

Chapter 7

984 Man-Machine Interfaces

This chapter identifies and describes the three man-machine interfaces used to program and communicate with the 984 Controller.

P190 Multi-family Programmer

IBM Personal Computer and compatible workstations

964/965 Data Access Panel (DAP)

DEC PDP-11 and VAX

P190 Programmer

General Characteristics

Portable

Withstands harsh factory environments

Use on-site or from remote locations

Use with many Modicon Controllers

Provides real time, on-line programming

48K words of user memory

Built-in tape drive

Two RS-232-C ports for serial communications

Support for additional video monitor

Model P190-112 for 115v, P190-122 for 220v

Specifications

Physical Dimensions 11.0 in. High x 17.5 in. Wide x 24.0 in. Deep (279 mm x 444.5 mm x 609.6 mm). Weight, 30.0 lb (13.6 kg).

Environmental Operating Temperature, 41 to 104 Degrees F (5 to 40 Degrees C). Storage Temperature, -4 to 140 Degrees F (-20 to 60 Degrees C). Operating Humidity, 20-80% relative humidity, non-condensing. Storage Humidity, 0-95 % relative humidity, non-condensing.

Power P190-112, 95-130 Vac, 47-63 Hz, 100W. P190-122, 190-260 Vac, 47-63 Hz, 100W. Fuse, 5 amp No. 57-0041-000.

Front Panel

The P190 (figure below) is your primary interface with a programmable controller. It is used to enter, edit, monitor and design user programs. Four main segments make up the front panel of the 190 Programmer:

the tape drive

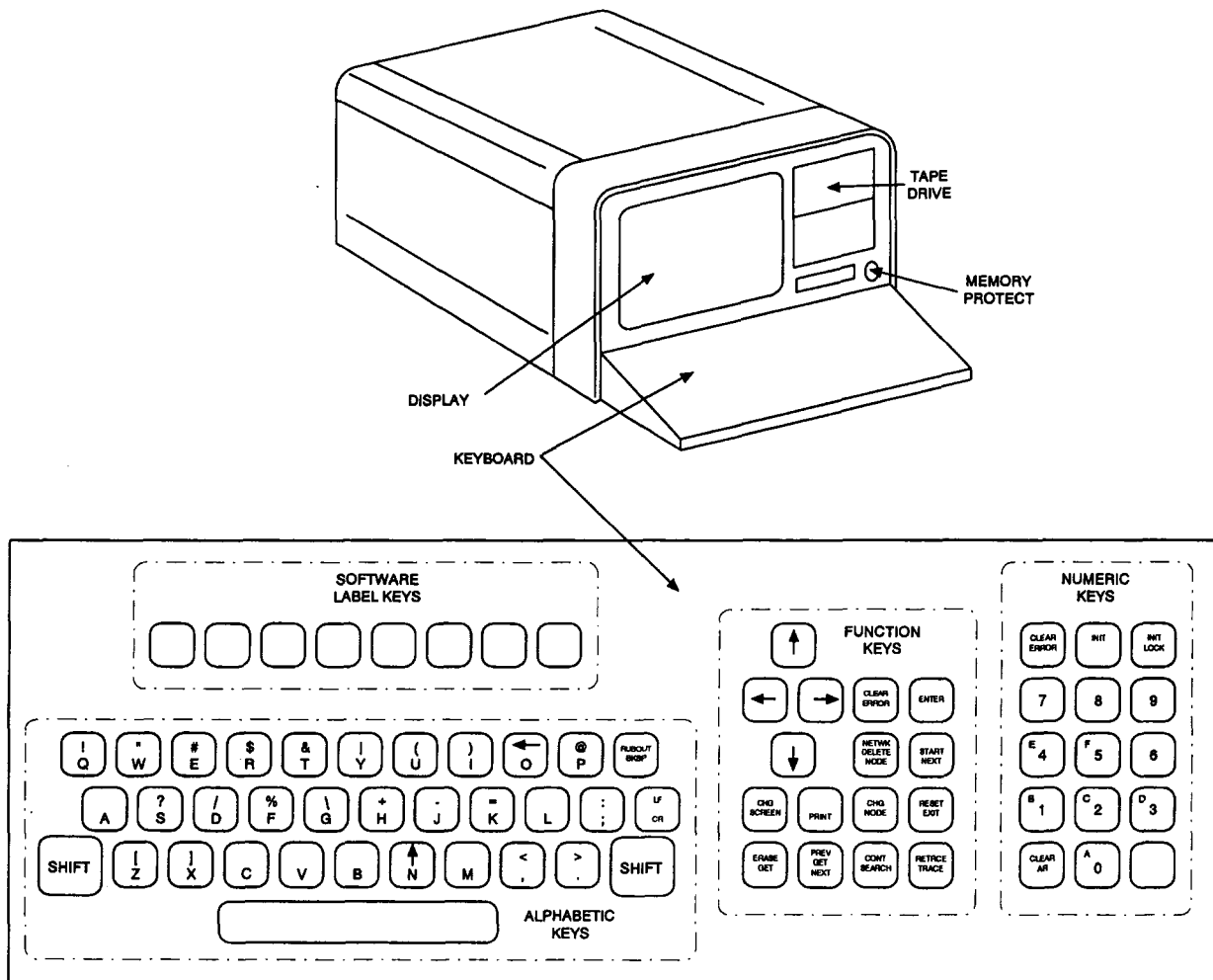
memory protect keylock

keyboard

cathode ray tube (CRT) display screen

The function of each of these segments is listed on the facing page.

Figure 7-1 P190 Front Panel and Keyboard



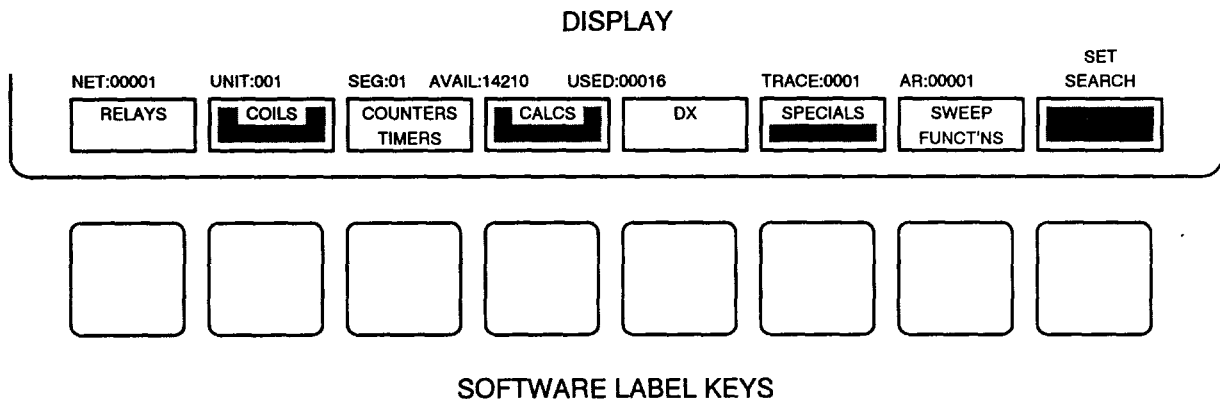
Display Displays the development of user logic and specific status information.

Keyboard Divides into four basic groups of keys; the software label keys, the alphabetic keys, the function keys, and the numeric keys. The keyboard and the appropriate software tapes are used to communicate with the programmable controller.

Software Label Keys The functions of these keys are defined by the program tapes, change with each tape used, and also change at various levels within a tape. The figure below shows the main program element menu from the program tape.

Figure 7-2 Software Label Keys

Pressing a Software Label Key on the P190 keyboard will cause the function described by the screen software label just above it to be performed. For example, pressing the leftmost P190 Software Label Key calls for the RELAYS function.



Alphabetic Keys These keys are used to enter messages for the controller's memory and headers for ladder listings.

Function Keys Enable the operation and control of cursor positioning, formatting, and basic logic functions.

Numeric Keys Permit numeric data entry during P190 operation.

