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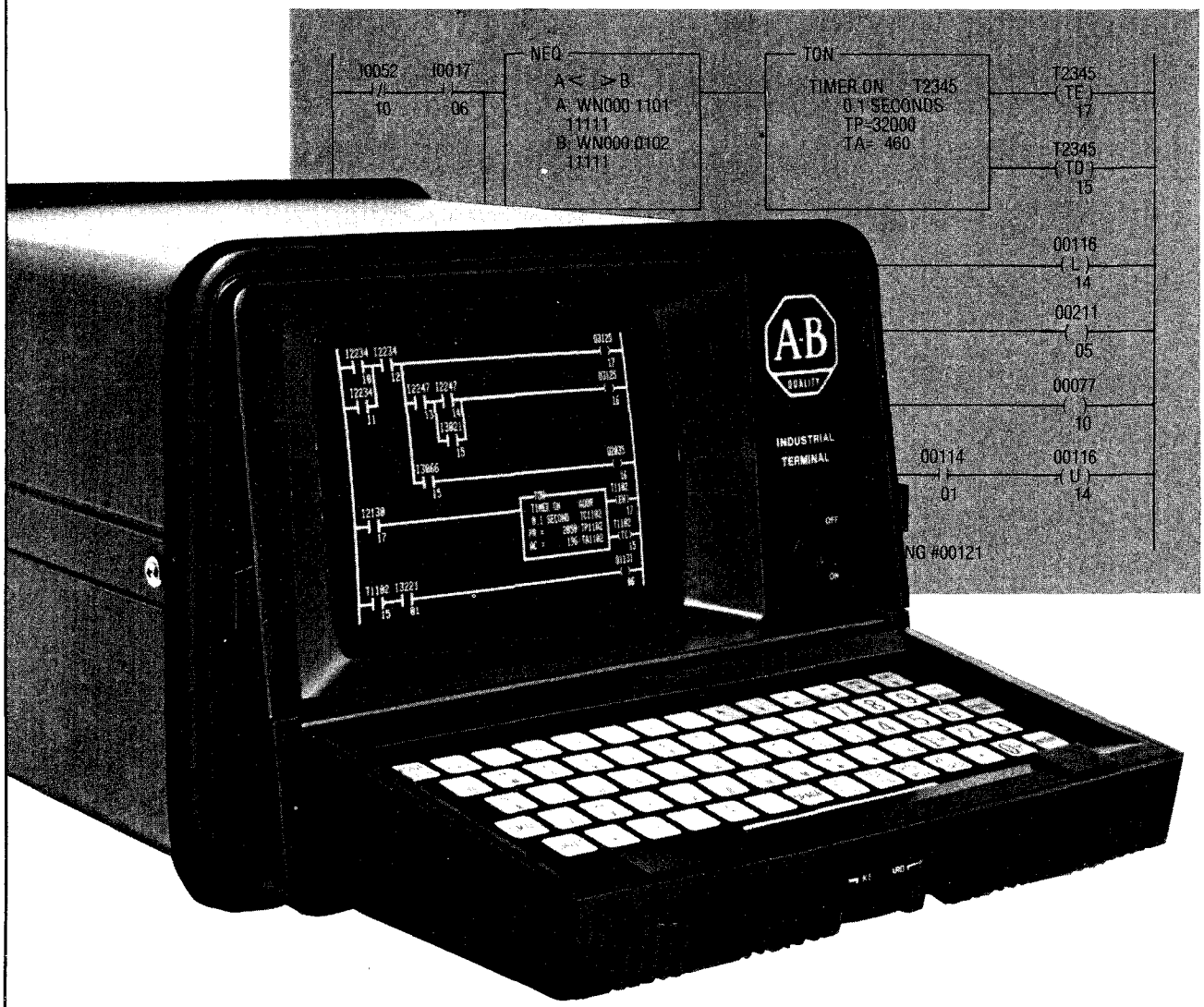
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ALLEN-BRADLEY

1770-805

Bulletin 1770
Industrial Terminal Systems
(Cat. No. 1770-T1, T2, T3, T4)

User's Manual



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Section 1
INTRODUCTION

1.0 SCOPE OF MANUAL

The Industrial Terminal System User's Manual describes the installation, operation, and general capabilities of the Industrial Terminal System (Cat. No. 1770-T1, -T2, -T3, -T4). The manual does not describe certain processor dependent characteristics, including peripheral device operation and programming information such as the instruction set and report generation capability. This information is contained in the appropriate Processor documentation. Table 1-1 provides a cross reference to other Allen-Bradley publications which discuss these topics in relation to specific Allen-Bradley processors.

1.1 GENERAL

The Industrial Terminal System is a portable and versatile programming terminal that has a Cathode Ray Tube (CRT) and a keyboard. When connected to an Allen-Bradley Processor, it is used to enter, monitor, and edit ladder diagram programs and report generation messages. It can also be connected to a line printer, a Digital Cassette Recorder, or a Data Cartridge Recorder to perform various peripheral functions. The Industrial Terminal System can also be connected to a modem, computer or other RS-232-C device for use as a data terminal. The ladder diagram instructions and alphanumeric/ graphic characters that are generated or received are clearly displayed on the CRT screen.

1.2 DESCRIPTION

There are four Industrial Terminal Systems (Cat. No. 1770-T1,T2, -T3, and -T4) available. Each has the same types of equipment. These items include:

- Industrial Terminal CRT Monitor (Cat. No. 1770-TA, Series B)

TABLE 1-1 — Supporting Documentation

Processor	Publication Title	Publication Number	Programming Information	Related Peripheral Operating Information
PLC-3	PLC-3 Programmable Controller Installation and Operations Manual	1775-800		X
PLC-3	PLC-3 Programmable Controller Programming Manual	1775-801	X	
PLC-2/30	PLC-2/30 Programmable Controller Programming and Operations Manual	1772-806	X	X
PLC-2/20 (LP2 or LP1)	PLC-2/20 Programmable Controller Programming and Operations Manual	1772-802	X	X
Mini-PLC-2/15	MINI-PLC-2/15 Programmable Controller Programming and Operations Manual	1772-804	X	X
Mini-PLC-2	Mini-PLC-2 Programmable Controller Programming and Operations Manual	1772-821	X	X
PLC-2	PLC-2 User's Manual	1772-800	X	X
PLC [1]	PLC Programmable Controller Programming and Operations	1774-800	X	
PLC [1]	PLC Programmable Controller Program Panel Interface Module Operating Instructions	1774-817	X	
Series 7100	Programmable Interface User's Guide	7100-4.2	X	X

[1] Only 1770-T2 and 1770-T3, series B or later Industrial Terminal Systems can be used with a PLC Programmable controller. They are used in the same manner as the PLC Program Panel, except that a blank blue key is used instead of a SELECT key.

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- Keyboard Connector Cover (Cat. No. 1770-XB)
- CRT Troubleshooting Test Plug (Cat. No. 1774-TT)
- User's Manual (Publication 1770-805)
- Keyboard with one or more Keytop Overlays
- One or more cables

The first four items listed above are the same for all Industrial Terminal Systems. The last two items listed are specific to each Industrial Terminal System. The Keyboard, Keytop Overlays, and Cables shipped with each Industrial Terminal System are listed in Table 1-2.

Note that the PLC-2 Family Keyboard (Cat. No. 1770-FD) and the PLC-3 Keyboard (Cat. No. 1770-FE) have a projection on the back that fits into the Industrial Terminal CRT Monitor. This projection is designed to fit into a notch on a Series B Industrial Terminal CRT Monitor. Series A Industrial Terminal CRT Monitors, shipped with earlier 1770-T1 and -T2 systems, do not have a notch. Thus, 1770-FD and 1770-FE Keyboards can only be used with Series B Industrial Terminal CRT Monitors.

TABLE 1-2 — Industrial Terminal Systems

Industrial Terminal System (Cat. No.) [1]	Keyboard Modules	Keytop Overlays	Cables
1770-T1	PLC-2 Keyboard (Cat. No. 1770-FC	PLC-2 Keytop Overlay (Cat. No. 1770-KCA) Alphanumeric Keytop Overlay (Cat. No. 1770-KAA)	PLC-2 Program Panel Interconnect Cable (Cat. No. 1772-TC)
1770-T2	PLC/PLC-2 Keyboard (Cat. No. 1770-FA)	PLC Keytop Overlay (Cat. No. 1770-KBA) PLC-2 Keytop Overlay (Cat. No. 1770-KCA) Alphanumeric Keytop Overlay (Cat. No. 1770-KAA)	PLC Program Panel Interconnect Cable PLC-2 Program Panel Interconnect Cable (Cat. No. 1772-TC)
1770-T3	PLC-2 Family Keyboard (Cat. No. 1770-FD)	PLC-2 Family Keytop Overlay (Cat. No. 1770-KCB) Alphanumeric Keytop Overlay (Cat. No. 1770-KAA) PLC Keytop Overlay (Cat. No. 1770-KBA	PLC-2 Program Panel Interconnect Cable (Cat. No. 1772-TC) PLC Program Panel Interconnect Cable (Cat. No. 1774-TC)
1770-T4	PLC-3 Keyboard (Cat. No. 1770-FE)	PLC-3 Keytop Overlay (Cat. No. 1770-KDA)	PLC-3 Industrial Terminal Cable (Cat. No. 1775-CAT)

[1] All Industrial Terminal Systems are shipped with the following common equipment:

Industrial Terminal (Cat. No. 1770-TA, Series B)
Keyboard Connector Cover (Cat. No. 1770-XB)
CRT Troubleshooting Test Plug (Cat. No. 1774-TT)
User's Manual (Publication 1770-805)

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In addition to the standard equipment shipped with the 1770-T1, -T2, -T3, andT4 systems, optional equipment can be ordered. These system options include:

- Keyboard Storage Case (Cat. No. 1770-XC)
- Industrial Terminal Adapter Cable (Cat. No. 1770-CB, -CC)
- Alphanumeric/ Graphics Keytop Overlay (Cat. No. 1770-KAB)
- PLC-3 Graphics Keytop Overlay (Cat. No. 1770-KDB)

1.3 COMPATIBILITY

The compatibility chart in Table 1-3 summarizes which Industrial Terminal Systems can be used with which Processors. For example, the 1770-T1, -T2, and T3 Industrial Terminal Systems can be used with all PLC-2 Family Processors. The 1770-T3 Industrial Terminal System, however, is the only one that can fully support the PLC-2/20 (LP2), PLC-2/30 and Mini-PLC-2/15 Processors. Therefore, programs entered on these Processors using a 1770-T3 Industrial Terminal System must not be edited using either 1770-T1 or -T2 Industrial Terminal Systems. The limitations footnoted in Table 1-3 are described in the corresponding programming manuals for the Processors.

TABLE 1-3 — Industrial Terminal/Processor Compatibility

Industrial Terminal System (Cat. No.)	PLC	PLC-2 (LB)	Mini-PLC-2 (LN1,LN2,LN3)	PLC-2/20 (LP1)	PLC-2-20 (LP2)	Mini-PLC-2/15 (LV)	PLC-2/30 (LP3)	PLC-3	Series 7100 CNC
1770-T1		X	X	X	X [1]	X [1]	X [1]		X
1770-T2	X	X	X	X	X [1]	X [1]	X [1]		X
1770-T3	X [2]	X	X	X	X	X	X		X
1770-T4								X	

[1] Processor capabilities will be limited when using this Industrial Terminal.

[2] 1770-T3 series B or later systems are compatible with PLC Programmable Controllers. Earlier 1770-T3 systems are not compatible with PLC Programmable Controllers.

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Section 2
SYSTEM HARDWARE

2.0 GENERAL

All models of the Industrial Terminal System have the same types of hardware components. This section describes these components.

2.1 CRT

The Industrial Terminal System has a nine-inch diagonal CRT used as the display screen (Figure 2-1). The screen can display 80 characters across by 24 lines down. When used for ladder diagram programming, the bottom three lines are reserved for displaying prompts and other related information. The processor and the type of instruction (single, multiple word, or block) determine the number of rungs or rung branches and the number of elements per rung displayed on the screen.

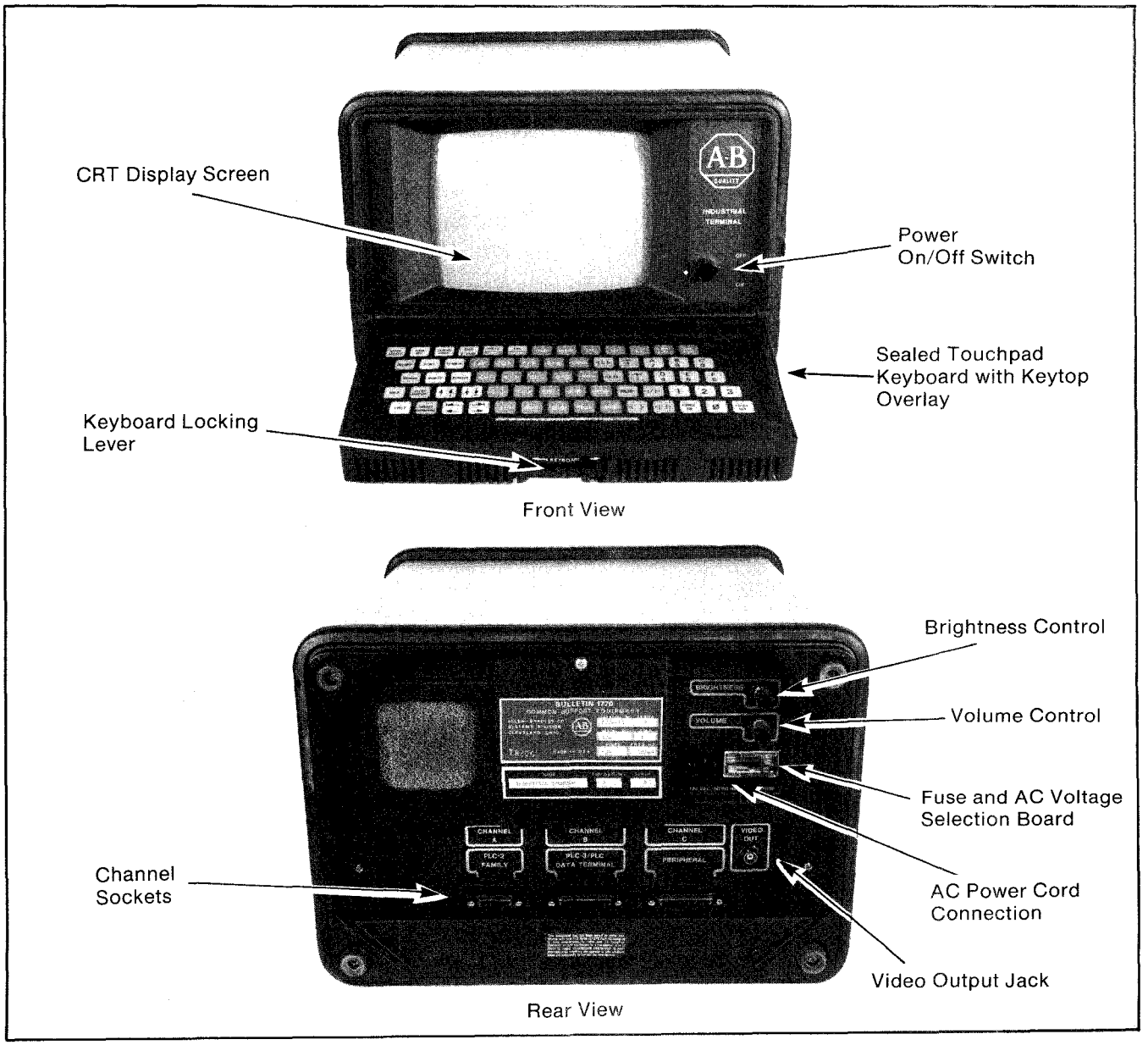


FIGURE 2-1 — Industrial Terminal

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When used as a data terminal or for report generation, the full 80 x 24 screen can be used to display alphanumeric and graphic characters.

