



64KZ-II

**Random
Access
Memory**

Instruction

Manual

Cromemco[®]

64KZ-II

Instruction Manual

**CROMEMCO, Inc.
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Mountain View, CA. 94043**

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This manual was produced using a Cromemco System Three computer with a Cromemco HDD-22 Hard Disk Storage System running under the Cromemco Cromix™ Operating System. The text was edited with the Cromemco Cromix Screen Editor. The edited text was proofread by the Cromemco SpellMaster™ Program and formatted by the Cromemco Word Processing System Formatter II. Camera-ready copy was printed on a Cromemco 3355B printer.

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TECHNICAL SPECIFICATIONS

Memory Capacity:	64 Kbytes
Memory Type:	TMS 4116-15, 16K-X-1-Bit Dynamic RAM
Memory Access Time:	250 ns (maximum)
Bus Compatibility:	S-100/IEEE-696
Power Requirements:	+8.0 volts @ 0.80 ampere (maximum) +18 volts @ 0.20 ampere (maximum) +18 volts @ 0.10 ampere (maximum)
Operating Environment:	0 to 55 degrees Celsius

Chapter 1

GENERAL INFORMATION

The Cromemco 64KZ-II Random Access Memory (RAM) board contains 64 Kbytes of dynamic read/write memory. The 250-nanosecond access time makes the board fully compatible with the 4-MHz operating rate of Cromemco central processing units. Both single-user CDOS and multiuser Z-80 Cromix Operating Systems are supported by the 64KZ-II.

Two to seven 64KZ-II's, allowing a maximum of 448 Kbytes of memory for up to six users and the operating system, may be incorporated into one Z-80 Cromix system.

The 64KZ-II conforms to the S-100/IEEE-696 bus standard.

Chapter 2

SETUP AND INSTALLATION

SETUP

The switches of each 64KZ-II must be properly set to operate in the memory configuration of a particular system. The switch locations and functions for the 64KZ-II are shown in Figure 2-1. Figures 2-2 through

