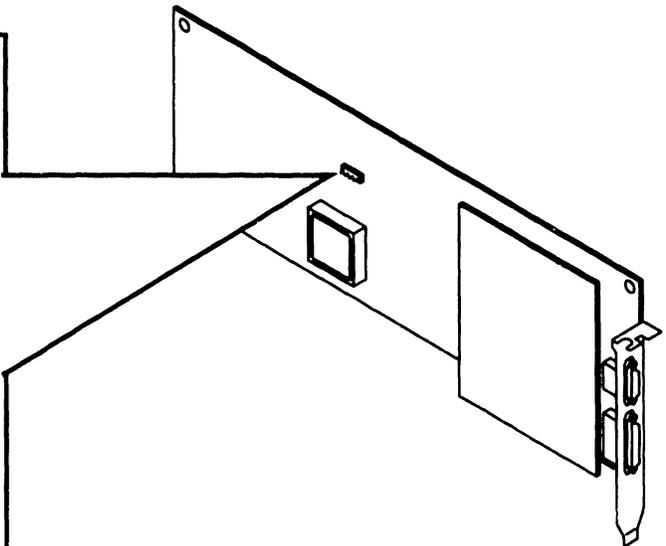
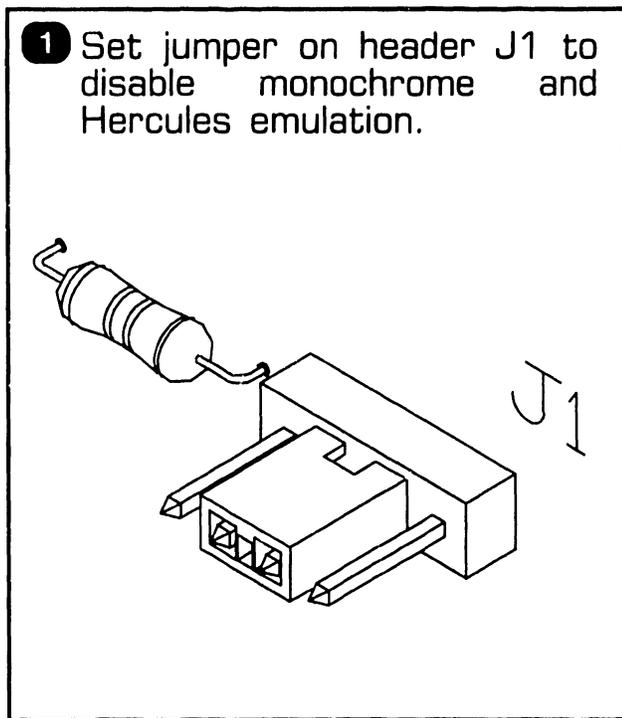
➡NEXT

3.6 1640 CONTROLLER (100 DPI)

3.6 Installation

3.6.3 Dual Monitor Systems (Sheet 3 of 4)

- 1640 as Secondary Display.



- 2** Physically install 1640 controller in any 8-bit or 16-bit expansion slot. (▶741-1771)

▶NEXT

3.6 1640 CONTROLLER (100 DPI)

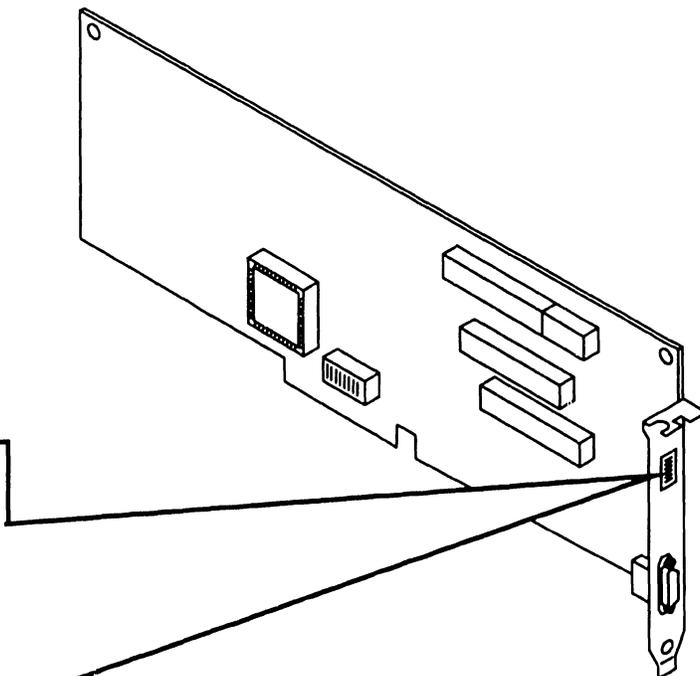
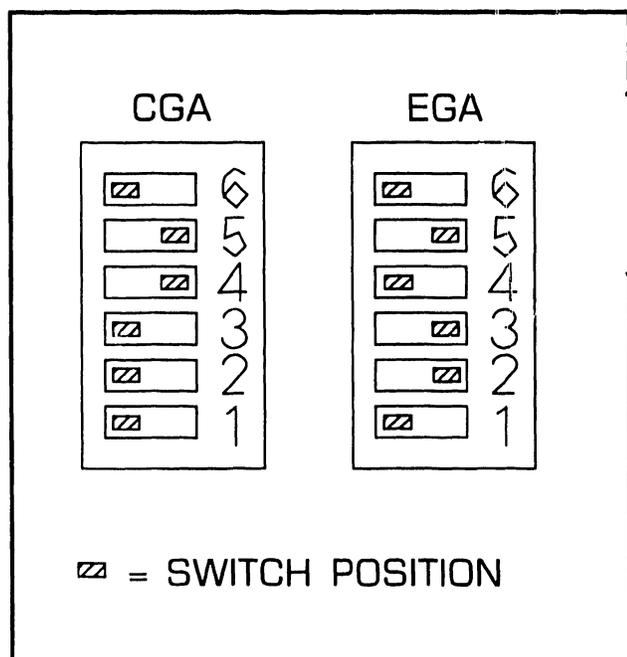
3.6 Installation

3.6.3 Dual Monitor Systems (Sheet 4 of 4)

NOTE

Illustrations on this page refer to MEGA monitor controller.

- 3 Set MEGA (primary) controller switches for 80x25 Color Display (CGA), or 350 line Enhanced Display (EGA). (►741-1771)



- 4 Run SETUP utility to configure the display controller. Specify **EGA**. (►Wang Professional Computer 200/300 Series Installation Guide)

● END

SECTION 4
MICROCONTROL

MICROCONTROL

SECTION 4

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4.1 Introduction

NOTE

MicroControl option section *does not* include configuration instructions, operating instructions, or user commands. This information is provided in the documentation included with the option.

MicroControl option, Model YDE-MCTL-PC2, provides a security feature for the Professional Computer Models 240, 280, and 380. The security feature provides file protection and limits PC access to authorized personnel.

