TEI INC.

SPECIAL SYSTEMS GROUP

MCS-112/122
RM12/RM22
USER'S MANUAL

TEI INC.
5075 S. Loop East
Houston, Texas 77033
713-738-2300
TWX: 1-910-881-3639

CONTENTS

1.1.0 INTRODUCTION

This reference manual supplies information on the TEI, Inc. MCS-112/122 RM-12/22 Microcomputer Systems. If additional information is required, please contact your local dealer or representative.

1.2.1. MCS-112/122 GENERAL DESCRIPTION

The MCS-112/122 is TEI's solution to your system needs. The TEI Microcomputer System features the following:

--The MCS-112 offers a high quality constant voltage transformer (CVT) power supply which is rated conservatively at 8V @17A, ±16V @2A, over a voltage range of 95 to 130V AC; while the MCS-122 offers a CVT power supply rated at 8V @30A, ±16V @4A, over a voltage range of 95 to 130V AC.

--The MCS-112 offers a 12 slot mother board, while the MCS-122 features a 22 slot mother board. Both come with all connectors factory installed and tested; a Mate-N-Loc connector on the reset line for dedicated systems; screw terminal connections for the DC power leads; and provision for a front panel.

--The MCS-112/122 gives you a rugged industrial quality chassis; a back panel punched for eight DB25, two DB37 connectors, and cable clamp for ribbon cable; and the front panel features a lighted power switch and a reset switch.

The MCS-112/122 is designed to meet U.L. 478 specification for those who require commercial or industrial application. TEI, Inc. has been a quality electronic manufacturer for ten years, building highly reliable electronic systems for industrial use. Many of these are U.L. approved with some approved for use in medical equipment where only the highest quality and dependability will do. By purchasing the MCS-112/122, you have obtained the best Microcomputer Mainframe available today!

1.2.2. RM-12/RM-22 GENERAL DESCRIPTION

The TEI RM-12 & RM-22 are the same as the MCS-112/122 described above except for the ruggedized Retma Rack enclosures (19" W X 7" H Panel Mounting with chassis slides).

1.2.3 THEORY OF OPERATION

The MCS-112/122 can be considered as two separate electrical components. These are: (1) The Power Supply and (2) the Mother Board.

(1) The Power Supply is designed to deliver three (3) DC voltages to the Mother Board, +8V @17A, ±16 @2A for the MCS-112; +8V @30A, ±16V @4A for the MCS-122. Our CVT Power Supply also provides 1% line regulation from 95 to 130V AC input. This regulation is due to the use of a constant voltage (or Ferroresonant) transformer.*

(2) The Mother Board uses the "S-100" bus format and will accept all cards designed for this configuration. The purpose of the Mother Board is to provide the various signals and power paths from card to card and have all signals available on all connectors on the Mother Board.

1.2.4 RECEIVING INSPECTION

Immediately upon receiving your MCS-112/122 inspect all contents for damage which may have occured during shipping. If your MCS-112/122 arrives damaged or incomplete contact your dealer so that he can take appropriate action. For further information on replacement and repair, see section 1.2.4.

*For the theory of operation of a CVT see the folder included in the documentation package.

1.3.1 WARRANTY INFORMATION

All components sold by TEI, Inc. are purchased through normal factory distribution and any part which fails because of defects in workmanship or material will be replaced at no charge for a period of three months for kits and one year for assembled modules, following the date of purchase. The defective part must be returned post paid to TEI, Inc. within the warranty period.

Any malfunctioning module, purchased as a kit, and returned to TEI, Inc. within the warranty period, which in the judgement of TEI, Inc. has been assembled with care and not subjected to electrical or mechanical abuse, will be restored to proper operating condition and returned, regardless of cause of malfunction, with a minimal charge to cover postage and handling.

Any modules purchased as a kit and returned to TEI, Inc which in the judgement of TEI, Inc. are not covered by the above conditions will be repaired and returned at a cost commensurate with the work required. In no case will this charge exceed $25.00 per unit without prior notification and approval of the owner.

TEI, Inc. guarantees every assembled product sold by them or their authorized representatives to be free of defects in material and workmanship, and that they will perform to rated specifications for a period of 1 year from original delivery. Obligation under this guarantee is limited to the repair or replacement of any defective part within the 1 year period that is returned to us by the original purchaser, transportation charges prepaid, that our examination proves to be defective. This guarantee applies to the original purchaser, or in the case of an original equipment manufacturer, to the end purchaser of the equipment.

This warranty is made in lieu of all other warranties expressed or implied and is limited in any case to the repair or replacement of the module involved.

The warranty herein extends only to the original purchaser-user and is not assignable or transferrable.

1.3.2 REPLACEMENT PARTS AND REPAIR SERVICE

In order to expedite repair or replacement and return of the product contact TEI, Inc. Customer Service for a Return Authorization Number. This number should be shown on the outside of the shipping container and on the packing slip. Your product will thus be repaired and processed with the best efficiency possible and returned to you F. O. B., TEI, Inc. Houston, Texas per your shipping instructions. If method of return shipment is not specified, the product will be returned to you by the same method it was received.

