Industrial Workstation (WCI)

PREFACE

This manual explains how to use the Horner APG Industrial Workstation - Controller - Interface (WCI) for use in industrial environments.

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To obtain warranty service, return the product to your distributor with a description of the problem, proof of purchase, post paid, insured and in a suitable package.

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CHAPTER 1:   INTRODUCTION

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Congratulations on your purchase of the Horner Electric Workstation (WCI). The WCI (Workstation - Controller - Interface) is a unique product in the industrial marketplace which combines standard personal computer hardware with specialized communications interfaces. The WCI is panel mountable, gasketed, and is rated for NEMA 4 and NEMA 12 applications. It operates from user supplied AC power, 80-267VAC, 50/60 Hz. It offers very high ratings for noise immunity, and as such carries the CE mark designation.

Figure 1-1. Horner Electric WCI (Workstation-Controller-Interface)

1.1   Features

The WCI offers standard personal computer functionality with enhanced communications. It's hardware features include the following:

    a)   Pentium-based microprocessor
    b)   8, 16, 32, or 64MB of DRAM
    c)   500MB or greater hard disk drive
    d)   3.5" 1.44MB floppy disk drive
    e)   10.4" Active Matrix TFT color display
    f)   Industrial pointing device (mouse) or optional touchscreen,
    g)   25-key tactile feel function keys
    h)   17-key tactile feel numeric keypad
    i)   Two (2) standard RS-232 ports,
    j)   Two (2) RS-485 ports
    k)   Enhanced Parallel (printer) port
    l)   keyboard port
    m)   Personal Computer Interface (PCIF) for Series 90TM-30 PLC
    n)   spare Full-length ISA expansion slot
    o)   optional GeniusTM PCIM-compatible interface (does not use spare slot)
    p)   optional Ethernet interface (eliminates spare slot)

1.2   Key Components

The WCI product line is manufactured using high quality components from a variety of manufacturers. These components are housed in a rugged, noise-immune package which has met the most stringent standards for industrial equipment (CE mark). The two primary circuit board components are described below.

Intel Pentium-based motherboard

Through a close relationship with Intel, Horner Electric has integrated a standard, Intel manufactured motherboard designed around the Pentium Processor. Beyond processing, this board includes interfaces to control the hard drive, floppy drive, RS-232 ports, Parallel port, keyboard port and mouse port. By using a standard Intel motherboard, Horner Electric can quickly keep pace with the latest microprocessor products as they are released by Intel.

Sharp Active Matrix (TFT) Display

This brilliant display features a 10.4" diagonal width and a resolution of 640 x 480 pixels. It is backlit, and because of its active matrix construction offers a wide viewing angle.

Horner Electric Communications board

In addition to high quality, standard hardware from Intel, the Horner Electric communications board provides unique functionality to the WCI. The option board includes two RS-485 ports, which are well suited for serial communications in an industrial environment. The board also provides an integrated Personal Computer Interface (PCIF) port, which enables the WCI to directly control up to four racks of Series 90-30 I/O. A Genius PCIM-compatible option adds high speed communications and capability to control up to 31 devices on the Genius LAN. An optional Ethernet card (residing in the spare ISA expansion slot) is also available. With these builit-in communications capabilities, the WCI can truly be effective as a Industrial Controller, or Human Machine Interface.

Operating System

The WCI is preloaded with MS-DOS on its units with 16MB or less of factory installed DRAM. The 32MB WCI product is offered with Windows NT Workstation as its standard operating system. If MS-DOS is desired on this model, it must be specifically requested.

Other operating systems (Windows '95, Windows 3.11, etc.) may be requested, but typically require a minimum order quantity.

CHAPTER 2:   **WCI Hardware**

2.1   Mounting Instructions

The WCI is panel mountable, typically mounted in an enclosure door. Mounting hardware includes ten (10) 6-32 studs. A rubber gasket provides the seal making the WCI oiltight and watertight when properly installed. The installation procedure follows below:

1)   Cut and Drill the enclosure door as shown in WCI panel cutout diagram located in Appendix A at the rear of this manual.

2)   Make sure that the external mouse or touchscreen cable is disconnected.

3)   From the front of the enclosure, place the WCI partway through the cutout

4)   Before tightening 6-32 hardware, remove the gasket's adhesive backing paper.

5)   Carefully place the WCI all the way through the cutout, carefully sealing the gasket to the enclosure door.