Minimum PC configuration required for the MicroControl option are PC Models 240, 280, and 380 with:

- Single Diskette Drive
- 192KB Memory
- DOS Version 2.1 or Higher

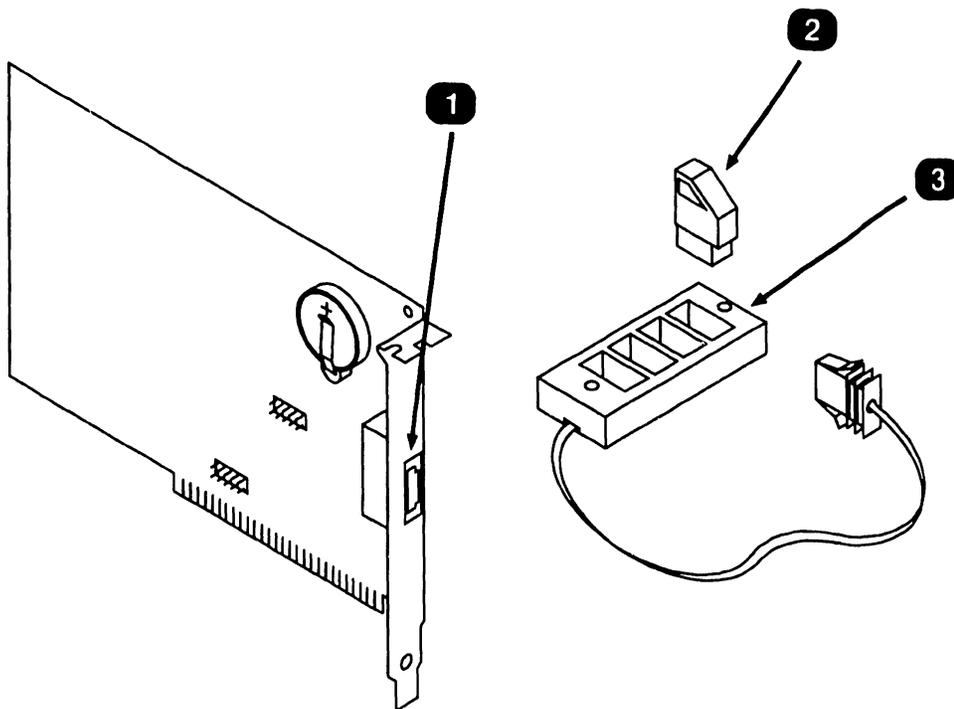
MicroControl option contains the following:

- MicroControl Board (725-4052)
- Token Receptacle (725-4048)
- Electronic Tokens
- Configuration Diskettes
- Documentation

● END

4.3 Controls and Indicators

MICROCONTROL



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Token Connector	4-Pin connector, provides physical interface for Token Reader.
2	Token	4-Pin programmable molded token, stores logon identifiers for authorized users.
3	Token Reader and Cable	Provides interface between token and MicroControl Board.

● END

4.4 Preventive Maintenance

MicroControl PCA lithium battery must be replaced every two years.
(▶4.6.2)

● END

4.5 Troubleshooting

4.5.1 Tools and Equipment

Tools and equipment required to troubleshoot the MicroControl board consists of MicroControl BIT diagnostics and PC Diagnostic Utility.

NOTE

PC-240, PC-280, and PC-380 BIT diagnostic error messages and error message interpretation are contained in Section 6 of their associated manuals.

● END

4.5 Troubleshooting

4.5.2 MicroControl Power-Up BIT Diagnostics

MicroControl power-up BIT Diagnostics only runs after the option is initially installed. Thereafter, BIT test must be run from the configuration diskette (part number 725-4051) by running the diagnostic file 'SPDIAG.EXE'. Diagnostic error codes are displayed on the monitor screen. If no error conditions are detected, the following status message is displayed on the monitor screen.

FULLY FUNCTIONAL

Prior to powering-on the PC, perform the following MicroControl hardware checks:

- Hex Segment Address jumper (H2) is set to a valid, non-conflicting address. (▶4.2)
- Interrupt Level jumper (H3) is set to a valid, non-conflicting address. (▶4.2)
- The board is properly seated in an expansion slot.
- Token Reader cable is properly connected.

● END

4.5 Troubleshooting

MICROCONTROL

4.5.3 MicroControl BIT Error Messages

<i>Test</i>	<i>Fault Code</i>	<i>Troubleshooting Action</i>
Memory 1	1	Verify Hex Segment address jumper (H2) setting. Select another valid setting (▶4.2) and re-run BIT. If error continues, board is defective.
Memory 2	2	Verify Hex Segment address jumper (H2) setting. Select another valid setting (▶4.2) and re-run BIT. If error continues, board is defective.
Memory 3	4	Verify Hex Segment address jumper (H2) setting. Select another valid setting (▶4.2) and re-run BIT. If error continues, board is defective.
Encryption	8	Encryption logic defective, replace board.
Watch	16	Watch logic is defective, replace board.
Protect 1	64	Interrupt level conflict, select another valid interrupt level (▶4.2) and re-run BIT diagnostics. If error continues, board is defective.
Protect 2	128	Board is defective, replace board.
Integrity Check		Battery replacement required. (▶4.6.2)

◆ END

4.5 Troubleshooting

4.5.4 Diagnostic Utility

NOTE

Diagnostic Utility software must be revision 2860 or greater to run Diagnostic Utility on PC 200/300 Series Computers with the MicroControl board installed. If the Diagnostic Utility software revision is less than 2860, the MicroControl board must be removed from the system before Diagnostic Utility can be run. Refer to section 4.6.1 for MicroControl board removal.

Refer to the associated PC manual for Diagnostic Utility operation procedures.

Diagnostic Utility is a diskette based troubleshooting aid that allows the user or CE to run extensive diagnostic testing. Diagnostic Utility part number 195-5537-9 Revision 2680 or higher supports the MicroControl option. To run Diagnostic Utility with MicroControl installed requires MicroControl-file 'PREPDIAG.COM' be loaded onto the Diagnostic Utility diskette. Perform the following to copy this file:

- From DOS Command Processor, copy file 'PREPDIAG.COM' from the MicroControl Security Control Menu diskette to the Wang PC 200/300 Diagnostic Utility diskette.

● END

4.5 Troubleshooting

MICROCONTROL

4.5.5 Troubleshooting Procedures

Troubleshooting procedures are presented in the format; Fault Condition and Troubleshooting Actions.

<i>Fault Condition</i>	<i>Troubleshooting Action</i>
System will not power-up with MicroControl Board installed.	<ul style="list-style-type: none">• MicroControl board may be defective: Remove MicroControl board and re-boot the system. If system powers-up, MicroControl board is defective. Run power-up diagnostics and Diagnostic Utility to verify system integrity. Replace MicroControl board.• If system does not power up with MicroControl board removed, refer to the associated system manual for troubleshooting procedures.
System powers-up, MicroControl error code 1, 2, 4, or 64 is displayed.	<ul style="list-style-type: none">• Verify MicroControl board Interrupt level (H3) and Hex Address Segment (H2) jumpers are set to valid, nonconflicting settings. (►4.2). Reseat board and re-boot the system. If error continues, replace board. (►4.6).
System displays intermittent errors.	<ul style="list-style-type: none">• MicroControl board may be defective: Run Diagnostic Utility and interpret results. Replace defective board. (►4.6).

◆ END

4.6 Parts Replacement

MICROCONTROL

4.6.1 MicroControl Board (Sheet 1 of 2)

To Remove

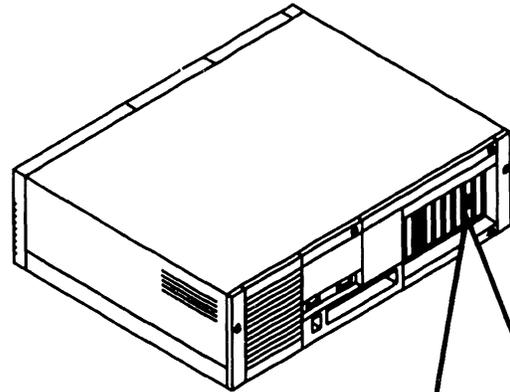
CAUTION

Prior to performing any parts replacement, the system administrator should be present. When the board is removed from the card cage, a security feature disables the onboard configuration file memory retention; requiring the configuration file to be reloaded.