2.2 CONTROLS

There are three controls on the Industrial Terminal CRT Monitor as Figure 2-1 shows. They are:

- Power ON/OFF - located on the front of the Industrial Terminal CRT Monitor. When the power switch is ON, it engages a mechanical interlock to guard against attaching or removing the keyboard while power is applied.
- Brightness - located on the back of the Industrial Terminal CRT Monitor. It controls the intensity of the screen.
- Volume - located on the back of the Industrial Terminal CRT Monitor. It controls the audio level of the beep tone that is generated when a valid key on the keyboard is pressed.

2.3 SOCKETS AND CABLES

The various sockets on the back of the Industrial Terminal CRT Monitor (Figure 2-1) include the:

- AC power cord connection
- Three Channel sockets (A, B, and C)
- Video Output Jack

Channels A, B, and C are the communication ports for connecting Processors, peripheral devices, computers, and modems. Channel B performs different functions in different Industrial Terminal Systems (Table 2-1). The Video Output Jack can be used to connect an RS-170 compatible Black & White CRT monitor capable of underscan operation. The function of each channel and the cables required are described in Table 2-1.

2.4 KEYBOARD CONNECTOR COVER

The Industrial Terminal System is shipped with the keyboard connector cover installed on the front of the CRT Monitor. If the Industrial Terminal System is used as a monitor (without a keyboard), this keyboard connector cover MUST be installed.

2.5 KEYBOARDS

There are four keyboards available, one for each Industrial Terminal System. They are:

TABLE 2-1 — Sockets and Cables

Socket	Function	Industrial Terminal System	Cables
Channel A PLC-2 Family	Connects to a PLC-2 Family Processor or a Series 7100 CNC	1770-T1,-T2,-T3	1772-TC
Channel B PLC-3/PLC Data Terminal	Connects to a PLC Processor	1770-T2 1770-T3 series B	1774-TC 1770-CB [1] with a 1774-DC or DC2 [1]
	Connects to a PLC-3 Processor	1770-T4	1775-CAT
	Use as a Data Terminal or Monitor	All	1770-CB [1] (male) or 1770-CC [1] (female)
Channel C Peripheral	Connecting to a Digital Cassette Recorder Data Cartridge Recorder or hard copy printer	All	Device provided RS-232-C
Video Output Jack (BNC) 75	Connecting to a B & W CRT Monitor [2]	All	User provided RS-170

[1] Optional Cable. Must be ordered separately.
[2] Must be Black & White monitor with underscan operation (the raster must be fully contained within the viewing area of the screen).

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- The 1770-FC Keyboard for a 1770-T1 system
- The 1770-FA Keyboard for a 1770-T2 system
- The 1770-FD Keyboard for a 1770-T3 system
- The 1770-FE Keyboard for a 1770-T4 system

Each keyboard is shipped with one or more keytop overlays. The keyboard (Figure 2-2) has a sealed touchpad and contains the PROM memory that gives the keyboard its instruction set for programming the specific Processors. Both the keytop overlays that are shipped with each Industrial Terminal System and the optional keytop overlays are identified in Figure 2-3.



FIGURE 2-2 — Industrial Terminal Keyboard

2.6 PROTECTIVE COVER

When the Industrial Terminal System is not in use, the Protective Cover (Figure 2-4) should be installed to protect the CRT screen and the keyboard. It can also be used to store unused equipment such as the CRT Troubleshooting Test Plug, extra keytop overlays, and cables.

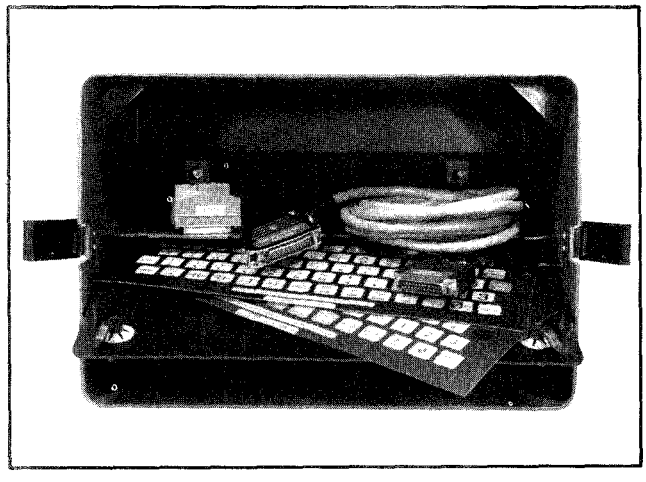
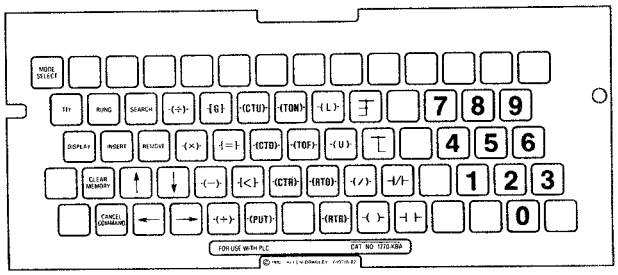


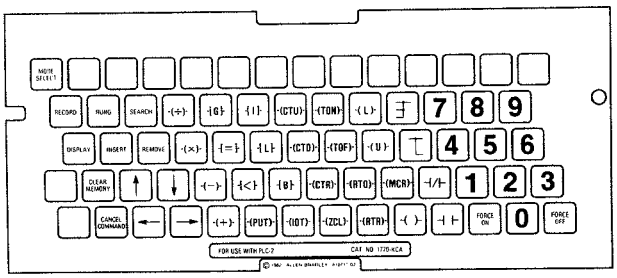
FIGURE 2-4 — Protective Cover

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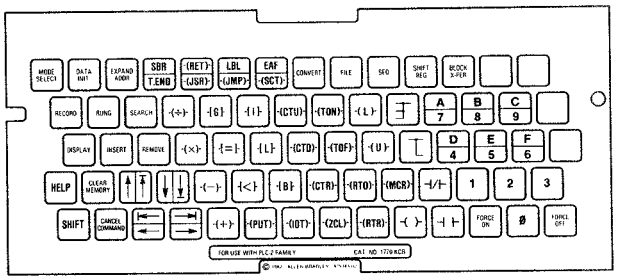
STANDARD



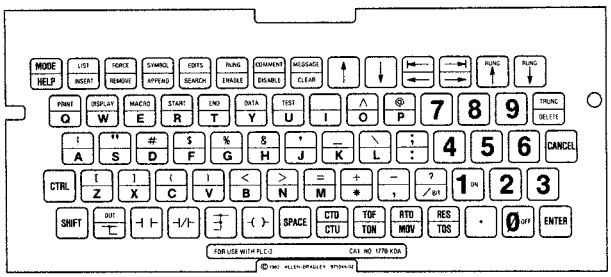
PLC Keytop Overlay 2 3



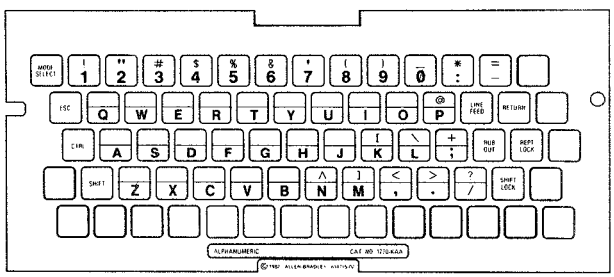
PLC-2 Keytop Overlay 1 2



PLC-2 Family Keytop Overlay 2



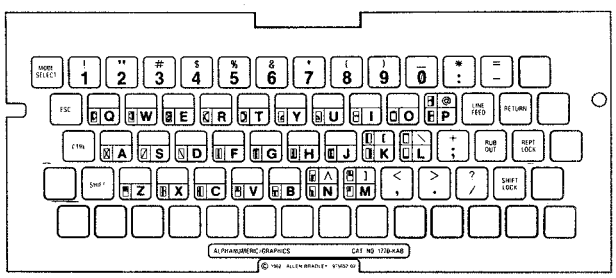
PLC-3 Keytop Overlay 4



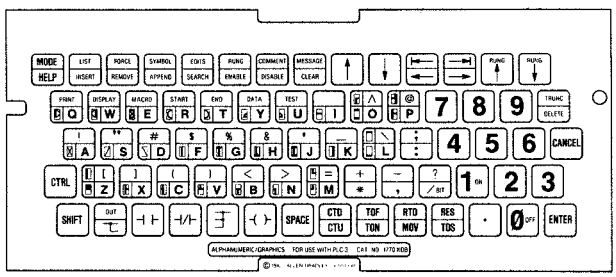
Alphanumeric Keytop Overlay 1 2 3

1 Part of a 1770-T1 System
2 Part of a 1770-T2 System
3 Part of a 1770-T3 System
4 Part of a 1770-T4 System

OPTIONAL



Alphanumeric/Graphics Keytop Overlay 1



PLC-3 Graphics Keytop Overlay 2

1 An Option for the 1770-T1, -T2 and -T3 Systems

2 An Option for the 1770-T4 Systems Only

FIGURE 2-3 — Keytop Overlays

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Section 3
ASSEMBLY

3.0 GENERAL

Before any Industrial Terminal System can be used, it must be set up for proper operation. This includes selecting the correct input voltage, line frequency, and fuse, and setting the correct baud rate and parity for Channels B and C.

Since all Industrial Terminal Systems are set up in the same manner, the information in this section applies to all systems.

3.1 KEYBOARD INSTALLATION

Perform the following steps to attach the keyboard to the Industrial terminal:

1. Loosen the mounting screws on the keyboard connector cover and remove the connector cover.

2. Be sure the power switch is off.

3. Lift and move the locking lever to the UNLOCK position.

4. Align the two support pins on the keyboard with the bushings on the front of the chassis (Figure 3-1) and insert the keyboard.

5. Lift and move the locking lever to the LOCK position.

Note that the PLC-2 Family Keyboard (Cat. No. 1770-FD) and the PLC-3 Keyboard (Cat. No. 1770-FE) have a projection on the back that fits into the Industrial Terminal CRT Monitor. This projection is designed to fit into a notch on a Series B Industrial Terminal Monitor. Series A Industrial Terminal Monitors, shipped with earlier 1770-T1 and -T2 systems, do not have a notch. Thus, 1770-FD and 1770-FE Keyboards can only be used with Series B Industrial Terminal Monitors.

3.2 KEYTOP OVERLAY INSTALLATION

The desired keytop overlay is easily installed on the keyboard by aligning the notches in the overlay with the tabs on the keyboard as Figure 3-2 shows.

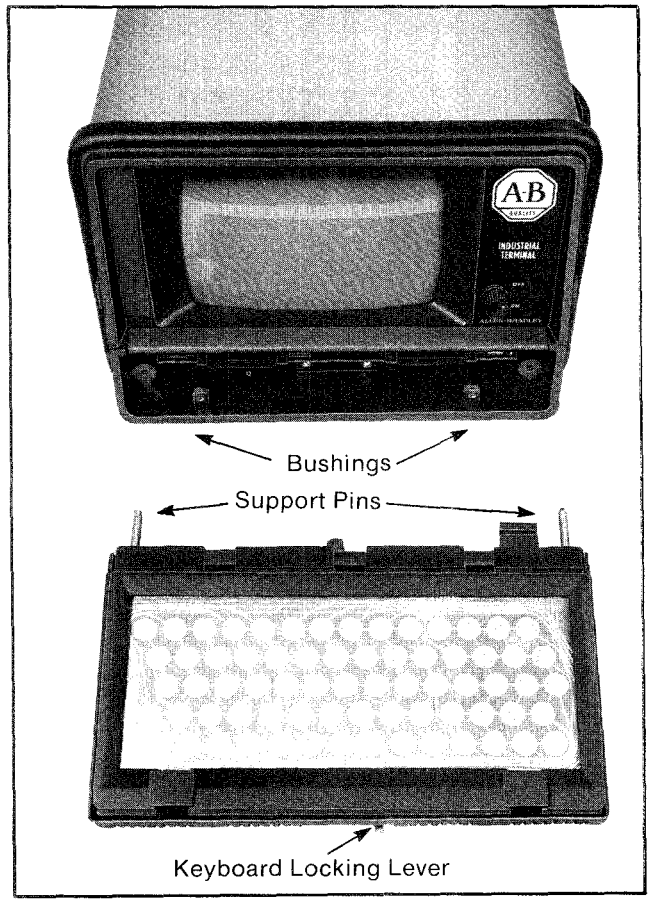


FIGURE 3-1 — Attaching Keyboard Module

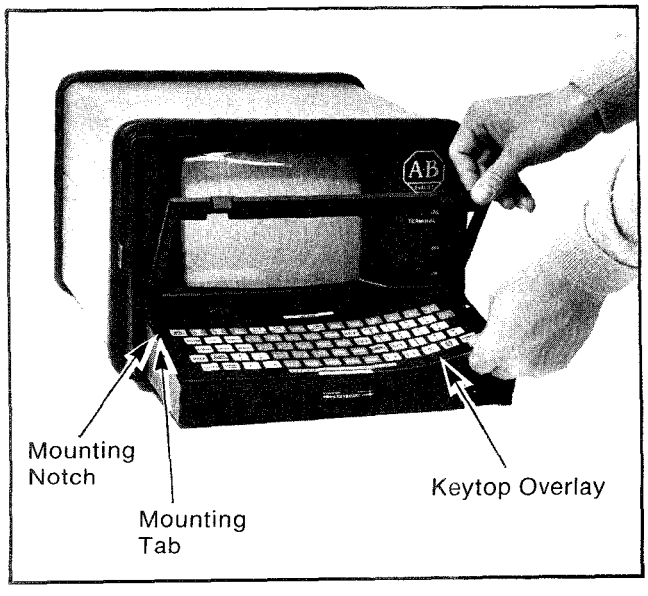


FIGURE 3-2 — Installing Keytop Overlay

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3.3 KEYBOARD CONNECTOR COVER INSTALLATION

If the Industrial Terminal System is used as a monitor (without a keyboard), the keyboard connector cover MUST be installed. When attaching the keyboard connector cover, tighten the two mounting screws (Figure 3-3) by hand; do not overtighten.

3.4 SELECTING AC INPUT VOLTAGE RANGE

All Industrial Terminal CRT Monitors are shipped configured for 120V AC, 60 Hz operation.

The CRT Monitor can be configured for 220/240V AC operation by repositioning the AC selector board, located on the back of the Industrial Terminal CRT Monitor (Figure 3-4). The board has four positions: 100, 120, 220 and 240. When either 100 or 120 is selected, the voltage range is 98 to 132V AC. When 220 or 240 is selected, the voltage range is 196 to 250V AC.

