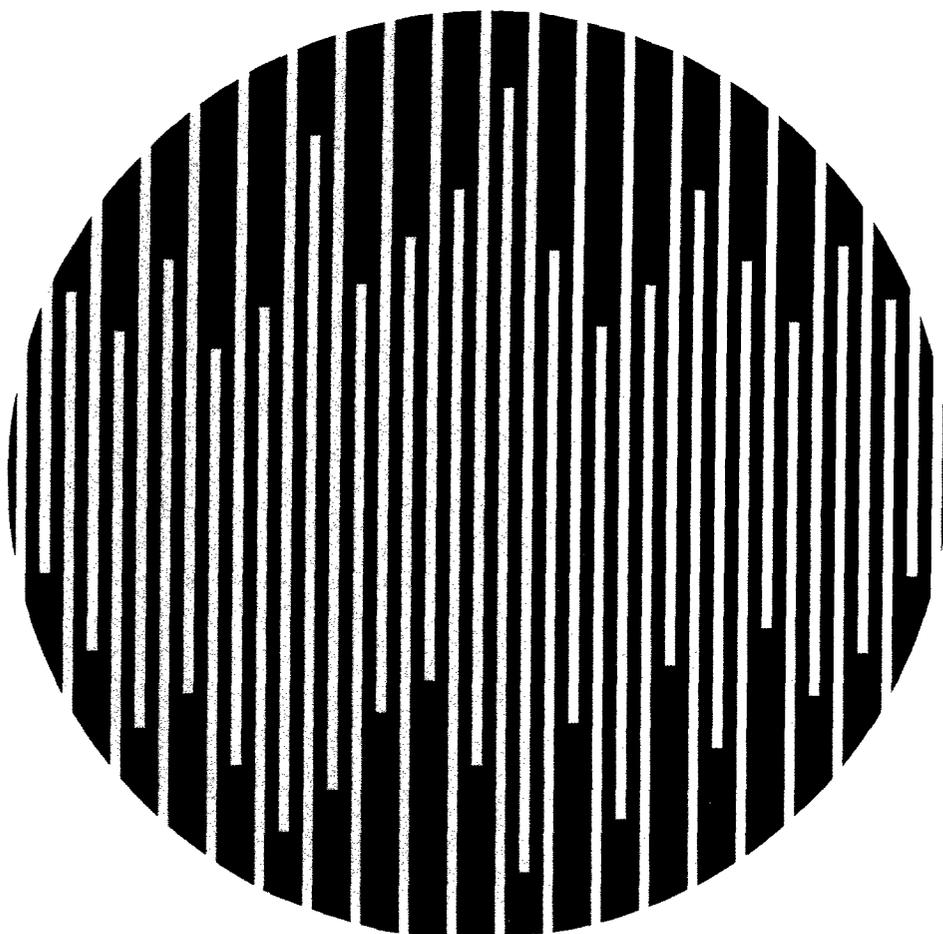


MODICON 584 and 984 Controller Tape Loader User's Guide



MODICON
584 and 984 Controller
Tape Loader User's Guide

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Preface

This guide describes the use of the Tape Loader Tape with a P190 Programmer and a MODICON 584 or 984 Controller. The following procedures are included in this guide:

- relocate logic from one controller to another
- load logic into a controller from tape
- record logic from a controller on tape
- verify a tape against a controller

This guide is written for a control engineer or plant electrician for use when loading, recording, or verifying controller programs.

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List of Related Publications

Use the following manuals in conjunction with this publication:

GM-0984-003	MODICON 984 PC System Planning and Installation
GM-0984-004	MODICON 984 Programmable Controller Programming Guide
ML-P190-USE	P190 Programmer User's Manual
PI-584L-002	MODICON 584L Programmable Controller Programming Guide
PI-584M-002	MODICON 584M Programmable Controller Programming Guide

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Chapter 1
Introduction

This chapter defines the purpose and structure of this guide. The topics covered in each chapter are listed.

Introduction

This guide explains how to use a Gould Tape Loader Tape (AS-T190-001) with a P190 Programmer and a Gould 584 or 984 Programmable Controller. The following procedures are included in this guide:

- relocate logic from one controller to another
- load memory into a controller from tape
- record memory from a controller onto tape
- verify a tape against a controller's memory

In order to use the Tape Loader Tape you will need the equipment specified in Table 1-1.

Table 1-2

**Required
Equipment**

Equipment

P190 Programmer

AS-W907-XXX Cable -
P190 to 984 Controller
or

AS-W190-XXX Cable -
P190 to 584 Controller

584 or 984 Programmable Controller

Organization Of This Manual

The remainder of this manual is organized as follows:

- Chapter 2 **The Tape Loader.** This chapter describes the operations you can perform using the Tape Loader Tape. The terms load, record, and verify are defined and specific operations are listed.