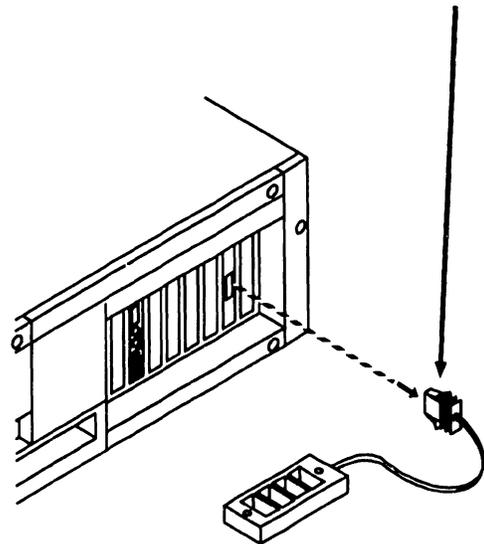
NOTE

Parts replacement illustrations use Professional Computer Model 280. PC Models 240 and 380 parts replacement procedure for this option are similar.

- 1 Power unit OFF and disconnect ac power.



- 2 Disconnect token reader cable connected to MicroControl rear panel.



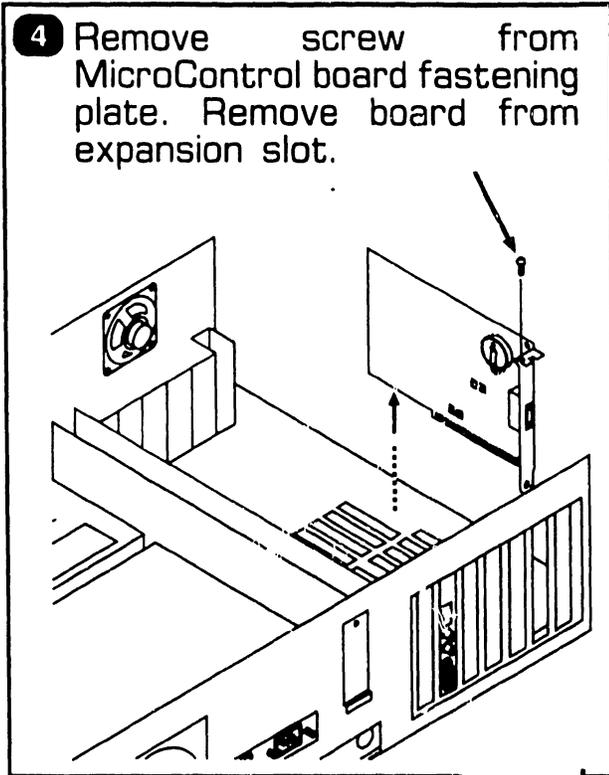
- 3 Remove electronic enclosure top/front cover.

▶ NEXT

4.6 Parts Replacement

MICROCONTROL

4.6.1 MicroControl Board (Sheet 2 of 2)

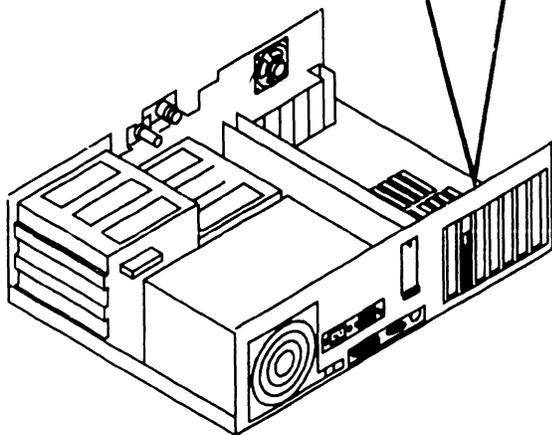


To Install

NOTE

Slot 8 (the slot closest to the power supply) *should not* be used for the MicroControl board.

- 1 Verify MicroControl board jumper positions. (►4.2)
- 2 Reverse removal procedures to complete the installation.
- 3 System Administrator must re-configure the system.



● END

4.6 Parts Replacement

MICROCONTROL

4.6.2 MicroControl Board Battery

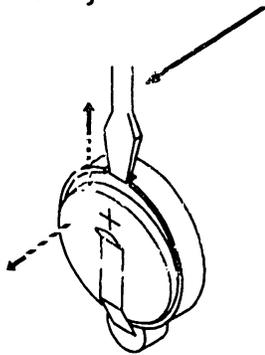
To Remove

CAUTION

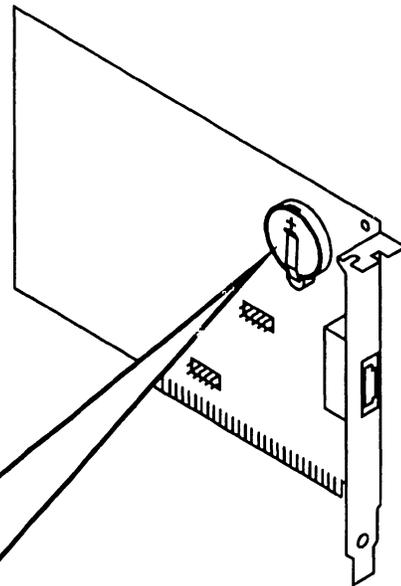
Prior to performing any parts replacement, the system administrator should be present. When the board is removed from the card cage and the battery is replaced, the onboard configuration file retention is disabled; requiring the configuration file to be reloaded.

- 1 Remove MicroControl board from system. (►4.6.1)

- 2 Insert small flat-blade screwdriver between the battery holder top cutout and battery.



- 3 Lift top of battery out of the holder and slide battery out from under the retaining spring.



To Install

- 1 Note battery polarity and position battery with positive (denoted +) sign towards retaining spring.
- 2 Lift up retaining spring and slide battery into battery holder.
- 3 Ensure battery is properly seated in holder and retaining spring is making good contact with the positive side of the battery.
- 4 Reverse removal procedures to complete installation. (►4.6.1)

● END

4.7 Installation

MICROCONTROL

4.7.1 MicroControl Board (725-4052) Installation

NOTE

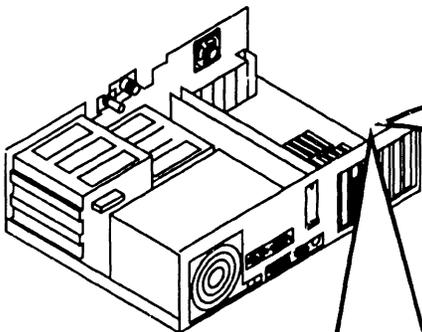
Before installing MicroControl PCA, ensure the System Administrator has completed the initial MicroControl programming (i.e., loaded configuration diskettes, ran program SYSWATCH and SYSCHECK, etc.).

- 4 Verify proper positions of Interrupt Level jumper (H3) and Hex Address jumper (H2). (➡4.2)

NOTE

Slot 8 (the slot closest to the power supply) should not be used for the MicroControl board.

- 1 Power unit OFF and disconnect ac power. (➡4.6.1)
- 2 Remove top/front cover. (➡4.6.1)



- 3 Remove screw securing fastening/access plate to enclosure and remove.

A close-up diagram of the access plate on the back of the chassis. A screw is shown being removed from the plate. An arrow points to the screw.

- 5 Install MicroControl option board into expansion slot and secure with screw removed in step 3.
- 6 Replace top/front cover.