At the time a return authorization is obtained from Customer Services, please provide the following information:

A. Product Model Number
B. Product S/N (if returning a module within a TEI, Inc. product indicate the product S/N).
C. Nature of Failure or Damage
D. Carrier and Waybill Number
E. Requested Return Date of Product
F. Return Carrier

Every effort was made to produce the product for high quality and reliability and was tested to specification before shipment to you. Title to the product passes to the buyer at the time of shipment and any claims for freight damage must be filed with the freight carrier promptly. TEI, Inc. makes no warranties expressed or implied against physical abuse or neglect, including freight damage. Freight damaged products may be returned to TEI, Inc. for estimates of cost to repair and replace. Such units should be returned following the procedures outlined above. A Purchase Order or letter is necessary however to cover the cost to repair or of replacement of damaged units and can form the basis of your claim for liability of the carrier. Every effort is made, utilizing professional packaging techniques, to minimize the possibility of freight damage.

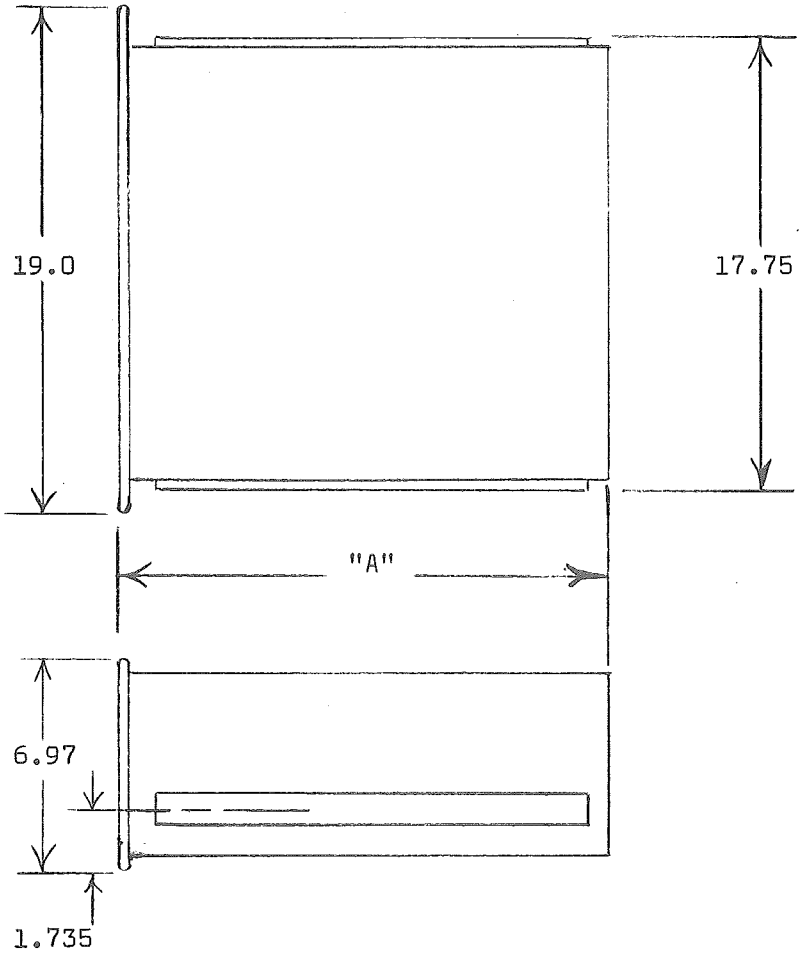
DIMENSIONAL DATA

MCS-112 Dimensions: 17.25 Wide X 7.25 High X 12 Deep

MCS-122 Dimensions: 17.25 Wide X 7.25 High X 19.5 Deep

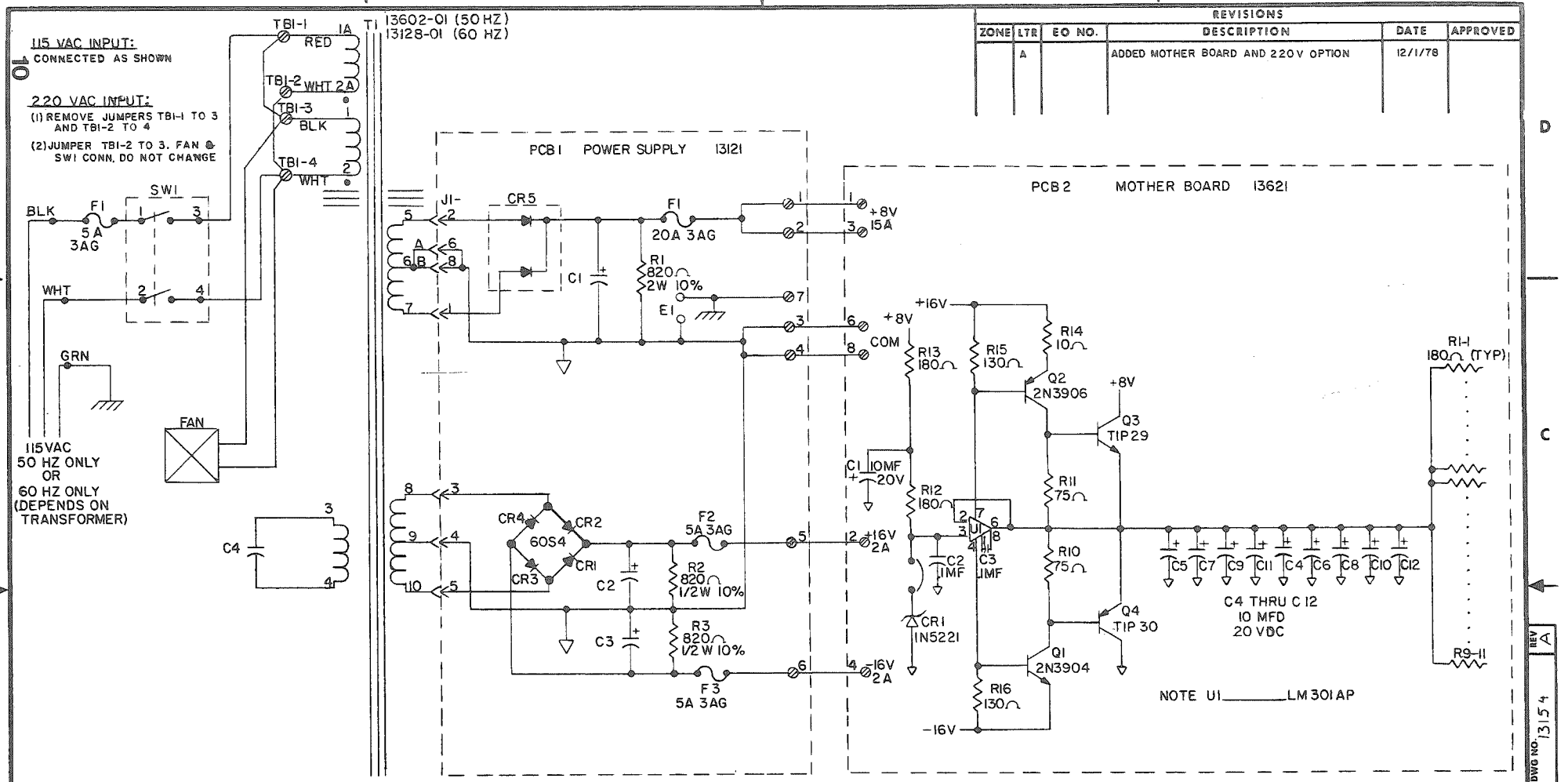
RM-12 Dimensions: 19" Wide X 7" High Rack Panel X 13" Deep

RM-22 Dimensions: 19" Wide X 7" High Rack Panel X 19.5 Deep



	DIM A
RM-12	13.0
RM-22	19.5

RM-12/22
OUTLINE DRAWING



REVISIONS					
ZONE	LTR	EO NO.	DESCRIPTION	DATE	APPROVED
	A		ADDED MOTHER BOARD AND 220V OPTION	12/1/78	

NOTES
C1 45,000 15V TEI P/N 1521-068
C2,C3 10,000 30V TEI P/N 1521-088
C4 3 MF 600 VAC TEI P/N 1543-006
CR1 THRU CR4 60S4 TEI P/N 4825-043
CR5 R712 VARO TEI P/N 4815-017

NOTES:

QTY	PART NUMBER	DESCRIPTION	MANUFACTURER	CODE IDENT	REF DES	ITEM

PARTS LIST

	MCS-112
NEXT ASSY	USED ON
APPLICATION	

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE
.X ± .06
.XX ± .02
.XXX ± .010
ANGULAR ± .5 DEG

SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE ✓

MATERIAL

CONTRACT NO.

SIGNATURES	DATE
DR Joseph B Wallstrup	11-30-78
DES	
CHK	
ENGR E. McCain	12-13-78
APP Wallace Barrow	
APP	