- Chapter 3 **Starting Out.** The steps required to gain access to the tape loader operations are described in this chapter. This starts with turning on the P190 Programmer and going to the display of tape loader operations.

- Chapter 4 **Controller Operations.** The basic controller operations are described in this chapter: start controller, stop controller, and clear controller memory.

- Chapter 5 **Relocating Logic.** This chapter describes the relocate logic operation. This operation allows you to move logic and memory (where reference states and values are held) from one controller to another.

- Chapter 6 **Loading Controller Memory.** This chapter describes the procedure for loading a program from a tape to a controller's memory.

- Chapter 7 **Recording Controller Memory.** The procedure for recording a controller's memory onto a tape is described in this chapter.

- Chapter 8 **Verifying Controller Memory.** This chapter describes the procedure for verifying a tape program against a controller's memory.

- Chapter 9 **Extended Memory Functions.** Load, record, and verify operations for extended memory storage in a controller are described in this chapter.

Chapter 2 The Tape Loader

This chapter describes the operations you can perform using the Tape Loader Tape. The terms relocate logic, load, record, and verify are defined and specific operations are listed.

Definition of Tape Loader Functions

There are a number of terms that must be defined before you use the Tape Loader Tape. These operations are very powerful, so make sure you understand the implications before performing an operation.

Relocate Logic

Relocate logic loads previously recorded user logic and state RAM from a tape to the controller. State RAM is random access memory holding the state or content of user logic references, such as coils, discrete inputs, and registers. The configuration table and traffic cop are not loaded into the controller.

The memory size of the controller loading to must be able to hold all the logic and state RAM and the controller must be able to perform all the functions on the tape program. The controller must be stopped to perform this function.

This function is typically used to load programs from one controller into another controller or to replace user logic over an existing configuration table and traffic cop.

Load

The load function transfers a previously recorded program (including configuration table and traffic cop) from a tape to a controller's memory.

The memory size of the controller being loaded must be able to hold the entire program and be able to perform all the functions on the tape program. In addition, the I/O types (e.g. 800 series I/O) in the control system and in the tape program must be the same. The controller must be stopped to perform this function (see Chapter 4). The load function cannot transfer loadable DX functions from a 984 A, B, or X to 984 Models 680, 480, or 380.

NOTE

You should always configure and relocate logic when transferring programs between different controller types. You can only relocate logic between the 984X and Models 680, 480, or 380.

Record (Dump)

The term dump is used on the tape loader, but it may be helpful to think of this operation as record. This operation records the program stored in a controller (including configuration table and traffic cop) onto a tape.

The record or dump operation can be done on a running controller. If you plan to verify a recorded program against a controller's memory, it is best to stop the controller before performing the record operation. A recorded program of a running controller will not complete verification without errors; the changing data in the running controller will not match the fixed data on the tape.

Verify

The verify function compares the information recorded on a tape with a controller's memory. This operation can be used to verify that a program was recorded or loaded correctly. You can also use verify as a security procedure to ensure that no changes have been made to the controller's memory.

The controller must be stopped to perform a verify operation (see Chapter 4), otherwise errors will occur because the changing data in the running controller will not match the fixed data on the tape.

Available Operations

The following is a list of the available operations in the tape loader. Just as on the P190 screen, they are separated into 584 and 984 Controller operations.

Although the list looks long, keep in mind that procedures for the 984 and 584 controllers are very similar. There are actually only five types of operations: controller operations (stop, start, clear), relocate logic, load, record, and verify.

984 Operations

- Stop a 984 controller
- Start a 984 controller
- Clear the memory of a 984 controller
- Record (dump) memory from a 984 controller to a tape
- Relocate logic from tape to a 984 controller
- Load memory into a 984 controller from a tape
- Verify the memory of a 984 controller against a tape
- Record (dump) extended memory registers from a 984 controller to a tape
- Load extended memory registers into a 984 controller from a tape
- Verify extended memory registers in a 984 controller against a tape

584 Operations

- Stop a 584 controller
- Start a 584 controller
- Clear the memory of a 584 controller
- Record (dump) memory from a 584 controller to a tape
- Relocate logic from tape to a 584 controller
- Load memory into a 584 controller from a tape
- Verify the memory of a 584 controller against a tape
- Record (dump) extended memory registers from a 584 controller to a tape
- Load extended memory registers into a 584 controller from a tape
- Verify extended memory registers in a 584 controller against a tape

Chapter 3
Starting Out

This chapter describes how you gain access to the tape loader operations using the Tape Loader Tape and a P190 Programmer.

