

SECTION 2 P190 PROGRAMMER DESCRIPTION

This section describes the physical arrangement and basic functions of the P190 Programmer. It also describes the keys on the keyboard and tells you how and when to use them. The P190 is described as a separate unit, independent of the device being programmed.

The P190 Programmer has three primary user-oriented features; the CRT screen, the keyboard, and the tape drive. The CRT screen provides a graphic representation of user programs and communications with the controller (using ladder logic symbols), and displays information to assist in programming. The keyboard is used to enter programs and to communicate with the controller. The tape drive is used to load P190 operating software into the programmer's memory; to load user programs into various controllers; and to record programs from various controllers. (Each PC has its own library of related tapes; Tape Loader and Programming Tapes, for example. See Section 3.5 for a current listing of all Software Tapes.)

Throughout the text of this manual, references to fixed function keys which are located on the programming panel will be capitalized (START/NEXT, ENTER, etc.), and references to software label keys (see Section 2.2.1) will be in quotation marks ("Attach", "Proceed", etc.).

2.1 CRT SCREEN DESCRIPTION

The P190 has a nine inch CRT screen which displays the development of user logic and specific status information. The screen displays change with the different program tapes used with each PC. The screen displays common to most program tapes are the Logic Screen and the Alternate Screen. (These screens are not used with all of the program tapes. Consult the appropriate reference manual for screen display information relating to specific controllers.)

2.1.1 Logic Screen

The logic screen is divided into five parts; the logic area, the reference area, the error line, the status line, and the software labels. A sample logic screen, with these five areas identified, is shown in Figure 2-1. (This sample screen is displayed during 584 PC programming.)

LOGIC AREA — This area is for the display and creation of user-programmed logic. Each logic display contains a single network. Each network has up to a total 77 elements (11 horizontal elements, including coils, on each of 7 rungs). See the appropriate PC programming guide for more information.

NOTE

In Micro 84 Programming, each network contains a maximum of 28 elements; 7 horizontal elements, including coils, on each of 4 rungs.

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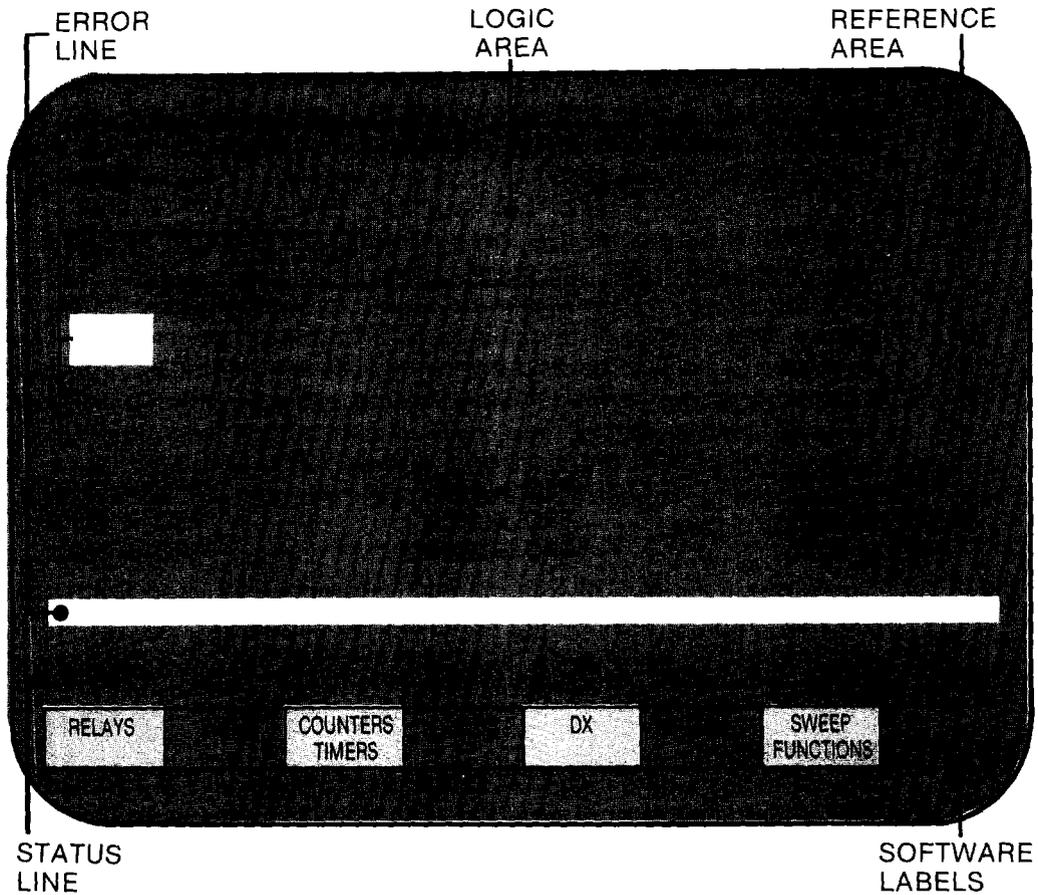


