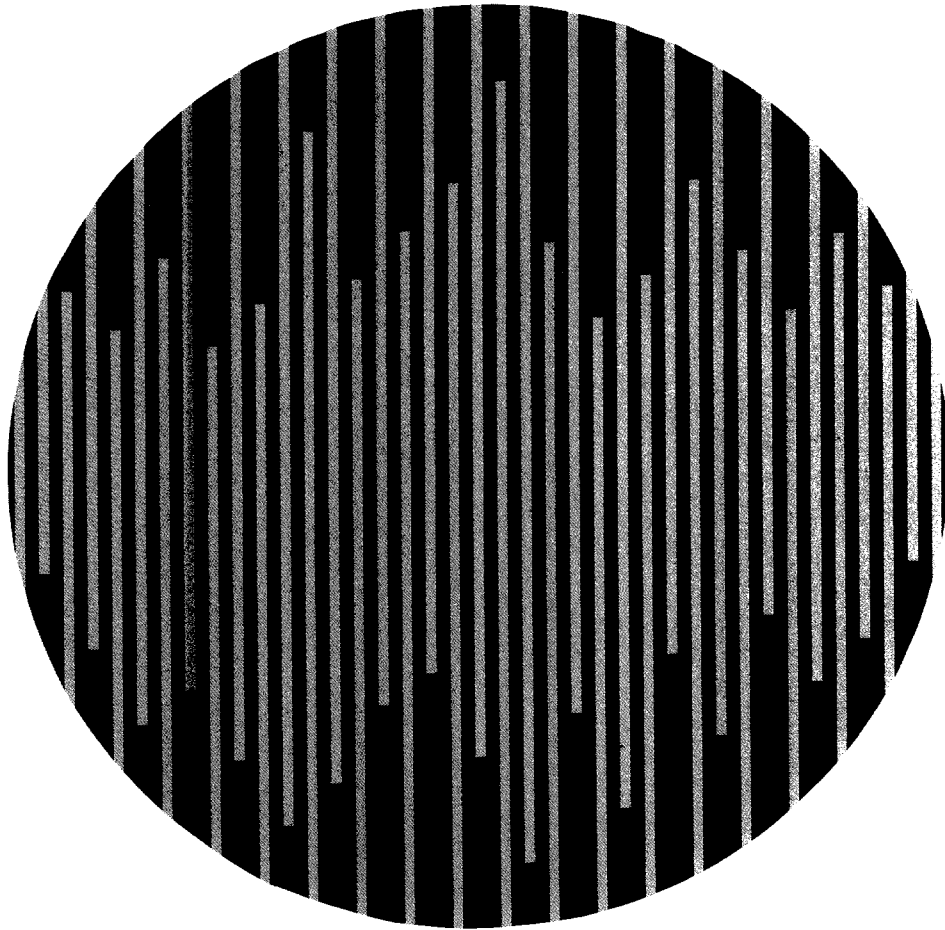


MODICON P965 Modbus DAP User's Guide

GM-P965-001 Rev A

AEG



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GM-P965-001 Rev A

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P965 Modbus DAP

User's Guide

July, 1989

MODICON Inc., Industrial Automation Systems
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Preface

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Subject

This document is written expressly for the Installer/Maintainer of this unit; describing its features, functional operation, and specifications.

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Modicon	184	584L	M984
Micro 84	384	884	J375
MODBUS	484	984	J475
Modvue	584	P180	P964
Modway	584M	P190	P965

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Components of the P965 MODBUS DAP Package

The P965 MODBUS DAP
Six AA-size 1.5-volt alkaline batteries
One 25-pin-to-9-pin adapter
One copy of this book GM-P965-001 REV. A

Customer Service

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Chapter 1

Introduction

- **Overview**
- **Terminology**
- **P965 Functions**
- **List of Related Documents**
- **Chapter Descriptions**
- **General Precautions**

Overview

The P965 MODBUS Data Access Panel (DAP) is a hand-held diagnostic terminal that connects to a Modicon controller. The major functions of the P965 are as follows:

- Uses either the MODBUS protocol (MDAP mode) when connected to a controller's MODBUS port or the ASCII protocol (DAP mode) when connected to a controller's ASCII/DAP port. In DAP mode, all functions and features of the P964 DAP are provided.
- Can be battery powered.
- Retains operating parameters upon power-down and restores them on power-up.

The P965 supports the following Modicon controller models: Micro 84 (with a J375 MODBUS interface), 484 (with a J475 MODBUS interface), 584, 884, and the 984 family.

Terminology

The words 'connected,' 'detached,' and 'attached' have special meanings in this manual. Furthermore, connected can be used in two ways: physically connected or logically connected.

Physically Connected This means that the male connector of the P965 is coupled with the female port on the controller.

Logically Connected The P965 is 'logically connected,' 'successfully connected,' or, more simply, 'connected' when it is physically connected AND communication parameters in the P965 and the controller match. (The word 'logically' is generally omitted in this manual.) In DAP mode, connected and attached are equivalent.

Attached and Detached These two terms are significant only in MDAP mode. Attaching the P965 to the controller requires MODBUS login commands and allows the P965 to perform more privileged functions such as stop/start and modifying the contents of the controller.

Attaching and detaching are done via the ATT/DET function key. If the software label for this key shows DET, the P965 is not attached (logged in) to the connected port of the controller.

Pressing this key sends a login command to the controller. If the login is successful, the display shows ATT, indicating attached. Pressing the key again sends a logout command to the controller. The screen now shows DET, indicating that the P965 is detached from the controller.

P965 Functions

Attached

With the P965 attached, you can perform the following operations:

- Display the status of inputs, coils, and registers.
- Enable, disable, and force inputs and coils.
- Display controller memory contents.
- Modify the contents of holding registers.
- Monitor or alter MODBUS or ASCII port parameters.
- Monitor or alter MODBUS or ASCII port parameters while the controller is in dim awareness.
- Automatically determine the port parameters of the MODBUS port to which the P965 is connected using all possible port parameters or a list of parameters determined by the user.
- Set the P965 to detached mode, thereby allowing no changes to the controller.
- Display the status of the controller, including memory-protect, run/stop, attach/detach, and controller type.
- Set time value at which an inactive P965 automatically powers down, saving battery life.
- Configure and troubleshoot communication networks:
 - by monitoring and setting MODBUS and ASCII port parameters.
 - by using the P965 to test the controller communication ports.
- Start and stop the controller.
- (884 only) Allow the entry of passwords containing uppercase letters A-Z and numerals 0-9 for attaching to 884. See Chapter 4 for information about changing a password that is incompatible with the P965.

Detached

When detached, the P965 can perform 'read' type commands that do not require a login. These functions are:

- Display the status of inputs, coils and registers.
- Display the contents of controller memory.
- Display MODBUS communication parameters.
- Display 984 simple ASCII port parameters.
- Display controller status, including controller type, attached or detached, stopped or running, and memory protect on or off. (Memory protect not displayed for the 884.)
- Display communication parameters for P453 and J812/J892 ASCII ports configured within the 584/984 controllers.

Terminal

In addition, the P965 can act as a simple terminal. In this mode, it can display status or error messages from the controller. ASCII characters can also be sent to the controller via the P965 keypad. See P965 MODBUS Description and Installation, Power-Up Tests and Displays, Overview of Menus, and Appendix B for further information.

P965 and Modicon Controllers

Not all of the above functions are supported by the P965 for all controller types.

Table 1-1, Functions for Each Type of Controller, shows the types of controllers supported by the indicated P965 functions, where

Y	=	fully supported
(Y)	=	limited support. See notes for further explanation
-	=	not applicable to indicated PC type
N	=	not supported

Table 1-1

Functions for Each Type of
Controller

FUNCTION		984	884	M84	584	484
1.	Status					
	Running/Stopped	Y	Y	Y	Y	Y
	Attached (logged in) or detached	Y	Y	Y	Y	-
	Memory protect	Y	N	N	Y	N
2.	Attach (login)/ Detach (logout)	Y	Y	Y	Y	-
3.	Passwords (See Note 1.)	-	(Y)	-	-	-
4.	Read references					
(0x)	Discrete outputs (coils)	Y	Y	Y	Y	Y
(1X)	Discrete Inputs	Y	Y	Y	Y	Y
(2x)	Sequencers	-	N	N	-	N
(3x)	Input registers	Y	Y	Y	Y	Y
(4x)	Output registers	Y	Y	Y	Y	Y
(5x)	Double precision registers	-	N	-	-	-
(6x)	Extended memory registers	N	-	-	N	-
(9x)	Latches	-	N	-	-	-
5.	Write references (See notes 2 and 3.)					
(0x)	Discrete Outputs (Coils)	Y	Y	Y	Y	Y
(1x)	Discrete inputs	Y	Y	Y	Y	Y
(2x)	Sequencers	-	N	N	-	N
(3x)	Input registers	-	-	-	-	-
(4x)	Output registers	Y	Y	Y	Y	Y
(5x)	Double precision registers	-	N	-	-	-
(6x)	Extended memory registers	N	-	-	N	-
(9X)	Latches	-	N	-	-	-
6.	Enable/Disable Coils	Y	Y	Y	Y	N
7.	Read Memory	Y	Y	-	Y	Y
8.	Write memory	N	N	-	N	N
9.	Read table (See Note 4.)	-	Y	Y	-	-
10.	Write table	-	N	N	-	-

(continued)

Table 1-1

Functions for Each Type of
Controller (Cont.)

FUNCTION		984	884	M84	584	484
11.	Start/Stop PC	Y	Y	Y	Y	Y
12.	Read PC comm. parameters (See Note 5.)	Y	Y	Y	Y	-
13.	Modify PC comm parameters (See Note 5.)	Y	(Y)	-	Y	-
14.	Read/Modify Simple ASCII port parameters	Y	-	-	-	-
15.	Read/Modify Remote ASCII port parameters	Y	-	-	Y	-

► **Notes:**

1. P965 supports passwords of uppercase A-Z and 0-9 characters only. If other characters are in the password, see Chapter 4 for information about entering a new password accessible by the P965.
2. Coils and discrete inputs cannot be written (forced) unless disabled.
3. Coils and registers cannot be written unless memory protect is off, and P965 is attached to the controller.
4. P965 cannot read password Table.
5. 884 and M84 can only modify port parameter settings for connected (i.e., to the P965) port. Cannot read MODBUS slave address.

Unsupported Functions

The following functionality is specifically not supported by the P965.

1. Configure a programmable controller.
2. Ladder logic programming.
3. Modify 884 MODBUS slave address.
4. Modify 884 port parameters for non-connected port.
5. Display 884, 484, or Micro84 memory protect as part of status display.

6. Enter 884 passwords other than uppercase A-Z and numeric 0-9.
7. Read 884 password table.
8. Display or modify reference types 2xxxx, 5xxxx, 6xxxx, and 9xxxx.
9. Modify Micro84 port parameters.
10. Display or modify port parameters for 484.
11. Modify 484 input/output discrete enable/disable status.
12. Communicate to programmable controller at 3600 or 7200 baud
13. Port parameter combination: ASCII, no parity, 1 stop bit.
14. Port parameter combination: RTU, parity, 2 stop bits.
15. Communicate to Micro84 at 1800 or 2000 baud.

584/984 Login Failure

A login (attach) attempt to a 584 or a 984 may fail if the controller is already logged in on either the connected MODBUS port (the port to which the P965 is communicating) or a non-connected MODBUS port.

Normally, an attach attempt fails because another user on another controller port has logged in.

However, a failure to attach to the connected port can occur if the P965 were previously attached, powered off but not physically disconnected from the controller, and then the P965 is powered on and attempts to attach again.

This failure to attach to the connected port can also occur if the P965 is connected through a MODBUS Port Multiplexer. The multiplexer allows multiple MODBUS masters to connect to the same 584/984 port. If another master were logged in to the same port connecting to the P965, the P965 user is alerted that the port is already logged in and that a logout/login sequence can force an attach. However, the other user, going through a multiplexer to the same controller port, would be unknowingly logged out.

You learn of a login failure from the Login Failed Display, Figure 1-1.

Figure 1-1

Login Failed Display

```
LOGIN.FAILED....  
PORT.n.LOGGED.IN  
DO.LOGOUT,LOGIN?  
Y.....N
```

- F1 (Y) — sends a logout and then a login command to the controller. This obtains the login privilege to the controller, if it had been rejected on the previous login attempt because the connected port was already logged in.
- F4 (N) — abandons the login attempt. Forcing logout, then login, may unwittingly log out another user accessing the same port of the controller through a MODBUS port multiplexer device.

List of Related Documents

This guide covers only the connection and operation of the P965 MODBUS DAP. You may need installation and programming information about your controller while using the P965 MODBUS DAP. Refer to the following publications as necessary.

GM-0984-003	984 Programmable Controller System Planning and Installation
GM-0984-001	984 Programmable Controller Programming Guide
PI-884A-002 Rev. D	884 Programmable Controller System Planning and Installation.
PI-884A-001 Rev. B	884 Programmable Controller Programming Guide.
GM-0584-IBM	584/IBM PC Programming Guide
PI-584M-001 Rev. B	System Planning and Installation (584M)
PI-584M-002	Programming Guide (584M)
PI-C484-002 Rev. A	(484) Programming Guide/P190
PI-M84A-001 Rev. A	Micro 84/P190 Programming Guide

Chapter Descriptions

The chapters of this guide are summarized below.

Chapter 2 P965 MODBUS DAP Description and Installation This chapter describes the P965 display screen, keypad, and connector.

Chapter 3 Power-Up Tests and Displays This chapter describes the confidence tests performed by the P965 when connected to the controller and a normal power-up sequence.

Chapter 4 Overview of Menus This chapter provides an overview of the P965 menus. The main menu and the normal connect menus, which are the starting points for all operations, are described as well as the Auto Search function.

Chapter 5 Reference Access Panel (RAP) Operations This chapter describes how to display discrete or register references, change discrete reference states (on/off), and enter values into output registers.

Chapter 6 Command (CMD) Operations This chapter describes how to start or stop the controller with the P965.

Chapter 7 Communications Port (COM) Operations This chapter describes how to display or change communication parameters for the ASCII/DAP and MODBUS ports on the controller.

Chapter 8 Error Displays This chapter describes error displays and procedures for resolving the errors.

Appendix A P965 MODBUS DAP Specifications Specifications are listed concerning power, the communications interface, the keyboard, environmental limits, and mechanical properties.

Appendix B ASCII Characters A table of ASCII characters and related keys is given.

General Precautions

Set Auto Power-Down This feature conserves the batteries by shutting off the P965 whenever it is unused, i.e., no key is pressed, for the set time. The MDAP Auto Off Display, described in Chapter 7, allows you to set the Auto Off time.

Connectors and Adaptors The P965 cable terminates with a 25-pin male connector that directly connects to 984's with 25-pin MODBUS ports, 884's and Micro84's (J375). The P965 is delivered with a 25-to-9 pin adaptor cable that permits access to the 9-pin female connectors on 984-x8x MODBUS ports. For 484 and 584 controllers, a user-supplied adaptor cable is required. See Chapter 2 for full descriptions of the connectors and for wiring diagrams.

884 Password When attaching to an 884, a password may be required. The 884 accepts any printable characters for the password. This includes uppercase and lowercase letters, numerals, and certain special characters. The P965 can use only numerals or uppercase alphabetic characters. If the 884 password contains characters not supported by the P965, change the password via a P190 or an IBM PC. See Chapter 4.

Chapter 2

P965 Description and Installation

- **P965 Physical Description**
- **P965 Keypad Description**
- **Installation for Controller Operations**
- **Installation for Simple ASCII Terminal Operations**
- **Low Battery Message**

P965 Physical Description

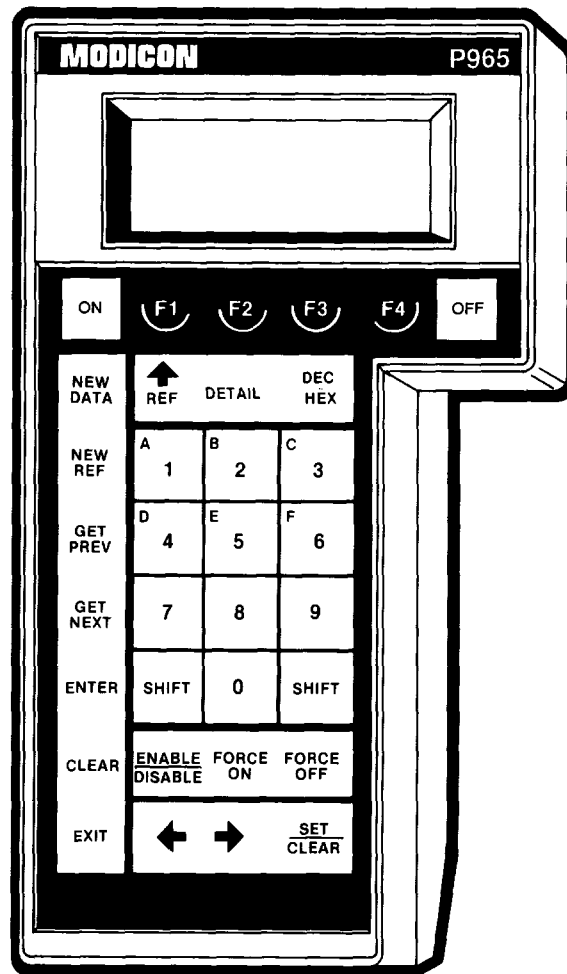
The P965 has three main components:

- a 64-character liquid crystal display (LCD) screen.
- a keypad with alphanumeric and function keys.
- a cable terminated with a 25-pin D connector for connection to the ASCII/DAP port or MODBUS port of a controller .

Figure 2-1 shows a front view of the P965.

Figure 2-1

P965 MODBUS Data Access
Panel — Front View



P965 Keypad Description

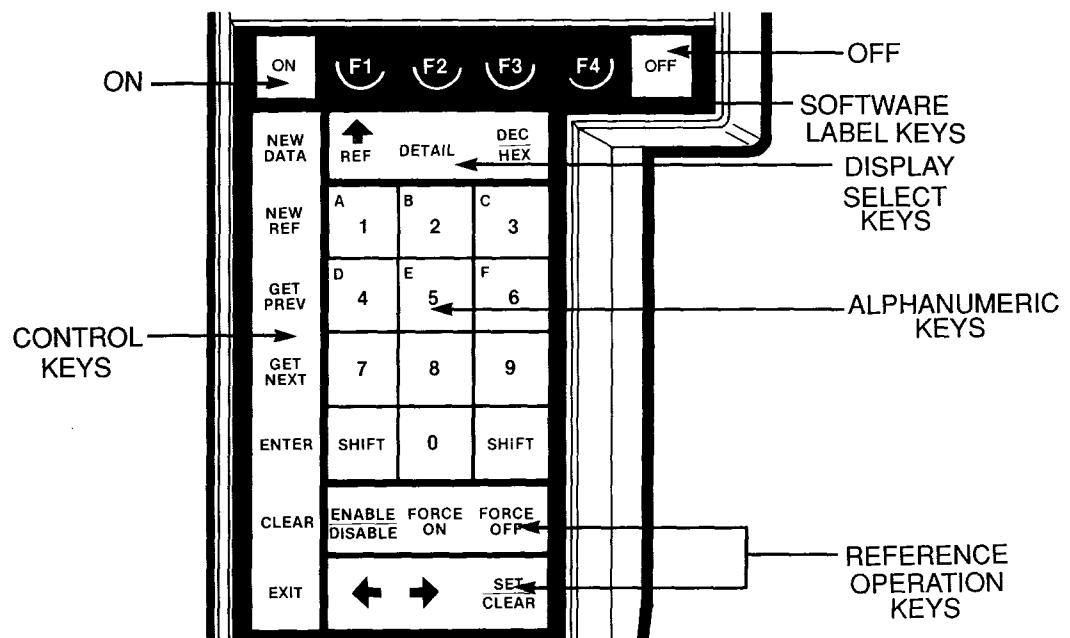
There are six groups of keys on the P965 keypad.

- On/Off keys
- Software label keys
- Control keys
- Display select keys
- Alphanumeric keys
- Reference operation keys

Each of these groups is shown in Figure 2-2.

Figure 2-2

Keypad Groups



General key functions are given below. The specific functions of some keys vary depending on the screen display. Also, not all keys are active for each display.

Software Label Keys

On,Off 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.

When the P965 is connected to an ASCII/DAP port or to a J375 (Micro84 MODBUS interface), power is supplied by that port. The P965 automatically utilizes power supplied by the controller. If not supplied, then battery power must be selected via the P965's ON key.

F1, F2, F3, F4 Selects an option shown on the display screen. Pressing a key selects the option displayed directly above it.

Alphanumeric

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. Press the SHIFT key before pressing the key with the desired character. 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 one line by the REF key. When the cursor reaches the top line, the REF key causes it to wrap to the last line. This key also returns to the overview display from the detail display.

DETAIL Displays the current line in the detail display format

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

Upon power-up, the P965 defaults to the decimal mode. Once you select the hexadecimal mode, the P965 remains in this mode until powered off/on or until you select the decimal mode.

Control Keys

NEW DATA Allows entry of decimal or hexadecimal data from the alphanumeric keys.

NEW REF Clears the displayed reference number or detail display and allows the entry of a new reference number.

GET PREV Clears the displayed data and displays the previous reference or parameter.

GET NEXT Clears the displayed data and displays the next sequential reference or parameter.

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

CLEAR Clears a partial decimal or hexadecimal numeric operator entry. 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 Returns to the preceding menu display.

Reference Operation Keys

ENABLE/DISABLE Requests that the controller enable or disable 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 reference.

SET/CLEAR Requests that the controller set to 1 or clear to 0 a specific bit in a reference. This key is used in conjunction with the left and right arrows. Also used as a SHIFT key to enter numerics 0-9 when entering 884 passwords.