Before You Begin

Before you can gain access to the tape loader operations, you must connect the P190 Programmer to the 584 or 984 Controller. Refer to the P190 Programmer User's Manual (ML-P190-USE) and the appropriate System Planning and Installation manual for information on general operation and switch settings. In general, you should perform the following steps before the Tape Loader Tape.

- | Procedure | How to Prepare for Using the Tape Loader Tape |
|-----------|---|
| Step 1 | Make sure that you have all the required software and hardware listed in Chapter 1. You should already be familiar with the P190 Programmer. Make sure you have blank tapes if necessary. |
| Step 2 | Ensure that the communications parameters set for the PC match those set for the P190 Programmer. |
| Step 3 | Connect the W907 (P190 to 984) or W190 (P190 to 584) cable to port 1 on the P190 Programmer and to the selected Modbus port on the controller. |

Starting Out

Once you have performed the preceding steps, you are ready to use the tape loader. The following steps take you from turning on the P190 to the point where you can perform tape loader operations.

Procedure **How to Start Out with the Tape Loader Tape**

Step 1 Turn on your P190 Programmer.

Step 2 Insert the Tape Loader Tape in the P190 tape drive. If it is the first tape inserted since power-up, it will load automatically. If you use another tape first, press the INIT and INIT LOCK keys simultaneously to load the tape.

Result The Tape Loader Menu is displayed as shown in Figure 3-1.

Figure 3-1 Tape Loader Menu

984	584	484	184/384	EVALUATE	ATTACH
OPERATIONS	OPERATIONS	OPERATIONS	OPERATIONS	TAPE	UNIT #

Evaluating a Tape

The evaluate tape function ensures that a blank or scratch (previously used) tape is free of defects and can be used to store data. Blank tapes and scratch tapes should be evaluated before being used to hold PC user logic.

Procedure

How to Evaluate a Tape

- Step 1 Press the Evaluate Tape software label key.
- Result The message "Insert blank tape and press Proceed" is displayed, along with the software label keys, Proceed and Cancel.
- Step 2 Load the blank or scratch tape into the P190 Programmer tape drive.
- Step 3 Press the Proceed software label key.
- Result The P190 Programmer starts to evaluate the tape. Two passes are made and the legends PASS 1 and PASS 2 are displayed.

You can stop the evaluation by pressing the Stop software label key. Then, you can continue evaluation by pressing the Proceed software label key. To rewind the tape and return to the Tape Loader menu, press the Abort software label key. When evaluation is complete, the message "Tape Verification Complete" is displayed.

Chapter 4
Controller Operations

This chapter describes how to perform controller operations: starting and stopping the controller, and clearing a controller's memory.

Controller Operations

There are three controller operations:

- starting a controller
- stopping a controller
- clearing a controller's memory

When you start a controller, it begins to scan (read inputs, solve logic, and write outputs). The contents of memory locations are changed due to new data coming in and to calculations performed within the user logic.

When you stop a controller, it stops scanning. The controller does not change the content of memory locations while stopped.

When you clear a controller's memory, the user logic and ASCII messages in the controller are deleted from controller memory. The memory locations holding the logic and messages are set to zero. The configuration table and traffic cop are not affected.

You cannot load to, relocate logic into, or verify a tape against a running controller. Use the STOP 584/984 function to stop the controller before you attempt these operations.

You can record (dump) a controller to tape while it is running, but if you later try to verify the tape against the controller, a large number of errors will be reported because of changing data. If possible, record a controller's memory while it is stopped.

Step 3 Press the PROCEED software label key to perform the operation. Press the CANCEL software label key to withdraw the request and go back to the 584 or 984 Controller main menu.

If you choose to proceed, the operation will be performed and the 584 or 984 Controller main menu will be displayed.

Chapter 5
Recording Controller Memory

This chapter describes how to record a controller's memory onto a tape.

Recording Controller Memory

When you record (dump) a controller's memory onto a tape, you create an image of the controller memory on the tape. This image includes user logic, ASCII messages, the configuration table, and the traffic cop. This gives you a backup of your program which can be loaded into another controller or into the same controller in the event of controller failure. All programs should be recorded on tape when first written and whenever changes are made.

The following procedure is for a 584 or 984 Controller and starts from the 584 or 984 Controller main menu.

Procedure	How to Record a Controller Memory
Step 1	Make sure you have a blank tape or scratch tape on which the memory will be recorded.
Step 2	Press the DUMP 584/984 software label key.
Result	A prompt and several software labels are displayed as shown in Figure 5-1.