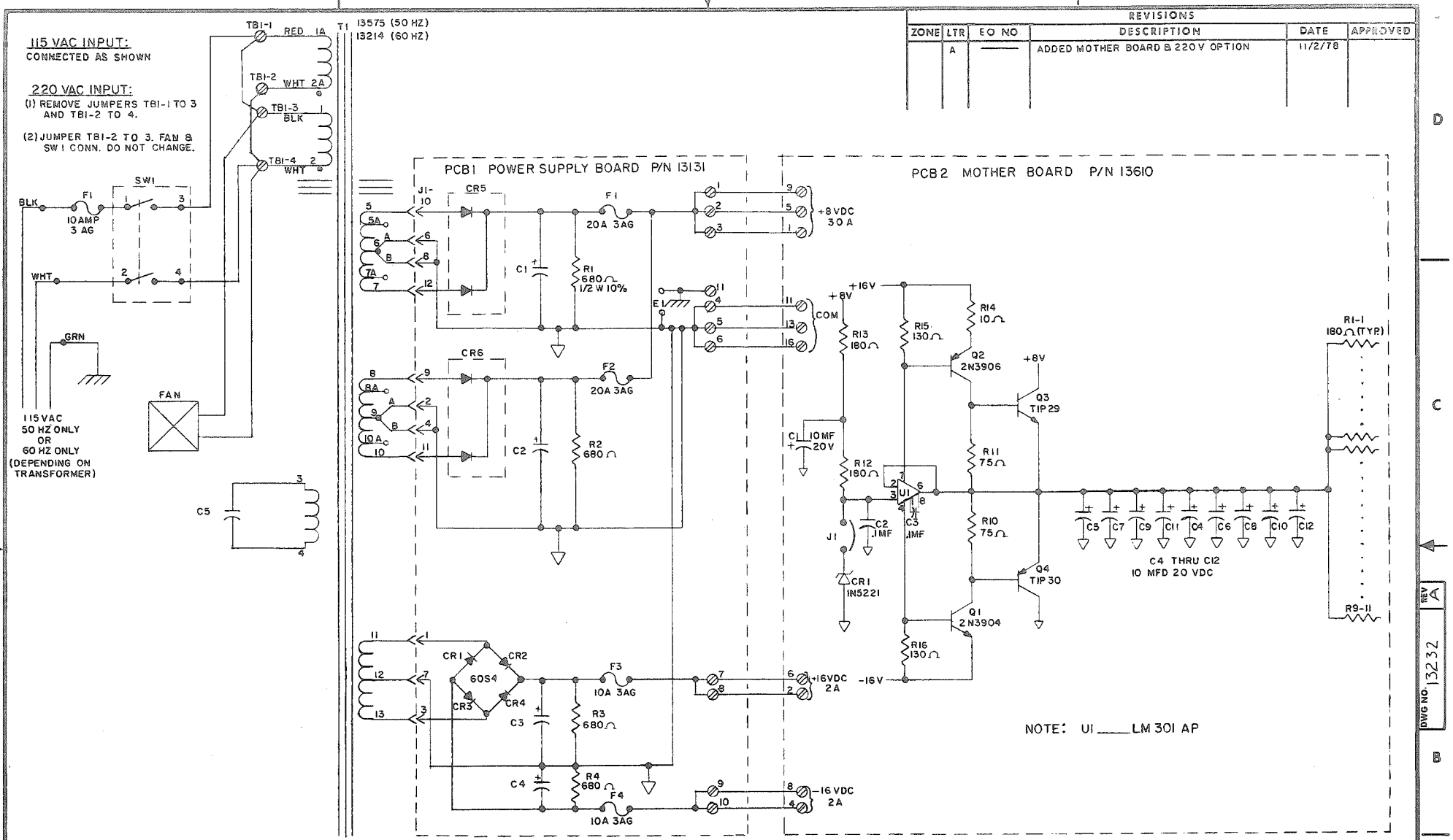
TEXAS ELECTRONIC INSTRUMENTS, INC
HOUSTON, TEXAS

MCS-112
SCHEMATIC

SIZE	CODE IDENT NO.	DWG NO.	REV
C	33179	13154	A

SCALE | REL EO NO. | SHEET | OF

REV A
DWG NO. 13154



NOTES:	
C1,C2	45,000 MF, 15V TEI P/N 1521-068
C3,C4	10,000 MF, 30 V TEI P/N 1521-088
C5	5 MF, 660 VAC TEI P/N 1543-001
CR1 THRU CR4	60S4 TEI P/N 4825-043
CR5, CR6	TEI P/N 4815-017

NOTES:

REVISIONS					
ZONE	LTR	EO NO	DESCRIPTION	DATE	APPROVED
	A	———	ADDED MOTHER BOARD & 220V OPTION	11/2/78	

QTY	PART NUMBER	DESCRIPTION	MANUFACTURER	CODE IDENT	REF DES	ITEM

PARTS LIST

	MCS-122
NEXT ASSY	USED ON
APPLICATION	

DIMENSIONAL TOLERANCE UNLESS NOTED OTHERWISE
.X ± .06
.XX ± .02
.XXX ± .010
ANGULAR ± .5 DEG

SURFACE FINISH IN MICROINCHES RMS UNLESS NOTED OTHERWISE ✓

MATERIAL

CONTRACT NO.

SIGNATURES	DATE
DR J. BROCHTRUP	11-2-78
DES	
CHK C. [illegible]	11-8-78
ENGR E. [illegible]	11-8-78
APP Wallace Berry	
APP	

TEXAS ELECTRONIC INSTRUMENTS, INC
HOUSTON, TEXAS

MCS-122
SCHEMATIC

SIZE	CODE IDENT NO.	DWG NO.	REV
C	33179	13232	A

SCALE | REL EO NO. | SHEET 1 OF 1

DWG NO. 13232 REV A

11

10-70 ROYTYPED 4 40-21

1.4.4 PARTS LIST

The following parts list is included to supply the necessary part numbers needed for ordering replacement parts.