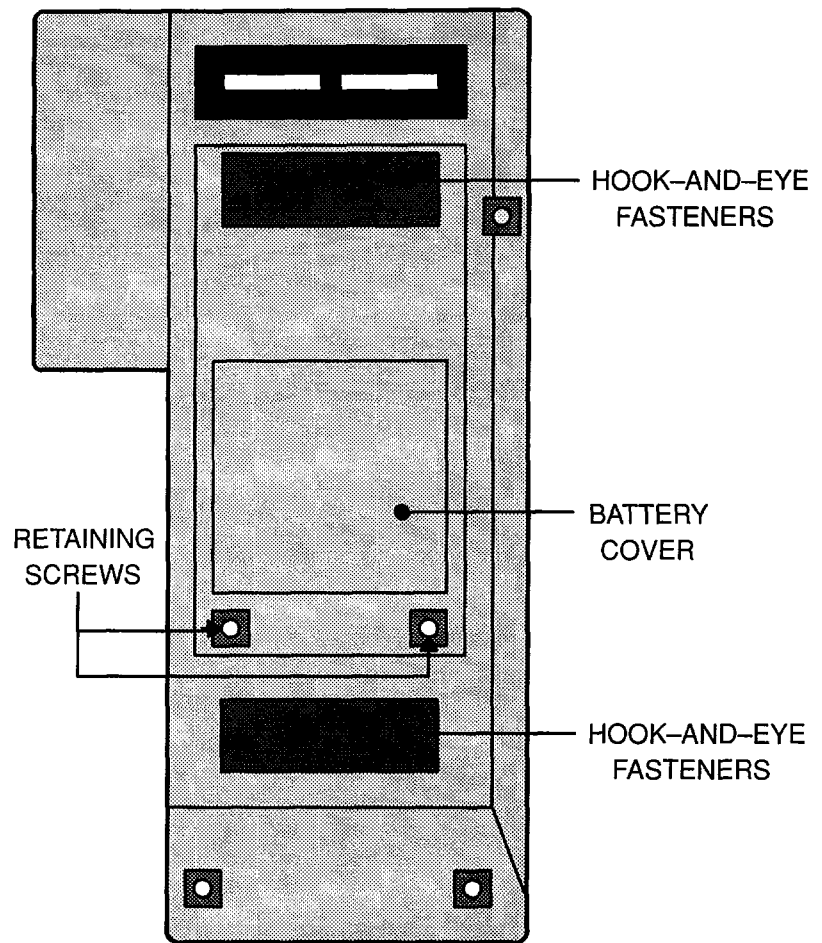
Installation for Controller Operations

Batteries

Installation Two screws on the back of the P965 secure the cover of the battery compartment. Remove the screws and the cover. Insert the batteries according to the correct polarity. Replace the cover and the screws. The P965 holds six standard AA-size 1.5-volt alkaline NICAD batteries.

Figure 2-3

P965 Rear View



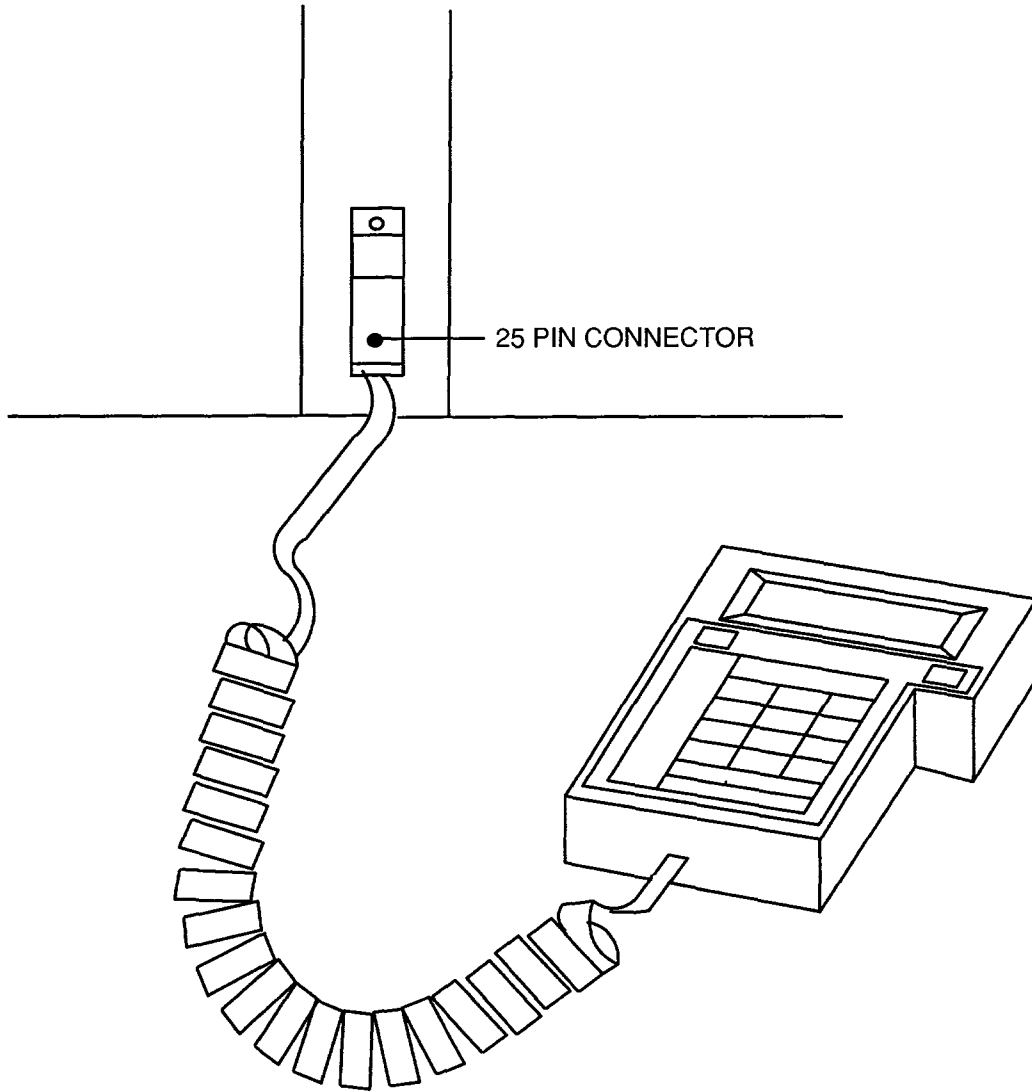
Connectors

The mechanical connector on the P965 is a snap-lock 25-pin male connector on the end of a coiled cord. This connector mates with the female 25-pin MODBUS ports (or ASCII/DAP ports) on supported controllers. The snap lock on this connector can be removed and the screws reversed to convert to a screw-in type connector. This can be securely fastened to the screw-in 25-pin female MODBUS connector, such as in ports 2 and 3 of a 984B.

The 25-pin male connector permits attaching directly to the 984A, 984B, 984X, 884, and the Micro84. See Figure 2-4, which shows a typical connection between a P965 and a controller.

Figure 2-4

Connecting a P965 to a
Controller



A short adapter is also provided that has a female 25-pin connector on one end and a standard 9-pin male connector on the opposite end to mate with 984-x8x controllers. This adaptor is attachable to the back of the P965 with hook-and-eye fabric .

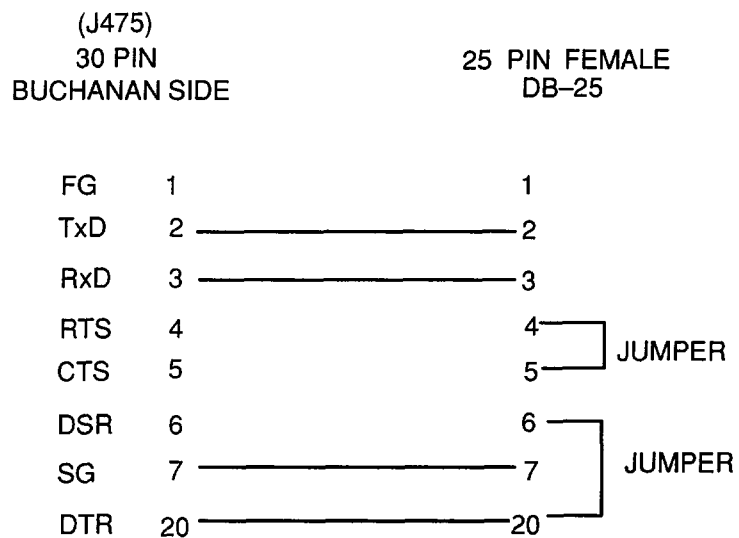
With the 25-pin-to-9-pin adapter, the P965 can attach to any 984 controller with a 9-pin female MODBUS port.

Special Adaptors

484/J475 The 484/J475 has a 30-pin MODBUS port. The user must supply an adaptor that has a 25-pin female DB-25 connector on one end to mate with the P965. On the other end, attach a 30-pin Buchanan connector. Figure 2-5 describes the wiring for this adaptor for the P965.

Figure 2-5

484/J475 Adaptor Cable Wiring

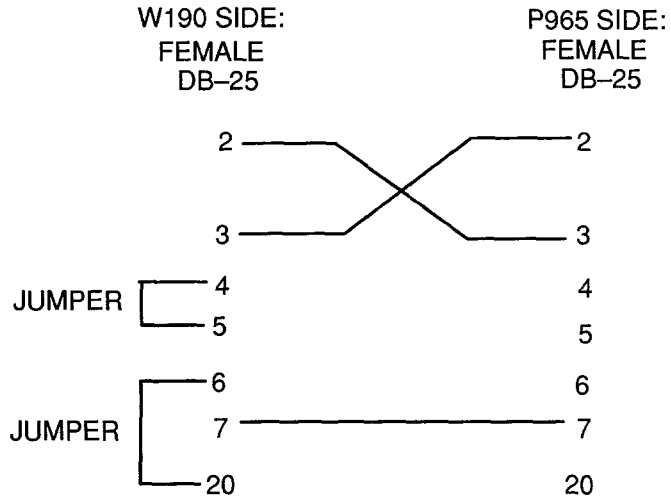


584 The P965 can be connected to a 584 with either a Modicon W190 cable (which connects the 584 to a P190) and a user-supplied adaptor cable or a Modicon W192 cable (which connects the 584 to a modem) and a user-supplied adaptor cable.

584/W190 The W190 cable has a 24-pin round military connector on one end that fits into either one of two MODBUS ports on the 584. On the other end is a male DB-25 connector. To this you must connect an adaptor cable that has a female DB-25 connector on each end. Figure 2-6 shows the wiring for this adaptor cable.

Figure 2-6

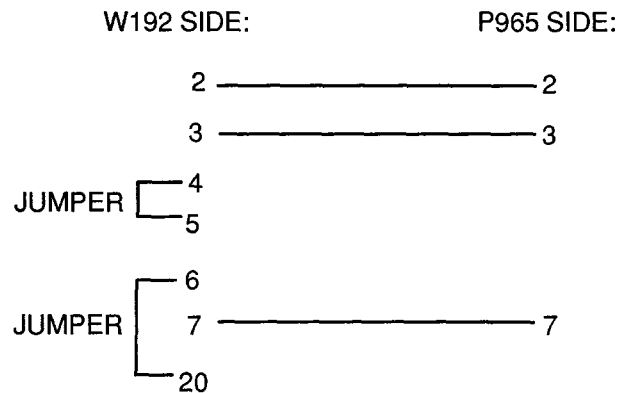
584/W190 Adaptor Cable
Wiring



584/W192 The W192 cable has a 24-pin round military connector on one end that fits into either one of two MODBUS ports on the 584. On the other end is a male DB-25 connector. To this you must connect an adaptor cable that has a female DB-25 connector on each end, or you can use a standard ribbon cable. Figure 2-7 shows the wiring for this adaptor cable.

Figure 2-7

584/W192 Adaptor Cable
Wiring



Installation for Simple ASCII Terminal Operations

The P965 can be used as a simple ASCII terminal as well as a controller data access panel. Its primary application as a terminal is to receive and display status or alarm messages from the controller.

In addition, when in terminal mode, and with the appropriate loopback connector, the P965 can be used in a "loopback" test mode to verify the proper functional operation of the unit.

Low Battery Message

As battery power begins to drop, the P965 displays a screen message indicating a low battery. This screen appears for approximately two seconds, and then the previous display is restored. As soon as possible after this message appears, replace the batteries in the P965. Except for the interruption by the 'low battery' message, the unit continues to function normally until battery power is depleted, which is approximately 15 minutes after the message first appears.

Chapter 3

Power-Up Tests and Displays

- **Power-Up Tests and Displays**
- **Error Message Displays**

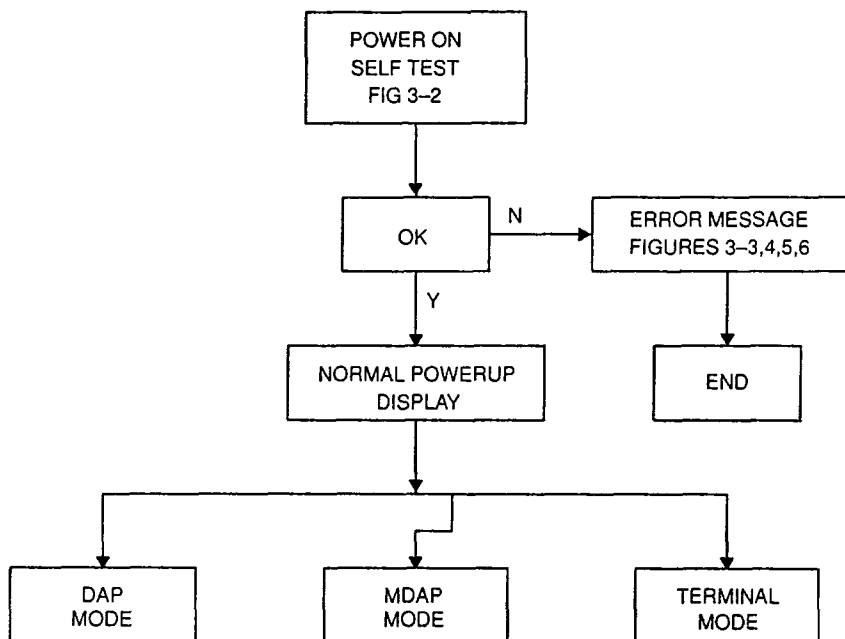
Power-Up Tests and Displays

When the P965 is turned on, it performs internal power-up confidence tests. All confidence tests must be passed before further operations can be performed. A series of displays accompanies the tests, ending with an indication of success or failure.

Power-Up Menu Diagram

The following menus (Figure 3-1) appear for the power-up sequence, with error messages. The figure numbers for the displays/menus are given in the boxes.

Figure 3-1
Power-Up Menu Diagram



The menus for DAP mode and MDAP mode are described in Chapter 4.

Power On When power is first turned on, the P965 runs through a series of self tests. While these self tests are being performed, you see arrays of characters on the LCD screen. After the P965 passes all tests successfully, the Power-Up Display (Figure 3-2) appears.

Operating Modes The P965 supports the operating modes of the DAP as well as the MODBUS DAP (MDAP), and can function in terminal mode. DAP mode requires connection to an ASCII/DAP port. MDAP mode requires connection to a MODBUS port. Upon power-up you may select the desired operating mode via the power-up display.

To function in terminal mode, the P965 must be connected to an ASCII/DAP controller port. In terminal mode the display shows all received printable ASCII characters as well as carriage return and line feed (95 character printing set plus execute CR and LF). Each P965 keypad key transmits a single printable ASCII code to the controller.

To exit terminal mode, the P965 must be powered down.

Figure 3-2

Power-up Display

```
P965...REV. X.X  
SELF.TEST.PASSED  
SELECT FUNCTION:  
DAP...MDAP...TER
```

- F1 (DAP) — DAP operating mode. Either the DAP Normal Connect Display appears, or an error display appears.
- F2 (MDAP) — MDAP operating mode. Either the MDAP Normal Connect Display or the MDAP Connect Timeout Display appears.
- F3 (TER) — invokes the terminal mode.

The EXIT key provides no function.

Error Message Displays

If a failure occurs during power-up confidence tests, one of three error messages is displayed: RAM failure (Figure 3-3), ROM failure (Figure 3-4), or NVRAM failure (Figure 3-5).

Figure 3-3

RAM Failure Power-Up Display

```
CRITICAL.ERROR..  
RAM.FAILED.TO...  
PASS.SELF.TEST..  
CANNOT.CONTINUE.
```

This failure stops the unit function. Press the CLEAR key to retry the self test. If the retry fails, contact Modicon.

Figure 3-4

ROM Failure Power-Up Display

```
CRITICAL.ERROR..  
ROM.FAILED.TO...  
PASS.SELF.TEST..  
CANNOT.CONTINUE.
```

This failure stops unit function. Press the CLEAR key to retry the self test. If the retry fails, contact Modicon.

Figure 3-5

NVRAM Failure Power-Up
Display

```
P965.NVRAM.FAIL.  
LOADING.DEFAULTS  
.....  
.....
```

This display appears for several seconds if the NVRAM fails, and automatically clears itself, returning to the Power-Up display (Figure 3-2) with line 2 blanked (since the self test did not pass).

If the NVRAM fails, the P965 continues to function normally. However, changes to the P965's port parameters are not saved. Auto Search still automatically determines the port parameter values that are set by the controller, and successful communications are established. When convenient, return the unit to Modicon for NVRAM replacement.

Figure 3-6

P965 Cold Boot Display

```
P965.COLD.BOOT..  
REQUIRED.....  
LOADING.DEFAULTS  
.....
```

The P965 Cold Boot Display, Figure 3-6, appears for several seconds and then automatically clears itself, returning to the Power-Up Display, Figure 3-2 with line 2 blanked (since the self test did not really pass). This display should occur only the first time a new unit is powered up with an uninitialized NVRAM.

Chapter 4

Overview of Menus

- **Introduction**
- **Selecting DAP Mode**
- **Selecting MDAP Mode**
- **Auto Search Function**
- **Setting MDAP MODBUS Port Parameters**
- **884 Passwords**

Introduction

This chapter presents an overview of the menus displayed on the P965 screen. The software label keys, F1 through F4, assume the function of the label displayed directly above them. If no label is shown, the key has no function. When a display is described in this guide, the active keys are listed. Menu flow diagrams for DAP normal connect (Figure 4-1) and MDAP normal connect (Figure 4-2) are given below.

Figure 4-1

DAP Normal-Connect Menu Flow Diagram

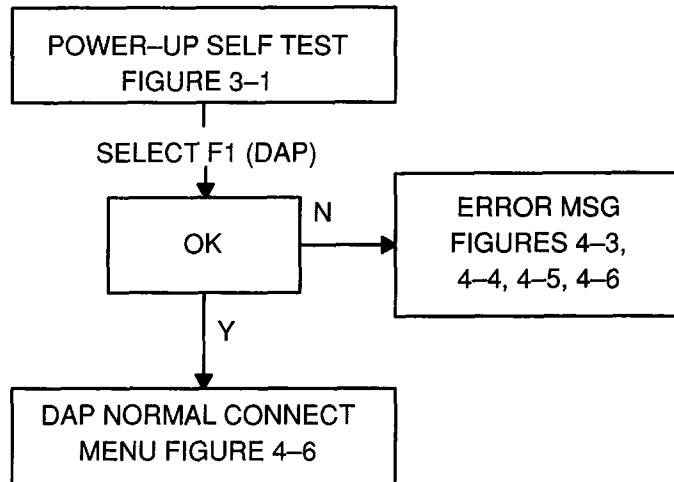
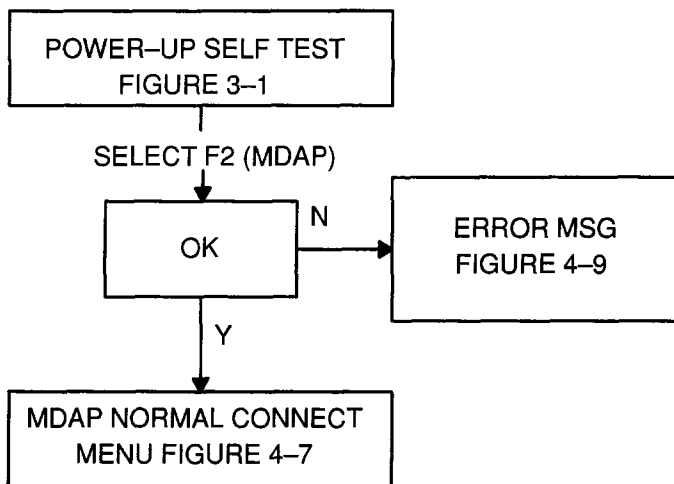


Figure 4-2

MDAP Normal-Connect Menu Flow Diagram

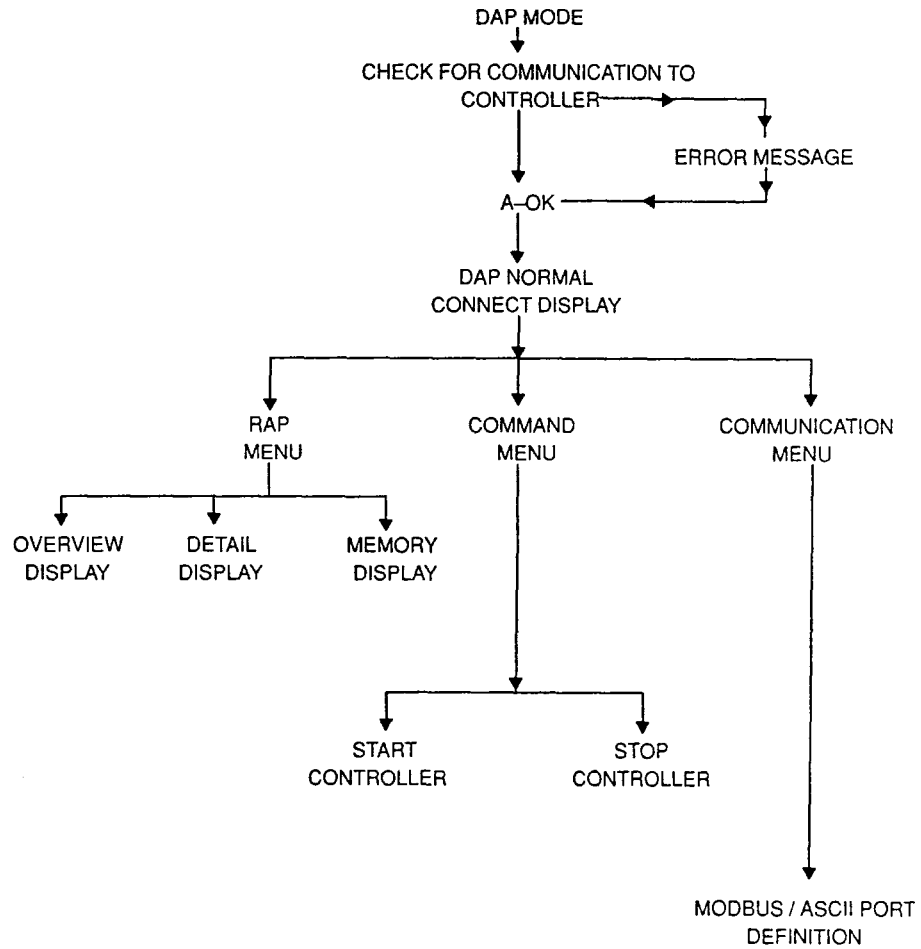


Selecting DAP Mode

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. See Figure 4-3.