Figure 2-1. Sample Logic Screen

REFERENCE AREA — The reference area displays the value or state of any reference (registers and/or discrete inputs and outputs), in the attached programmable controller.

ERROR LINE — The error line displays all error messages and prompts from the P190 Programmer to the user.

STATUS LINE — The status line displays the current status of the P190 Programmer and the screen display as shown in Figure 2-2. The line is made up of the following parts:

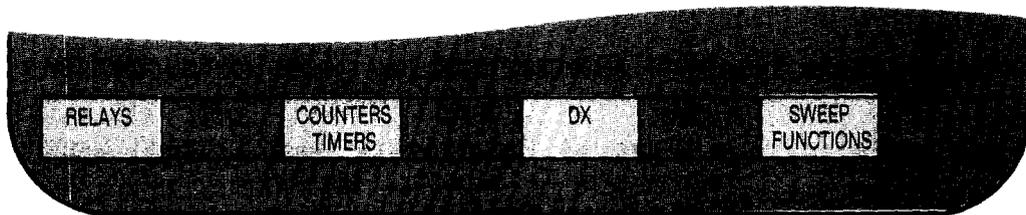


Figure 2-2. Sample Status Line and Software Labels

NET — The number of the network currently displayed in the logic area of the screen.

UNIT — The unit number of the controller that is presently attached to the P190 programmer.

SEG — The logic segment which contains the currently displayed network (584 PC only)

AVAIL — Displays the amount of memory, in words, that is still available

USED — Displays the total amount of memory, in words, that has been used

TRACE — The network number from which the most recent trace was originated. This number will be "0" if no traces exist.

AR — This is the assembly register. The AR holds the reference numbers or the values to be used in programming and utility support operations. Each number is displayed as it is entered in the register. (Press the CLEAR AR key on the programming panel to clear this register to all zeros.)

SET SEARCH — The cursor is positioned in this area of the screen when search parameters are to be set.

SOFTWARE LABELS — These labels define the functions of the software label keys on the top of the programming panel. These software labels correspond directly to the software label keys just below them on the programming panel. The function indicated on a white software label is accessed by pressing the white software label key directly below it on the programming panel. Likewise, the function indicated on a black software label is accessed by pressing the grey software label key directly below it. Figure 2-2 illustrates the software labels. They are located below the status line on the CRT screen.

The functions of these keys vary from one PC to another. Consult the appropriate PC programming guide for a more detailed description of these keys and how they function. (See Section 2.2.1)