MCS-112/RM-12

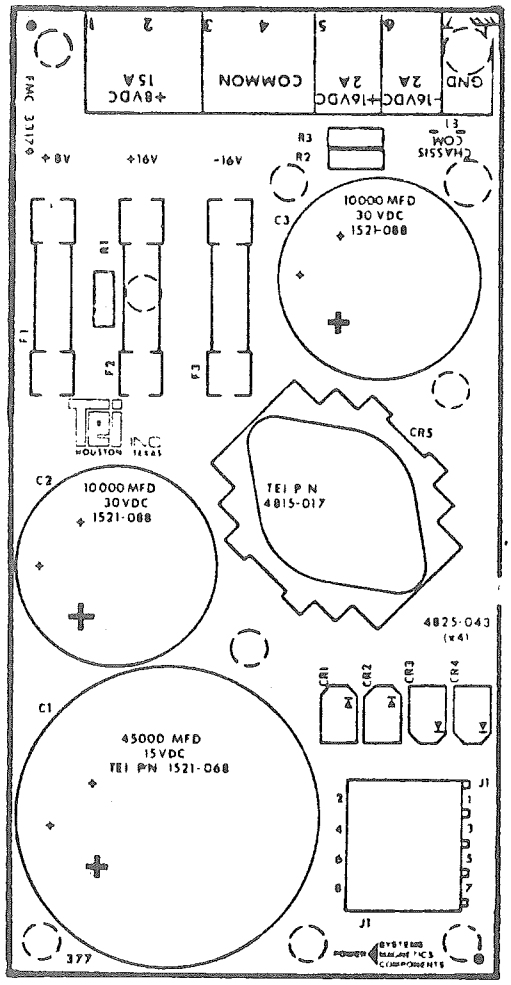
REF DES	DESCRIPTION	TEI P/N
	CHASSIS MOUNTED PARTS	
PCB2	* Mother Board 12 Slot	13620
PCB1	* Power Supply	13120
T1	Transformer (112-60Hz)	13128-01
T1	Transformer (RM12-60Hz)	13128-02
T1	Transformer (112-50Hz)	13602-01
T1	Trnasformer (RM12-50Hz)	13602-02
C4	Cap, 3MF @660 VAC	1543-006
PCB1-J1	Socket Housing, 8 CKT	2122-011
PCB2-J1	Socket Housing, 2 CKT	2122-021
Fan	Fan	2610-011
-	Filter, Fan	13146
SW1	Power Switch	5113-001
SW2	Reset Switch	5110-005
F1	Fuse 5A 250V, 3 AG	5173-062
-	Power Cord	6080-003
-	Rubber Feet	1419-001
-	Boot, Rubber Cap	1592-003
-	Card Guide	1750-004

MCS-122/RM-22

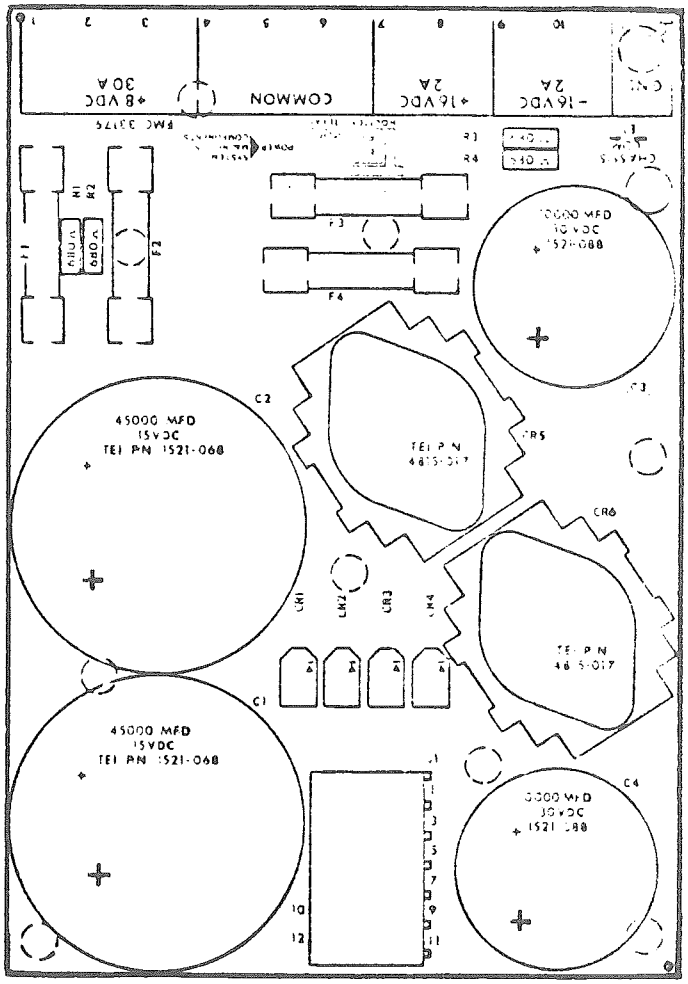
REF DES	DESCRIPTION	TEI P/N
	Chassis Mounted Parts	
PCB2	* Mother Board 22 Slot	13610
PCB1	* Power Supply	13130
T1	Transformer (122-60Hz)	13214-01
T1	Transformer (RM22-60Hz)	13214-02
T1	Transformer (122-50Hz)	13575-01
T1	Transformer (RM22-50Hz)	13575-02
C4	Cap, 5MF @660 VAC	1543-001
PCB1-J1	Socket Housing, 12 CKT	2122-013
PCB2-J1	Socket Housing, 2 CKT	2122-021
FAN	FAN	2610-011
-	Filter,Fan	13146
SW1	Power Switch	5110-001
SW2	Reset Switch	5110-005
F1	Fuse 10A 250V, 3 AG	5173-079
-	Power Cord	6080-003
-	Rubber Feet	1419-001
-	Boot, Rubber Cap	1592-003
-	Card Guide	1750-004

*Refer to pp. 13 & 14 For P.C. Board Data.

