Tektronix®

8500

MODULAR MDL SERIES

MEMORY ALLOCATION CONTROLLER

INSTALLATION SERVICE

INSTRUCTION MANUAL

Tektronix®
COMMITTED TO EXCELLENCE

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

PLEASE CHECK FOR CHANGE INFORMATION AT THE REAR OF THIS MANUAL.

This manual supports the following TEKTRONIX product:

8550F06

8500
MODULAR MDL SERIES
MEMORY ALLOCATION CONTROLLER
INSTALLATION SERVICE

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

070-3925-00
Product Group 61

Serial Number B011092

First Printing JAN 1982
Revised JAN 1984

Printed in U.S.A.

PREFACE

ABOUT THIS MANUAL

This manual tells how to install the 8500 MDL Series Memory Allocation Controller in an 8301 Microcomputer Development Unit or an 8540 Integration Unit.

CAUTION

The Memory Allocation Controller should only be installed by a Tektronix Field Service Specialist. Tektronix, Inc., is not obligated to furnish service to repair damage resulting from attempts by unauthorized personnel to install this product. Please call your nearest Tektronix Field Service Office for installation.

EQUIPMENT NOMENCLATURE

Throughout this manual, the terms "development system" and "the mainframe" apply equally to the 8301 Microprocessor Development Unit and to the 8540 Integration Unit, unless otherwise stated.

MANUAL ORGANIZATION

The 8500 MDL Series Memory Allocation Controller Installation Manual is divided into four sections:

- Section 1 contains general information about the Memory Allocation Controller, including specifications.
- Section 2 contains information about jumper and switch settings.
- Section 3 provides installation procedures for the Memory Allocation Controller.
- Section 4 discusses verification of the installed Memory Allocation Controller.

DOCUMENTATION OVERVIEW

Support documentation for TEKTRONIX development systems consists of three groups of manuals: service manuals, installation manuals, and user's manuals.

SERVICE MANUALS

Service manuals provide the information necessary to perform system testing, to isolate hardware problems, and to repair system components. Service manuals are identified by their blue covers and may be purchased from Tektronix as optional accessories.

The following manuals provide service information for the Memory Allocation Controller and its host systems:

- 8500 MDL Series Memory Allocation Controller Service Manual
- 8301 Microprocessor Development Unit Service Manual
- 8540 Integration Unit Service Manual

Also available are service manuals for Emulator Processor modules, peripheral equipment, and other optional features, such as the PROM Programmer Controller.

INSTALLATION MANUALS

Installation manuals or guides tell how to unpack and install equipment, and how to verify the equipment's proper operation. Installation manuals may be separate manuals with blue covers, or may be provided as supplements to existing publications. Installation manuals are provided with system components as standard accessories.

The following manuals provide installation information for the Memory Allocation Controller's host systems:

- 8550 Microcomputer Development Lab Installation Guide
- 8540 Integration Unit Installation Guide

USER'S MANUALS

User's manuals tell how to operate the development system and its peripheral devices. User's manuals are identified by their grey covers and are provided as standard accessories with the development system or option.

For an overview of your development system and its capabilities, the following manuals may be of interest:

- 8550 Microcomputer Development Lab System User's Manual
- 8540 Integration Unit System User's Manual

To derive the greatest benefit from this manual, you should be familiar with your TEKTRONIX microcomputer development system, as described in the appropriate manual listed here.

GENERAL INFORMATION

REVISION HISTORY

As this manual is revised and reprinted, revision history information is included on the text and diagram pages. Original manual pages are identified with an '@' symbol at the bottom inside corner of the page. When existing pages are revised, the '@' symbol is replaced with a revision date (REV OCT 1981). New pages added to a section, whether they contain old, new, or revised information, will be identified with the '@' symbol and a date (@ OCT 1981).

CHANGE INFORMATION

Change notices are issued by Tektronix, Inc., to document changes to the manual after it has been published. Change information is located at the back of this manual, following the yellow tab marked "CHANGE INFORMATION". When you receive the manual, you should enter any change information into the body of the manual, according to the instructions on the change notice.

CONTENTS

ILLUSTRATIONS

TABLES

OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

TERMS

In This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

As Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS

As Marked on Equipment

 DANGER high voltage.

 Protective ground (earth) terminal.

 ATTENTION - Refer to manual.

SAFETY PRECAUTIONS

Grounding the Product

The product is grounded through the grounding conductors in the interconnecting cables. To avoid electrical shock, plug the supporting system's power cord into a properly wired receptacle. A protective ground connection by way of the grounding conductor in the system power cord is essential for safe operation.