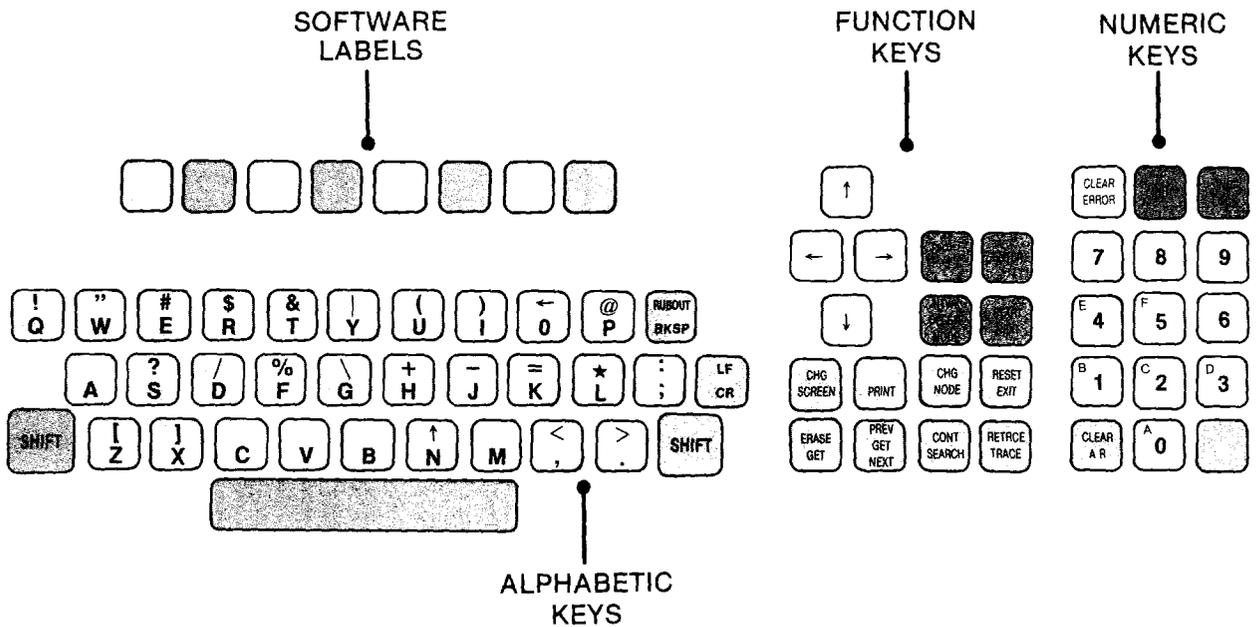


Figure 2-4. P190 Keyboard

2.2.1 Software Label Keys

Eight software label keys are located above the alphabetic keyboard (See Figure 2-5). These keys alternate in color from white to black and correspond with the software labels on the CRT screen. The functions of these keys are defined by the program tapes, and change with each tape used. These keys provide access to the highest level of programming functions available with the P190.

In some cases, the software label is blank. This indicates that the key is has no function in that particular menu. (A menu is a selection of the operations you can perform at any given point in your programming.) If the key is pressed, an error message will appear in the error line of the CRT screen. To remove any error message, press the CLEAR ERROR key located directly above the numeric keyboard.



Figure 2-5. Software Label Keys

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2.2.2 Alphabetic Keyboard

The alphabetic keyboard is arranged typewriter-style, with 33 keys and a space bar. It is used to enter messages for the controller's memory and headers for ladder listings. This keyboard has two SHIFT keys that function the same way as the SHIFT keys on a typewriter. When the keys are pressed and held, any double function key pressed will assume the upper function. See Figure 2-6.

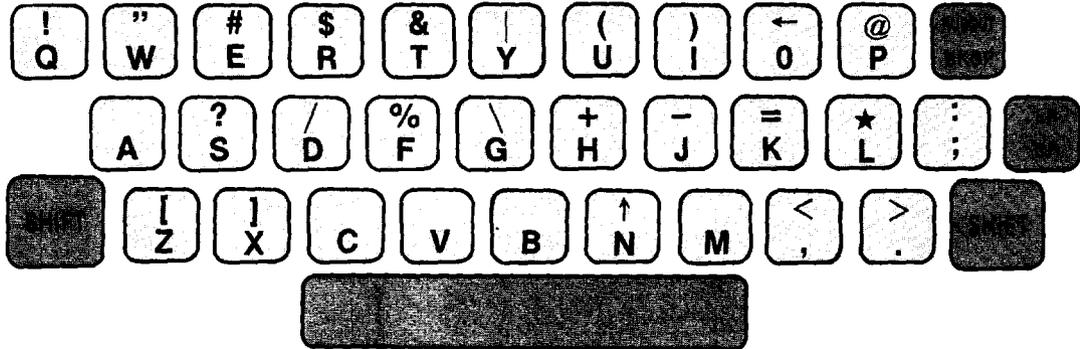


Figure 2-6. P190 Alphabetic Keyboard

2.2.2.1 SHIFT Keys



These keys provide access to the upper functions of all double function keys on the P190 programming panel, and the software labels displayed during programming. Press the SHIFT key and the desired function key simultaneously to access the key's upper function.

NOTE

Some controller-specific software tapes assign a SHIFT LOCK function to one of the unassigned keys on the keyboard. But this function is not standard, so consult the appropriate PC reference manual before attempting to utilize this function.

2.2.2.2 RUBOUT/BKSP Key



Press the BKSP key to delete the last character entered and to move the cursor one position to the left. Press the SHIFT/RUBOUT keys to delete the entry on which the cursor is located and to move the cursor to the first location of the data field.