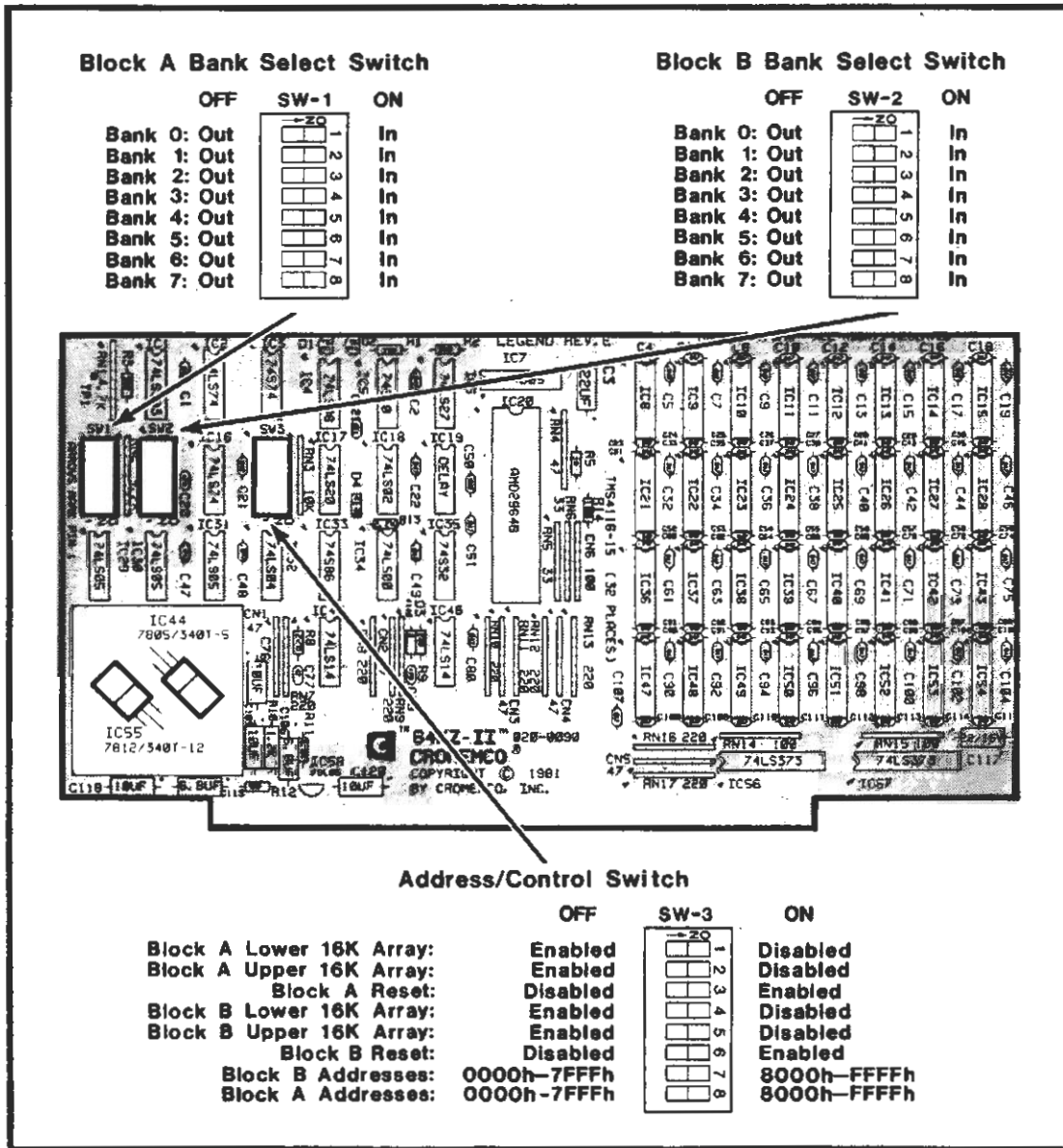


Figure 2-1: 64KZ-II SWITCH LOCATIONS AND FUNCTIONS

2-5 show the switch settings for typical system configurations. For the switch locations and settings of the other boards in the system, refer to the appropriate Cromemco manual.

INSTALLATION

Before opening the system cabinet for any reason, turn the system's **POWER SWITCH** to the **OFF** position and remove the power cable from the rear panel power/fuse module. The system cabinet may now be opened and circuit boards removed or installed. The 64KZ-II may be installed in any available bus slot. No cables are connected to this board.

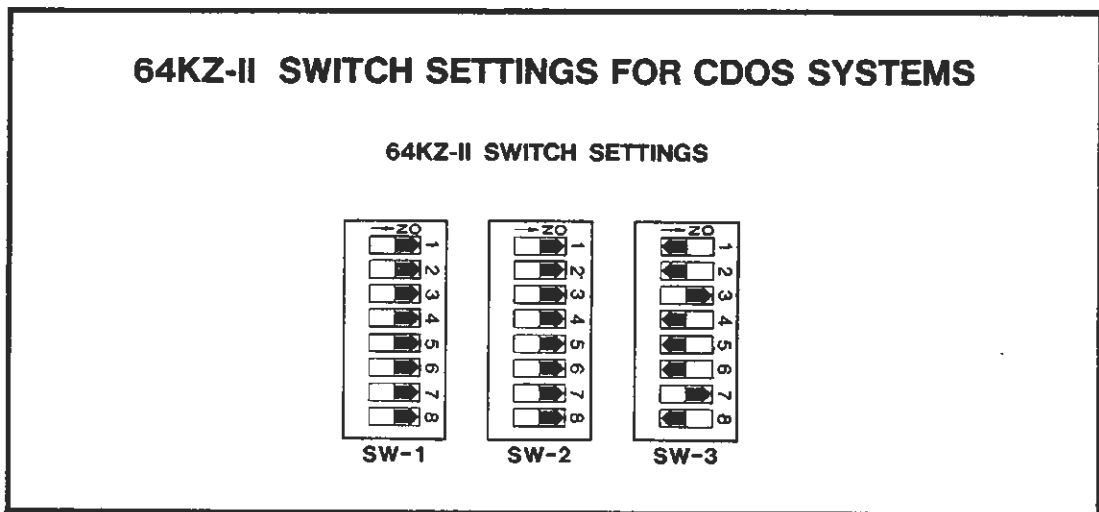
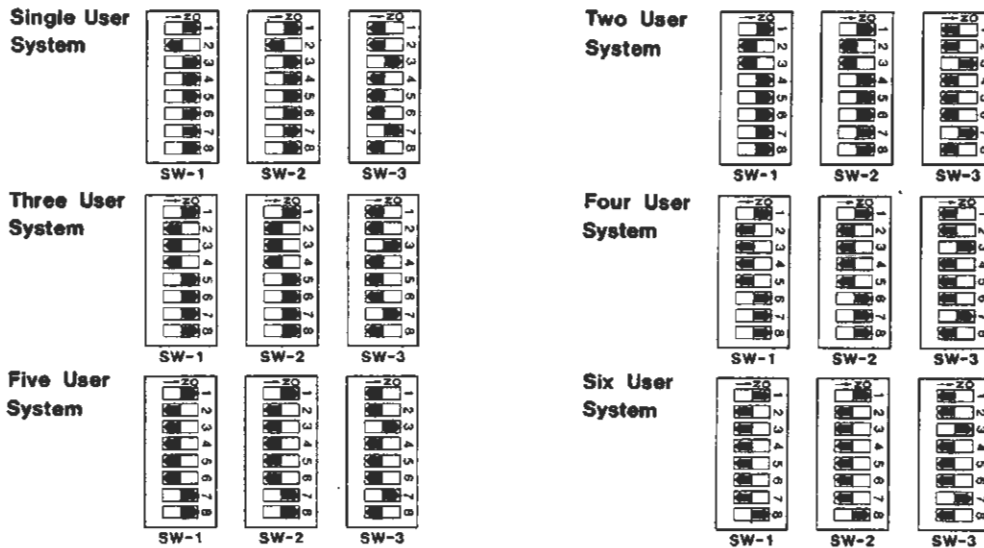