Figure 4-3

DAP Mode Menu Path



If you select DAP from the power-up display (Figure 3-2) and no error displays appear, the DAP Normal Connect Display, Figure 4-4, appears.

Figure 4-4

DAP Normal Connect Display

```

DAP.CONNECT.....
SELECT.MENU.....
.....
RAP.CMD.COM.....
  
```

- F1 (RAP) — invokes the RAP submenu. (See Chapter 5.)
- F2 (CMD) — invokes the CMD submenu. (See Chapter 6.)
- F3 (COM) — invokes the COM submenu. (See Chapter 7.)

If communication with the controller is unsuccessful when you select DAP mode, one of four displays appears with an error message. These displays are shown in figures 4-5, 4-6, 4-7, and 4-8.

DAP Mode Error Displays

The DAP Connect Communication Timeout Failure Display, Figure 4-5, appears if the connect operation fails. The F2 key retries the connect operation.

Figure 4-5

DAP Connect Comm
Timeout Failure Display

```
P965.WARNING.05.
COMM.TIMEOUT.ERR
CONNECT.FAILED..
....RETRY.....
```

The DAP Connect Communication Data Failure Display, Figure 4-6, appears if there is no response from the controller during the connect attempt. The F2 key retries the connect operation.

Figure 4-6

DAP Connect Comm Data
Failure Display

```
P965.WARNING.06.
COMM.DATA.ERR...
CONNECT.FAILED..
....RETRY.....
```

During the connect attempt, if an invalid response is received, the P965 halts and presents the error display in Figure 4-6.

After the display in either Figure 4-4 or Figure 4-5 appears, pressing the F2 (RETRY) key causes the display to blank momentarily (about 500 msec). Then the P965 attempts to communicate again. This cycle continues until a successful connection is established, or until the unit is powered down and powered up again.

The DAP Operation Communication Timeout Failure Display, Figure 4-7 allows you to retry or to cancel the function.

Figure 4-7

DAP Operation Comm
Timeout Failure Display

```
P965.WARNING.07.  
COMM.TIMEOUT.ERR  
CONNECT.FAILED..  
....RETRY...CNCL
```

During any operation, if a timeout occurs, the DAP Operation Communication Data Failure Display, Figure 4-8, appears.

Figure 4-8

DAP Operation Comm Data
Failure Display

```
P965.WARNING.08.  
COMM.DATA.ERR..  
REQUEST.ABORTED..  
....RETRY...CNCL
```

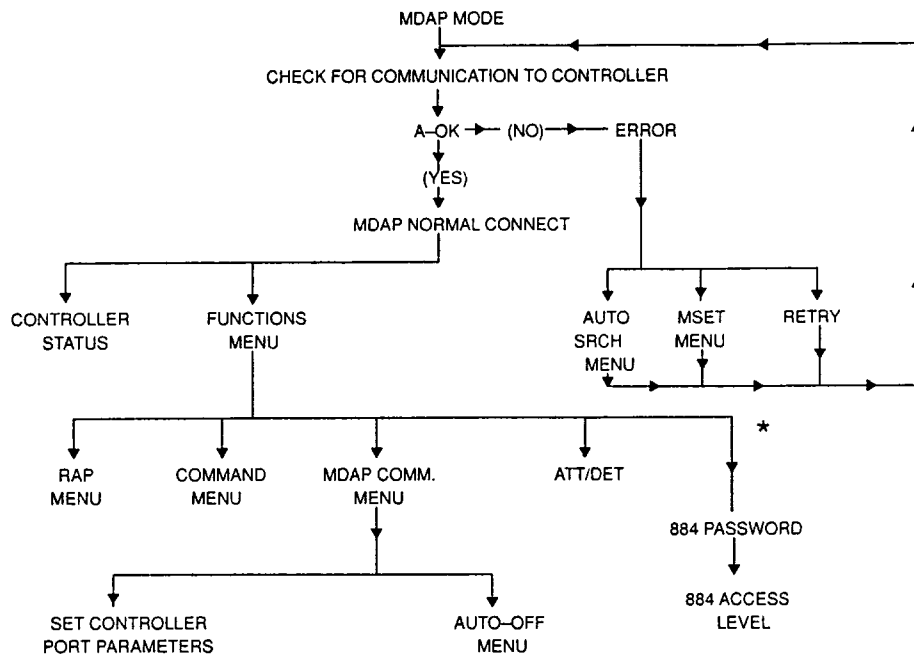
- F2 (RETRY) — performs a retry.
- F4 (CNCL) — returns to the previous display, and allows you to resume normal operation.

Selecting 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. See Figure 4-9.

Figure 4-9

MDAP Mode Menu Path



* FOR 884 CONTROLLERS ONLY

Selecting MDAP in the power-up display (Figure 3-2) invokes the MDAP Normal Connect Display, or main menu, (Figure 4-10) if the connection is successful. If not, an error message display appears.

Figure 4-10

MDAP Normal Connect Display

```
P965.MDAP.....
CONNECTED TO....
TTTTTT...SELECT:
STATUS..FUNCTION
```

TTTTTT in the SELECT line shows the type controller the P965 is connected to, i.e., M84, 484, 584, 884, or 984.

- F1 (STATUS) — invokes the STATUS display.
- F4 (FUNCTION) — invokes the FUNCTION Display.
- EXIT — returns to the Power-Up menu (Figure 3-1)

Error Display In MDAP mode, whenever any communication to the controller times out, the MDAP Communications Timeout Error Display (Figure 4-11) appears.

Figure 4-11

MDAP Communications
Timeout Error Display

```
P965.WARNING..05
COMMUNICATIONS..
TIMEOUT.ERROR...
RETRY.AUTO.MSET.
```

- F1 (RETRY) — attempts to connect (communicate) again with the controller. If successful, the MDAP Normal Connect Display appears. If not successful, the error display in Figure 4-11 appears.
- F2 (AUTO) — invokes the Auto Search Menu Display. In Auto Search, MODBUS port parameters are varied until a correct set is found to communicate with the controller. This correct set becomes the power-up default set of parameters. See Figure 4-11.
- F3 (MSET) — sets the MODBUS DAP port parameters. These then become the power-up default parameters.
- EXIT — returns to the power-up display (Figure 3-1).

MDAP Status Display The MDAP status display describes the state of the controller. Figure 4-12 shows the MDAP status display and gives an example.

Figure 4-12

MDAP Status Display

	For example:
TTT.....	984.....
MEM.PROT:ppp....	MEM.PROT:OFF....
SSSSSS.AAAAAAA.	STOPPED.ATTACHED
.....mmm.DET

- TTT — specifies the type of controller, such as M84, 484, 584, 884, or 984.
- PPP — indicates whether the memory-protect function is ON or OFF.
- SSSSSS — shows whether the controller is STOPPED or RUNNING.
- AAAAAAA — shows whether the P965 is ATTACHED to or DETACHED from the controller.
- F4 (ATT or DET) If ATT is displayed, the P965 is attached (i.e., logged in) to the controller. If DET is displayed, it is detached from the controller.
- EXIT — returns to the MDAP Normal Connect Display.

Exceptions — Memory protect is not displayed for the 484, Micro84 or 884. Status display has line 2 blanked for these controllers.

ATTACH/DETACH is not displayed for the 484, since the 484 does not support MODBUS login commands.

MDAP Functions Menu

Selecting Functions on the Normal Connect Menu invokes the MDAP Functions Menu, Figure 4-13.

Figure 4-13

MDAP Functions Menu

```
MDAP.FUNCTIONS..
.....
SELECT:.....
RAP.CMD.COM.mmm.
```

- F1 (RAP) — invokes the MODBUS RAP menu.
- F2 (CMD) — invokes the MODBUS CMD menu.
- F3 (COM) — invokes MODBUS COM menu (Figure 4-15).
- mmm F4 (ATT/DET) toggles between attached and detached modes.
- EXIT — returns the MDAP Normal Connect Display.

RAP Display Selecting F1 (RAP) in the MDAP function menu invokes the RAP Menu Display, Figure 4-14. (See Chapter 5.)

Figure 4-14

RAP Menu

```
TTT.RAP.MENU....
.....
.....
REF.DTL.MEM.TBL
```

- F1 (REF) — selects the overview display format.
- F2 (DTL) — selects the detail display format.
- F3 (MEM) — selects the memory display format.
Read Memory is not a supported function for the Micro84.
- EXIT — returns to the MDAP functions menu.
- F4 (TBL) (884 and Micro84) invokes Read Table option.

CMD Display Selecting F2 (CMD) in the MDAP function menu invokes the CMD Display, Figure 4-15. (See Chapter 6.)

Figure 4-15

CMD Display

```
TTT.CMD.MENU....
STATUS: .SSSSSS.
MEM.PROTECT: .mmm
XXXXX.....
```

- XXXXX on the bottom line is the action key. It shows STOP if the status is running; START if the status is stopped.
- F1 (XXXXX) — invokes the action stated on the bottom line of the display.

- EXIT — returns to the display from which you entered.

COM Menu Selecting F3 (COM) in the MDAP Function Display invokes the COM Menu Display, Figure 4-16. (See Chapter 7.)

Figure 4-16

Com Menu

```
MDAP.COM.MENU...
.....
SELECT.....
PORTS...AUTO.OFF
```

- F1 (PORTS) — invokes Set PC Port Parameters Display. In a 484, this key is inactive and “PORTS” is not displayed. (See Chapter 7.)
- F4 (AUTO OFF) — invokes MDAP Auto Off Display.
- EXIT — returns to MDAP functions display.

Set PC Port Parameters Display This display (Figure 4-17) allows you to set port parameters.

Figure 4-17

Set PC Port Parameters
Display

```
MDAP.PORTS.MENU.
.....
SELECT:.....
MP1.MP2.MP3.AP1.
```

- F1 (MP1) — sets communication parameters for MODBUS port 1.
- F2 (MP2) — sets communication parameters for MODBUS port 2.
- F3 (MP3) — sets communication parameters for MODBUS port 3.
- F4 (AP1) — sets communication parameters for the ASCII port.
- EXIT — returns to MDAP Communications Menu Display.

Dim Awareness

Dim awareness is a state whereby the controller reacts only to a limited set of MODBUS commands. A validly configured running controller can be put into dim awareness. (Master must log in and stop controller first.) After exiting dim awareness, the controller can be restarted, i.e., there is no corruption of the configuration or user logic by this process.

A controller in Safe84 condition typically needs to be configured. Exiting dim awareness puts out the Safe84 indicator LED on some controllers **but this does not bring a Safe84 to a state from which it can be run!** For the controller to be able to run, a valid configuration must be written to it, which is beyond the scope of the P965.

The Clear Dim Awareness Display, Figure 4-18, is entered from the MDAP Normal Connect Display after selecting either STATUS or FUNCTIONS.

Figure 4-18

Clear Dim Awareness
Display

```
.....  
CLEAR.DIM.....  
AWARENESS.....  
Y.....N
```

F1 (Y) — exits from dim awareness and returns to previous menu (STATUS or FUNCTIONS).

F4 (N) — leaves controller in dim awareness and returns to previous menu.

Auto Search Function

After power-up and selection of the MDAP operating mode, if a connect attempt has failed, you may select the Automatic Port Parameter Determination (Auto Search) function.

The P965 tries to establish communications using its existing set of MODBUS port parameter values. If these do not work, then a retry is done with a different set of port parameters.

This is repeated automatically with a different set of parameters until communication is established. The set of port parameters that produces successful communication is then stored as the new default parameters in the P965.

The order of port parameter settings to be tried in order to establish communications is:

1. The current MODBUS port parameters saved in the P965.
2. The default P190 port parameter settings:
 - Slave address 1 to 32
 - 9600 baud
 - Even Parity
 - 1 Stop Bit
 - RTU Mode
3.
 - Slave Address 1 to 32
 - 9600 baud
 - No Parity
 - 2 Stop Bits
 - ASCII Mode
4. All other combinations of slave address, baud rate, parity, stop bits, and mode. The baud rate is set higher at first and all other parameters varied, and then the baud rate is set to the next lower rate and all other parameters varied, in order to expend the least amount of time in the search.

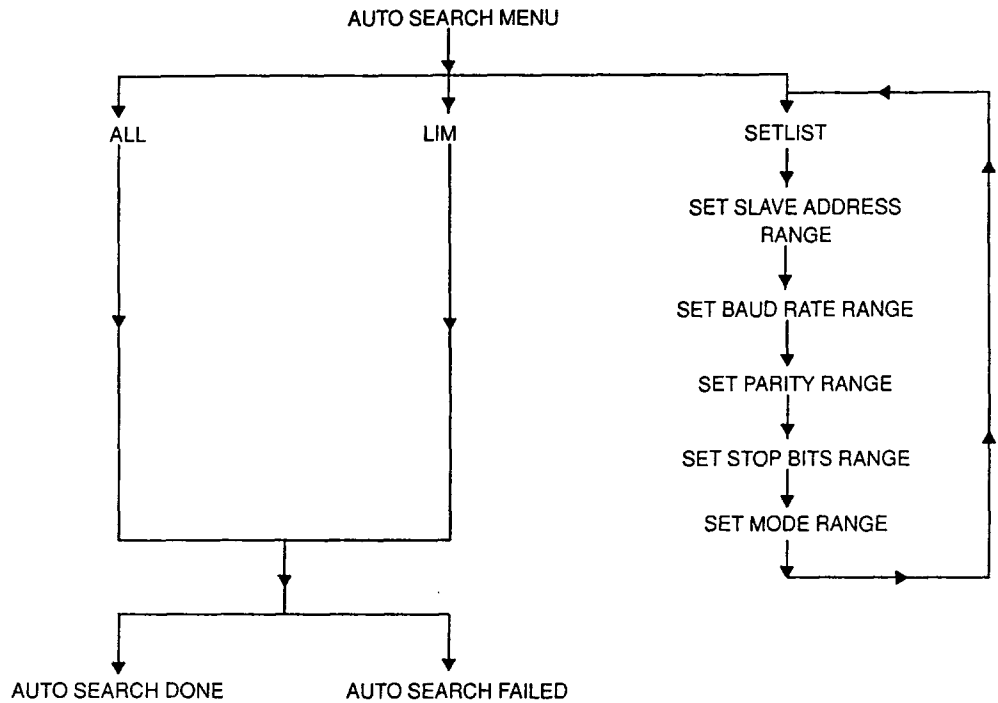
You can limit the scope of this retry activity via the LIMITED search function. Before invoking LIMITED search, select SETLIST to limit the range of values.

For example, although 247 MODBUS slave addresses are possible, they frequently range from 1 to 32. By selecting boundary values before the function is executed, the time required to successfully determine the MODBUS parameters can be greatly reduced.

Figure 4-19 shows the Auto Search Menu Path.

Figure 4-19

Auto Search Menu Path



To invoke the Auto Search function after an MDAP communications timeout error, select the Auto Search Menu, Figure 4-20.

Figure 4-20

Auto Search Menu

```

AUTO . SEARCH . MENU
SRCH . ALL . OR . LIM .
. OR . SET . LIM . LIST
ALL . LIM . SETLIST .
  
```

- F1 (ALL) — attempts to communicate with the controller by varying all possible port parameters.
- F2 (LIM) — attempts to communicate with the controller by varying a user-specified subset of the port parameters.
- F4 (SETL) — chooses a reduced set of MODBUS port parameters for communications with the controller. This key invokes the Set Slave Address Range for Search Display. This display allows you to select a reduced set of port parameters to attempt to communicate with the controller. See Figure 4-21.
- EXIT — returns to the MDAP Connect Communications Timeout Display.

Set Slave Address Range for Search

Pressing F4 (SETL) in the Auto Search Menu invokes the Set Slave Address Range for Search Display (Figure 4-21).

Figure 4-21

Set Slave Address Range
for Search Display

```
AUTO SEARCH LIST
SLV.ADDR.RANGE..
ADDR.MINIMUM=xxx
ADDR.MAXIMUM=yyy
```

- xxx — 3-digit minimum numeric slave address.
- yyy — 3-digit maximum numeric slave address.
- ← (LEFT ARROW) or → (RIGHT ARROW) — toggles the cursor between MINIMUM and MAXIMUM.
- GET NEXT — accepts current values and moves to the next parameter, baud rate.
- EXIT — returns to the Auto Search Menu Display.

Only slave addresses of 1 to 247 are valid.

When shipped, the P965 has a minimum address of 1 and a maximum address of 10. After power-up, this screen displays the values last saved.

The Set Baud Rates for Search Display (Figure 4-22) allows you to set the next parameter, baud rate.

Figure 4-22

Set Baud Rates for Search
Display

```
AUTO SEARCH LIST
BAUD.RATE: .xxxx.
IN.SRCH.LST: .YES
YES.....NO
```

- F1 (YES) — includes this baud rate in the Search list.
- F4 (NO) — omits this baud rate from the Search list.
- ← (LEFT ARROW) — displays the next lower baud rate.
- → (RIGHT ARROW) — displays the next higher baud rate.
- GET NEXT — accepts the current values and moves to the next parameter, parity.
- EXIT — returns to the Auto Search Menu Display.

Each of the 14 supported baud rates is displayed one at a time with an indication that it is or is not in the search list. Use the arrow keys to display lower or higher baud rates.

When shipped, the P965 includes only 9600 baud and 19,200 baud (displayed as 19.2) in this list.

The Set MODBUS Parity Selection for Search Display (Figure 4-23) allows you to select the parity parameter for Auto Search.

Figure 4-23

Set MODBUS Parity
Selection for Search
Display

```
AUTO.SEARCH.LIST  
PARITY:.....xxxx  
SELECT.PARITY...  
EVN.ODD.NONE.ALL
```

xxxx stands for EVEN, ODD, NONE, or ALL.

- F1 (EVN) — EVEN parity only in the search list.
- F2 (ODD) — ODD parity only in the search list.
- F3 (NONE) — NO parity only in the search list.
- F4 (ALL) — ODD, EVEN, and NO parity in the search list.
- GET NEXT — accepts the current values and moves to the next parameter, stop bits.
- EXIT — returns to the Auto Search Menu Display.

When shipped, the P965 defaults to ALL.

The Set Number of Stop Bits for Search Display (Figure 4-24) appears after parity has been selected for Auto Search.

Figure 4-24

Set Number of Stop Bits for
Search Display

```
AUTO.SEARCH.LIST  
STOP BITS:.....x ← 1, 2 stop bits, or both  
SELECT.STOP.BITS  
1...2...BOTH....
```

- F1 (1) — 1 stop bit in the search list.
- F2 (2) — 2 stop bits in the search list.
- F3 (BOTH) — both 1 and 2 stop bits in the search list.
- GET NEXT — accepts the current values and moves to the next parameter, mode.
- EXIT — returns to the Auto Search Menu Display.

When shipped, the P965 defaults to 1 stop bit.

- **NOTE** The configuration of 8 data bits plus parity plus 2 stop bits is not supported.

The Set MODBUS Mode Selection for Search Display (Figure 4-25) appears after the number of stop bits is selected for search.

Figure 4-25

Set MODBUS Mode
Selection for Search
Display

```
AUTO.SEARCH.LIST
MODBUS.MODE:.xxx    ← RTU, ASCII, or both
SELECT.MBUS.MODE
RTU.ASCII.BOTH..
```

- F1 (RTU) — sets mode to RTU in search list.
- F2 (ASCII) — sets mode to ASCII in search list.
- F3 (BOTH) — sets mode to both RTU and ASCII in search list.
- EXIT — returns to the Auto Search Menu Display.

The GET NEXT key provides no function.

When shipped, the P965 defaults to BOTH.

The Auto Search Done Display, Figure 4-26, appears after you press ALL or LIM in the Auto Search Menu.

Figure 4-26

Auto Search Done Display

```
AUTO.SEARCH.DONE
PC.CONNECTED...
NEW.MDAP.PARAMS.
HAVE.BEEN.SET...
```

- GET NEXT — invokes MDAP Normal Connect Display.

Reviewing Port Parameters

To review the new set of port parameters, follow the following procedure.

Procedure How to View Port Parameters

- | | |
|---------------|--|
| Step 1 | Press GET NEXT key. |
| Result | The MDAP Normal Connect Display appears. |
| Step 2 | Press F4 (FUNCTIONS) key. |
| Result | The MDAP Functions Display appears. |
| Step 3 | Press the F3 (COM) key. |
| Result | The MDAP Communications Display appears. |

Step 4 Press the F1 (PORTS) key.

Result The Set PC Port Parameters Display appears.

Step 5 Press any key, F1-F4.

Step 6 Press EXIT key regardless of the display.

Result The Save Port Parameters Display appears.

Step 7 Press F4 (VIEW) key.

Result This sets you up so that you can step your way through the parameters that are in the P965.

If you press the ALL or LIM keys on the Auto Search Menu and the Auto Search is not successful, the Auto Search Failed Display (Figure 4-27) appears.

Figure 4-27

Auto Search Failed Display

```
AUTO . SEARCH . FAIL  
NOT . CONNECTED . . .  
MDAP . PARAMETERS .  
UNCHANGED . . . . .
```

EXIT — returns to the Auto Search Menu Display.

Setting MDAP MODBUS Port Parameters

After you select MDAP operating mode, the P965 automatically attempts to communicate with the controller using current P965 MODBUS port parameters. If the P965 cannot communicate with the controller, the error message in Figure 4-11 appears.