When the Industrial Terminal System is set up for 220/240V AC operation, place the 230V

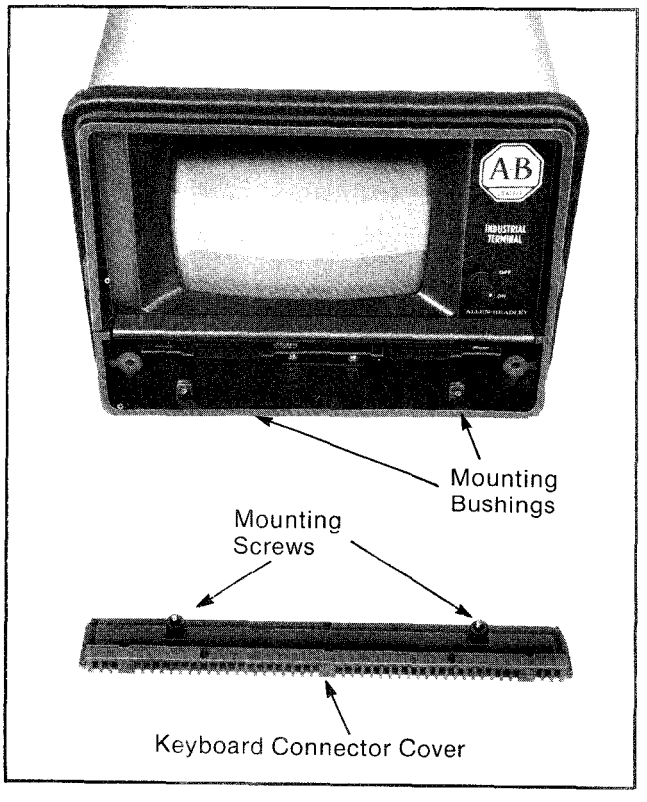


FIGURE 3-3 — Attaching Keyboard Connector Cover

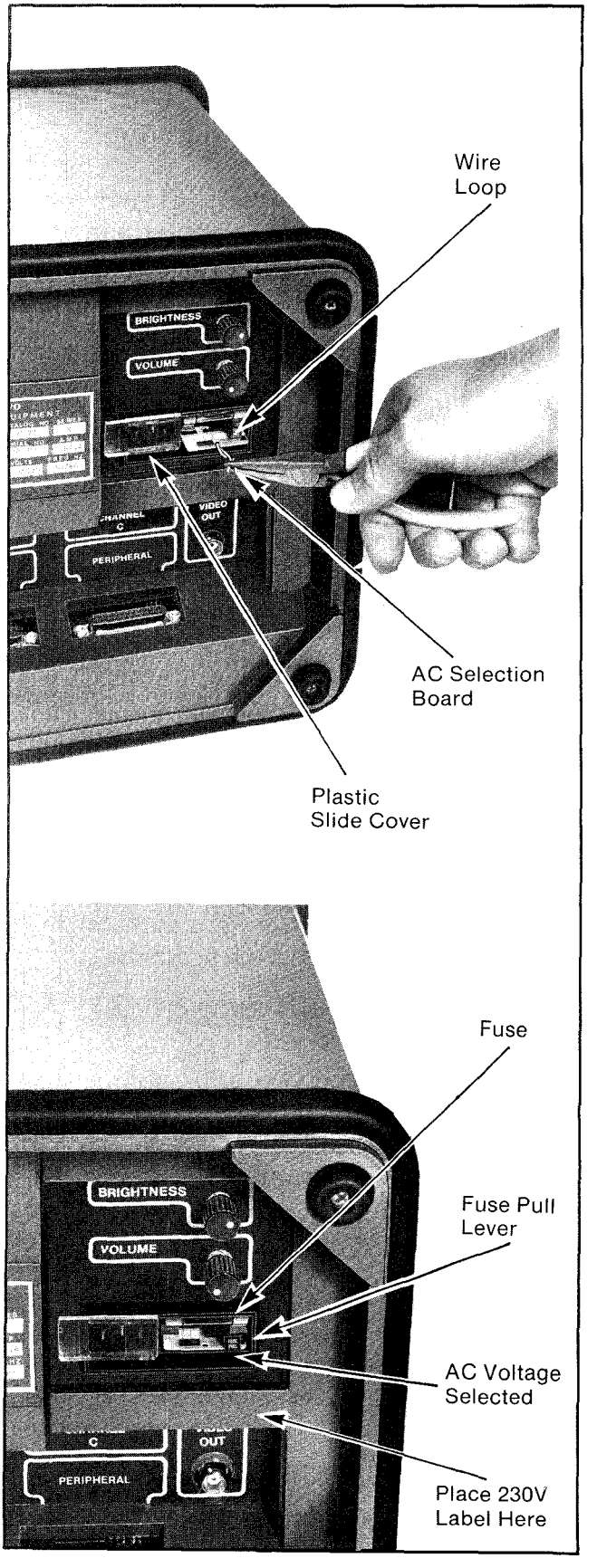


FIGURE 3-4 — AC Voltage Selection and Fuse Replacement

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label, contained in the 230V Fuse Kit, directly below the AC selection board housing (Figure 3-4). Also replace the 1 amp fuse with the 1/2 amp fuse (Section 3.5), and attach a 240V cord.

Perform the following steps to change the AC input voltage setting (Refer to Figure 3-4):

1. Be sure the power ON/OFF switch is turned OFF and the AC power cord is disconnected from the Industrial Terminal CRT Monitor.

2. Slide the plastic cover to the left over the AC power cord connection.

3. Insert a piece of wire through the hole on the AC selection board and twist the ends together to form a loop.

4. Grasp the wire loop with a pair of needle nose pliers and pull to remove the board.

5. Remove the wire loop from the AC selection board.

6. Position the AC selection board so that the number that is visible matches the line voltage.

7. Install the AC selection board. The number now visible should match the line voltage.

8. If the 220/240V setting is used, place the 230V label below the selection board.

9. Change the AC fuse and power cable as described below.

3.5 CHANGING AC FUSE

Perform the following steps to change or inspect the main AC fuse of the Industrial Terminal CRT Monitor (Figure 3-4):

1. With the power switch OFF, disconnect the AC power cord from the Industrial Terminal CRT Monitor.

2. Slide the plastic cover to the left over the AC power cord connection.

3. Pull the FUSE PULL lever to the left and remove the fuse.

4. Move the FUSE PULL lever back to the right.

5. Insert the proper fuse: 1 amp for 120V operations and 1/2 amp for 220/240V operations.

6. Attach a suitable power cord to the Industrial Terminal CRT Monitor.The power cord supplied with the unit is suitable for 120VAC operation. For 220/240V operation, the cord must be replaced or modified by replacing the plug.

3.6 BAUD RATE, PARITY AND LINE FREQUENCY SELECTION

Located on the front of the main logic board of the CRT monitor is a set of switches in a switch group assembly (Figure 3-5). They select line frequency, and the baud rate and parity used in Channels B and C of the Industrial Terminal CRT Monitor.

Table 3-1 shows the proper switch positions for selecting line frequency, baud rate, and parity.

Note that with a 1770-T3 system (with a keyboard attached), switches 4 and 5 can be used to select automatic report generation and turn ON Channel C during power up and Mode Select in addition to selecting parity.

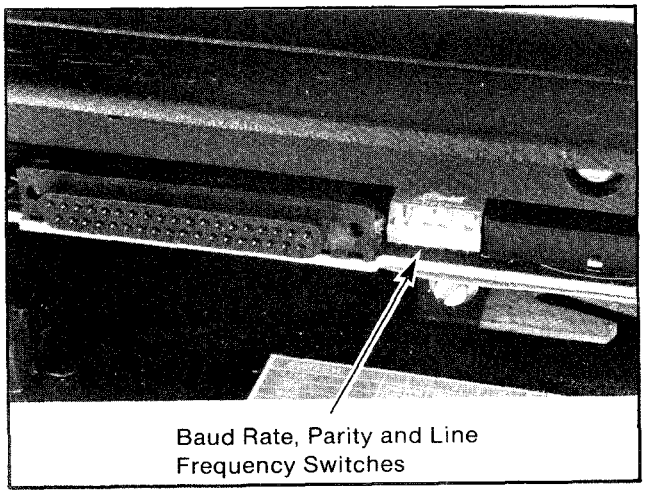


FIGURE 3-5 — Switch Group Assembly

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TABLE 3-1 — Switch Group Settings

PARITY

TYPE	SWITCH 4	SWITCH 5
NONE [1]	DOWN	DOWN
ODD	DOWN	UP
EVEN	UP	DOWN
NOT USED [2]	UP	UP

BAUD RATE

SPEED	SWITCH 1	SWITCH 2	SWITCH 3
110	DOWN	DOWN	DOWN
300	DOWN	DOWN	UP
600	DOWN	UP	DOWN
1200	DOWN	UP	UP
2400	UP	DOWN	DOWN
4800	UP	DOWN	UP
9600	UP	UP	DOWN
NOT USED	UP	UP	UP

LINE FREQ. (Hz)

Hz	SWITCH 6
50	DOWN
60	UP

[1] When connecting to a PLC Processor, this switch setting must be used.

[2] With a 1770-T3 system, this setting can be used for Automatic Report Generation at power-up. With a 1770-T4, Series B or later, this setting selects PLC-3 mode at power-up if a PLC-3 processor is connected.

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Section 4
CONNECTIONS AND PINOUTS

4.0 GENERAL

The connection diagrams in this section show how to connect Allen-Bradley Processors, the Series 7100 CNC, peripheral devices, modems, and computers to Channels A, B, and C of an Industrial Terminal System.

4.1 CONNECTING A PLC-2 FAMILY PROCESSOR

All PLC-2 Family Processors connect to Channel A of a 1770-T1,T2, or -T3 Industrial Terminal System in the same manner and with the same cable (Figure 4-1). One end of the Program Panel Interconnect Cable (Cat. No. 1772-TC) is connected to Channel A of the Industrial Terminal System. The other end is connected to a 15-pin socket on the front of a PLC-2 family Processor. The socket on the Processor will be labeled either INTERFACE or PROGRAM PANEL. The Industrial Terminal System can be connected to and disconnected from the PLC-2 Family Processor without removing AC power.

4.2 CONNECTING A PLC PROCESSOR

Note: Before making any connections, be sure both Industrial Terminal System parity switches (4 and 5) are set to the DOWN position.

The PLC Processor can be connected up to 15 cable-feet from a 1770-T2 or 1770-T3, series B Industrial Terminal System using the Program Panel Interconnect Cable (Cat. No. 1774-TC). The PLC Processor must have either a Program Panel Interface Module (Cat. NO. 1774-TB, -TB2) or an On-line Programming Module (Cat. No. 1774-TL2) installed in slot zero of its chassis. The 41-pin end of the cable connects to the module in slot zero of the PLC Processor chassis (Figure 4-2). The other end of the cable (25-pin end) is connected to Channel B. The cable can be connected or disconnected

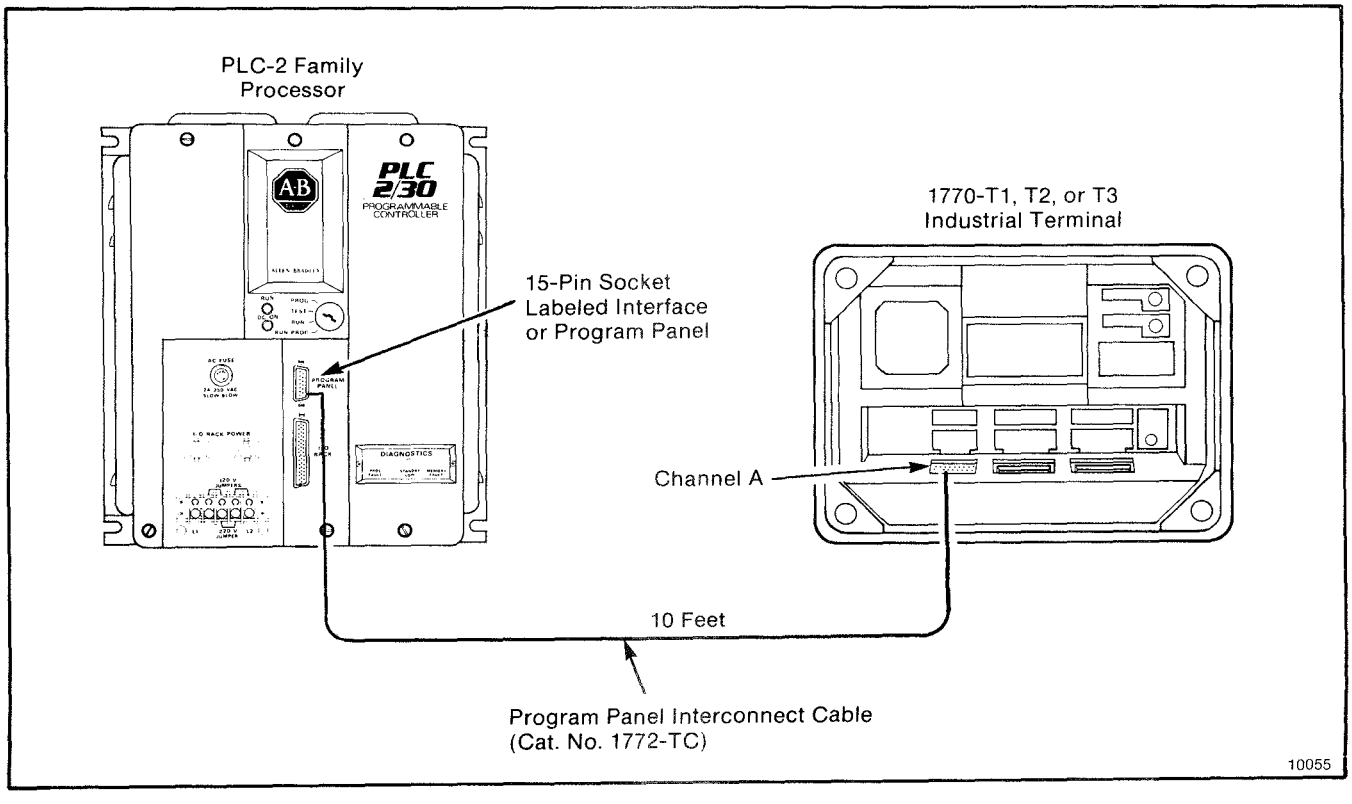


FIGURE 4-1 — PLC-2 Family Connection Diagram

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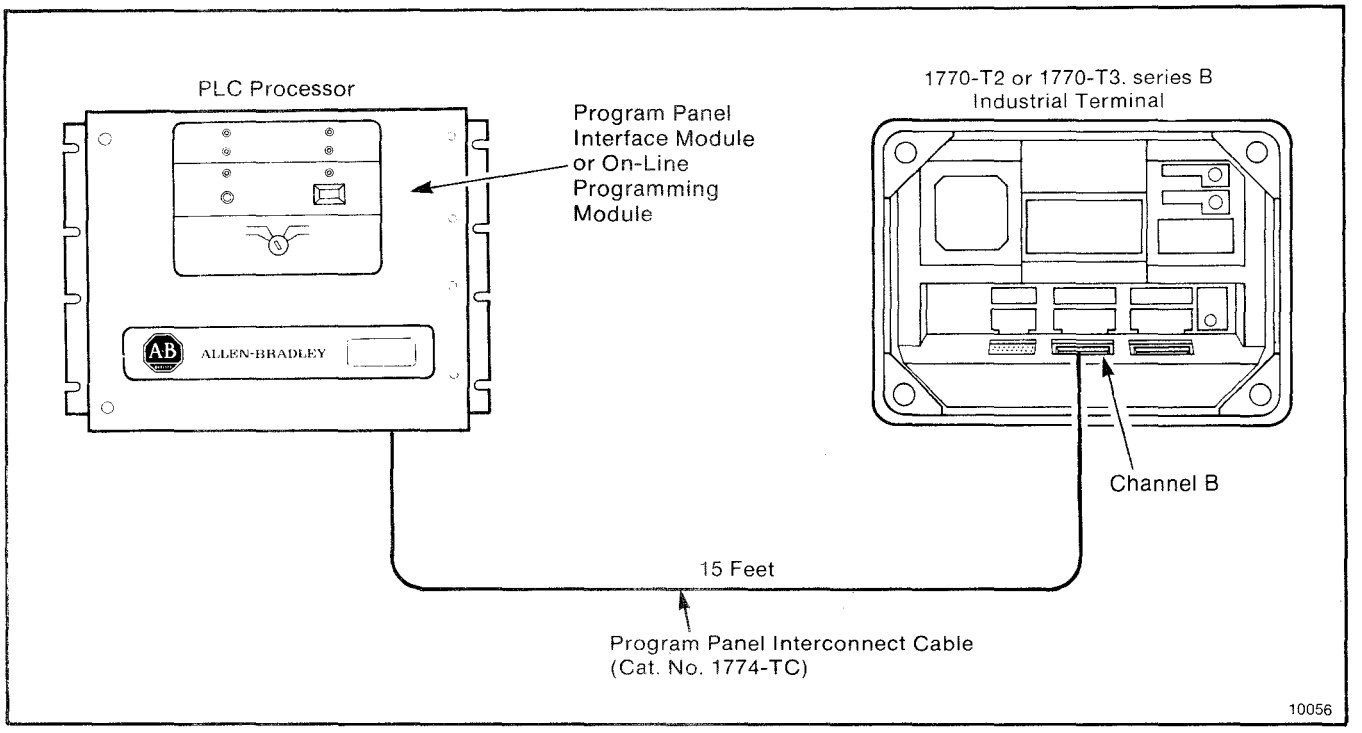