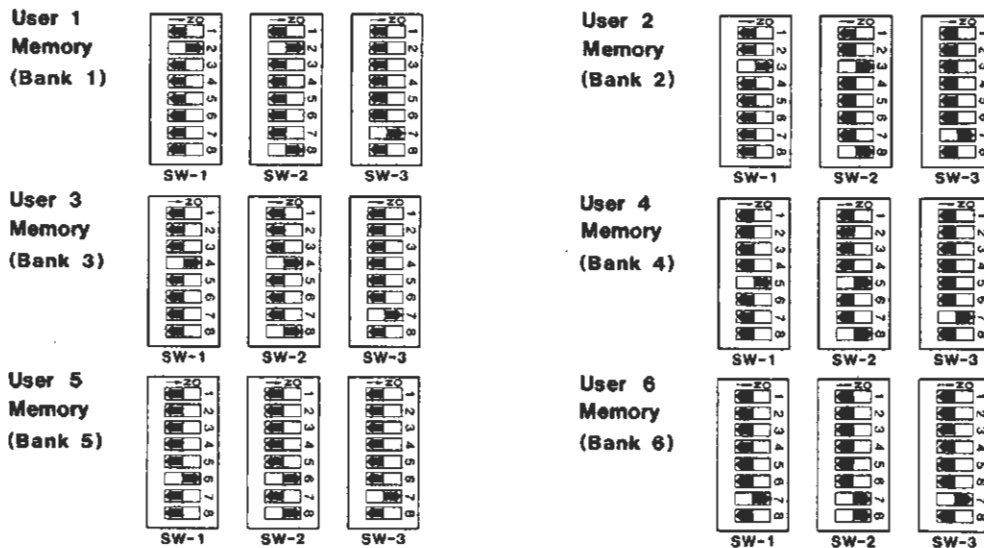
Figure 2-2: CDOS SYSTEM 64KZ-II SWITCH SETTINGS

MEMORY BOARD SWITCH SETTINGS FOR AN 8-BIT CROMIX SYSTEM

SWITCH SETTINGS FOR 64KZ-II CONTAINING THE CROMIX OPERATING SYSTEM (BANK 0)



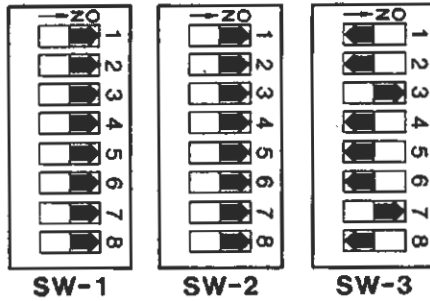
SWITCH SETTINGS FOR 64KZ-II CONTAINING:



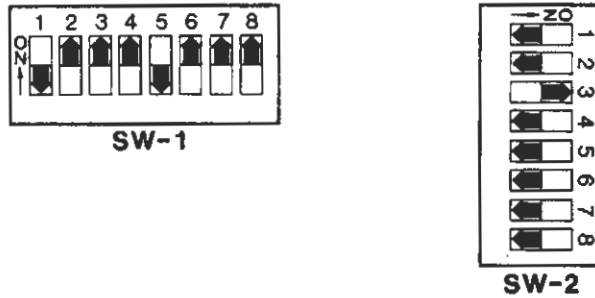
**Figure 2-3: Z-80 CROMIX SYSTEM
 MEMORY BOARD SWITCH SETTINGS**

