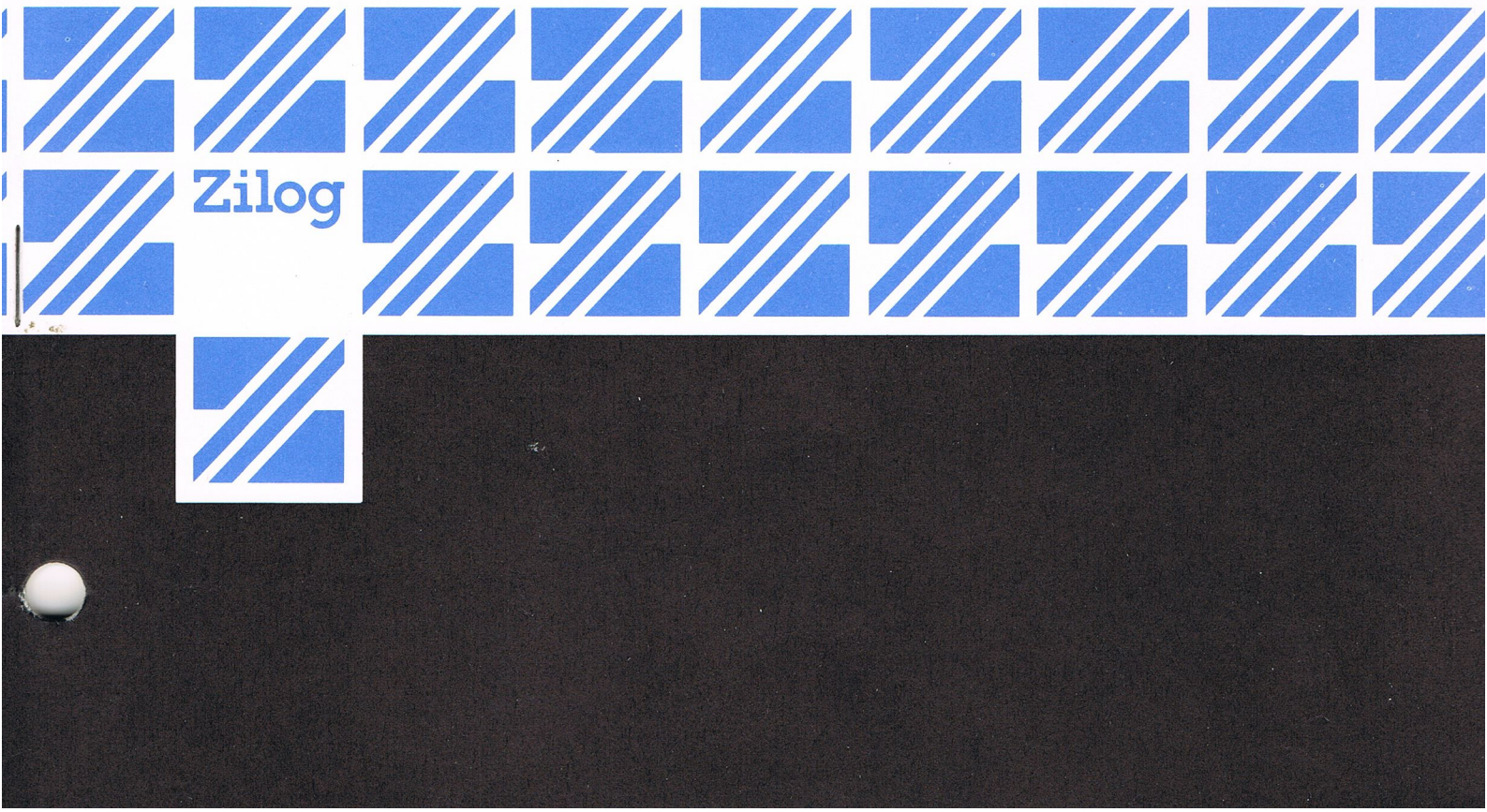
MCZ-1/05

Hardware User's Manual



Price: $4.50
03-0092-01
Revision B
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MCZ-1/05
HARDWARE USER'S MANUAL

MCZ-1/05 HARDWARE USER'S MANUAL

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MCZ-1/05 HARDWARE USER'S MANUAL

SECTION 1. GENERAL INFORMATION

1.1 SYSTEM DESCRIPTION

The Microcomputer System (Z80-MCZ) is a disk-based microcomputer unit utilizing the Z80 family of microcomputer cards. The basic system includes a compact card enclosure, dual disk drives, and the capability of interfacing to any CRT or hard-copy terminal.

The card enclosure is composed of a four card slot chassis with two Z80 microcomputer series boards, power supply, cooling fan, interface connectors, control switches, and a hinged front cover. The Z80 microcomputer board (MCB) performs primary system control. Detailed documentation on this card can be found in the "Z80-MCB Hardware User's Manual". Disk interface is controlled by the Z80 memory disk controller (MDC). Detailed documentation on this card can be found in the "Z80-MDC Hardware User's Manual". These two cards constitute the basic MCZ-1/05 system, which provides 32K bytes of RAM memory 3K bytes of executive PROM firmware, and control of the disk drive module and terminal.

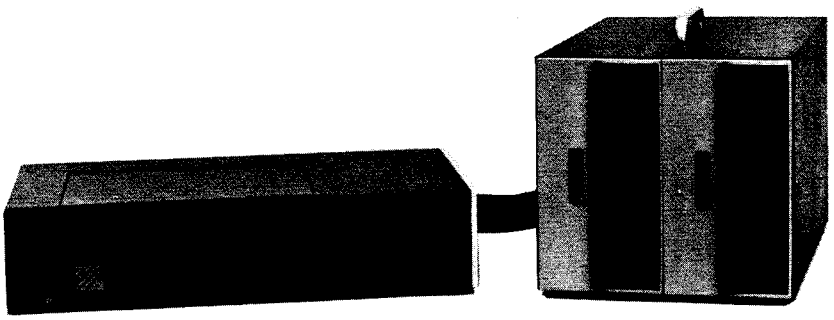
Interface to a standard RS232 or current-loop terminal allows writing, debugging, and execution of software programs. Supporting software consists of a full-disk operating system (RIO), which includes:

- Relocatable or absolute object code macroassembler
- Linker
- Text Editor
- File Utility
- PROM resident debugger

A detailed description of the software capability can be found in the Z80-RIO Operating System User's Manual.

The MCZ is characterized by the following features:

- Card enclosure with a dual floppy unit
- Basic RAM memory of 32K bytes is configured with 16K dynamic RAM elements. Memory expandable to 64K bytes by factory upgrade. NOTE: Address space is PROM controlled.
- Unused PROM socket on the MCB allows 1K bytes of user PROM. System expansion with PROM memory board (PMB) allows additional 32K bytes of PROM.
- PROM burning capability with PPB or PPB/16 PROM programming board and ZPROG software utility.
- Additional cards can be inserted into the option slot for analog, parallel I/O, and serial I/O capability. (Requires backplane wiring change per option card.)
- Video display and keyboard capability with VDB card and PROM upgrade.



SECTION 2. INSTALLATION

2.1 INTRODUCTION

This section provides instructions for the unpacking, inspection, installation, and preparation for use of the MCZ. Also included are instructions for connecting the selected data terminal to the system and the function of the MCZ switches.

2.2 UNPACKING AND INSPECTION

The MCZ system is packaged in a large fibreboard carton. The unit is protected by a foam cushion holding it completely suspended within the carton. Packed with the carton are the documentation package, power cables, and system diskettes. Cut the tape on the top of the package and carefully remove the contents and packing material. Check all surfaces of the chassis for scratches, nicks, dents, or punctures which may have occurred during transit.

Check the equipment against the packing slip and system component list for any loss that might have occurred during shipment. Open the hinged lid for internal inspection. All internal components should then be visually inspected for obvious damage or dislocation. In particular, cards should be checked for proper seating.

If the system has been damaged in shipment or is incomplete, immediately notify the shipper and/or Zilog.

2.3 PREPARATION FOR USE

After unpacking the system, verify that all PC cards are properly seated in the correct card slots.