FIGURE 4-2 — PLC Connection Diagram

without removing AC power from either the Industrial Terminal System or the PLC Processor.

The 1770-T2 or 1770-T3, series B Industrial Terminal System can be connected up to 5000 cable-feet from the PLC Processor by using additional cable between the 1774-TC Cable and Channel B (Figure 4-3). This additional cable (Cat. No. 1778-CR, Belden 8723 or its equivalent) must be constructed as shown in Figure 4-4. The parts required to construct this cable are listed in Table 4-1.

4.3 CONNECTING A PLC-3 PROCESSOR

The PLC-3 Processor is connected to the 1770-T4 Industrial Terminal System for programming using the PLC-3 Industrial Terminal Cable (Cat. No. 1775-CAT). The end of the cable labeled INDUSTRIAL TERMINAL END connects to Channel B (Figure 4-5). The end of the cable labeled PLC-3 END is connected to one of two ports on the PLC-3 Processor: either Channel 0 on the front panel or Channel 5 on the I/O Scanner-Programmer Interface Module (Cat. No. 1775-S4A) inside the PLC-3 Chassis.

The 1770-T4 Industrial Terminal System can be connected up to 5000 cable feet from the PLC-3 Processor (Figure 4-6) using cable constructed from Cat. No. 1778-CK, Belden 8723 or its equivalent. The cable diagram in Figure 4-7 shows how to wire the pins to the male connectors. The parts necessary to construct the cable are listed in Table 4-1.

4.4 CONNECTING A SERIES 7100 CNC

The Programmable Interface (PI) Module is an optional software feature of the Series 7100 Computerized Numerical Control (CNC). It consists of a printed circuit module that can be programmed much like a programmable controller, using ladder-diagram instructions. For detailed information about programming and operating the Series 7100 CNC with the PI Module, refer to Programmable Interface User's Guide (Publication 7100-4.2).

The 1770-T1, -T2, and -T3 Industrial Terminal Systems can be connected to the PI Module using the 1772-TC Program Panel Interconnect Cable (Figure 4-8). One end of the cable connects to Channel A on the Industrial Terminal System. The other end connects to the 15-pin socket on the front edge of the PI Module. Power need not be removed when

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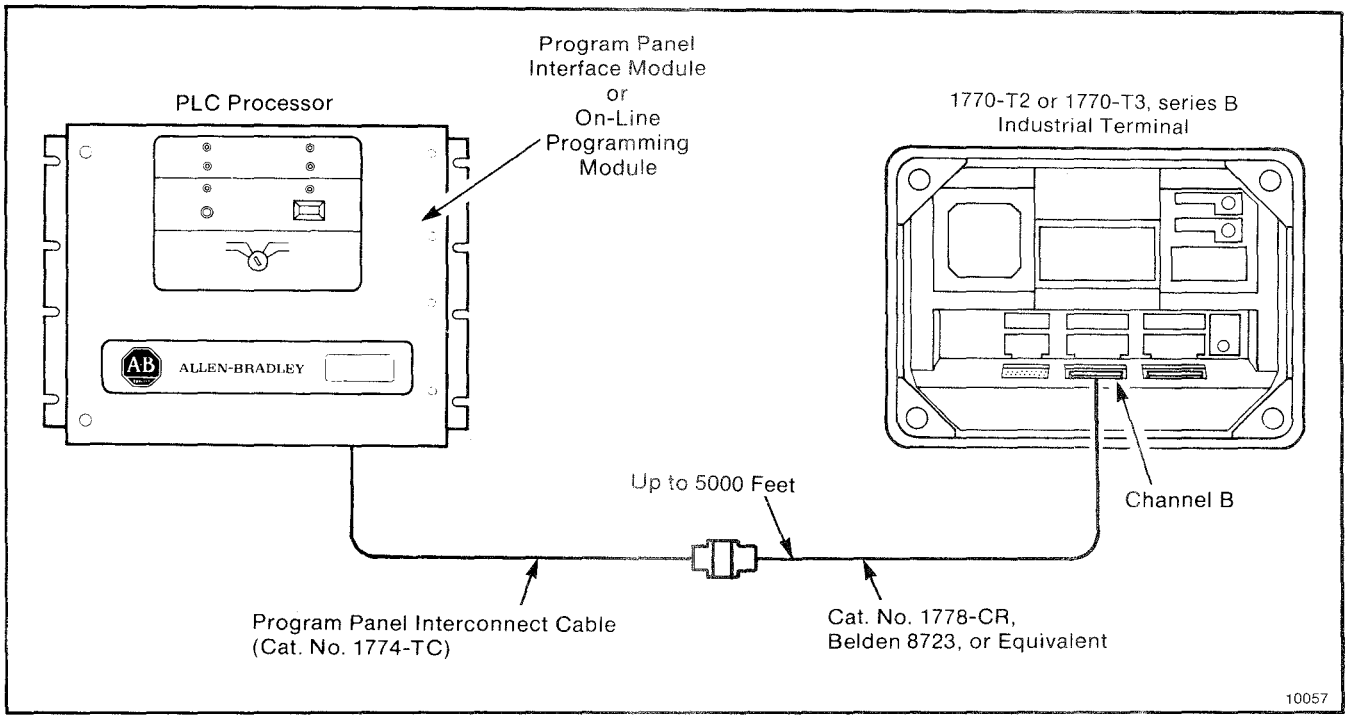


FIGURE 4-3 — PLC Remote Connection Diagram

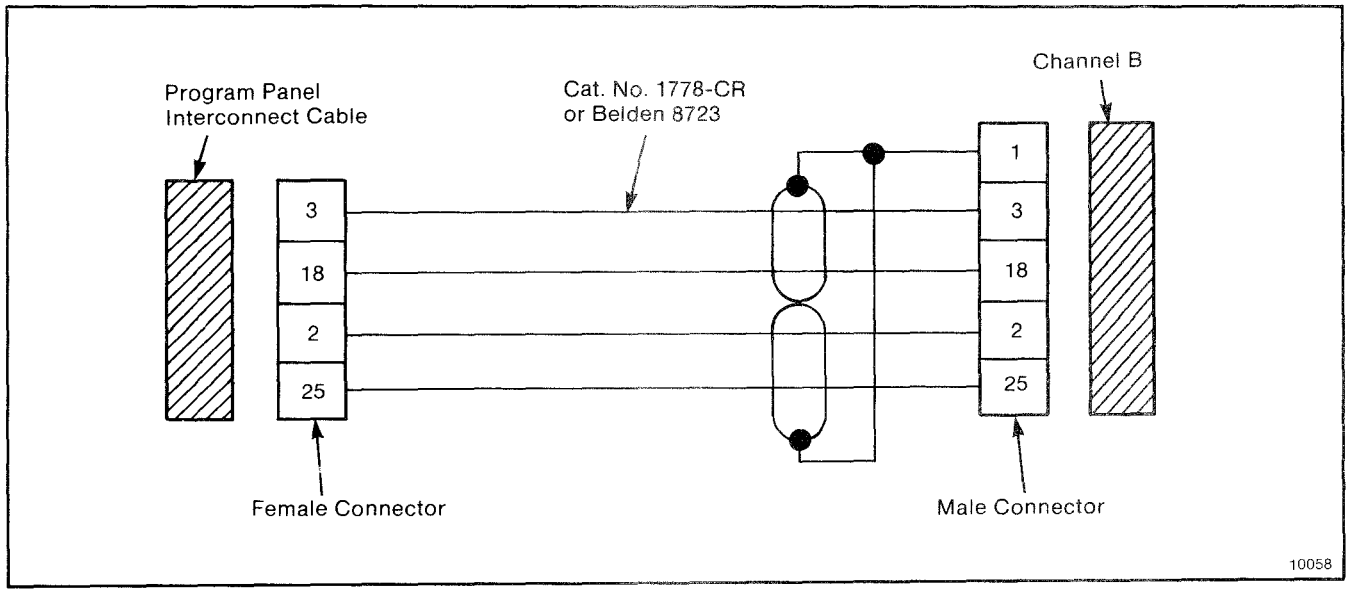


FIGURE 4-4 — PLC Remote Cable Diagram

connecting and disconnecting the Industrial Terminal System.

4.5 CONNECTING AS AN ASCII TERMINAL USING CHANNEL B

The Industrial Terminal System can operate as a data terminal in Alphanumeric mode. As a data terminal, it communicates with RS-232-C devices such as modems and computers. It also performs report generation with the PLC and PLC-3 Processors. Cable connections for all of these functions are made to Channel B as described in the following sections.

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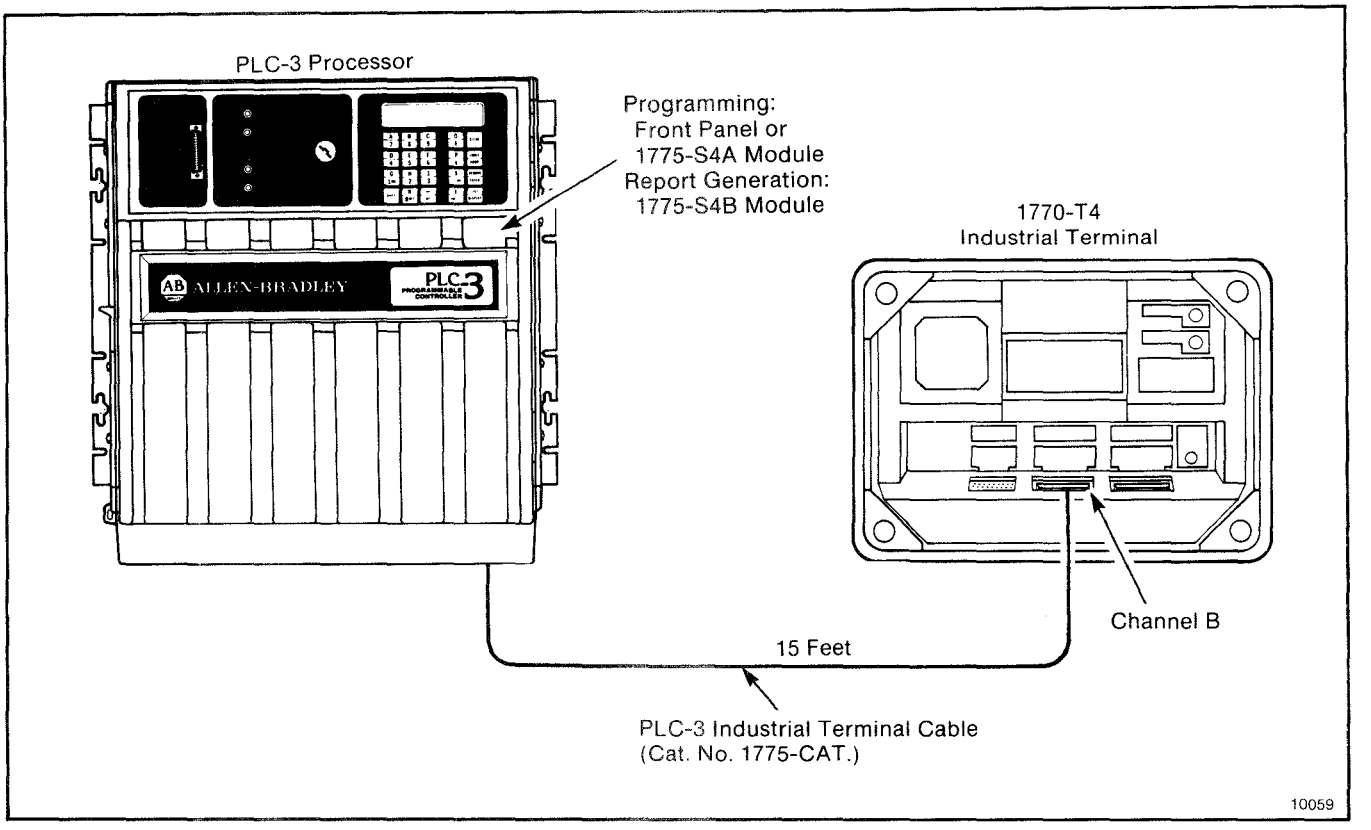


