

**Canon**  
**X-07**  
HAND HELD COMPUTER

- TECHNICAL GUIDE
- PARTS CATALOG

ENGLISH

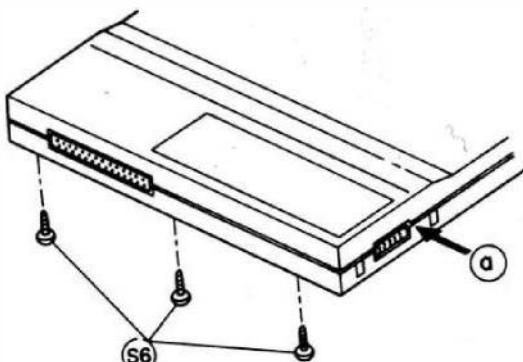
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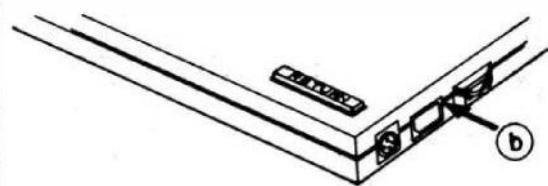
## 1. RELEASE of COVER

(1) Loosen 3 screws S6

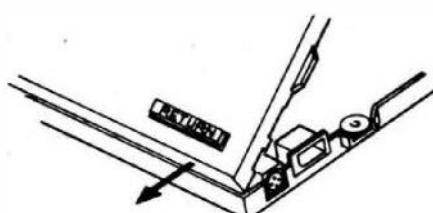
(2) Push **a** part of Lower cover and release the hook on Upper cover.



(3) Push **b** part of Lower cover.

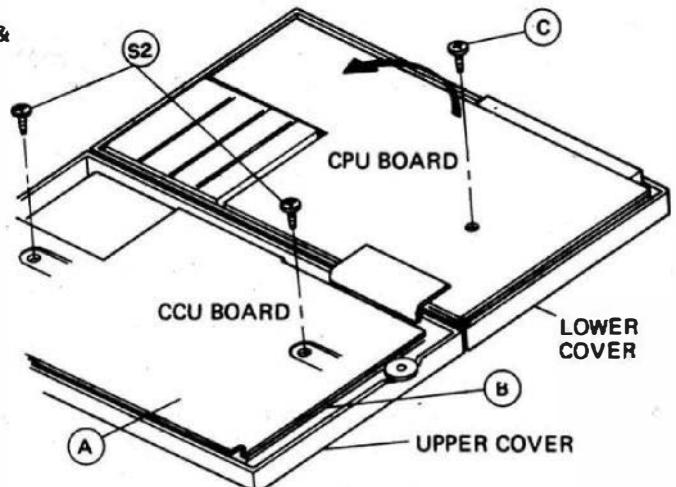


(4) Slide Upper cover.

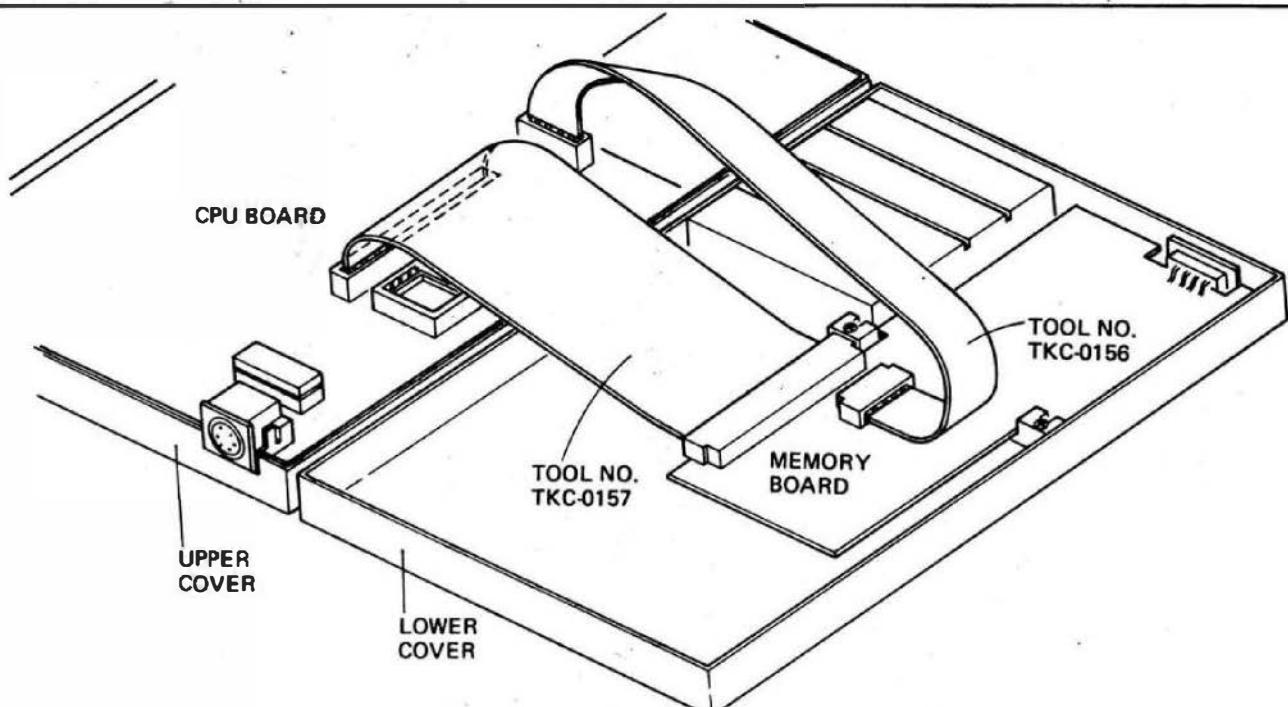


(5) Loosen two screws S2 and remove insulation plate **A** & shield plate **B** of CCU board.

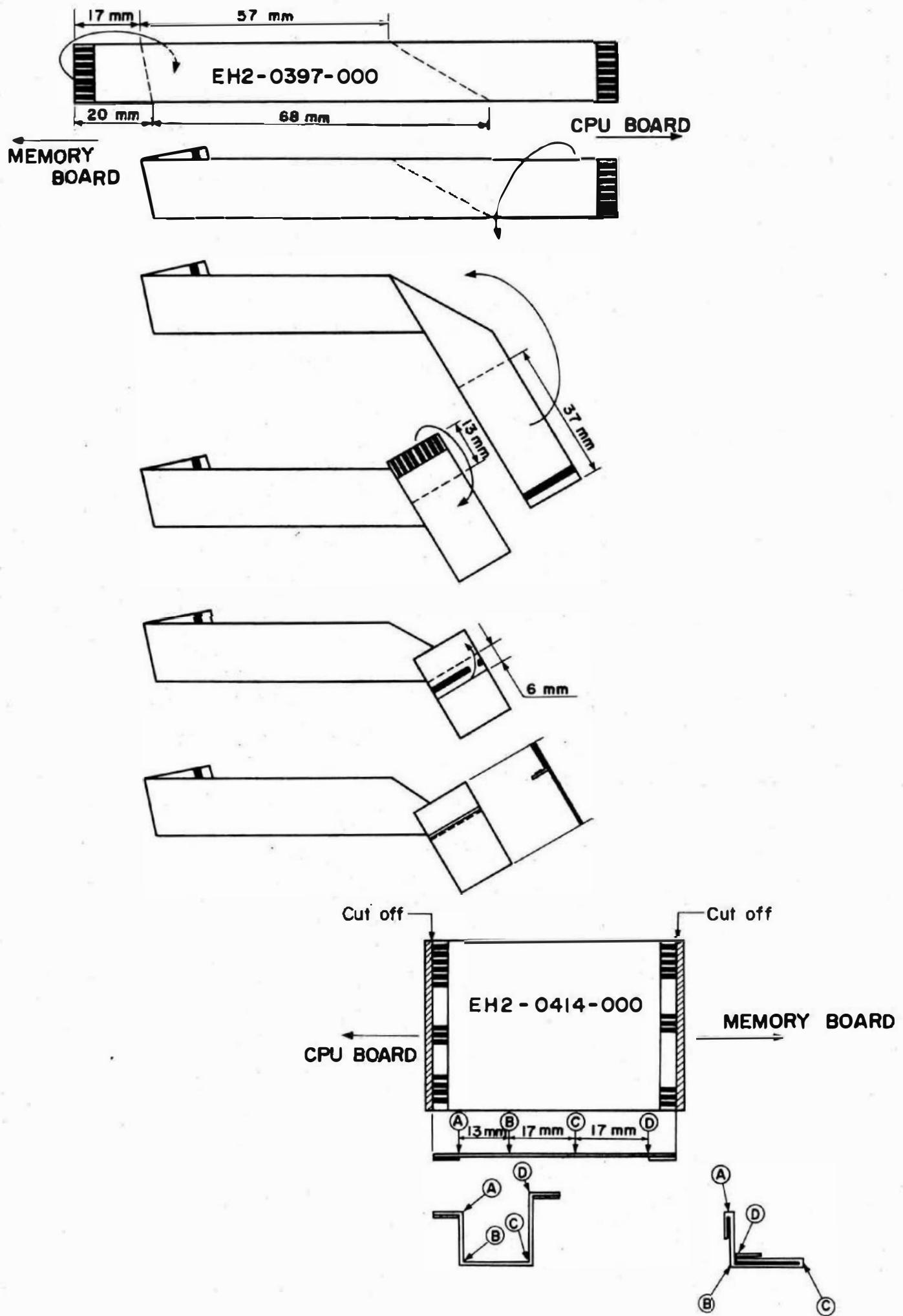
(6) Loosen screw **C** and lift CPU board.