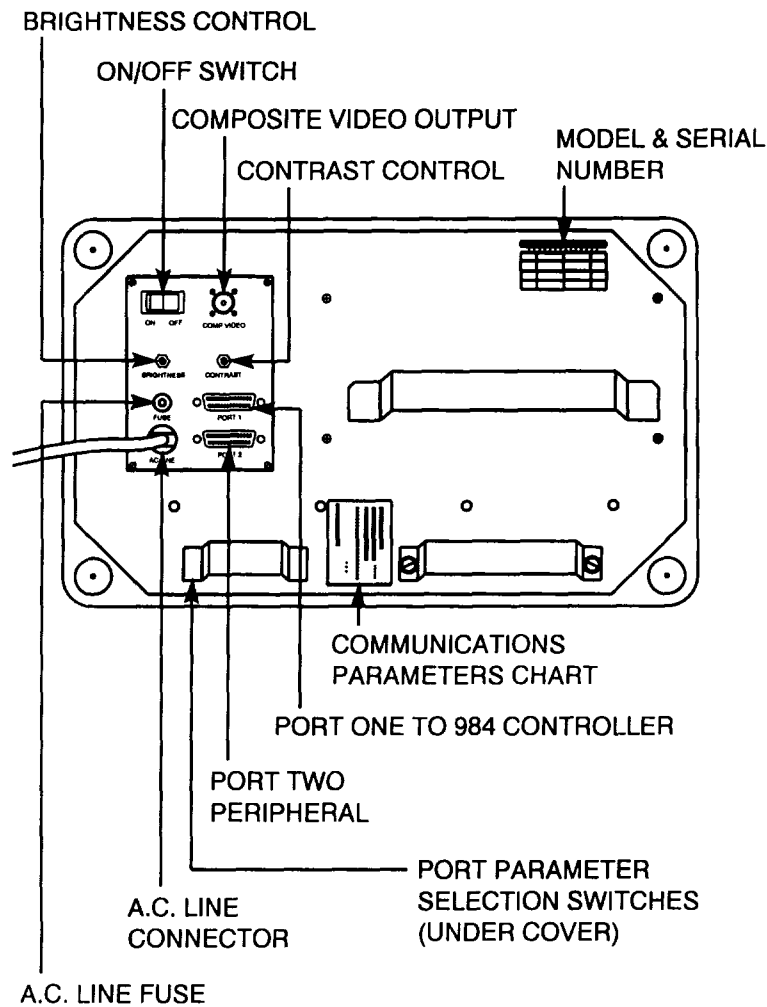
Memory Protect Keyswitch In the UNLOCK position the P190 is in the program mode and you can monitor, configure, and program P190 operations. In the LOCK position, the P190 is in a monitor mode and you can not access any configuration and programming operations.

Tape Drive The built-in data cartridge tape drive is used to configure, program, and service a Programmable Controller.

Rear Panel

The following controls, switches, and other features are located on the rear panel (figure below) of the P190 controller.

Figure 7-3 P190 Rear Panel



Controls The ON/OFF Power Switch applies power to the P190 in the ON position and shuts off power in the OFF position. The Brightness/Contrast Controls regulate the overall brightness of the display (Brightness Control) and the brightness of the characters on the screen relative to the background (Contrast Control).

Power Connection and Fuse AC power is applied to the P190 Programmer through a standard, accessible socket. The fuse is located to the left of port 1. This allows quick and easy fuse checking and replacement. To replace the fuse:

Remove AC Power

Push the fuse casing in and turn it counterclockwise to free the fuse.

Verify that the replacement fuse is proper amperage. Replace fuse.

Push the fuse casing in and turn it clockwise until it is securely in place.

Apply AC power

Composite Video Connector 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 characteristics shown in the tables below.

Table 7-1

Monitor Specifications

<u>Descriptions</u>	<u>Characteristics</u>
Type	B/W raster scan
Signal	EIA RS-170
Video Response	10 MHz
Scan Width	10% underscan
Horizontal Frequency	16,041 Hz (15,750 + 1.8%)
Vertical Frequency	651.4 Hz (non-interlaced)

Table 7-2

Compatible Video Monitors

Some monitors may require magnetic shielding or external mounting of the power transformer to eliminate "swim."

<u>Name</u>	<u>Part Number</u>
Panasonic	WV5310
Panasonic	WV5311
Ball Brothers	TD 12
Ball Brothers	TD 15
Brothers	TD 23
Motorola	M3560-155

Communication Ports Two EIA RS-232 ports allow communication between the P190 and the controller as well as other peripheral devices. Port 1 is used to connect the P190 to the controller, and Port 2 is used to connect the P190 to a printer or other peripheral device. Port parameters are set by the parameter selection switches.

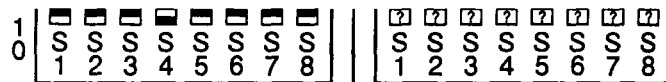
Port Parameter Selection Switches Two eight-switch packs are used to set parity, stop bit, and data bit parameters for the two RS-232-C peripheral ports. The switches on the left set parameters for Port 1, and the switches on the right set parameters for Port 2. Baud rates for both ports are set at the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

The switch settings are shown on a parameter selection label which is located to the right of the ports. The figure below shows this label along with the Port 1 and Port 2 switch diagrams. Note that 1 = UP, and 0 = DOWN. Switches must be placed all the way up or all the way down to insure a proper selection.

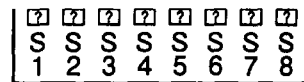
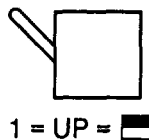
➤ **NOTE** The P190 only reads these switch settings at turn-on.

Figure 7-4 Port Parameter Selection Switches

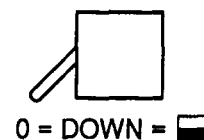
9,600	1	1	1	0
7,200	1	1	0	1
4,800	1	1	0	0
3,600	1	0	1	1
2,400	1	0	1	0
2,000	1	0	0	1
1,800	1	0	0	0
1,200	0	1	1	1
600	0	1	1	0
300	0	1	0	1
150	0	1	0	0
134.5	0	0	1	1
110	0	0	1	0
75	0	0	0	1
50	0	0	0	0
S5	1	Parity Enable		
	0	Parity Disable		
S6	1	Even Parity		
	0	Odd Parity		
S7	1	1 Stop Bit		
	0	2 Stop Bit		
S8	1	8 Data Bit		
	0	7 Data Bit		



FACTORY SET AT
9600 BAUD,
EVEN PARITY
1 STOP BIT,
8 DATA BITS.