Pressing RETRY (F1) has the P965 repeat its attempt to communicate with the controller. Pressing AUTO (F2) invokes the Auto Search function. This allows the P965 to try different combinations of communication parameters. Pressing MSET (F3) invokes a menu, MDAP MSET Slave Address Select (Figure 4-28), that allows you to set the P965 internal MODBUS parameters.

This allows you to change any/all of the other communication parameters. Whenever you change the MODBUS port parameters, whether by the Auto Search function or with this MSET function, the newly entered parameters become the new power-up default parameters.

Figure 4-28

MDAP MSET Slave Address
Select Display

```
MODBUS.PORT#.1..  
ADDRESS:..nnn..  
CHANGE TO:.*TT..  
.....
```

nnn represents the current MODBUS port address.

- 0-9 — enters new MODBUS slave address, which can be between 1 and 247.
- CLEAR — erases entered data. Allows entry of new data.
- ENTER — saves new slave address in P965 memory.
- GET NEXT — goes to next parameter, baud rate.
- EXIT — returns to MDAP Connect Comm Timeout Display.

You may review the next MODBUS communication parameter, baud rate, with the MDAP MSET Baud Rate Select Display, Figure 4-29.

Figure 4-29

MDAP MSET Baud Rate
Select Display

```
MODBUS.PORT#.1..  
BAUD RATE: ,xxxx.  
CHANGE TO: .TTTT.  
LOWER.....HIGHER
```

xxxx states the current baud rate.

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — selects next higher baud rate.

The baud rates displayed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, or 19.2 (19,200).

Baud rates of 3600 and 7200 are not supported by the P965. This means that the P965 cannot communicate at these baud rates. The P965 does not include 3600 and 7200 in the list of baud rates that can be set for the connected port. The P965 can set non-connected ports to 3600 or 7200 baud. Port parameter changes to a connected port do not take effect until the controller is started.

- ENTER — saves the new baud rate in P965 memory.
- GET NEXT — goes to next parameter, parity.
- EXIT — goes to MDAP Connect Timeout Display.

You may review the next parameter with the MSET MDAP Parity Select Display, Figure 4-30.

Figure 4-30

MDAP MSET Parity Select Display

```
MODBUS.PORT#.1..
PARITY...:xxxx.
CHANGE TO:.TTTT.
ODD.EVEN.NONE...
```

- F1 (ODD) — selects odd parity.
- F2 (EVEN) — selects even parity.
- F3 (NONE) — disables parity.
- ENTER — saves new parameter in P965 memory.
- GET NEXT — goes to next parameter, stop bits.
- EXIT — goes to MDAP Connect Timeout Display.

You may review the number of stop bits with the MDAP MSET Stop Bits Select Display, Figure 4-31.

Figure 4-31

MDAP MSET Stop Bits Select Display

```
MODBUS.PORT#.1..
STOP BITS:.x....
CHANGE TO:.T....
.1...2.....
```

- F1 (1) — selects 1 stop bit.
- F2 (2) — selects 2 stop bits.
- ENTER — saves new parameter in P965 memory.
- GET NEXT — goes to next parameter, mode.
- EXIT — goes to MDAP Connect Timeout Display.

Review the next parameter, mode, with the MDAP MSET RTU/ASCII Mode Select Display, Figure 4-32.

Figure 4-32

MDAP MSET RTU/ASCII Mode Select Display

```
MODBUS.PORT#.1..
MODE:.....xxxxx
CHANGE TO:.TTTTT
RTU.ASCII.....
```

xxxxx in the display states the current mode.

- F1 (RTU) — selects RTU mode.
- F2 (ASCII) — select ASCII mode.

- ENTER — saves new parameter in P965 memory.
- GET NEXT — attempts to communicate with the controller. If successful, invokes MDAP Normal Connect Display. If unsuccessful, invokes MDAP Connect Communications Timeout Display.
- EXIT — goes to MDAP Connect Communications Timeout Display.

884 Passwords

When attaching to an 884 controller with the P965 and the controller is password protected, you must provide a password, using only uppercase A-Z letters or 0-9 numerals.

The level of access granted by the controller for that password is displayed by the P965.

From the MDAP Status or Functions displays, the 884 Enter Password Prompt Display (Figure 4-33) appears.

Figure 4-33

Enter Password Prompt
Display

```

.....
ENTER PASSWORD..
.....
.....

```

- The uppercase A-Z letters, as shown in Figure 4-36, are used to enter the password.
- SET/CLEAR (Figure 4-35) acts as a SHIFT key for keying in the numerals 0-9.
- F1 is used as an ENTER key to end inputting of password characters.
- F4 clears the characters if F1 is not yet pressed.

If the password is accepted by the controller, the access level granted is displayed in the 884 Access Level Display, Figure 4-34.

Figure 4-34

884 Access Level Display

```

.....
LEVEL.n.....
ACCESS.GRANTED..
.....

```

n is a numeral between 1-3 that defines your access level. For further information about these access levels, see the 884 manuals listed in Chapter 1.

Press CLEAR to return to whichever display you entered from, MDAP Functions Display or Status Display,

If access is not granted upon entry of the password, the Invalid Password Display, Figure 4-35, appears. For example:

- If you made an error in entering the password, re-enter with the correct password.
- If the password requires characters other than the uppercase alphabetic characters and numerals available with the P965, change the password with a P190 or an IBM PC.

Figure 4-35

Invalid Password Display

```
884.....  
USER.ERROR.....  
INVALID.....  
PASSWORD.....
```

Press CLEAR to return to the display you entered from, MDAP Functions Display or Status Display.

The layout of the P965 keyboard changes for entry of the 884 password. The top row, ON, F1, F2, F3, F4, and OFF, stays the same. Figure 4-36 shows the standard layout of the rest of the keyboard and Figure 4-37, the 884 password layout.

Compare the standard layout with the password layout. To enter the numerals 0-9, use the SET/CLEAR key on the standard layout as a SHIFT key. For each numeral you enter, press SET/CLEAR and then the desired numeral as shown on the standard layout. This enters that numeral into the password field.

Figure 4-36

Standard Layout of the
P965 Keyboard




NEW DATA	 REF	DETAIL	<u>DEC</u> <u>HEX</u>
NEW REF	A 1	B 2	C 3
GET PREV	D 4	E 5	F 6
GET NEXT	7	8	9
ENTER	SHIFT	0	SHIFT
CLEAR	<u>ENABLE</u> DISABLE	<u>FORCE</u> ON	<u>FORCE</u> OFF
EXIT			<u>SET</u> CLEAR

Figure 4-37

884 Password Layout of the
P965 Keyboard

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P
Q	R	S	T
U	V	W	X
Y	Z		SHIFT

Chapter 5

Reference Access Panel (RAP) Operations

- **Reference Access Panel (RAP) Operations**
- **Overview Display**
- **Detail Display**
- **Memory Display**

Reference Access Panel (RAP) Operations

To gain access to the RAP menu, press F1 (RAP) in the DAP Normal Connect Display or press F1 (RAP) in the MDAP Functions Menu. This invokes the RAP menu, shown in Figure 4-14.

These symbols are used in the displays in this chapter:

- * -- represents current cursor position.
- 6xxxx represents values between 0 and 65,535.
- 9xxx represents values between 0 and 9999.
- Fxxx represents hexadecimal values.

Overview Display

When you press F1 (REF) on the RAP menu, the overview prompt display appears, which is shown in Figure 5-1.

Figure 5-1

Overview Prompt Display

```
ENTER REFERENCE :  
*--- .....  
.....  
.....
```

This prompt display allows you to enter a reference and display its state or value. The following types of references can be displayed:

- Coils (0XXXX) State (on or off, enabled or disabled)
 - Discrete Inputs State (on or off, enabled or disabled)
(1XXXX)
 - Input Registers Value (0 to 9999 decimal, or overflow)
(3XXXX)
 - Output Registers Value (0 to 9999 decimal, or overflow)
(4XXXX)
- **NOTE** 484 controllers have four-digit references, e.g., 0xxx, 1xxx, etc.

The valid keys for this display are the following:

- 0-9 — used to enter the reference number.
- CLEAR — clears the reference number. Allows entry of another number.

- ENTER — accepts the value and invokes the overview display.
- EXIT — returns to the RAP menu.

Some Typical Overview Displays

Pressing ENTER in the overview prompt display invokes the overview display. A typical overview display (Figure 5-2) may use all four lines on the screen.

Figure 5-2

Typical Overview Display

```
>0xxxx= .OFF .ENBL
.1xxxx= .ON .DSBL
.3xxxx=9xxx.....
.4xxxx=9xxx.....
```

The right arrow, which appears in the left most column, indicates the 'active' line. You may alter only the active line. If you select a detail display, it shows the active line.

The overview display can present inputs, coils, input registers, and holding registers. Data values are always displayed as decimal values between 0 and 9999. Values outside the range of 0 to 9999 are displayed as the literal "OVFL." For 484's, values outside the range of 0 to 999 are displayed as "OVFL."

A typical overview display for either a discrete input or output, invoked via the overview display prompt, is shown in Figure 5-3.

Figure 5-3

Typical Discrete Overview Display

```
>Dxxxx= .OFF .ENBL
.Dxxxx= .ON .DSBL
.....
.....
```

D in Figure 5-3 can be either 0 or 1.

- ENABLE/DISABLE — writes an enable or disable change to the controller.
- FORCE ON — attempts to force a disabled discrete on within the controller.
- FORCE OFF — attempts to force a disabled discrete off within the controller.
- GET PREV — displays the previous reference.
- GET NEXT — displays the next reference.

- REF — moves the line selector up one line or wraps to the bottom line.
- NEW REF — clears current line. Allows entry of a new reference.
- EXIT — returns to the RAP menu.

Figure 5-4 shows a typical overview display for an input register, invoked via the overview display prompt.

Figure 5-4
Typical Input Register
Overview Display

```
>3xxxx=9xxx.....
.3xxxx=0VFL.....
.....
.....
```

- GET PREV — displays the previous reference.
- GET NEXT — displays the next reference.
- DETAIL — displays the current line in the detail display format.
- NEW REF — clears current line. Allows entry of a new reference.
- REF — moves the line selector up one line or wraps it to the bottom line.
- EXIT — returns to the RAP menu.

► **NOTE** You cannot alter the contents of input registers through the P965.

Figure 5-5 shows a typical overview display for a holding register, invoked via the overview display prompt.

Figure 5-5
Holding Register Display

```
>4xxxx=9xxx.....
.4xxxx=0VFL.....
.....
.....
```

- NEW DATA — displays the Holding Register Data Entry Prompt (Figure 5-6).
- GET PREV — displays the previous reference.
- GET NEXT — displays the next reference.
- DETAIL — displays the current line in detail display format.
- NEW REF — clears current line. Allows entry of a new reference.
- REF — moves the line selector up one line or wraps to the bottom line.
- EXIT — returns to the RAP menu.

Holding Register Data Entry Prompt Display You may use this display (Figure 5-6) to enter new data into a holding register. You can call up this display by pressing the NEW DATA key in the Holding Register Display.

Figure 5-6

Holding Register Data Entry Prompt Display

```
>4xxxx=9xxx.*---
.....
.....
.....
```

- 0-9 keys — enters new register data.
 - CLEAR — erases entered data. Allows data re-entry.
 - ENTER — writes new register value to controller. Then resume normal overview display operation.
 - EXIT — returns to the RAP menu.
- **NOTE** The register data entry mode is valid only for 4xxxx reference numbers.

Detail Display

To access the detail display, press F2 (DTL) in the RAP menu. This invokes the Detail Prompt Display, which is described below.

Detail Prompt Display This display allows you to specify the register number for a detail display. Figure 5-7 shows this display.

Figure 5-7

Detail Prompt Display

```
ENTER REGISTER:..
*---.....
.....
.....
```

- 0-9 — used to enter the register number.
 - CLEAR — erases register number. Allows re-entry.
 - ENTER — invokes detail display.
 - REF — invokes overview display.
 - EXIT — returns to the RAP menu.
- **NOTE** Only 3xxxx and 4xxxx reference numbers are valid.

Typical Detail Displays

Detail displays can be entered via the detail display prompt or from an overview display by pressing the DTL key.

The up arrow indicates which bit of the binary value is modified when the SET/CLEAR key is pressed. The number of this bit is shown following the bit indicator on the display. The bits are numbered from 1 to 16 with 1 as the left most bit and 16, the right most bit. If an attempt is made to position the up arrow past the end positions of the display, the arrow wraps horizontally to the other end.

Typical Detail Display (Decimal Mode, Bit Entry) This example is shown in Figure 5-8.

Figure 5-8

Typical Detail Display
(Decimal Mode, Bit Entry)

```
4xxxx=6xxxx.DEC.  
bbbbbbbbbbbbbbbb  
.....  
BIT.xx.....
```

- LEFT ARROW and RIGHT ARROW keys — position bit-select indicator.
 - SET/CLEAR — sets or clears the selected bit.
 - NEW DATA — selects decimal data entry mode.
 - DEC/HEX — changes to or from decimal and hexadecimal.
 - GET PREV — displays the previous register.
 - GET NEXT — displays the next register.
 - NEW REF — clears the display and returns to the detail prompt display.
 - REF — invokes the overview display.
 - EXIT — returns to the RAP menu.
- **NOTE** The bit set mode is valid only for 4xxxx reference numbers.

A typical sequence is as follows:

1. Press the SET/CLEAR key.
2. This sets the currently selected bit on or off as appropriate. (The display is not altered at this point.)
3. The data is automatically re-read for the controller, and both the decimal and bit displays are updated.

Typical Detail Display (Decimal Mode, Decimal Entry) This example is shown in Figure 5-9.

Figure 5-9

Typical Detail Display
(Decimal Mode, Decimal
Entry)

```
4xxxx=6xxxx.DEC.
bbbbbbbbbbbbbbbb
.....
.....*----
```

- 0-9 — used to enter register data.
 - CLEAR — erases entered data. Allows entry of new data.
 - ENTER — writes new register data to the controller and returns to bit entry mode.
 - DEC/HEX — changes display/entry mode from decimal to hexadecimal.
 - GET PREV — displays previous register.
 - GET NEXT — displays next register.
 - NEW REF — clears the display and returns to the detail prompt display.
 - REF — invokes overview display format.
 - EXIT — returns to the RAP menu.
- **NOTE** The bit set mode is valid only for 4xxxx reference numbers.

In detail displays the following sequence should occur when the first decimal digit or hexadecimal character is entered.

1. The operator-entered data appears in the display.
2. The write data request is serviced after the ENTER key is pressed.
3. The new data is re-read and displayed in decimal (or hexadecimal) and binary.
4. The display is cleared.

Typical Detail Display (Hexadecimal Mode, Bit Entry) This example is shown in Figure 5-10.

Figure 5-10

Typical Detail Display,
Hex Mode Bit Entry

```
4xxxx=Fxxx.HEX..
bbbbbbbbbbbbbbbb
.....
BIT.XX.....
```

- ← (LEFT ARROW) and → (RIGHT ARROW) — position bit-selection indicator.
- SET/CLEAR — sets or clears selected bit.

- NEW DATA — selects hexadecimal mode.
 - DEC/HEX — changes display from hexadecimal to decimal.
 - GET PREV — displays previous register.
 - GET NEXT — displays next register.
 - NEW REF — clears display and returns to detail display prompt.
 - REF — invokes overview display format.
 - EXIT — returns to the RAP menu.
- **NOTE** The bit set mode is valid only for 4xxxx reference numbers.

Typical Detail Display (Hexadecimal Mode, Hexadecimal Entry) This example is shown in Figure 5-11.

Figure 5-11

Typical Detail Display
(Hex Mode Hex Entry)

```

4xxxx=Fxxx.HEX..
bbbbbbbbbbbbbbbb
.....
.....*----

```

- 0-9 and A-F — used to enter register data.
 - CLEAR — erases entered data. Allows entry of new data.
 - ENTER — writes new register data to controller and returns to bit entry mode.
 - DEC/HEX — changes display/entry mode from hexadecimal to decimal.
 - GET PREV — displays previous register.
 - GET NEXT — displays next register.
 - NEW REF — erases display and returns to detail prompt display.
 - REF — invokes overview display format.
 - EXIT — returns to RAP menu.
- **NOTE** Data entry mode is valid only for 4xxxx reference numbers.

Typical Detail Display (Decimal/Binary Mode) This example is shown in Figure 5-12.

Figure 5-12

Typical Detail Display
(Decimal/Binary Mode)

```
3xxxx=6xxxx.DEC.  
bbbbbbbbbbbbbbbb  
.....  
BIT.xx.....
```

- LEFT ARROW and RIGHT ARROW — position bit-select indicator.
 - DEC/HEX — changes display from decimal to hexadecimal.
 - GET PREV — displays previous register.
 - GET NEXT — displays next register.
 - NEW REF — clears display and returns to detail prompt display.
 - REF — invokes overview display format.
 - EXIT — returns to RAP menu.
- **NOTE** The contents of input registers cannot be altered through the P965. The bit-select indicator and the bit number display are active, but the SET/CLEAR key is disabled.

Typical Detail Display (Hexadecimal/Binary Mode) This example is shown in Figure 5-13.

Figure 5-13

Typical Detail Display
(Hex/Binary Mode)

```
3xxxx=6xxxx.HEX.  
bbbbbbbbbbbbbbbb  
.....  
BIT.xx.....
```

- LEFT ARROW and RIGHT ARROW — position bit-select indicator.
 - DEC/HEX — changes display from hexadecimal to decimal.
 - GET PREV — displays previous register.
 - GET NEXT — displays next register.
 - NEW REF — clears display and returns to detail prompt display.
 - EXIT — returns to RAP menu.
- **NOTE** The contents of input registers cannot be altered through the P965. The bit-select indicator and the bit number display are active, but the SET/CLEAR key is disabled.

Memory Display

To access the memory display, press F3 (MEM) on the RAP menu. This invokes the Memory Prompt Display (Figure 5-14).

Figure 5-14

Memory Prompt Display

```
ENTER ADDRESS: ..  
*----- ..  
.....  
.....
```

- 0-9 — used to enter memory address.
 - CLEAR — erases memory address. Allows re-entry.
 - ENTER — accepts the entered value and goes to the memory display.
 - EXIT — returns to RAP menu.
- **NOTE** Only memory addresses (3xxxxx numbers) are valid.

Some Typical Memory Displays

Typical Memory Display (Decimal/Binary Mode) This example is shown in Figure 5-15.

Figure 5-15

Typical Memory Display
(Decimal/Binary Mode)

```
3xxxxx=6xxxx.DEC  
bbbbbbbbbbbbbbbb  
.....  
BIT.xx.....
```

- LEFT ARROW and RIGHT ARROW — position bit-select indicator.
 - DEC/HEX — changes display from decimal to hexadecimal.
 - GET PREV — displays previous memory address.
 - GET NEXT — displays next memory address.
 - NEW REF — clears display and returns to memory prompt display.
 - EXIT — returns to RAP menu.
- **NOTE** The contents of memory addresses cannot be altered through the P965. The bit-select indicator and the bit number display are active, but the SET/CLEAR key is disabled.

Typical Memory Display (Hexadecimal/Binary Mode) This example is shown in Figure 5-16.

Figure 5-16

Typical Memory Display
(Hex/Binary Mode)

```
3xxxxx=6xxxx.HEX
bbbbbbbbbbbbbbbb
.....
BIT.xx.....
```

- LEFT ARROW and RIGHT ARROW — position bit-select indicator.
- DEC/HEX — changes display from hexadecimal to decimal.
- GET PREV — displays previous memory address.
- GET NEXT — displays next memory address.
- NEW REF — clears display and returns to memory prompt display.
- EXIT — returns to RAP menu.

Chapter 6

Command (CMD) Operations

- **Command (CMD) Access**
- **Starting a Controller**
- **Stopping a Controller**

Command (CMD) Access

To gain access to the CMD menu, go to the DAP normal connect menu or the MDAP functions menu and press F2 (CMD). The EXIT key is used to return to the main menu from the command menu, or to get to the command menu from a lower level.

The display presented depends upon the status of the controller (running or stopped) and the setting of the memory-protect key (on or off).

Starting a Controller

To start the controller, select F2 (CMD) from either the DAP main menu or the MDAP function menu. This invokes the CMD Menu Display, which is shown in Figure 6-1.

Figure 6-1

Command Menu Display

```
TTT.CMD.MENU....  
STATUS: .SSSSSS.  
MEM.PROTECT: .MMM  
CCCCC.....
```

TTT — The controller type, e.g., 984.

SSSSSS — Running or stopped. The status line indicates whether the controller is RUNNING or STOPPED.

MMM — Off or on. The third line indicates if the memory-protect function is on or off. If memory-protect is on, the controller cannot be started or stopped or have its contents modified.

CCCCC — Start or stop command. (Not displayed if memory-protect is on.)

- F1 — starts or stops the controller.
- EXIT — returns to the DAP main menu or the MDAP functions menu.

The start request invokes a display (Figure 6-2) that requires a confirmation of the request.

Figure 6-2

Confirming Start Display

```
TTT.CMD.MENU....  
START.REQUESTED.  
.....  
....CONF....CNCL
```

- F2 (CONF) — issues the start command to the controller.
- F4 (CNCL) — cancels and returns to the CMD menu.
- EXIT — returns to the DAP main, or MDAP functions, menu.

Stopping a Controller

To stop the controller, select F2 (CMD) from either the DAP main menu or the MDAP function menu. This invokes the CMD menu display, which is shown in Figure 6-1.

The stop request invokes the display (Figure 6-3) that requires a confirmation of the request.

Figure 6-3

Confirming Stop Display

```
TTT.CMD.MENU....  
STOP.REQUESTED..  
.....  
....CONF....CNCL
```

- F2 (CONF) — issues the stop command to the controller.
- F4 (CNCL) — cancels and returns to the CMD menu.
- EXIT — returns to the DAP main, or MDAP functions, menu.

Chapter 7

Communication (COM) Operations

- **Communication (COM) Functions**
- **DAP Mode Communication Menu Path**
- **Setting Communication Parameters in DAP Mode**
- **MDAP Mode Selection Path**
- **Setting Communication Parameters in MDAP Mode**
- **MODBUS Plus Networks**

Communications (COM) Functions

In controllers that have both an ASCII/DAP port and MODBUS ports, the P965 may connect to either type port to read or set communications parameters. The P965 can read these parameters while connected, but it must be attached to set communication parameters if connected to a MODBUS port.