## 2. ATTACH the FLAT CABLES for REPAIR

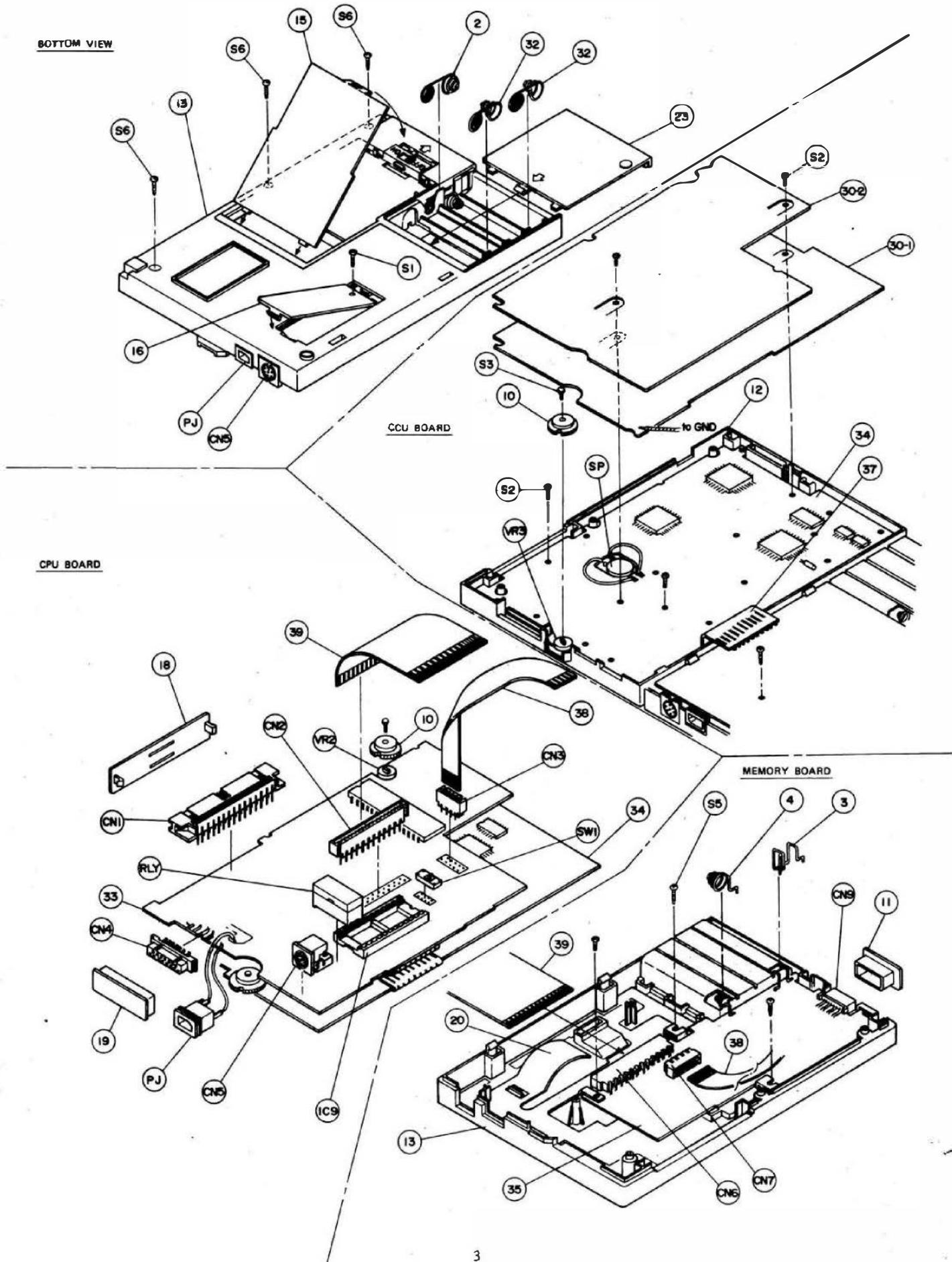


### 3. FOLDING OF FLAT CABLE

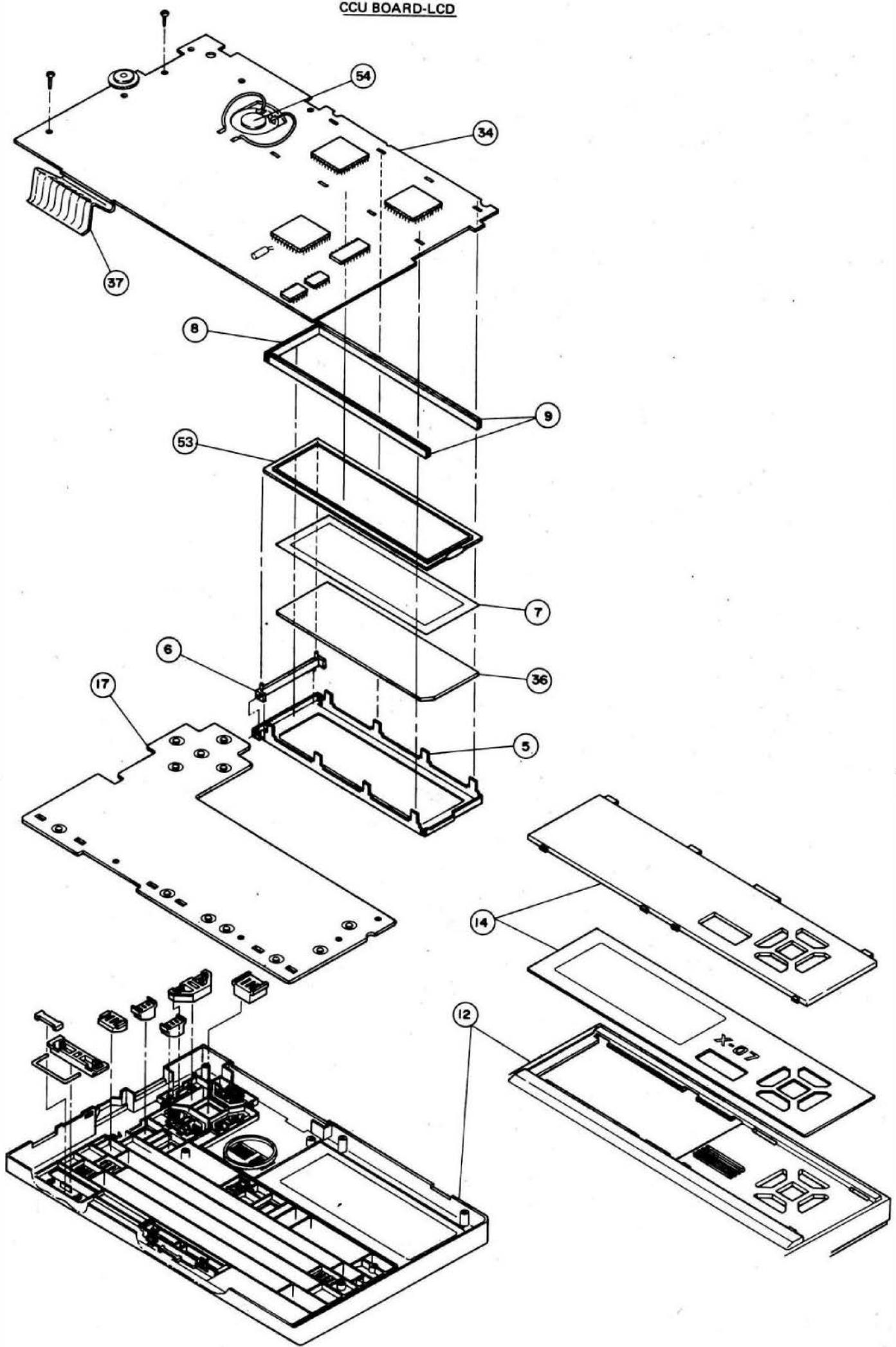


## 4. PARTS CATALOG

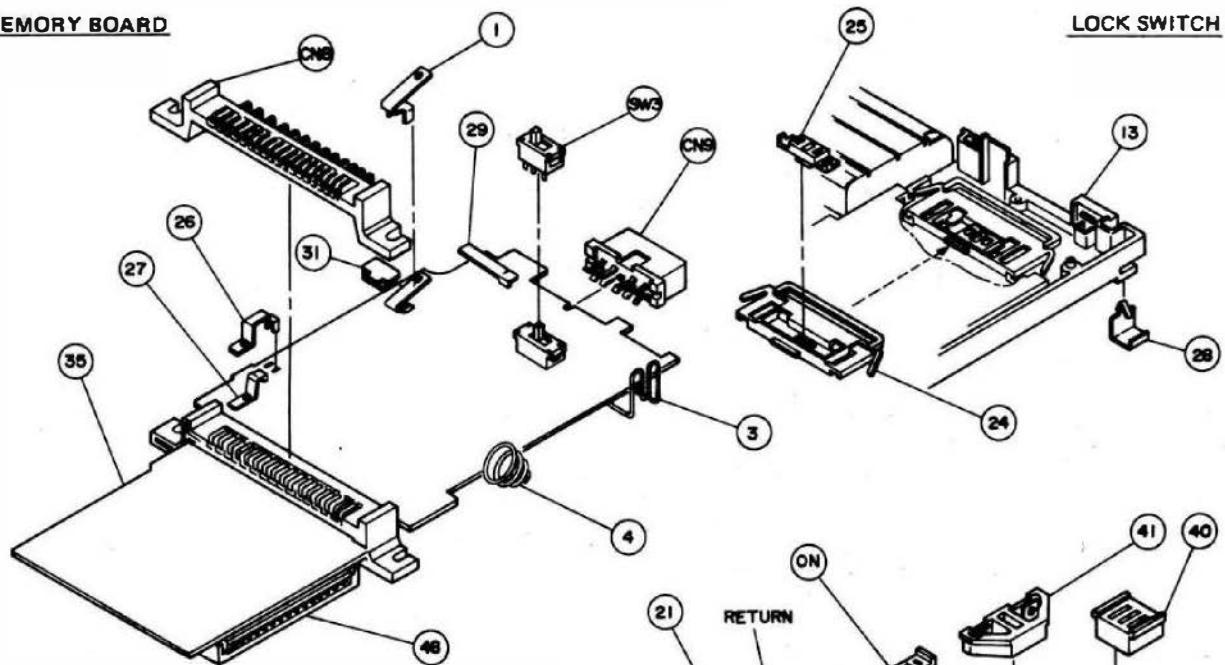
### EXPLODED VIEW



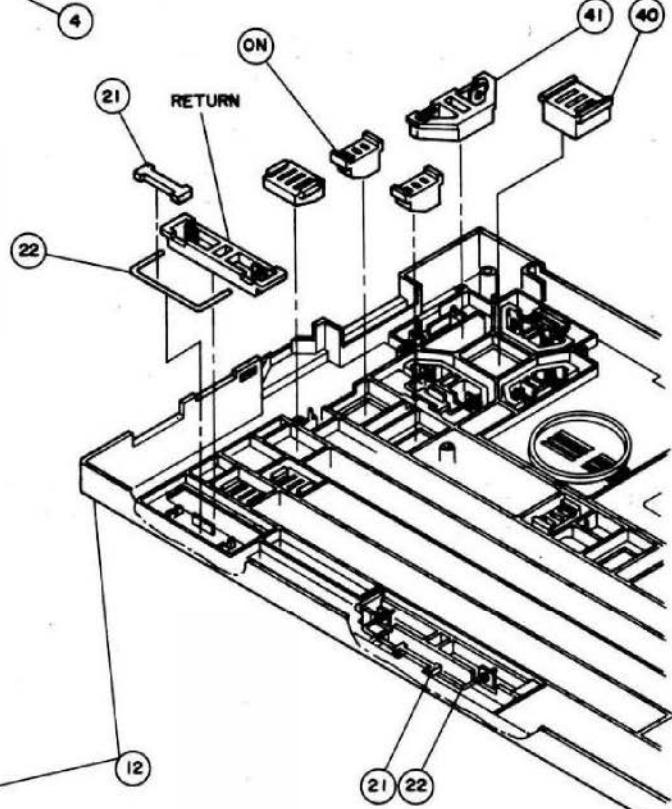
CCU BOARD-LCD



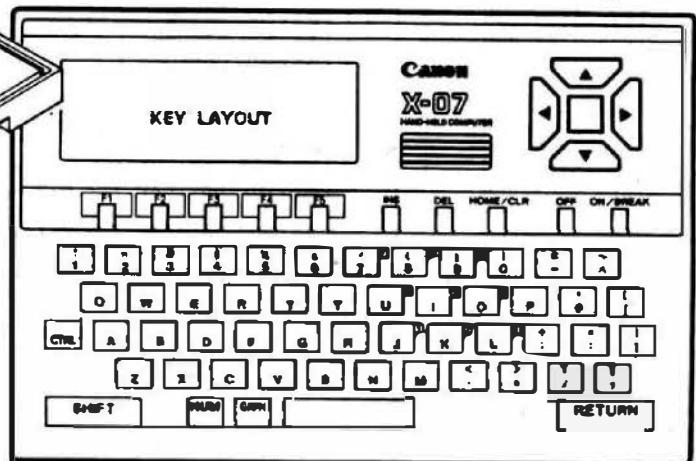
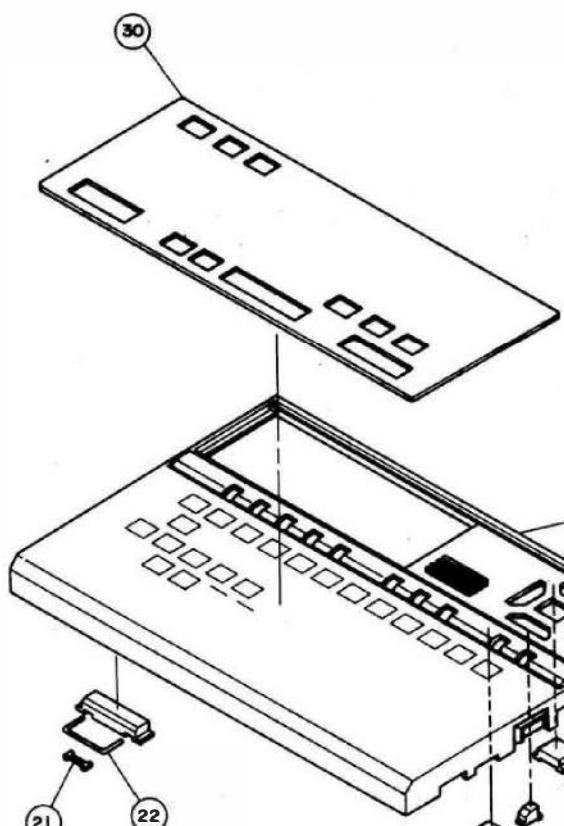
MEMORY BOARD



LOCK SWITCH



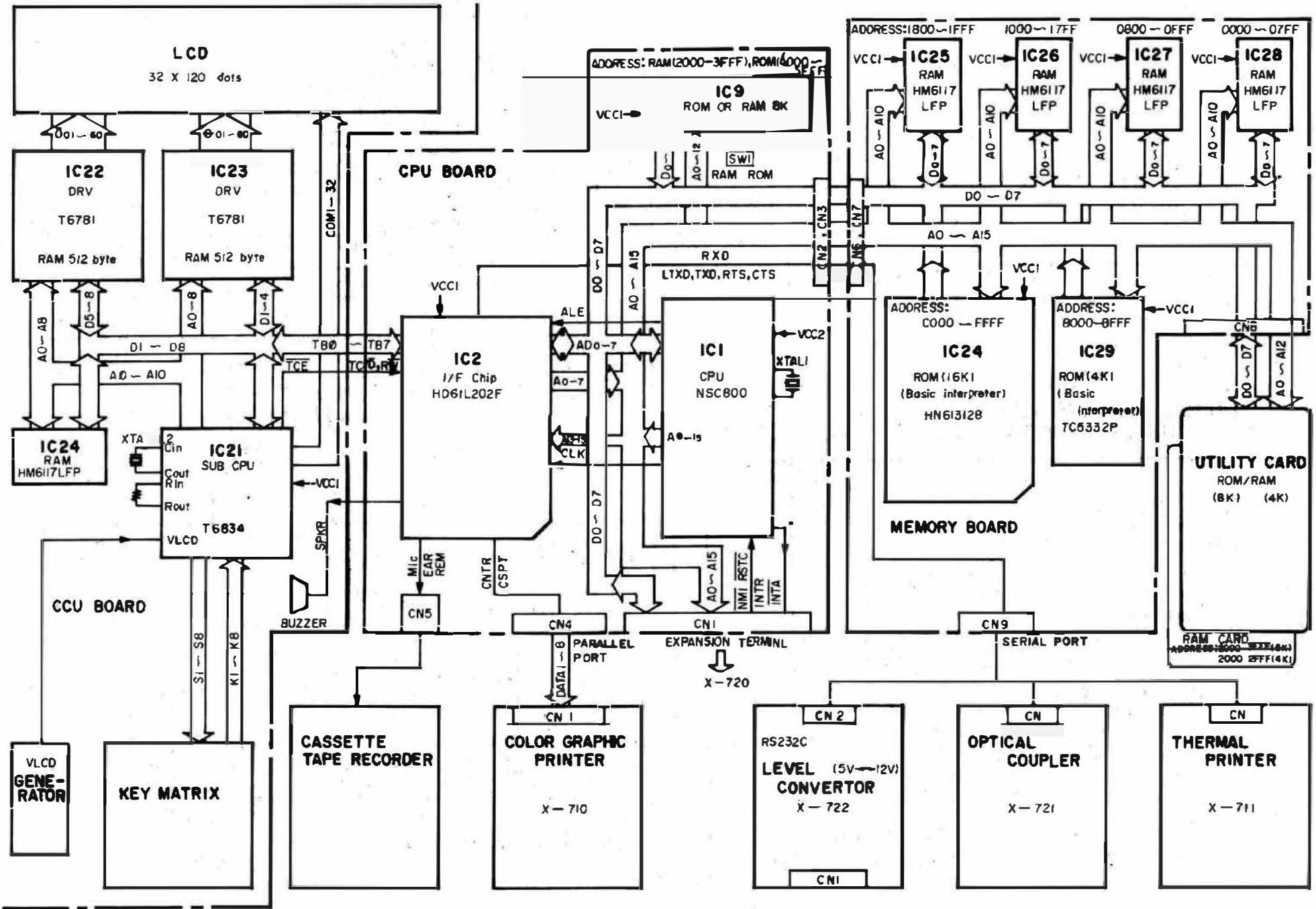
KEYTOP



KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
1	EA1-2731-000	1	SPRING,RESET		
2	EA1-3750-000	1	TERMINAL,BATTERY, C1		
3	EA1-4560-000	1	TERMINAL (+)		
4	EA1-4561-000	1	TERMINAL (-)		
5	EA1-4858-000	1	HOLDER,LCD		
6	EA1-4861-000	1	BAR, SET LCD		
7	EA1-4862-000	1	SPACER,LCD		
8	EA1-4863-000	1	CONNECTOR (A),CONDUCTIVE RUBBER		
9	EA1-4864-000	2	CONNECTOR (B),CONDUCTIVE RUBBER		
10	EA1-4865-000	2	KNOB, VARIABLE RESISTOR		
11	EA1-4866-000	1	CAP, CONNECTOR		
* 12	EA1-5038-000	1	UPPER COVER		
* 13	EA1-5040-000	1	LOWER COVER		
* 14	EA1-5041-000	1	ACRYL, INDICATOR (DOM.)		
* 15	EA1-5042-000	1	COVER,UTILITY CARD		
* 16	EA1-5043-000	1	COVER,ROM/RAM SOCKET	KEYBOARD	
* 17	EA1-5044-000	1	RUBBER PLATE, CONDUCTIVE		
* 18	EA1-5045-000	1	CAP(A),CONNECTOR		
* 19	EA1-5046-000	1	CAP(B),CONNECTOR		
* 20	EA1-5047-000	1	PLATE,SHIELD		
* 21	EA1-5048-000	3	KEY,ARM, SHIFT,SPACE,RETURN		
* 22	EA1-5051-000	3	LEVER(B)		
* 23	EA1-5052-000	1	COVER,BATTERY		
* 24	EA1-5116-000	1	KNOB,LOCK		
* 25	EA1-5117-000	1	KNOB,SWITCH		
* 26	EA1-5120-000	1	LEAF SPRING(A)		
* 27	EA1-5121-000	1	LEAF SPRING(B)		
* 28	EA1-5122-000	1	CONTACT(A),GND		
* 29	EA1-5123-000	1	CONTACT(B),GND		
* 30	EA1-5156-000	1	PLATE,KEYBOARD		
* 30-1	EA1-5335-000	1	PLATE,SHIELD,CCU BOARD		
* 30-2	EA1-5336-000	1	PLATE,INSULATION,CCU BOARD		
* 30-3	EA1-5340-000	1	ACRYL, INDICATOR (EXPORT)		