Figure 5-1 Record Controller Memory Screen

```
INSERT BLANK DISK AND PRESS PROCEED
UNIT:001                                DATE:021985 AR:00001
ENTER      ENTER                          PROCEED  CANCEL
TITLE      DATE
```

Step 3 Press the ENTER TITLE software label key and then type in a title for the controller memory to be recorded. The title can be up to 52 characters long. If you try to enter more than 52 characters, an error message ("End of Title") is displayed.

Result The title is displayed at the top of the screen:

TITLE: 984B TECH PUBS

UNIT:001

DATE:021985 AR:00001

END
TITLE

Step 4 Press the END TITLE software label key.

Step 5 Press the ENTER DATE software label key to enter a date for the memory being recorded. Enter a six digit date (for example, 042986).

Result The date is displayed as you enter it. Once the sixth number is entered, the date is accepted and erased from the screen.

Step 6 Insert the blank or scratch tape into the tape drive and press the PROCEED software label key. If you decide not to record memory, press the CANCEL software label key to abort the operation.

Result The title, date, and the status of the operation are displayed.

TITLE: TECH PUBS 984B
DATE: 042986

EXEC #02353

TRANSFER ADDRESS: NONE

ACTION	COUNT	MEMORY TYPE	ADDRESS
DUMPING	032	WORDS	0013F

TOTAL RETRY COUNT = 0000

UNIT:001

DATE:021985 AR:00001

STOP

You have the option of stopping the record operation temporarily by pressing the STOP software label key. When STOP is selected, you can then choose to keep recording by pressing the PROCEED software label key or stop recording by pressing the ABORT software label key.

After the controller memory has been recorded, the message "DUMP COMPLETE" is displayed and you are returned to the 584 or 984 Controller main menu.

DUMP COMPLETE
UNIT:001

DATE:021985 AR:00001

CONTROLLER	984 XMEM	RELOCATE	LOAD	DUMP	VERFY DISK	RELEASE
OPERATIONS	FUNCTIONS	LOGIC	984	984	WITH 984	984

Chapter 6
Loading Controller Memory

This chapter describes how to load a previously recorded controller memory from tape to a controller.

Loading a Controller

When you load a tape into a controller, you transfer the information from the tape to the controller memory. This information includes user logic, ASCII messages, the configuration table, and the traffic cop.

To load a controller, you must have a program stored on a tape. Before you load a program into a controller, make sure that the controller has enough memory to hold the recorded program and can perform all the functions in the program.

The following procedure is for a 584 or 984 Controller and starts from the 584 or 984 Controller main menu.

Procedure	How to Load a Controller from a Tape.
Step 1	Press the LOAD 584/984 software label key.
Result	A prompt and the PROCEED and CANCEL software labels are displayed:

INSERT DUMP TAPE AND PRESS PROCEED
UNIT:001

DATE:021985 AR:00001

PROCEED CANCEL

Step 2 Insert the tape holding the recorded program into the tape drive.

- Press the PROCEED software label key to start the load operation.
- If you choose not to load the controller, press the CANCEL software label key.

Result The title and date stored on the tape are displayed along with the status of the load operation:

TITLE: TECH PUBS 984B
DATE: 042985

EXEC #02353

TRANSFER ADDRESS: NONE

ACTION	COUNT	MEMORY TYPE	ADDRESS
LOADING	171	WORDS	F02AC

TOTAL RETRY COUNT = 0000

UNIT:001

DATE:021985 AR:00001

PROCEED ^ ABORT

Step 3 You have the option of stopping the load operation temporarily by pressing the STOP software label key.

- If STOP is selected, you can then choose to keep loading by pressing the PROCEED software label key or stop loading by pressing the ABORT software label key.

Result After the program has been loaded into controller memory, the message "LOAD COMPLETE" and new baud rate data are displayed and you are returned to the 584 or 984 Controller main menu.

LOAD COMPLETE - NEW PORT 1,2,&3 BAUD RATES: 9600,9600,9600

UNIT:001

DATE:021985 AR:00001

CONTROLLER	984 XMEM	RELOCATE	LOAD	DUMP	VERIFY DISK	RELEASE
OPERATIONS	FUNCTIONS	LOGIC	984	984	WITH 984	984

Chapter 7
Relocating Logic

This chapter describes how to load only user logic and ASCII messages from a previously recorded program tape to a controller.

Relocating Logic into a Controller

Relocate logic is a specialized load operation. When you relocate logic from a tape to a controller, you transfer only part of the information on the tape into the controller memory. This information includes user logic and ASCII messages. The configuration table and the traffic cop are not loaded into the controller.