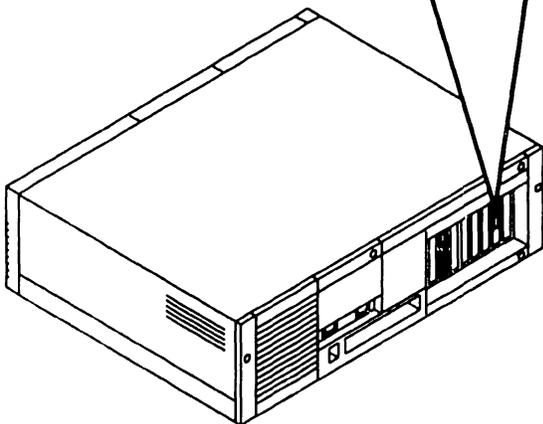
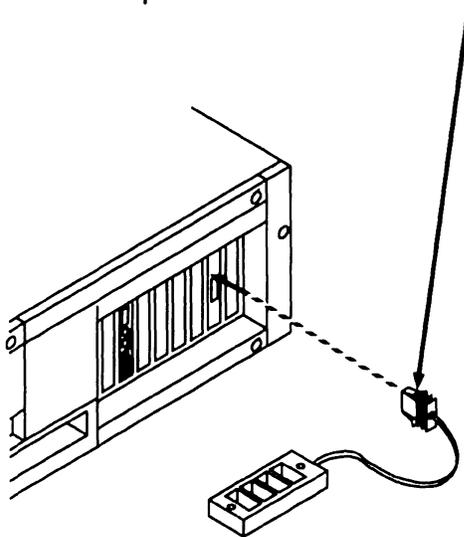
A perspective view of the chassis with the MicroControl board fully installed in the expansion slot. A screw is shown being inserted into the board to secure it. An arrow points from the screw in step 3 to this screw. Below the chassis, a separate diagram shows the top/front cover being placed back on the unit.

◆ END

4.7 Installation

4.7.2 MicroControl Token Reader/Cable Installation

- 1 Connect token reader cable to connector mounted on MicroControl fastening/access plate.



● END

4.7 Installation

4.7.3 MicroControl Software Installation

1. Perform system power-on procedures. MicroControl BIT will run and upon successful completion displayed the message:

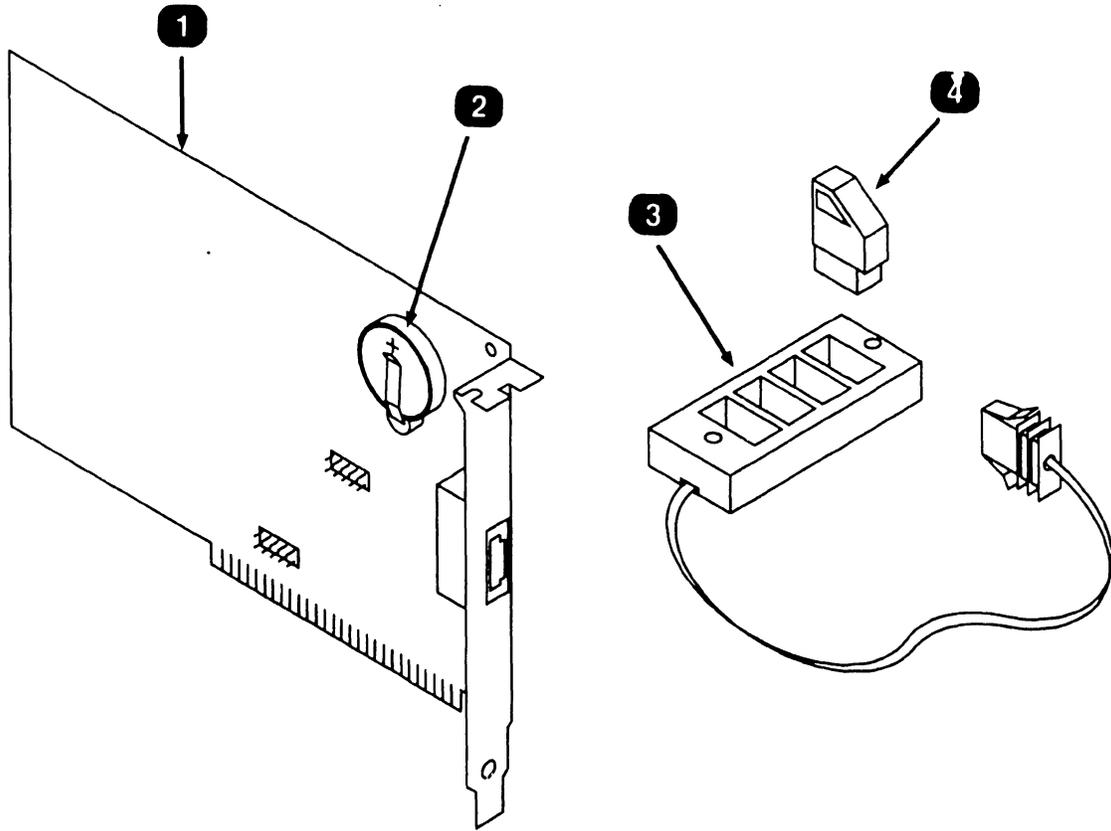
Fully Functional

At this time, the System Administrator will configure or re-configure the MicroControl option.

● END

4.8 Illustrated Parts

MICROCONTROL



<i>Item</i>	<i>Name</i>	<i>Description</i>
1	725-4052	MicroControl Board (Model YDE-MCTL-PC2)
2	725-4544	Battery, Lithium
3	725-4048	Token Receptacle and Cable
4	725-4049	Token (Package of Five)

● END

SECTION 5
1640
CONTROLLER
(200 DPI)

1640 CONTROLLER (200 DPI)

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5.8 ILLUSTRATED PARTS	5-17

5.1 1640 CONTROLLER (200 DPI)

Introduction

NOTE

Series 300 Professional Computers do not support the 200 DPI 1640 Controller Model WIIS-CRTL-1640.

This section only contains information pertaining to the 1640 Controller (200 DPI). For information on the Full Page Monitor (MON-1640), refer to manual, 741-1800.

The 1640 Monitor Controller Model WIIS-CTRL-1640 supports the 16 inch full page monochrome monitor Model MON-1640, and provides high resolution graphics capability of either 100 or 200 Dots Per Inch (dpi) for Series 200 Professional Computer Imaging Workstations. Additionally, this board can emulate a Hercules Plus board (switch selectable) and supports Hercules™ text and graphics mode as well as Hercules Plus RAM-FONT modes.

NOTE

Series 280 Professional Computers requires CPU board E-Rev 9 or higher and an Expanded Memory Module E-Rev 4 or higher for this option.