On the right end of the chassis is a module containing a line filter, fuse holder, voltage programming card, and line cord connector. With the cover of the module moved to the left, both the fuse and the voltage programming card are exposed. The fuse has a built-in extractor lever while the programming card requires a pair of needle nose pliers to remove it. The voltage programming card should be inserted such that the desired line voltage is displayed near the left end of the fuse. The holder is designed such that only one voltage

range can be read when the card is in place. There are four possible orientations of the card, corresponding to the four voltage ranges available (100V, 115-120V, 220V, and 230-240V). See Figure 1 for a diagram of the voltage programming card. Once the programming card is properly inserted, a 3 amp fuse should be inserted into the fuse holder. The cover may then be moved to the right, exposing the line cord connector. Verify that the main power switch is in the off position and connect the AC single phase line cord.

2.4 DATA TERMINAL CONNECTION

The user has the option of interfacing the system with an ASR33 teletypewriter (TTY) or an RS232 terminal device. For TTY use, modification to the MCB card will be required as detailed in the MCB Hardware User's Manual.

The terminal's interconnect cable is connected to J106 on the rear of the chassis. CAUTION: The interface is designed to be RS232 compatible. However, some terminal manufacturers provide RS232 interfaces that are not fully compatible with the standard; i.e., the terminal might use pins such as Clear to Send or DATA Set Ready for functions other than the normal RS232 requirements. If this occurs, the cable should be modified to meet specific terminal requirements. See Figure 2 for a list of RS232 signals and their corresponding pin numbers.

NOTE: The MCB is configured to look like a Modem with 'Clear to Send' always active and 'Request to Send' ignored.

Refer to the MCB manual for information on wiring a modem to the system.

2.5 BAUD RATE SETTING

The baud rate of the terminal must match the baud rate setting of the switches on the MCB card. These switches are read by the CPU to set the communication frequency to any of 14 common rates. (See MCB Hardware User's Manual.)

After connecting the terminal to the 25-pin connector on the rear of the chassis, determine the baud rate of the terminal. The switches on the MCB board should be set to match this baud rate and are read by the CPU to set the communication frequency to any of 14 common rates. (The switches can also be used for other functions at the user's discretion.)

NOTE: THE SYSTEM, AS SHIPPED FROM THE FACTORY, IS SET AT 9600 BAUD.

2.6 FLOPPY DISK DRIVE CONNECTION

The floppy disk drive is connected to the main unit via two four-foot cables. One cable, with 9-pin AMP connectors on each end, provides power for the floppy disk drive. One end connects to J110 on the basic system, while the other end connects to J101 on the rear of the floppy unit. The signal cable consists of a 34-conductor flat ribbon cable. One end connects to J107 on the basic system, with the other connecting to J102 on the floppy disk.

2.7 SWITCHES AND INDICATORS

The left side panel of the system has a reset switch and a break switch (see Figure 3). The system can be reset at any time by simply depressing the reset switch. NOTE: This will destroy any programs that have been loaded into the RAM memory. After a reset, a carriage return may be entered from the terminal in order to bootstrap the operating system from the disk drive. Refer to the Software User's Manual for details.

The system will execute a non-maskable interrupt when the BREAK switch is depressed. This will send the system back to the debug environment in the same manner as would a breakpoint set via the PROM DEBUG package.

The main power switch is an illuminated rocker switch located on the right side of the chassis (See Figure 3). Power is off when the bottom of the switch is depressed and the light is off.

2.8 CARD PLACEMENT

The Z80 microcomputer cards are positioned in the card cage as indicated in Figure 4.

2.9 START UP PROCEDURE

Turn on the power to both the terminal and the system. Depress the reset button on the side of the system. Make sure that the terminal is in the on-line mode and that the speeds have been properly correlated as previously described. The character ">" should appear on the terminal when RESET is depressed. If it does not, check the terminal connections and baud rates.

NOTE: Reset always initializes the system and destroys data RAM memory.

Now remove the system software diskette from the envelope. Open the door of the system disk drive (right drive) by pressing the button and insert the diskette into the drive with the label facing away from the button until a click is heard. Then carefully shut the door.

CAUTION: To prevent loss of information, every diskette must be removed from the disk chassis prior to powering down the system. Additionally, diskettes should only be reinserted after the units have been powered up.

The system now awaits a handshake character from the terminal. This character should be a carriage return which will cause the system executive program to be loaded from the diskette. At this point, the user should refer to the MCZ or RIO User's Software Manual for details of operation.

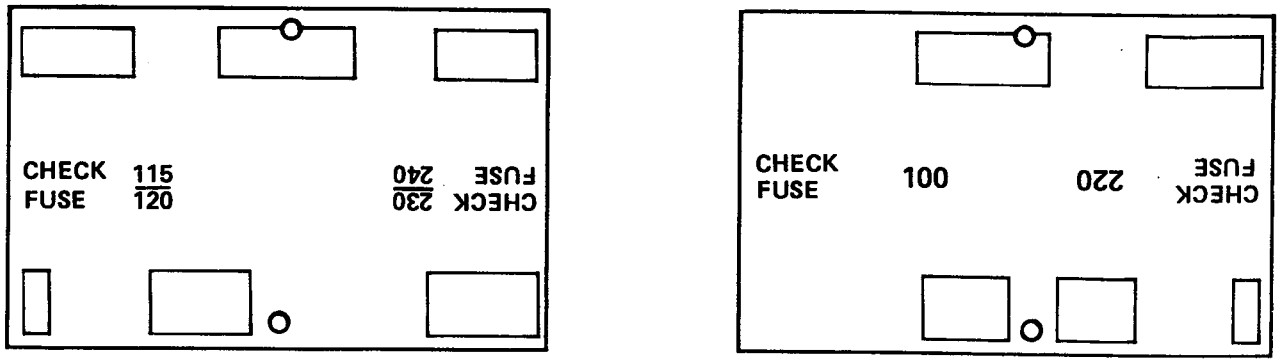
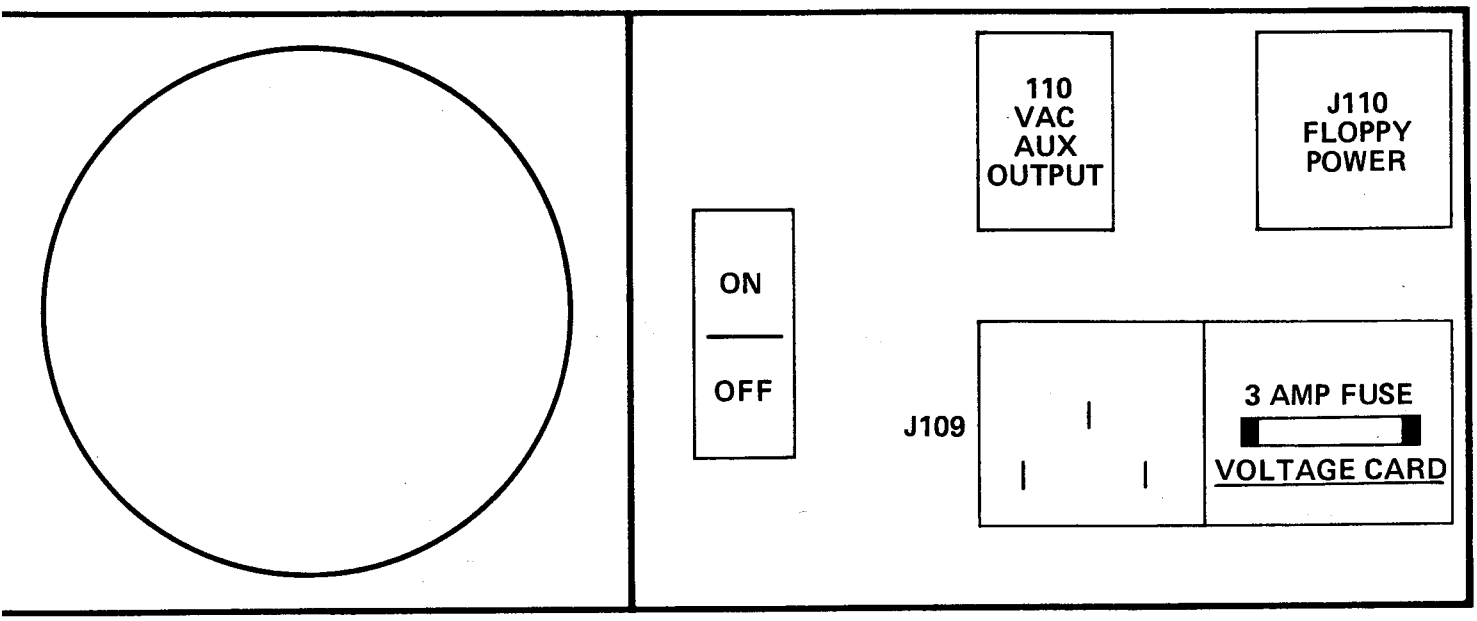