To relocate logic to a controller, you must have a program stored on a tape. Before you load a program into a controller, make sure that the controller has enough memory to hold the recorded program and can perform all the functions in the program.

The following procedure is for a 584 or 984 Controller and starts from the 584 or 984 Controller main menu.

- Procedure** How to Relocate Logic from a Tape to a Controller.
- Step 1** Press the RELOCATE LOGIC software label key.
- Result** A prompt and the PROCEED and CANCEL software labels are displayed:

INSERT DUMP DISK AND PRESS PROCEED
UNIT:001

DATE:021985 AR:00001

PROCEED CANCEL

Step 2 Insert the tape holding the recorded program into the tape drive.

Step 3 Press the PROCEED software label key to start the relocate logic operation.

- If you choose not to relocate logic into the controller, press the CANCEL software label key.

Result The title and date stored on the tape are displayed along with the status of the operation:

TITLE: TECH PUBS 984B
DATE: 042986

EXEC #02353

TRANSFER ADDRESS: NONE

ACTION	COUNT	MEMORY TYPE	ADDRESS
LOADING	171	WORDS	F02AC

TOTAL RETRY COUNT = 0000

UNIT:001

DATE:021985 AR:00001

PROCEED ABORT

Step 4 You have the option of stopping the operation temporarily by pressing the STOP software label key.

If STOP is selected, you can then choose to keep loading logic by pressing the PROCEED software label key or stop loading logic by pressing the ABORT software label key.

Result After the logic has been loaded into controller memory, the message "RELOCATION COMPLETE" is displayed and you are returned to the 584 or 984 Controller main menu.

RELOCATION COMPLETE
UNIT:001

DATE:021985 AR:00001

CONTROLLER	984 XMEM	RELOCATE	LOAD	DUMP	VERIFY DISK	RELEASE
OPERATIONS	FUNCTIONS	LOGIC	984	984	WITH 984	984

Chapter 8
Verifying Controller Memory

This chapter describes how to compare the content of a tape with controller memory.

Verifying a Controller Memory Against a Tape

The verify operation does a word for word and node for node comparison between the controller memory and the memory recorded on a tape. This operation can be used as a security procedure to ensure that no changes have been made to user logic. It may also be used to verify that a load or record (dump) operation was completed accurately.

The memory type shown on the screen during the verification process can be one of two types: words and nodes. A miscompare caused by the normal operation of the controller will be of the memory type "words". For example, if a controller has been stopped or started since the tape was recorded, there will be a miscompare displayed and the memory type will be "words". Discrete and register data changes are also reflected as word miscompares; for example, a change in a timer value is a word miscompare.

If a miscompare occurs when the memory type is "nodes", logic has been changed. You should check the program against hardcopy program and process documentation.

The following procedure is for a 584 or 984 Controller and starts from the 584 or 984 Controller main menu.

Procedure	How to Verify Controller Memory Against a Tape
Step 1	Press the VERIFY TAPE WITH 584/984 software label key.
Result	A prompt and the software labels PROCEED and CANCEL are displayed.

INSERT DUMP DISK AND PRESS PROCEED
UNIT:001

DATE:021985 AR:00001

PROCEED CANCEL

- Step 2** Insert the tape holding the previously recorded program and press the PROCEED software label key.
- Result** The tape title, creation date, and a status area are displayed on the screen as shown in Figure 8-1.

Figure 8-1 Verify Controller Screen

```

TITLE: TECH PUBS 984B                               EXEC #02353
DATE: 042986

TRANSFER ADDRESS: NONE

ACTION          COUNT          MEMORY TYPE      ADDRESS
-----
VERIFYING      032              WORDS            0013F

TOTAL RETRY COUNT = 0000
LAST MISCOMPARE:

                ADDRESS          MEMORY           DISK
                -----
                00067            8000             0000

UNIT:001

STOP           PAUSE
              CONTINUE

```

- Step 3** Select whether or not you want to view each miscompare using the PAUSE/CONTINUE toggle key. Up or down arrows in the software label indicate the selection. The default state is PAUSE. The pause setting means that verification stops when a miscompare is found. The continue setting means that verification continues even if a miscompare is found.
- The pause option allows you to view each miscompare. You must press the PROCEED software label key to restart verification after each miscompare.
- Step 4** To stop the verification temporarily, press the STOP software label key.
- Press the PROCEED software label key to restart the verification.
 - Press the ABORT software label key to cancel the operation and return to the 584/984 main menu.
- Result** When the verification is complete, the 584/984 main menu is displayed with a message telling you how many miscompares were found.