The P965 may change port parameters for MODBUS ports or ASCII ports when connected to either the ASCII/DAP port or a MODBUS port.

DAP or MDAP Mode

You may choose either DAP mode if connected to an ASCII/DAP port or MDAP (MODBUS) mode if connected to a MODBUS port after power-up. For the RAP and the CMD functions, the choices are equivalent. However, two significant differences exist when selecting communications (COM) functions. One difference is single entry or batch entry of parameter changes; the other difference involves the Auto Search function.

Single Entry or Batch Entry In DAP mode, each parameter change is written immediately to the controller. In MDAP mode, each parameter change is stored temporarily in the P965. The entire set of new parameters is written to the controller in one step and the controller then performs a series of validity checks. This takes approximately the same amount of time to perform as it takes to start the controller. In MDAP mode, the new parameters written to the controller for the connected port do not take effect until the controller is restarted. In DAP mode, and for non-connected ports in MDAP mode, the changes take effect immediately.

P965 Auto Search In the MDAP mode only, you have access to the Auto Search feature. This allows you to automatically connect by varying P965 communication parameters until they match those of the connected port. This can involve varying all parameters or defining a limited list within which the search is conducted. The Auto Search function is described in Chapter 4.

Default Communication Parameters

Upon power-up, the P965 automatically retrieves the communication parameters that are saved from the previous P965 session.

The ASCII/DAP port can be viewed as two ports exiting the controller through a single connector. The P965, operating in DAP mode, communicates always at the fixed parameters shown in Table 3-1.

Table 7-1

DAP Mode Default
Communication Parameters

Parameter	Default Value
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1

The ASCII parameters are for ASCII devices (e.g., CRT's) connected to the ASCII/DAP port. These devices operate at variable port parameters, and thus the P965 has the capability of varying these simple ASCII parameters. Changing the ASCII port parameters does not change the ability of the P965 to communicate in DAP mode, since the controller's "DAP" port parameters remain fixed.

Initially, the default communication parameters in MDAP mode connected to a MODBUS port are (see Table 3-2):

Table 7-2

MDAP Mode Default
Communication Parameters

Parameter	Default Value
ASCII/RTU Mode	RTU
Baud Rate	9600
No. of Stop Bits	1
Parity	Even
No. of Data Bits	8
Slave Address	1
Delay (in 10ms increments)	1

These are the same as the P190 default parameters. This default setting changes whenever you modify them through the MSET option, whenever a new set of port parameters is saved by the P965, or whenever they change as a result of the Auto Search function.

The P965 saves a new set of port parameters in its NVRAM whenever successful communication is established to a controller at port parameters different from what had been previously saved in the P965.

Upon power-up, the P965 attempts to connect using the parameter values saved from the last session. If this fails, the above P190 default parameters are used, with the slave address varying from 1 to 32. If this fails, the P965 tries to connect in ASCII mode, 9600 baud, no parity, two stop bits, addresses 1 to 32. If these parameters fail to produce a normal connect, the connect failure display appears. Then you must either use the Auto Search option to establish communications or set the correct port parameters via the MSET option.

In all instances, the communication parameters in effect at each power-down become the default parameters at the next power-up.

Unsupported Communications Parameter Combinations

The P965 does not support the following port parameter combinations:

- RTU mode, (eight data bits), parity, two stop bits
- ASCII mode, (seven data bits), one stop bit, no parity

All other port parameter combinations are supported unless noted below.

984-380: Two Stop Bits The 984-380 requires two stop bits in ASCII mode, even parity.

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.

The P965 can read baud rates of 3600 or 7200 on MODBUS ports other than the connected port. It can change the baud rate on a NON-connected port to 3600 or 7200. However, it cannot change the baud rate to 3600 or 7200 on a connected port.

Micro84 Port Parameters These can be displayed, but not modified.

484 Port Parameters These can neither be displayed nor modified.

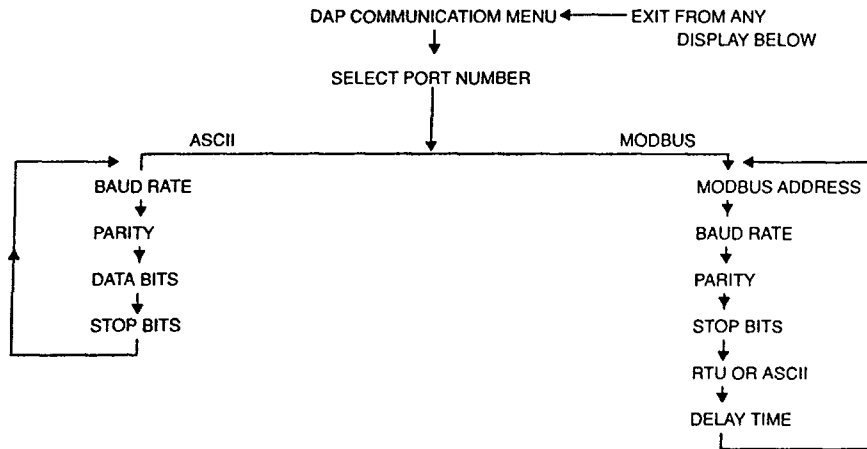
884 Port Parameters You may modify the parameters only of the port to which you are connected.

DAP Mode Communication Menu Path

Figure 7-1 shows the menu path that allows you to set communication parameters in the DAP mode for both ASCII/DAP and MODBUS ports.

Figure 7-1

DAP Mode Communication Menu Path



Setting Communication Parameters in DAP Mode

If, after power-up, you select DAP mode and then go to the communications function, the DAP Communications Menu (Figure 7-2) appears.

To gain access to the COM menu from the DAP Normal Connect Menu, press F3 (COM). This invokes the DAP Communication Menu Display (Figure 7-2).

Figure 7-2

DAP Communication Menu Display

```

    984.COMM.MENU...
    .....
    MP1.MP2..MP3.AP1
    .....
  
```

- F1 (MP1) — sets communication parameters for MODBUS port 1.
- F2 (MP2) — sets communication parameters for MODBUS port 2.
- F3 (MP3) — sets communication parameters for MODBUS port 3.

Pressing F1, F2, or F3 takes you to the MODBUS Port Address Selection Display.

The procedure for setting port parameters is identical for all three MODBUS ports.

- F4 (AP1) — sets communication parameters for the ASCII port. This takes you to the DAP ASCII Port Baud Rate Selection Display.
- EXIT — returns to the DAP Communications Menu.

DAP Mode MODBUS Port Display

Press F1, F2, or F3 on the DAP Communication Menu to display the MODBUS port parameters. This invokes the MODBUS Port Address Selection Display (Figure 7-3).

Figure 7-3

MODBUS Port Address
Selection Display

```
MODBUS . PORT# . 1 . .  
ADDRESS : . . . xxx . .  
CHANGE . TO : . * - - . .  
.....
```

- 0-9 — used to enter the new MODBUS slave address.
- CLEAR — erases entered data. Allows entry of new data.
- ENTER — writes the new slave address to the MODBUS port.
- GET NEXT — goes to the next parameter, baud rate.
- EXIT — returns to the DAP Communication Menu.

After you press GET NEXT on the port address selection display, the MODBUS Baud Rate Selection Display appears (Figure 7-4).

Figure 7-4

MODBUS Baud Rate
Selection Display

```
MODBUS . PORT# . 1 . .  
BAUD . RATE : . xxxx .  
CHANGE . TO : . ---- .  
LOWER . . . . . HIGHER
```

The baud rates displayed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19,200.

- **NOTE** Baud rates of 3600 and 7200 are not supported by the P965. This means the P965 cannot communicate at these rates, but it can change the baud rate of any port (except the one to which it is connected) to these rates. In MDAP mode, port parameter changes to a connected port do not take effect until the controller is started.

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — selects next higher baud rate.
- ENTER — writes new baud rate to MODBUS port.
- GET NEXT — goes to next parameter, parity.
- EXIT — returns to DAP Communications menu.

After you press GET NEXT on the baud rate selection display, the MODBUS Parity Selection Display (Figure 7-5) appears.

Figure 7-5

MODBUS Parity Selection Display

```
MODBUS . PORT# . 1 . .
PARITY . . . . : .xxxx .
CHANGE . TO : .---- .
ODD . EVEN . NONE . . .
```

xxxx represents parity, which is displayed as ODD, EVEN, or NONE.

- F1 (ODD) — selects ODD parity.
- F2 (EVEN) — selects EVEN parity.
- F3 (NONE) — disables parity.
- ENTER — writes new parity parameter to MODBUS port.
- GET NEXT — goes to next parameter, stop bits.
- EXIT — returns to DAP Communications Menu.

After you press GET NEXT on the parity selection display, the MODBUS Stop Bit Selection Display appears (Figure 7-6).

Figure 7-6

MODBUS Stop Bit Selection Display

```
MODBUS . PORT# . 1 . .
STOP . BITS : .x . . . .
CHANGE . TO : .- . . . .
.1 . . . . 2 . . . . . . . . . .
```

x represents stop bits, which are displayed as 1 or 2.

- F1 (1) — sets 1 stop bit.
- F2 (2) — sets 2 stop bits.
- ENTER — writes new stop bit parameter to MODBUS port.
- GET NEXT — goes to next parameter, mode.
- EXIT — returns to DAP Communications Menu.

After you press GET NEXT on the stop bit selection display, the MODBUS Mode Selection Display appears (Figure 7-7).

Figure 7-7

MODBUS Mode Selection
Display

```
MODBUS.PORT#.1..  
MODE:.....xxxxx  
CHANGE.TO:.-....  
RTU.ASCII.....
```

xxxxx represents mode, which is displayed as RTU or ASCII.

- F1 (RTU) — selects RTU mode.
- F2 (ASCII) — selects ASCII mode.
- ENTER — writes new mode to the MODBUS port.
- GET NEXT — goes to next parameter, delay time.
- EXIT — returns to DAP Communications Menu.

After you press GET NEXT on the mode selection display, the MODBUS Delay Time Selection Display appears (Figure 7-8).

Figure 7-8

MODBUS Delay Time
Selection Display

```
MODBUS.PORT#.1..  
DELAY.TIME:.xx..  
CHANGE.TO:..*-..  
.....
```

xx represents delay time, which is displayed in multiples of 10 milliseconds.

- 0-9 — used to enter new delay time, in multiples of 10 milliseconds, up to a maximum of 200 milliseconds. Range is 1 — 20.
- CLEAR — erases entered data. Allows entry of new data.
- ENTER — writes new delay time to MODBUS port.
- GET NEXT — goes to MODBUS port address display.
- EXIT — returns to DAP Communications Menu.

DAP Mode ASCII Port Definition

The procedure for setting ASCII port parameters is similar to that for the MODBUS ports.

Press F4 on the DAP Communications Menu to begin setting up the ASCII port parameters. This invokes the ASCII Port Baud Rate Selection Display (Figure 7-9).

Figure 7-9

ASCII Port Baud Rate
Selection Display

```
ASCII.PORT#.1...  
BAUD.RATE:.xxxx.  
CHANGE.TO:-----  
LOWER.....HIGHER
```

xxxx represents the baud rates. The rates displayed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19.2 (19,200).

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — sets next higher baud rate.
- ENTER — writes new baud rate to ASCII port.
- GET NEXT — goes to next parameter, parity.
- EXIT — returns to DAP Communications menu.

After you press GET NEXT in the ASCII Baud Rate Display, the ASCII Parity Selection Display (Figure 7-10) appears.

Figure 7-10

ASCII Parity Selection
Display

```
ASCII.PORT#.1...  
PARITY...:xxxx.  
CHANGE.TO:-----  
ODD.EVEN.NONE...
```

xxxx represents parity, which is displayed as ODD, EVEN, or NONE.

- F1 (ODD) — sets ODD parity.
- F2 (EVEN) — sets EVEN parity.
- F3 (NONE) — disables parity.
- ENTER — writes new parity to ASCII port.
- GET NEXT — goes to next parameter, data bits.
- EXIT — returns to DAP Communications Menu.

After you press GET NEXT in the ASCII Parity Select Display, the ASCII Data Bit Selection Display appears (Figure 7-11).

Figure 7-11

ASCII Data Bit Selection
Display

```
ASCII.PORT#.1...
DATA.BITS:.x....
CHANGE.TO:.-....
.7...8.....
```

x represents the number of data bits, which is displayed as 7 or 8.

- F1 (7) — selects 7 data bits.
- F2 (8) — selects 8 data bits.
- ENTER — writes new data bit parameter to ASCII port.
- GET NEXT — goes to next parameter, stop bits.
- EXIT — returns to DAP Communications Menu.

After you press GET NEXT in the ASCII Data Bit Display, the ASCII Stop Bit Selection Display appears (Figure 7-12).

Figure 7-12

ASCII Stop Bit Selection
Display

```
ASCII.PORT#.1...
STOP.BITS:.x....
CHANGE.TO:.-....
.1...2.....
```

x represents the number of stop bits, which is displayed as 1 or 2.

- F1 (1) — selects 1 stop bit.
- F2 (2) — selects 2 stop bits.
- ENTER — writes new stop bit parameter to ASCII port.
- GET NEXT — goes to baud rate display.
- EXIT — returns to DAP Communications Menu.

You have now reviewed all of the ASCII port parameters in the DAP mode.

MDAP Mode Selection Path

After power-up, you can select MDAP mode, which invokes the MDAP Normal Connect Display. This allows you to go to the Functions Menu and select the MDAP Communications Menu.

From the MDAP Communications Menu you can set the Auto Off function or set parameters for either MODBUS or ASCII/DAP ports. Furthermore, MDAP mode offers you the Auto Search function.

The MDAP mode brings you first to the Set Port Parameters Menu and to the Auto Off Menu. The Set Port Parameters Menu allows you to choose one of the MODBUS ports or the ASCII/DAP port on your controller. Alternatively, you may go to the Auto Off Menu to select the automatic power-off time setting.

Figure 7-13 shows the MDAP mode communications menu path that takes you to the point where you choose between MODBUS and ASCII/DAP port communication parameters.

Figure 7-13

MDAP Menu Path to ASCII
or MODBUS

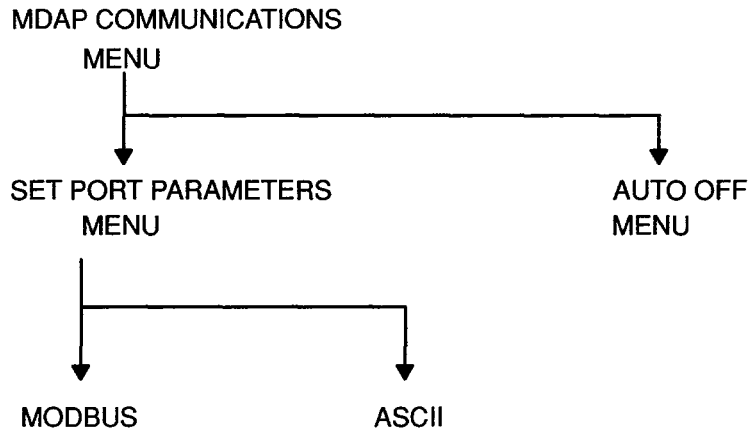


Figure 7-14, MDAP Communications Menu Display, is entered from the MDAP Functions Display. This menu allows you to choose between setting the Auto Off function or continuing to the communications menus.

Figure 7-14

MDAP Communications
Menu Display

```
MDAP.PORTS.MENU.  
.....  
SELECT:.....  
PORTS...AUTO.OFF
```

- F1 (PORTS) — invokes Set PC Port Parameters Menu.
- F4 (AUTO OFF) — invokes MDAP Auto Off Display.
- EXIT — returns to MDAP Functions Display.

MDAP Auto Off Display

The Auto Off feature allows you to save battery life in the P965 by setting the time to automatically turn the unit off after an interval of no keyboard activity. The MDAP Auto Off Display, Figure 7-15, allows you to set this time interval.

Figure 7-15

MDAP Auto Off Display

```
MDAP.MSET.MENU..  
POWER-OFF:....25  
CHANGE.TO:.....  
NONE..5..15..25.
```

In this example, the power-off time is displayed as 25.

- F1 (NONE) — no automatic power-down.
- F2 (5) — automatic power-down after 5 minutes of no keyboard entry.
- F3 (15) — automatic power-down after 15 minutes of no keyboard entry.
- F4 (25) — automatic power-down after 25 minutes of no keyboard entry.
- EXIT — returns to MDAP Communications Menu.

Setting Communication Parameters in MDAP Mode

The Set PC Port Parameters Display, Figure 7-16, allows you to select the port for which you shall set communication parameters.

Figure 7-16

Set PC Port Parameters
Display

```
MDAP . PORTS . . MENU
.....
SELECT : .....
MP1 . MP2 . MP3 . AP1 .
```

- F1 (MP1) — sets parameters for MODBUS Port 1.
- F2 (MP2) — sets parameters for MODBUS Port 2.
- F3 (MP3) — sets parameters for MODBUS Port 3.

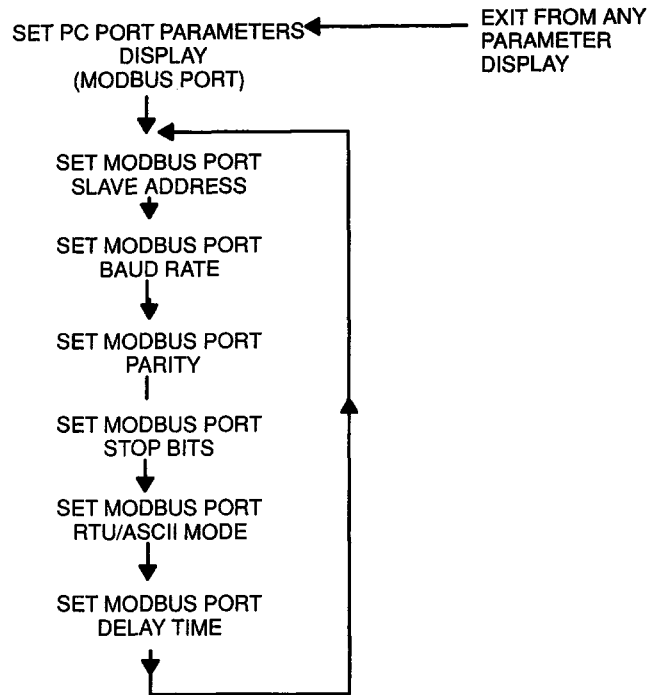
Pressing F1, F2, or F3 invokes the PC MODBUS Port Address Select Display.

- F4 (AP1) — sets parameters for the ASCII port. This takes you to the Simple/Remote ASCII Type Select Display.
- ▶ **NOTE** When detached (DET), the port parameter change screens display the top two lines only. These show the parameter value. The screens do not show the bottom two lines, which show CHANGE TO: and a prompt for you to enter the new value.
- EXIT — returns to MDAP Communications Menu.

The MDAP MODBUS Port Menu Path, Figure 7-17, shows the MODBUS port parameters in MDAP mode.

Figure 7-17

MDAP MODBUS Port Menu
Path



Setting MDAP MODBUS Port Parameters

When you select F1, F2, or F3 on the Set PC Port Parameters Menu, the Set MODBUS Port Slave Address Menu (Figure 7-18) appears.

Figure 7-18

MODBUS Port Slave
Address Selection Display

```
MODBUS . PORT# . 1 . .  
ADDRESS : . . . xxx . .  
CHANGE . TO : . . *-- .  
.....
```

xxx represents the slave address, which is displayed as a number between 1 and 247.

- 0-9 — used to enter new MODBUS slave address.
- CLEAR — erases entered data. Allows entry of new data.
- ENTER — stores new slave address in the P965.
- GET NEXT — goes to next parameter, baud rate.
- EXIT — goes to Save Port Parameters Menu.

The MODBUS Baud Rate Selection Display, Figure 7-19, allows you to set the baud rate.

Figure 7-19

MODBUS Baud Rate
Selection Display

```
MODBUS . PORT# . 1 . .  
BAUD . RATE : . xxxx .  
CHANGE . TO : . ---- .  
LOWER . . . . . HIGHER
```

xxxx represents the baud rate, which is displayed as 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 200, 2400, 3600, 4800, 7200, 9600, or 19,200.

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — selects next higher baud rate.
- ENTER — stores the change in the P965.
- GET NEXT — goes to next parameter, parity.
- EXIT — goes to Save Port Parameters Menu.

The MODBUS Parity Selection Display, Figure 7-20, allows you to select the parity parameter.

Figure 7-20

MODBUS Parity Selection
Display

```
MODBUS . PORT# . 1 . .  
PARITY : . . . . . xxxx .  
CHANGE . TO : . ---- .  
ODD . EVEN . NONE . . .
```

xxxx represents parity, which is displayed as ODD, EVEN, or NONE.

- F1 (ODD) — selects odd parity.
- F2 (EVEN) — selects even parity.
- F3 (NONE) — disables parity on this port.
- ENTER — stores the change in the P965.
- GET NEXT — bring up next parameter, stop bits.
- EXIT — goes to Save Port Parameters Menu.

The MODBUS Stop Bit Selection Display, Figure 7-21, allows you to set the stop bits for this port.

Figure 7-21

MODBUS Stop Bit Selection
Display

```
MODBUS.PORT#.1..  
STOP.BITS:.x....  
CHANGE.TO:.-....  
.1...2.....
```

x represents stop bits, which are displayed as 1 or 2.

- F1 (1) — sets 1 stop bit.
- F2 (2) — sets 2 stop bits.
- ENTER — stores the change in the P965.
- GET NEXT — invokes next parameter, RTU or ASCII mode.
- EXIT — goes to Save Port Parameters Menu.

The MODBUS Mode Selection Display, Figure 7-22, allows you choose either RTU or ASCII mode.

Figure 7-22

MODBUS Mode Selection
Display

```
MODBUS.PORT#.1..  
MODE:.....xxxxx  
CHANGE.TO:.-....  
RTU.ASCII.....
```

xxxxx represents mode, RTU or ASCII.

- F1 (RTU) — selects RTU mode.
- F2 (ASCII) — selects ASCII mode.
- ENTER — stores the change in the P965.
- GET NEXT — goes to next parameter, delay time.
- EXIT — goes to Save Port Parameters Menu.

The MODBUS Delay Time Selection Display, Figure 7-23, allows you to select the delay time.