FIGURE 4-5 — PLC-3 Connection Diagram

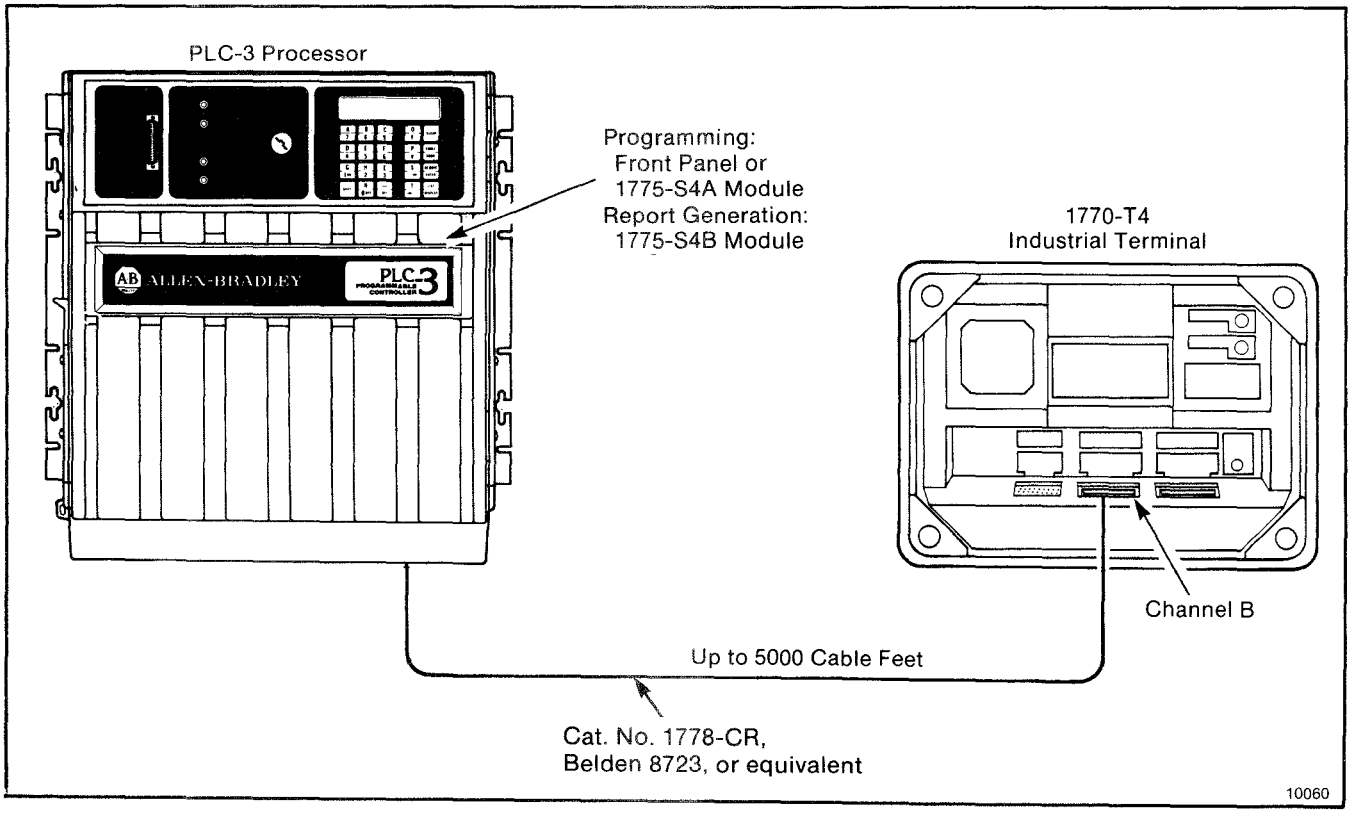


FIGURE 4-6 — PLC-3 Remote Connection Diagram

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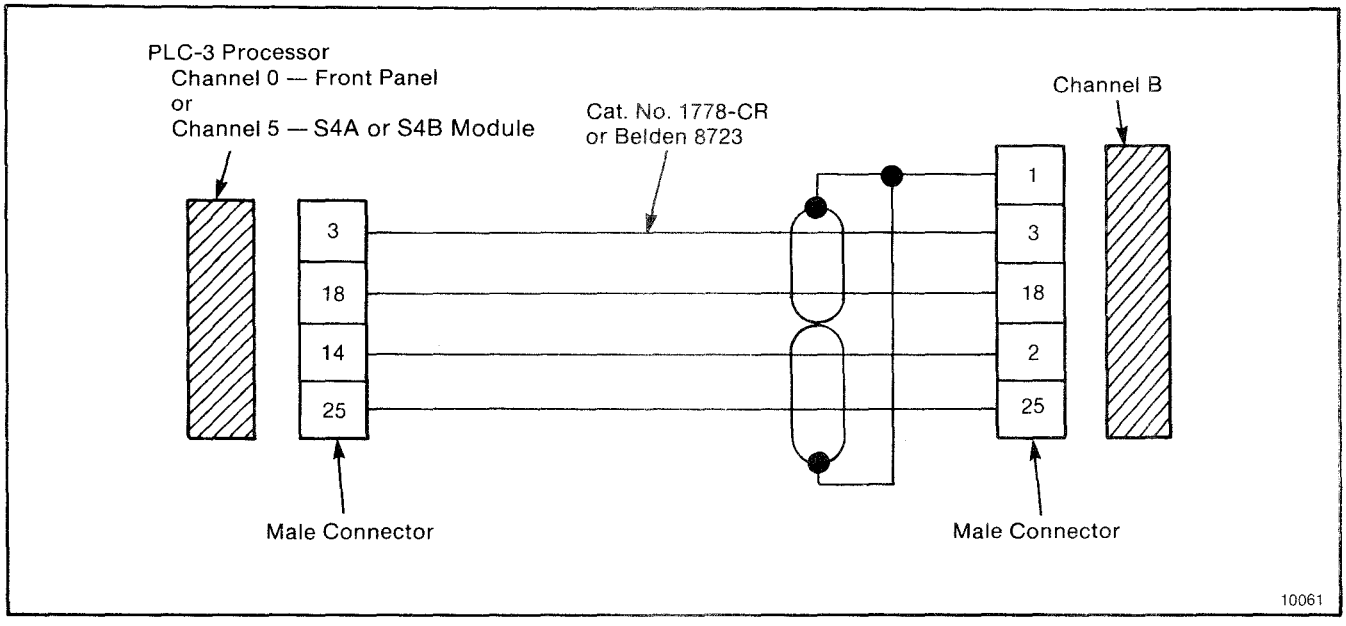


FIGURE 4-7 — PLC-3 Remote Cable Diagram

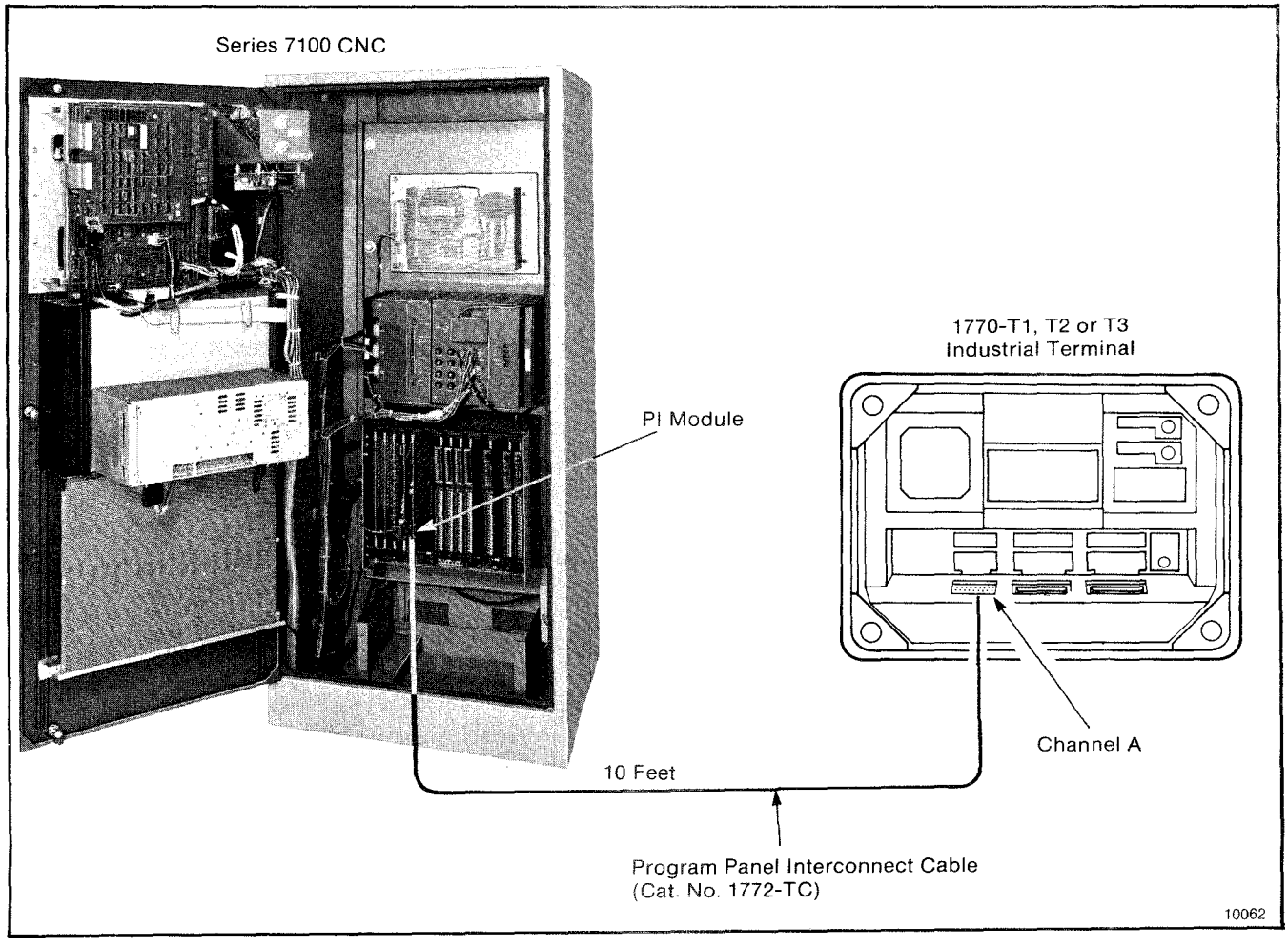


FIGURE 4-8 — Industrial Terminal/Series 7100 CNC (PI) Connection Diagram

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TABLE 4-1 — Remote Cable Parts

PART	MANUFACTURER'S DESTINATION
25-Pin Female Connector	Cannon Type DB-25S, or equivalent
25-Pin Male Connector	Cannon Type DB-25P, or equivalent
Plastic Hood	AMP Type 205718-1
2 twisted pair 22 guage, individually shielded cable	Cat. No. 1778-CR Belden 8723, or equivalent

Cannon 666 E. Dyer Santa Ana, CA 92702	Amp, Inc. P.O. Box 3608 Harrisburg, PA 17105	Belden Corp. P.O. Box 1327 Richmond, IN 47374

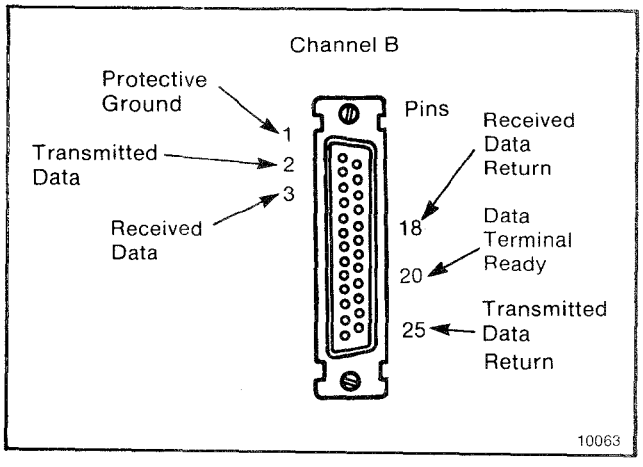


FIGURE 4-9 — Pinout of Channel B

4.5.1 Connecting RS-232-C Devices to Channel B

Modems, computers, or other non-Allen-Bradley RS-232-C devices can be connected to Channel B using one of two cables. These cables are three feet long and differ only by the type of connectors. They are:

- Industrial Terminal/Data Handling Adapter Cable (Cat. No. 1770-CB) - has two male connectors
- Industrial Terminal Adapter Cable (Cat. No. 1770-CC) - has one male and one female connector

Cable can be constructed for distances up to 50 feet. The pinout of Channel B (Figure 4-9) identifies the pins used. The cable to be used is Cat. No. 1778-CR, Belden 8723 or its equivalent and is constructed as shown in Figure 4-10. The parts for constructing this cable are listed in Table 4-1. Note that pins 7, 18, and 25 on the Industrial Terminal CRT Monitor end of the cable must be wired together.

For RS-232-C applications that require distances greater than 50 feet, refer to the EIA RS-232-C Standards publication for guidelines.

4.5.2 Connecting a PLC Processor for Report Generation

The Industrial Terminal System, in Alphanumeric mode, can be used for report generation with a PLC Processor. The Industrial Terminal System can be connected locally (13 cable-feet) or up to 5000 cable feet from the PLC Processor.

The local configuration (Figure 4-11) shows a Series B or later Data Handling Module (Cat. No. 1774-DH2) in the PLC Processor Chassis. The ten foot Data Handling Interconnect Cable (Cat. No. 1774-DC2) connects this Module to one end of the 1770-CB Cable. The other end of the 1770-CB Cable connects to Channel B.

The 5000 cable-foot configuration (Figure 4-12) uses the same Data Handling Module and cable, and a section of constructed cable (Cat. No. 1778-CR, Belden 8723 or equivalent). The

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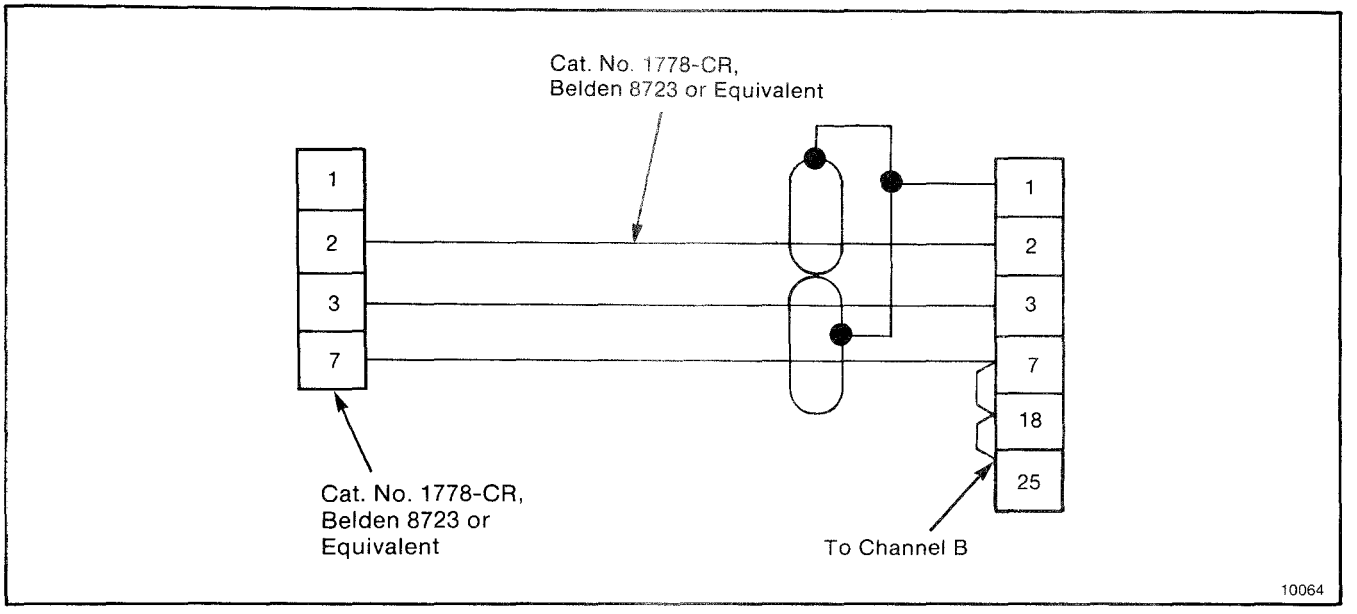