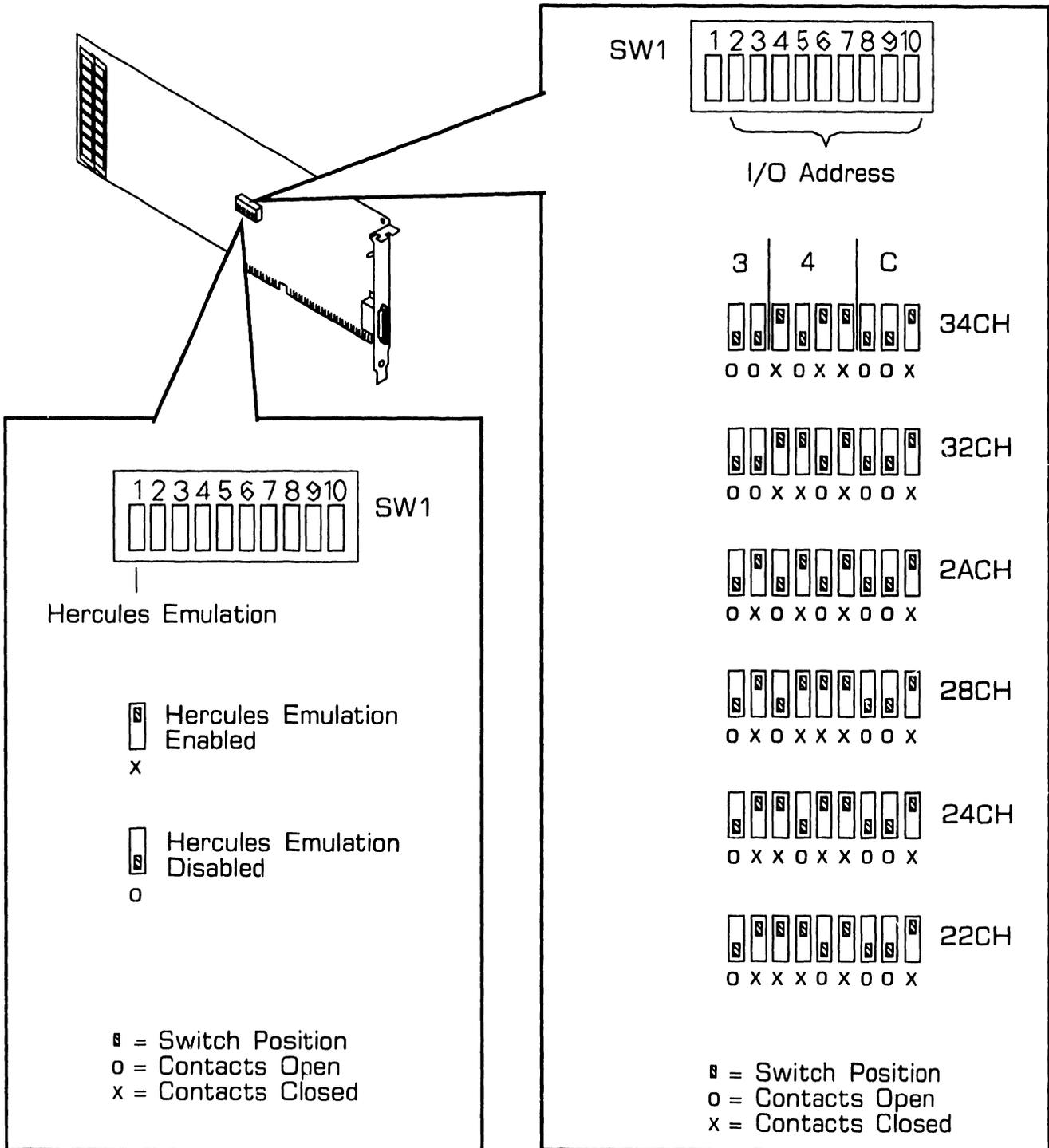
Minimum PC hardware configuration required for Series 200 Professional Computer Imaging Workstations are PC Models 240 or 280 with:

Hercules is a trademark of Hercules Technology, Inc.

- 1.2 MB Diskette
 - 640KB Main Memory
 - 512K Expanded Memory Module (EMM) E-Rev 4 or higher
 - 928 WLOC Card
 - 1640 Controller (200 DPI)
- Software required for WIIS Imaging are:
- MS DOS 3.2 or Higher
 - VS Operating System 7 14 or Higher
 - VS WIIS Environment 2.20 or Higher
 - 4250-IMG-SW-9 Workstation Software

● END

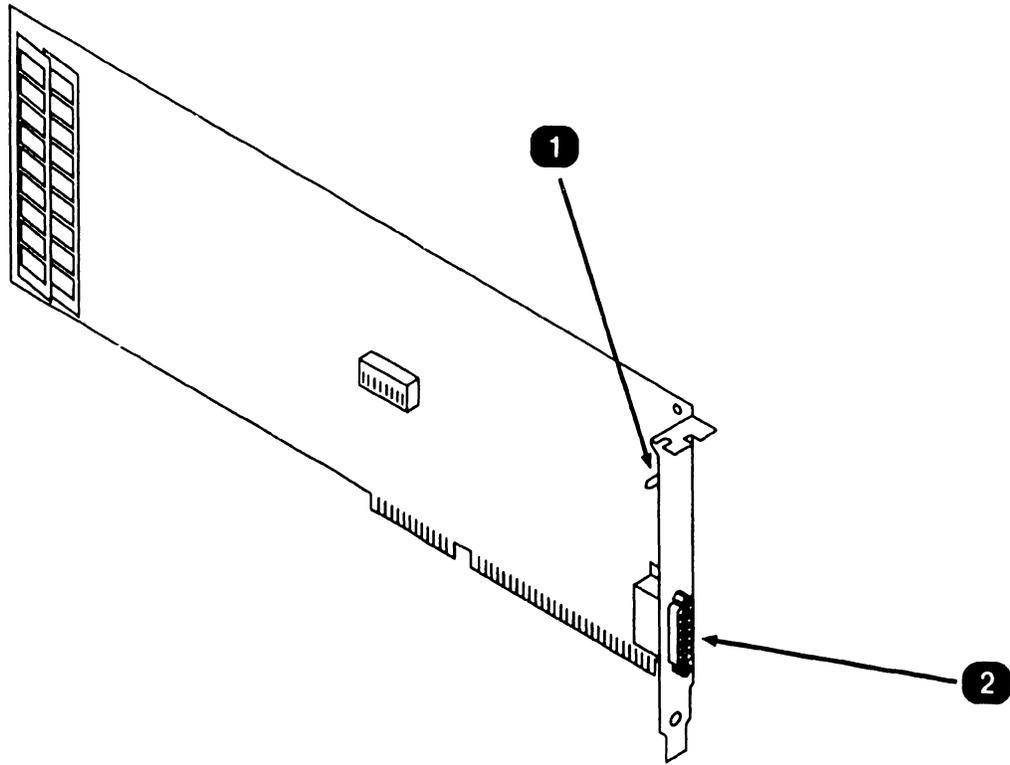
5.2 1640 CONTROLLER (200 DPI) Settings



● END

5.3 1640 CONTROLLER (200 DPI)

Controls And Indicators



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	LED, Z1	Not used.
2	Interface Connector, J1	26-Pin connector, provides physical interface to MON-1640 Full Page Monitor.

● END

5.4 1640 CONTROLLER (200 DPI)

5.4 Troubleshooting

5.4.1 Tools and Equipment

Tools and equipment required to troubleshoot the 1640 Controller 200 DPI consists of BIT diagnostics and PC Diagnostic Utility.

NOTE

PC-240 and PC-280 BIT diagnostic error messages and error message interpretation are contained in Section 6 of their associated manuals.

● END

5.4 1640 CONTROLLER (200 DPI)

5.4 Troubleshooting

5.4.2 Power-Up BIT Diagnostics

Power-up BIT Diagnostics perform diagnostics testing of the option system every time the PC is powered-on. The 1640 Controller performs a basic memory BIT test, and in the event of an error, an audible tone (beep) will be sounded through the system speaker. If other circuitry on the board is not functional, the system may either hang or the monitor will not display information. If a problem is encountered, run the Diagnostic Utilities. (►5.4.3)

Prior to powering-on the PC, perform the following hardware checks.

- The board is properly seated in an expansion slot.

The board Address I/O Space switch (SW1) is set to a valid, non-conflicting address.

- Monitor cable is properly connected.
- Monitor is powered-on.

● END

5.4 Troubleshooting

5.4.3 Diagnostic Utility

Diagnostic Utility is a diskette based troubleshooting aid that allows the user or CE to run extensive diagnostic testing. Diagnostic Utility part number 195-5537-9 Revision 2880 or higher supports the 1640 Controller (200 DPI). Refer to the associated PC manual for Diagnostic Utility operating procedures.

● END

5.4 1640 CONTROLLER (200 DPI)

5.4 Troubleshooting

5.4.4 Troubleshooting Procedures

Troubleshooting procedures are presented in the format; Fault Condition and Troubleshooting Actions.