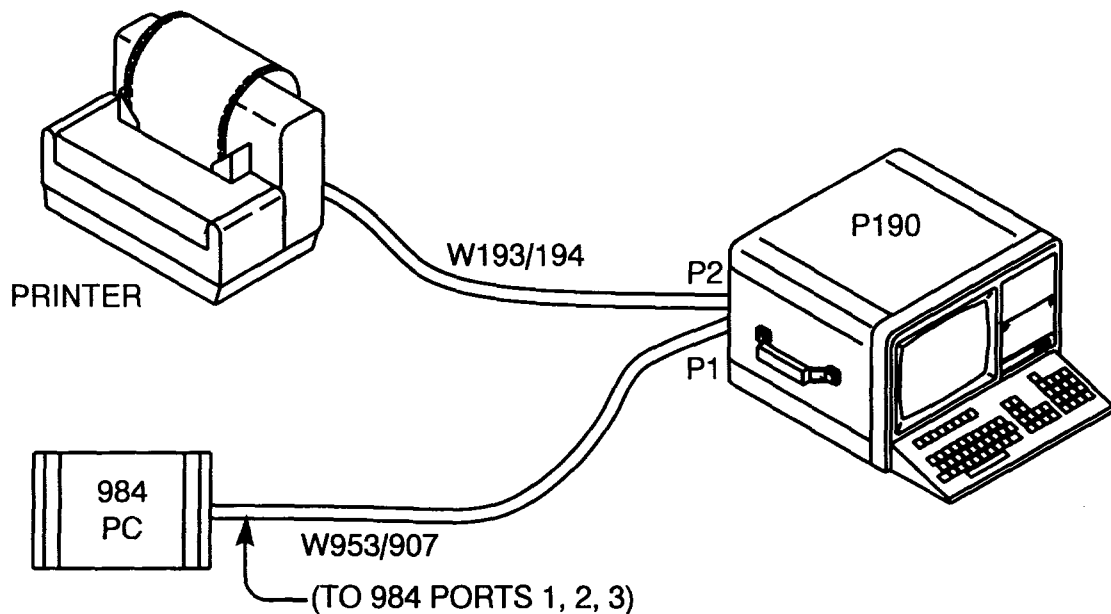
YOU SET
FOR YOUR
PRINTER



Cabling

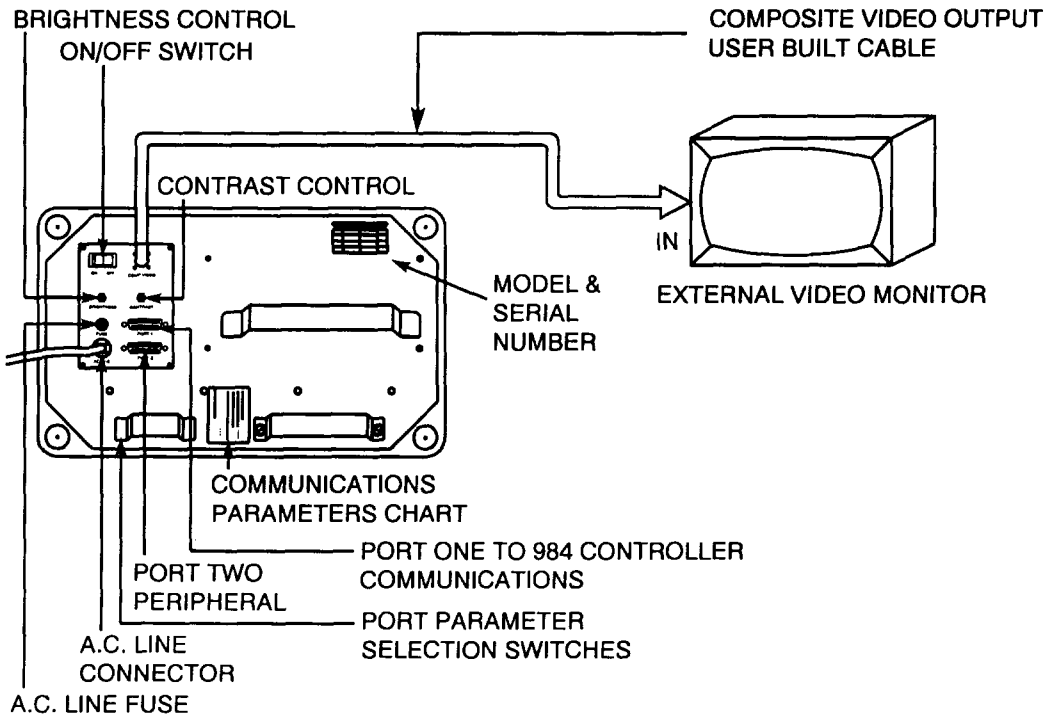
Ports 1 and 2 The figure below shows cable connections and part numbers for connecting the P190 to a printer and a 984 controller. The printer's port receptacle determines whether the W193-xxx 25-pin female connector or the W194-xxx 25-pin male connector cable will be used. The specific 984 controller model to be used determines whether the W907-xxx 25-pin male connector or the W953-xxx 9-pin male connector cable will be used.

Figure 7-5 Ports 1 and 2 Cabling



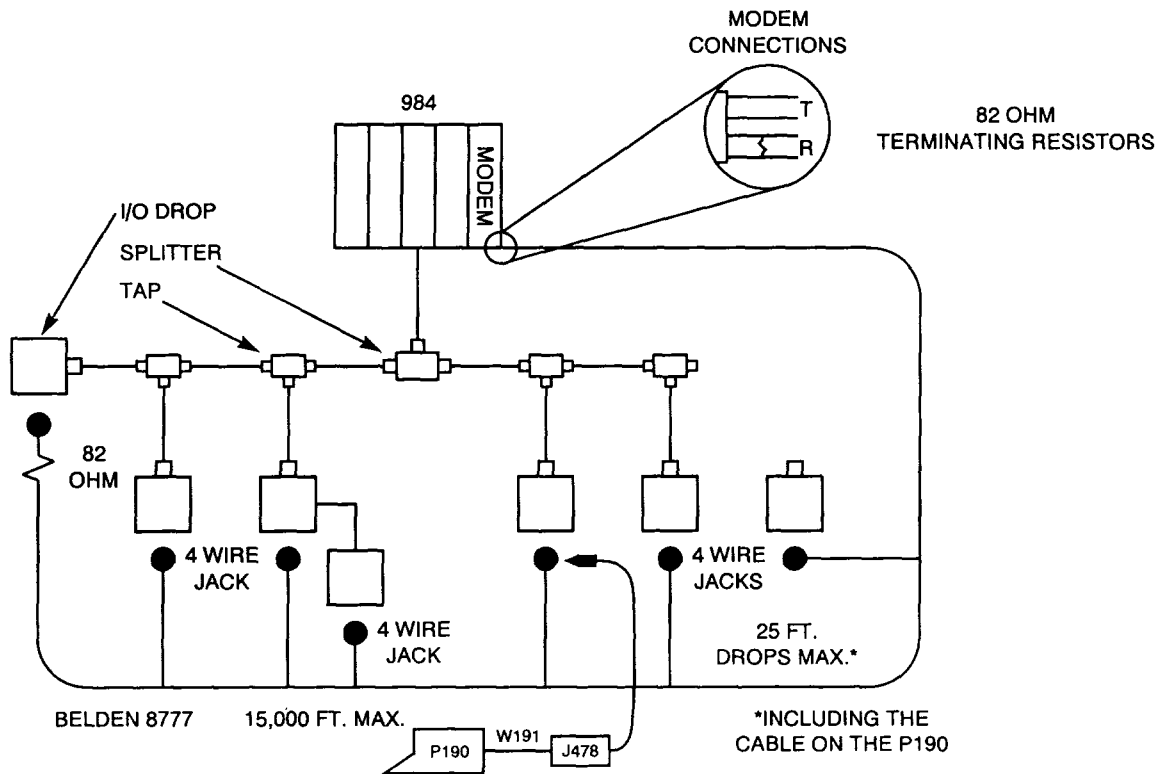
Composite Video The Composite Video Connector allows the use of an external video monitor with the P190. The figure below shows the cable connections for attaching the P190 to an external video monitor. Note that the hook-up cable (P190 to external video monitor) is USER BUILT. This cable may be constructed using standard RG 75 ohm coaxial cable. Signal attenuation/100 ft. should be determined against a frequency of 10 Mhz.

Figure 7-6 Composite Video Cabling



Remote Station P190 The P190 can be used to program and debug logic at a remote site by using J478 modems, and a number of 4 wire jacks at remote I/O and other strategic locations. See figure below. To use the P190 just plug into the nearest jack and "attach" to the 984.

Figure 7-7 Using the P190 at a Remote I/O Location



Cable Part Numbers Cable options are summarized in the table below by part number and function. The last three digits of the cable assembly number indicate the cable length.

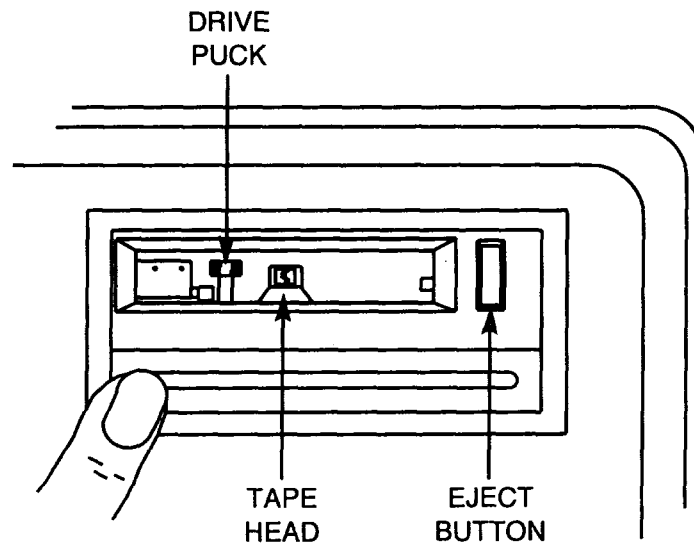
Table 7-3 P190 Cables

<u>Cable No.</u>	<u>Length</u>	<u>Function</u>
W907-XXX	-006	Connects 984A, B, X controllers only, to P190 Programmer
	-015	
	-025	
	-050	
	-200	
W953-XXX	-006	Connects 984 X8X controllers to P190 Programmer
	-015	
	-025	
W191-XXX	-015	Connects the P190 Programmer to a modem
	-025	
	-050	
W193-XXX	-015	Connects the P190 Programmer to a printer (female connector on the printer side)
	-025	
	-050	
W194-XXX	-015	Connects the P190 Programmer to a printer (male connector on the printer side)
	-025	
	-050	

Tapes

Use of Tape Drive The P190's memory is loaded from the built in mini-cartridge tape drive. The tape drive is located in the upper right-hand corner of the P190 front panel (see figure below).

Figure 7-8 P190 Tape Drive



To load a tape:

- 1 Open the tape drive door.
- 2 Hold tape with metal plate down, exposed tape facing the drive.
- 3 Slide tape into drive and press until it clicks into place.
- 4 Close the tape drive door.