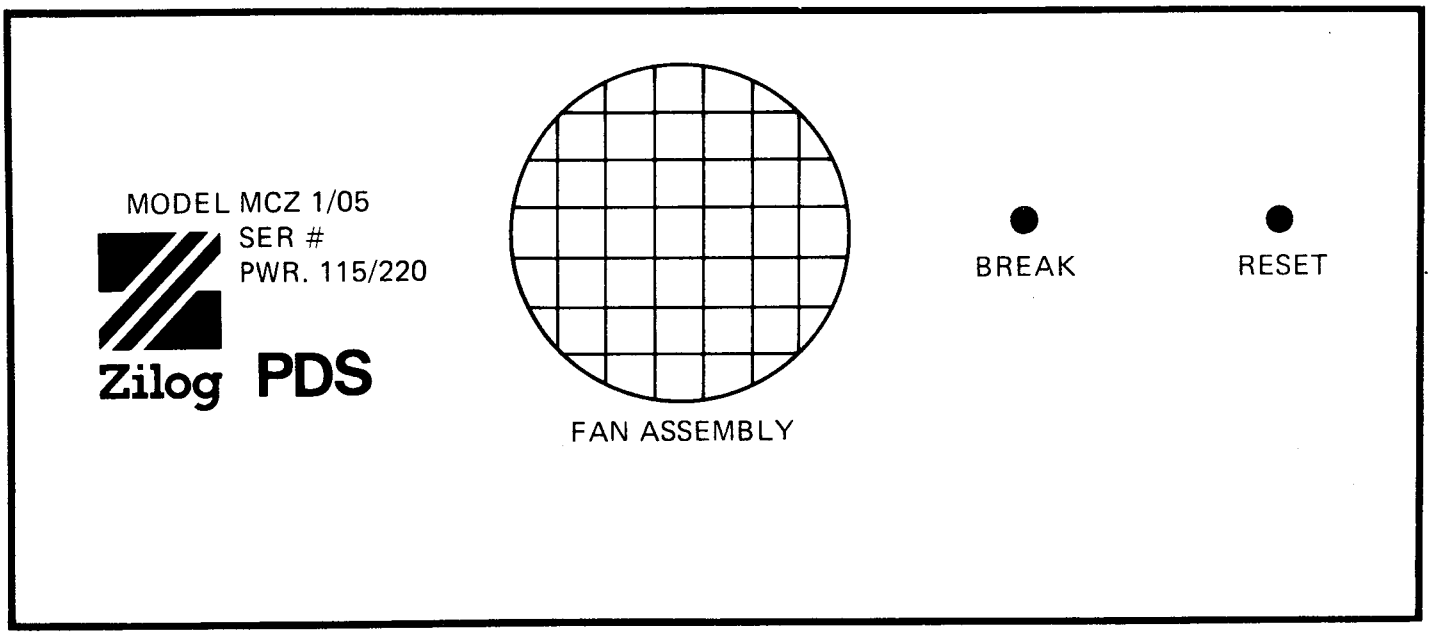
FIGURE 1: VOLTAGE PROGRAMMING CARD

MCB		TERMINAL	
XMITED DATA	15	2	XMITED DATA
DATA TERM RDY–	76	20	$\overline{\text{DTR}}$
REQ TO SEND–	14	4	$\overline{\text{RTS}}$
CLR TO SEND–	11	5	$\overline{\text{CTS}}$
DATA SET RDY–	74	6	$\overline{\text{DSR}}$
RECV DATA	7	3	RECV DATA
LINE SIG DET	80	8	LSD

FIGURE 2: MCB TO TERMINAL (RS232)



RIGHT SIDE PANEL, CARD ENCLOSURE



LEFT SIDE PANEL, CARD ENCLOSURE

FIGURE 3: MCZ SIDE PANELS

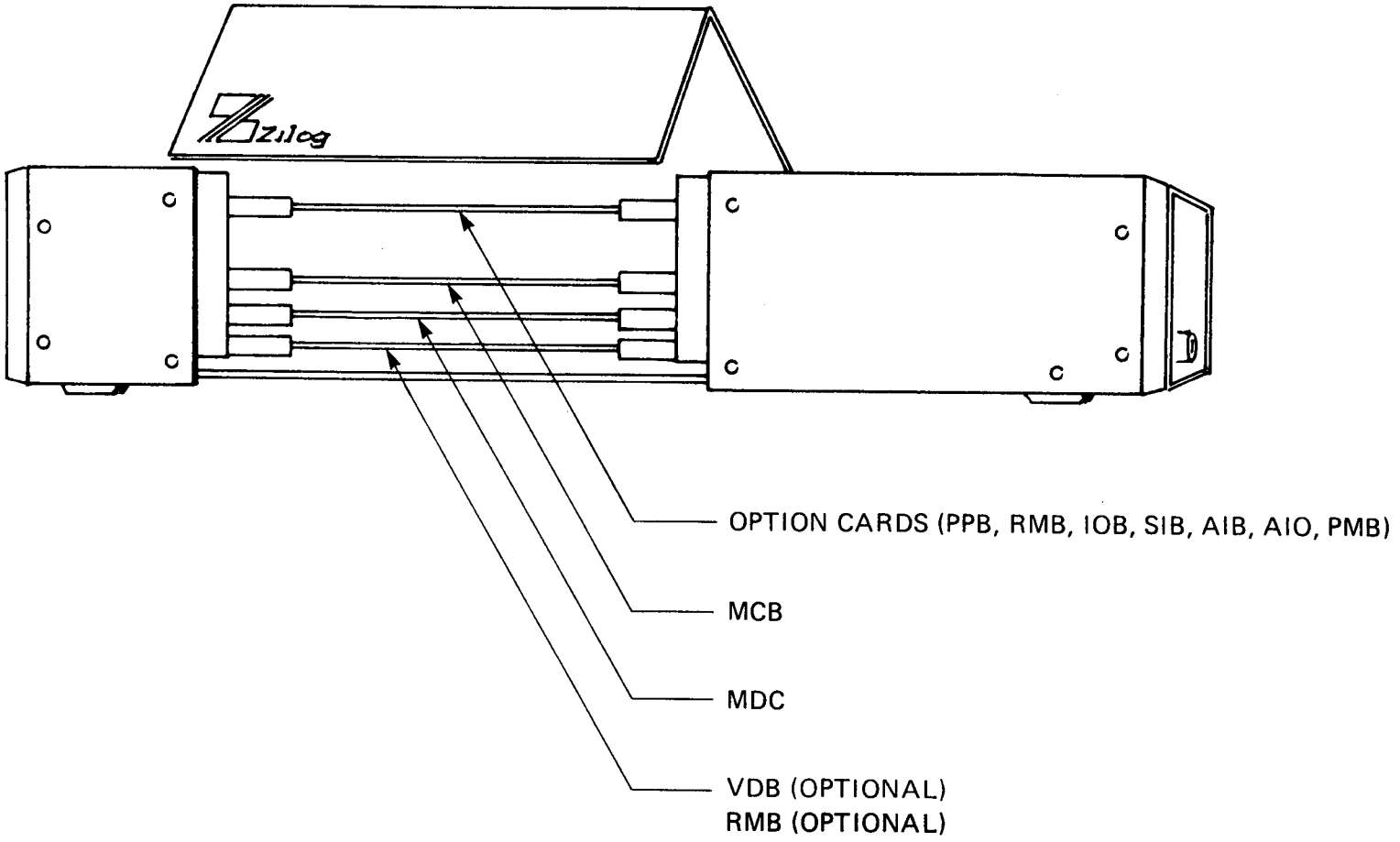


FIGURE 4: MCZ CARD PLACEMENT

SECTION 3. BASIC PRINCIPLES OF OPERATION

3.1 SYSTEM CONFIGURATION

The major functional units of each system are shown in Figure 5 and are composed of the following:

* Central Processing Unit (Z80-CPU)
* Clock Generator
* System Memory
* Address, Data, and Control Buffers
* Serial and Parallel I/O
* I/O Peripheral Address Decode
* Disk Control Logic

The Z80 devices that are part of the MCZ system include the CPU, PIO, and STC. The STC is a version of the CTC designed specifically for the system but is functionally equivalent to the CTC. One of the four STC channels is available to the user (Channel 3, see MCB Hardware User's Manual). The STC is used in conjunction with the USART (8251) to provide both synchronous and asynchronous serial communication channels. Another channel is used for basic disk timing. The user has the option (with jumper connections) of configuring the interface as RS232 or current loop compatible. Also provided is a reader control signal for remote control of modified manual TTY terminals.