Chapter 9
Extended Memory Functions

This chapter describes how to record (dump), load, and verify extended memory registers.

Extended Memory Functions

Extended memory is a way of storing large amounts of numeric data separate from user logic. The 6XXX extended memory registers are stored in files and are transferred to and from user logic by XMEM READ and XMEM WRIT function blocks. Because of this structure, extended memory registers are recorded, loaded, and verified apart from user logic. A separate set of functions is provided.

The following procedures are for a 584 or 984 Controller and start from the 584 or 984 Controller main menu.

Procedure	How to Record Extended Memory
Step 1	Make sure you have a formatted blank tape or scratch tape on which the extended memory will be recorded.
Step 2	Press the 584/984 XMEM FUNCTIONS software label key.
Step 3	Press the DUMP 584/984 XMEM software label key.
Result	A prompt and several software labels are displayed as shown in Figure 9-1.

Figure 9-1 Record Controller Memory Screen

UNIT:001

DATE:021985 AR:00001

LOAD DUMP VERIFY DISK PREVIOUS
984 XMEM 984 XMEM WITH XMEM MENU

Step 4 Press the ENTER TITLE software label key and then type in a title for the extended memory to be recorded. The title can be up to 52 characters long. If you try to enter more than 52 characters, the title will end automatically and only the first 52 characters will be recorded.

Result The title is displayed at the top of the screen:

TITLE: TECH PUBS 984B

Step 5 Press the END TITLE software label key.

Step 6 Press the ENTER DATE software label key to enter a date for the extended memory being recorded. Enter a six digit date (for example, 042986).

Result The date is displayed as you enter it. Once the sixth number is entered, the date is accepted and erased from the screen.

Step 7 Insert the blank or scratch tape into the tape drive and press the PROCEED software label key. If you decide not to record extended memory, press the CANCEL software label key to abort the operation.

Result The title, date, and the status of the operation are displayed.

TITLE: TECH PUBS 984B XMEM
DATE: 042986

EXEC #02353

ACTION	COUNT	MEMORY TYPE	FILE	REGISTER
DUMPING XMEM	171	6X REGISTERS	01	60855

TOTAL RETRY COUNT = 0000

UNIT:001

DATE:021985 AR:00001

PROCEED ABORT

You have the option of stopping the record operation temporarily by pressing the STOP software label key. When STOP is selected, you can then choose to keep recording by pressing the PROCEED software label key or stop recording by pressing the ABORT software label key.

After the extended memory has been recorded, the message "DUMP COMPLETE" is displayed and you are returned to the 584 or 984 Controller main menu.

Procedure	How to Load Extended Memory from a Tape.
Step 1	Press the 584/984 XMEM FUNCTIONS software label key.
Step 2	Press the LOAD 584/984 XMEM software label key.
Result	A prompt and the PROCEED and CANCEL software labels are displayed.

Step 3 Insert the tape holding the recorded memory into the tape drive.

- Press the PROCEED software label key to start the load operation.
- If you choose not to load the controller, press the CANCEL software label key.

Result The title and date stored on the tape are displayed along with the status of the load operation:

TITLE: TECH PUBS 9848 XMEM
DATE: 042986

EXEC #02353

ACTION	COUNT	MEMORY TYPE	FILE	REGISTER
LOADING XMEM	171	6X REGISTERS	01	60000

TOTAL RETRY COUNT = 0000

UNIT:001

DATE:021985 AR:00001

STOP

Step 4 You have the option of stopping the load operation temporarily by pressing the STOP software label key.

If STOP is selected, you can then choose to keep loading by pressing the PROCEED software label key or stop loading by pressing the ABORT software label key.

Result After the extended memory has been loaded into the controller, the message "LOAD COMPLETE" is displayed and you are returned to the 584 or 984 Controller main menu.

Procedure How to Verify Controller Extended Memory Against a Tape.

Step 1 Press the 584/984 XMEM FUNCTIONS software label key.

Step 2 Press the VERIFY DISK WITH XMEM software label key.

Result A prompt and the software labels PROCEED and CANCEL are displayed.

Step 3 Insert the tape holding the previously recorded extended memory and press the PROCEED software label key.

Result The tape title, creation date, and a status area are displayed on the screen as shown in Figure 9-2.