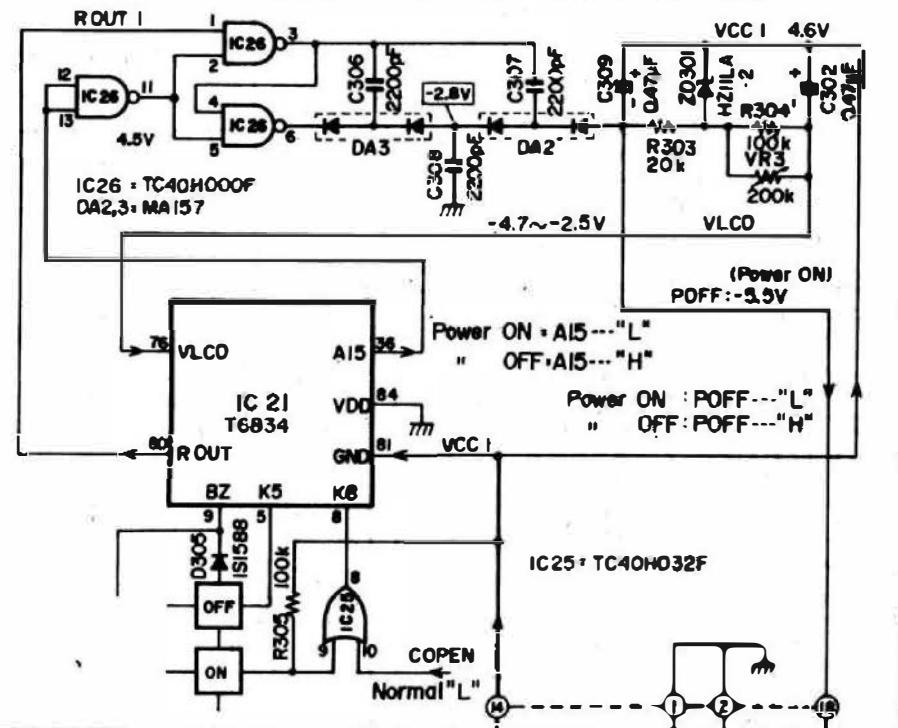
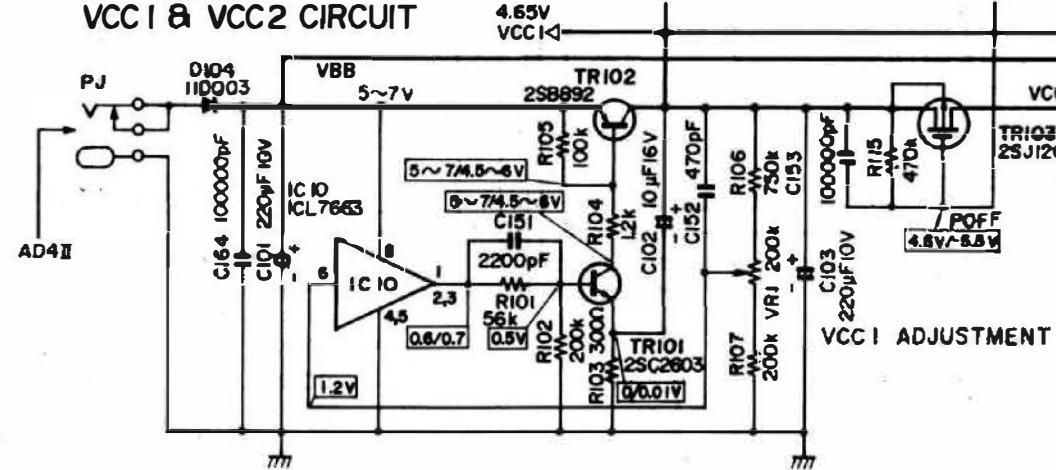
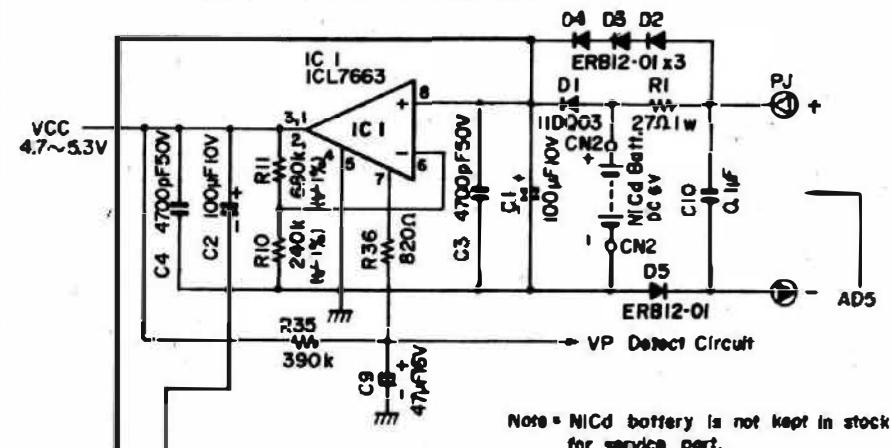
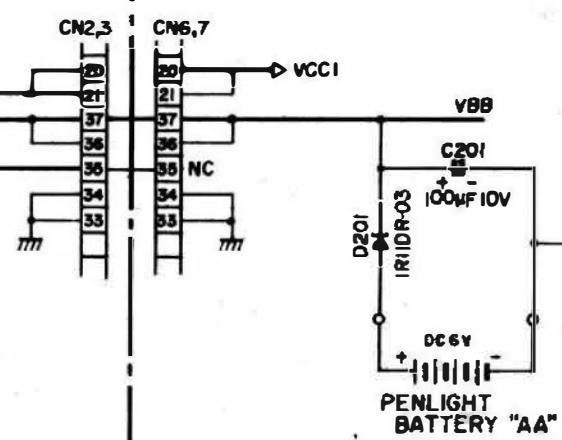
KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
* 31	EA1-5342-000	1	CONTACT		
*	EA1-8082-000	1	HARD CASE,X-07		
32	EA9-0119-000	2	TERMINAL,BATTERY(C2)		
* 33	EH1-0669-000	1	PCB,CPU BOARD		
* 34	EH1-0670-000	1	PCB,CCU BOARD(KEYBOARD)		
* 35	EH1-0671-000	1	PCB,MEMORY BOARD		
36	EH2-0387-000	1	ACRYL,FILTER,LCD		
* 37	EH2-0395-000	1	FLAT CABLE,19P		
* 38	EH2-0397-000	1	FLAT CABLE,12P		
* 39	EH2-0414-000	1	FLAT CABLE,34P		
* 40	ES2-2185-000	1	KEYTOP,GRAY,F6		
*	ES2-2186-000	1	KEYTOP,SPACE		
*	ES2-2187-000	1	KEYTOP,SHIFT		
*	ES2-2188-000	1	KEYTOP,RETURN		
* 41	ES2-2189-000	4	KEYTOP,CURSOLE		
*	ES2-2190-000	5	KEYTOP,BLUE,F1~F5		
*	ES2-2266-000	4	KEYTOP,LIGHT GRAY,INS,OFF,DEL,CLR		
*	ES2-2267-000	1	KEYTOP,BROWN,ON/BRK		
A	ES9-5202-000	1	KEYTOP SET(EXP.),1,2,3,4,5,6,A BCDEFGNQRSTVWXZ,CTRL		
B	ES9-5203-000	1	KEYTOP SET(EXP.),7,8,9,0,HIJKLNOPU ?,+,*,=,<,>,*		
*	ES9-5204-000	1	KEYTOP SET(EXP.),NUMx12,GRPHx12		
1	ES9-5205-000	1	KEYTOP SET(DOM.),1,2,3,4,5,6,A BCDEFGNQRSTVWXZ,CTRL		
D	ES9-5206-000	1	KEYTOP SET(DOM.),7,8,9,0,HIJKLNOPU ?,+,*,=,<,>,*		
*	ES9-5207-000	1	KEYTOP SET(DOM.),カナx12,GRPHx12		
S1	XA9-0113-000	1	SCREW, TAPPING M2x5. +/-		
S2	XA9-0154-000	19	SCREW, TAPPING M2x4		
S3	XAI-7140-305	2	SCREW 1.4x3		
S4	XB3-1260-607	2	SCREW, TAPPING 2.6x6		
S5	XB3-1261-007	2	SCREW, TAPPING 2.6x10		
S6	XB3-1261-207	3	SCREW, TAPPING 2.6x12		

## 5. BLOCK DIAGRAM



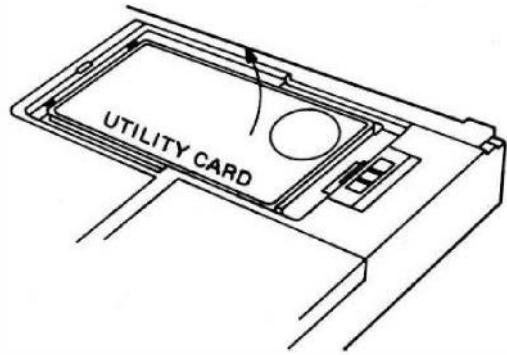
## CCU BOARD

## VLCD &amp; POWER ON/OFF CIRCUIT

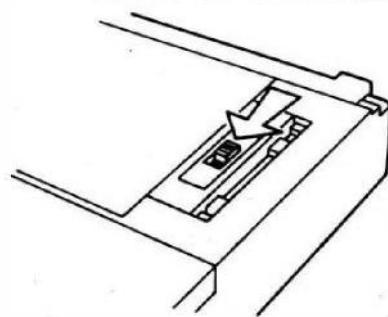
CPU BOARD  
VCC1 & VCC2 CIRCUITGRAPHIC PRINTER X-710  
POWER SUPPLY CIRCUITMEMORY BOARD  
DRY BATTERY CIRCUIT

## 7. SELF-CHECK OF CCU

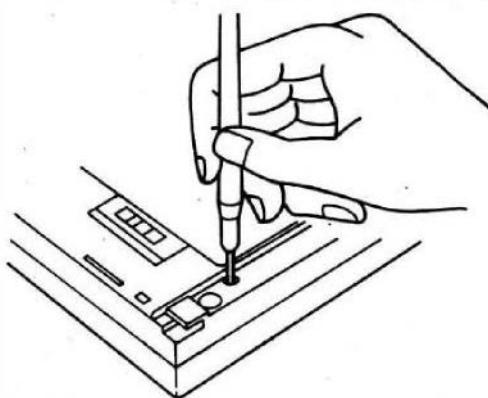
1. Remove the utility card.



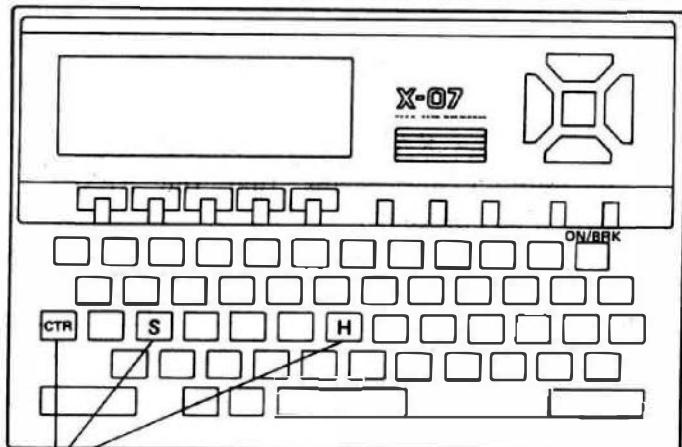
2. Set the LOCK switch of utility card to ON.



3. Press the RESET switch.



4. Press and hold down the CTRL , S , and H keys, then press the ON key. (If the ON key is pressed too long, an SRES signal is output and initial clearing is performed, disabling self-check.)



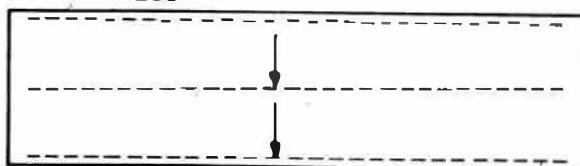
Pressed at the  
same time.

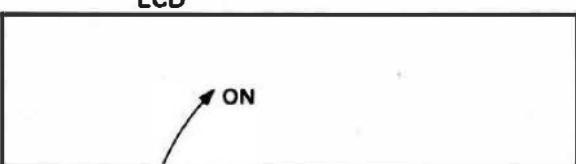
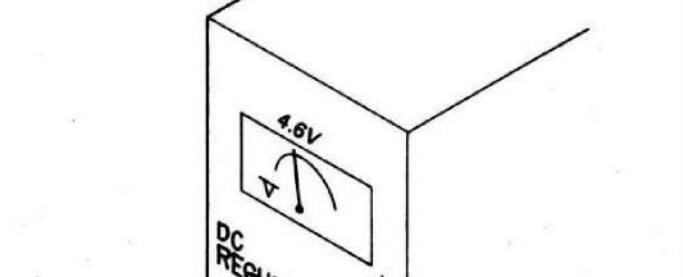
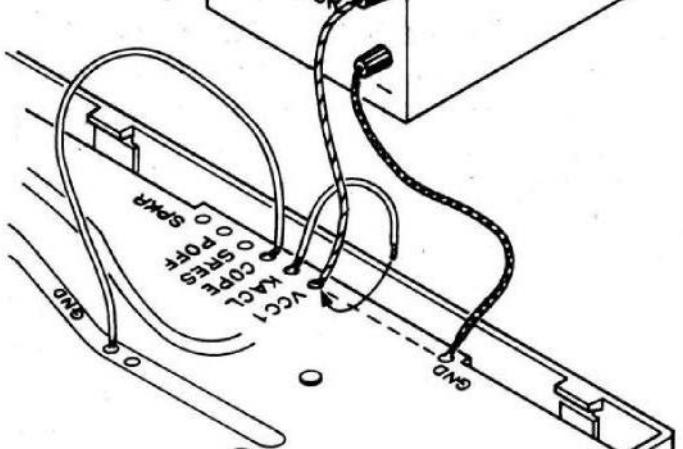
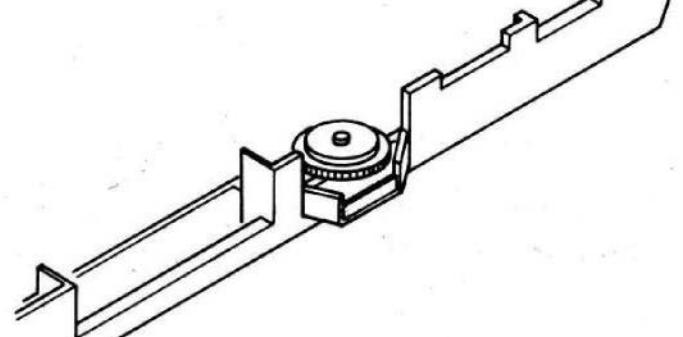
Press the ON/BREAK key for a little while,  
while holding the CTRL , S , and H keys down.