The first tape inserted after power-up is automatically loaded. All other tapes are loaded by simultaneously pressing the **INIT** and **INIT LOCK** keys. Holding down the **R** key for 2 seconds will cause the P190 to skip the self test and speed the loading.

To remove a tape:

- 1 Open the tape drive door.
- 2 Press the eject button (on the right).

Master Tapes/Part Numbers The P190 uses specially constructed cassette tapes. Tapes received from Modicon are "master" tapes. They can only be used to create duplicate "working" tapes.

Table 7-4 Master Tapes

All tapes are shown with their most current part number listed first. Revision levels are given for the most current versions only. All part and revision numbers are valid and current as of the date of publication of the P984 Reference Manual.

Title	Part No.	Revision Level	Description
Tape Loader	AS-T190-401 301	2.2	Records user program on tape, loads tape program to controller memory, compares tape program vs. program in controller.
Programmer	AS-T984-301 201 001	2.2	Enters, edits, monitors user logic and accesses Controller Operations.
Ascii Programmer	AS-T984-003	3.0	Create, edit, and generate Ascii formatted messages.
¹ Configurator	AS-T984-304 204 004	3.11	Defines communication parameters, allocates memory, and accesses Controller Operations.
² Traffic Cop	AS-T984-302	3.1	Specifies reference numbers associated with each I/O slot and type.
Utility	AS-T984-305	3.0	Monitors user program, prints ladder listing, and accesses Controller Operations.
³ Hot Standby	AS-T984-210 110	1.01 (984-X8X) 1.0 (984-A,B,X)	Switches remote I/O to a back-up 984.
PID Module	AS-T984-102 101	1.01 (A,B,X only) 1.0	Enables you to configure, tune or monitor, each of the PID loops.
Table to Block Loadable Module	AS-T984-103	1.0 (A,B,X only)	Data Transfer move (DX) copies 16 bit data word from one memory location to another.
Block to Table Loadable Module	AS-T984-104	1.0 (A,B,X only)	Data Transfer move (DX) copies 16 bit data word from one memory location to another.
Math Loadable Module	AS-T984-105	1.0 (A,B,X only)	Provides four math functions, square root, process square root, log and anti-log.
Double Precision Math Loadable Module	AS-T984-106	1.0 (A,B,X only)	Provides double precision add, subtract, multiply, and divide functions.
Checksum Loadable Module	AS-T984-107	1.0 (A,B,X only)	Provides four types of Check-sum calculations: Cyclical Redundancy Checks (CRC), Longitudinal Redundancy Checks (LRC), Straight Check-sum and Binary Addition Check-sum.
C986 Loadable DX	AS-T984-115	1.0 (A,B,X only)	Expands 984 problem solving capabilities with the C986 Coprocessor.
S975 Modbus Peer	AS-T984-217 117	1.0 (984-X8X) 1.01 (984-A,B,X)	Allows controller to simultaneously write register data to as many as 16 separate controllers via a Modbus II Link.
Drum and Input Compare Loadable	AS-T984-220 120	3.0 (984-A,B,X) 1.0 (984-X8X)	Simplifies implementation of sequential step orientated logic.
Serial Data Analyzer	AS-T190-SDA	2.0	Enables P190 debugging and trouble-shooting of P453 ASCII, Modbus RS232 communications.
Dumb Terminal Tape	AS-T190-ODT	1.0	Allows P190 to emulate dumb terminal.
P190 Blank Tape	AS-T190-000		Blank P190 tape.

¹Configurator tapes AS-T984-204 and 004 contain traffic cop functionality. Configurator tape AS-T984-304 does not.

²Traffic Cop tape AS-T984-302 consists of two tapes; Volume 1 and Volume 2.

³Hot Standby tape AS-T984-210 is used with 680, 685, 780, and 785 controllers only.

Back-up Tapes The back-up process involves making a duplicate copy of a tape. The tape to be duplicated must be an original Modicon master.

Back-up copies of original Modicon master tapes **MUST** be used as working tapes for all P190 functions. The master copies themselves can not be used for controller operations.

To back-up an original Modicon master to a working tape:

- 1 Place the master in the tape drive. Simultaneously press the **INIT** and the **INIT LOCK** keys and loading will begin.
- 2 After about 50 seconds, the REMOVE TAPE prompt appears.
- 3 Remove the master and the CRT prompts you to **LOAD WRITE ENABLED SCRATCH TAPE**.
- 4 Select a blank tape and verify the **record tab** is to the left (write enabled).
- 5 Insert the blank tape into the tape drive.



- 6 The CRT prompt will read **DUPLICATING**.
- 7 When finished, the CRT prompt will read **REMOVE TAPE**.
- 8 Remove the tape from the drive, write disable it (slide the record tab to the right or remove it) and label the tape with the same information as the master (Modicon tape number, tape name, revision level, and release date). This tape is now the working tape. The master should be kept in a safe place. Back-up copies of user logic should also be saved.

Care of Tapes and Transport The useful life of a tape is approximately 5,000 complete passes. Extreme high or low temperatures (41° to 113°F) may cause tape stretching or sagging. All tapes should be carefully stored in their containers, and kept in a dust free environment. Do not expose tapes to strong electrical or magnetic fields. This includes the top of the P190 programmer, Airport X-Ray devices, magnetic screwdrivers, or electric motors.

The estimated life of the tape drive is about 40,000 tape cycles. The tape drive should be cleaned with a cotton swab moistened in Ethyl Alcohol. This should be done once every 24 hours of operation.

Personal Computer

Features

Performs the same functions as the P190

Software works with IBM Personal Computers and compatibles

Use on-site or from remote locations

Provides real time, on-line programming

Specifications

Modicon Executive software for the Personal Computer requires:

256 Kbytes of memory

One floppy and a hard drive or Dual floppy drives

One RS-232-C port

MS-DOS 2.1 or greater

Modicon Executive Disk

The 984 software will run on all true compatibles. Other hardware (printer port and printer, hard drive, etc.) is optional.

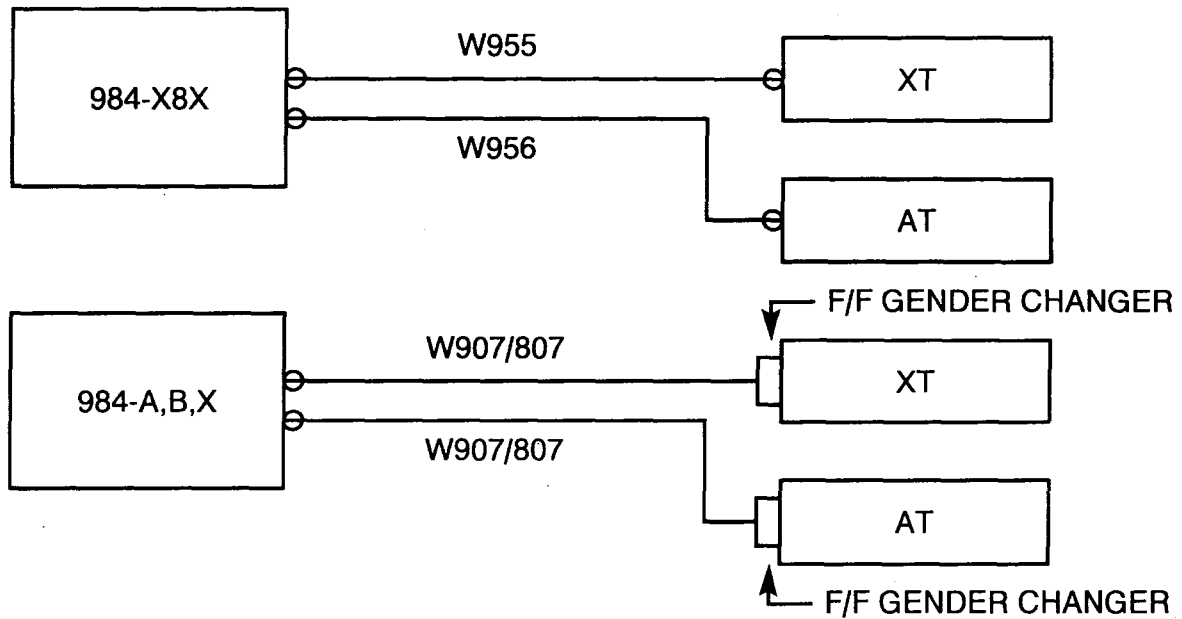
Cabling

IBM XT/AT The figure below shows the cable connections and part numbers for connecting an IBM-XT or AT computer to a 984 controller.