PC BOARD #13120
MCS-112/RM-12



PC BOARD #13130
MCS-122/RM-22



PARTS LIST

REF DES	DESCRIPTION	TEI P/N
PCB	FAB Power Supply	13121
C1	Cap, 45,000 MFD, 15 VDC	1521-068
C2, C3	Cap, 10,000 MFD, 30 VDC	1521-088
CR1 thru CR4	Diode 60S4	4825-043
CR5	Rectifier, R702	4815-017
E1	#20 Ga Jumper	6009-003
F1	Fuse, 20A, 32V, 3AG	5173-029
F2, F3	Fuse, 5A, 250V, 3AG	5173-022
J1	Pin Header, 8 CKT	2122-005
R1, R2, R3	RES 820 Ω 1/2 W 10%	4725-329

PARTS LIST

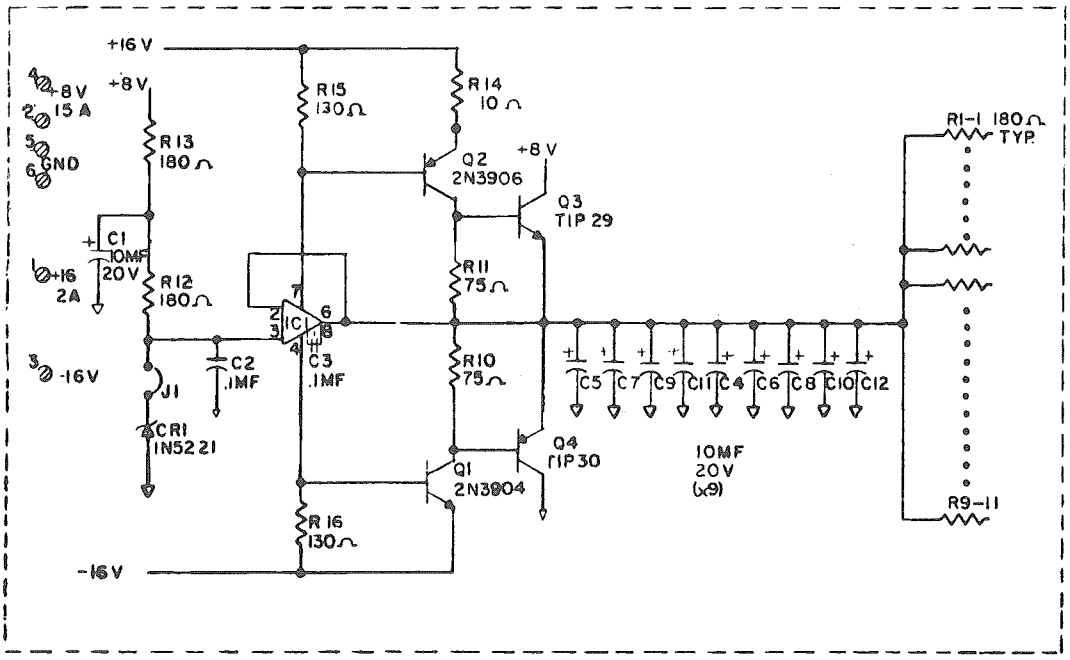
REF DES	DESCRIPTION	TEI P/N
PCB	FAB Power Supply	13131
C1,C2	Cap, 45,000 MFD, 15VDC	1521-068
C3,C4	Cap, 10,000 MFD, 30VDC	1521-088
CR1 thru CR4	Diode 60S4	4825-043
CR5,CR6	Rectifier, R702	4815-017
E1	#20 GA Jumper	6009-003
F1,F2	Fuse, 20A, 32V, 3AG	5173-029
F3,F4	Fuse, 10A, 32V, 3AG	5173-022
J1	Pin Header, 12 CKT	2122-007
R1, R2, R3,R4,	Res 680 Ω 1/2W 10%	4725-329

MOTHER BOARDS

P/N	CAPACITY	SIZE
13630	8 Slot	8.500 X 6.800
13620	12 Slot	8.500 X 10.050
13612	22 Slot	8.500 X 17.500