5. Check the display. .... 1

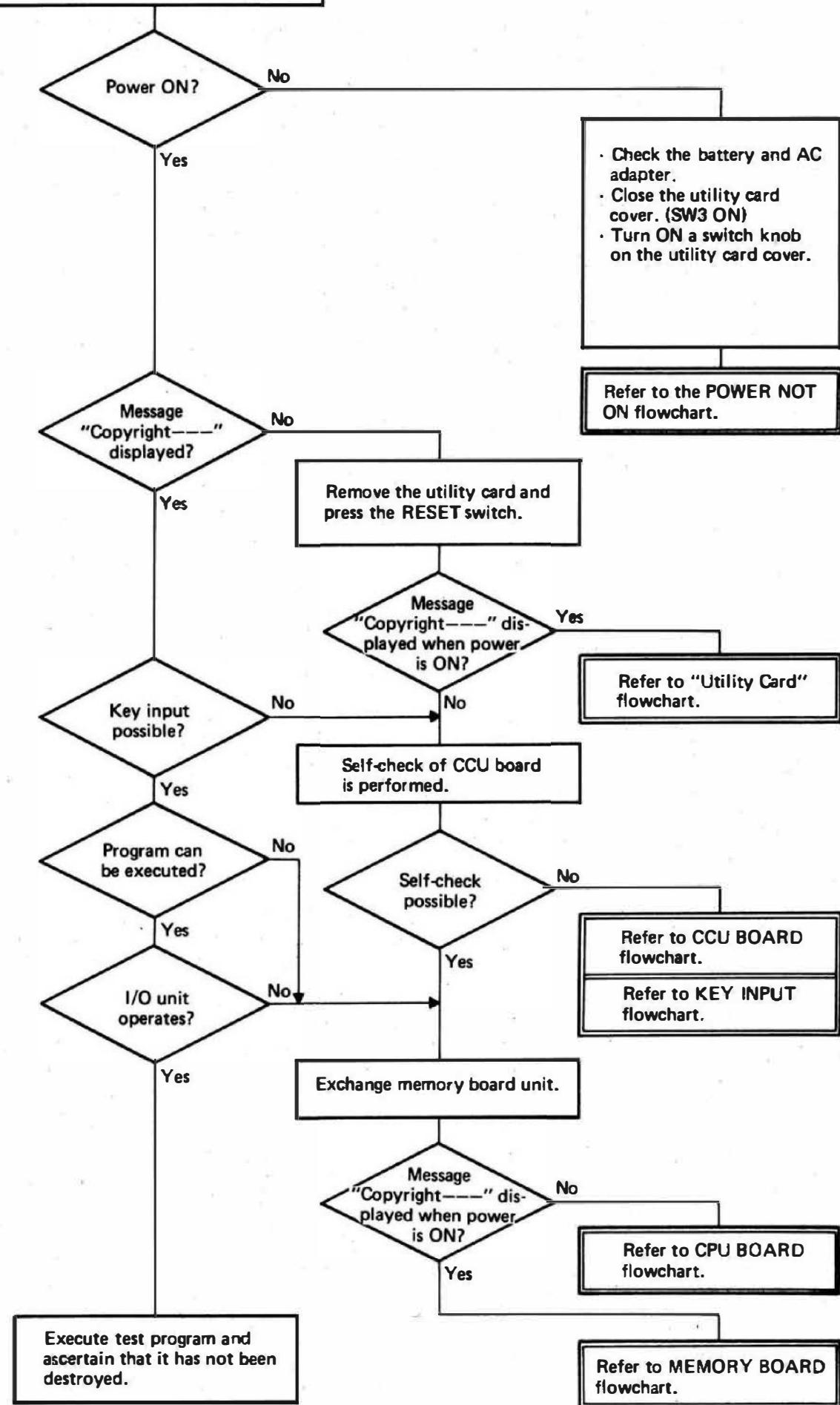
Check of sub-CPU on CCU board, driver,  
and display is performed automatically.

LCD



6. Check of display ..... 2	
7. Nothing is displayed on the LCD after the display check is completed. * Check key input.	 <p>Displayed when ON/BREAK key is pressed.</p> <p>Note: Nothing is displayed on a space key.</p>
8. Self-check of the CCU board is released when the RESET switch on the bottom of the body is pressed.	
9. When self-check is possible, the CCU board is not faulty. If self-check is impossible, repair the CCU board referring to the CCU BOARD flowchart.	
<p>[Independent self-check of CCU board]</p>	
<p>(1) Apply +4.6 V to the VCC1 terminal.</p> <p>(2) Connect the COPEN signal to GND.</p>	
<p>(3) Contact the KACL signal to VCC1, then separate. (This means that the RESET switch was pressed.)</p>	
<p>(4) Execute items 4~9 of the self-check successively.</p>	

## **8. GENERAL TROUBLESHOOT**



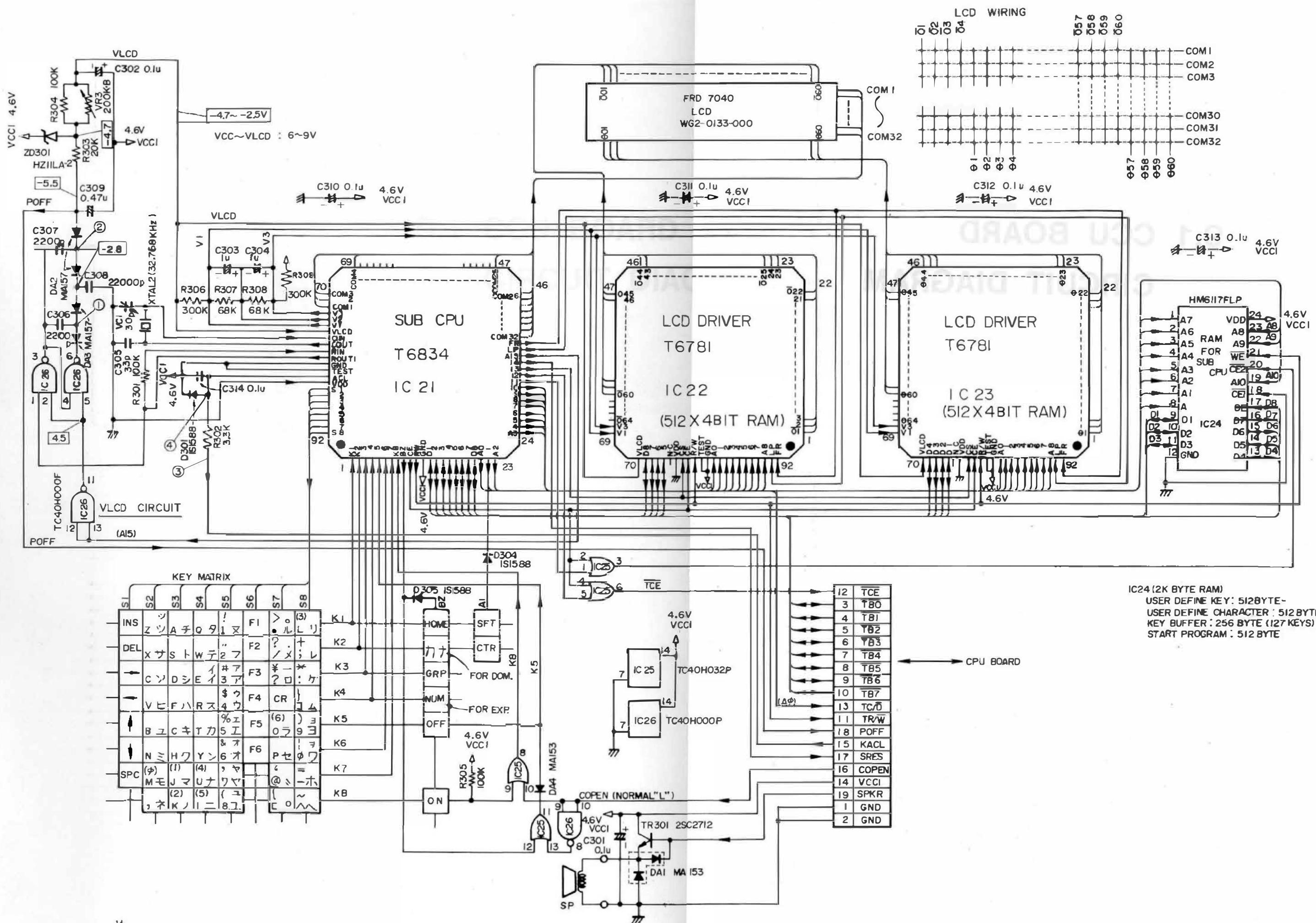
**9. X-07**

**CIRCUIT DIAGRAM  
TROUBLESHOOTING**

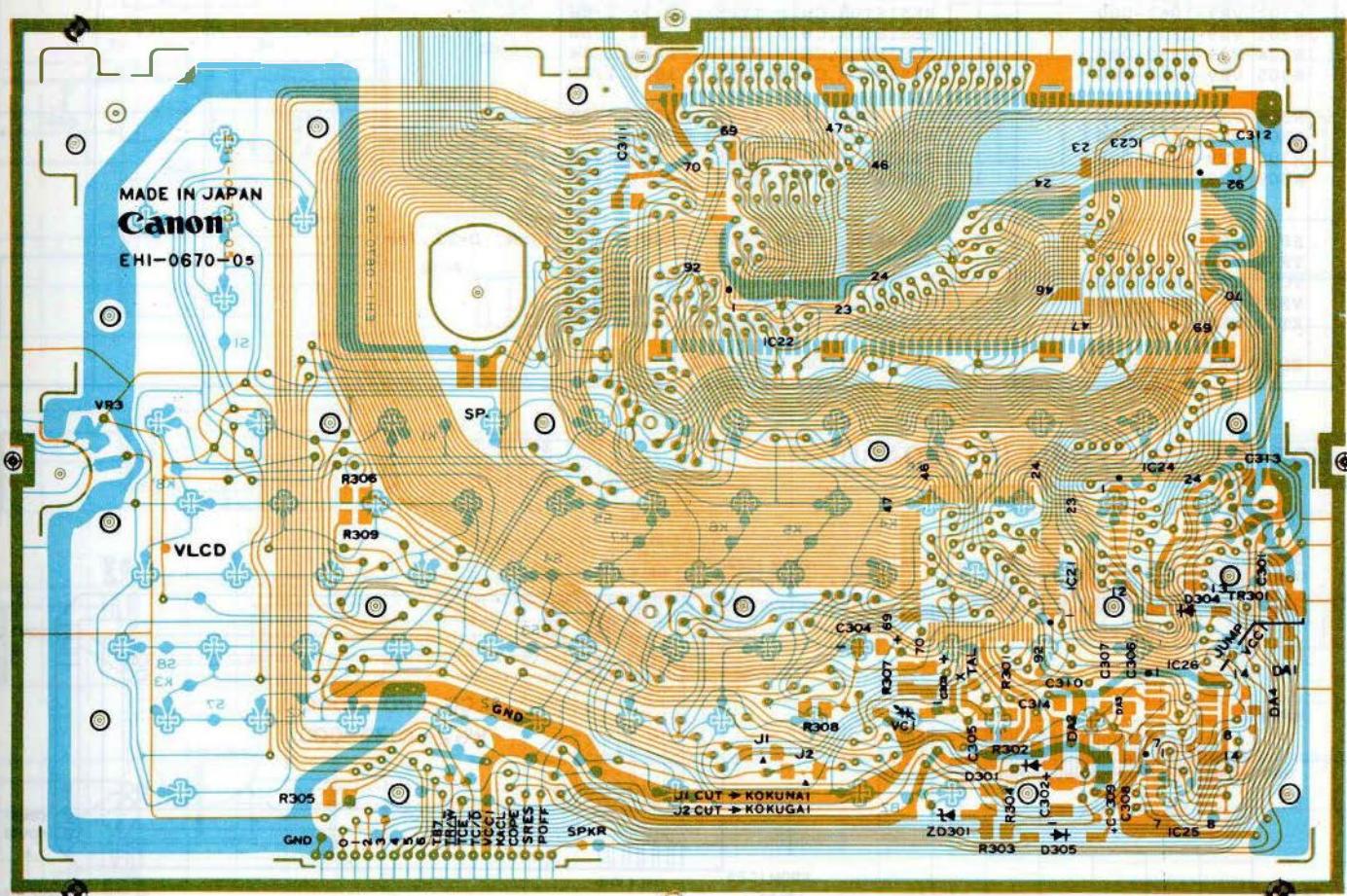
## **9.1 CCU BOARD CIRCUIT DIAGRAM**

## 9. X-07 CIRCUIT DIAGRAM

### 9-1) CCU Board



# CARD LAYOUT



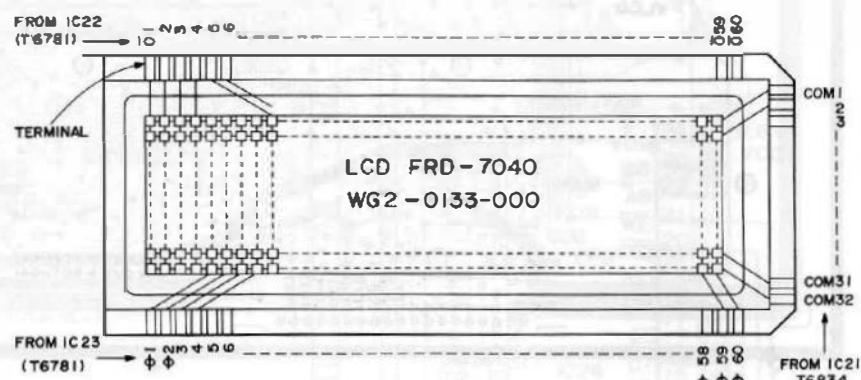
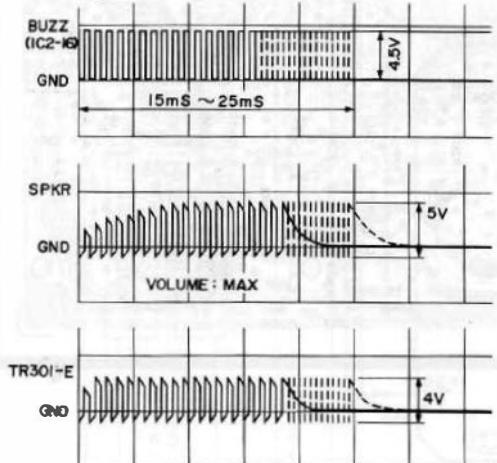
## CCU BOARD

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
C301	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
C302	VC9-1119-000	1	TANTALUM CAPACITOR	0.47uF 25V	
C303	VC9-1120-000	1	TANTALUM CAPACITOR	1uF 16V	
C304	VC9-1120-000	1	TANTALUM CAPACITOR	1uF 16V	
C305	VC9-1122-000	1	CERAMIC CAPACITOR	33pF 25V	
* C306	VC9-1225-000	1	CERAMIC CAPACITOR	2200pF 25V	
* C307	VC9-1225-000	1	CERAMIC CAPACITOR	2200pF 25V	
* C308	VC9-1224-000	1	CERAMIC CAPACITOR	22000pF 25V	
C309	VC9-1119-000	1	TANTALUM CAPACITOR	0.47uF 25V	
C310	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
C311	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
C312	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
C313	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
C314	VC9-0532-000	1	CERAMIC CAPACITOR	0.1uF 25V	
D301	X65-5032-000	1	DIODE 1S1588		
D302					
D303					
D304	X65-5032-000	1	DIODE 1S1588		
D305	X65-5032-000	1	DIODE 1S1588		
DA1	WA1-0375-000	1	DIODE MA153, CHIP TYPE		
DA2	WA1-0380-000	1	DIODE MA157, CHIP TYPE		
DA3	WA1-0380-000	1	DIODE MA157, CHIP TYPE		
DA4	WA1-0357-000	1	DIODE MA153, CHIP TYPE		
* IC21	WA3-9171-000	1	CMOS LSI T6834, SUB CPU		
IC22	WA3-0791-000	1	CMOS LSI T6781, DRIVER		
IC23	WA3-0791-000	1	CMOS LSI T6781, DRIVER		
IC24	WA3-0955-000	1	CMOS LSI HM6117LFP-4, RAM		
IC25	WA3-0963-000	1	CMOS IC TC40H032F, OR-GATE		
IC26	WA3-0800-000	1	CMOS IC TC40H000F, NAND-GATE		
LCD	WG2-0133-000	1	LIQUID CRYSTAL DISPLAY FRD7040		