2.2.2.3 LF/CR Key



Press the CARRIAGE RETURN key to return the cursor to the first space at the beginning of the same line. Press the SHIFT/LINE FEED keys to move the cursor down to the next line of the screen display.

NOTE

This key is used only in the ASCII Programming mode which is, at this time, only available with the 584 Programmable Controller.

2.2.3 Function Keyboard

The P190's function keyboard has sixteen keys. The blank orange key located next to the ENTER key is not assigned a function in general P190 programming. However, some P190 related software does assign a SHIFT LOCK function to this key. This is not true for all software tapes, so consult the appropriate reference manual before attempting to use this key.

The function keyboard contains the cursor control keys, formatting, and basic logic functions. The range of functions is greatly expanded through use of the software label keys. Not all of the keys described below are active on all program tapes. Refer to the appropriate manual to find which keys are used with a specific tape. See Figure 2-7.

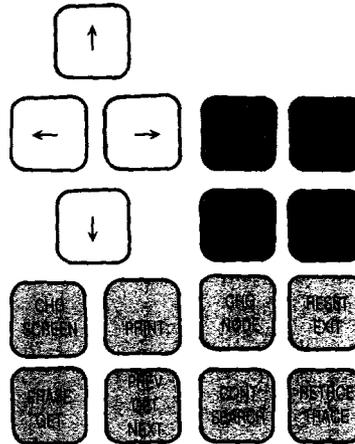
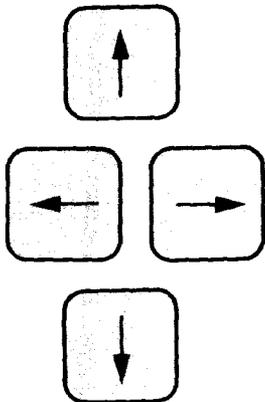


Figure 2-7. P190 Function Keyboard

2.2.3.1 Cursor Control Keys



The cursor control keys move the cursor, up or down, or to the left or right. Each time you press a cursor control key, the cursor moves one space in the direction indicated by the arrow on the key. The cursor will continue to move in the indicated direction, one space at a time, each time the key is pressed. When the cursor reaches the last position in any one direction, it "wraps around" and appears in the first position of the same line on the opposite side of the screen.

2.2.3.2 ENTER Key



Press the ENTER key to move a value from the AR to a reference (for example, 10301) or to a numeric area under the cursor. This function validates the data so that no illegal data may be entered.

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2.2.3.3 DELETE NETWORK/DELETE NODE Key



Press the DELETE NODE key to delete the node (element) and vertical short (if present) where the cursor is currently positioned. When the SHIFT/DELETE NETWORK keys are pressed, the network that is displayed on the screen is deleted from user logic. The next network in sequence will automatically be displayed. If the deleted network was the last in memory, the CRT will display a message stating this fact.

2.2.3.4 START NEXT Key



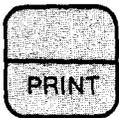
Press the START NEXT key to start a new network. The new network is automatically inserted after the network currently on display.

2.2.3.5 CHANGE SCREEN Key



Press the CHANGE SCREEN key to change the screen display from logic screen to alternate screen and back. The P190 panel "remembers" the contents of each screen display so that you can easily switch from one to the other.

2.2.3.6 PRINT Key



Press the PRINT key to print the currently displayed screen. An RS-232-C compatible printing device must be attached to Port 2 of the P190 Programmer. This function provides documentation of programming and maintenance activities.

2.2.3.7 CHANGE NODE Key



Press the CHANGE NODE key to access the most powerful level of software label keys. These keys control the insertion and replacement of nodes (elements) in user logic and the selection of search parameters. (See Section 2.2.1 for a definition of the software label keys.)

2.2.3.8 RESET/EXIT Key



Press the EXIT key to access a series of software label keys that control detailed operations, such as programming or ladder listing. Press the SHIFT/RESET keys to access basic information about the attached controller. It also accesses a level of software keys that control fundamental actions such as "Attach," "Start PC," "Stop PC," and "Clear PC memory." Consult the appropriate programming manual for further explanation of these keys.

2.2.3.9 ERASE/GET Key



Press the GET key to retrieve and display networks, registers, or discretes specified in the AR. Only one network will be displayed at a time, but multiple registers or discretes may be displayed concurrently. Press the SHIFT/ERASE keys to erase the displayed network or reference from the CRT screen. The ERASE function affects the P190 CRT screen only; it does not affect the memory of the attached controller.