Figure 7-23

MODBUS Port Delay Time
Select Display

```
MODBUS.PORT#.1..  
DELAY.TIME:.xx..  
CHANGE.TO:.*-..  
.....
```

xx represents delay time (in multiples of 10 ms), displayed as a number between 1 and 20.

- 0-9 — used to enter new delay time.
- CLEAR — erases entered data. Allows entry of new data.
- ENTER — stores the change in the P965.
- GET NEXT — goes to MODBUS Address Select Display.
- EXIT — goes to Save Port Parameters Menu.

This completes the setting of the MODBUS port parameters in the P965. With the Save Port Parameters Menu (Figure 7-24), you can review these changes, and then either discard these changes or write them to the controller.

Figure 7-24

Save Port Parameters
Menu

```

PORT.PARAMETER..
CHANGES.COMPLETE
.....
QUIT.SAVE...VIEW

```

- F1 (QUIT) — quits this display without saving changes. Returns to MDAP Communications Menu.
 - F2 (SAVE) — enters modified parameters into the controller. Returns to MDAP Communications Menu.
 - F4 (VIEW) — returns to your initial display, MODBUS Slave Address Select Display, Simple ASCII Baud Rate Select Display, or Remote ASCII Baud Rate Select Display. This allows you to review the temporary new settings. They are lost if you select QUIT; they are written to the controller if you select SAVE.
- **NOTE** When you modify the parameters of the connected MODBUS port, the P965 automatically revises its own parameters to match those of the port in order to maintain communications with the controller. These updated parameters are then saved as the new default parameters.

Setting MDAP ASCII Port Parameters

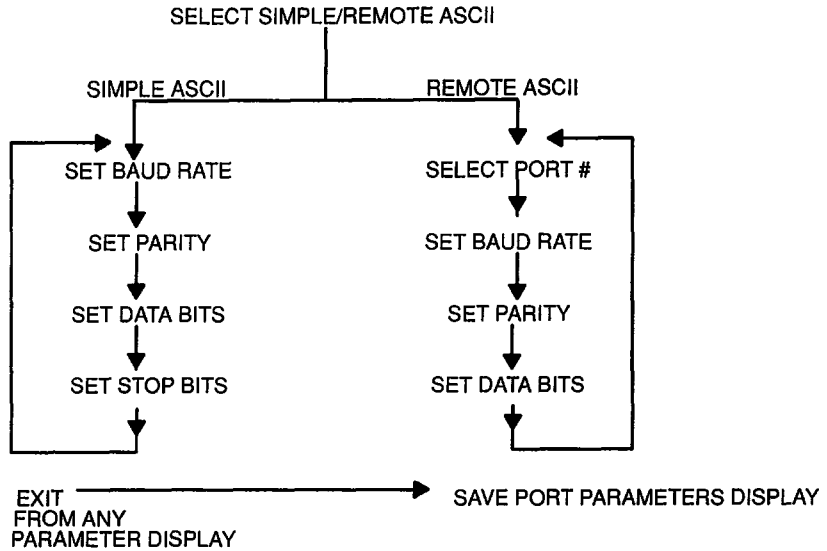
In MDAP mode, you may separately review simple ASCII port parameters or remote ASCII port parameters.

The menu path for setting ASCII/DAP port parameters begins with the Select Simple/Remote ASCII Display, then leads through either a series of simple ASCII/DAP port communication parameters or a series of remote ASCII/DAP port communication parameters.

In either case, the parameters are stored in the P965. With the Save Port Parameters Display, you write them to the controller. Figure 7-25, MDAP ASCII Port Menu Path describes the setting of simple and remote ASCII port parameters.

Figure 7-25

MDAP ASCII Port Menu Path



Selecting ASCII on the Set Port Parameters Display invokes the Simple/Remote ASCII Type Select Display (Figure 7-26).

Figure 7-26

Simple/Remote ASCII Type Select Display

```

ASCII.TYPE.....
.....
SELECT:.....
SIMPLE....REMOTE
  
```

- F1 (SIMPLE) — invokes the Simple ASCII Baud Rate Selection Display.
- F4 (REMOTE) — invokes the Remote ASCII Port Select Display.
- EXIT — goes to Save Port Parameters Menu.

Pressing F1 in the Simple/Remote ASCII Type Select Display invokes the Simple ASCII Baud Rate Select Display (Figure 7-27).

Figure 7-27

Simple ASCII Baud Rate
Select Display

```
ASCII.PORT#.1...
BAUD.RATE:. .xxxx
CHANGE.TO:. .----
LOWER. . . .HIGHER
```

The baud rates displayed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19,200.

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — selects next higher baud rate.
- ENTER — stores new baud rate in the P965.
- GET NEXT — goes to next parameter, parity.
- EXIT — goes to Save Port Parameters Menu.

Set the next communication parameter with the Simple ASCII Parity Select Display, Figure 7-28.

Figure 7-28

Simple ASCII Parity Select
Display

```
ASCII.PORT#.1...
PARITY:. . . .xxxx
CHANGE.TO:. .----.
ODD.EVEN.NONE...
```

xxxx represents parity, ODD, EVEN, or NONE.

- F1 (ODD) — selects odd parity.
- F2 (EVEN) — selects even parity.
- F3 (NONE) — disables parity.
- ENTER — stores this parameter in the P965.
- GET NEXT — goes to next parameter, data bits.
- EXIT — goes to Save Port Parameters Menu.

Select the number of data bits from the Simple ASCII Data Bits Select Display (Figure 7-29).

Figure 7-29

Simple ASCII Data Bits
Select Display

```
ASCII.PORT#.1...
DATA.BITS:.x....
CHANGE.TO:.-....
.7...8.....
```

x represents data bits, displayed as 7 or 8.

- F1 (7) — selects 7 data bits.
- F2 (8) — selects 8 data bits.
- ENTER — stores this parameter in the P965.
- GET NEXT — goes to next parameter, stop bits.
- EXIT — goes to Save Port Parameters Menu.

Select the number of stop bits from the Simple ASCII Stop Bits Select Display (Figure 7-30).

Figure 7-30

Simple ASCII Stop Bits
Select Display

```
ASCII.PORT#.1...
STOP.BITS:.x....
CHANGE.TO:.-....
.1..2.....
```

x represents the stop bits, 1 or 2.

- F1 (ONE) — selects 1 stop bit.
- F2 (TWO) — selects 2 stop bits.
- ENTER — stores this parameter in the P965.
- GET NEXT — goes to the Simple ASCII Baud Rate Selection Display, Figure 7-27.
- EXIT — goes to Save Port Parameters Menu.

Pressing F4 (REMOTE) on the Simple/Remote ASCII Type Select Display invokes the display for selecting the first of the remote ASCII communication parameters, Remote ASCII Port Select Display (Figure 7-31).

Figure 7-31

Remote ASCII Port Select Display

```
REMOTE.ASCII...
PORT.NUMBER....
SELECTION.....
ENTER: .nn.....   nn range: 1 to 32
```

- 0-9 — used to enter the remote ASCII port number. Upon keying in this number, the Remote ASCII Baud Rate Selection Display (Figure 7-32) appears.
- EXIT — returns to Simple/Remote ASCII Type Select Display.

Figure 7-32

Remote ASCII Baud Rate Selection Display

```
REMOTE.ASCII.#nn
BAUD.RATE: .xxxxx
CHANGE.TO: .yyyyy
LOWER....HIGHER
```

Where:

nn = the remote ASCII port number.

xxxxx = existing baud rate.

yyyyy = proposed baud rate.

The baud rates displayed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19,200.

- F1 (LOWER) — selects next lower baud rate.
- F4 (HIGHER) — selects next higher baud rate.
- ENTER — stores the new baud rate in the P965.
- GET NEXT — goes to next parameter, parity.
- EXIT — goes to Save Port Parameters Menu.

Select the next parameter, parity, from the Remote ASCII Parity Select Display (Figure 7-33).

Figure 7-33

Remote ASCII Parity Select Display

```
REMOTE.ASCII.#nn
PARITY...: .xxxx.
CHANGE.TO: .----.
ODD.EVEN.NONE...
```

nn represents the remote ASCII port number.

xxxx shows current parity, ODD, EVEN, or NONE.

---- shows changed parity, ODD, EVEN, or NONE.

- F1 (ODD) — selects odd parity.
- F2 (EVEN) — selects even parity.
- F3 (NONE) — disables parity.
- ENTER — stores new parity in the P965.
- GET NEXT — goes to next parameter, data bits.
- EXIT — goes to Save Port Parameters Menu.

Select the next parameter from the Remote ASCII Data Bits Select Display (Figure 7-34).

Figure 7-34

Remote ASCII Data Bits
Select Display

```
REMOTE.ASCII.#nn
DATA BITS: .x....
CHANGE.TO: .-....
          .5...6...7...8..
```

x shows the current number of data bits.

- shows the changed data bits parameter.

- F1 (5) — selects 5 data bits.
- F2 (6) — selects 6 data bits.
- F3 (7) — selects 7 data bits.
- F4 (8) — selects 8 data bits.
- ENTER — stores new data bits parameter in the P965.
- GET NEXT — goes to next parameter, stop bits.
- EXIT — goes to Save Port Parameters Menu.

Select the stop bits parameter from the Remote ASCII Stop Bit Select Display (Figure 7-35).

Figure 7-35

Remote ASCII Stop Bit
Select Display

```
REMOTE.ASCII.#nn
STOP.BITS: .x....
CHANGE.TO: .-....
          .1..2.....
```

x shows the current number of stop bits, 1 or 2.

- shows the new number of stop bits.

- F1 (1) — selects 1 stop bit.
- F2 (2) — selects 2 stop bits.
- ENTER — stores new stop bit parameter in the P965.
- GET NEXT — goes to next parameter, keyboard mode.
- EXIT — goes to Save Port Parameters Menu.

Select the keyboard mode from the Remote ASCII Keyboard Mode Select Display (Figure 7-36).

Figure 7-36

Remote ASCII Keyboard
Mode Select Display

```
REMOTE.ASCII.#01
KBD.MODE:xxxxxxx
CHANGE.TO:.....
KEYBOARD.NONTKBD
```

Where xxxxxx is KBD for keyboard mode or NON-KBD for non-keyboard mode.

- F1 (KEYBOARD) — selects keyboard mode.
- F4 (NON-KBD) — selects non-keyboard mode.
- ENTER — stores the new keyboard mode parameter in the P965.
- GET NEXT — goes to the Remote ASCII Port Select Display (Figure 7-31).
- EXIT — goes to Save Port Parameters Menu.

This completes the setting of communication parameters.

MODBUS Plus Networks

Some 984 programmable controllers support MODBUS Plus networking. Those controllers have a toggle switch associated with the MODBUS port that either supports MODBUS or MODBUS Plus. If that toggle switch is in the “DIP” position, the port does not act as a standard MODBUS port. Instead, the port is a window into the MODBUS Plus network. When the P965 attempts to connect to that port, it is actually interrogating controllers along the MODBUS Plus network.

When this occurs, if the P965 fails to communicate because its saved port parameters do not match those of the first controller along the network, the MODBUS Plus network returns a MODBUS Error 2, Illegal Address, not a Communications Timeout Error. Retries produce the same error.

To connect to a controller along the MODBUS Plus network, power up the P965 without physically connecting to the controller. After trying the default port parameters, the P965 times out with a Communications Timeout Error Display.

Now select the MSET option, and set the P965's port parameters to the parameters needed to communicate with the controller along the MODBUS Plus network. Physically connect the P965 to the 984 controller port, and select RETRY on the P965 screen. This should now logically connect you to the selected controller along the MODBUS Plus network.

Chapter 8

Error Displays

- **Error Displays**
- **Types of Errors**
- **MODBUS Functional Error Messages**
- **884/M84 Error Messages**
- **584/984 Error Messages**
- **484 Error Messages**
- **DAP Mode Error Messages**
- **584/984 Stopcode Error Messages**

Error Displays

This chapter presents P965 error displays in alphanumeric order for easy reference. Descriptions and suggested actions are also given.

Several types of error displays appear in the P965. Some are due to errors in P965 operation, and some are due to controller faults.

Upon receiving an error indication, control is returned to the menu level appropriate for modifying the parameters used to invoke the command. The parameters can be changed, and a retry executed. Generally, this results in returning up one menu level from the current operation.

Invalid operator entries generally result in an error display. On some invalid operator entries, the invalid key or keys have no effect, but no error screen is displayed. Upon clearing the error display, a screen appears requesting operator input.

When an error display appears, locate the display in this section. If retries or other suggested actions fail, contact your local Modicon representative or the Modicon Field Support Center in North Andover, Massachusetts. You can contact the Modicon Field Support Center by telephone. The numbers are given in the front of this guide.

Types of Errors

Error Messages are organized in groups. One group pertains to DAP mode. These are listed in Table 8-6. Another group pertains to general MODBUS errors. Other groups of error messages are organized by controller type: 484, 884/M84, and 584/984.

In the error displays shown below, TTT is the controller type.

Unexpected Errors

UNEXPECTED ERROR is a category of error that should not occur. For example, a legitimate 984 error may result from an operation modifying user logic. Since the P965 does not modify user logic, this error should never occur.

If this error, or other errors not supported by the P965, is returned to the P965 from the controller, the Unexpected Error Display appears. The general format of this display is shown in Figure 8-1.

Figure 8-1
Unexpected Error Display

```
TTT.....  
USER.ERROR.nn...  
UNEXPECTED.ERROR  
.....
```

nn specifies the error number.

If an unexpected error occurs, perform the following steps:

- Retry the operation. If this is not successful:
- Power the unit off and on, and retry again.
- In any case, inform Modicon of the error.

If the P965 receives what it believes to be an error message from a controller but cannot classify the message as to USER, SYSTEM, MODBUS, or LINK error, the Unknown Error Display (Figure 8-2) appears.

Figure 8-2
Unknown Error Display

```
.ERROR.DETECTED.  
.....OF.....  
..UNKNOWN.TYPE..  
.....
```

MODBUS Functional Error Messages

In this section the MODBUS functional error displays that you may see are shown.

Table 8-1 describes the MODBUS Functional Errors that may occur, their causes, and suggested actions.

Table 8-1

**MODBUS Functional Error
Displays with Suggested
Actions**

Error Display	Cause	Suggested Action
TTT..... MODBUS.ERROR.1..... ILLEGAL.FUNCTION	Function requested is not allowed	Verify that controller is properly configured and can be started.
TTT..... MODBUS.ERROR.2..... ILLEGAL..... ADDRESS.....	Address is not allowed.	Verify that controller is properly configured and can be started.
TTT..... MODBUS.ERROR.3..... ILLEGAL.DATA.OR..... END.ADDRESS.....	Data or end address is not allowed.	Verify that controller is properly configured and can be started.
TTT..... MODBUS.ERROR.4..... SLAVE-ADAPTER..... ERROR.....	Controller error	Verify that controller is properly configured and can be started.

884/M84 Error Messages

884/M84 Link Errors These link errors, such as Message Ack, should be handled by the P965 internally. In those situations in which the P965 cannot overcome the link error, the Link Error Display, Figure 8-3, appears.

Figure 8-3

Link Error Display

```
TTT.....
LINK.ERROR...nn
.....
.....
```

nn is the link error number.

- ▶ **NOTE** For link errors 12, 13, and 14, the third line of the display shows:

```
RESETTING.LINK..
```

and the P965 automatically issues a reset command to the 884 or Micro84.

884/M84 User Errors

These error messages (Table 8-2) may occur in M84 and 884 controllers. Other errors should not occur.

Table 8-2

884/M84 User Error
Displays with Suggested
Actions

Error Display	Cause	Suggested Action
TTT..... USER.ERROR.01..... OTHER.USER..... LOGGED.IN.....	Another user is logged in.	Controller must be logged out.
TTT..... USER.ERROR.02..... INVALID.PASSWORD	Invalid password.	Use valid password.
TTT..... USER.ERROR.04..... CONTROLLER.IS..... RUNNING.....	The attempted action (e.g., trying to clear memory) cannot be performed because the controller is running.	Stop controller. Then perform action.

(continued)

Table 8-2

884/M84 User Error
Displays with Suggested
Actions (Cont.)

Error Display	Cause	Suggested Action
TTT..... USER.ERROR.05..... MEMORY PROTECT.... ON.....	The desired action can not be performed because the memory protect is on.	Memory protect must be unlocked to perform desired action.
TTT..... USER.ERROR.06..... CONTROLLER.IS..... ALREADY.RUNNING.	The attempted action (e.g., trying to start controller) cannot be performed because the controller is running.	Stop controller. Then, perform action.
TTT..... USER.ERROR.07..... CONTROLLER.IS..... NOT.RUNNING.....	Stop controller attempted while controller is not running.	None required.
TTT..... USER.ERROR.08..... CONTROLLER.START FAILED.....	Controller did not start.	Retry controller start. Verify that controller is properly configured.
TTT..... USER.ERROR.09..... NOT.LOGGED.IN.....	User not logged in.	Log in.
TTT..... USER.ERROR.10 CANNOT.PERFORM.... COMMAND.....	Unacceptable command.	Retry command. Verify that controller is properly configured.
TTT..... USER.ERROR.18..... CORRUPT.DATABASE COMMAND.FAILED.....	Command failed due to corrupt database.	Verify that controller is properly configured and can be started.
TTT..... USER.ERROR.19..... CAN'T.ACCESS..... PASSWORD.TABLE.....	Denied access to password table.	Verify that controller is properly configured and can be started.

(continued)

Table 8-2

884/M84 User Error
Displays with Suggested
Actions (Cont.)

Error Display	Cause	Suggested Action
TTT..... USER.ERROR.21..... UNSUPPORTED..... FEATURE.....	This feature is not supported at this time.	Call Modicon.
TTT..... USER.ERROR.22..... WATCHDOG.TIMER..... EXPIRED.....	Watchdog timer expired.	Verify the controller is properly configured and can be started.
TTT..... USER.ERROR.23..... UNKNOWN_OPCODE..	Corrupted user logic.	Verify that controller is properly configured and can be started.

Other errors should not occur. The general display for these errors contains the error number with no error text, similar to Figure 8-1.

884/M84 System Errors

System errors in the 884 and M84 may give rise to error messages. These are shown in Table 8-3.

Table 8-3

884/M84 System Error
Displays with Suggested
Actions

Error Display	Cause	Suggested Action
TTT..... SYSTEM.ERROR.69.... UNSUPPORTED..... COMMAND.....	Command not allowed	
TTT..... SYSTEM.ERROR.70.... INSUFFICIENT..... PRIVILEGE.....	Level of access not sufficient.	Obtain higher level of access (password)
TTT..... SYSTEM.ERROR.73.... INVALID..... REFERENCE.....	Invalid reference.	Use a valid reference.
TTT..... SYSTEM.ERROR.74.... DISCRETE.NOT..... DISABLED.....	Discrete not disabled.	Disable discrete.
TTT..... SYSTEM.ERROR.92.... TABLE.IS.READ..... ONLY.....	Read only table; cannot be written to.	Verify controller is properly configured.
TTT..... SYSTEM.ERROR.93.... INVALID.TABLE..... OFFSET/LENGTH.....	Invalid table offset/length.	Use valid table or offset length.
TTT..... SYSTEM.ERROR.94.... INVALID.TABLE.....	Invalid table.	Use valid table.
TTT..... SYSTEM.ERROR.95.... INVALID.TABLE..... DATA.....	Invalid table data.	Verify controller is properly configured.
TTT..... SYSTEM.ERROR.97.... INVALID.MEMORY..... ADDRESS.....	Invalid memory address.	Use valid memory address.

584/984 Error Messages

The following error messages may occur with either the 584 or the 984 programmable controller. Table 8-4 shows the error messages, the causes, and gives suggested actions.

Table 8-4

584/984 Error Displays with
Suggested Actions

Error Display	Cause	Suggested Action
T84 ERROR.01 INVALID.COMMAND....	Command not allowed	Verify controller is properly configured.
T84 ERROR.02 INVALID.ADDRESS.....	Address is invalid.	Use a valid address.
T84 ERROR.03 MEMORY.PROTECT.... ON.....	Memory protect is on.	Turn memory protect off.
TTT ERROR.07 INVALID..... REFERENCE/RANGE..	Invalid reference or range.	Use valid reference or range.
TTT ERROR.08 INVALID..... PARAMETER.....	Invalid parameter.	Use valid parameter.
TTT ERROR.09 CONTROLLER.IS..... RUNNING.....	Controller is running.	Stop controller.
TTT ERROR.10 NOT.LOGGED.IN.....	Not logged in.	Log in.
TTT ERROR.11 COIL.NOT..... DISABLED.....	Coil is not disabled.	Disable coil.

(continued)

Table 8-4

584/984 Error Displays with Suggested Actions (Cont.)

Error Display	Cause	Suggested Action
TTT..... ERROR.13..... ILLEGAL..... CONFIGURATION.....	Illegal configuration.	Reconfigure controller.
984..... ERROR.17..... COIL.DISABLE.NOT ALLOWED.....	Coil disable not allowed. (984 only)	Login and turn memory protect off. Verify controller is properly configured.

484 Error Messages

In addition to unexpected errors, the error messages shown in Table 8-5 may appear when connected to a 484 controller.

Table 8-5

484 Error Messages, Causes, and Actions

Error Display	Cause	Suggested Action
484..... ERROR.....04 INCORRECT..... ADDRESS.RANGE.....	Address is beyond allowed range.	Change address to fall in assigned range.
484..... ERROR.....05 ILLEGAL..... BOUNDARY.....	Lower member of addressing word pair has odd value.	Change to an even value.
484..... ERROR.....06 ILLEGAL..... COMMAND.....	Does not correspond with valid message types.	No action needed. Controller is reset.
484..... ERROR.....10 INVALID.DATA.....	Invalid data.	Check for invalid element type or reference.

(continued)

Table 8-5

484 Error Messages,
Causes, and Actions (Cont.)

Error Display	Cause	Suggested Action
484..... ERROR..... 11 MEMORY PROTECT.... ON.....	Controller's memory protect is ON.	Set memory protect to OFF.
484..... ERROR..... 12 SYSTEM NOT..... STOPPED.....	Controller running.	Stop controller.

DAP Mode Error Messages

Table 8-6 lists DAP mode error message displays, causes, and suggested actions.