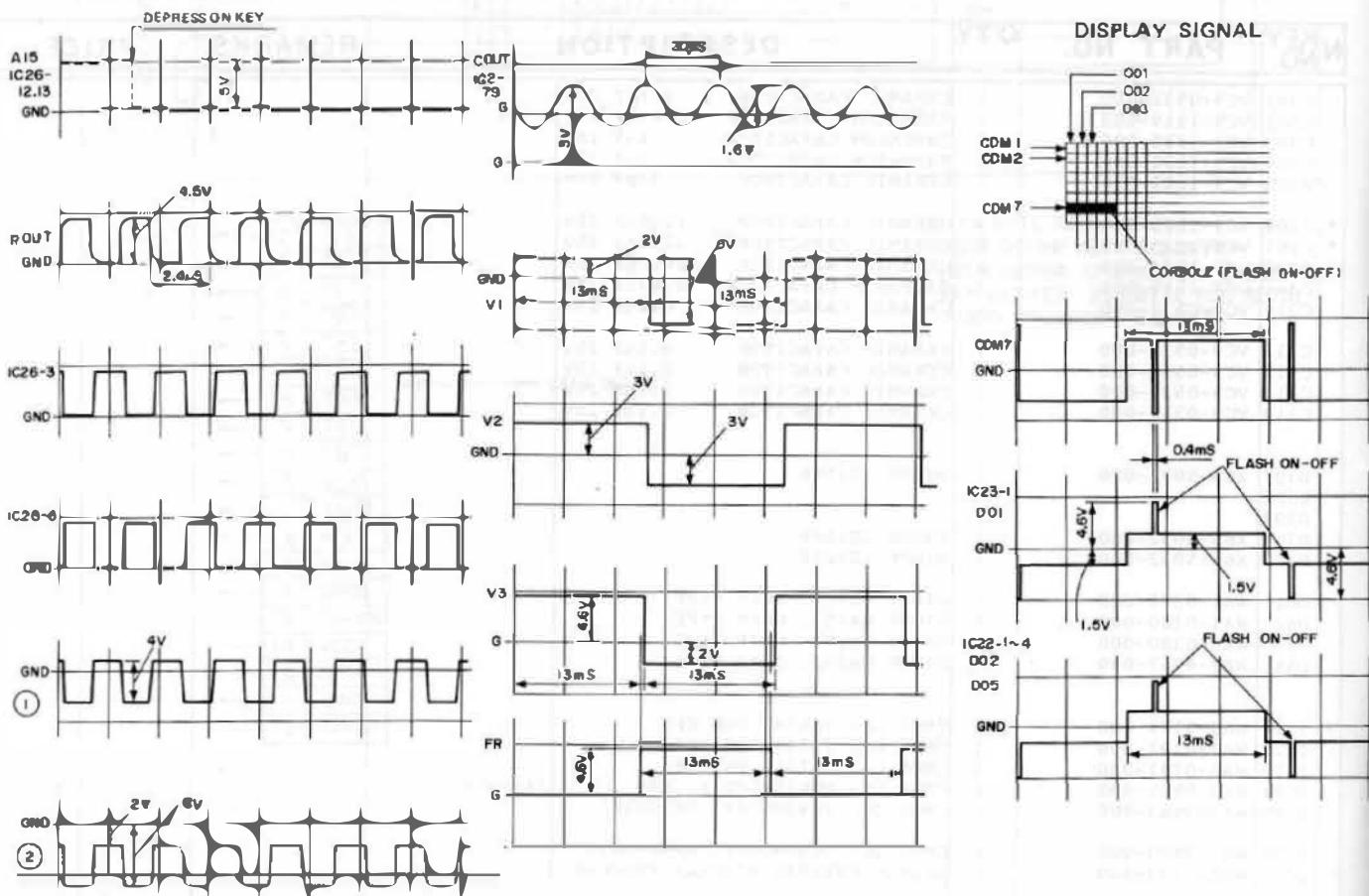
N KEY NO.	PART NO.	Q'TY	DESCRIPTION			REMARKS	PRICE
R301	WR9-1058-000	1	RESISTOR,CHIP TYPE	100k	1/8W		
R302	VR9-1062-000	1	RESISTOR,CHIP TYPE	3.3k	1/8W		
R303	VR9-2835-000	1	RESISTOR,CHIP TYPE	20k	1/8W		
R304	VR9-1058-000	1	RESISTOR,CHIP TYPE	100k	1/8W		
R305	VR9-1058-000	1	RESISTOR,CHIP TYPE	100k	1/8W		
R306	VR9-1059-000	1	RESISTOR,CHIP TYPE	300k	1/8W		
R307	VR9-2418-000	1	RESISTOR,CHIP TYPE	68k	1/8W		
R308	VR9-2418-000	1	RESISTOR,CHIP TYPE	68k	1/8W		
R309	VR9-1059-000	1	RESISTOR,CHIP TYPE	300k	1/8W		
SP	WR1-0031-000	1	SPEAKER, CONE TYPE	200 ohm	30mW, D=22.7mm		
TR301	WA2-0343-000	1	TRANSISTOR 2SC2712				
VC1	VC9-0467-000	1	VARIABLE CAPACITOR	30pF			
VR3	VR9-2618-000	1	VARIABLE RESISTOR	200k	50mW		
XTL2	WK2-0002-000	1	CRYSTAL OACILLATOR	32.768kHz			
ZD301	WA1-0308-000	1	ZENER DIODE HZ11LA-2				