2.2.3.10 GET PREV/GET NEXT Key



Press the GET NEXT key to retrieve and display the network, register, or discrete reference that directly follows the one presently displayed on the screen. Press the SHIFT/GET PREV key to retrieve and display the network, register, or discrete reference which is just before the one currently displayed on the screen.

If the cursor is in the logic field when this key is pressed, it will get the applicable network. If the cursor is in the reference area when the key is pressed, it will get the applicable reference.

2.2.3.11 CONT/SEARCH Key



Press the SEARCH and CONTINUE SEARCH keys, one after the other, to quickly “search” an entire logic program for a specific reference or coil number. The keys, used in conjunction with each other, provide a comprehensive search procedure. Press the SEARCH key to display the first network containing the complete or partial node specified in the search parameters. (The cursor must be in the “Search” block before search parameters can be set.) Press the SHIFT/CONT key to display the next network containing the specified node. The SHIFT/CONT key must be pressed after each network is displayed in order to continue the search. (Software label keys are used to set search parameters. See the appropriate PC manual for further instructions.)

2.2.3.12 RETRACE/TRACE Key



Press the TRACE key to display the network that drives the referenced coil. The cursor must be on a relay contact referencing a coil when the key is pressed. Press the SHIFT/RETRACE key to return to the network displayed before the TRACE was begun.

2.2.4 Numeric Keyboard

The numeric keyboard is located at the right-hand side of the P190 keyboard. It is composed of fifteen keys arranged three across by five down. The blank key in the lower right hand corner of the keyboard is not assigned a function at this time. Figure 2-8 shows the numeric or alphanumeric keys A/0, B/1, C/2, D/3, E/4, F/5, 6, 7, 8, and 9. Decimal and hexadecimal data can be entered in the P190 assembly register as reference numbers, function codes, register contents, etc.

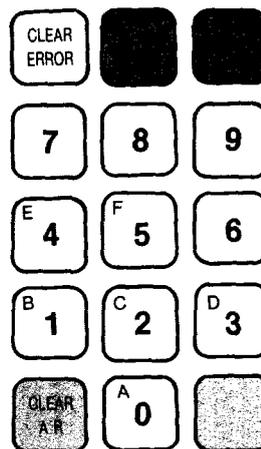


Figure 2-8. P190 Numeric Keyboard

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To access the alphabetic characters, press the SHIFT key together with the appropriate numeric key. For example, to enter an "E" press SHIFT/"4". To enter a "4" press "4".

The CLEAR ERROR, CLEAR AR, INIT, AND INIT LOCK keys are also on the Numeric Keyboard. These keys perform the functions discussed below.

2.2.4.1 CLEAR AR Key



Press the CLEAR AR key to remove any value from the assembly register and clear the register to zeros. This key also clears the screen of any error messages which relate to the assembly register.

2.2.4.2 CLEAR ERROR Key



Press the CLEAR ERROR key to clear an error message from the screen. For example, if you enter a network number that is greater than the the number of the last existing network, an error message will be displayed on the error line of the screen. This message describes the error. To continue processing, press the CLEAR ERROR key. This removes the incorrect network number from the assembly register and removes the error message. You can now enter the correct network number.

2.2.4.3 INIT and INIT LOCK Keys



Press the INIT and INIT LOCK keys, located in the upper right-hand corner of the numeric keyboard, to clear (initialize) the memory of the PC. Do this each time a new tape is inserted in the tape drive. Press both the keys at the same time. If there is no tape in the drive when these keys are pressed, the P190 will display a prompt telling you to insert a program tape.



The tape inserted in the P190's Tape Drive after power-up is automatically loaded. Subsequent tape loadings must be started using the INIT and INIT LOCK keys. The two keys must be pressed simultaneously to load or reload a tape into the P190 programmable memory. The INIT and INIT LOCK keys are also used to restart the P190's operations after a parameter change has been made using the DIP switches on the back of the programmer. See Section 2.5.3.

2.3 TAPE DRIVE

The P190 Programmer's memory is loaded from a tape via a built-in data-cartridge tape drive. This tape drive is located in the upper right-hand corner of the front panel of the P190. The door has a spring hinge, and must be held down when inserting a tape into the drive. This keeps the door to the tape drive closed and helps prevent environmental damage to the tape drive, such as dust, dirt, moisture, etc. Figures 2-9 and 2-10 illustrate tape loading and removal.