Use the Proper Fuse

To avoid fire hazard, use only the fuse specified in the parts list for your product. Be sure the fuse is identical in type, voltage rating, and current rating.

Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an atmosphere of explosive gases.

Do Not Remove Covers or Panels

To avoid personal injury, do not remove covers or panels from this product. Do not operate the product without the covers and panels properly installed.

SERVICING SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

(Refer also to the preceding Operators Safety Summary)

DO NOT SERVICE ALONE

Do not perform internal service or adjustment on this product unless another person capable of rendering first aid and resuscitation is present.

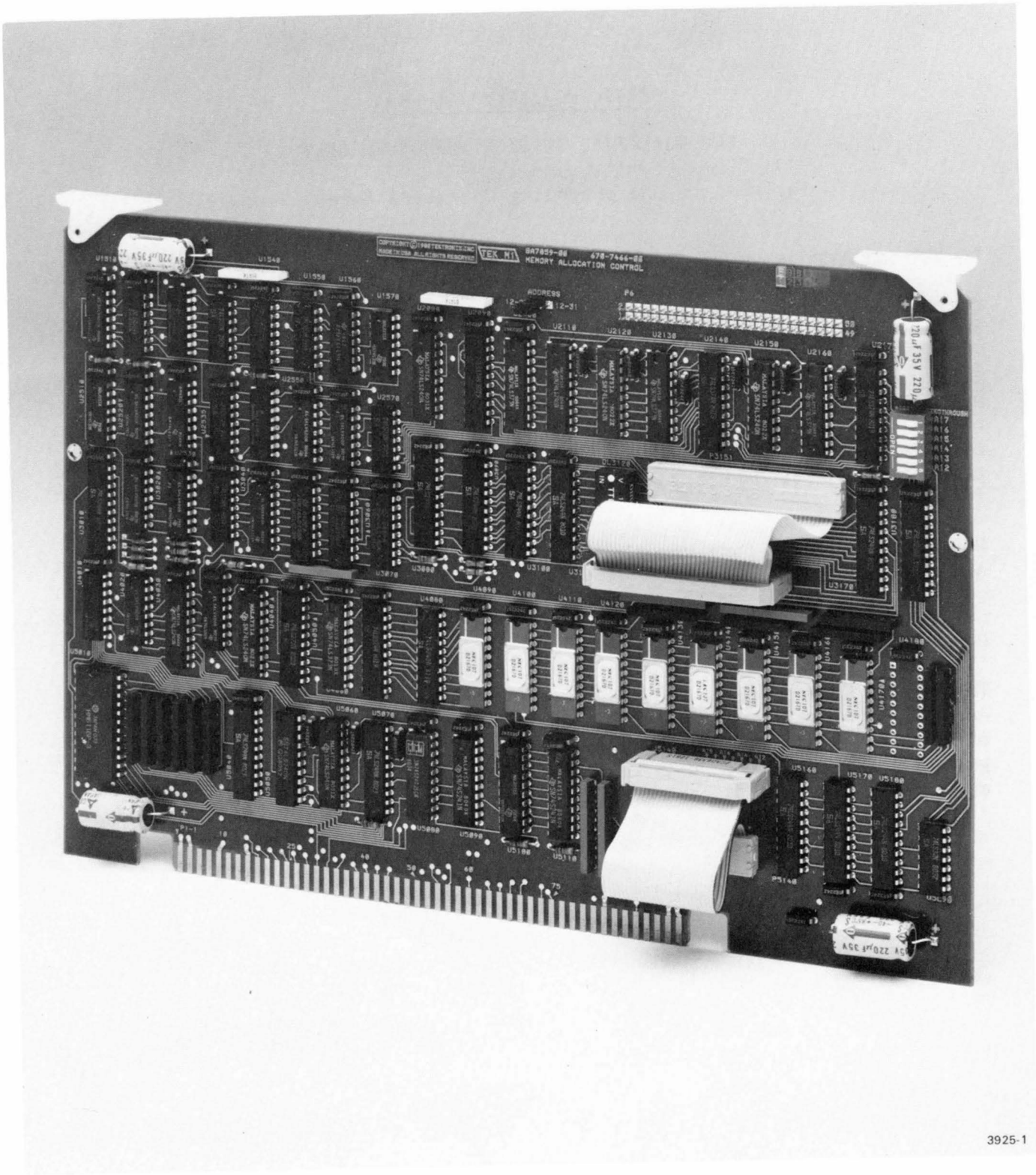
USE CARE WHEN SERVICING WITH POWER ON

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

POWER SOURCE

The system that supports this product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the supporting system's power cord is essential for safe operation of this product.