The clock generator provides the CPU with a clock which is distributed to the system for external use including disk synchronization.

The MCB card provides 12 I/O port address decode signals that can be used to select peripheral devices within add-on cards. These signals are routed on the back plane (I/O group 0-4 and subgroup 0-3) and minimize the need for additional I/O decode logic (See MCB Hardware User's Manual).

The Z80-PIO provides two software-programmable 8-bit ports for a standard hardware interface between peripheral devices and the MCZ. Upon request, the PIO can be configured for a line printer interface. (See MCB Hardware User's Manual.)

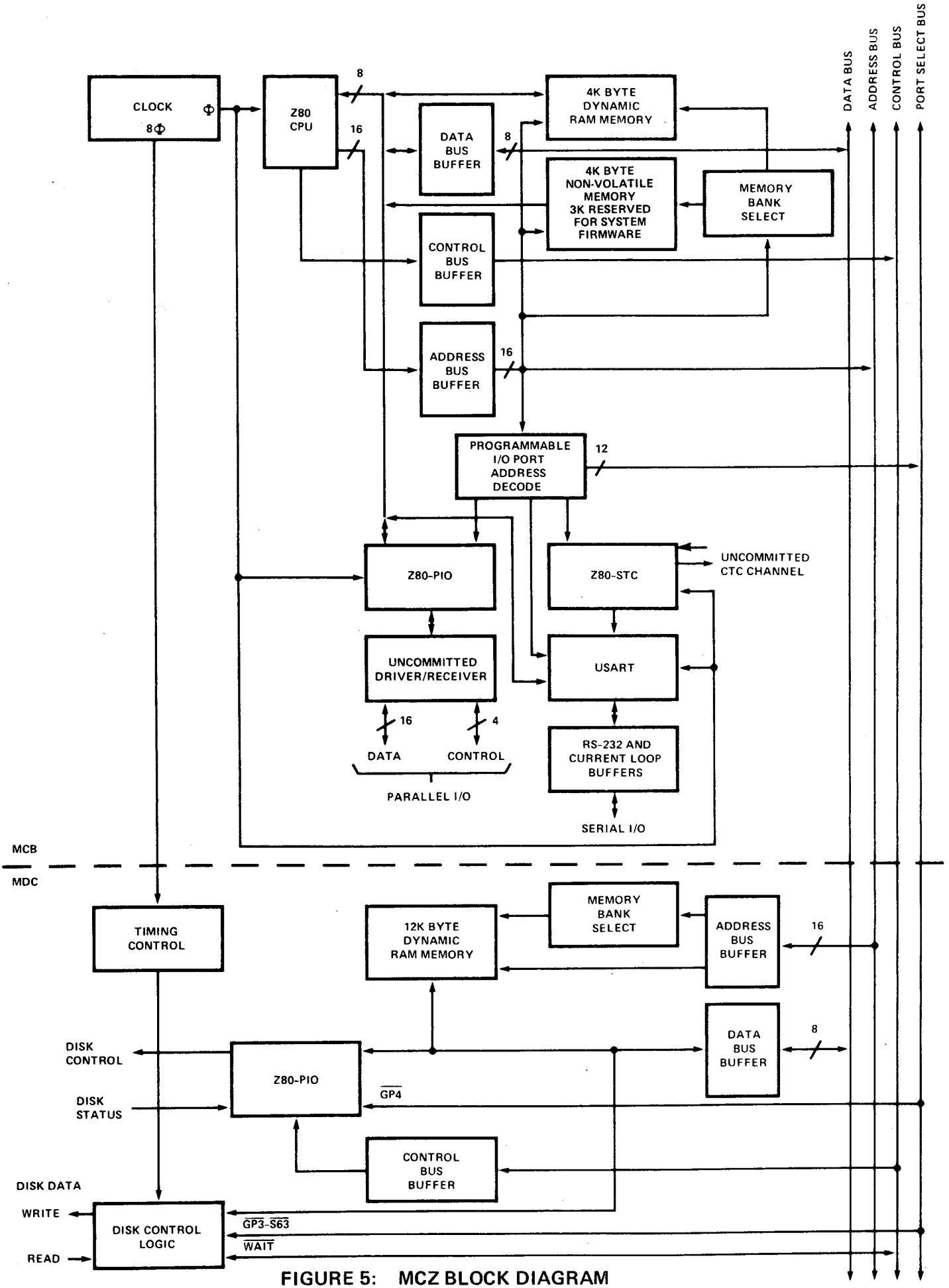


FIGURE 5: MCZ BLOCK DIAGRAM

The Z80-PIO is also used with disk control logic to format and adjust the data rate between a standard Shugart 801R floppy disk (with write protect option) and the CPU.

The 3K monitor firmware resides in PROMs and is inserted into MCB sockets, providing the basic debugging commands, Input/Output control and bootstrapping portions of a floppy disk-based operating system.

Basic MCZ system memory consists of 16K bytes of dynamic RAM on the MCB.

3.2 SYSTEM BUS STRUCTURE

The system bus can be classified as a tri-state unterminated bus. All input lines, on any card in the series, are buffered to present no more than one TTL load to this bus. The interconnect wiring list identifies the bus signal and the routing of each on the wirewrap motherboard. To add lines, the card cage can be removed by first removing the chassis cover, and then unscrewing the six 6-32 x 3/8 phillips head screws at the bottom of the chassis.

The external bus should be designed to minimize crosstalk, reflection, etc. so as to preserve signal integrity. Normally, a line length of 18 inches or less will not require line termination. The user should also consider the addition of a buffer card to regenerate the external bus if lengths of 18 inches are to be exceeded.

SECTION 4. INTEGRATION

4.1 INTERIOR

The system chassis houses a four-slot PCB rack with a wirewrap motherboard. This card cage is mounted to the main chassis with six 6-32 x 3/8 phillips' head screws which may be removed for adding additional lines to the motherboard. The PC cards are mounted into the card cage according to the convention in Figure 6. Slots J2, J3, and J4 are factory wired for the cards indicated.

Slot J1 is wired for an SIB card, with SIB channels 2 and 3 wired to I/O connectors J11 and J12, respectively. Additional wiring may be required for a specific optional card. It will be necessary to check each card's signal pinout against the wire list at the end of this document.

NOTE: If a VDB is to be installed, remove the interrupt daisy chain jumper from J4-33 to J4-34, leaving the jumper from J4-34 to J1-81 in place.