A,B,X controllers using Modicon cable W907-xxx or W807-xxx to connect to an IBM-XT, must have a 25 pin female to female gender changer at the XT's port. For A,B,X connection to an IBM-AT a 25 to 9 pin female to female gender changer is required at the AT's port. A parallel printer can be connected to the IBM computer using the parallel port LPT1. This port is located on the back of the computer.

Gender changers are not required for 984-X8X controller cables W955-xxx and W956-xxx.

Figure 7-9 IBM AT, XT Cabling



Keyboard

The Modicon Executive takes advantage of the standard IBM Personal Computer function and keypad keys to perform programming and configuration tasks. The NUM LOCK key must be kept in keypad mode (OFF).

Function Keys The function keys F1 to F10 on the computer keyboard are used to configure and program. Software labels are shown on the display screen along with the applicable function key to press. The software labels are mapped to the function keys and are shown on the display screen to aid programming.

Command Keys are Function and Keypad keys that replace P190 keys. The table below shows what key(s) must be pressed for a particular function. When two keys are shown (ALT C for example) they must be pressed simultaneously.

Table 7-5 Command Key Map

<u>Keys</u>	<u>Function</u>
ALT C	CHANGE SCREEN
ALT F3	CHANGE NODE
ALT F6	EXIT
ALT F9	RESET
ALT F4	SEARCH
ALT F5	CONTINUE SEARCH
ALT F7	TRACE
ALT F8	RETRACE
ALT P	PRINT
ALT F1	ERASE
ESC	CLEAR ERROR
ALT F10	CLEAR AR
DEL	DELETE NODE
ALT N	DELETE NETWORK
ALT F2	GET
PG DN	GET NEXT
PG UP	GET PREVIOUS
INS	START NEXT

➤ **NOTE** When entering numerical data, use only the numeric keys at the top of the computer keyboard.

Floppy Disks/Part Numbers

The table below lists the application software that is currently available for the personal computer and the 984. All application software is contained on standard 5.25 inch diskettes.

Table 7-6 Floppy Disks

All software titles are shown with their most current part number listed first. Revision levels are given for the most current versions only. Part and revision numbers are valid and current as of the date of publication of the P984 Reference Manual.

Title				
984 Executive Software	AS-DIBM-904	4.1		Defines communication parameters, allocates memory, and accesses Controller Operations.
984 Configurator	AS-DIBM-902	4.3		Specifies reference numbers associated with each I/O slot and I/O type; Discrete, BCD, or Binary.
984 Traffic Cop	AS-DIBM-984	3.0		Enters, edits, monitors user logic and accesses Controller Operations.
984 Programmer	AS-DIBM-593	4.0		Create, edit, and generate Ascii formatted messages.
984 Ascii Message Editor	AS-DIBM-905	2.0		Provides hard copy listing of users logic program.
984 Ladder Lister	AS-DIBM-125	3.2		Prints annotated graphic representations of ladder diagrams.
984 Annotated Ladder Lister	AS-DIBM-592	1.0 (984 A,B,X)		Loads previously recorded program to 984's memory, Dumps 984's memory on to a disc, Verifies that data is loaded/dumped accurately.
984 Load/Dump Compare	AS-D984-909	1.01 (984 A,B,X) 1.01 (984 A,B,X)		Provides four math functions, square root, process square root, log and anti-log.
984 Math and DX Loadable Module	AS-D984-101 102	1.01 (984-X8X) 1.0 (984-A,B,X)		Enables you to configure, tune or monitor, each of the PID loops.
984 PID Loadable Module	AS-D984-210 110	1.0 (A,B,X only)		Switches remote I/O to a back-up 984.
984 Hotstandby Loadable Module	AS-DIBM-115	3.10		Expands 984's problem solving capabilities by accessing the C986 Coprocessor.
984/C986 Loadable DX	AS-DIBM-116	1.0 (984-X8X) 1.01 (984-A,B,X)		Enables configuration, operation, and access to online documentation. Used with 986 Loadable DX.
984/C986 Utility	AS-DIBM-217 117	1.0		Allows controller to simultaneously write register data to 16 separate controllers via a Modbus II Link.
Modbus Peer Loadable DX	AS-DIBM-118	3.0 (984-A,B,X) 1.0 (984-X8X)		Allows you to configure, monitor, and tune B884 PID Module software.
PID/MMI Assembly Disk	AS-D984-220 120			Simplifies implementation of sequential step orientated logic.
			Description	
984/Drum and Input Compare Loadable	Revision Level			Allows you to Attach, Configure, and Program a 984 controller using a personal computer.
	1.02			
Part No.				
AS-DIBM-001	5.1			

Back Up Disks

It is a good practice to maintain back-ups (duplicates) of any data stored on magnetic media. Be sure to make a copy of any original distribution floppies from Modicon before installation. (Consult your controller-DOS or MS-DOS manuals for the correct method of maintaining backup copies.) Any user logic programs should have back-ups maintained. The procedure for doing this is explained in the Load, Record and Verify chapter.

Preparing to use Modicon Executive Software

Before you can install and run any of the Modicon application disks listed in the preceding table, you must use the 984 Executive Software disk (also listed in table) to display the Executive Menu. Complete procedures for displaying the Executive Menu, selecting options, and installing your Modicon application disks are given in the the Modicon IBM PC Executive Software Manual (GM-HIBM-001). When the installation is complete you can then ATTACH, configure, and program the 984 controller.

964/965 Hand-Held Interfaces

Features

- Handheld portability
- Retains and restores communication parameters
- 64 character Liquid Crystal Display
- Alphanumeric keyboard
- Built in connecting cable

Operations

- Display status of inputs, coils, and registers
- Enable, disable, and force inputs and coils
- Display controller memory contents
- Modify contents of holding registers
- Monitor or alter MODBUS or ASCII port parameters
- Automatic determination of controllers port parameters
- Display status of controller, including memory-protect, run/stop, attach/detach, and controller type
- Time delay automatic power down (Conserves battery life)
- Configure and troubleshoot communication networks
- Stop and start the controller

Cabling

Figure 7-10

P964 to 984 Controller

The P964 can be used as a simple ASCII terminal as well as a 984 Data Access Panel. The P964 supports the Simple ASCII communications mode only. It can be connected to a 984A or B controller ASCII/DAP Port, either directly or through a W903 ASCII/DAP cable.

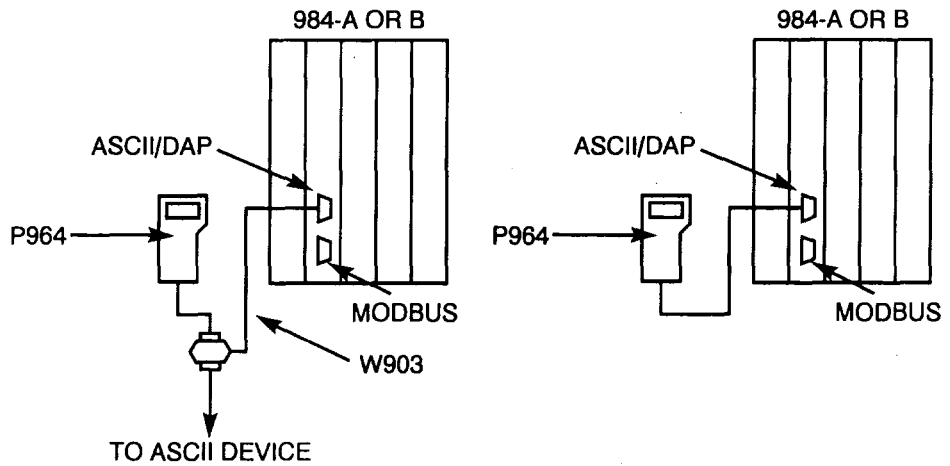


Figure 7-11

P965 to 984 Controller

The P965 supports both the Modbus and Simple ASCII communication modes. The P965 can be connected to a 984A or 984B ASCII/DAP port directly or through a W903 ASCII/DAP cable. The P965 can be connected directly to a Modbus port of a 984A, B or X. Use the Termiflex Adapter Cable part # 97-0209-000 (supplied with the P965 DAP) for connecting to Modbus ports of 984-X8X controllers.