MEMORY BOARD SWITCH SETTINGS FOR CDOS COLOR GRAPHICS SYSTEM

SWITCH SETTINGS FOR 64KZ-II CONTAINING
 THE CDOS OPERATING SYSTEM (BANK 0)



SWITCH SETTINGS FOR 48KTP CONTAINING
 PAGE 0 OF COLOR GRAPHICS MEMORY (BANK 5)



SWITCH SETTINGS FOR 48KTP CONTAINING
 PAGE 1 OF COLOR GRAPHICS MEMORY (BANK 6)

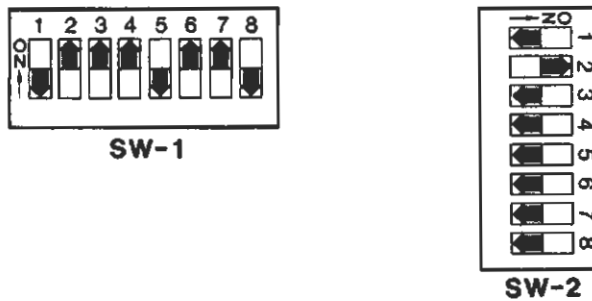
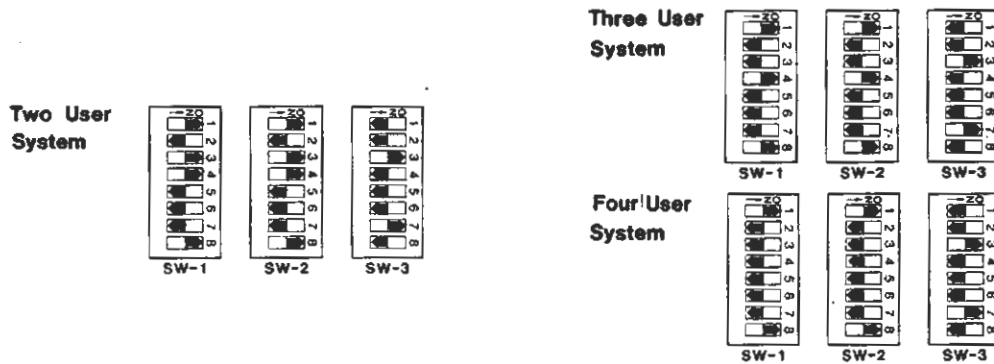


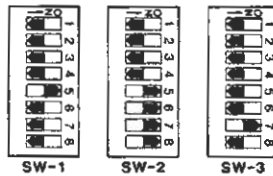
Figure 2-4: CDOS COLOR GRAPHICS SYSTEM
 MEMORY BOARD SWITCH SETTINGS

MEMORY BOARD SWITCH SETTINGS FOR AN 8-BIT CROMIX COLOR GRAPHICS SYSTEM

SWITCH SETTINGS FOR 64KZ-II CONTAINING THE CROMIX OPERATING SYSTEM (BANK 0)



SWITCH SETTINGS FOR 64KZ-II CONTAINING USER 4 MEMORY AND COLOR GRAPHICS DRIVERS (USED IN TWO, THREE, AND FOUR USER SYSTEMS; BANK 4)



SWITCH SETTINGS FOR 64KZ-II CONTAINING USER 1 MEMORY (USED IN TWO, THREE, AND FOUR USER SYSTEMS; (BANK 1)

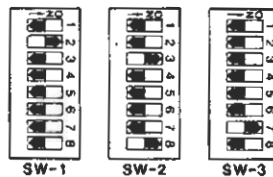
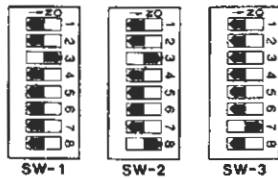
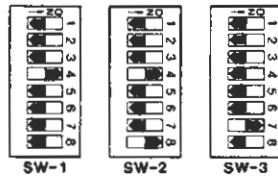


Figure 2-5: Z-80 CROMIX COLOR GRAPHICS SYSTEM MEMORY BOARD SWITCH SETTINGS

**SWITCH SETTINGS FOR 64KZ-II CONTAINING USER 2 MEMORY
(USED IN THREE AND FOUR USER SYSTEMS; (BANK 3))**



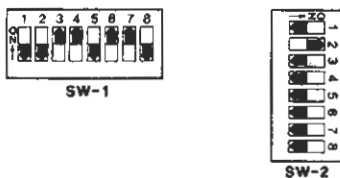
**SWITCH SETTINGS FOR 64KZ-II CONTAINING USER 3 MEMORY
(USED IN FOUR USER SYSTEMS; (BANK 3))**