## **NORMAL WAVEFORM (KEYBOARD)**

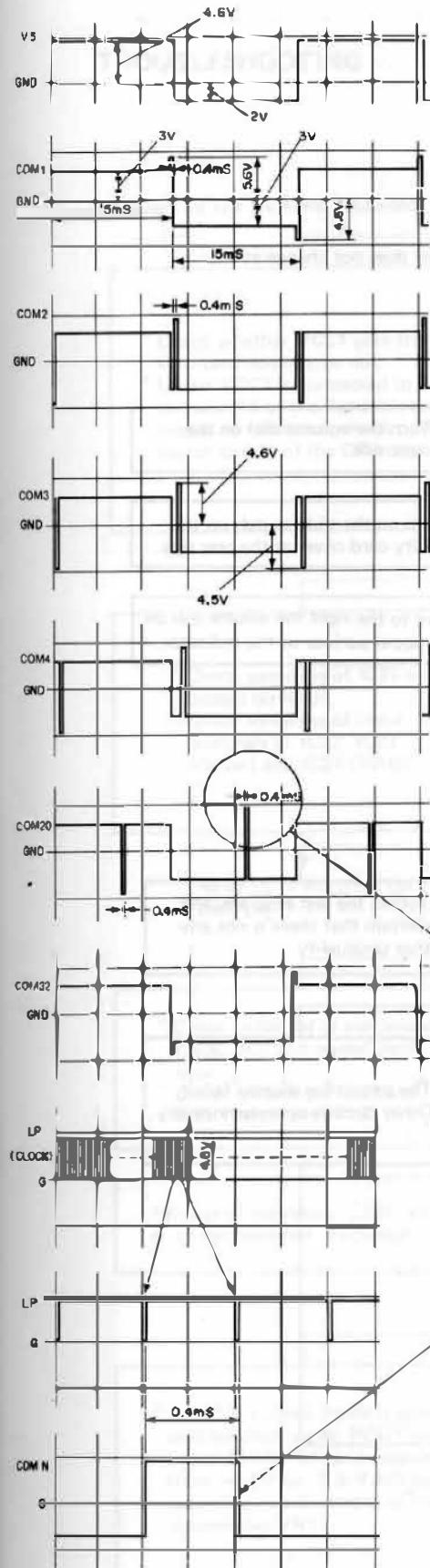
## BUZZER



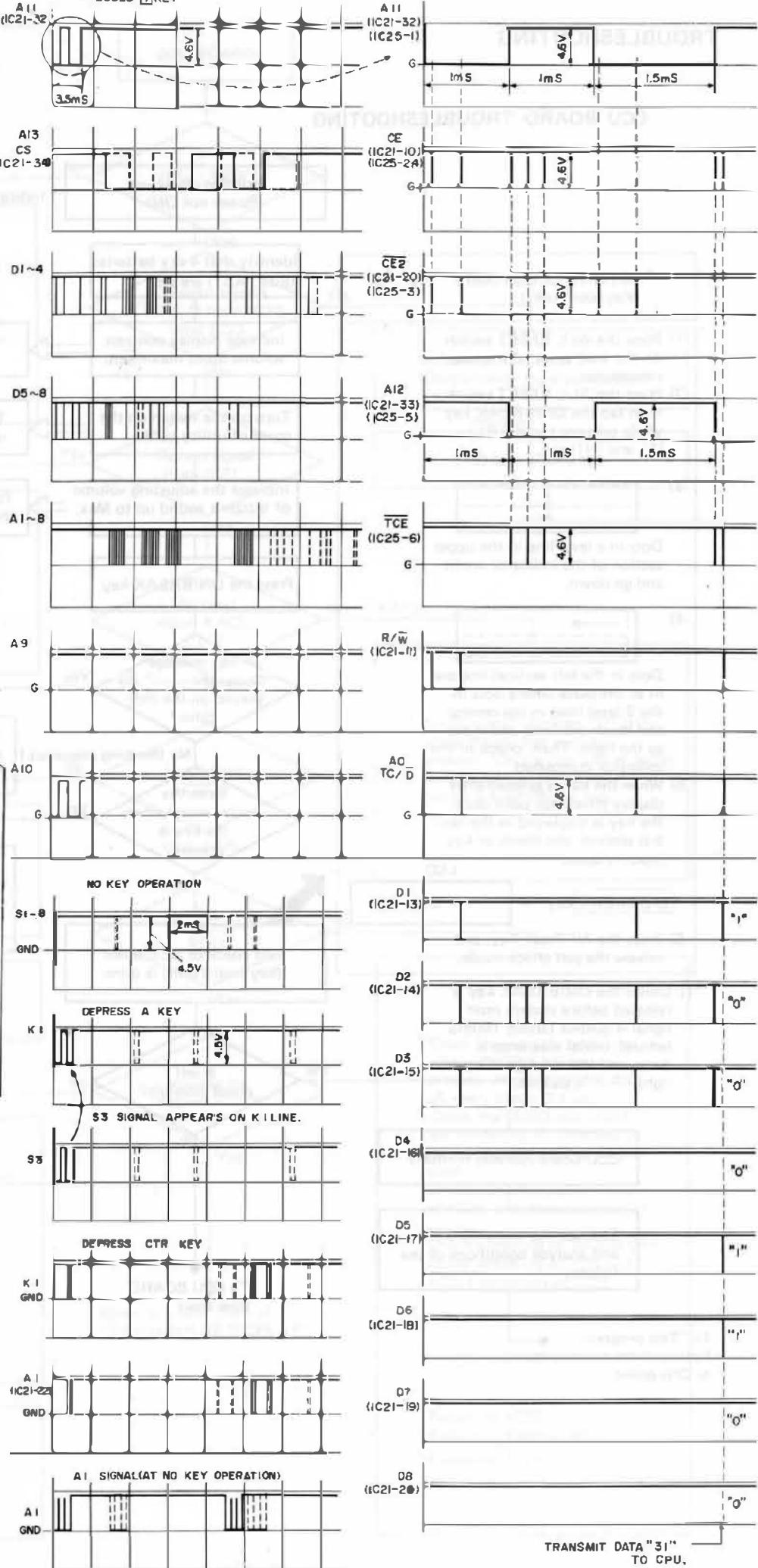
## 1. VLCD Circuit



**KEY SIGNAL  
PRESSED KEY**

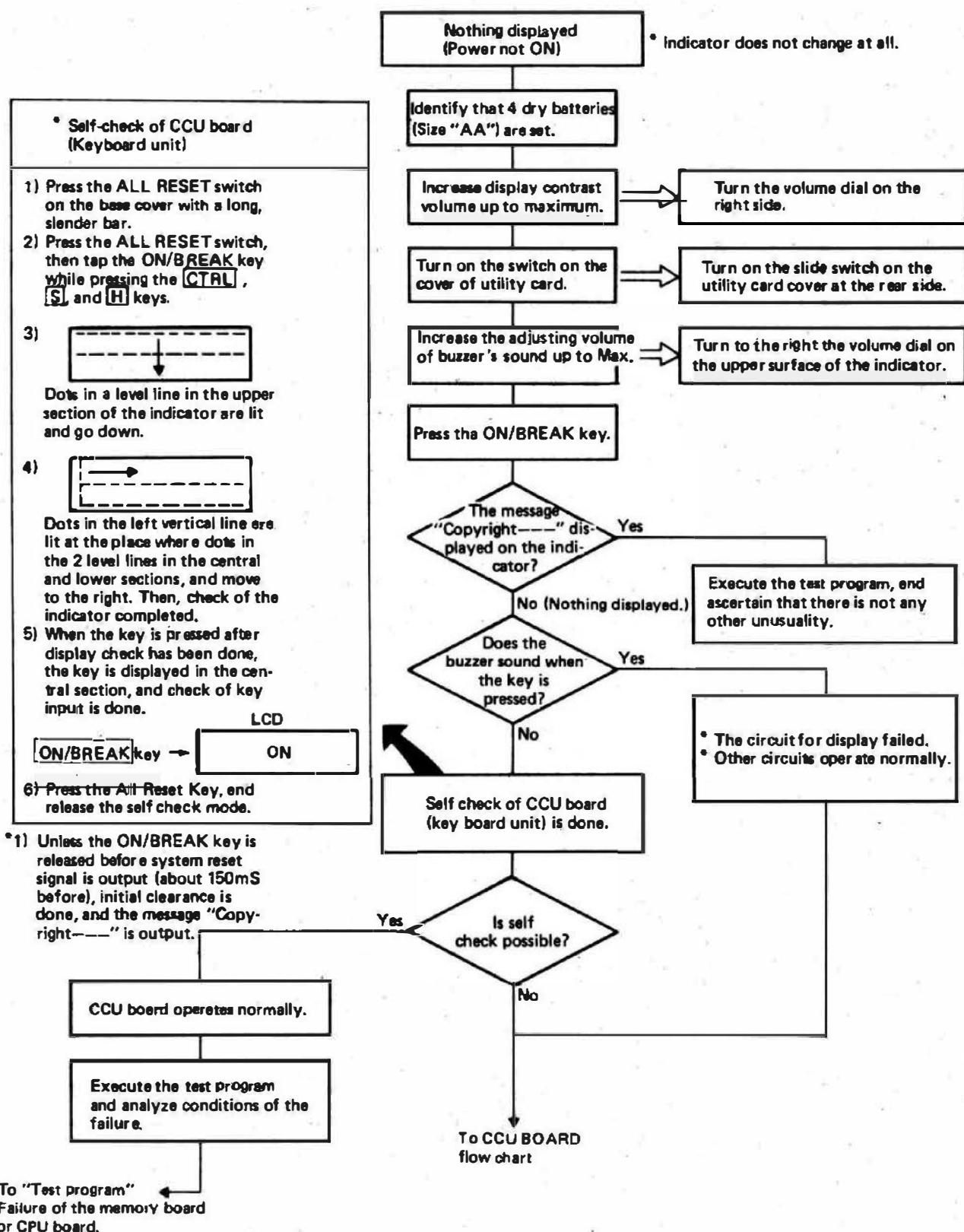


**CCU 2/2**

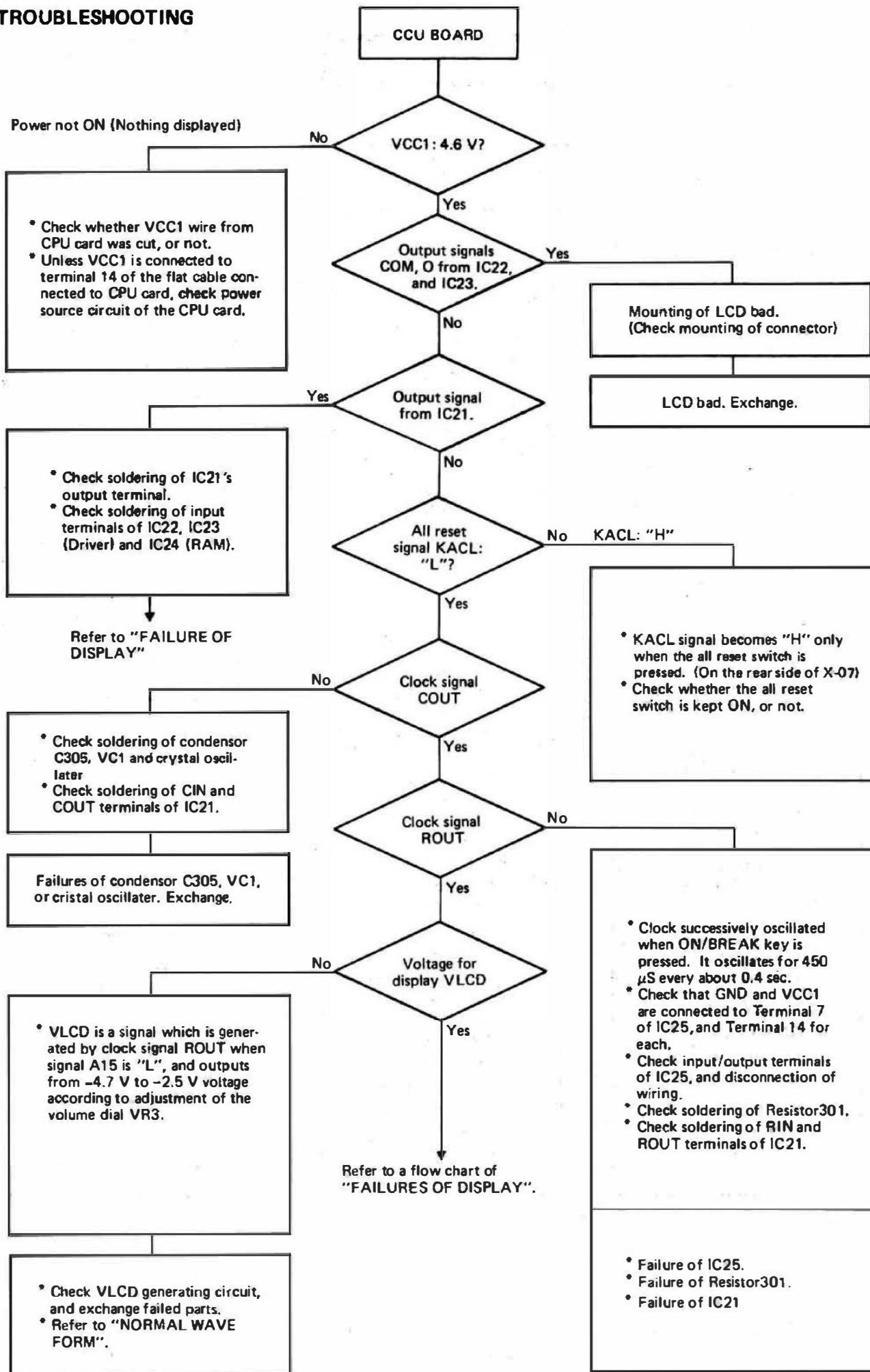


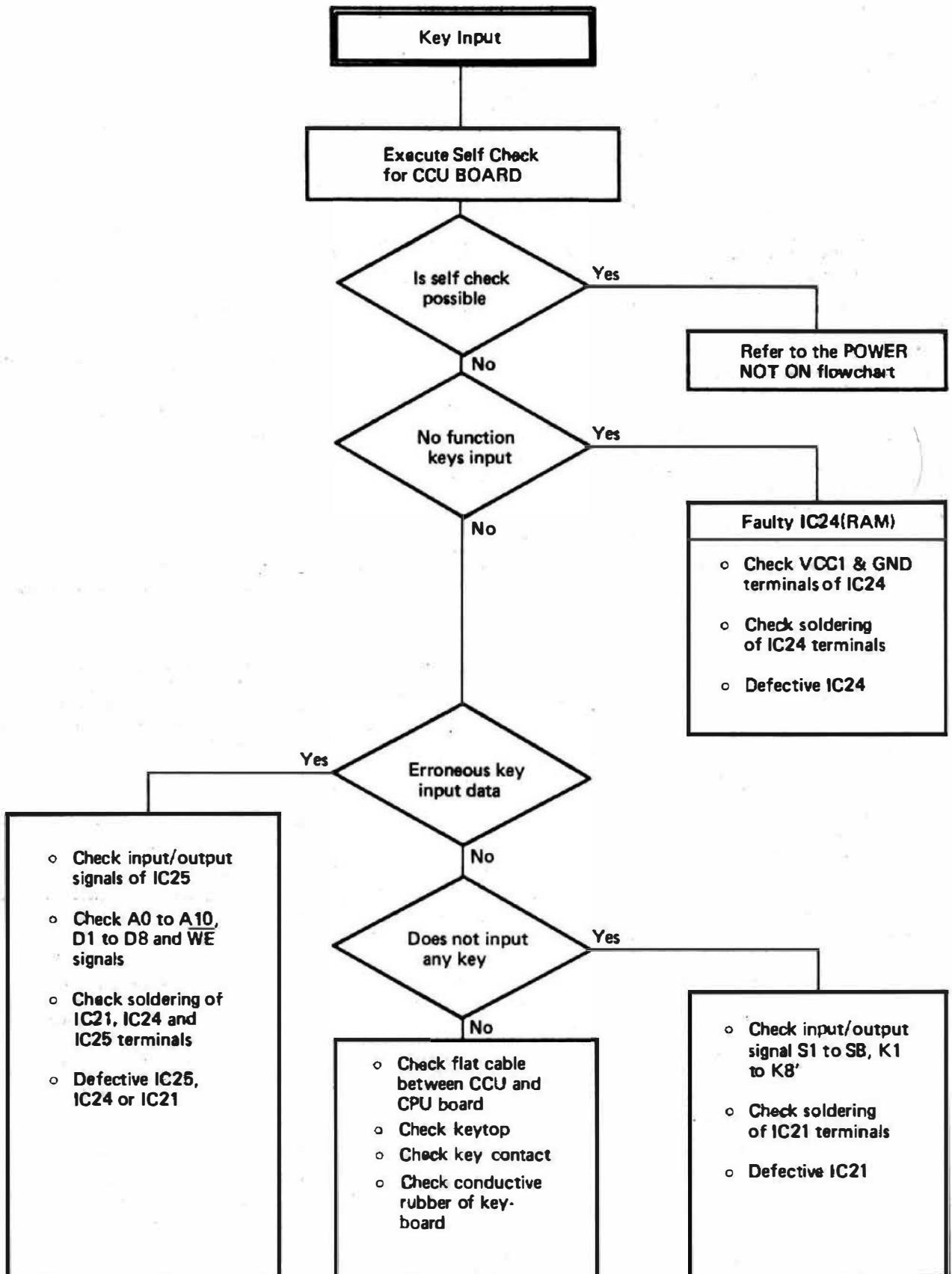
## TROUBLESHOOTING

### CCU BOARD TROUBLESHOOTING

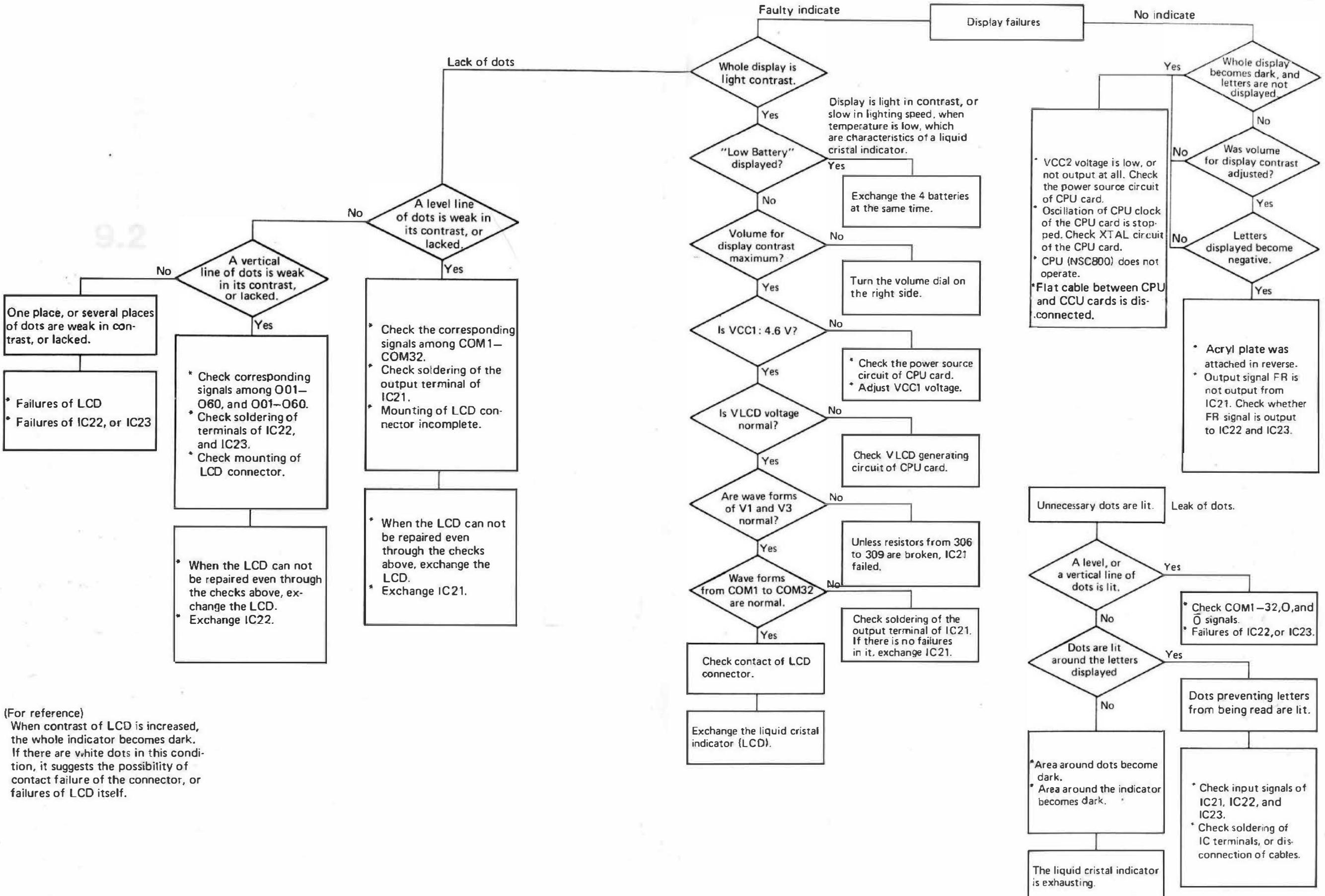


## TROUBLESHOOTING



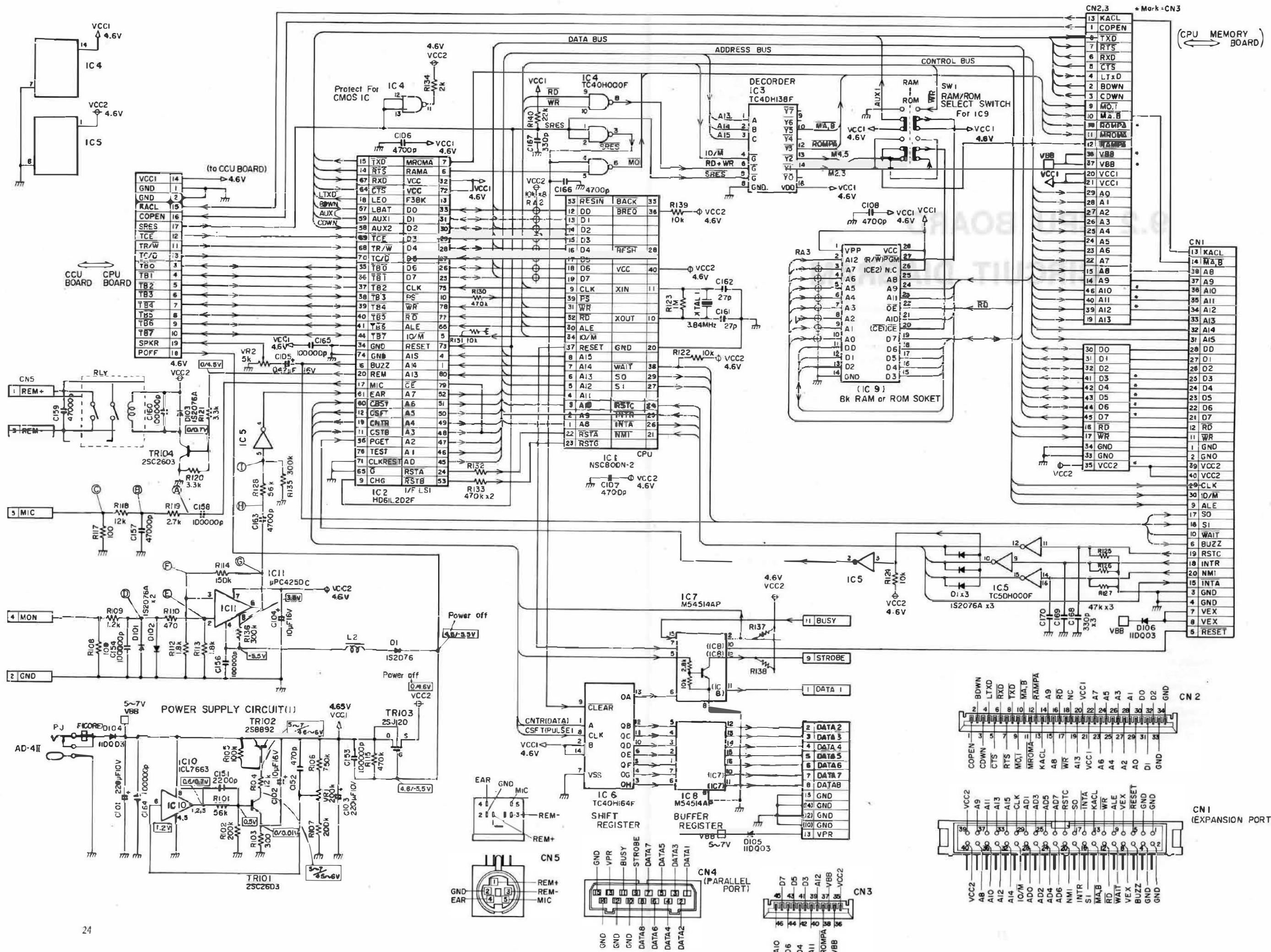


## TROUBLESHOOTING

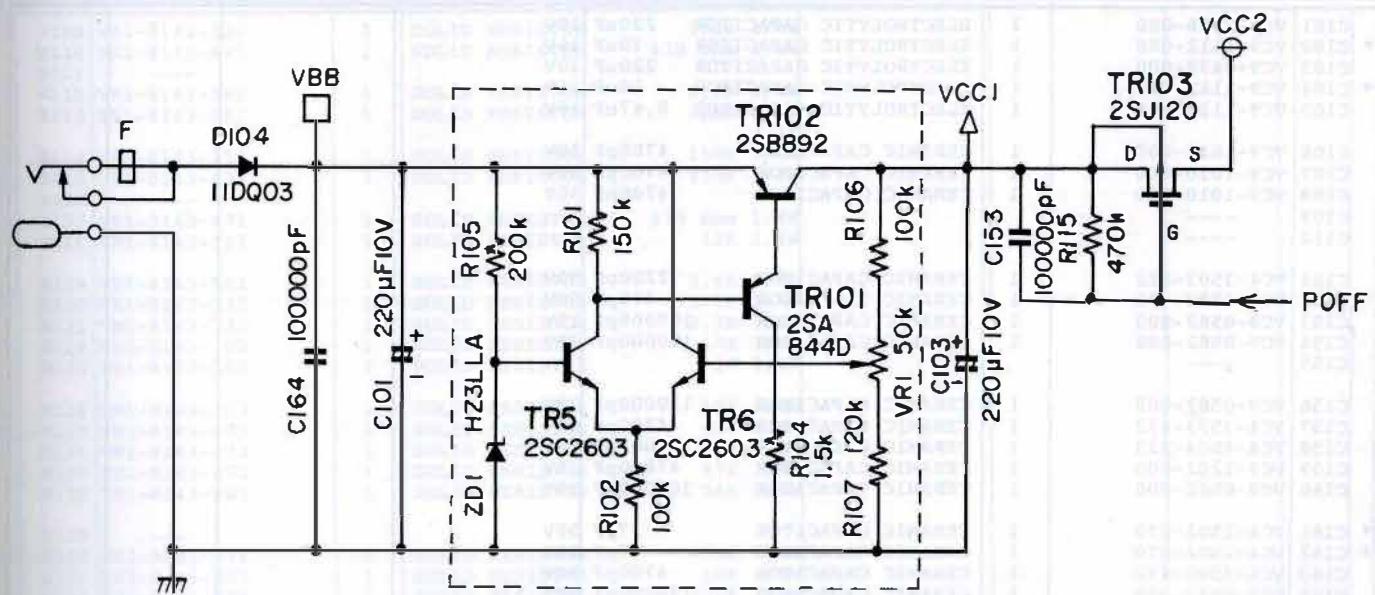


## **9.2 CPU BOARD CIRCUIT DIAGRAM**

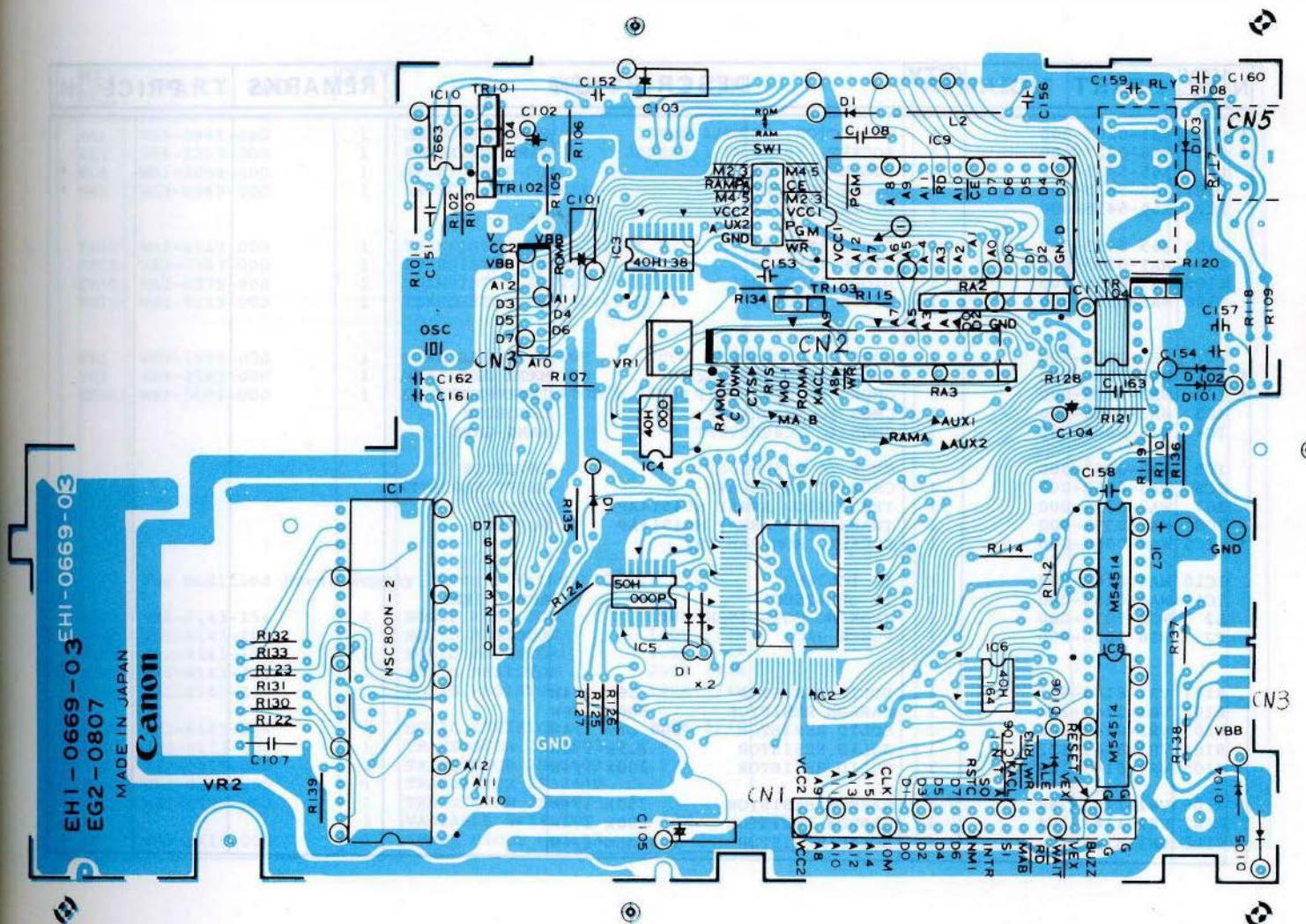
## 9-2) CPU BOARD CIRCUIT DIAGRAM



## MODIFIED POWER SUPPLY CIRCUIT (WITHOUT IC10)



## CARD LAYOUT



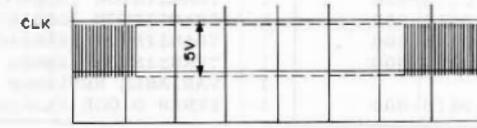
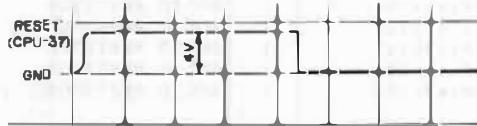
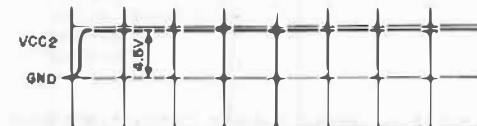
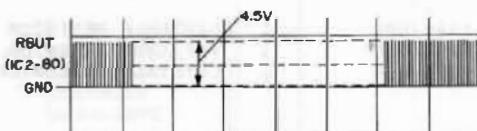
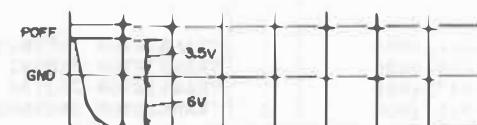
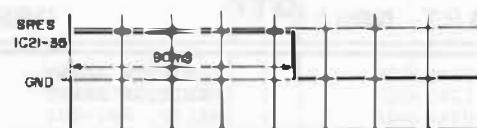
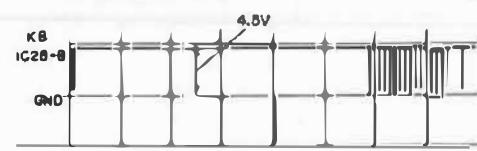
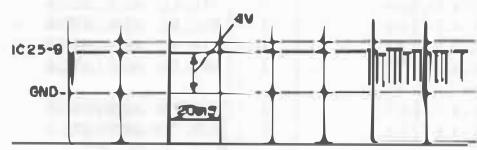
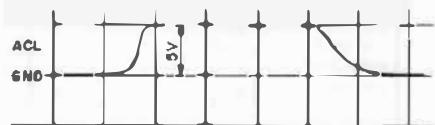
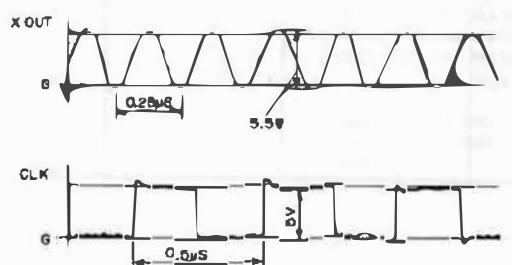
N	KEY NO.	PART NO.	Q'TY	DESCRIPTION			REMARKS	PRICE
*	C101	VC9-0478-000	1	ELECTROLYTIC CAPACITOR	220uF	10V		
*	C102	VC9-1112-000	1	ELECTROLYTIC CAPACITOR	10uF	16V		
*	C103	VC9-0478-000	1	ELECTROLYTIC CAPACITOR	220uF	10V		
*	C104	VC9-1112-000	1	ELECTROLYTIC CAPACITOR	10uF	16V		
	C105	VC9-1118-000	1	ELECTROLYTIC CAPACITOR	0.47uF	16V		
	C106	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V		
	C107	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V		
	C108	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V		
	C109	----						
	C110	----						
	C151	VC4-3503-222	1	CERAMIC CAPACITOR	2200pF	50V		
	C152	VC4-3503-471	1	CERAMIC CAPACITOR	470pF	50V		
	C153	VC9-0582-000	1	CERAMIC CAPACITOR	100000pF	25V		
	C154	VC9-0582-000	1	CERAMIC CAPACITOR	100000pF	25V		
	C155	----						
	C156	VC9-0582-000	1	CERAMIC CAPACITOR	100000pF	25V		
	C157	VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V		
	C158	VC4-4504-223	1	CERAMIC CAPACITOR	22000pF	50V		
	C159	VC9-1202-000	1	CERAMIC CAPACITOR	47000pF	25V		
	C160	VC9-0582-000	1	CERAMIC CAPACITOR	100000pF	50V		
*	C161	VC4-2502-270	1	CERAMIC CAPACITOR	27pF	50V		
*	C162	VC4-2502-270	1	CERAMIC CAPACITOR	27pF	50V		
	C163	VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V		
	C165	VC9-0582-000	1	CERAMIC CAPACITOR	100000pF	50V		
	C166	VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V		
	C167	VC4-3503-331	1	CERAMIC CAPACITOR	330pF	50V		
	C168	VC4-3503-331	1	CERAMIC CAPACITOR	330pF	50V		
	C169	VC4-3503-331	1	CERAMIC CAPACITOR	330pF	50V		
	C170	VC4-3503-331	1	CERAMIC CAPACITOR	330pF	50V		
*	CN1	WS1-0211-000	1	CONNECTOR, 40P			EXPANSION PORT	
*	CN2	VS1-0148-034	1	CONNECTOR, 34P			CPU-MEMORY PCB	
*	CN3	VS1-0148-012	1	CONNECTOR, 12P			CPU-MEMORY PCB	