6)   Tighten the 6-32 nuts to the mounting studs carefully, providing even pressure. Hardware should be tightened until the unit is secure, and slight compression of the sealing gasket is evident. **Do not over-tighten!**

7)   Re-install the external mouse or touchscreen cable as detailed later in this chapter.

2.2   Providing Power

The WCI operates on user-supplied AC power, 80-267VAC, 50-60Hz. A three position removable terminal strip is located on the upper left side of the unit, and its connection is shown in **Figure 2-1** below:
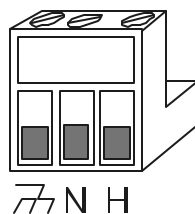
Figure 2-1. Power Connections

2.3   User Connections

Figure 2-2 shows the relative location of the WCI components. **Figure 2-3** details the connections located on the left side of the WCI. These figures are shown on the following page.
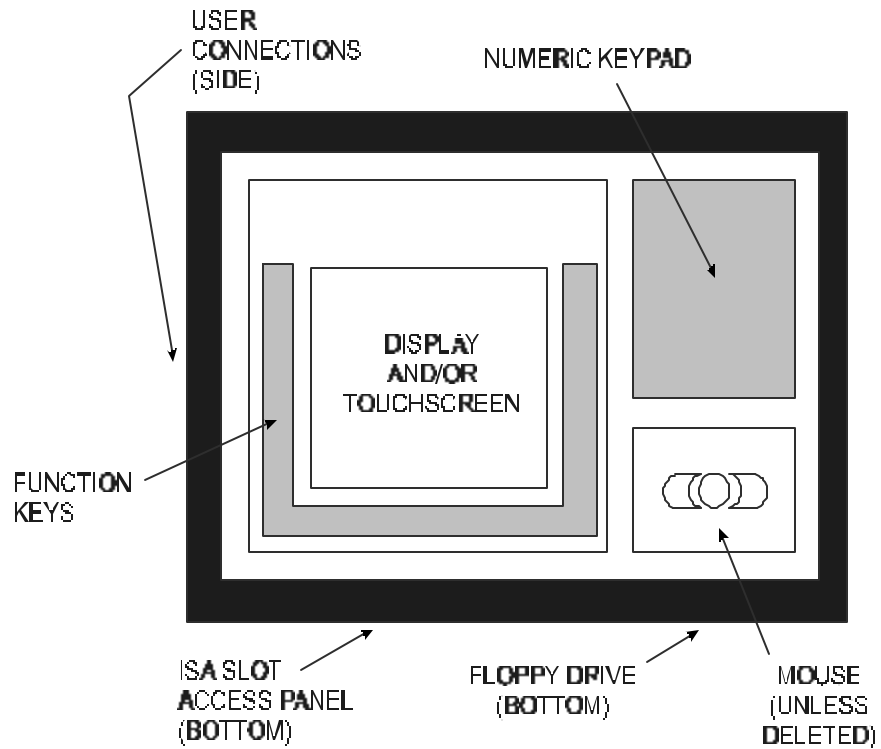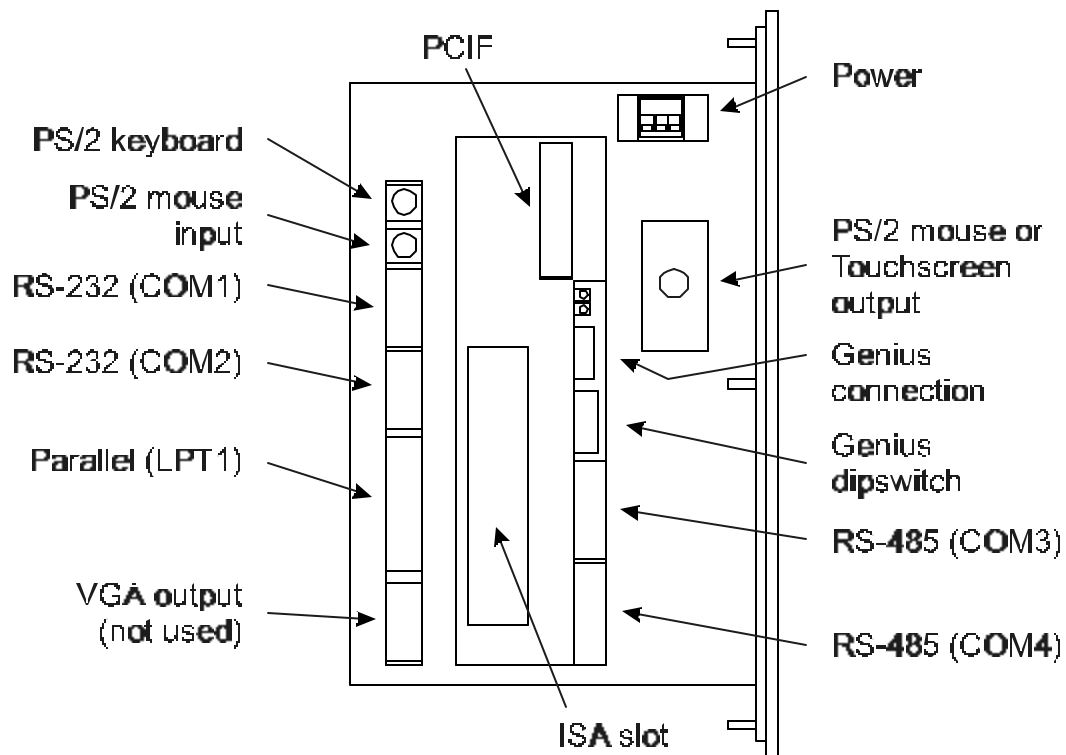
Figure 2-2. WCI layout