**SWITCH SETTINGS FOR 48KTP CONTAINING
PAGE 0 COLOR GRAPHICS MEMORY (BANK 5)**



**SWITCH SETTINGS FOR 48KTP CONTAINING
PAGE 1 COLOR GRAPHICS MEMORY (BANK 6)**



**Figure 2-5: Z-80 CROMIX COLOR GRAPHICS
SYSTEM MEMORY BOARD SWITCH SETTINGS (continued)**

Chapter 3

PRINCIPLES OF OPERATION

SINGLE-USER AND MULTIUSER SYSTEMS

The operating system and user memory of the single user CDOS Operating System are contained in one 64KZ-II. The 64KZ-II is always enabled during the operation of this system.

The multiuser Z-80 Cromix Operating System is contained in the memory of one 64KZ-II board. During the course of normal system operation, this board is frequently turned on. Additional 64KZ-IIs are required and contain the user memory. These boards may be turned off for comparatively long periods of time. The operating system selects the user memory board that is enabled at any given time.

HORIZONTAL MEMORY CONFIGURATION

64KZ-IIs are designed for use in horizontal memory configurations. The 8-bit Cromix Operating System controls horizontal memory through bank selection. In a multiuser system, up to seven 64KZ-IIs, each with 64 Kbytes of memory, provide a maximum of 448 Kbytes of addressable memory.

Bank Select Switches

SW1 and SW2 set up memory blocks A and B, respectively, so that they may be enabled through bank selection. The eight switches that are part of SW1 or SW2 correspond to banks 0 through 7. Each of these eight switches may be set ON to effectively place the memory block in a memory bank. Therefore, each memory block may be placed in up to eight memory banks.

Memory Block Enabling Through Bank Selection

Each of the eight bits in the bank-selection byte corresponds to one of the eight banks. When a bank-selection byte is placed on the data-out lines and port 40h is addressed, the bank selection bit with a

logical 1 selects the memory bank. When the switch associated with the bit is set to ON, the memory block is enabled. Depending on the bank select switch settings, enabling different memory banks will enable the same 64KZ-II memory block.

Bank Selection Port Addressing

In nonstandard systems, a PROM selects the port address to which the 64KZ-II responds. There is no PROM in standard boards. The standard port address is 40h. Optional addresses are 41h through 4Fh.

Appendix A

64KZ-II PROM INFORMATION

To change the 64KZ-II output port address, a PROM must be ordered and installed on the board. When ordering the PROM from the Cromemco Customer Service Department, specify the port address.

To install the PROM in the IC7 location, refer to Figure A-1. Follow these steps:

1. Remove the in-line jumper insert and/or cut the eight circuit traces that cross the IC7 location from pin to pin.
2. Install and solder the PROM into the proper position using pin 1 as a reference.
3. Install a jumper between pins 15 and pin 8.