8500 MDL Series Memory Allocation Controller.

Section 1

GENERAL INFORMATION

INTRODUCTION

The 8500 MDL Series Memory Allocation Controller (MAC) facilitates the development of microprocessor-based prototypes that have large memory addressing capabilities (typically, over 256K bytes). The MAC provides a means of mapping selected blocks of the development system's program memory into any part of the target microprocessor's address space.

This section provides a brief description of the MAC, and the instrument's specifications.

DESCRIPTION

The MAC is a single circuit board that plugs into the development system's Main Interconnect board. The MAC is also connected to the emulator (and optionally to the Trigger Trace Analyzer) through a connector on the top of the MAC board.

Figure 1-1 shows how the MAC functions within the development system. The top plane bus, which links the MAC with the emulator and optional Trigger Trace Analyzer (TTA), carries several signals generated by the emulator. Among these signals are the upper bits (A12 and above) of all addresses generated by the target microprocessor. These addresses are referred to as logical addresses. The MAC translates logical addresses into physical addresses. Physical addresses access the development system's program memory, via the Main Interconnect board. Data bits from the memory are then transmitted across the Main Interconnect board to the emulator.

User commands configure the MAC relocation circuits that translate logical addresses to physical addresses. When these and other MAC circuits are programmed by the System Processor, all data, addresses, and control signals are supplied to the MAC through the backplane connector.

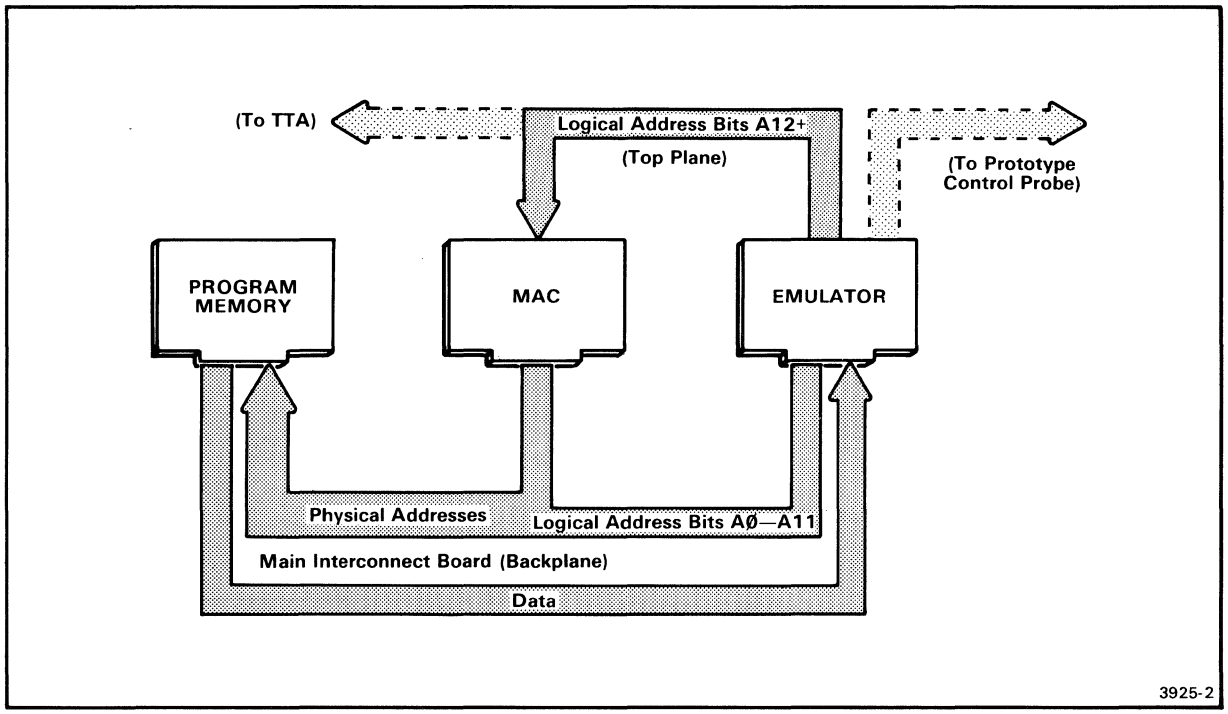


Fig. 1-1. How the MAC functions within the development system.