Figure 2-3. WCI User Connections

2.4   Pinouts

For standard RS-232, keyboard, mouse, and parallel port pinouts, consult the Intel portion of the documentation in subsequent sections of this manual. This section covers the specific industrial communications interfaces provided by the Horner Electric communications board.

2.4.1   RS-485 Connections

The WCI provides two RS-485 ports which are well suited to industrial environments. These are accessed as COM3 and COM4, and have been specifically designed with the standard GE Fanuc RS-485 pinout. The pinout follows below in **Table 2-1**, and the standard cable diagram for connection of the WCI to a Series 90 PLC follows in Figure 2-4.
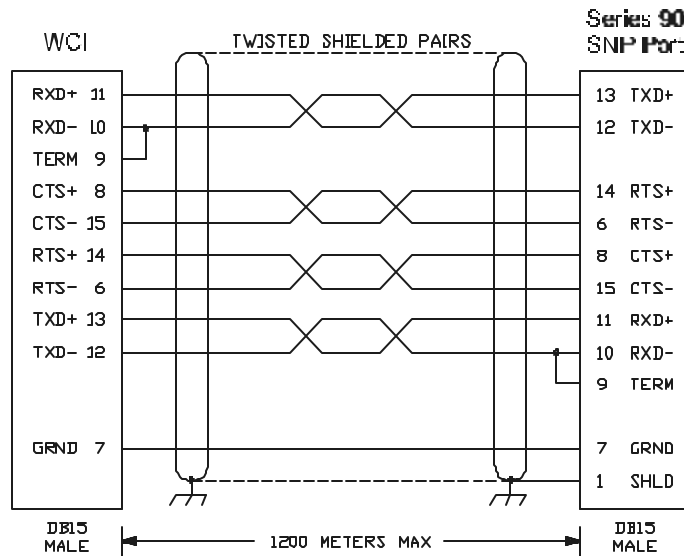
Table 2-1. RS-485 Ports (COM3 & COM4) pinouts

Figure 2-4. Cable pinout from WCI RS-485 port to Series 90 PLC.

2.4.2   PCIF Interface

The WCI's PCIF connector allows the WCI to directly control Series 90-30 remote and/or expansion racks. As in any PCIF application, the personal computer (in this case the WCI) takes the place of the PLC CPU, performing all logic and I/O scanning. A variety of personal computer based industrial control software available in the market-place supports the PCIF interface. A number of programming libraries (C++, DLL, etc.) are also available for those using a standard development language such as Visual Basic or Visual C.

The WCI connects to GE Fanuc expansion and/or remote racks through standard GE Fanuc cables, or alterna-tively, through customer built-to-length cables. See the GE Fanuc document **GFK-0356G**, *Series 90-30 Program-mable Controller Installation Manual*, for information on standard cables and custom cable specifications. This manual also provides installation details crucial to a successful installation. For informational purposes, the pinout for the 25-pin female PCIF connector follows in **Table 2-2**.