64KZ-II Instruction Manual
 A. 64KZ-II PROM Information

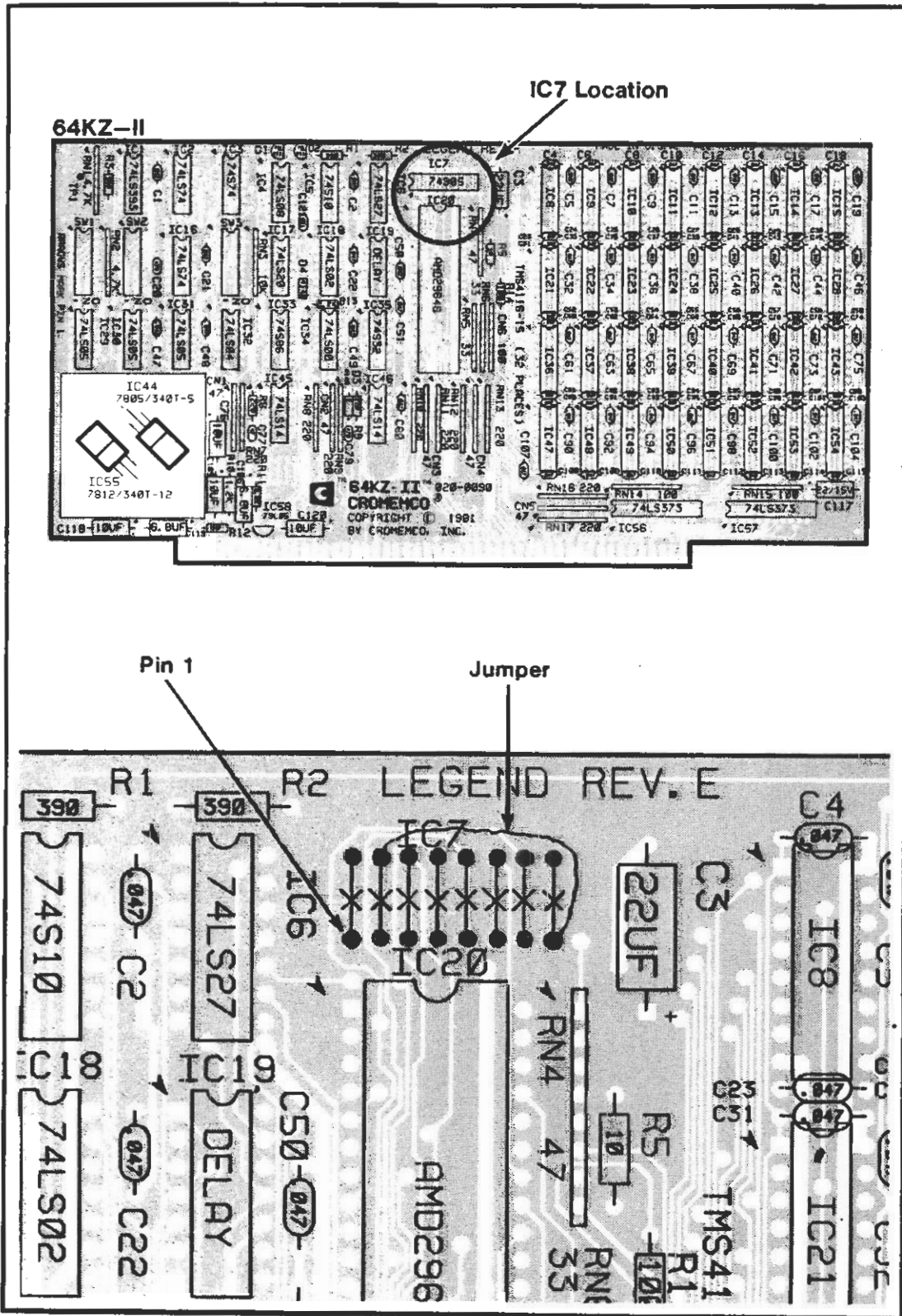


Figure A-1: PROM INSTALLATION

Appendix B

LIMITED WARRANTY

Cromemco, Inc. ("Cromemco") warrants this product against defects in material and workmanship to the original purchaser for ninety (90) days from the date of purchase, subject to the following terms and conditions.

What Is Covered By This Warranty:

During the ninety (90) day warranty period Cromemco will, at its option, repair or replace this Cromemco product or repair or replace with new or used parts any parts or components, manufactured by Cromemco, which prove to be defective, provided the product is returned to an Authorized Cromemco Dealer as set forth below.

How To Obtain Warranty Service:

You should immediately notify IN WRITING your Authorized Cromemco Dealer or Cromemco of problems encountered during the warranty period. In order to obtain warranty service, first obtain a return authorization number by contacting the Authorized Cromemco Dealer from whom you purchased the product. Then attach to the product:

1. Your name, address and telephone number,
2. the return authorization number,
3. a description of the problem, and
4. proof of the date of retail purchase.

Ship or otherwise return the product, transportation and insurance costs prepaid, to the Authorized Cromemco Dealer. If you are unable to receive warranty repair from the Authorized Cromemco Dealer from whom you purchased the product, you should contact Cromemco Customer Support at: Cromemco, Inc., 280 Bernardo Ave., Mountain View, Ca. 94043.

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Cromemco does not warrant any products, components or parts not manufactured by Cromemco.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, modification or misapplication; by damage during shipment; or by improper service. This product is not warranted to operate satisfactorily with peripherals or products not manufactured by Cromemco. Transportation and insurance charges incurred in transporting the product to and from the Authorized Cromemco Dealer or Cromemco are not covered by this Warranty.