Table 8-6

DAP Mode Error Displays
with Suggested Actions

Error Display	Cause	Suggested Action
P964 ENTRY ERROR CANNOT FORCE COIL WITH 984 IN RUN MODE	Coils can only be forced when controller is stopped.	Go to CMD menu, stop controller and retry.
P964 ENTRY ERROR CANNOT FORCE ENABLED COIL	Coils can only be forced when disabled.	Display coil, press DISABLE, and retry.
P964 ENTRY ERROR COMMAND INVALID WITH CONTROLLER IN RUN MODE	Command can only be performed when controller is stopped.	Go to CMD menu, stop controller, and retry.
P964 ENTRY ERROR COMMAND INVALID WITH MEMORY PROTECT KEY ON	Command can only be performed when memory protect is off.	Turn 984 controller memory protect key to off position. Retry

(continued)

Table 8-6

DAP Mode Error Displays
with Suggested Actions
(Cont.)

Error Display	Cause	Suggested Action
P964 ENTRY ERROR COMMAND INVALID xxxxx NOT VALID	Reference number is outside configured range in controller.	Re-enter reference number within controller configuration, or reconfigure controller.
P964 ENTRY ERROR DELAY TIME xx NOT VALID	Delay time entered not decimal value in correct range.	Re-enter delay time. Must be decimal value from 1 to 20.
P964 ENTRY ERROR MEMORY ADDRESS xxxxxx NOT VALID	Memory address not decimal value in correct range.	Re-enter memory address. Must be decimal value from 300000 to 365535.
P964 ENTRY ERROR REFERENCE NUMBER xxxxx NOT VALID	Reference number not in controller.	Check that reference number is valid type (0xxxx, 1xxxx, 3xxxx, 4xxxx) and is configured in controller.
P964 WARNING 01 SYSTEM ERROR 984 RCVD INVALID COMMAND	Invalid command sent to controller.	1) Press CLEAR and retry. 2) If retries fail, contact Modicon.
P964 WARNING 02 SYSTEM ERROR 984 RCVD INVALID REFERENCE TYPE	Invalid reference type sent to controller.	1) Press CLEAR and retry. 2) If retries fail, contact Modicon.
P964 WARNING 03 SYSTEM ERROR 984 RCVD INVALID COMM PORT NUMBER	Invalid MODBUS or ASCII port number sent to controller.	1) Press CLEAR and retry. 2) If retries fail, contact Modicon.
P964 WARNING 04 SYSTEM ERROR 984 RCVD INVALID MESSAGE PACKET	Message with invalid format sent to controller.	1) Press CLEAR and retry. 2) If retries fail, contact Modicon.
P964 WARNING 05 COMM TIMEOUT ERROR CONNECT FAILED RETRY	No communication within required time.	1) Press RETRY (F2). Screen blanks for 0.5 sec, then retries. 2) If retries fail, contact Modicon.

(continued)

Table 8-6

DAP Mode Error Displays
with Suggested Actions
(Cont.)

Error Display	Cause	Suggested Action
P964 WARNING 06 COMM DATA ERROR REQUEST FAILED RETRY	Invalid communication data sent to controller.	1) Press RETRY (F2). Screen blanks for 0.5 sec, then retries. 2) If retries fail, contact Modicon.
P964 WARNING 07 COMM TIMEOUT ERROR REQUEST ABORTED RETRY CNCL	No communication within required time. Request not acted on.	1) Press RETRY (F2). Screen blanks for 0.5 sec, then retries. 2) Press CNCL (F4) to return to previous display. 3) If retries fail, contact Modicon.
<p>► NOTE Press the CLEAR key to erase the error message from the screen. No retry is performed when the CLEAR key is pressed.</p>		
P964 WARNING 08 COMM DATA ERROR REQUEST ABORTED RETRY CNCL	Invalid communication data sent to controller. Request not acted on.	1) Press RETRY (F2). Screen blanks for 0.5 sec, then retries. 2) Press CNCL (F4) to return to previous display. 3) If retries fail, contact Modicon.
<p>► NOTE Press the CLEAR key to erase the error message from the screen. No retry is performed when the CLEAR key is pressed.</p>		
984 START ERR 01 NO EOL DETECTED OR BAD NUMBER OF SEGMENTS	No end of logic node found or illegal number of logic segments.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail, contact Modicon
984 START ERR 02 STATE RAM TEST FAILED	Test of random access memory in controller failed.	1) Press CLEAR and retry. 2) Replace 984 IOP board. 3) If retries fail, contact Modicon.
984 START ERR 03 START OF NETWORK NODE DID NOT START SEGMENT	No start of network node at beginning of logic segment.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail, contact Modicon.
984 START ERR 04 MULTI-RATE SOLVE TABLE IS INVALID	Invalid multi-rate solve table in 984 controller.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail, contact Modicon.

(continued)

Table 8-6

DAP Mode Error Displays
with Suggested Actions
(Cont.)

Error Display	Cause	Suggested Action
984 START ERR 05 ILLEGAL PERIPHERAL INTERVENTION	Illegal peripheral intervention.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail, contact Modicon.
984 START ERR 06 984 HAS NOT YET BEEN CONFIGURED	984 controller must be configured before communicating with P964.	1) Load user data tape OR 2) Configure controller with P190 and AS-T984-004.
984 START ERR 07 984 MEMORY PARITY ERROR	Parity error detected in 984 controller memory.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail contact Modicon.
984 START ERR 08 984 PERIPHERAL PORT STOP	Peripheral port error detected in controller.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail contact Modicon.
984 START ERR 09 ILLEGAL 984 CONFIGURATION	Errors detected in configuration of controller.	1) Reload user data tape OR 2) Reconfigure 984 using P190 and AS-T984-004. 3) Replace memory board. 4) If retries fail, contact Modicon.
984 START ERR 10 COIL IS DISABLED WITH 984 IN RUN MODE	Detected disabling of coil with 984 running.	1) Press CLEAR and retry. 2) Reload user data tape. 3) If retries fail, contact Modicon.
984 START ERR 11 CHECKSUM ERROR IN 984 LOGIC	Checksum error detected in 984 controller logic.	1) Press CLEAR and retry. 2) Reload user data tape. 3) Replace memory board. 4) If retries fail, contact Modicon.
984 START ERR 12 INVALID NODE IN 984 LOGIC	Invalid node type detected in 984 controller logic.	1) Press CLEAR and retry. 2) Reload user data tape. 3) Check for tape and controller compatibility. 4) If retries fail, contact Modicon.

(continued)

Table 8-6

DAP Mode Error Displays
with Suggested Actions
(Cont.)

Error Display	Cause	Suggested Action
984 START ERR 13 INVALID TRAFFIC COP TYPE	Invalid traffic cop type detected in controller.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Check controller program for interference with traffic cop area. 3) Replace memory board. 4) If retries fail, contact Modicon.
984 START ERR 14 984 FAILED CPU DIAGNOSTIC TEST	984 controller failed diagnostic test.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace CPU board. 3) If retries fail, contact Modicon.
984 START ERR 15 ERROR IN 984 REAL TIME CLOCK	Error detected in 984 real time clock	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace CPU board. 3) If retries fail, contact Modicon.
984 START ERR 16 984 WATCHDOG TIMER EXPIRED	984 watch dog timer not reset within specified time.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Check program for too many DX blocks. 3) If retries fail, contact Modicon.
984 SYMPTOM 05 PROM CHECKSUM PROBABLE CAUSE EXEC PROM PACK	Controller will not run due to PROM checksum error.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace controller exec PROM pack. 3) If retries fail, call Modicon.
984 SYMPTOM 10 MEMORY ERROR PROBABLE CAUSE: MEMORY.BOARD	Controller will not run due to page 0 memory error.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace memory board. 3) If retries fail, call Modicon.
984 SYMPTOM 20 MEMORY ERROR PROBABLE CAUSE: MEMORY BOARD	Controller will not run due to page F memory error.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace memory board. 3) If retries fail, contact Modicon.
984 SYMPTOM 30 MICROCODE ERROR PROBABLE CAUSE: CPU BOARD	Controller will not run due to illegal microcode error.	<ol style="list-style-type: none"> 1) Press CLEAR and retry. 2) Replace CPU board. 3) If retries fail, contact Modicon.

(continued)

Table 8-6

DAP Mode Error Displays
with Suggested Actions
(Cont.)

Error Display	Cause	Suggested Action
984 SYMPTOM 40 MINICODE ERROR PROBABLE CAUSE: CPU BOARD	Controller will not run due to illegal minicode error.	1) Press CLEAR and retry. 2) Replace CPU board. 3) If retries fail, contact Modicon.
984 SYMPTOM 50 BAD PORT PARAM PROBABLE CAUSE: MEMORY BOARD	984 will not run due to invalid port parameter.	1) Press CLEAR and retry. 2) Replace memory board. 3) If retries fail, contact Modicon.
984 SYMPTOM 60 MEM PARITY ERROR PROBABLE CAUSE: MEMORY BOARD	Controller will not run due to parity error in memory.	1) Press CLEAR and retry. 2) Replace memory board. 3) If retries fail, contact Modicon.
984 SYMPTOM 70 DIM AWARENESS PROBABLE CAUSE: MEMORY BOARD	Controller will not run unless configured.	1) Configure 984 using P190 and AS-T984-204. 2) Retry communications.
984 SYMPTOM 100 P964 RCVD UNKNWN DEAD ERROR CODE CONTACT MODICON	P964 received an unknown error code from the 984.	1) Retry operation. 2) If retries fail, contact Modicon.
984 WARNING 100 P964 RCVD UNKNWN RAP ERROR CODE CONTACT MODICON	P964 received an unknown error code from the 984.	1) Retry operation. 2) If retries fail, contact Modicon.

584/984 Stopcode Error Messages

Whenever a START command fails to cause a 584 or 984 controller to begin running, the Unable to Start Display (Figure 8-4) appears.

Figure 8-4

Unable to Start Display

```

UNABLE TO START
PC.....
.....
.....
    
```

Press the CLEAR key to display the stopcode value, as shown in the 584/984 Stopcode Error Display, Figure 8-5.

Figure 8-5

584/984 Stopcode Error Display

```
UNABLE TO START
PC.....
STOP CODE IS....
.....xxxx.....
```

xxxx — the hexadecimal value of the stopcode.

CLEAR — returns the P965 to the display which originated the START request.

Table 8-7 lists the four-digit hexadecimal codes and the meaning for each code.

Table 8-7

Stopped Controller Error Displays with Suggested Action

FFFF	Controller unhealthy
8000	Controller stopped
4000	Bad I/O traffic cop
2000	Controller in dim awareness
1000	Bad port intervention
0800	Bad segment scheduler
0400	SON did not start segment
0200	Bad power-down checksum
0100	Bad number of DOIL-EOL
0080	Watchdog expired
0040	Real time clock failed
0020	Bad coil used table
0010	Remote I/O option failed
0008	Illegal node type used
0004	User logic cksum error
0002	Discretes disabled error
0001	Bad configuration

Suggested Action Using a P190 or an IBM PC, verify that controller has a valid configuration and can be started. Reference appropriate controller user manual for corrective action.

The four-digit number in the Stop Code Error Display, Figure 8-5, indicates either a single error or the hexadecimal no-carry sum of two or more of the errors listed in Table 8-7. For example:

```
Controller stopped.....8000
Bad coil used table.....0020
Illegal node type used.....0008
User logic cksum error.....0004
Stopcode error.....802C
```


Appendix A

P965 Specifications

Display

No. of characters	64 (4 lines of 16)
Font	5 × 7 Dot Matrix
Display type	Liquid crystal display (LCD)
Displayable characters	95 character ASCII printable set, plus two special defined characters
Character size	0.116" × 0.187" high (2.95mm × 4.75mm)

Keyboard

Number of keys	34
Function keys	Yes — 4 (F1-F4)
Tactile feedback	Yes
Sealed membrane	Yes

Interface

Communication link Serial, RS-232C

Pin assignments — DB25 (male) connector

	1	Shield (Protective ground)
	2	Transmit (data to P965 DAP)
	3	Receive (data from P965 DAP)
Jumper	4	RTS (Request to send)
	5	CTS (Clear to send)
	6	DSR (Data set ready)
Jumper	7	GND (Signal & Power)
	8	Carrier Detect
	9	Power (+ 5VDC)
	20	DTR (Data terminal ready)

Internal Default Parameters at Power-Up

DAP Mode

Speed	9600 baud
Parity	None
Stop bits	1
Data bits	8

MDAP Mode

Mode	RTU
Speed	9600 baud
Parity	Even
Stop bits	1
Data bits	8
Slave address	001

Power

Voltage	5 VDC \pm 5% from controller 9 VDC from 6 AA batteries
----------------	---

Current	30-35 mA (typical)
----------------	--------------------

Mechanical

**Dimensions
(H x W x D)** 7-3/4" x 4-5/16" x 2"
(198.4 mm x 110.1 mm x 51.2 mm)

Weight 18 oz (514 g) (excluding batteries)

Primary Cable (Termiflex part # 97-0207-0000)

Cable length 6 ft (1.8 m) extended
1.5 ft (0.46 m) coiled

Case connector 6-pin modular jack

Cable connector 25 pin, DB-25P

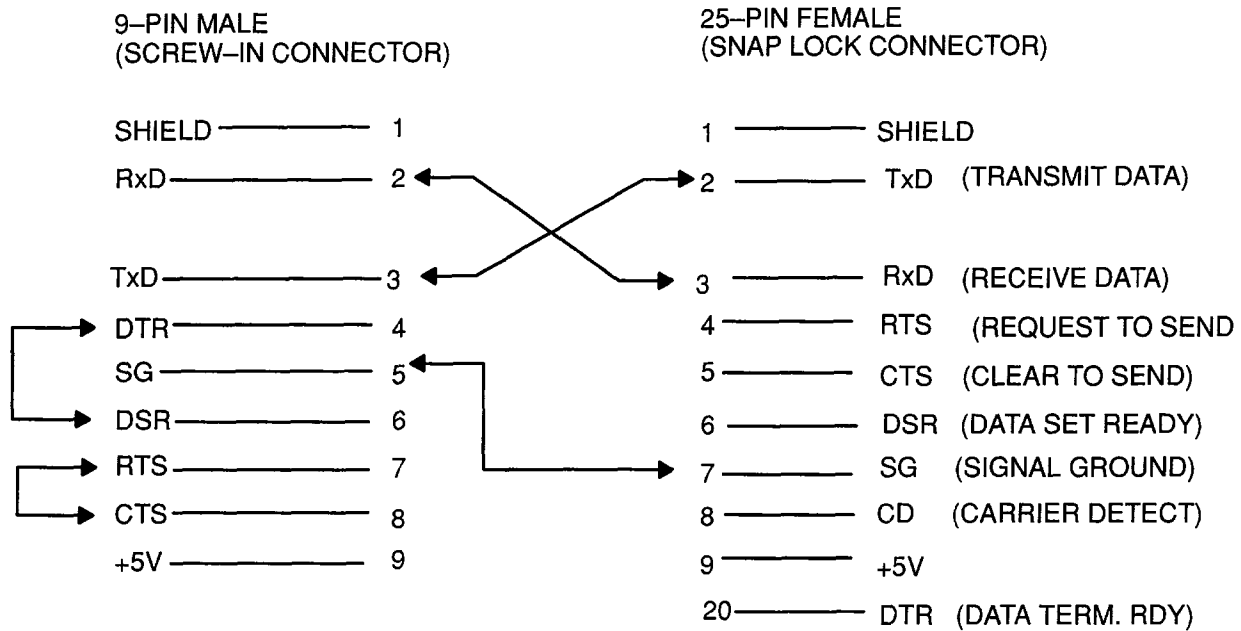
Adapter Cable (Termiflex part # 97-0209-0000)

Cable length 6 inches, or less, connector end to
connector end

**Connector
(P965 end)** 25 position, DB-25S,

**Connector
(controller end)** 9 position, DE-9F

Wiring Diagram for 25-to-9 Pin Adapter Cable



- **NOTE** The P965 has neither circuitry nor software to process signals on RTS, CTS, DSR, CD, and DTR. It processes Transmit Data, Receive Data, and Signal Ground only.

Environmental

Temperature	0 to +50°C (operating) -20 to +70°C (storage)
Humidity	0 to 95% (non-condensing)

Appendix B

ASCII Characters

The ASCII characters A through Z (all upper case) and 1 through 6 can be entered in the 984 controller with the P965 Data Access Panel. Select ASCII terminal operations by pressing TER (F4). Each keystroke sends an ASCII character to the 984 controller. Figure B-1 and Table B-1 define the ASCII character generated for each key.

Figure B-1

ASCII Character Key
Locations

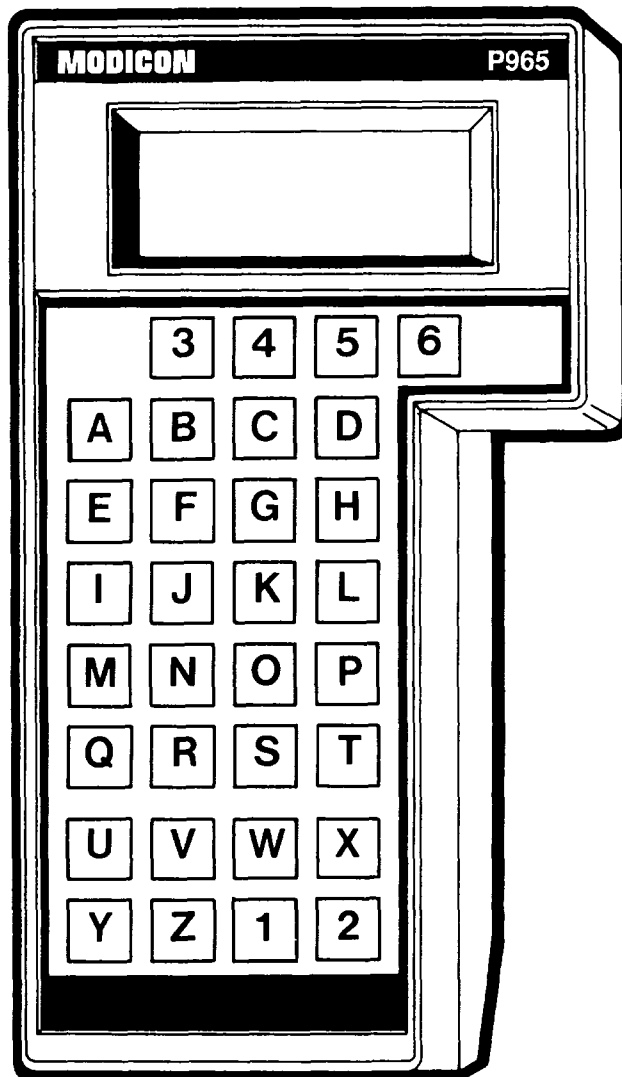


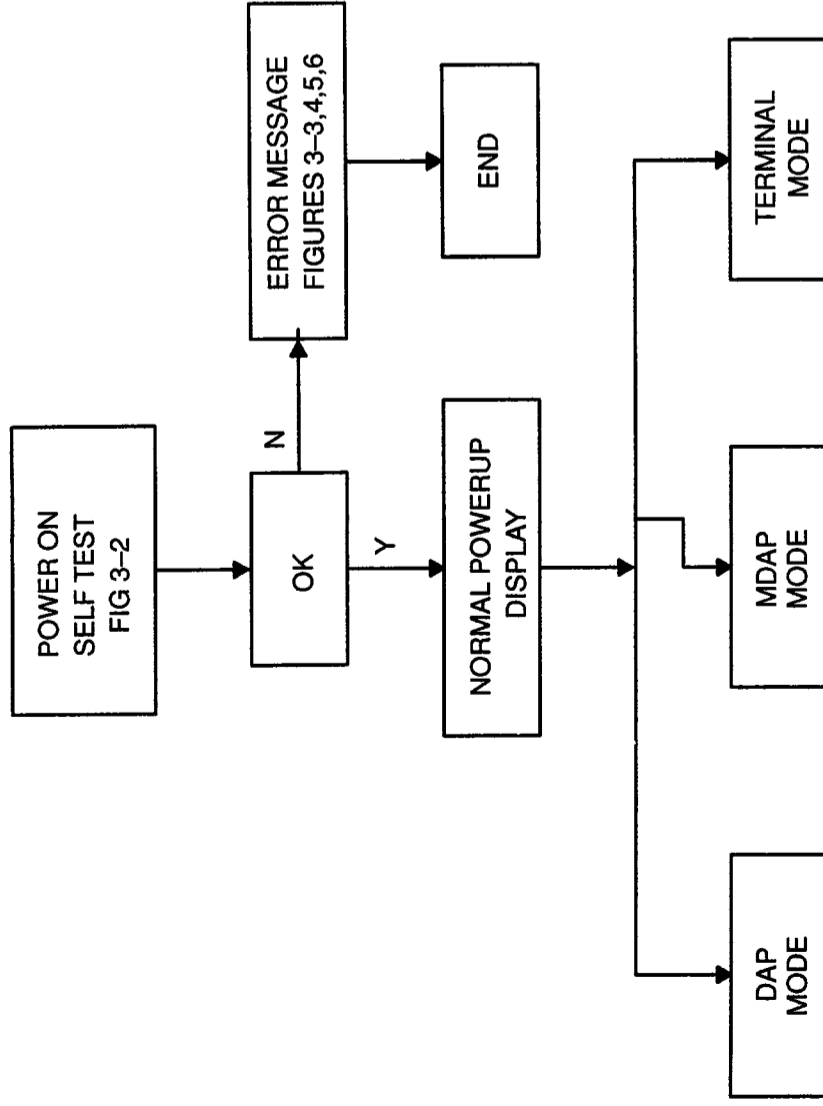
Table B-1

ASCII Characters and
Related Keys

ASCII Character	Key Name
A	NEW DATA
B	↑ REF
C	DETAIL
D	DEC/HEX
F	1/A
G	2/B
H	3/C
I	GET PREV
J	4/D
K	5/E
L	6/F
M	GET NEXT
N	7
O	8
P	9
Q	ENTER
R	SHIFT
S	0
T	SHIFT
U	CLEAR
V	DISABLE/ENABLE
W	FORCE ON
X	FORCE OFF
Y	EXIT
Z	—
1	→
2	CLEAR/SET
3	F1
4	F2
5	F3
6	F4