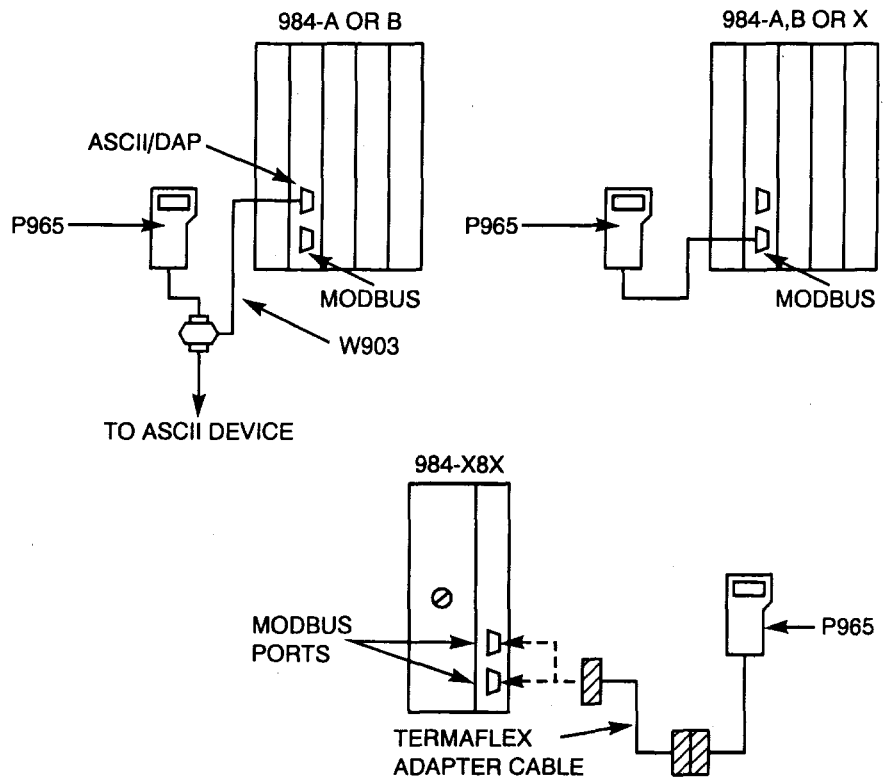
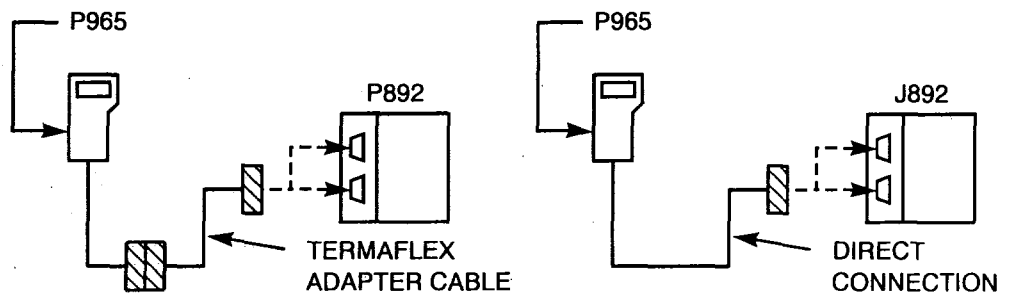


Figure 7-12

P965 to 984 Remote ASCII I/O

The P965 can be connected to either a J982 or P982 remote ASCII I/O interface. Use the Termaflex Adapter Cable part # 97-0209-000 (supplied with the P965 DAP) for connecting to the P982.



Keyboard

P964 Keypad There are five groups of keys on the P964 keypad.

Software label keys

Control keys

Display select keys

Alphanumeric keys

Reference operation keys

P965 Keypad There are six groups of keys on the P965 keypad.

On/Off Keys

Software label keys

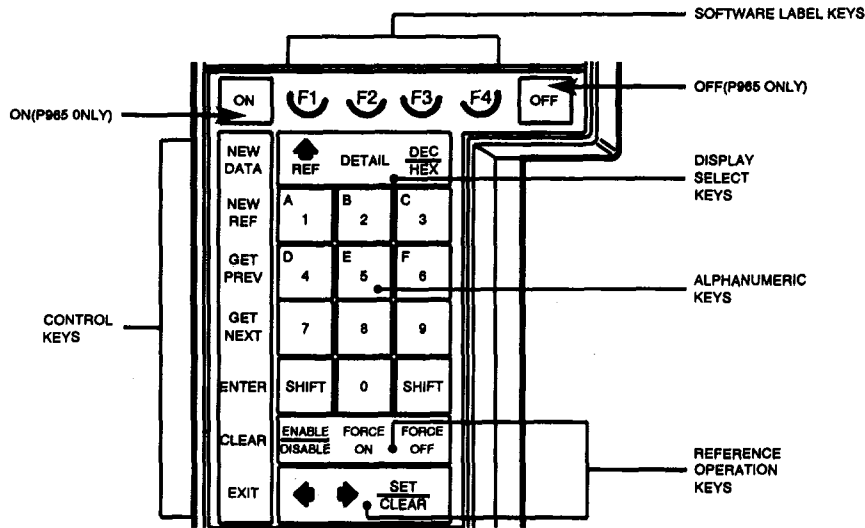
Control keys

Display select keys

Alphanumeric keys

Reference operation keys

Figure 7-13 P964/965 Keypad



Software Label Keys

F1, F2, F3, F4 Selects an option shown on the display screen. The function of these keys change with the menu choices displayed. Pressing a key selects the option displayed directly above it.

Alphanumeric Keys

A-F, 0-9, and SHIFT These keys are used to enter decimal or hexadecimal data. The SHIFT keys convert decimal keys 1 through 6 on the numeric keypad to hexadecimal A through F. The SHIFT key is pressed before pressing the key with the desired value. The shift action lasts for only one keystroke.

Display Select Keys

REF Selects the active line in a display of more than one reference by positioning a cursor in the leftmost display column. The cursor is initially positioned on the last line of the display and is moved up by the REF key. When the cursor reaches the top line, the REF key causes it to wrap to the last line. Also returns to overview display from detail display.

DETAIL Displays the current line in the detail display format.

DEC/HEX Toggles the data display between decimal and hexadecimal modes.

Control Keys

NEW DATA Enter decimal or hexadecimal data from the alphanumeric keys.

NEW REF Clear the displayed reference number or detail display and allow entry of a new reference number.

GET PREV Clear the displayed data and display the previous reference or parameter.

GET NEXT Clear the displayed data and display the next sequential reference or parameter.

ENTER Send newly selected data (reference, parameter, or state) to the controller.

CLEAR Clear displayed data or error message from the display screen. Control remains at the menu level at which the change occurred. Valid only for entries requiring the REF or ENTER keys. Also used to clear error or information displays and to return to previous menu.

EXIT Return to previous menu.

Reference Operation Keys

ENABLE/DISABLE Toggle switch that enables or disables a coil or discrete input.

FORCE ON Requests that the controller force on a disabled coil or discrete input.

FORCE OFF Requests that the controller force off a disabled coil or discrete input.

LEFT ARROW, RIGHT ARROW Selects a specific bit within a detail display of a register.

SET/CLEAR Toggle switch that sets to 1 or clears to 0 a specific bit in a reference. This key is used in conjunction with the left and right arrow keys.