Table 2-2. PCIF Pinout

2.4.3   Genius Pinouts

The Genius terminal strip and dipswitch are installed on each WCI whether or not the Genius option is actually installed at the factory. A factory installed micro-GENI board, located within the WCI case, enables the Genius PCIM functions. See the GE Fanuc document, **GEK-90486F-1**, *Genius I/O System & Communications* for details.
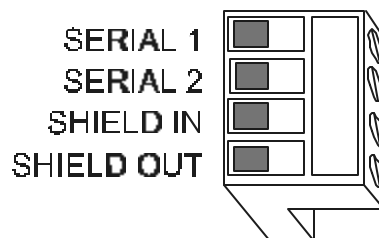

Figure 2-5. Genius pinouts

2.4.4   Genius Communications Dip Switches

The WCI features an 8-position dip switch for configuring the Genius baud rate and device number. This is accessible through an access hole in the rear cover of the OIU, and its settings are listed as follows:
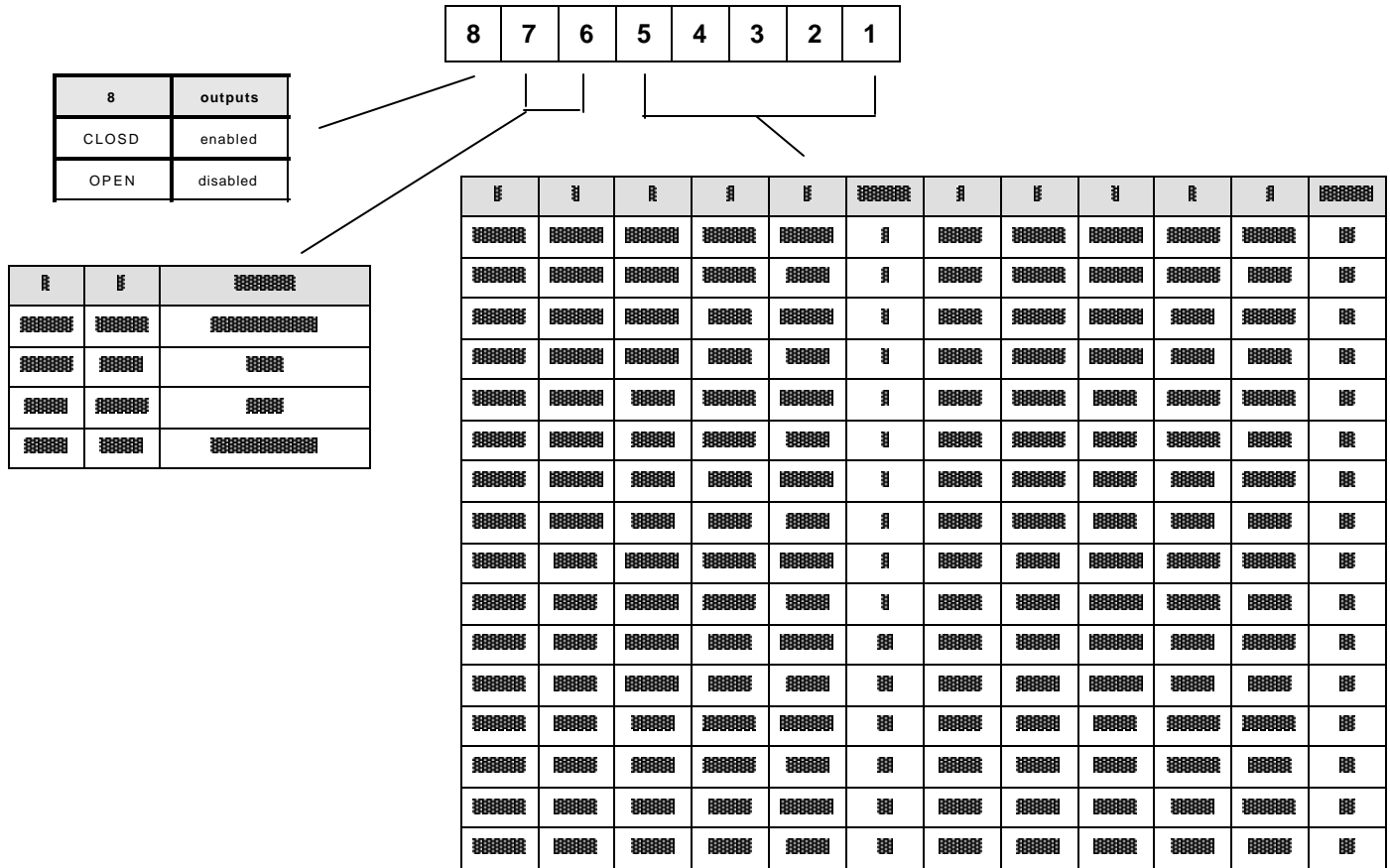
8	7	6	5	4	3	2	1