<i>Fault Condition</i>	<i>Troubleshooting Action</i>
System will not power-up with 1640 Controller installed.	<ul style="list-style-type: none">• 1640 Controller may be defective: Remove 1640 Controller (200 DPI) and re-boot the system. If system powers-up, 1640 Controller may be defective. Run power-up diagnostics and Diagnostic Utility to verify system integrity. Verify 1640 Controller I/O Address Space switch settings. (➡5.2) Replace 1640 Controller (200 DPI) and perform power-on procedures.• If system does not power up with 1640 Controller removed, refer to associated system manual for troubleshooting procedures.
System powers-up, 1640 Controller BIT error is encountered.	<ul style="list-style-type: none">• Verify 1640 Controller address setting is set to a valid, nonconflicting settings. (➡5.2) Reseat board and re-boot the system. If error continues, replace 1640 Controller. (➡5.6)
System powers-up, monitor screen does not display raster or screen load	<ul style="list-style-type: none">• Full Page monitor may be defective: Verify monitor cabling and that monitor is powered-on (power LED is lit). Refer to Full Page Monitor manual (741-1800) for monitor troubleshooting procedures.• 1640 Controller may be defective, replace controller board.

● END

5.5 1640 CONTROLLER (200 DPI)

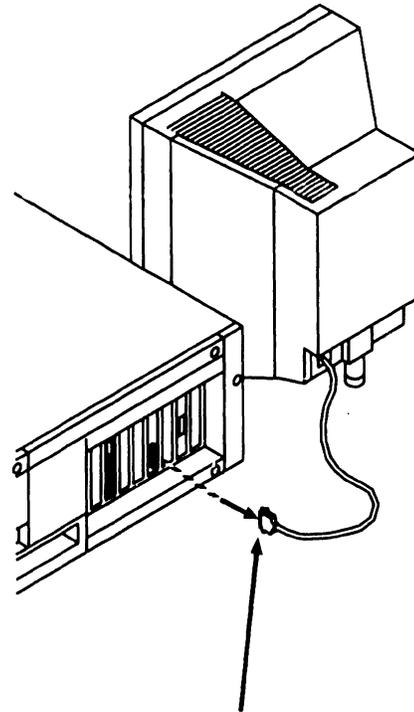
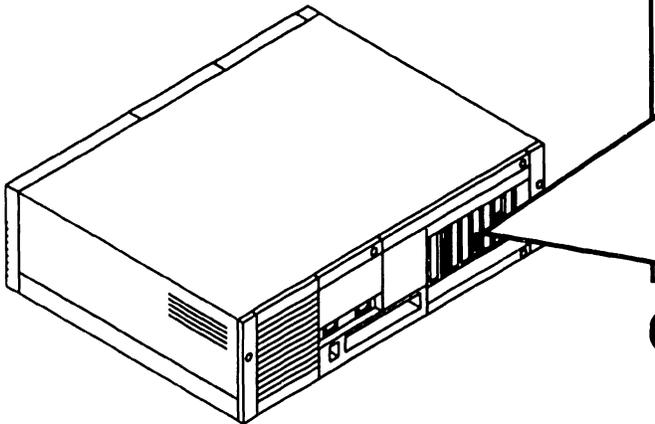
Parts Replacement (Sheet 1 of 2)

To Remove

NOTE

Parts replacement illustrations use Professional Computer Model 280. PC Model 240 parts replacement procedure for this option are similar.

- 1 Power unit OFF and disconnect ac power.



- 2 Disconnect monitor cable connected to 1640 Controller rear panel connector.

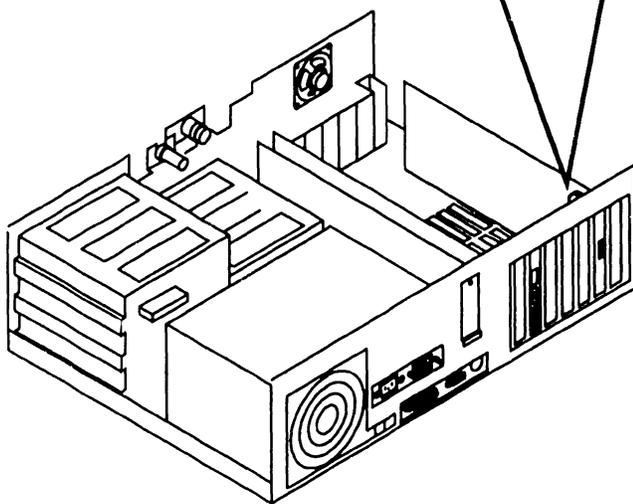
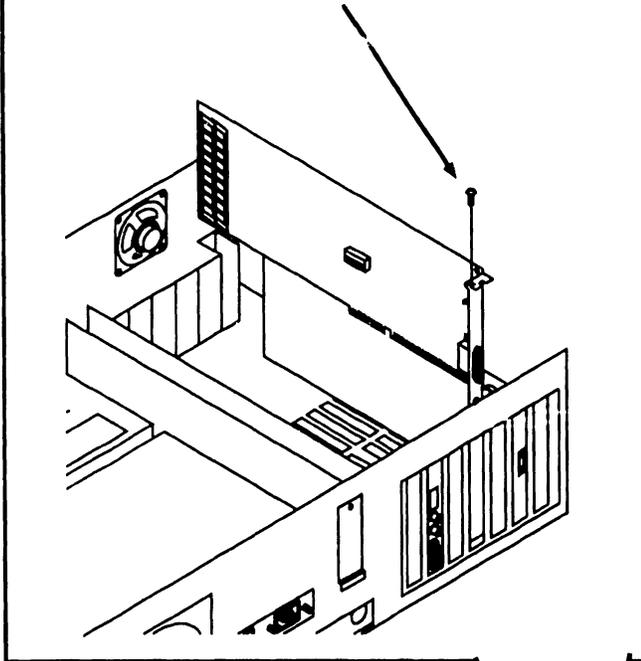
- 3 Remove electronic enclosure top/front cover.

▶NEXT

5.5 1640 CONTROLLER (200 DPI)

Parts Replacement (Sheet 2 of 2)

- 4 Remove screw from 1640 Controller fastening plate. Remove board from expansion slot.



To Install

- 1 Verify 1640 Controller I/O Address Space switch settings (►5.2).

NOTE

1640 Controller (200 DPI) must be installed in a 16-bit expansion slot.

- 2 Reverse removal procedures to complete the installation.

● END

5.6 1640 CONTROLLER (200 DPI)

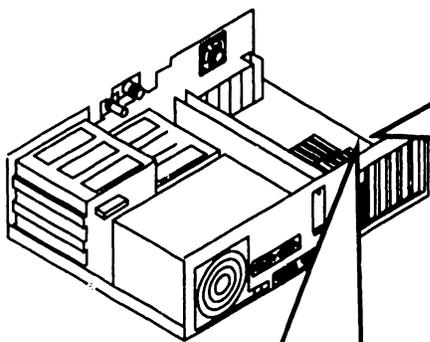
Installation

5.6.1 1640 Controller (200 DPI) Installation

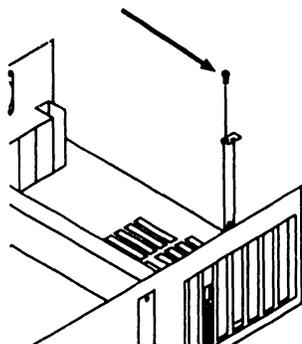
NOTE

Series 280 Professional Computers requires CPU board E-Rev 9 or higher and an EMM board E-Rev 4 or higher for this option.

- 1 Power unit OFF and disconnect ac power. (➡5.5)
- 2 Remove top/front cover. (➡5.5)

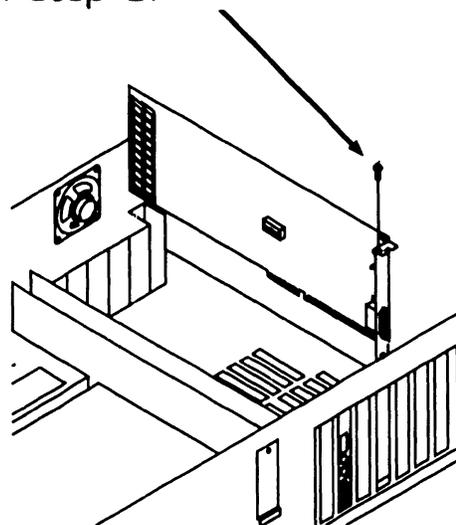


- 3 Remove screw securing fastening/access plate to enclosure and remove.