N	KEY NO.	PART NO.	Q'TY	DESCRIPTION			REMARKS	PRICE
*	CN4	WS1-0205-000	1	CONNECTOR, 15P				
*	CN5	WS6-0027-000	1	SOCKET, 5P				
D1	X65-5435-000	4	DIODE 1S2076A					
D101	X65-5435-000	1	DIODE 1S2076A					
D102	X65-5435-000	1	DIODE 1S2076A					
D103	X65-5435-000	1	DIODE 1S2076A					
D104	WA1-0355-000	1	DIODE 11D0-03					
D105	WA1-0355-000	1	DIODE 11D0-03					
D106	WA1-0355-000	1	DIODE 11D0-03					
F	WE8-0002-000	1	CORE					
*	IC1	WA3-0956-000	1	CMOS LSI NSC800N-2			MAIN CPU	
*	IC2	WA3-9170-000	1	CMOS LSI HD61L202F			INTERFACE	
IC3	WA3-0958-000	1	CMOS IC TC40H138F				DECODER	
IC4	WA3-0800-000	1	CMOS IC TC40H000PF				NAND-GATE	
IC5	WA3-0957-000	1	CMOS IC TC50H000F					
IC6	WA3-0960-000	1	CMOS IC TC40H164F					
IC7	WA2-0399-000	1	TRANSISTOR ARRAY M54514AP					
IC8	WA2-0399-000	1	TRANSISTOR ARRAY M54514AP					
*	(IC9)	WA9-0058-000	1	SOCKET, ROM/RAM LSI				
IC10	WA4-0261-000	1	IC ICL7663					
IC11	WA4-0283-000	1	IC UPD4250C				AMPLIFIER	
L2	WE2-9019-000	1	CHOKING COIL 15mH					
PJ	WS6-9910-000	1	POWER JACK				AD4-II	
R101	VR1-8143-563	1	SOLID RESISTOR	56k	1/4W			
R102	VR1-1143-204	1	CARBON RESISTOR	200k	1/4W			
R103	VR1-8143-301	1	SOLID RESISTOR	300 ohm	1/4W			
R104	VR1-8143-122	1	SOLID RESISTOR	1.2k	1/4W			
R105	VR1-8143-104	1	SOLID RESISTOR	100k	1/4W			
R106	VR1-1143-754	1	CARBON RESISTOR	750k	1/4W			
R107	VR1-1143-204	1	CARBON RESISTOR	200k	1/4W			
R108	VR1-8143-101	1	SOLID RESISTOR	100 ohm	1/4W			

KEY NO.	PART NO.	QTY	DESCRIPTION	REMARKS	PRICE
R109	VR1-8143-122	1	SOLID RESISTOR 1.2K 1/4W		
R110	VR1-8143-471	1	SOLID RESISTOR 470 ohm 1/4W		
R111	---				
R112	VR1-8143-182	1	SOLID RESISTOR 1.8K 1/4W		
R113	VR1-8143-182	1	SOLID RESISTOR 1.8K 1/4W		
R114	VR1-8143-154	1	SOLID RESISTOR 150K 1/4W		
R115	VR1-8143-474	1	SOLID RESISTOR 470K 1/4W		
R116	---				
R117	VR1-8143-471	1	SOLID RESISTOR 470 ohm 1/4W		
R118	VR1-8143-123	1	SOLID RESISTOR 12K 1/4W		
R119	VR1-8143-562	1	SOLID RESISTOR 5.6K 1/4W		
R120	VR1-8143-332	1	SOLID RESISTOR 3.3K 1/4W		
R121	VR1-8143-332	1	SOLID RESISTOR 3.3K 1/4W		
R122	VR1-8143-103	1	SOLID RESISTOR 10K 1/4W		
R123	VR1-8143-105	1	SOLID RESISTOR 1M 1/4W		
R124	VR1-8143-103	1	SOLID RESISTOR 10K 1/4W		
R125	VR1-8143-473	1	SOLID RESISTOR 47K 1/4W		
R126	VR1-8143-473	1	SOLID RESISTOR 47K 1/4W		
R127	VR1-8143-473	1	SOLID RESISTOR 47K 1/4W		
R128	VR1-8143-563	1	SOLID RESISTOR 56K 1/4W		
R129	---				
R130	VR1-8143-474	1	SOLID RESISTOR 470K 1/4W		
R131	VR1-8143-103	1	SOLID RESISTOR 10K 1/4W		
R132	VR1-8143-474	1	SOLID RESISTOR 470K 1/4W		
R133	VR1-8143-474	1	SOLID RESISTOR 470K 1/4W		
R134	VR1-8143-202	1	SOLID RESISTOR 2K 1/4W		
R135	VR1-8143-304	1	SOLID RESISTOR 300K 1/4W		
R136	VR1-8143-304	1	SOLID RESISTOR 300K 1/4W		
R137	VR1-8143-223	1	SOLID RESISTOR 22K 1/4W		
R138	VR1-8143-223	1	SOLID RESISTOR 22K 1/4W		
R139	VR1-8143-103	1	SOLID RESISTOR 10K 1/4W		
R140	VR1-8143-223	1	SOLID RESISTOR 22K 1/4W		