8	outputs
CLOSD	enabled
OPEN	disabled

Figure 2-6. Genius dispswitch settings

2.4.5   Mouse / Touchscreen Cable

Due to its construction utilizing a standard Intel motherboard, a physical cable connection must be made between the mouse and mouse port. A short "jumper" cable is included with the WCI which has a PS/2 style connector on either end. This cable must be connected by the user between the PS/2 mouse input port and the PS/2 mouse output port. For port location, see **Figure 2-3** on page 2-2.

In the case of touchscreen models, this cable connection must be made between the touchscreen output port and either of the RS-232 ports (COM1 or COM2). The "jumper" cable supplied for these units has a 9-pin femal D-sub on either end.

2.5   Keypad Interface

The WCI features 25 function keys and a full numeric keypad. The function keys can operate as "macro" keys, allowing the press of one of these keys to generate one or more keystrokes, seen to the personals computer as keyboard input. A driver disk is supplied which includes DOS, Windows NT, and Windows '95 drivers. As of March 1996, only the DOS driver and utility was complete. As all the drivers become available, additional information will be added to this manual as Appendix C.

2.6   I/O Addresses

The specialized communications interfaces offered on the WCI require personal computer rescources, just as standard peripherals (COM ports, LPT ports, etc.) do. See the Intel documentation later on in this manual for information on the I/O addresses and IRQ interrupts used by the standard peripherals. Table 2-3, below, shows the resources (namely, I/O addresses) used by the WCIs communications and keypad peripherals.