To load a tape into the P190 Programmer:

1. Select appropriate tape.
2. Open the tape drive door. Hold the door open while inserting the tape.
3. Hold the tape so that the bottom metal plate is down and the exposed tape area is toward the tape drive.
4. Insert tape and press firmly until the tape clicks into place.
5. Release the tape drive door.
6. The first tape inserted after P190 power-up is automatically loaded. Subsequent tape loadings must be started by pressing the INIT and INIT LOCK keys simultaneously.

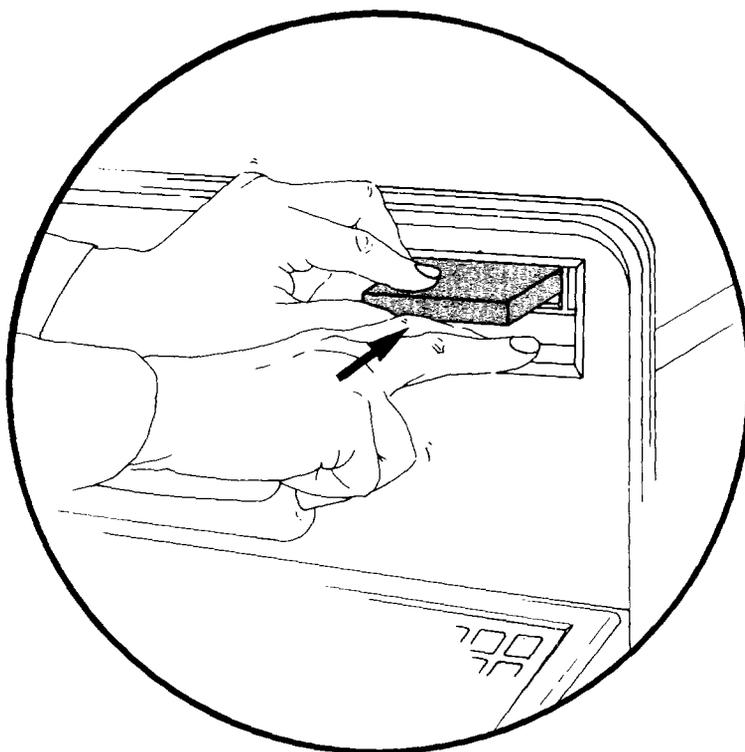


Figure 2-9. Inserting a Tape into the P190

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To remove tape from the P190 Programmer:

1. Open the tape drive door and hold down.
2. Push the EJECT button and remove tape from the tape drive.
3. Return the tape to its storage case.

CAUTION

Never attempt to remove a tape from the drive while the tape is loading. You may damage the tape. Wait until the tape has been loaded before removing.

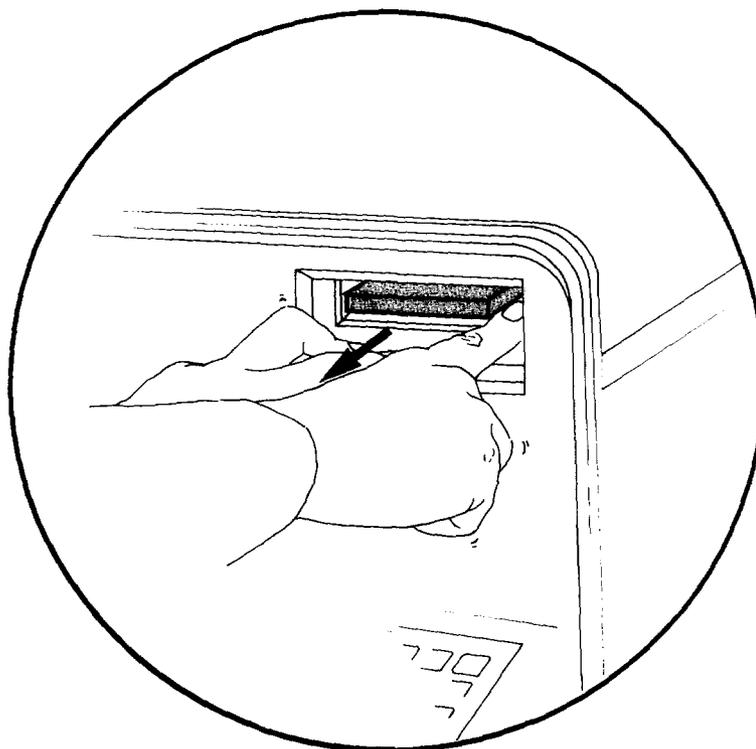


Figure 2-10. Removing a Tape from the P190

2.4 KEYLOCK/MEMORY PROTECT

The P190 Programmer has a keylock located to the right of the CRT screen, directly under the tape drive. This is a security device that controls access to the programming and configuration operations on the tapes.