OPERATING INFORMATION

COMMANDS

Four operating system commands control operation of the MAC: AL, DEAL, MEM, and NOMEM. More information about these commands is available in your system user's manual. The following paragraphs provide a general overview of the MAC commands.

AL — Allocate. Assigns blocks of physical memory to corresponding blocks of logical addresses. Optional command parameters specify the boundaries of the assigned logical address block, and the microprocessor memory spaces affected. When used without parameters, AL displays a list of all memory allocations. (A similar AL command performs this function for standard address space emulators; however, it is not a MAC command.)

DEAL — De-allocate. Removes a current allocation of a physical memory block. DEAL accepts additional parameters similar to those used with the AL command.

MEM — Memory. Indicates that the specified memory block exists in the prototype. MEM accepts additional parameters similar to those used with the AL command. When used without parameters, MEM displays all current assignments of the MEM command.

NOMEM — No memory. Indicates that there is no memory in the prototype for the specified range of addresses. NOMEM accepts additional parameters similar to those used with the MEM command. When used without parameters, NOMEM displays all current assignments of the NOMEM command.

The AL and DEAL commands operate independently of the MEM and NOMEM commands. The standard operating system command MAP, in conjunction with the emulation mode, determines if the emulator will address development system or prototype memory for a specific memory access. (Refer to your system user's manual for more information about the MAP command.)

All four MAC commands are a part of the emulator software. If the MAC is not needed with a given emulator, the development system will not recognize MAC commands.

BOARD CONFIGURATION

Three jumpers and a set of switches on the MAC configure the MAC for a specific emulator. Procedures for setting the jumpers and switches are presented in Section 2 of this manual.

NOTE

Be sure to verify MAC configuration every time you install an emulator.

SPECIFICATIONS

The following tables contain the specifications for the MAC's electrical, environmental, and physical characteristics.

Table 1-1
Electrical Characteristics

Characteristic	Performance Requirement	Supplemental Information
Input Power	+5.2 Vdc +1%/-2%	@ 2.8 A (typical, board selected)
Power Dissipation	14.6 W	(typical, board selected)

Table 1-2
Environmental Characteristics

Characteristic	Description
Temperature	
Operating	0° C to 50° C (+32° F to +122° F)
Storage	-55° C to 75° C (-67° F to +167° F)
Humidity	0 to 90%, non-condensing
Altitude	
Operating	To 4 500 m (15,000 feet)
Storage	To 15 000 m (50,000 feet)

Table 1-3
Physical Characteristics

Characteristic	Description
Weight	700 grams (1.5 pounds)
Height	188 mm (7.4 inches)
Length	279 mm (11.0 inches)

Section 2

JUMPERS AND SWITCHES

ABOUT THIS SECTION

This section is divided into two parts. The first part describes MAC jumper and switch functions. The second part contains procedures for setting the jumpers and switches.

DESCRIPTION

The MAC board contains three jumpers and one set of switches:

- The Address Range jumper (J2101).
- The Relocation jumpers (J3151/P3151 and J5140/P5140).
- The Address Feedthrough switches (SW2180).

Figure 2-1 shows the locations of these jumpers and switches.

ADDRESS RANGE JUMPER

This jumper enables or disables logical address lines A26--A31 on the MAC. Some emulators use these lines strictly for address signals; other emulators use these lines to transmit data to the TTA.

RELOCATION JUMPERS

These jumpers determine the size of the relocated memory block. Each jumper consists of a set of square pins and a cable connector. Both jumpers are marked with seven positions (A12--A18).

The internal relocation circuits of the MAC accept the 14 most significant bits of the logical address generated by the emulator. Since the maximum address space varies from one emulator to another, the Relocation jumpers are required to determine which bits of logical address bits A12--A31 are the 14 most significant for a given emulator.