ON/OFF Keys

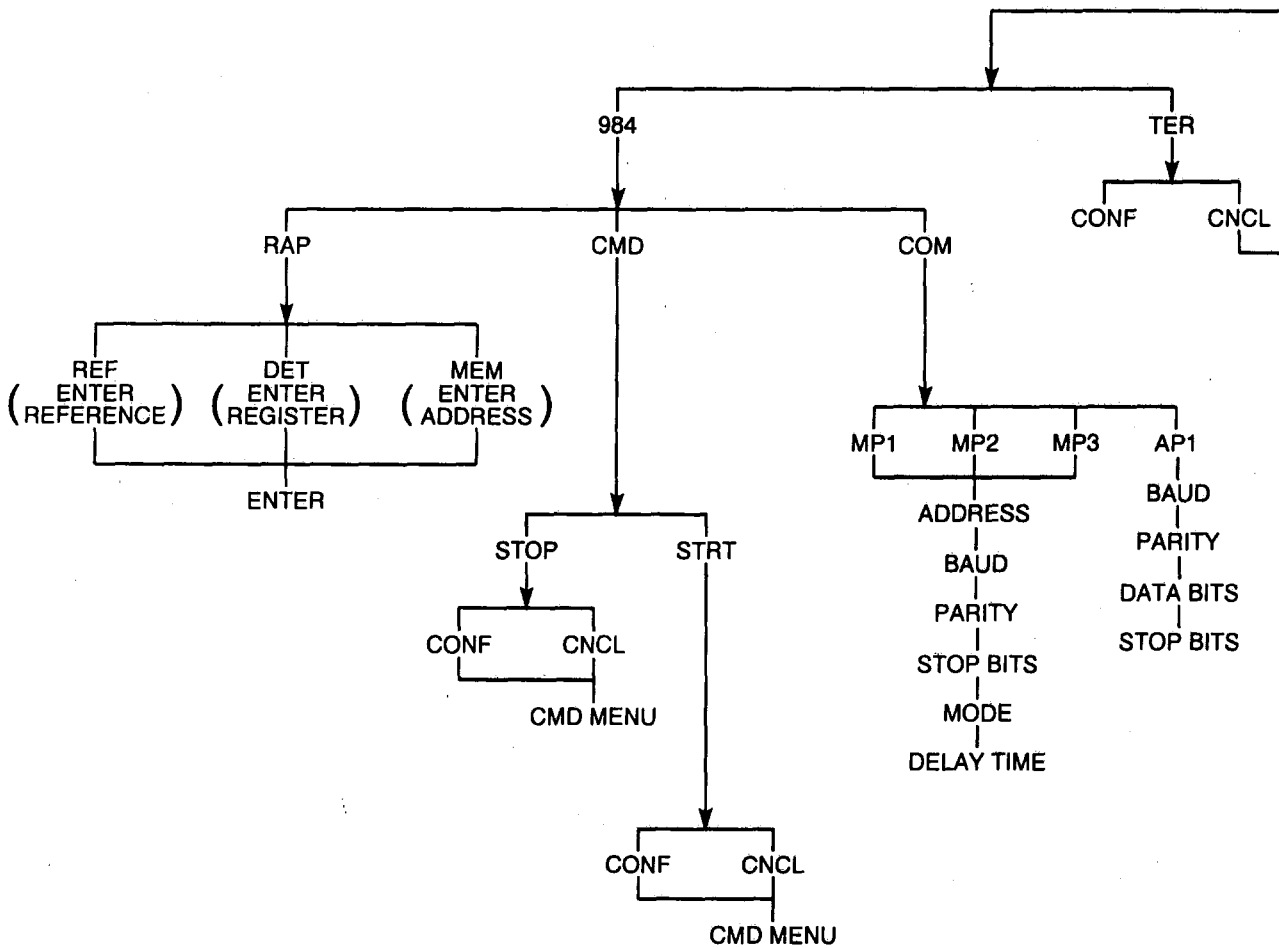
ON/OFF P965 only. ON turns power on from the internal battery. OFF turns internal battery power off. If power is provided by the port to which the P965 is connected, the ON and OFF keys have no effect.

P964 Menu

The software labels that make up the P964 menus are listed in the table below. The menus allow you to choose operations or parameters. For example, when you select 984, the labels RAP, CMD, and COM are displayed.

When using the P964 in the RAP or COM mode of operation, enter the appropriate data for each parameter then press the ENTER Key. Use the GET NEXT Key to display the next parameter. Pressing the EXIT Key on the P964 returns you to the previous menu.

Table 7- 7 P964 Menu Summary



P964 Menu Selection Descriptions

984	Choose controller operations
RAP	Invokes RAP menu
REF	Display state or value of entered reference number
DET	Display entered register value in binary plus decimal or hexadecimal. Selector arrow can be used to select a binary bit to set to 1 or 0.
MEM	Display entered memory address in binary plus decimal or hexadecimal. Memory addresses range from 300,000 to 365,535 depending on 984 memory size. Display values cannot be altered from the 964.
CMD	Invokes COMMAND menu
STOP	Issue command to stop controller
STRT	Issue command to start controller
COM	Invokes COMMUNICATION menu
MP1	Set Modbus port 1 parameters
MP2	Set Modbus port 2 parameters
MP3	Set Modbus port 3 parameters
AP1	Set ASCII port parameters
TER	Invokes ASCII Terminal Mode operation
CONF	Confirm ASCII operation request
CNCL	Cancel ASCII operation request

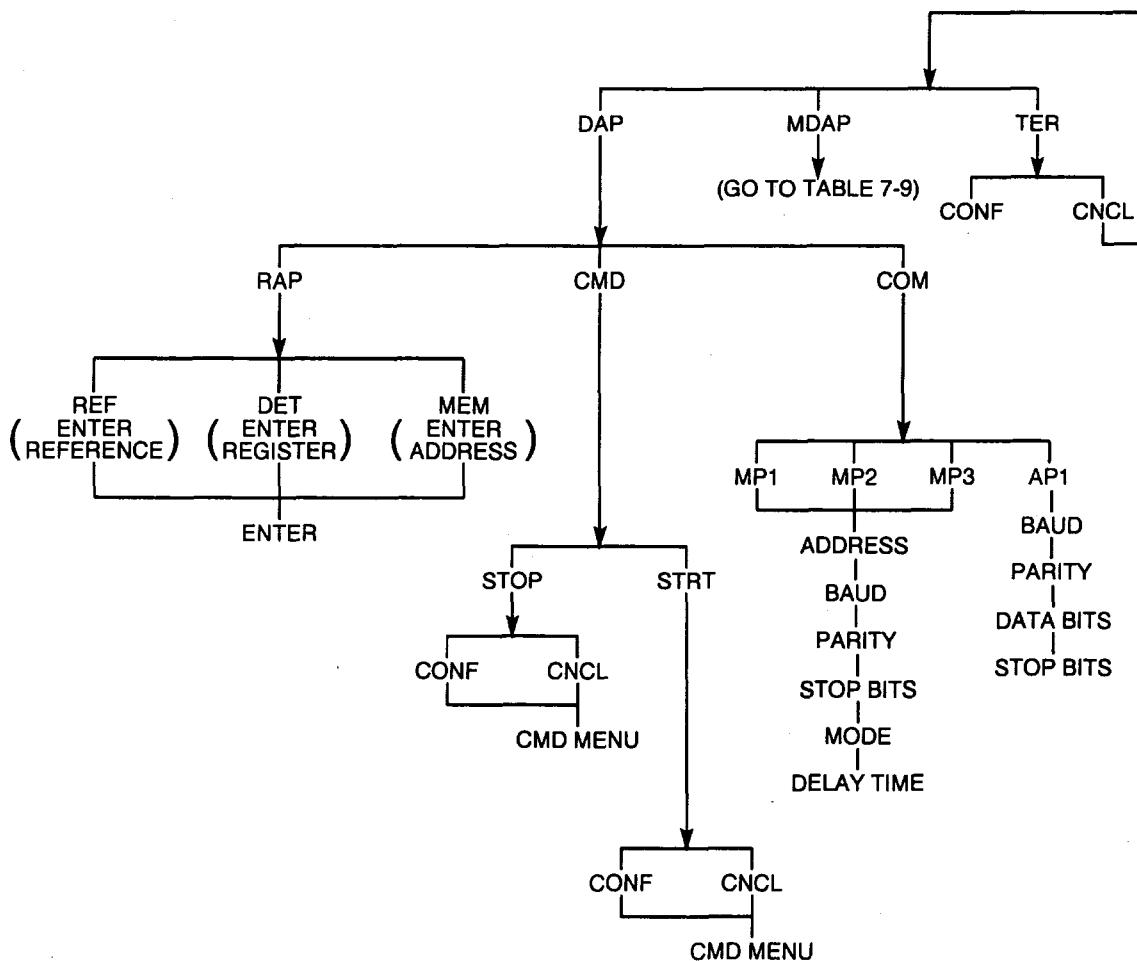
P965 Menus

You can select either DAP, MDAP or TER modes of operation from the power-up display. DAP and TER modes require connection to an ASCII/DAP port. MDAP mode requires connection to a MODBUS port.

DAP Mode In DAP mode the P965 can access controller data and memory, start or stop the controller, or modify communication port parameters, either ASCII or MODBUS. The table below shows the DAP Mode Menu Path.

When using the P965 in the RAP or COM mode of operation, enter the appropriate data for each parameter then press the ENTER Key. Use the GET NEXT Key to display the next parameter. Pressing the EXIT Key on the P965 returns you to the previous menu. Refer to the Modicon P965 Modbus DAP User's Guide GM-P965-001 Rev-A. for complete connection and operation procedures.