Figure 9-2 Verify Controller Screen

TITLE: TECH PUBS 984B XMEM
DATE: 042986

EXEC #02353

ACTION	COUNT	MEMORY TYPE	FILE	REGISTER
VERIFYING XMEM	171	6X REGISTERS	01	63420

TOTAL RETRY COUNT = 0000
LAST MISCOMPARE:: NONE

FILE	REGISTER	MEMORY	DISK
------	----------	--------	------

UNIT:001

DATE:021985 AR:00001

PROCEED ABORT

CONTINUE

Step 4 Select whether or not you want to view each miscompare using the PAUSE/CONTINUE toggle key. Up or down arrows in the software label indicate the selection. The default state is PAUSE. The pause setting means that verification stops when a miscompare is found. The continue setting means that verification continues even if a miscompare is found.

The pause option allows you to view each miscompare. You must press the PROCEED software label key to restart verification after each miscompare.

Step 5 To stop the verification temporarily, press the STOP software label key.

- Press the PROCEED software label key to restart the verification.
- Press the ABORT software label key to cancel the operation and return to the 584/984 main menu.

Result When the verification is complete, the 584/984 main menu is displayed with a message telling you how many miscompares were found.

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Examples	- Are the examples helpful and realistic? Are there enough examples?	<input type="checkbox"/>				
Organization	- Is the organization of the manual logical? Is it easy to find what you are looking for?	<input type="checkbox"/>				
Illustrations	- Are the illustrations clear and useful?	<input type="checkbox"/>				
Physical Attractiveness	- What did you think of the layout, printing, binding, etc?	<input type="checkbox"/>				

Are there any terms or concepts that are not defined clearly? Y N
If so, what are they? _____

After reading this document, are you able to use the equipment? Y N

What errors did you find in the manual? (Please include page numbers. Attach an extra sheet if necessary.)