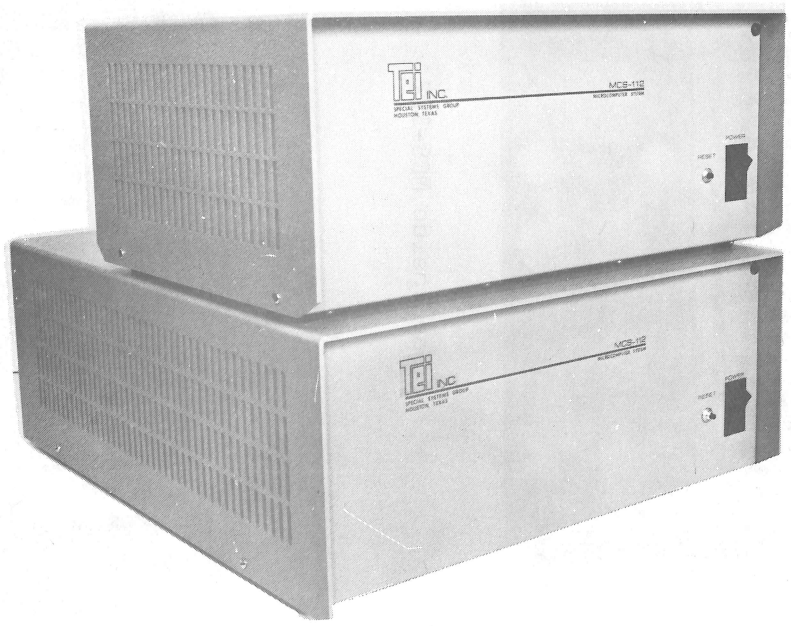
PARTS LIST

REF DES	P/N	DESCRIPTION	8 SLOT QTY	12 SLOT QTY	22 SLOT QTY
	13631	FAB TEI	1	-	-
	13621	FAB TEI	-	1	-
	13611	FAB TEI	-	-	1
C2,C3	1562-002	CAP .1MF	2	2	2
C1,C4-C12	1580-001	CAP 10MF@20V	10	10	10
	2122-020	PIN HEADER 2CKT	1	1	1
	2125-011	100 PIN EDGE CONN	8	12	22
U1	3110-006	IC CHIP MA 301	1	1	1
	3190-002	IC SOCKET 8 PIN	1	1	1
R14	4741-145	RES. 10Ω 1/4 W 2%	1	1	1
R10,R11	4741-229	RES. 75Ω 1/4 W 2%	2	2	2
R15,R16	4741-252	RES. 130Ω 1/4 W 2%	2	2	2
R12,R13	4741-266	RES. 180Ω 1/4 W 2%	2	2	2
R1,R9	4784-002	11 SEG. RES. NETWORK 180Ω	9	9	9
CR1	4840-026	DIODE IN5221	1	1	1
Q1	4864-005	TRANS. 2N3904	1	1	1
Q2	4864-007	TRANS. 2N3906	1	1	1
Q4	4873-011	TRANS. TIP 30	1	1	1
Q3	4874-035	TRANS. TIP 29	1	1	1

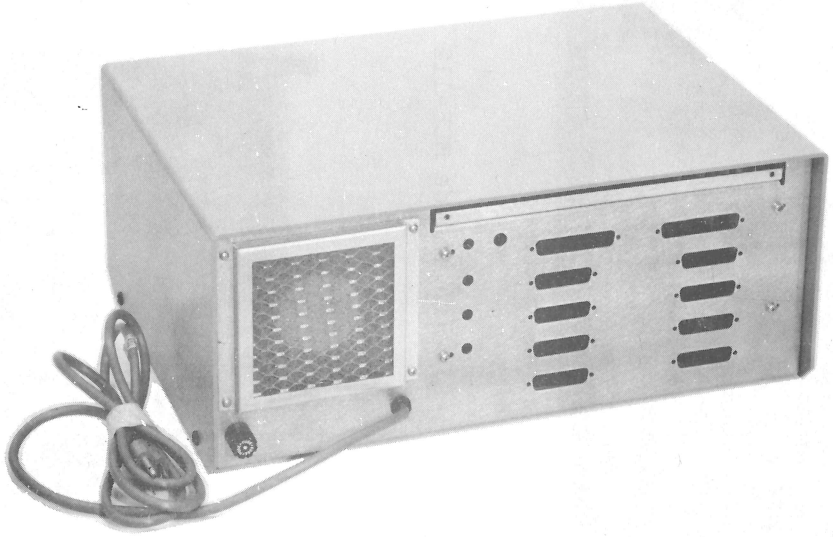


GENERAL ASSEMBLY VIEWS

Figure 1.4.1 COMPLETE ASSEMBLY WITH COVER



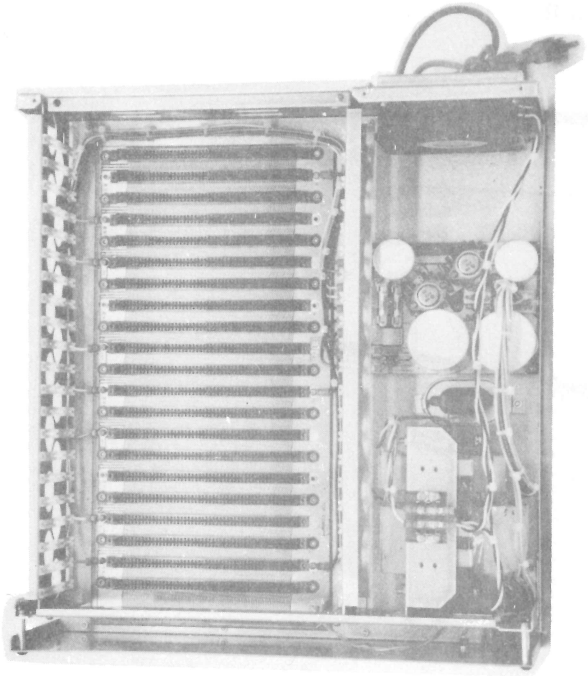
MCS-112 (top) and MCS-122 (btm)