Slot 1 - Option (PPB/RMB/PMB/AIO/IOB/SIB/AIB)

Slot 2 - MCB

Slot 3 - MDC

Slot 4 - Video and keyboard interface card (Z80-VDB)
(Requires PROM upgrade -
(Slot 4 will also accept an RMB)

4.2 INTERNAL CABLING

On a standard system, there are five cables that are internally connected between the four-slot card cage motherboard and the system back panel I/O connectors. The floppy disk cable is connected from J107 on the back panel to the system motherboard connector J8. The terminal interface (RS232 or current loop) is connected from J106 on the back panel to the motherboard connector J5. Lines from J5 also feed the side panel for the break and reset switches. For the optional line printer interface, a cable is inserted between back panel connector J104 and motherboard connector J7. For the optional SIB board, cables are inserted between backpanel connector J102 and motherboard connector J11 for

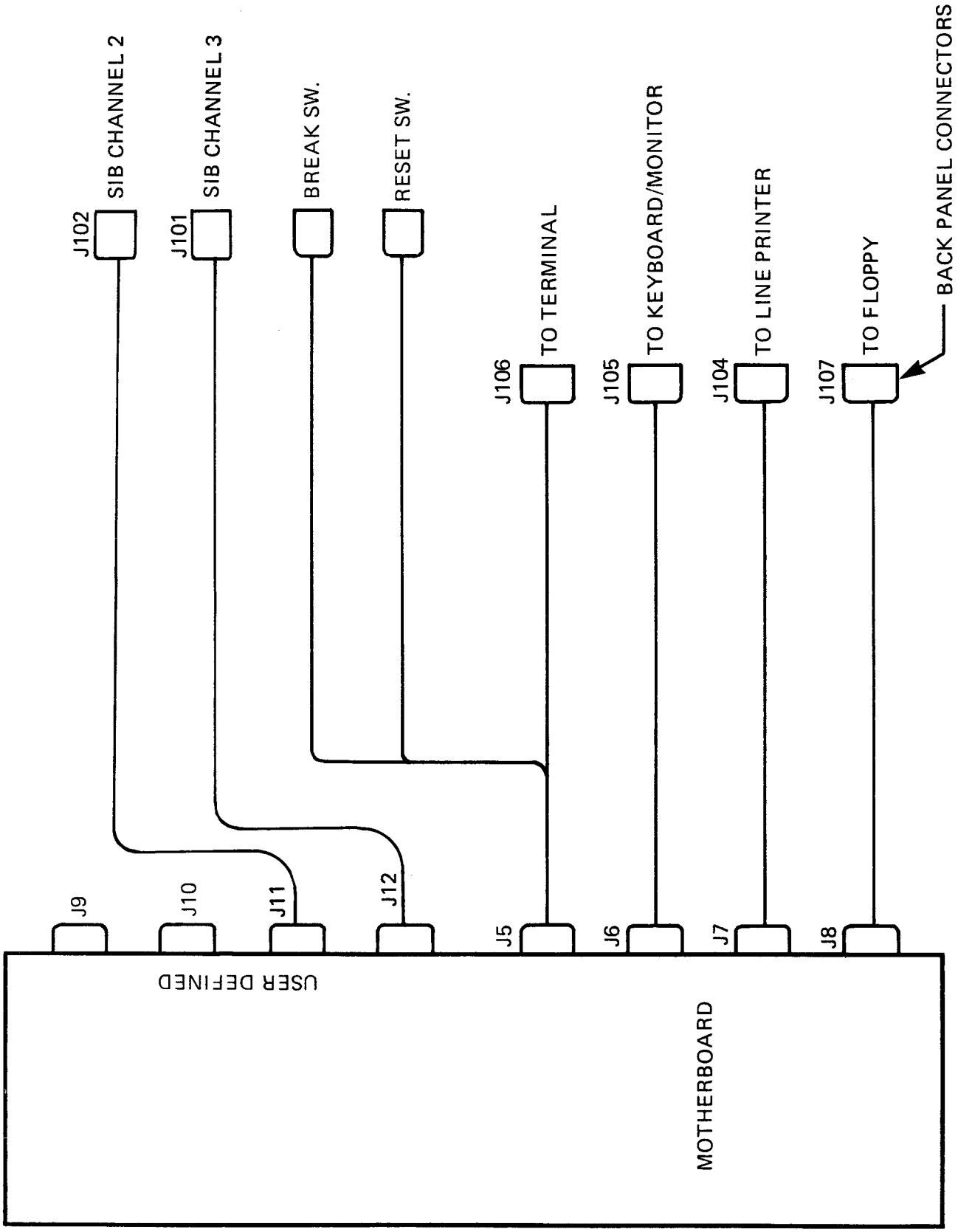


FIGURE 7: MCZ CABLE ROUTING

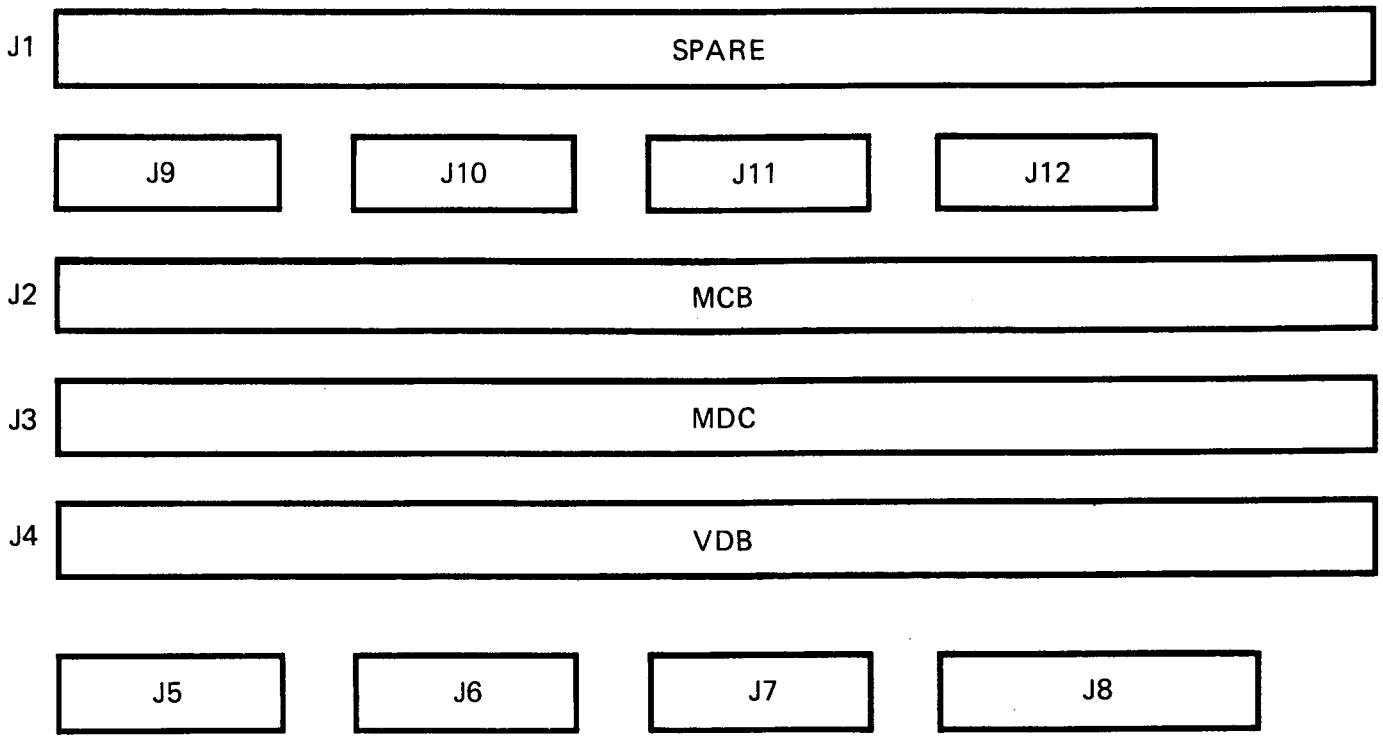


FIGURE 6: MCZ MOTHERBOARD ORGANIZATION

channel 2, and between backpanel connector J101 and motherboard connector J12 for channel 3. Figure 7 identifies these cables and their routing.

4.3 I/O CONNECTORS

The right side panel on the main unit contains a standard 3-prong AC power cable connector (J109), a 3-amp fuse, a 9-pin floppy disk power connector (J110), and a 110VAC auxiliary connector. Rear panel connectors are used to interface to external peripherals as follows:

J101 - SIB channel 3
J102 - SIB channel 2
J103 - Spare
J104 - Line Printer
J105 - Keyboard/Monitor
J106 - Terminal
J107 - Floppy Disk I/O
J108 - Spare

See Figure 8 for backpanel connector locations.