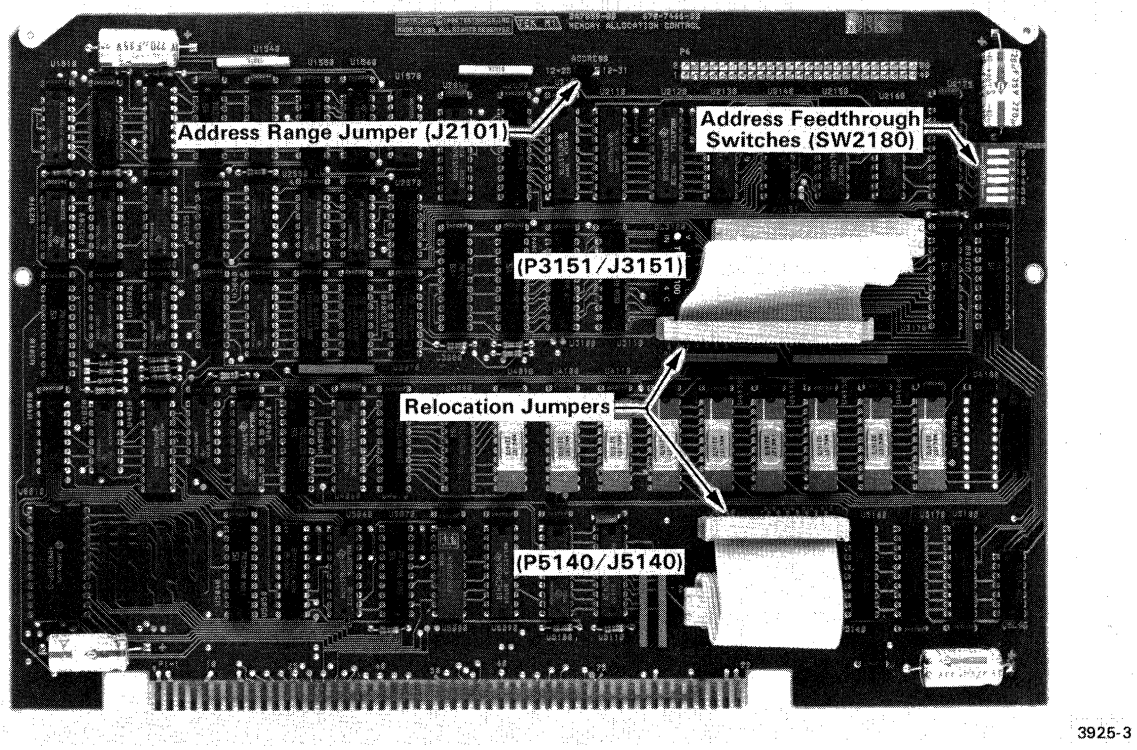


Fig. 2-1. MAC jumper and switch locations.

For example, with an emulator that generates 26-bit or smaller addresses (such as the Z8000 or 68000 emulators), both jumpers are normally set to position A12; this position routes lines A12--A25 (the most significant bits) to the MAC's relocation circuits. Line A12 toggles for every 4K segment of memory, resulting in a block size of 4K. Similarly, with an emulator that generates 29-bit addresses, both jumpers are normally set to A15, routing lines A15--A28 to the internal circuits. Line A15 toggles for every 32K segment of memory, and the resulting block size is 32K.

ADDRESS FEEDTHROUGH SWITCHES

This set of six switches works with the Relocation jumpers to determine the size of the relocated memory block. When the Relocation jumpers are moved from A12 to a higher position, one or more lines (starting with A12) are disconnected from the relocation circuit. Switches in SW2180, corresponding to the disconnected lines, are closed to route these lines directly to the physical address bus.

CONFIGURATION PROCEDURES

Configuration of the MAC consists of the following procedures:

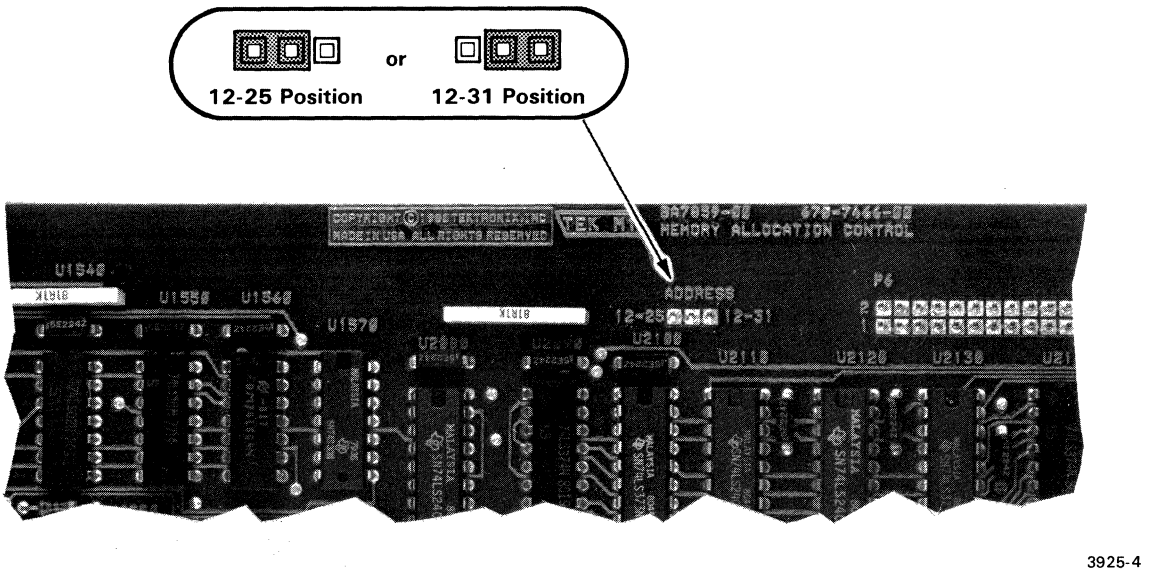
- Setting the Address Range jumper.
- Setting the Relocation jumpers.
- Setting the Address Feedthrough switches.