Table 2-3. WCI personal computer resources occupied

2.7   Expansion Slot

The WCI offers a single, full sized spare expansion slot which may utilize any standard personal computer card. This slot is accessed from an access panel located on the bottom side of the WCI chassis (near the floppy drive). See **Figure 2-7** for the exact location. To gain access to that slot, remove the access panel by removing the ten (10) 4-40 screws holding it in place. The removal of the plate makes the ISA slot visible, and the option card can now be installed in the typical fashion. After installation, the option card's connectors (if there are any) are accessible from the left side of the WCI chassis. The access plate can be reinstalled using the ten 4-40 screws.
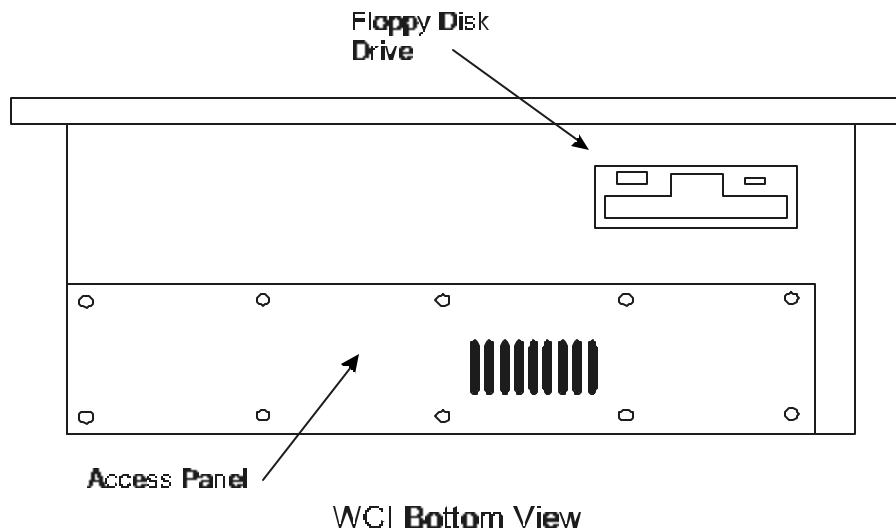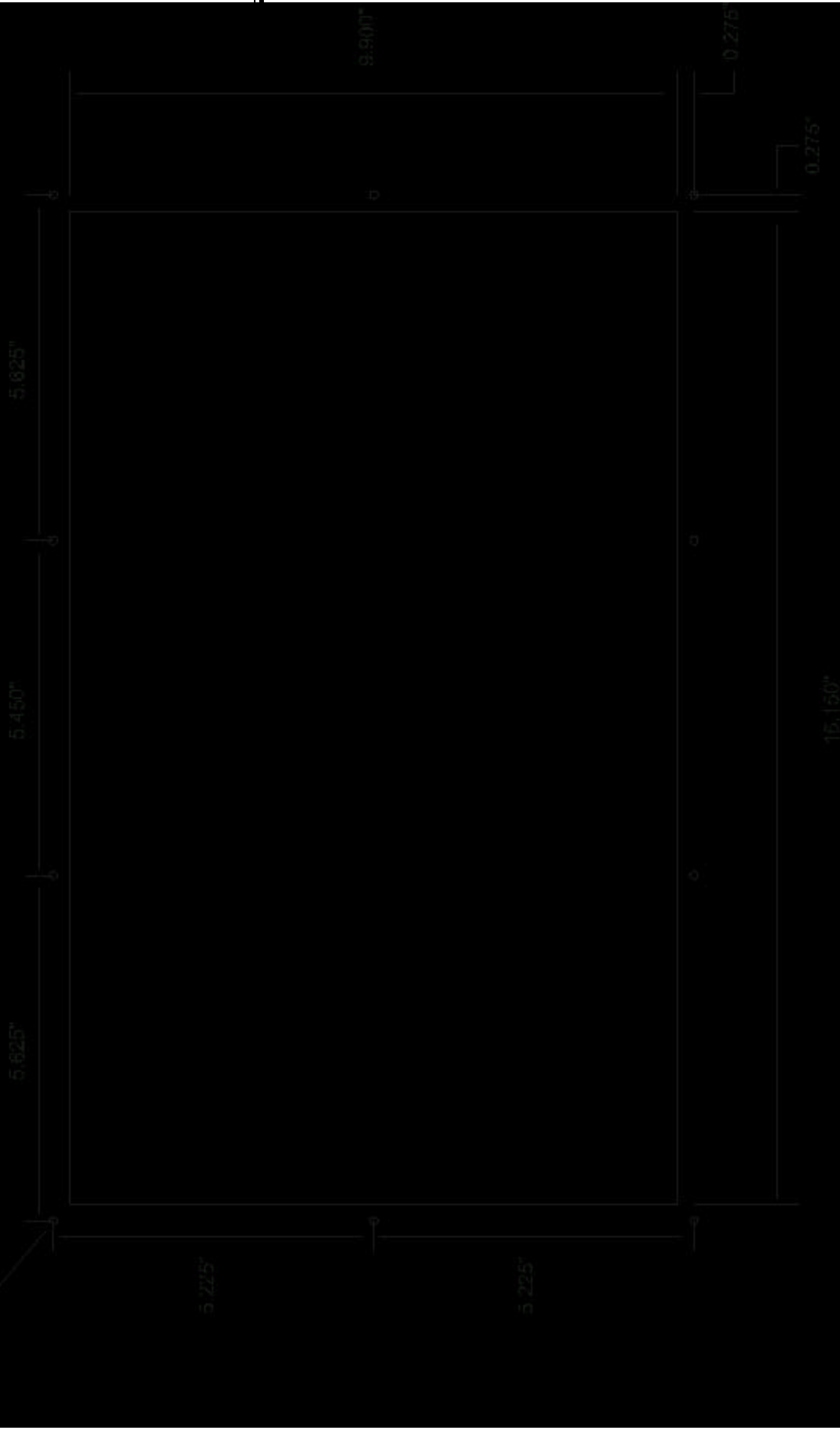

Figure 2-7. WCI access panel

WCI Workstation Panel Cutout

9.907"

0.275"

0.275"

5.625"

5.450"

16.150"

5.625"

5.225"

5.225"

HOLES (10)
TO ACCOMODATE
#6 STUDS

APPENDIX B: INTEL DOCUMENTATION

The WCI product line has been designed around a high quality Pentium-based motherboard manufactured by Intel Corporation. Intel Corporation has graciously allowed Horner to reprint the user documentation of their product in this manual. For specific WCI functions added by Horner (PCIF, Genius, Keypad Interface, Mouse, etc.) see **Chapter 2: WCI Hardware**.

Prior to examining the Intel supplied documentation, the following errata should be noted:

1) The WCI has been designed using a Horner-designed Industrial Chassis, not the standard Intel chassis. Therefore, the section "System Level Features" does not apply.

2) The PCI expansion bus is not implemented.

3) The on-board graphics controller, drivers and utilities are unused.