Do you have any comments or suggestions? _____

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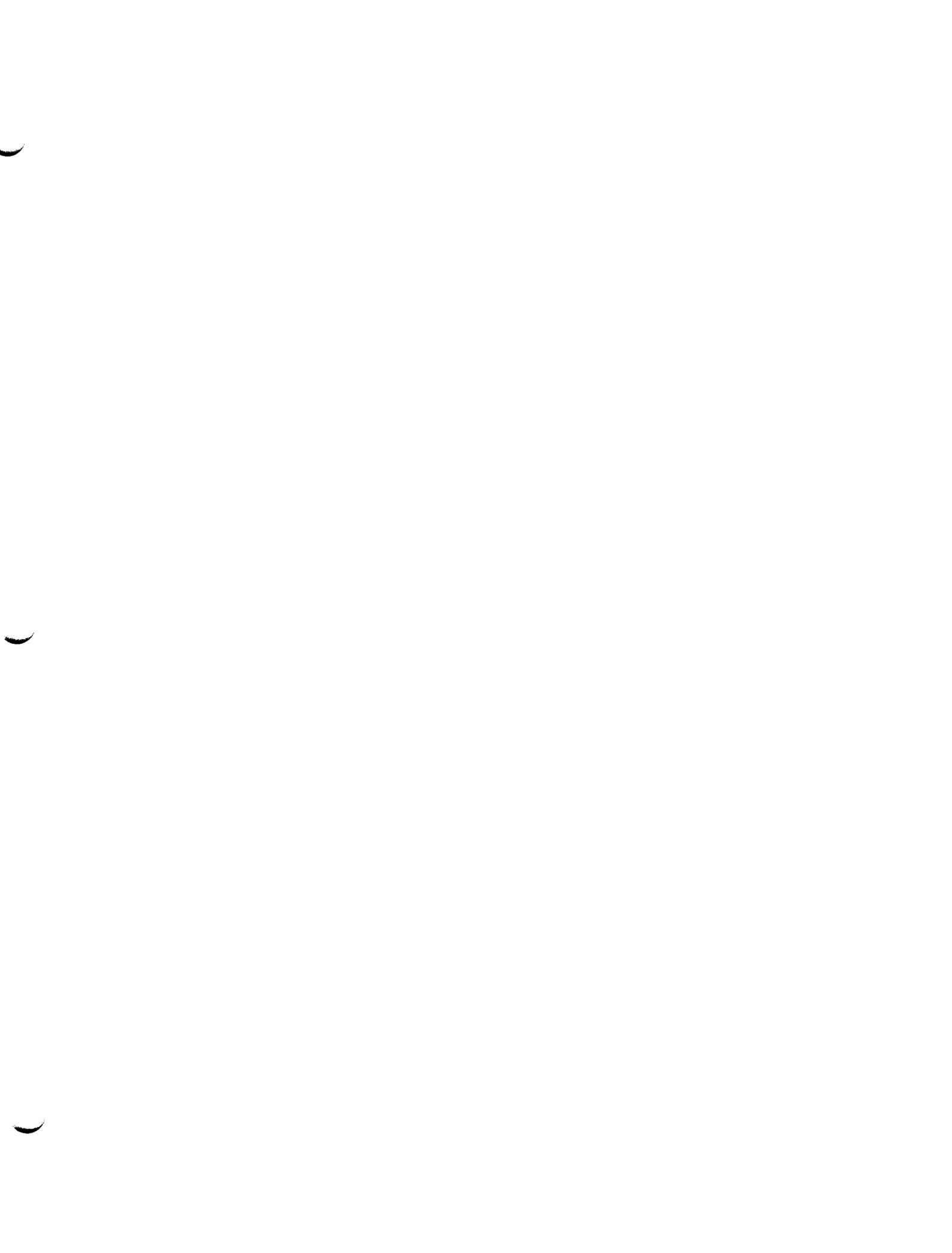
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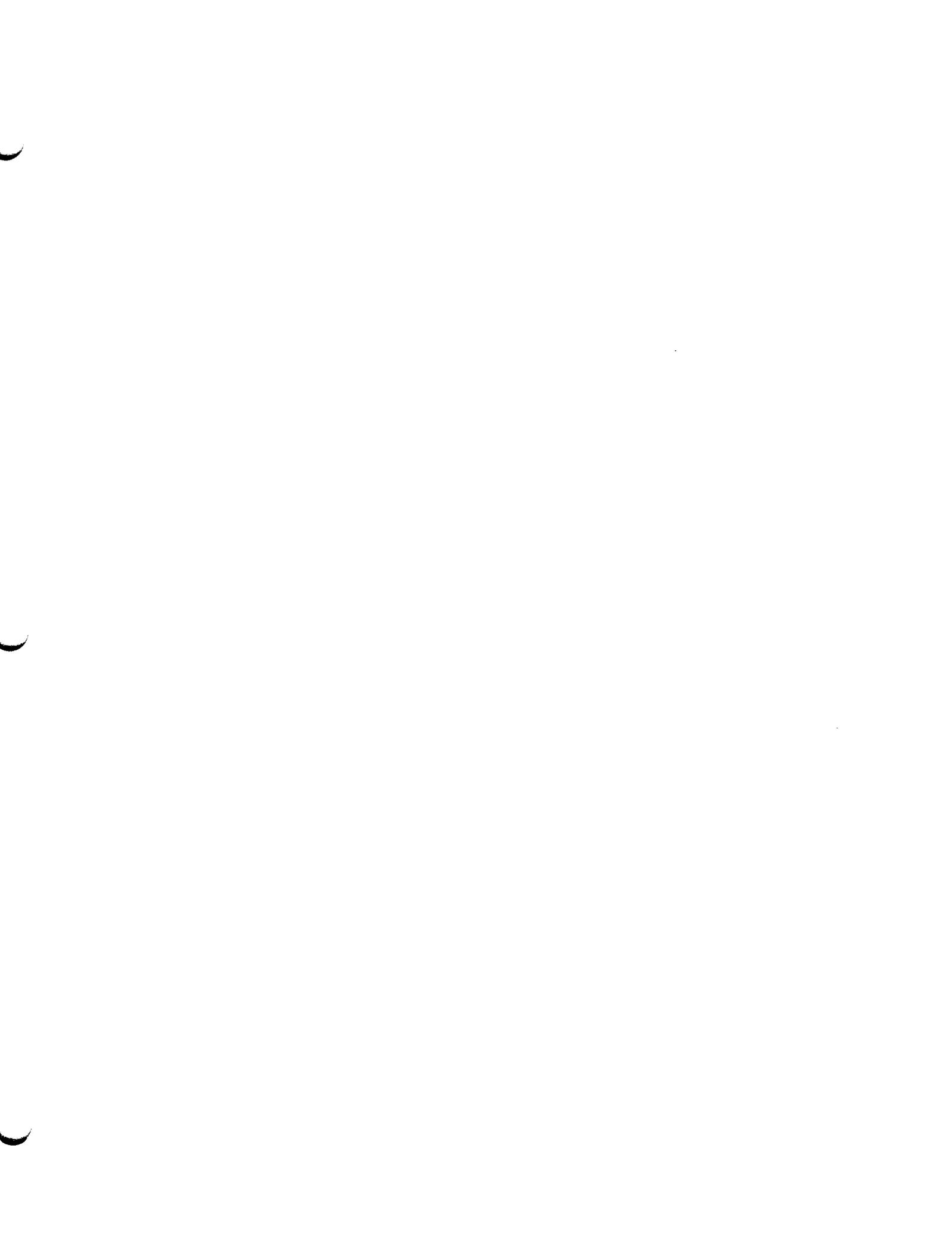
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