P965 QUICK REFERENCE SHEET

POWER-UP MENU DIAGRAM



DAP MODE MENU PATH

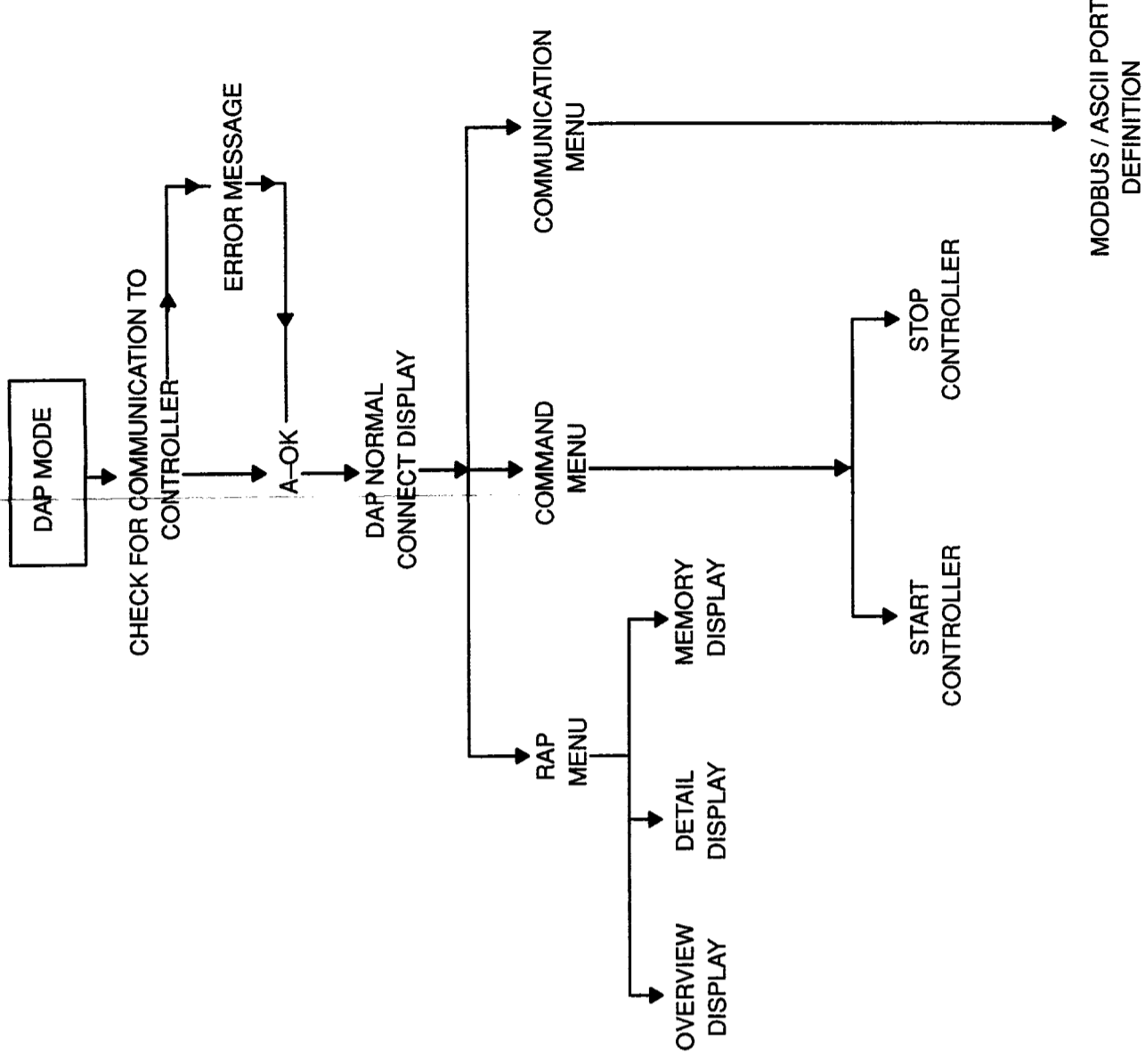
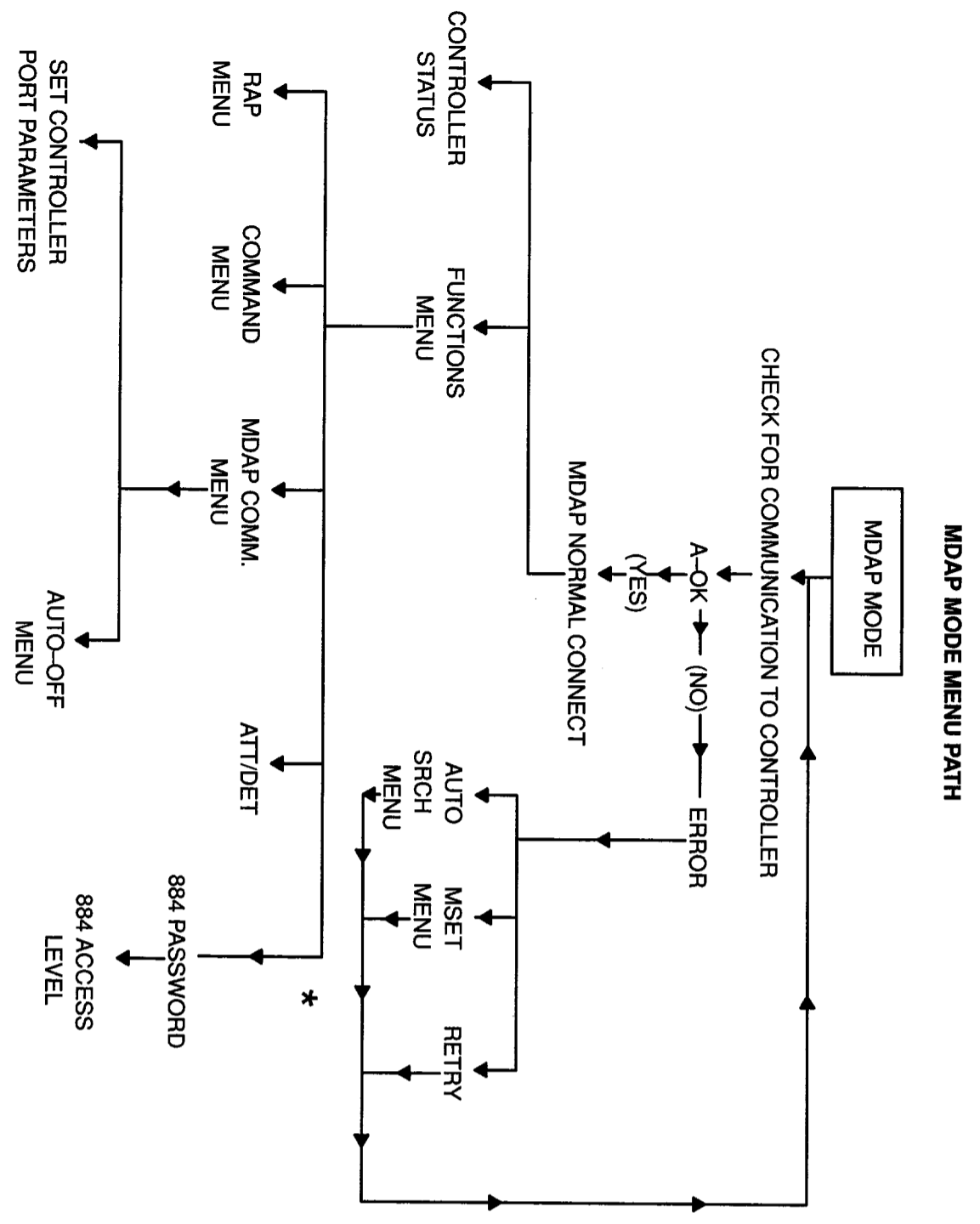


Table 1-1
Functions for Each Type of
Controller

MDAP MODE FUNCTIONALITY

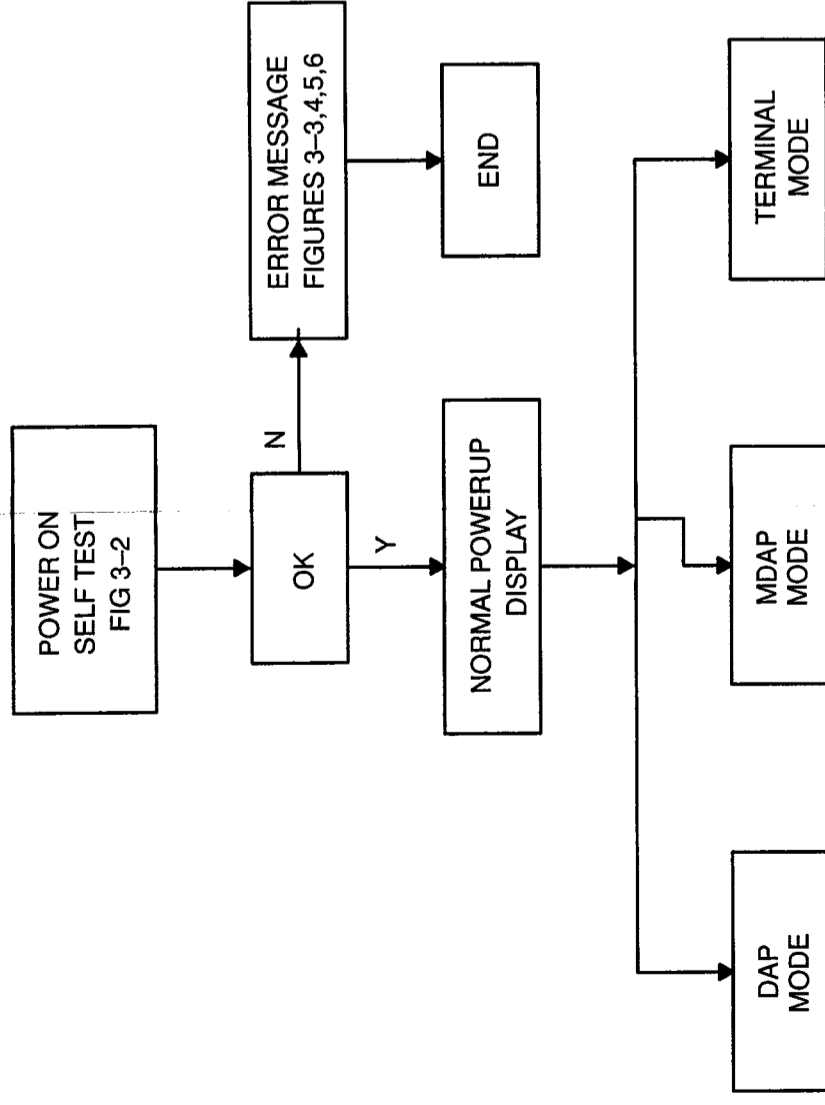
	984	884	M84	584	484
1. Status	Y	Y	Y	Y	Y
Running/Stopped	Y	Y	Y	Y	Y
Attached (logged in) or detached	Y	Y	Y	Y	-
Memory protect	Y	N	N	Y	N
2. Attach (login)/Detach (logout)	Y	Y	Y	Y	-
3. Passwords	-	(Y)	-	-	-
(See Note 1.)					
4. Read references					
(0x) Discrete outputs (coils)	Y	Y	Y	Y	Y
(1X) Discrete Inputs	Y	Y	Y	Y	Y
(2x) Sequencers	-	N	N	-	N
(3x) Input registers	Y	Y	Y	Y	Y
(4x) Output registers	Y	Y	Y	Y	Y
(5x) Double precision registers	-	N	-	-	-
(6x) Extended memory registers	N	-	-	N	-
(9x) Latches	-	N	-	-	-
5. Write references					
(See notes 2 and 3.)					
(0x) Discrete Outputs (Coils)	Y	Y	Y	Y	Y
(1X) Discrete Inputs	Y	Y	Y	Y	Y
(2x) Sequencers	-	N	N	-	N
(3x) Input registers	-	-	-	-	-
(4x) Output registers	Y	Y	Y	Y	Y
(5x) Double precision registers	-	N	-	-	-
(6x) Extended memory registers	N	-	-	N	-
(9x) Latches	-	N	-	-	-
6. Enable/Disable Coils	Y	Y	Y	Y	N
7. Read Memory	Y	Y	-	Y	Y
8. Write memory	N	N	-	N	N
9. Read table	-	Y	Y	-	-
(See Note 4.)					
10. Write table	-	N	N	-	-
11. Start/Stop PC	Y	Y	Y	Y	Y
12. Read PC comm. parameters	Y	Y	Y	Y	-
(See Note 5.)					
13. Modify PC comm parameters	Y	(Y)	-	Y	-
(See Note 5.)					
14. Read/Modify Simple ASCII port parameters	Y	-	-	-	-
15. Read/Modify Remote ASCII port parameters	Y	-	-	Y	-

* FOR 884 CONTROLLERS ONLY



P965 QUICK REFERENCE SHEET

POWER-UP MENU DIAGRAM



DAP MODE MENU PATH

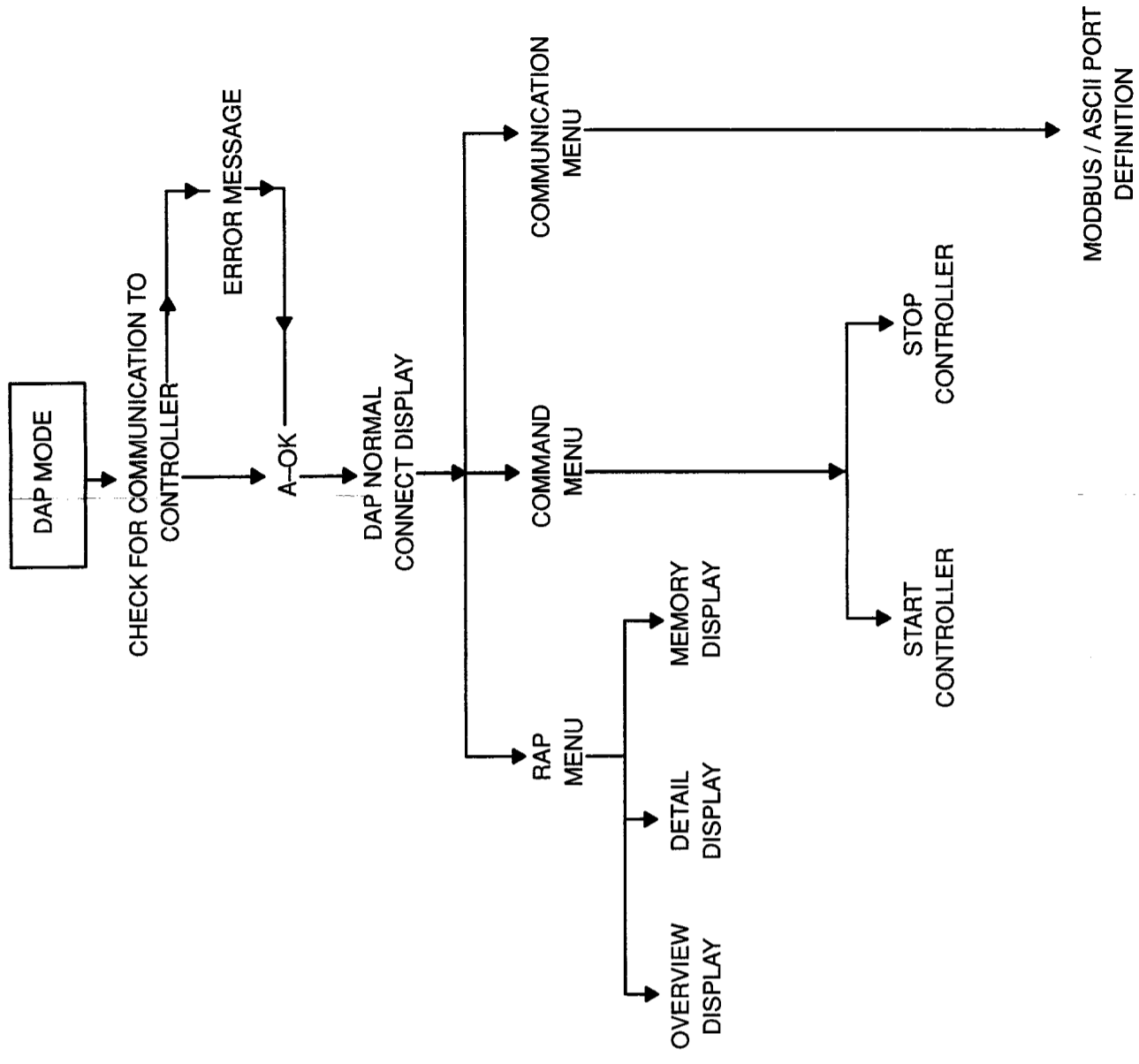
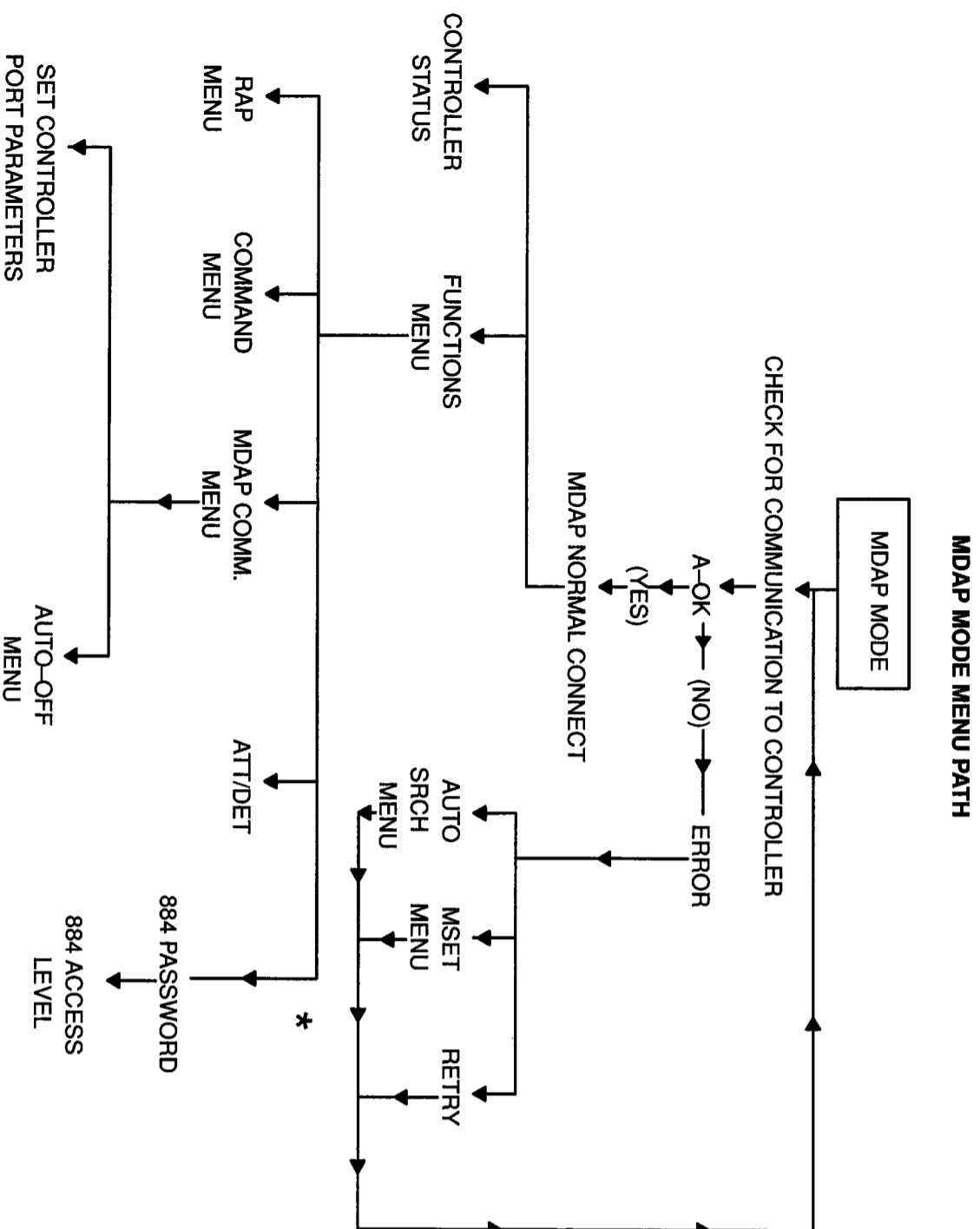


Table 1-1
Functions for Each Type of
Controller

MIDAP MODE FUNCTIONALITY

FUNCTION	984	884	M84	584	484
1. Status Running/Stopped Attached (logged in) or detached Memory protect	Y	Y	Y	Y	Y
2. Attach (login)/Detach (logout)	Y	N	N	Y	N
3. Passwords (See Note 1.)	-	(Y)	-	-	-
4. Read references Discrete outputs (coils) Discrete Inputs Sequencers Input registers Output registers Double precision registers Extended memory registers Latches	Y Y - Y Y - N	Y Y N Y Y N N	Y Y N Y Y - -	Y Y N Y Y - -	Y Y N Y Y - -
5. Write references (See notes 2 and 3.) Discrete Outputs (Coils) Discrete Inputs Sequencers Input registers Output registers Double precision registers Extended memory registers Latches	Y Y - - Y Y N	Y Y N - Y Y N	Y Y N - Y Y -	Y Y - - Y Y -	Y Y N - Y Y -
6. Enable/Disable Coils	Y	Y	Y	Y	N
7. Read Memory	Y	Y	-	Y	Y
8. Write memory	N	N	-	N	N
9. Read table (See Note 4.)	-	Y	Y	-	-
10. Write table	-	N	N	-	-
11. Start/Stop PC	Y	Y	Y	Y	Y
12. Read PC comm. parameters (See Note 5.)	Y	Y	Y	Y	-
13. Modify PC comm parameters (See Note 5.)	Y	(Y)	-	Y	-
14. Read/Modify Simple ASCII port parameters	Y	-	-	-	-
15. Read/Modify Remote ASCII port parameters	Y	-	-	Y	-



* FOR 884 CONTROLLERS ONLY

Publications Comment Form

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Title P965 Modbus DAP User's Guide

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