Table 7-8 P965 DAP Mode Menu Path



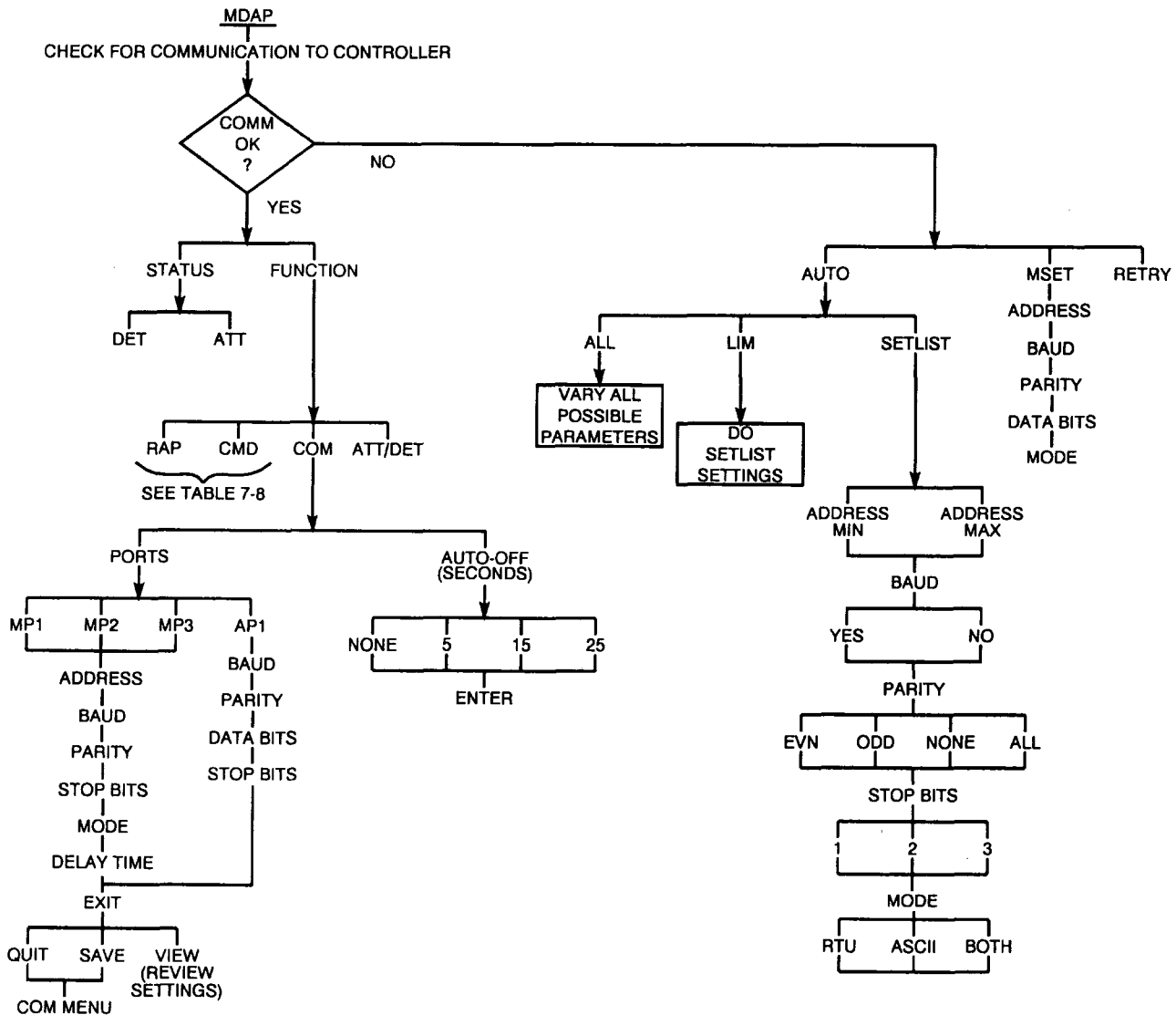
965 Menu Selection Descriptions

DAP	Choose controller operations
RAP	Invokes RAP menu
REF	Display state or value of entered reference number
DTL	Display entered register value in binary plus decimal or hexadecimal. Selector arrow can be used to select a binary bit to set to 1 or 0.
MEM	Display entered memory address in binary plus decimal or hexadecimal. Memory addresses range from 300,000 to 365,535 depending on 984 memory size. Display values cannot be altered by the 965.
CMD	Invokes COMMAND menu
STOP	Issue command to stop controller
STRT	Issue command to start controller
COM	Invokes COMMUNICATION menu
MP1	Set Modbus port 1 parameters
MP2	Set Modbus port 2 parameters
MP3	Set Modbus port 3 parameters
AP1	Set ASCII port parameters
TER	Invokes ASCII Terminal Mode operation
CONF	Confirm ASCII operation request
CNCL	Cancel ASCII operation request

MDAP Mode In MDAP mode the P965 can access controller data and memory, start or stop the controller, modify port parameters, set communication parameters for the P965, invoke Auto Search, limit the Auto Search list, and set the Auto Off feature. The table below shows the MDAP Mode Menu Path.

When using the P965 in the RAP or COM mode of operation, enter the appropriate data for each parameter then press the ENTER Key. Use the GET NEXT Key to display the next parameter. Pressing the EXIT Key on the P965 returns you to the previous menu. Refer to the Modicon P965 Modbus DAP User's Guide GM-P965-001 Rev-A. for complete connection and operation procedures.

Table 7-9 P965 MDAP Mode Menu Path



P965 MDAP Menu Selection Descriptions

AUTO	Invokes Auto Search menu
ALL	Attempts to communicate with controller by varying all possible port parameters
LIM	Attempts to communicate with controller by varying a user specified subset of the port parameters (The SETLIST).
SETLIST	Allows you to define a reduced set of MODBUS port parameters for communication with the controller
MSET	Sets MODBUS DAP port default parameters
RETRY	Attempts to communicate again with controller
STATUS	Invokes the STATUS display
DET	P965 detached from controller
ATT	P965 attached to controller
FUNCTION	Invokes MDAP Functions Menu
COM	Invokes COM Menu Display
PORTS	Invokes Set Port Parameters Display
AUTO-OFF	Invokes MDAP Auto Off Display. (Auto Off function, saves battery life by automatically shutting off the P965 after a selected interval of no keyboard activity)
ATT/DET	Toggles between the attached and detached modes

Unsupported Communication Parameters

The P965 does not support the following port parameter combinations:

3600 and 7200 Baud The P965 does not communicate at 3600 or 7200 baud. These two baud rates are not included in the Auto Search, Set List, or MSET functions.

On non-connected MODBUS ports (P965 not physically connected) you *can* read or set baud rates of 3600 or 7200. On connected ports (P965 physically connected) you *cannot* read or set baud rates of 3600 or 7200.

DEC PDP-11 and VAX

Modicon 984 software packages are available for the DEC PDP-11 and VAX computer systems. This section identifies and describes the application software contained in these packages. Titles, part numbers, and media information are provided in the accompanying table.

984/DEC PDP-11

DEC-RSX-11M Documentor Support Module This software package contains two application programs, the Load/Dump/Compare and the Annotated Ladder Lister. The Load/Dump/Compare is an application level Fortran 77 software program that utilizes the Modbus Communications Handler Utility. The Annotated Ladder Lister is a transportable Fortran program that provides comprehensive documentaion of user logic for the 984 series of programmable controllers.

Application Support Module/Modcom II-A This software package contains the Modcom II-A Protocol Handler application program. The Modcom II-A is a Fortran 77 software program that enables a 984 programmable controller to receive a request from the user's application program and structure it in a Modbus protocol format.

Application Support Module/Modcom II-C This software package contains the Modcom II-C Protocol Handler application program. The Modcom II-C is a C language 984 software program that provides the same purpose and functionality as the Modcom II-A program.

984/DEC VAX

Documentor Support Module This software package contains the same applications as the DEC-RSX-11M package. The only difference is in its format.

Protocol Handler Support Module This software package contains the same application as the Application Support Module/Modcom II-C package. The only difference is in its format.

Table 7-10 DEC PDP-11 and VAX Packaged Software

<u>Title</u>	<u>Part No.</u>	<u>Media</u>
DEC-RSX-11M	SW-D09R-11A	800 BPI Mag Tape
Document Support	SW-D09R-12A	1600 BPI Mag Tape
Module	SW-D09R-13A	RL01
	SW-D09R-14A	RI02
Application	SW-D09R-11A	800 BPI Mag Tape
Support Module	SW-D09R-12A	1600 BPI Mag Tape
Modcom II-A	SW-D09R-13A	RL01
	SW-D09R-14A	RI02
Application	SW-D09R-11A	800 BPI Mag Tape
Support Module	SW-D09R-12A	1600 BPI Mag Tape
Modcom II-C	SW-D09R-13A	RL01
	SW-D09R-14A	RI02
VAX Documentor	SW-D09V-12A	1600 BPI Mag Tape
Support Module		
VAX Protocol	SW-APPV-12C	1600 BPI Mag Tape
Handler Support		
Module		