When the key is in the UNLOCK position (Figure 2-11), the P190 is in program mode and you can monitor, configure, and program P190 operations. When the key is in the LOCK position (Figure 2-12), the P190 is in a monitor mode and you can not access any configuration and programming operations.

The P190 periodically monitors the status of the Keylock/Memory Protect. If the position of the switch is changed while the P190 is running, the P190 will automatically "logout", or detach, from the controller.

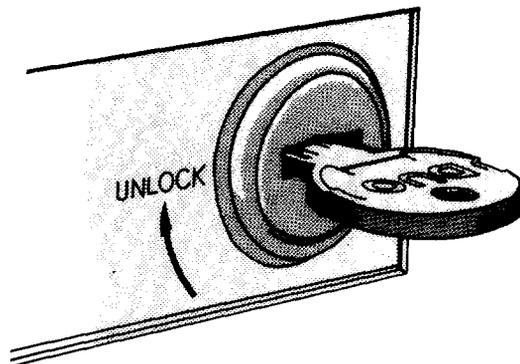


Figure 2-11. UNLOCKED Position

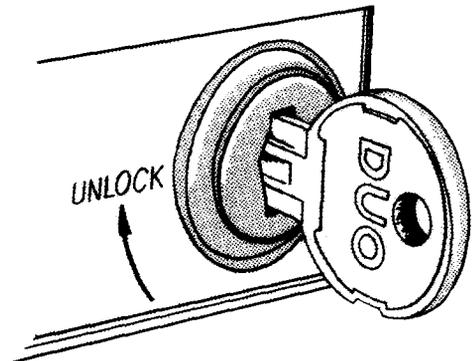


Figure 2-12. LOCKED Position

2.5 REAR PANEL CONTROLS, SWITCHES, AND OTHER PHYSICAL FEATURES

The following controls, switches, and other physical features are located on the rear panel of the P190 Programmer; identification plate, ON-OFF switch, parameter selection switches, brightness and contrast controls, composite video connector, AC power connection, fuse, and two EIA RS-232-C communication ports. Figure 2-14 illustrates the various features located on the back panel of the P190.