FIGURE 4-10 — Cable Diagram for RS-232-C

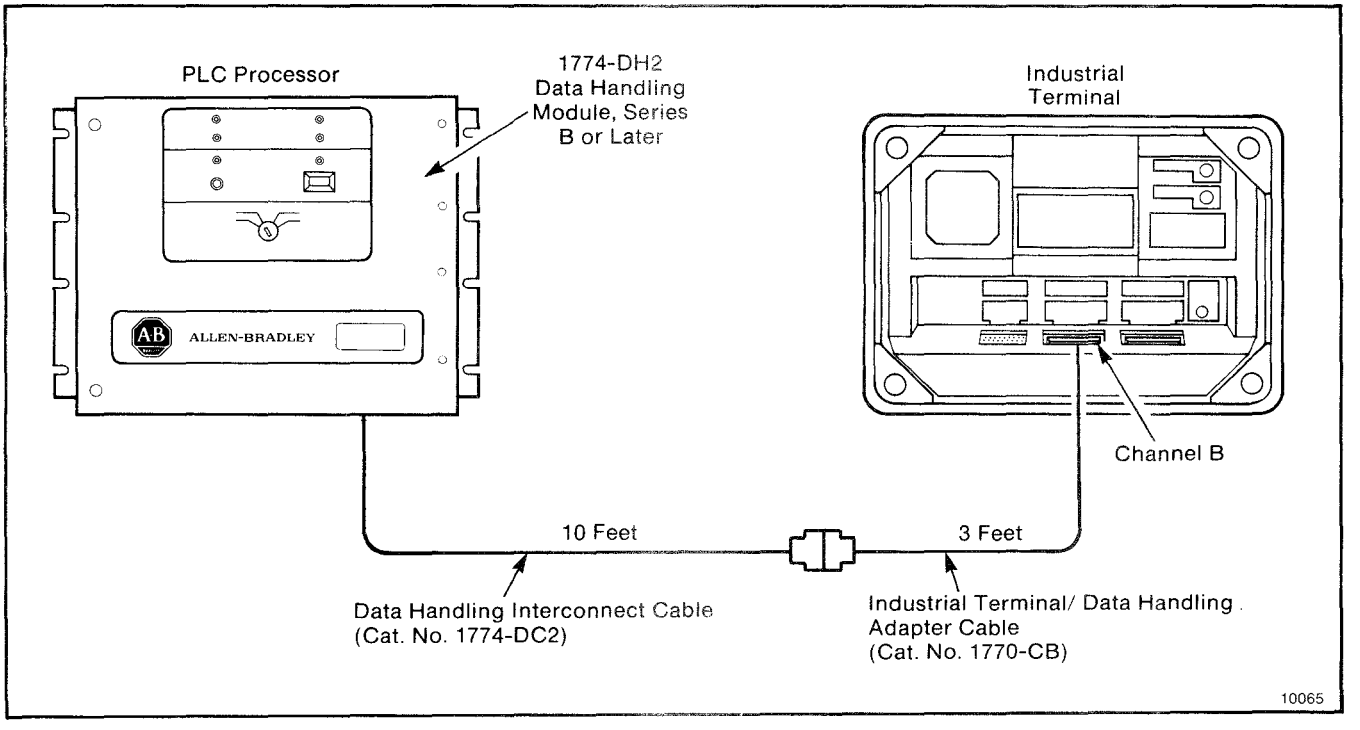


FIGURE 4-11 — Data Handling Connection Diagram (13 feet)

cable is constructed as shown in Figure 4-13 using two male connectors. The parts needed to construct the cable are listed in Table 4-1.

4.5.3 Connecting a PLC-3 Processor for Report Generation

The Industrial Terminal System can be used in Alphanumeric mode for report generation with the PLC-3 Processor. They can be connected locally (15 cable-feet) or up to 5000 cable-feet apart.

The PLC-3 Processor is connected locally to the Industrial Terminal System for report

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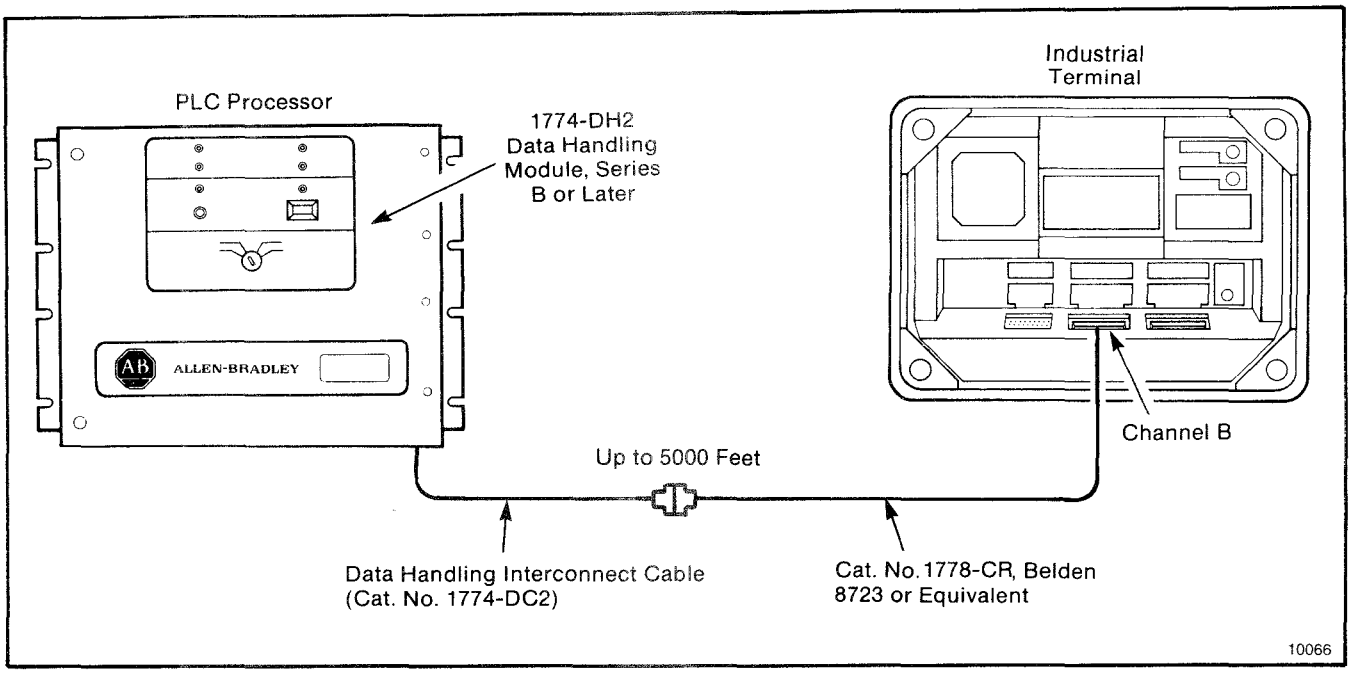


FIGURE 4-12 — Data Handling Connection Diagram (5000 feet)

generation using the PLC-3 Industrial Terminal Cable (Cat. No. 1775-CAT) as shown in Figure 4-5. One end connects to Channel 5 on the I/O Scanner-Message Handling Module (Cat. No. 1775-S4B) inside the PLC-3 Processor Chassis. The other end connects to Channel B on the Industrial Terminal System.

To connect the PLC-3 Processor up to 5000 feet from the Industrial Terminal System for report generation (Figure 4-6), a cable with two male connectors must be constructed using Cat. No. 1778-CR, Belden 8723 or equivalent following the cable diagram in Figure 4-7. The parts required to build this cable are listed in Table 4-1.

4.6 CONNECTING PERIPHERAL DEVICES TO CHANNEL C

RS-232-C peripheral devices such as the Digital Cassette Recorder (Cat. No. 1770-SA), the Data Cartridge Recorder (Cat. No. 1770-SB), or a hard copy printer can be connected to Channel C of any Industrial Terminal System. The pinout of Channel C (Figure 4-14) shows the pins used for making cable for this channel.

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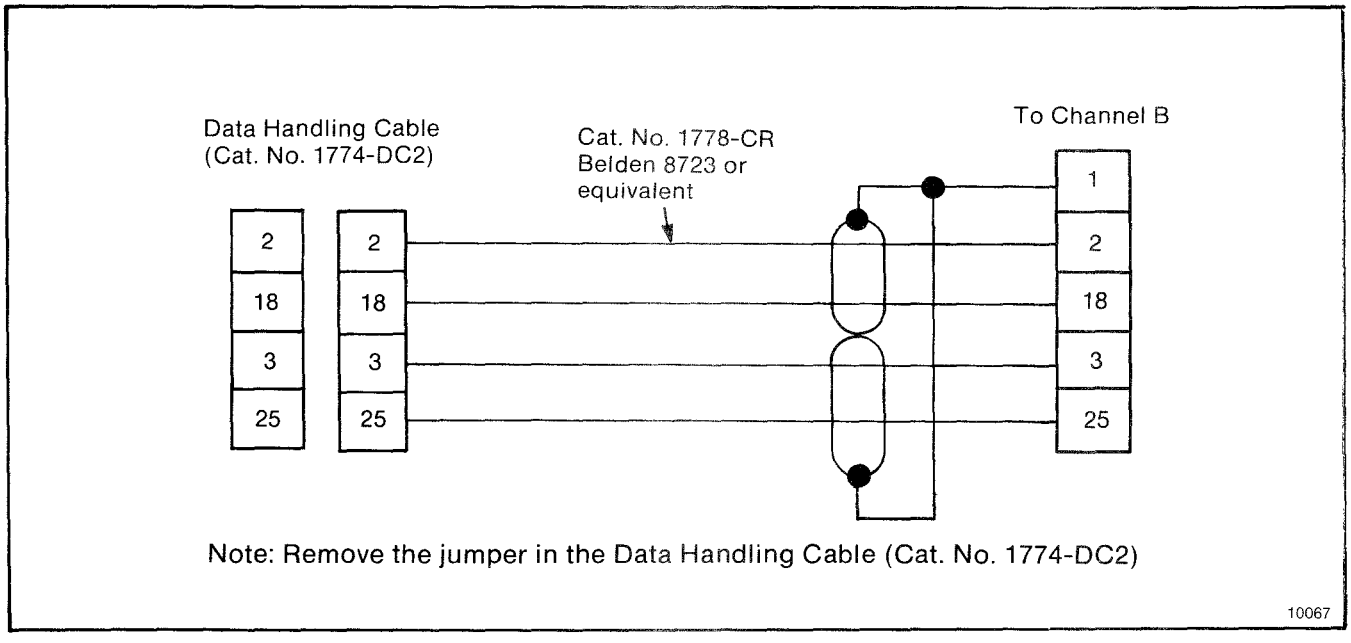


FIGURE 4-13 — PLC Remote Report Generation Cable Diagram

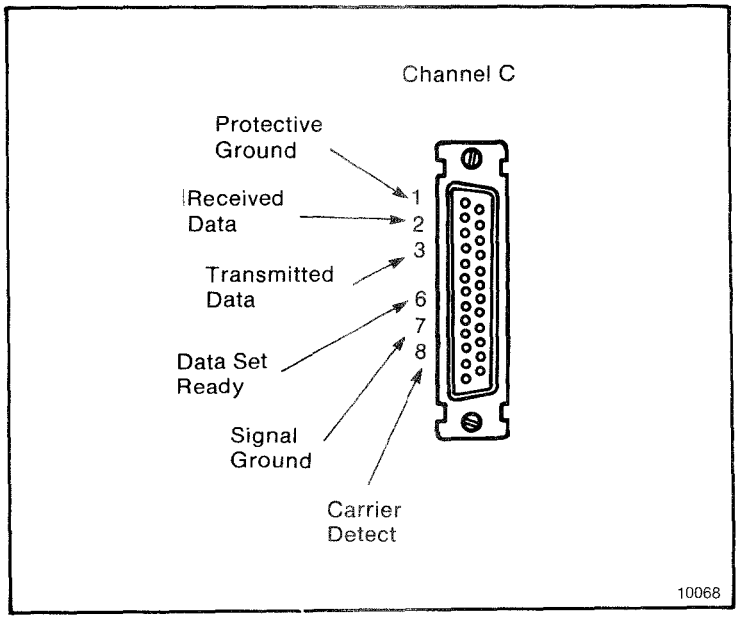


FIGURE 4-14 — Pinout of Channel C

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Section 5
MODE SELECTION

5.0 GENERAL

All Industrial Terminal Systems can operate in an Alphanumeric mode and one or more Processor modes. In addition, all Industrial Terminal Systems can operate in a Monitor mode when the keyboard is replaced by a keyboard connector cover.

When the Industrial Terminal System is turned ON, self-diagnostic checks are performed. When no problems are found and a keyboard is attached, either a Processor mode or Alphanumeric mode can be selected. The 1770-T4 Industrial Terminal System allows either automatic or manual mode selection after fault-free diagnostics are performed at power up. Mode selection with 1770-T1, -T2, and T3 Industrial Terminal Systems is performed manually.

If a problem is detected during power up of any Industrial Terminal System, a diagnostic fault prompt and continuous beep tone are generated.

5.1 MONITOR MODE

When the keyboard connector cover is attached and fault-free diagnostics have been performed, the Industrial Terminal System automatically enters the Monitor mode. In this mode, the Industrial Terminal System functions as a data terminal that can only receive ASCII characters through Channel B. If lower case ASCII characters are received, their upper case equivalents will be displayed.

The baud rate and parity switch settings for the Industrial Terminal System (Section 3.6) must match the baud rate and parity of the data received on Channel B.

5.2 MODE SELECTION WITH A T1, T2, OR T3 SYSTEM

The operating modes for the 1770-T1, -T2, and -T3 systems are selected in the same manner from a mode selection menu. After fault-free diagnostics have been performed at power up, or when the [MODE SELECT] key on the keyboard is pressed, a MODE SELECTION menu will be displayed on the screen. This menu identifies the keyboard that is attached and lists the operating modes and keytop overlays that can be used (Figure 5-2). Note that the 1770-T3 Mode Selection menu identifies the Processor connected to Channel A by intensifying its name on the screen. To select the desired mode, install the proper keytop overlay and enter the appropriate two-digit number.

When a Processor mode is selected, the Industrial Terminal System is used to enter, edit, and monitor ladder diagram instructions. In addition, report generation for PLC-2 family Processors is performed in this mode. Information on the instruction set and report generation for the various Processors is found in the appropriate Processor documentation.