Exclusion of Liability, Damages, and Other Warranties:

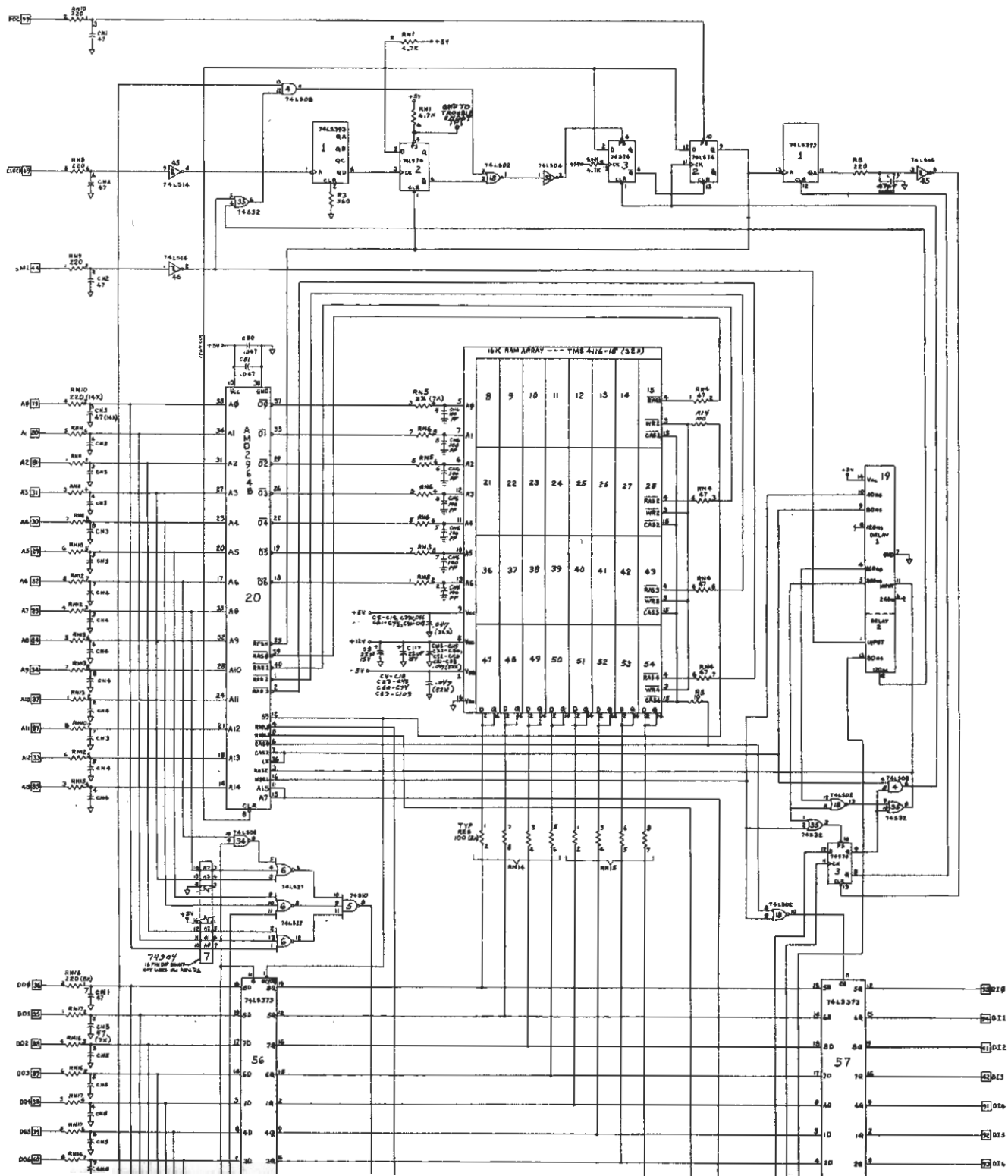
THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. ANY IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF PURCHASE OF THIS PRODUCT. IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER AS WARRANTED ABOVE, YOUR SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. CROMEMCO SHALL NOT BE LIABLE FOR INCIDENTAL AND/OR CONSEQUENTIAL DAMAGES FOR THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING DAMAGE TO PROPERTY AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY, EVEN IF CROMEMCO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE AGENTS, DEALERS, AND EMPLOYEES OF CROMEMCO ARE NOT AUTHORIZED TO MAKE MODIFICATIONS TO THIS WARRANTY, OR ADDITIONAL WARRANTIES BINDING ON CROMEMCO ABOUT OR FOR PRODUCTS SOLD OR LICENSED BY CROMEMCO. ACCORDINGLY, ADDITIONAL STATEMENTS WHETHER ORAL OR WRITTEN EXCEPT SIGNED WRITTEN STATEMENTS FROM AN OFFICER OF CROMEMCO DO NOT CONSTITUTE WARRANTIES AND SHOULD NOT BE RELIED UPON. SOFTWARE, TECHNICAL INFORMATION AND FIRMWARE ARE LICENSED ONLY BY A SEPARATE AGREEMENT ON AN "AS IS" BASIS.