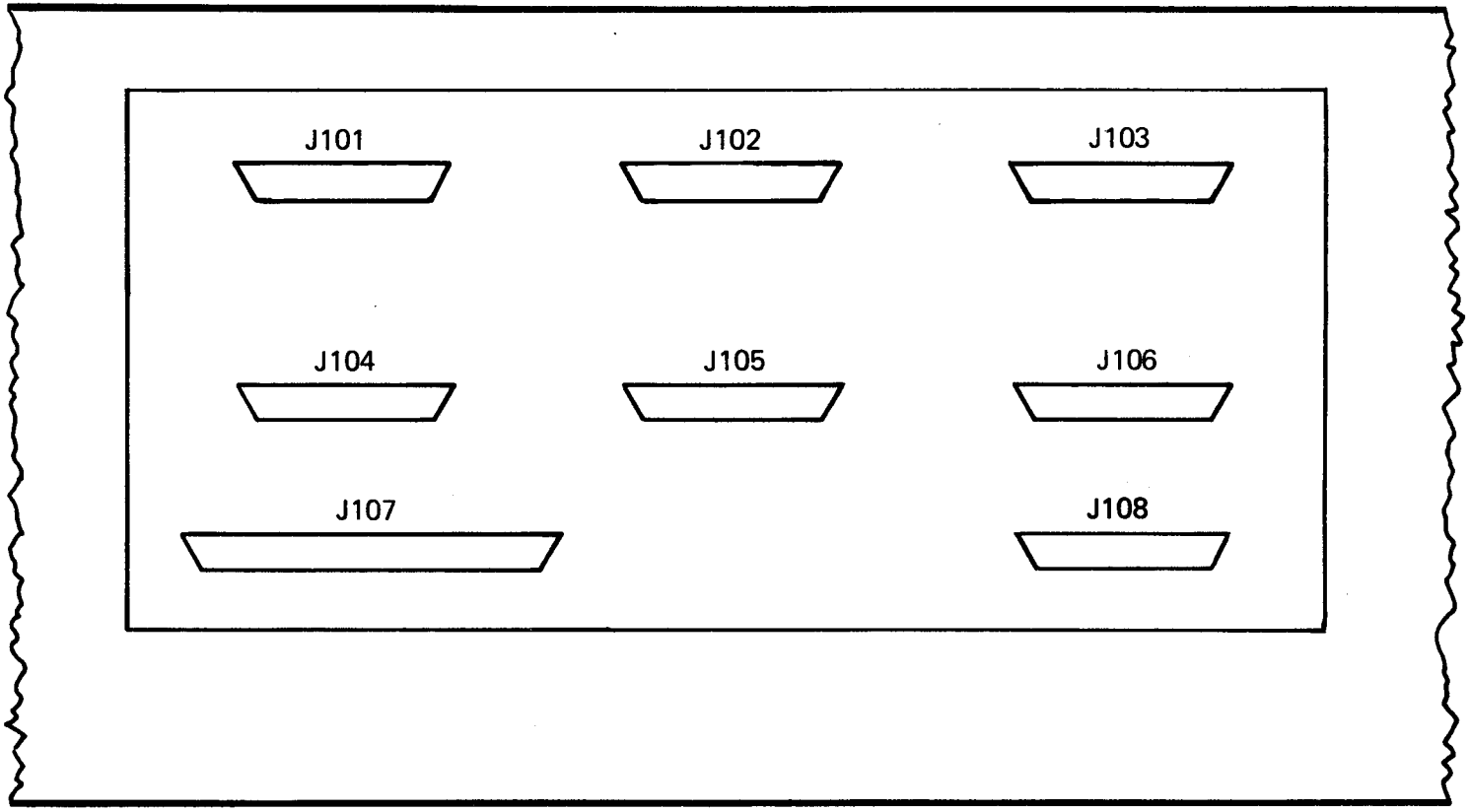


FIGURE 8: MCZ CONNECTOR PLACEMENT

SECTION 5. MCZ SPECIFICATIONS

1. RAM Memory Storage: Up to 60K bytes of main storage. (Standard configuration is 3K bytes of PROM monitor plus 32K bytes of RAM, 16K bytes on MCB and 16K bytes on the MDC.)

2. Word Size: 8 bits (1 byte)

3. Instruction Set: 158 variable length instructions

4. Shortest Instruction Cycle Time: 1.6 usec

5. Baud Rates (switch selectable on MCB): 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400.

6. I/O: Two 8-bit parallel ports and one serial with RS232 or current-loop interface.

7. Interrupt: Three modes of maskable interrupts.

8. Disk Storage: 300K bytes/disk - two disks

9. Card Enclosure Dimensions: 17" (43.2cm) wide x 10" (25.4cm) deep x 3.75" (9.5cm) high.

10. Disk Unit Dimensions: 9.5" (24.1 cm) wide x 15.5" (39.4 cm) deep x 10" (25.4 cm) high

11. Card Cage Dimensions: 8.5" (21.6cm) wide x 8.25" (21.0cm) deep x 3.5" (8.9cm) high.
    Slots: 4

12. System Weight:
    Card Enclosure - 10 lbs. (4.5 kg)
    Disk Unit - 30 lbs. (13.6 kg)

13. User Panel: (Left side panel) One system reset switch. One non-maskable interrupt switch (break) for return to debug environment.

14. Power Requirements: 110-115 VAC/3.0 A, 200-240 VAC/1.5 A, 50-60 HZ.

15. Internal Power Supply:
5 VDC 9 A capability
-5 VDC .5 A capability
+24 VDC 1 A capability

16. Connectors:
Ansley connector (25-pin, 609-25S) to rear panel
J101 - SIB channel 3
J102 - SIB channel 2
J103 - Spare
J104 - Line Printer (optional)
J105 - Keyboard/video monitor (optional)
J106 - Terminal - RS232 or current loop
J107 - Floppy Disk I/O (Ansley 609-37S)
J108 - Spare
The above are at the rear of chassis
J109 - System AC Power
J110 - Floppy Disk Power (AMP 3507282-1)
110 VAC Auxiliary connector (AMP 350778-0)
36 Watts maximum
The above are on the right side of chassis.

17. Environment: 0 degrees C - 40 degrees C
Operating temperature range.

18. ON/OFF: An ON/OFF switch is located on the right side of the unit.

19. Internal Cable: Flat ribbon with Ansley connector (26-pin, 609-2600m) to motherboard.
External Cable: Compatible with 25-pin Ansley 609-25S.

20. Optional Hardware:
RAM memory board (RMB)
PROM memory board (PMB)
Serial I/O Board (SIB)
Parallel I/O Board (IOB)
Analog Boards (AIO, AIB)
PROM Programmer Boards (PPB or PPB/16)
Video Display Board (VDB)
(PROM upgrade for VDB)

SECTION 6. MCZ INTERCONNECT AND SIGNAL LIST

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	BOARDS												CONNECTORS										
	OPTION (SIB)	MCB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)			POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12			J-24
+5 volts	1	1	1	1																			1
+5 volts	2	2	2	2																			2
+5 volts	3	3	3	3																			
+5 volts	59	59	59	59																			
+5 volts	60	60	60	60																			
+5 volts	61	61	61	61																			
*1/2 PHI	86	18																					
*1/2 PHI		118																					
* 20 mA Data		6											16										
* 20 mA Data.1	92																			16			
* 20 mA Data.Ret		19											17										
* 20 mA Data.RTN.1	25																			17			
* 20 mA REC.RTN.1	105																			10			
* 20 mA RECV		81											10										
* 20 mA RECV.RETN		77											24										
* 20 mA RECVR.1	90																			24			
* 2X.SERIAL.CLOCK		87																					
* 2X.SERIAL.CLOCK		112																					
8 PHI-		93	93																				
AB00	103	103	103	103																			
AB01	102	102	102	102																			
AB02	101	101	101	101																			
AB03	100	100	100	100																			
AB04	98	98	98	98																			
AB05	29	29	29	29																			
AB06	30	30	30	30																			
AB07	26	26	26	26																			
AB08	27	27	27	27																			
AB09	89	89	89	89																			
AB10	91	91	91	91																			
AB11	37	37	37	37																			
AB12	97	97	97	97																			