NOTE

Before you can configure the MAC jumpers and switches, you must know the maximum number of logical address bits generated by the emulator. This number may not be the same as the number of address bits generated by the target microprocessor; some emulators translate microprocessor status signals into additional address bits. Refer to the installation manual for your emulator to determine the number of logical address bits that the emulator generates.

SETTING THE ADDRESS RANGE JUMPER

If the emulator generates 26 or fewer address bits, set J2101 to the 12--25 position. If the emulator generates 27 or more address bits, set J2101 to the 12--31 position. Figure 2-2 illustrates these positions.



3925-4

Fig. 2-2. Address Range jumper (J2101) settings.

SETTING THE RELOCATION JUMPERS

1. Determine the desired block size for your application. Table 2-1 lists the minimum block sizes imposed by emulator address ranges.

Table 2-1
Minimum Block Sizes

Total Number of Logical Address Bits	Minimum Block Size (in bytes)
26 or less	4K
27	8K
28	16K
29	32K
30	64K
31	128K
32	256K

2. Locate the proper position for the Relocation jumpers in Table 2-2. The same position is used for both jumpers.

Table 2-2
Relocation Jumper Positions

Block Size	Jumper Position
4K	A12
8K	A13
16K	A14
32K	A15
64K	A16
128K	A17
256K	A18

3. As shown in Fig. 2-3, attach cable connector P3151 to the adjacent set of square pins (J3151). Be sure to align the connector index mark with the proper position mark on the circuit board, as determined from Table 2-2.

NOTE

Depending on the jumper positions, some square pins will be exposed.