When Alphanumeric mode is selected, the Industrial Terminal System is used as a data terminal. ASCII code can be transmitted to or from a modem, computer or other RS-232-C device using Channel B. Report generation for PLC Processors is also performed in this

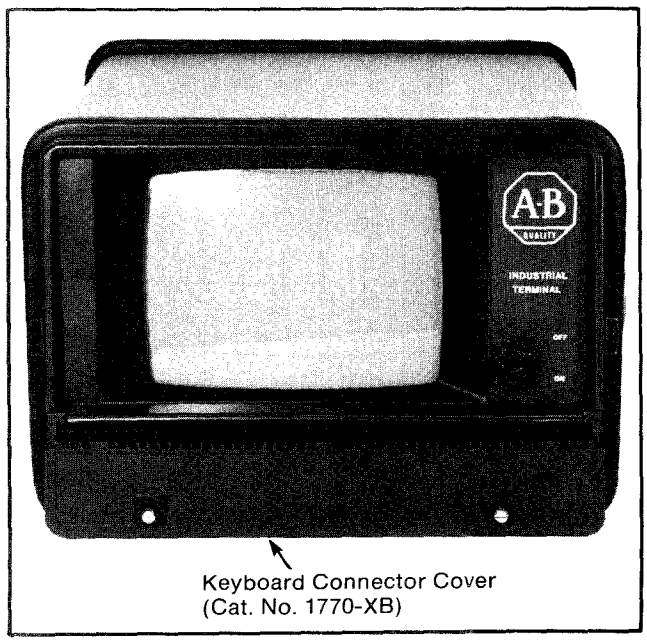


FIGURE 5-1 — Keyboard Connector Cover

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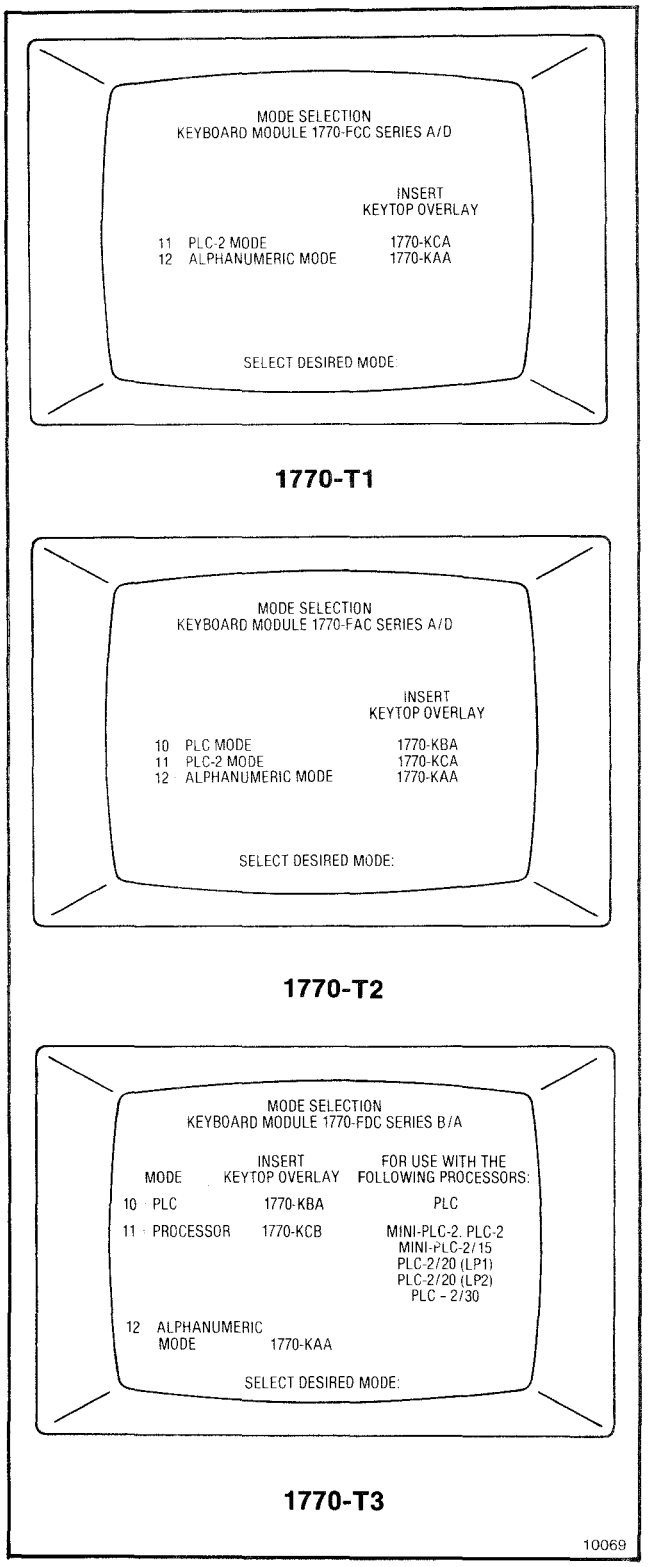


FIGURE 5-2 — Mode Selection Menus (T1, T2 and T3)

mode. After Alphanumeric mode is selected, an Alphanumeric Mode Options list will be displayed. This display lists several options that can be selected before beginning alphanumeric operations. The Alphanumeric mode operating commands for all Industrial Terminal Systems are fully described in Section 6.

5.3 MODE SELECTION WITH A T4 SYSTEM

A 1770-T4 Industrial Terminal System provides automatic mode selection at power-up. Series A, Rev B and later systems first determine the setting of the parity switches. If the switches are set for ODD, EVEN, or NONE, the Industrial Terminal System immediately enters the Alphanumeric Mode. The baud rate, parity, and line frequency are determined by the switch group settings on the Industrial Terminal System. If the switches are in the NOT USED position (both up), the Industrial Terminal System tries to communicate with a PLC-3 Processor. It sends a message out Channel B three times at each baud rate starting at 9600. While attempting to communicate with a PLC-3 Processor, it displays a prompt on the screen. If a PLC-3 Processor is connected, the Industrial Terminal System automatically enters PLC-3 mode at the baud rate specified by the Processor.

If a PLC-3 Processor is not connected, the Industrial Terminal System enters Alphanumeric mode after trying all baud rates. The baud rate and line frequency are determined by the switch group settings on the Industrial Terminal System. Parity selected is NONE.

Earlier Industrial Terminal Systems look for a PLC-3 Processor before determining parity switch settings. If a PLC-3 Processor is connected, the Industrial Terminal System automatically enters PLC-3 mode at the baud rate specified by the Processor.

If a PLC-3 Processor is not connected, the Industrial Terminal System enters Alphanumeric mode after trying all baud rates. The baud rate, parity, and line frequency are determined by the switch group settings on the Industrial Terminal System.

The mode can be changed manually at any time using the Mode Selection Menu (Figure 5-3). This menu, displayed by pressing [SHIFT][MODE] on the keyboard, lists the two modes which can be selected.

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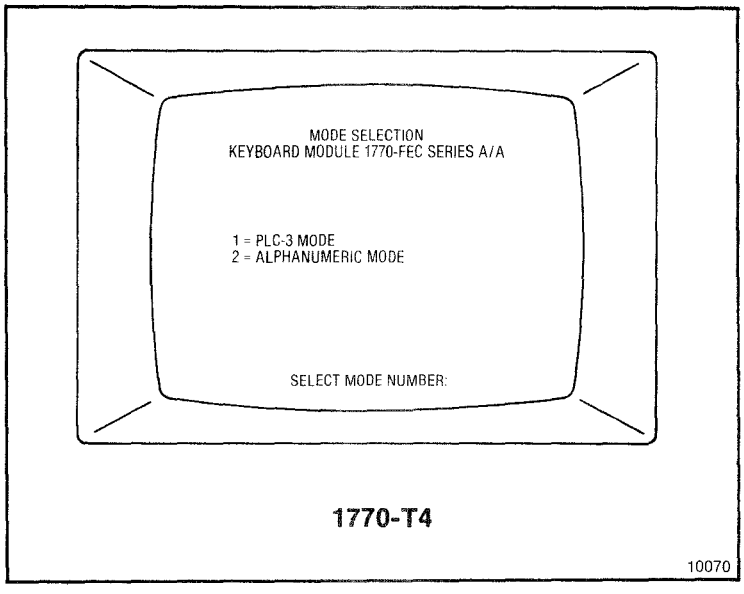


FIGURE 5-3 — Mode Selection Menu (T4)

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Section 6
ALPHANUMERIC MODE

6.0 GENERAL

When Alphanumeric mode is selected, the Industrial Terminal System will act as a data terminal. In this mode, it can communicate with a modem, computer, or other RS-232-C device connected to Channel B. When entering data from the Industrial Terminal keyboard, the keys are pressed one at a time, not two at one time like some data terminals.

The 1770-T1, -T2, and -T3 Industrial Terminal Systems have the same operating commands and use the same keytop overlay for alphanumeric mode. The 1770-T4 Industrial Terminal System uses some different operating commands and a different keytop overlay for alphanumeric mode. If graphic characters are desired, an Alphanumeric/ Graphics Keytop Overlay (Cat. No. 1770-KAB) or a PLC-3 Graphics Keytop Overlay (Cat. No. 1770-KDB) can be used. The keytop overlays used for Alphanumeric mode are shown in Figure 6-1.

In alphanumeric mode, the Industrial Terminal System can send and display many ASCII characters. The capabilities of the Industrial Terminal System are described in the following sections.

6.1 ALPHANUMERIC OPTIONS MENUS

After selecting Alphanumeric mode, an Alphanumeric options menu is displayed on the screen. It lists various operating parameters that can be selected before entering Alphanumeric mode. The menu for the 1770-T4 Industrial Terminal System differs from that of the 1770-T1, -T2, and -T3 Industrial Terminal Systems.

6.1.1 Alphanumeric Options (1770-T1, -T2, and -T3 Systems)

The seven options in the menu in Figure 6-2 are described as follows:

- BAUD RATE: the number of bits transmitted per second. The number initially displayed reflects the switch group assembly setting. When the 110 baud rate is selected, two stop bits are used. With all other baud rates, one stop bit is used.
- PARITY: used for checking the validity of data. Selections are ODD, EVEN, and NONE. The parity initially displayed reflects the switch group assembly settings. When ODD or EVEN parity is selected, a parity bit is transmitted. The parity bit can be a 1 or 0 and is added to the 1's in the data, so that the sum is always odd for ODD parity, or even for EVEN parity. When NONE is selected, no parity bit is transmitted.
- DUPLEX: communication mode can be HALF or FULL.
- CHANNEL C: initially OFF. Can be set ON for use with peripheral devices.
- CURSOR: initially ON. Can be set OFF so cursor will not be displayed on the screen.
- AUTO LINE FEED ON RETURN: initially OFF. When set ON, the RETURN key generates a carriage return and line feed. When set OFF, the RETURN key generates a carriage return without a line feed.
- CONTROL CODE DISPLAY: initially OFF. When set ON, a control code entered from the keyboard will display a corresponding two-letter abbreviation. The control code will not be executed.

6.1.2 Alphanumeric Options (1770-T4 System)

Thirteen options and operating parameters can be selected for Alphanumeric mode (Figure 6-3). These parameters are defined as follows:

- BAUD RATE: the rate of data transmission in bits per second. Initial value reflects the current switch group setting. Selections are 9600, 4800, 2400, 1200, 600, 300, and 110.
- PARITY: used for checking the validity of data. Selections are ODD, EVEN, and NONE. The parity initially displayed reflects the switch group assembly settings. When

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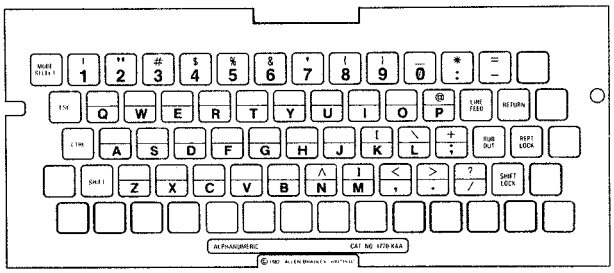
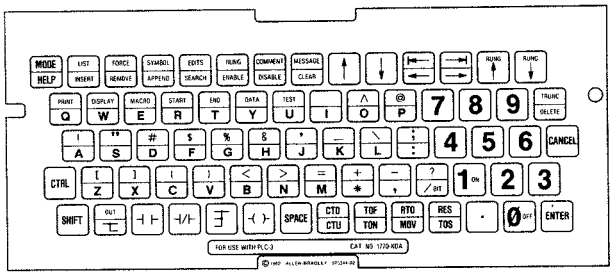
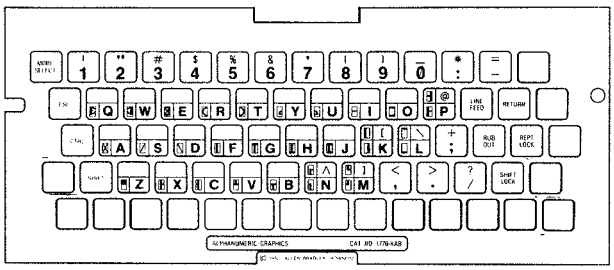
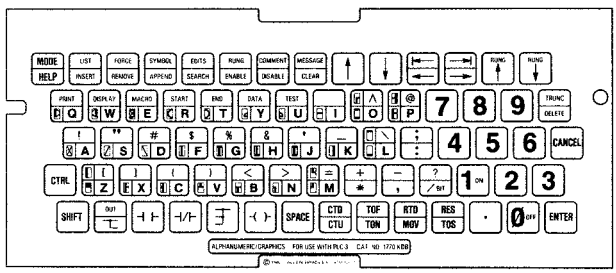
For Use With 1770-T1, -T2 and -T3 Systems	For Use With 1770-T4 Systems
	
Alphanumeric Keytop Overlay (Cat. No. 1770-KAA)	**PLC-3 Keytop Overlay (Cat. No. 1770-KDA)**
	
Alphanumeric/Graphics Keytop Overlay (Cat. No. 1770-KAB)	**PLC-3 Graphics Keytop Overlay (Cat. No. 1770-KDB)**

FIGURE 6-1 — Alphanumeric and Graphic Keytop Overlays

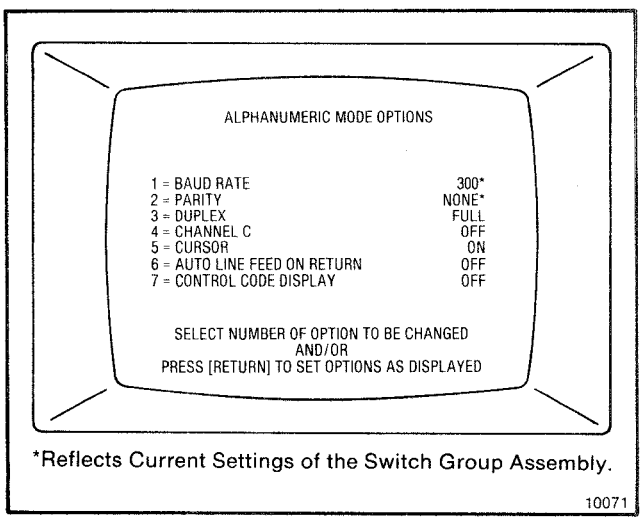


FIGURE 6-2 — Alphanumeric Options Menu (1770-T1, -T2 and -T3)

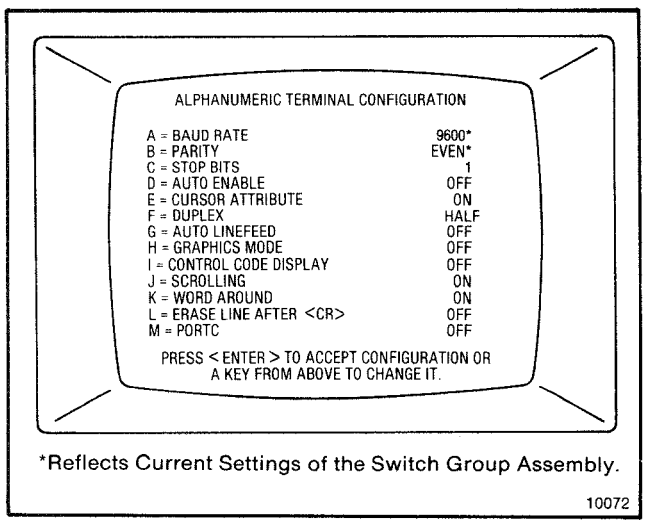


FIGURE 6-3 — Alphanumeric Options Menu (1770-T4)

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ODD or EVEN parity is selected, a parity bit is transmitted. The parity bit can be a 1 or 0 and is added to the 1's in the data, so that the sum is always odd for ODD parity, or even for EVEN parity. When NONE is selected, no parity bit is transmitted.