NOTE: * = Wirewrap connection

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	BOARDS												CONNECTORS										
	OPTION (SIB)	MCB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)			POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12			J-24
AB13	36	36	36	36																			
AB14	94	94	94	94																			
AB15	32	32	32	32																			
*ACK.LPT-		52													11								
BUSAK-		88		88																			
BUSRQ-		109		109																			
*BUSY.LPT		55													23								
*CLEAR.TO.SEND		11											5										
*CNTL1.LPT		50													25								
*COMPOSITE.VIDEO				52										4									
DAISY.CHAIN.1		86		33																			
*DAISY.CHAIN.1	81			34																			
*DATA.01.LPT		40													1								
*DATA.02.LPT		41													2								
*DATA.03.LPT		42													3								
*DATA.04.LPT		43													4								
*DATA.05.LPT		44													5								
*DATA.06.LPT		45													6								
*DATA.07.LPT		46													7								
*DATA.08.LPT		47													8								
*DATA.SET.RDY		74											6										
*DATA.STRB.LPT-		48													9								
*DATA.TERM.RDY		76											20										
DB00	13	13	13	13																			
DB01	75	75	75	75																			
DB02	71	71	71	71																			
DB03	8	8	8	8																			
DB04	68	68	68	68																			
DB05	5	5	5	5																			
DB06	12	12	12	12																			
DB07	73	73	73	73																			
*DIRECTION-			70													26							

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	BOARDS												CONNECTORS										
	OPTION (SIB)	MDB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)			POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12			J-24
DISK.C/T		17	17																				
*DRØ-			18													22							
*DR2-			76													23							
*DRIVE.PRESENT-			34													2							
*ENCODED.WRITE.DATA-			77													28							
*FAULT.LPT-		53													12								
*FLOPPY1.GND				121												1							
*FLOPPY1.GND																3							
*FLOPPY1.GND																4							
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*FLOPPY1.GND																6							
*FLOPPY1.GND																7							
*FLOPPY2.GND				122												8							
*FLOPPY2.GND																9							
*FLOPPY2.GND																10							
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*FLOPPY2.GND																12							
*FLOPPY2.GND																13							
*FLOPPY2.GND																14							
*FLOPPY2.GND																15							
*FLOPPY2.GND																16							
*FLOPPY2.GND																17							
*GND.DCØ		114																					
*GND.DCØ		117																					
*GND.DCØ		120																					
*GND.DC1			114																				
*GND.DC1			120																				
*GND.DC2	63																						
*GND.DC2	69																						
*GND.LPT				120											14								
*GND.LPT															15								

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	BOARDS												CONNECTORS										
	OPTION (SIB)	MCB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)			POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12			J-24
*GND.LPT															16								
*GND.LPT															17								
*GND.LPT															18								
*GND.LPT															19								
*GND.LPT															20								
*GND.LPT															21								
*GND.LPT															22								
GPØ-		104		104																			
GP3-		107	107																				
GP4-		108	108																				
GROUND	62	62	62	62																			3
GROUND	63	63	63	63																			4
GROUND	64	64	64	64																			
GROUND	120	120	120	120																			
GROUND	121	121	121	121																			
GROUND	122	122	122	122																			
*HALT-		113												23									
*HOZ.SYNC				56																			
*HOZ.SYNC				57										16									
*INPUT.PRIME.LPT-		49													10								
INT-	79	79	79	79																			
*INTE.IN.PULL.UP		22																					
*INTE.IN.PULL.UP		38																					
IORQ-	4	4	4	4																			
*KB.STRB-				47										7									
*KB.VD. 5V				3										25									
*KB.VD.GND				64										1									
*KB.VD.GND														2									
*KB.VD.GND														3									
*KB.VD.GND														13									
*KB.VD.GND														24									
*KBØØ				39										17									

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	BOARDS												CONNECTORS										
	OPTION (SIB)	MCB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)			POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12			J-24
*KBØ1				40										5									
*KBØ2				41										6									
*KBØ3				42										20									
*KBØ4				43										19									
*KBØ5				44										18									
*KBØ6				45										21									
*KBØ7				46										8									
*LINE.SIGNAL.DET		80											8										
M1-	115	115	115	115																			
*MASTER.RESET	9	9																					
*MEMORY.SEL		16																					
*MEMORY.SEL		21																					
MRQ-	85	85	85	85																			
*NMI-		110											25	11									
*PAPER.EMPTY.LPT		54													13								
PHI-	99	99	99	99																			
*RAW.READ.DATA-			66													32							
RD-	116	116	116	116																			
*READY-			33													20							
*RECV.DATA		7											3										
*REQ.TO.SEND		14											4										
*RESET-		31											26	12									
RFSH-	35	35	35	35																			
ROM.SELECT-		83	83																				
*ROM.SELECT-		92																					
*SECTOR-			19													19							
*SELECT.LPT		56													24								
SG3-		95	95																				
*SIB.2.GND	121																		7				
*SIB.3.GND	122																			7			
*SPARE2	42																		8				
*SPARE3	104																			8			