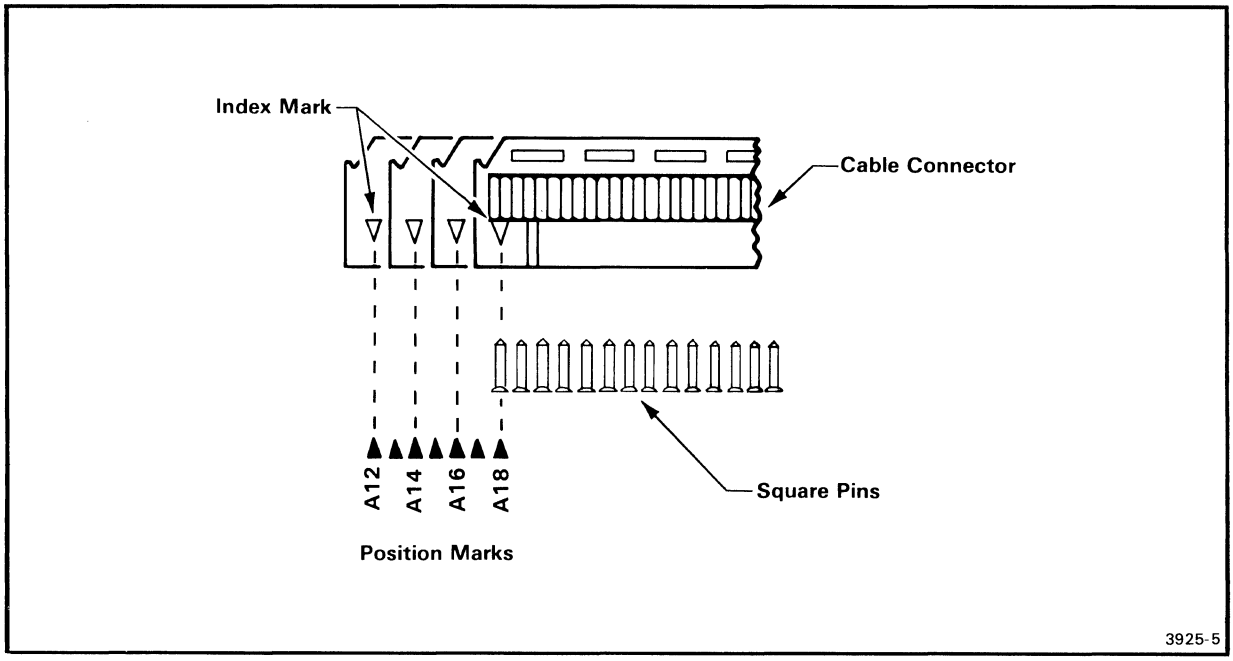


Fig. 2-3. Connecting P3151 to J3151.

4. As shown in Fig. 2-4, connect P5141 to J5141. Be sure to align the connector index mark with the proper position mark on the circuit board.

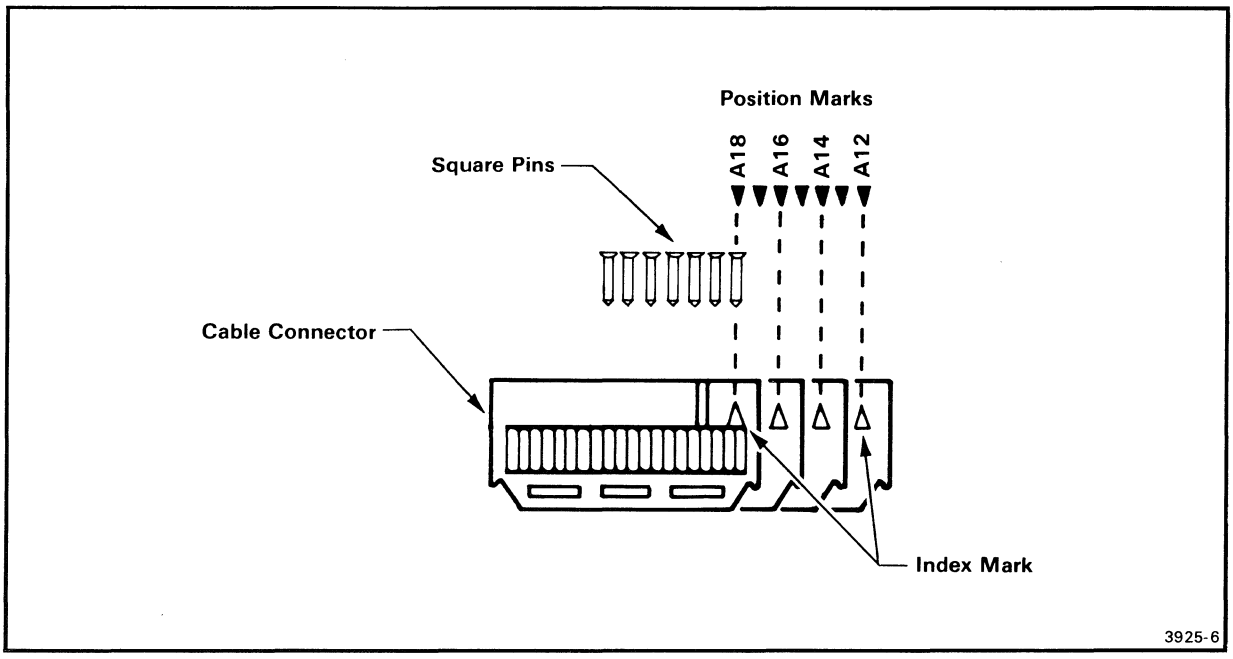


Fig. 2-4. Connecting P5140 to J5140.

SETTING THE ADDRESS FEEDTHROUGH SWITCHES

Set the Address Feedthrough switches to correspond to the desired block size, as shown in Table 2-3.

NOTE

On the switch pack, the open position is labeled OPEN or OFF.

Table 2-3
Address Feedthrough Switch Settings

	Switch Positions					
Block Size	A12	A13	A14	A15	A16	A17
4K	open	open	open	open	open	open
8K	closed	open	open	open	open	open
16K	closed	closed	open	open	open	open
32K	closed	closed	closed	open	open	open
64K	closed	closed	closed	closed	open	open
128K	closed	closed	closed	closed	closed	open
256K	closed	closed	closed	closed	closed	closed

CAUTION

Make sure that the Address Feedthrough switches are set correctly. Incorrect switch settings may result in damage to the MAC.