- STOP BITS: initially set to 1. Can be 1, 1-1/2 or 2. The stop bits are transmitted after the data bits.
- HARDWARE HANDSHAKING: Initially OFF. Can be set ON for use with intelligent printers connected to Channel C. Allows the Industrial Terminal System to recognize when to start and stop sending data.
- CURSOR ATTRIBUTE: When ON, cursor is displayed. When OFF, cursor is not displayed.
- HALF DUPLEX: initially ON. When OFF, full duplex is selected.
- AUTO LINE FEED: when ON, the ENTER key generates a line feed and carriage return. When OFF, the ENTER key generates a carriage return without a line feed.
- GRAPHICS MODE: turns graphics capability ON or OFF.
- CONTROL CODE DISPLAY: when ON, the two-letter symbol for some control codes (those used by the Industrial Terminal System) will be displayed. The control code will not be executed.
- SCROLLING: When ON and the cursor is on the last line of the screen, each new line of data added moves all other lines up one line. When OFF and the cursor is on the last line, the screen does not clear as new lines are entered at the top of the screen.
- WRAP AROUND: ON - When the cursor reaches the end of a line, it moves to the beginning of the next line. OFF - When the cursor reaches the end of a line, it stays there and, as new data is entered, each new character writes over the previous character.
- ERASE LINE AFTER CR: initially OFF. When ON, the data from the cursor position to the end of the line will be deleted when a carriage return is entered.

PORT C: can be set ON or OFF for use with a peripheral device.

6.2 ALPHANUMERIC CAPABILITIES

In Alphanumeric mode, all Industrial Terminal Systems can display most ASCII characters, excluding the lower case alphabet and a few symbols (Table 6-1). All lower case alpha characters received will be displayed as their upper case equivalents.

6.2.1 Alphanumeric Keyboard Definitions

There are several keys on the Industrial Terminal keyboards that have special functions. Some of these keys for the 1770-T4 system will be different from the ones used with the 1770-T1, -T2, andT3 systems. These keys are defined as follows:

1770-T1, -T2, AND -T3 SYSTEMS

[LINE FEED] - Moves the cursor down one line in the same column.

[RETURN] - Returns the cursor to the beginning of the same line.

[RUB OUT] - Backspaces one character and deletes the character last entered.

[REPT LOCK] - Allows the next key pressed to be repeated continuously until [REPT LOCK] is pressed again.

[SHIFT] - Allows the next key pressed to be a shift character.

[SHIFT LOCK] - Allows all subsequent keys pressed to be shift characters until [SHIFT] or [SHIFT LOCK] is pressed.

[CTRL] - Used as part of a key sequence to generate a control code.

[ESC] - Generates an ASCII ESCAPE code.

[MODE SELECT] - Terminates all functions and returns the Mode Select menu to the screen.

Blank Yellow Keys - Space keys. Generate an ASCII space character.

1770-T4 SYSTEMS

[ENTER] - Returns the cursor to the beginning of the same line.

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TABLE 6-1 — ASCII (American Standard Codes for Information Interchange)

BITS 4231	BITS 765 000	001	010	011	100	101	110	111
0000	NUL	DLE	SP	Ø	@	P	‘	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	”	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EOT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	’	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

[DELETE] - Backspaces one character and deletes the character last entered.

[SPACE] - Generates an ASCII SPACE character.

[CANCEL COMMAND] - Generates an ASCII ESCAPE code.

[SHIFT] - Allows the next key pressed to be a shift character.

[CTRL] - Used as a part of a key sequence to generate a control code.

[MODE] - Terminates all functions and returns the Mode Selection Menu to the screen.

6.2.2 ASCII Control Codes

The ASCII Control Codes listed in Table 6-2 can be generated from all Industrial Terminal keyboards by pressing [CTRL] and another key. All of the control codes are transmitted, but only a few are used by the Industrial Terminal System. These include:

[CTRL][G] - Generates a beep tone.

[CTRL][H] - Generates an ASCII BACK-SPACE. The cursor moves one position to the left.

[CTRL][I] - Generates an ASCII HORIZONTAL TAB. A horizontal tab is set at every eighth position. The cursor moves to the next preset position.

[CTRL][J] - Generates an ASCII LINE FEED. The cursor moves down one line in the same column.

[CTRL][K] - Generates an ASCII VERTICAL TAB. Clears the screen from the cursor position to the end of the screen. Moves the cursor to the top left corner of the screen.

[CTRL][L] - Generates an ASCII FORM FEED. Clears the entire screen. Moves the cursor to the top left corner of the screen.

[CTRL][M] - Returns the cursor to the beginning of the same line.

When the control code display option is set ON with a 1770-T1, -T2 or -T3 system, a control code entered will generate and display a corresponding two-letter abbreviation (See Table 6-2). The control codes will not be executed.

When the control code display option is set ON with a 1770-T4 system, only the control codes that the Industrial Terminal System uses will generate and display a two-letter abbreviation. The control codes will not be executed.

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TABLE 6-2 — ASCII Control Codes

CONTROL CODE [1]	DISPLAY [2]	ASCII	NAME
CTRL 0	$^{N}_{U}$	NUL	NULL
CTRL A	$^{S}_{H}$	SOH	START OF HEADER
CTRL B	$^{S}_{X}$	STX	START OF TEXT
CTRL C	$^{E}_{X}$	ETX	END OF TEXT
CTRL D	$^{E}_{T}$	EOT	END OF TRANSMISSION
CTRL E	$^{E}_{Q}$	ENQ	ENQUIRE
CTRL F	$^{A}_{K}$	ACK	ACKNOWLEDGE
CTRL G	$^{B}_{L}$	BEL	BELL
CTRL H	$^{B}_{S}$	BS	BACKSPACE
CTRL I	$^{H}_{T}$	HT	HORIZONTAL TAB
CTRL J	$^{L}_{F}$	LF	LINE FEED
CTRL K	$^{V}_{T}$	VT	VERTICAL TAB
CTRL L	$^{F}_{F}$	FF	FORM FEED
CTRL M	$^{C}_{R}$	CR	CARRIAGE RETURN
CTRL N	$^{S}_{O}$	SO	SHIFT OUT
CTRL O	$^{S}_{I}$	SI	SHIFT IN
CTRL P	$^{D}_{L}$	DLE	DATA LINK ESCAPE
CTRL Q	$^{D}_{1}$	DC1	DEVICE CONTROL 1
CTRL R	$^{D}_{2}$	DC2	DEVICE CONTROL 2
CTRL S	$^{D}_{3}$	DC3	DEVICE CONTROL 3
CTRL T	$^{D}_{4}$	DC4	DEVICE CONTROL 4
CTRL U	$^{N}_{K}$	NAK	NEGATIVE ACKNOWLEDGE
CTRL V	$^{S}_{Y}$	SYN	SYNCHRONOUS IDLE
CTRL W	$^{E}_{B}$	ETB	END OF TRANSMISSION BLOCK
CTRL X	$^{C}_{N}$	CAN	CANCEL
CTRL Y	$^{E}_{M}$	EM	END OF MEDIUM
CTRL Z	$^{S}_{B}$	SUB	SUBSTITUTE
ESCAPE	$^{E}_{C}$	ESC	ESCAPE
CTRL ,	$^{F}_{S}$	FS	FILE SEPARATOR
CTRL -	$^{G}_{S}$	GS	GROUP SEPARATOR
CTRL .	$^{R}_{S}$	RS	RECORD SEPARATOR
CTRL /	$^{U}_{S}$	US	UNIT SEPARATOR
DELETE [3] OR RUBOUT		DEL	DELETE

[1] Some ASCII control codes are generated using non standard keystrokes.
[2] Will be displayed when Control Code Display option is set ON.
[3] 1770-T3 systems display _ when [RUB OUT] is pressed. Other systems display ┼ when [DELETE] or [RUB OUT] is pressed.

6.2.3 GRAPHICS

In the Alphanumeric Mode the Industrial Terminal has the capability of displaying graphic (line drawing) characters. The Alphanumeric/Graphics Keytop Overlay (Cat. No. 1770-KAB) or the PLC-3 Graphics Keytop Overlay (Cat. No. 1770-KDB) shows the graphic characters generated by specific keys (Figure 6-1).

The Graphics ON command is the character sequence CONTROL P 5G. When the Graphics ON command is generated, all subsequent alpha characters will be displayed as its graphic equivalent. The Graphics OFF command must be generated in order to display alpha characters as alpha characters.

Figure 6-3 illustrates a typical graphic display that can be "drawn" on the Industrial Terminal.

6.2.4 Special Control Codes

There are several control codes unique to the

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Industrial Terminal System that use [CTRL][P] as part of the key sequence (Table 6-3). These control codes are used for cursor positioning and controlling other operating characteristics.

For example, [CTRL][P][5][G] is used to enable the graphics capabaility. Keys that contain alpha characters will now generate graphic characters. Alpha characters received through Channel B will be displayed as their graphic equivalents.

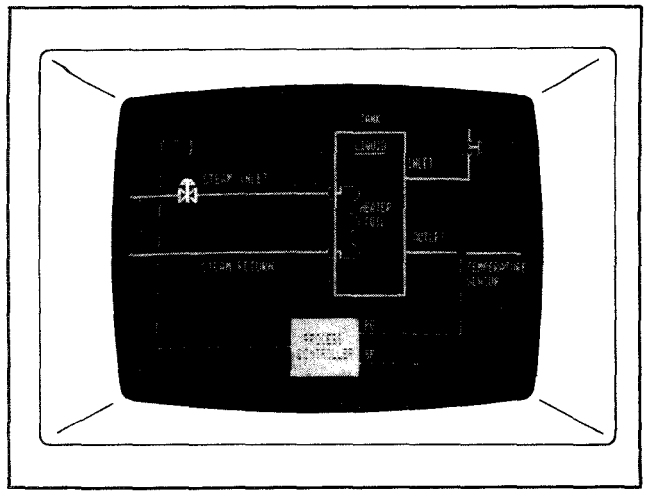


FIGURE 6-3 — Graphics Example

TABLE 6-3 — Industrial Terminal Control Codes

CONTROL CODE KEY SEQUENCE	FUNCTION
[CTRL][P] [Column #][;] [Line #][A]	Positions the cursor at the specified column and line number. [CTRL][P][A]will position the cursor at the top left corner of the screen.
[CTRL][P][F]	Moves the cursor one space to the right.
[CTRL][P][U]	Moves the cursor one line up in the same column.
[CTRL][P][5][C]	Turns cursor ON.
[CTRL][P][4][C]	Turns cursor OFF.
[CTRL][P][5][G]	Turns ON graphics capability.
[CTRL][P][4][G]	Turns OFF graphics capability.
[CTRL][P][5][P]	Turn Channel C ON.
[CTRL][P][4][P]	Turns Channel C OFF.
KEY SEQUENCE	**ATTRIBUTE [1]**
[CTRL][P][0][T] [CTRL][P][1][T] [CTRL][P][2][T] [CTRL][P][3][T] [CTRL][P][4][T]	Attribute 0 = Normal Intensity Attribute 1 = Underline Attribute 2 = Intensity Attribute 3 = Blinking Attribute 4 = Reverse Video

[1] Any three attributes can be used at one time using the following key sequence:[CRTL][P][Attribute #][;][Attribute #][T].

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Section 7
TROUBLESHOOTING

7.0 GENERAL

This section contains information on troubleshooting the Industrial Terminal System.

7.1 DIAGNOSTICS

The Industrial Terminal System performs self-diagnostics at power up. If a problem is found, a FAULT diagnostic prompt will be displayed and a continuous beep tone will be generated to alert the user of a problem. If the Industrial Terminal System cannot display a FAULT prompt, a continuous beep tone will still be generated.

If a "COMMUNICATION FAULT" message appears, cycle power to the Industrial Terminal System (turn Industrial Terminal power switch OFF, then ON). If the "COMMUNICATION FAULT" message still appears, turn Industrial Terminal power switch OFF, disconnect and reconnect the cable to its Channel socket, and turn the Industrial Terminal power switch ON.

If you find a problem with your Industrial Terminal System that cannot be resolved, contact your local Allen-Bradley Sales Representative.

7.2 TEST PLUG

The CRT Troubleshooting Test Plug (Cat. No. 1774-TT) can be used to verify proper operation of the keyboard. Plug the Test Plug into CHANNEL B, and select ALPHANUMERIC mode. Select full duplex from the Alphanumeric Options menu. Type on the keyboard. If the Industrial Terminal's keyboard circuits are functioning properly, whatever is typed should be displayed on the screen. It is still possible to have a problem that would not be detected by using the Test Plug. For the best possible test, exercise each key which causes a character to be displayed on the screen. If the Test Plug causes characters other than those pressed to be displayed, remove and insert the keyboard and repeat the procedure.

If still unsuccessful, contact your local Allen-Bradley Sales Representative.

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Section 8
SPECIFICATIONS

8.0 GENERAL

This section lists the specifications of the Industrial Terminal Systems.

8.1 PHYSICAL DIMENSIONS:

14.5 x 10 x 23 inches
36.8 x 25.4 x 58.4 centimeters

9 inch (22.9 centimeters) Diagonal CRT

Less than 35 pounds (15.9 Kg)

8.2 ELECTRICAL INTERFACE:

CHANNEL A - PLC-2 Family Processors and 7100 CNC (T1, T2, T3)not used (T4)

CHANNEL B - PLC Processor (T2, T3 series B) PLC-3 Processor (T4) Data Terminal (T1, T2, T3, T4)

CHANNEL C - RS-232-C peripheral devices (Data Cartridge Recorder, Digital Cassette Recorder, or Hard-copy printer)

VIDEO OUTPUT JACK - User supplied RS-170 (BNC) compatible Black & White CRT monitor

8.3 OPERATING AC LINE VOLTAGE:

120V AC or 220/240V AC (Selectable)

8.4 OPERATING AC VOLTAGE RANGE:

98-132V AC (120V)
196-250V AC (220/240V)

8.5 OPERATING LINE FREQUENCY:

50 or 60 Hz (Selectable)

8.6 FUSE RATING:

1 AMP at 120V AC
(Bussman AGC1 or 312001 Littelfuse)
1/2 AMP at 220/240V AC
(Bussman AGC1/2 or 312.500 Littelfuse)

8.7 COMMUNICATION RATE:

110 Baud
300 Baud
600 Baud
1200 Baud
2400 Baud
4800 Baud
9600 Baud

(Selectable from switches or keyboard)

8.8 ENVIRONMENTAL:

Ambient Temperature (Operational) - 0° to 55°C

Ambient Temperature (Storage) -40° to 65°C

Ambient Humidity (Without Condensation) 5% to 95%

8.9 FUNCTIONS:

Load, Edit, Monitor Allen-Bradley Processor program instructions and ASCII report generation messages. General purpose ASCII data terminal.

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