- 4 Verify proper positions of I/O Address Space/Hercules Emulation switch SW1. (➡5.2)

- 5 Install 1640 Controller into any 16-bit expansion slot and secure with screw removed in step 3.



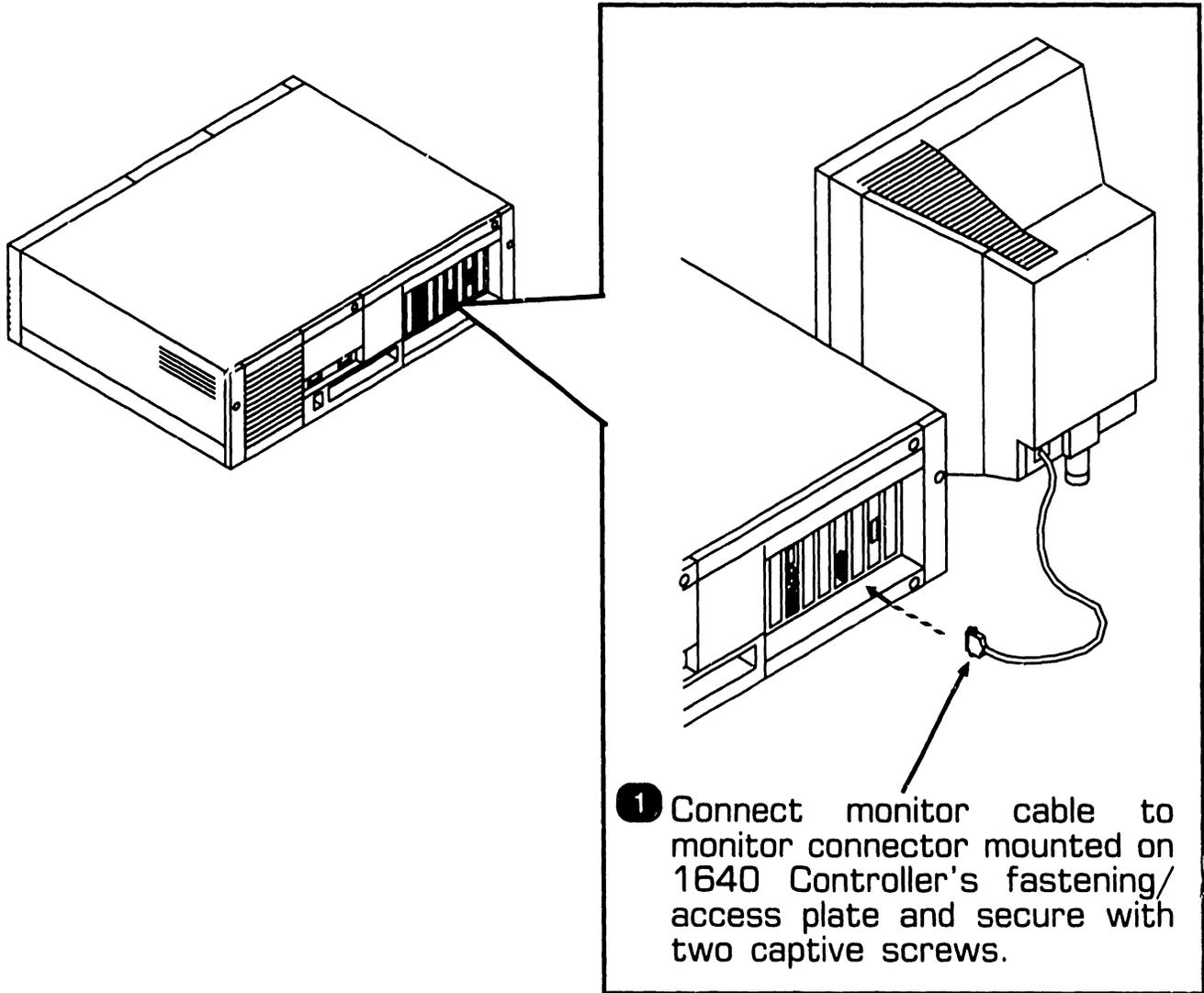
- 6 Replace top/front cover.

● END

5.6 1640 CONTROLLER (200 DPI)

.6 Installation

5.6.2 1640 Controller (200 DPI) Cabling



● END

1640 CONTROLLER (200 DPI)

5.7 Functional Description

5.7.1 1640 Controller (200 DPI) Architecture

The 1640 Controller (200 DPI) is designed to provide very high resolution of 200 dots per inch horizontally at 200 lines per inch vertically. Dot clock circuitry designed on the board provides additional horizontal resolutions of 75, 100, and 150 dot per inch with a vertical resolution of either 100 or 200 lines per inch. With this design incorporated into the 1640 Controller (200 DPI), the end user has the ability to run existing monochrome applications as well as high resolution graphics. Additionally, the 1640 Controller contains logic to emulate the Hercules Plus board thus emulating Hercules text mode, graphics mode as well as Hercules Plus RAMFONT modes.

The major features of the 1640 Controller (200 DPI) include:

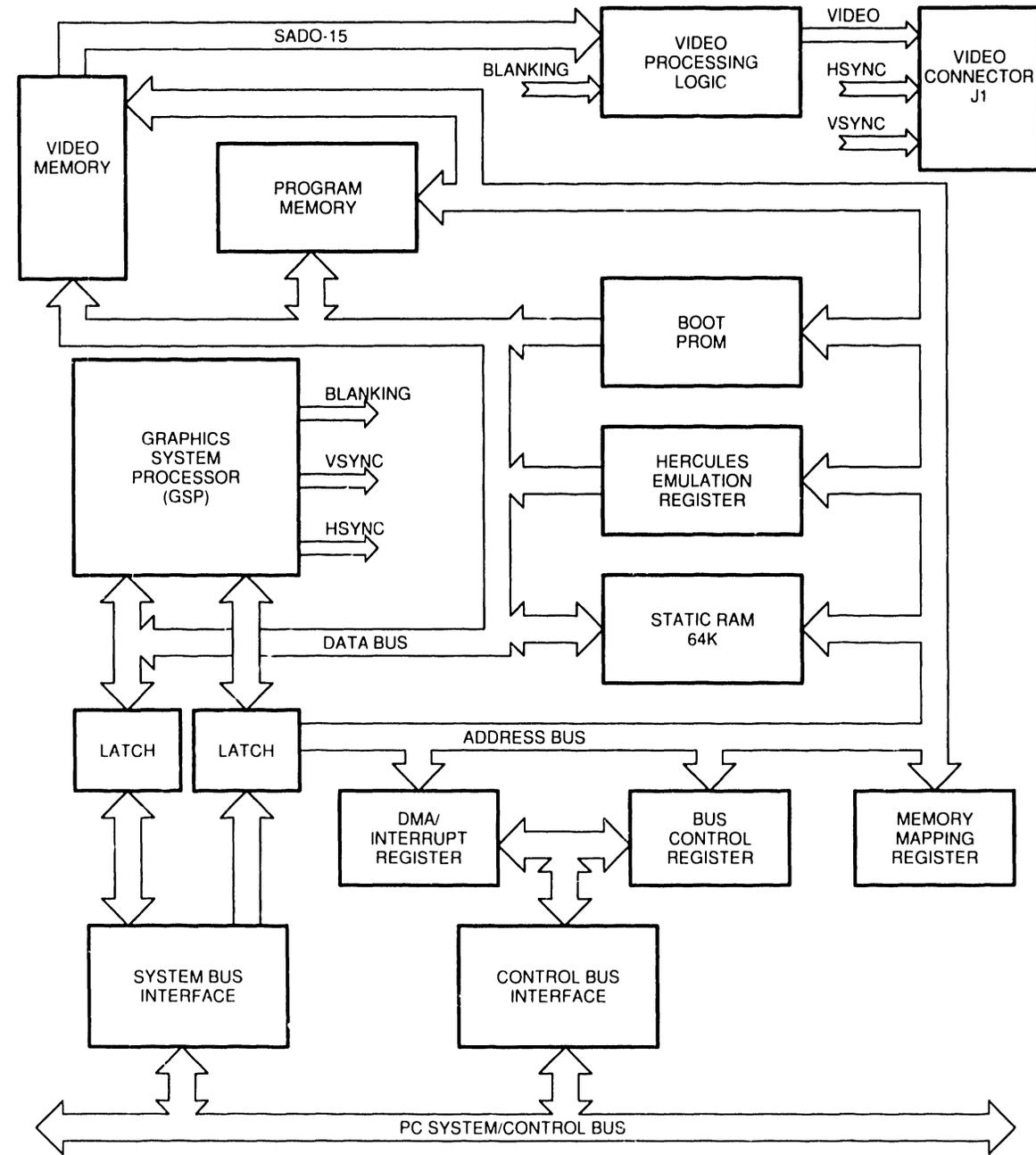
- 32-bit Graphics System Processor that provides the high performance computer graphics applications, CRT timing generation, CRT automatic display refresh, controls on-board memory, and provides direct communications with the system's CPU
- Memory mapping and control register providing CPU memory mapping of 32K or 64K, PROM enable, Hercules enable, and Hercules clock speed
- Up to 2MB of SIMM program memory
- 512KB of video display memory
- 64KB static RAM memory
- DMA logic and interrupt logic which provides three interrupt levels and three DMA channels
- PC system address, data, and control bus interface logic
- Hercules Emulation logic
- Power-On Boot PROM
- 26-pin video connector that provides monitor controls signals; video, Hsync, and Vsync.