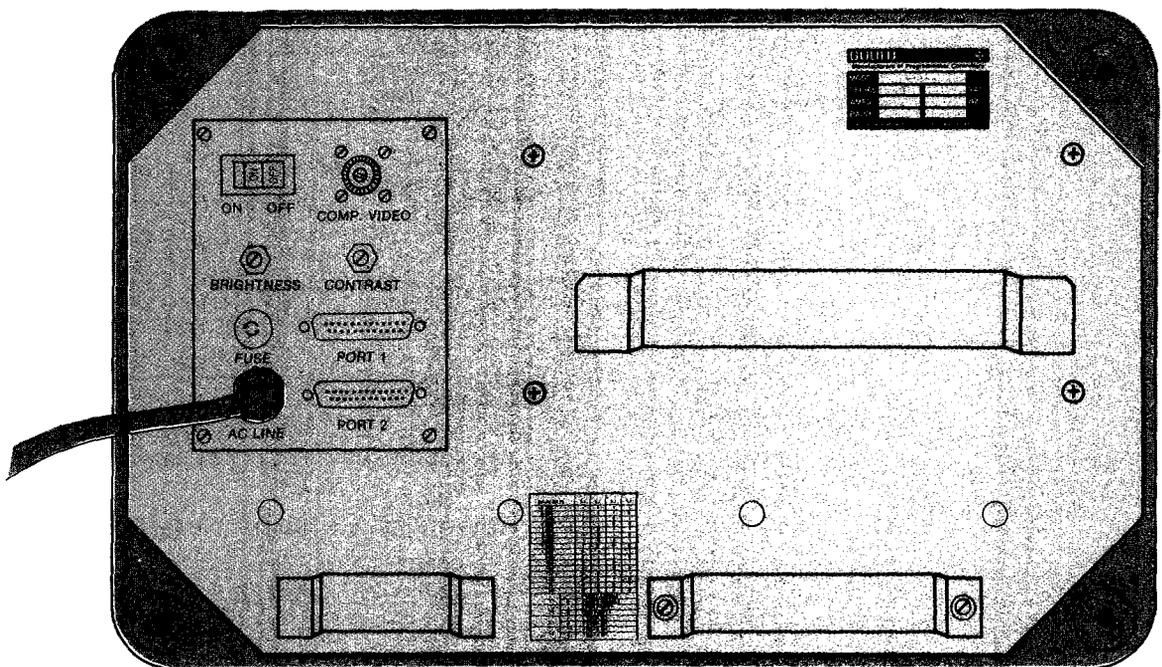


Figure 2-13. P190 Rear Panel

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2.5.1 OFF/ON Power Switch

This switch applies power to the P190 in the ON position and shuts off power in the OFF position.

2.5.2 Identification Plate

The identification plate displays the P190 Programmer model number, serial number, and power information (current, voltage, and frequency). The space for baud rate is not applicable since the baud rate is selectable. See Section 2-5-3.

2.5.3 Parameter Selection Switches

Two eight-switch DIP switch packs are used to set parity, stop bit, and data bit parameters for the two RS-232-C peripheral ports. The switches on the left set parameters for Port 1, and the switches on the right set parameters for Port 2. Baud rates for both ports are set at the factory to 9600 baud.

The switch settings are shown on a parameter selection label which is located to the right of the ports. Figure 2-14 shows this label. Note that 1 = UP (ON), and 0 = DOWN (OFF). Switches must be placed all the way up or all the way down to insure a proper selection.

BAUD RATE	S1	S2	S3	S4
19,200	1	1	1	1
9,600	1	1	1	0
7,200	1	1	0	1
4,800	1	1	0	0
3,600	1	0	1	1
2,400	1	0	1	0
2,000	1	0	0	1
1,800	1	0	0	0
1,200	0	1	1	1
600	0	1	1	0
300	0	1	0	1
150	0	1	0	0
134.5	0	0	1	1
110	0	0	1	0
75	0	0	0	1
50	0	0	0	0
S5	1	PARITY ENABLE		
	0	PARITY DISABLE		
S6	1	EVEN PARITY		
	0	ODD PARITY		
S7	1	1 STOP BIT		
	0	2 STOP BITS		
S8	1	7 DATA BITS		
	0	8 DATA BITS		

Figure 2-14. Parameter Selection Label

NOTE

Any parameter change (while the P190 is running) requires pressing the INIT and INIT LOCK keys simultaneously. This instructs the P190 to "read" these new switch settings.

2.5.4 Brightness/Contrast Controls

These controls are located above Port 1. They control the overall brightness of the CRT screen (Brightness Control) and the brightness of the characters on the screen relative to the background (Contrast Control).

2.5.5 Composite Video Connector

The Composite Video Connector is located next to the ON/OFF switch. This connector allows the use of an external video monitor with the P190. If other video monitors are used, they should have the following characteristics:

Monitor type:	black and white, raster scan CRT
Signal characteristics:	EIA RS-170
Video response:	10 MHz
Scan width:	10% underscan
Horizontal frequency:	16,041 Hz (15,750 + 1.8%)
Vertical frequency:	51.4 Hz (noninterlaced)

NOTE

Some monitors may require magnetic shielding or external mounting of the power transformer to eliminate "swim." Some compatible monitors which meet these specifications are:

Panasonic	WV 5310
Panasonic	WV 5311
Ball Brothers	TD 12
Ball Brothers	TD 53
Ball Brothers	TD 20
Motorola	M 3560-155

2.5.6 Communication Ports

Two EIA RS-232 ports allow communication between the P190 and the mainframe PC as well as other peripheral devices. Port 1 is used to connect the P190 to a PC, and Port two is used to connect the P190 to a printer. Port parameters are set by the parameter selection switches.

2.5.7 Power Connection and Fuse

The AC Power Connection and the fuse are located to the left of Port 1. To replace the fuse:

1. Turn the P190 OFF.
2. Disconnect P190 from AC power.
3. Push fuse casing in and turn to the left. This will free the fuse and it will "pop" out.
4. Verify that the replacement fuse is the proper amperage. Replace fuse.
5. Push fuse casing in and turn to the right. The fuse should "click" into place.
6. Reconnect the P190 to the AC power source.