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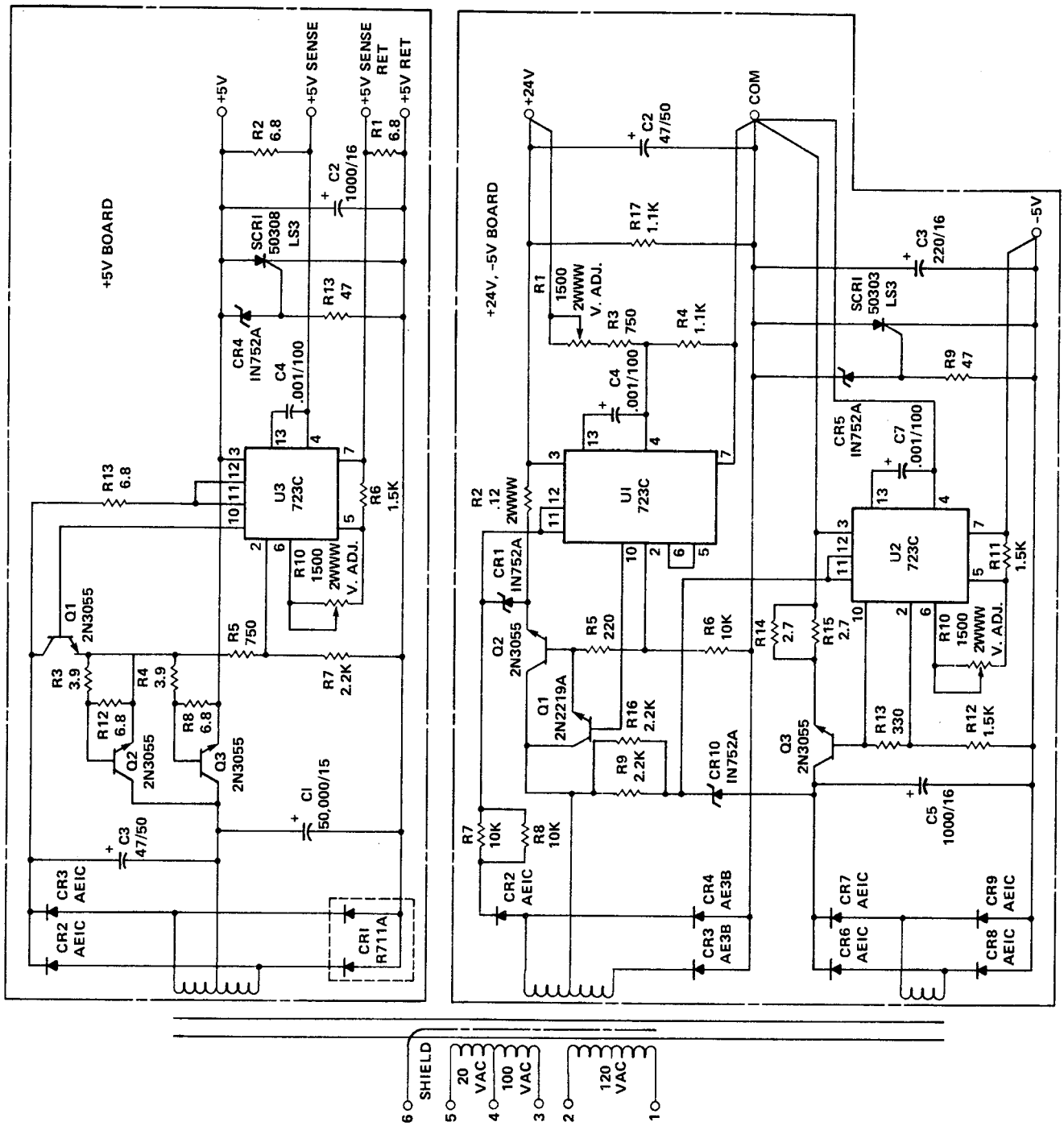
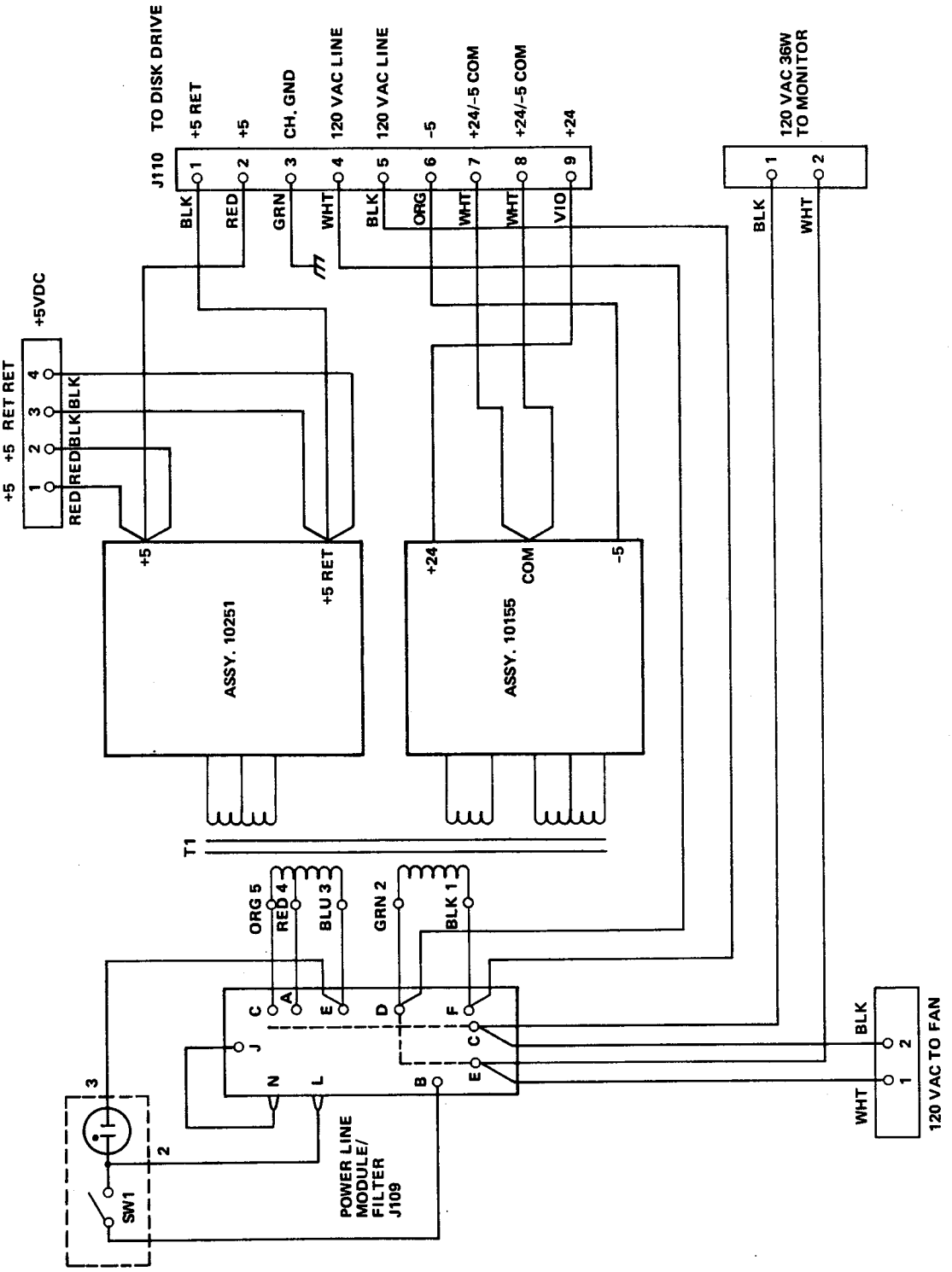
BOARDS

CONNECTORS

	OPTION (SIB)	MCB	MDC	VDB									TERM	KEY/MON	LINE PRINT	DISK	USER DEFINED	USER DEFINED	USER DEFINED (SIB CH 2)	USER DEFINED (SIB CH 3)				POWER
	J-1	J-2	J-3	J-4									J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12				J-24
*STEP-			9													27								
*TCTS	58																			5				
*TCTS2	54																		5					
*TDSR	57																			6				
*TDSR2	53																		6					
*TDTR	119																			20				
*TDTR2	114																		20					
*TER.GND				63									7											
*TER.GND													12											
*TER.GND													13											
*TRACKØ-			67													30								
*TRTS	118																			4				
*TRTS2	113																		4					
*TRXD	56																			3				
*TRXD2	52																		3					
*TTXD	117																			2				
*TTXD2	112																		2					
*TTY.TAPE.CNTL		65											14											
*TTY.TAPE.CNTL.RET		20											15											
*TTY.TAPE.CNTRL	82																			14				
*TTY.TAPE.CNTRL.RTN1	28																			15				
*VIDEO.DISABLE-			72	72																				
*VIDEO.DR				50																				
*VIDEO.DR				51										14										
*VRT.SYNC				54																				
*VRT.SYNC				55										15										
*WAIT-		119	119											22										
WR-	23	23	23	23																				
*WRITE.GATE-			11												29									
*WRITE.PROTECT-			96												31									
*XMITED.DATA		15											2											

SECTION 7. MCZ POWER SUPPLY SCHEMATICS


+5V BOARD
+5V
+5V SENSE
+5V SENSE RET
+5V RET
R2 6.8
R1 6.8
C2 1000/16
SCR1 50308 LS3
R13 47
CR4 IN752A
C4 .001/100
U3 723C
R13 6.8
R6 1.5K
R10 1500 2WWW V. ADJ.
Q1 2N3055
R5 750
R3 3.9
R4 3.9
R12 6.8
R8 6.8
Q2 2N3055
Q3 2N3055
R7 2.2K
C1 50,000/15
C3 47/50
CR3 AEIC
CR2 AEIC
CR1 R711A
+24V, -5V BOARD
+24V
COM
-5V
C2 47/50
R17 1.1K
R1 1500 2WWW V. ADJ.
R3 750
R4 1.1K
C4 .001/100
U1 723C
R2 .12 2WWW
CR1 IN752A
Q2 2N3055
R5 220
R6 10K
Q1 2N2219A
R16 2.2K
R9 2.2K
CR10 IN752A
R7 10K
R8 10K
CR2 AEIC
CR4 AE3B
CR3 AE3B
C3 220/16
SCR1 50303 LS3
R9 47
CR5 IN752A
C7 .001/100
U2 723C
R14 2.7
R15 2.7
R11 1.5K
R10 1500 2WWW V. ADJ.
R13 330
R12 1.5K
Q3 2N3055
C5 1000/16
CR7 AEIC
CR9 AEIC
CR6 AEIC
CR8 AEIC
SHIELD
20 VAC
100 VAC
120 VAC


TO DISK DRIVE
J110
+5 RET
+5
CH. GND
120 VAC LINE
120 VAC LINE
-5
+24/-5 COM
+24/-5 COM
+24
1 2 3 4 5 6 7 8 9
BLK RED GRN WHT BLK ORG WHT WHT VIO
120 VAC 36W
TO MONITOR
1 2
BLK WHT
+5VDC
+5 +5 RET RET
1 2 3 4
RED RED BLK BLK
+5
+5 RET
ASSY. 10251
+24
COM
-5
ASSY. 10155
T1
ORG 5
RED 4
BLU 3
GRN 2
BLK 1
C A E D F
J
C E
B
N L
3 2
SW1
POWER LINE
MODULE/
FILTER
J109
BLK
WHT
1 2
120 VAC TO FAN

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03-3030-01

Printed in USA