● END

5.7 1640 CONTROLLER (200 DPI)

5.7.2 Functional Description

5.7.2 1640 Controller Block Diagram



5.7.2

● END

1640 CONTROLLER (200 DPI)

5.7 Functional Description

5.7.3 1640 Controller Block Diagram Description (Sheet 1 of 2)

The 1640 Controller (200 DPI) provides very high resolution graphics at 200 dots per inch horizontal resolution and 100 or 200 dots per inch vertical resolution. The 200 dot per inch vertical resolution is interlaced. Horizontal resolutions of 75, 100, and 150 dots per inch are also supported.

A 32-bit Graphics System Processor (GSP) supports the high performance computer graphics applications, CRT timing generation, CRT automatic display refresh, controls on-board memory, and provides direct communications with the system's CPU. The GSP performs all general purpose processing task, and can access memory and peripheral as either a 16 bit device (word transfer) or an 8 bit device (byte transfer). All CRT timing signals, VSync, HSync, Blank, Display Refresh) are controlled by the GSP. On-board program memory, video memory, static memory, and Boot PROM can be accessed directly by the GSP or indirectly through the GSP by the system CPU.

The GSP communicates with the system CPU via the system bus using one of three interrupt channels and one of three DMA channels. These are:

- Interrupt Channel 15 (IRQ15)
- Interrupt Channel 12 (IRQ12)
- Interrupt Channel 10 (IRQ10)

- DMA Channel 5 (DRQ5)
- DMA Channel 6 (DRQ6)
- DMA Channel 7 (DRQ7)

The GSP becomes MASTER of the system bus by asserting a DMA Channel request (DRQ5-7). The system CPU returns the DMA acknowledge and the GSP asserts the MASTER line. When the GSP is Bus Master, it can access to system memory in 16-bit memory cycles. In order for the GSP to release control of the system bus, the DMA channel request is dropped and the MASTER line is set to inactive.

Memory Mapping and Control circuitry allows the system CPU and the GSP to access the 64K Static RAM memory, PROM, enable Hercules Emulation and/or Select Dot Clock. The system CPU can access this circuitry by either word or byte I/O instructions. The GSP accesses this circuitry as two 8-bit locations.

◆NEXT

1640 CONTROLLER (200 DPI)

5.7 Functional Description

5.7.3 1640 Controller Block Diagram Description (Sheet 2 of 2)

Program Memory consists of two SIMM modules and contain up to 2 Mbytes of memory. Program memory is accessed directly by the GSP. The system CPU can only access this memory through the GSP.

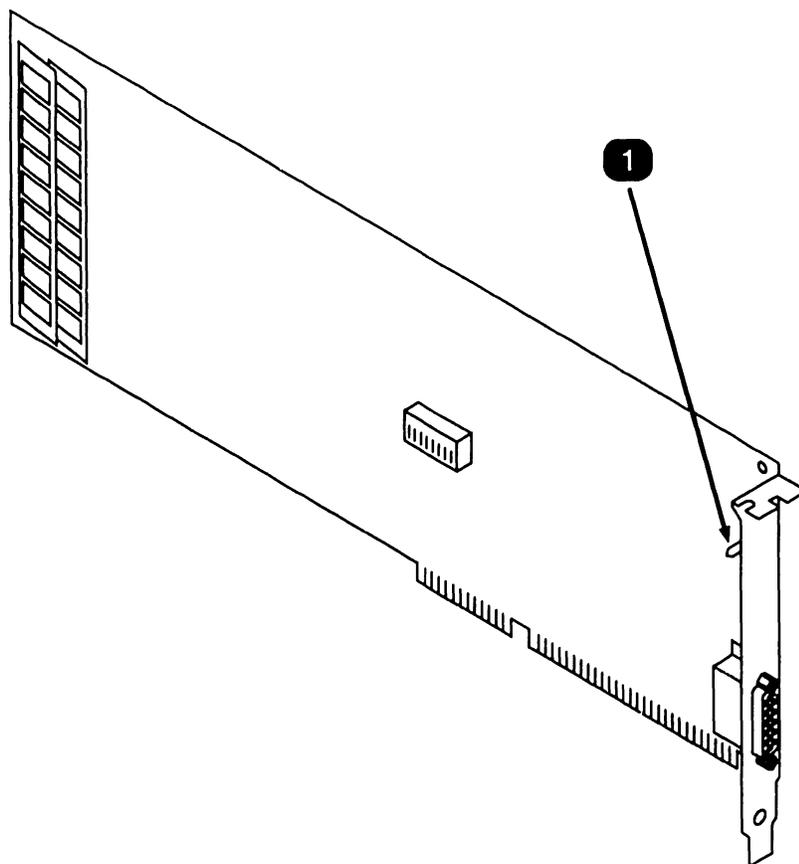
The 512 Kbytes of video memory contains the contents that are displayed on the monitor with bit 0 of a word being the first dot on the screen. Several resolutions are available depending on the dot clock selected and the internal programming of the GSP. On 200 dots per inch resolution, video memory is organized as 2048 lines of 128 sixteen bit words. The video memory is output to a shift register in 16 bit parallel format and is shifted out at the selected clock speed (dot clock) in a serial bit format to the monitor display.

Emulation of the Hercules Plus board is also supported by the 1640 Controller. Hercules Plus emulation is enabled by switch SW1-1 being set to the closed position and the ENEMUL bit is set in the Control register.

● END

5.8 1640 CONTROLLER (200 DPI)

Illustrated Parts



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
1	210-9229	1640 Controller, 200 DPI (Model WIIS-CTRL-1640)

● END