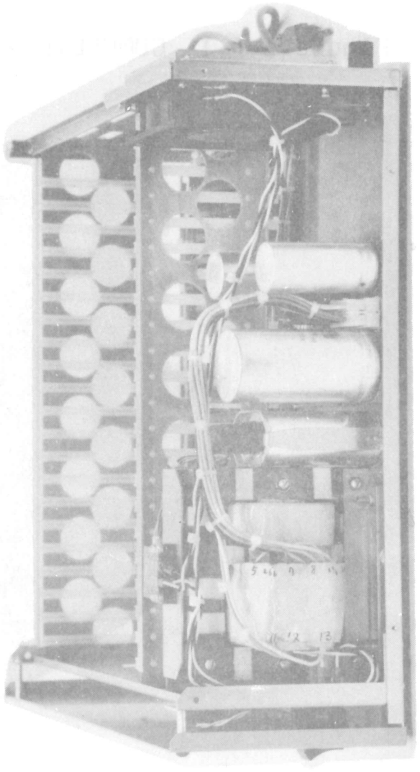
Rear View MCS-112
(Typical for MCS-122)

GENERAL ASSEMBLY VIEWS

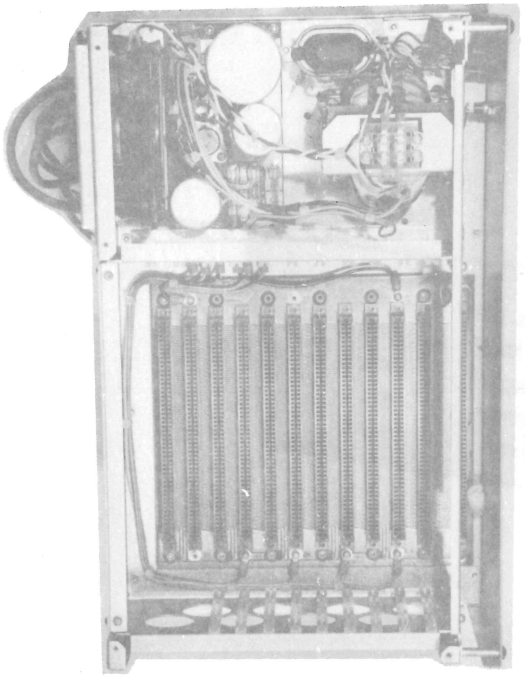
Figure 1.4.2 ASSEMBLY WITHOUT COVER



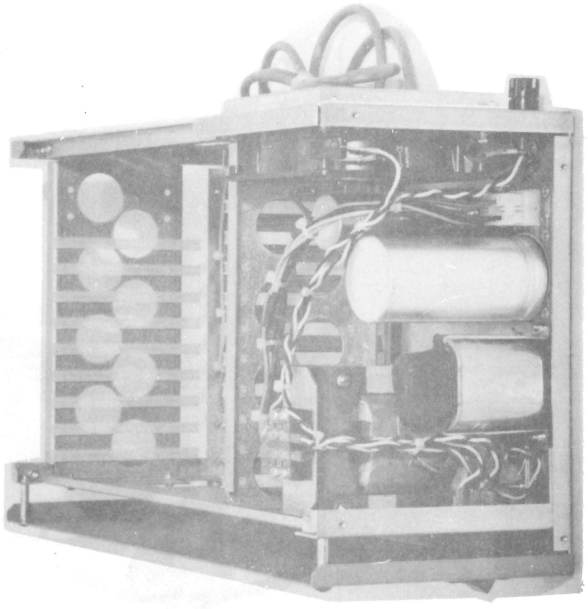
Top Inside MCS-122



Power Supply MCS-122



Top Inside MCS-112



Power Supply MCS-112

Your MCS-112 or 122 computer has been through a complete QC and test procedure at the factory both during and after completion. However should any problem arise in which your unit is not working properly, you may follow the following procedure to check your mainframe for proper wiring and voltage:

(1) Visually inspect the wiring against the color code described in the manual.

(2) Check the wires to be sure they are securely fastened to the PC cards.

(3) With a DC volt meter check the voltage on the +8V terminal to Common. The voltage should be around 10 to 11 volts. Check the voltage on the ±16V terminals. The voltage should be ±17 volts.

(4) Now check pins 1 and 51* of one of the Mother Board connectors for +8V to Common. Check pin 2 for +16V, and check pin 52 for -16V.

(5) With reference to Common make a check of the other pins for any other voltages. (There should be none).

(6) If the preceeding checks are ok, the mainframe is functioning properly, and you are now ready to install your PC cards.

*For each connector, the pin nearest the front left corner (as installed in unit) is No. 1 with No. 51 directly behind it on the next row.

NOTE: If the power switch indicator light stays on with the switch in the "off" position, swap the white/black wire pairs to the switch for proper power "on" indication.