The MAC is now ready for installation in the development system. Installation procedures are described in Section 3 of this manual.

Section 3

INSTALLATION PROCEDURES

INTRODUCTION

This section describes how to install the MAC in the development system. You may need to repeat part or all of this procedure each time an you install an emulator.

CAUTION

Some emulators contain their own memory allocation circuits. (These emulators are identified in their installation manuals.) With such emulators, the MAC is not necessary and should not be installed. Excessive power consumption may result.

INSTALLING THE MAC

WARNING

Dangerous voltages exist at several points within the development system. To avoid personal injury, be sure that the development system's primary power switch is OFF and that the line cord is disconnected.

1. Place the development system on the workbench so that you are facing the rear panel.

2. Remove the upper left and upper right cover retainers. See Fig. 3-1.

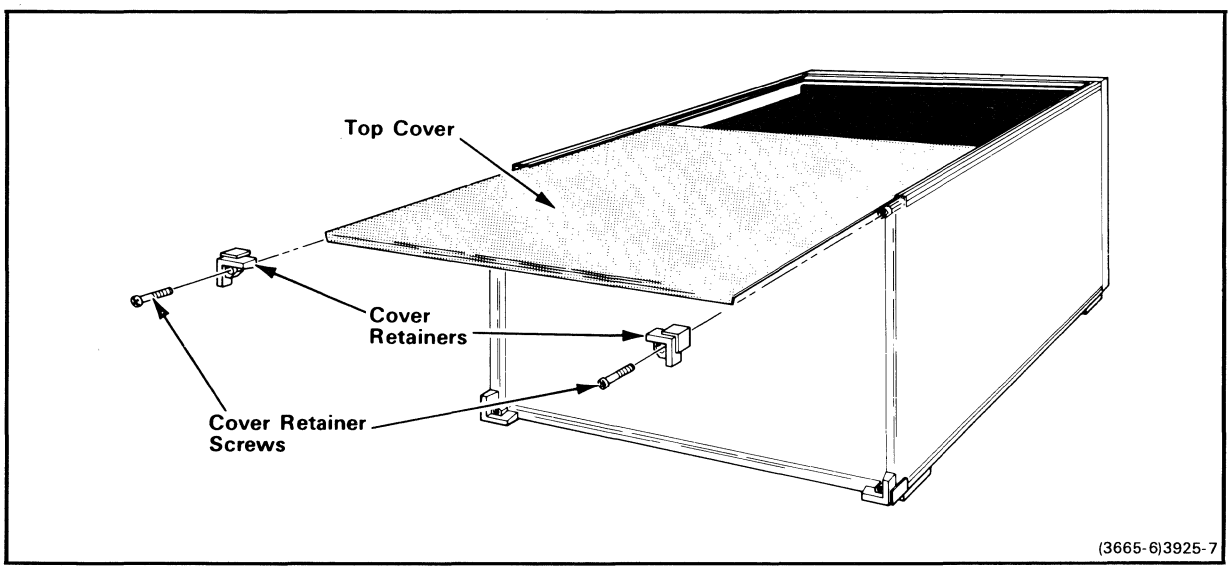


Fig. 3-1. Removing the cover retainers.

3. Remove the top cover by sliding it toward the back of the unit.

4. Turn the unit around 180 degrees, so that you are now facing the front panel.

5. Verify the jumper settings of the development system's Program Memory boards. The boards should be jumpered so that all program memory is contiguous, and the lowest memory location is 0000H. Refer to your development system's installation guide for more information about memory board jumper settings.

NOTE

Before you continue with this procedure, be sure you have set the MAC jumpers and switches, as described in Section 2 of this manual.

6. Insert the MAC into slot 14 (marked "SPARE") of the mainframe.

7. Connect the MAC to the emulator and to the optional TTA (if present), according to the procedures described in the emulator's installation manual.

8. Replace the mainframe's top cover, and the two cover retainers. The MAC is now ready for use.

GROUNDING

A proper ground system is mandatory for satisfactory operation of your microcomputer development system. The MAC, as well as any optional or peripheral equipment, must be properly grounded to reduce susceptibility to static discharge. See your system installation guide for proper grounding procedures.

Section 4

VERIFICATION

VERIFICATION PROCEDURES

The performance of the MAC is verified by running the development system's diagnostics. When the system diagnostics are executed in the "RUN ALL" mode, the MAC is detected and tested. Refer to the Verification section of the development system's Installation Guide for instructions on how to execute these system diagnostics. If an error message indicates that the MAC failed system diagnostics, contact authorized repair personnel.