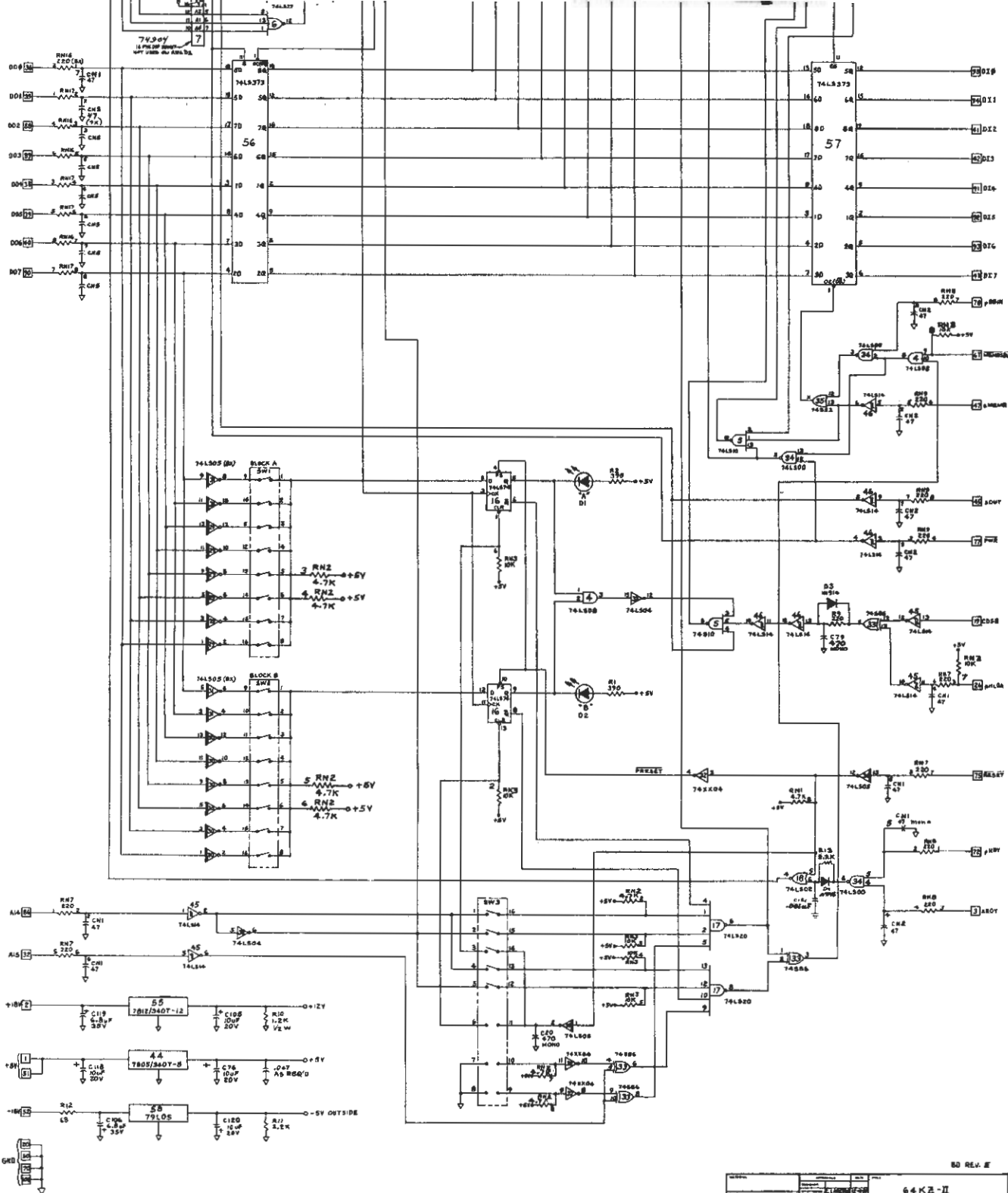
Limitation on Statute of Limitation and Transferability:

This warranty and the statute of limitations shall run concurrently with any acceptance period. This warranty is not transferable. No suit, litigation, or action shall be brought based on the alleged breach of this warranty or implied warranties more than one year after the date of purchase in those jurisdictions allowing such a limitation, otherwise no such action shall be brought more than one year after the expiration of this warranty.

Other Important Provisions:

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty shall not be applicable to the extent that any provision of this warranty is prohibited by any federal, state or municipal law which cannot be preempted. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.





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