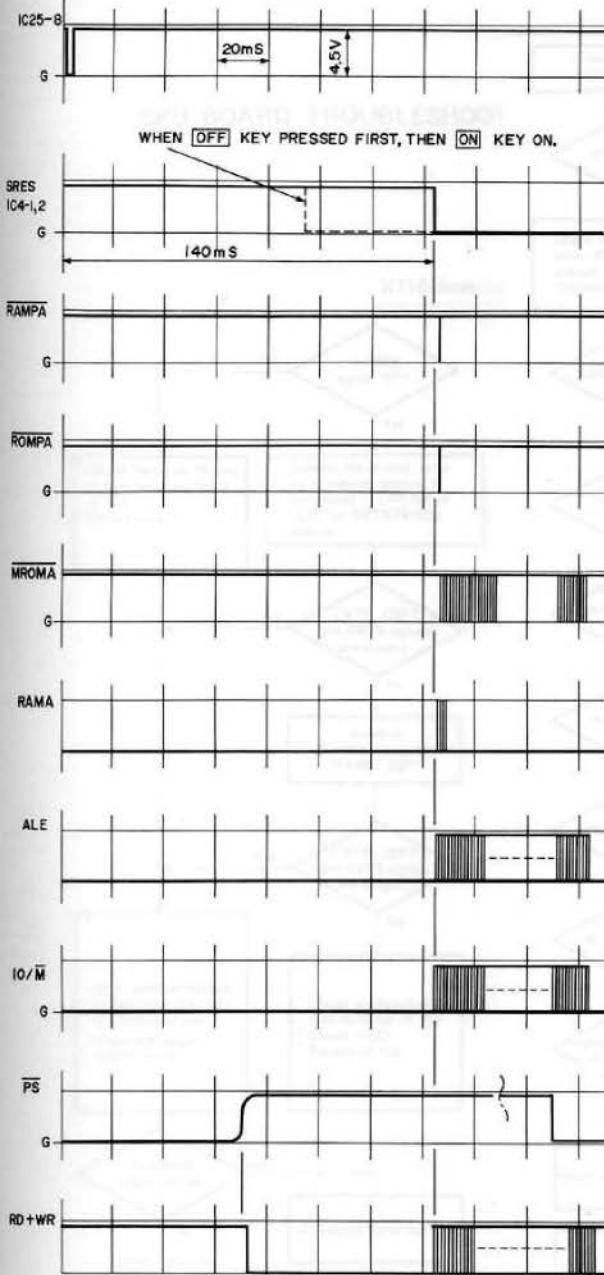
KEY NO.	PART NO.	QTY	DESCRIPTION	REMARKS	PRICE
RA2	VR9-0948-000	1	RESISTOR ARRAY 10Kx8 1/8W		
RA3	VR9-2253-000	1	RESISTOR ARRAY 300Kx8 1/8W		
RLY	WB1-0068-000	1	RELAY, RKT-002	TAPE RECORDER	
SW1	WC3-0049-000	1	SWITCH, 4P, SSS342	ROM/RAM SWITCH	
TR101	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR102	WA2-0297-000	1	TRANSISTOR 2SB892		
TR103	WA2-0375-000	1	TRANSISTOR 2SJ120	VCC2	
TR104	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
VR1	VR9-1999-000	1	VARIABLE RESISTOR 200K 1/2W	VCC1	
VR2	VR9-2783-000	1	VARIABLE RESISTOR 5K 50mA	BUZZER	
KTAL1	WK2-9004-000	1	CRYSTAL OSCILLATOR 3.84MHz	CPU	
For Modified Power Supply Circuit(Without IC10)					
R101	VR1-8143-154	1	SOLID RESISTOR 150K 1/4W		
R102	VR1-8143-104	1	SOLID RESISTOR 100K 1/4W		
R104	VR1-8143-152	1	SOLID RESISTOR 1.5K 1/4W		
R105	VR1-8143-204	1	SOLID RESISTOR 200K 1/4W		
R106	VR1-8143-104	1	SOLID RESISTOR 100K 1/4W		
R107	VR1-8143-124	1	SOLID RESISTOR 120K 1/4W		
TR5	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR6	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR101	WA2-0195-000	1	TRANSISTOR 2SA844D		
TR102	WA2-0297-000	1	TRANSISTOR 2SB892		
VR1		1	VARIABLE RESISTOR 50K	VCC1	
ZD1	WA1-0410-000	1	ZENER DIODE H23LLA, 3V		

## NORMAL WAVEFORM

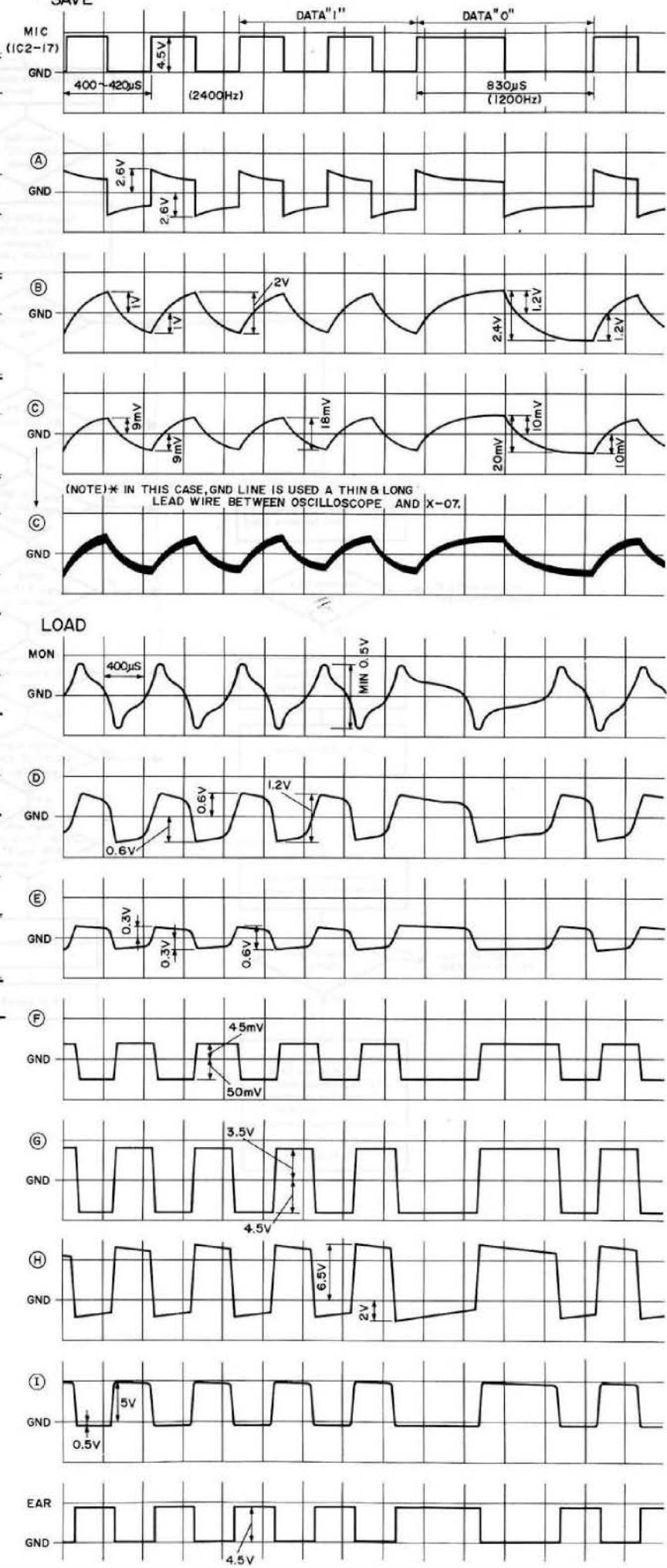


# RAMPA, ROMPA, RAMA & PS.

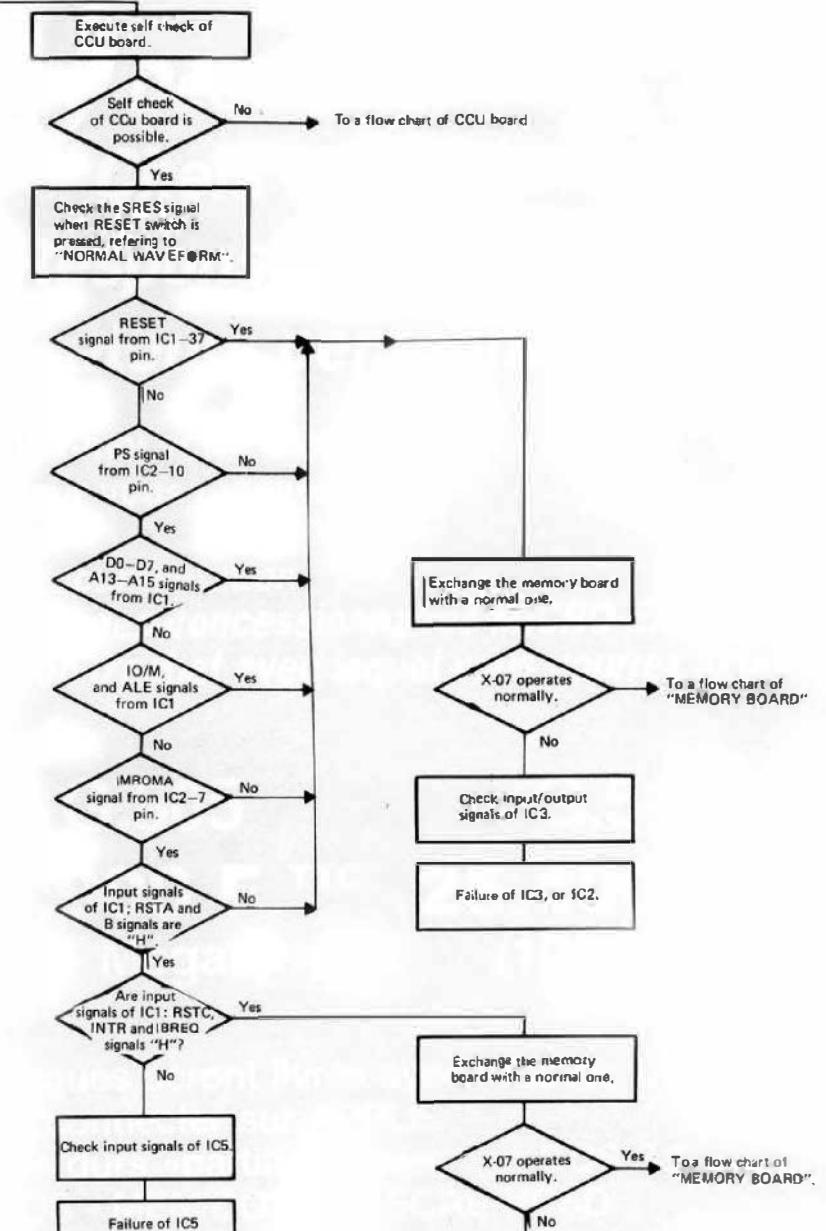
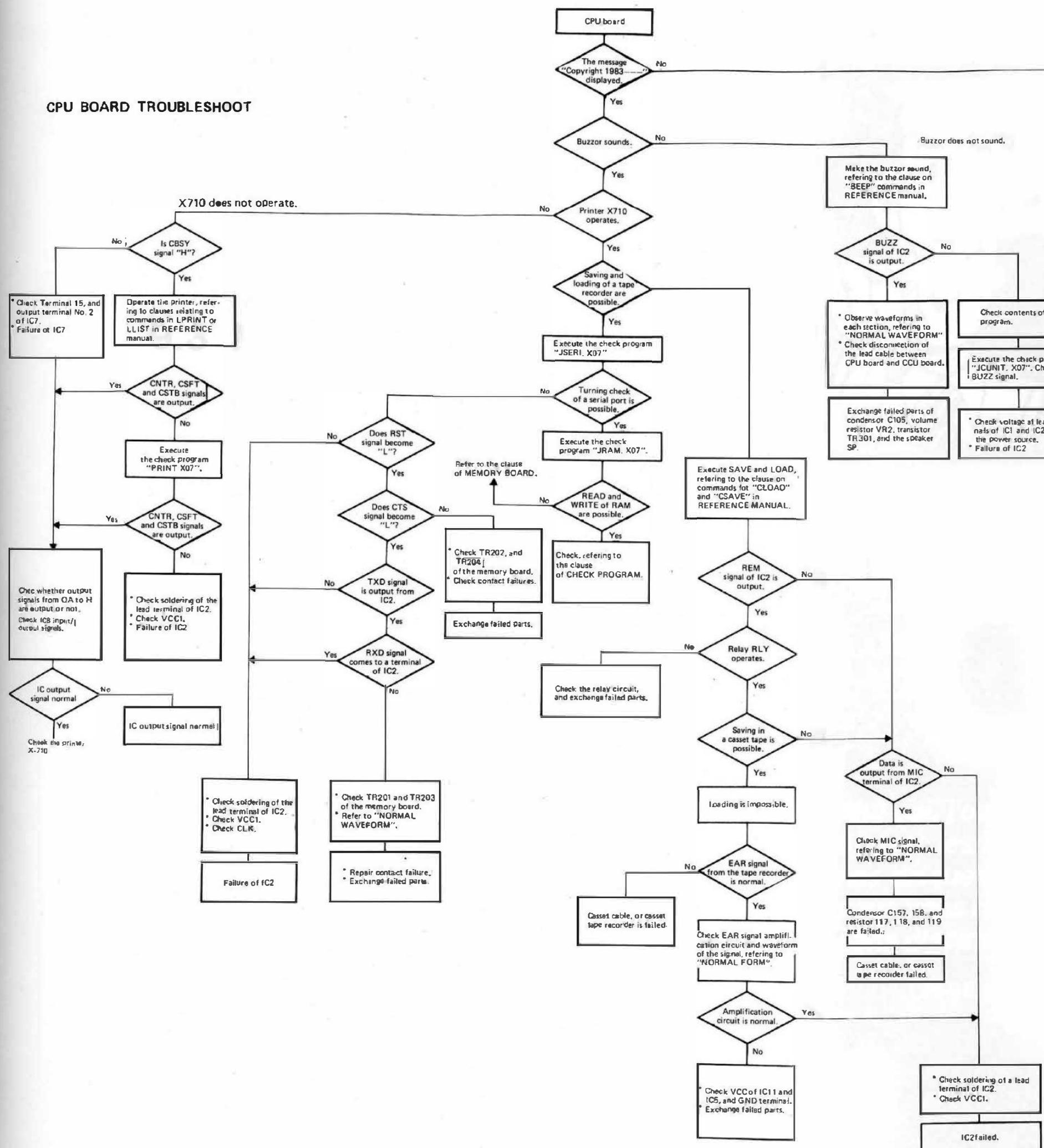
FIST PRESS RESET SW, THEN **ON** KEY IS PRESSED.



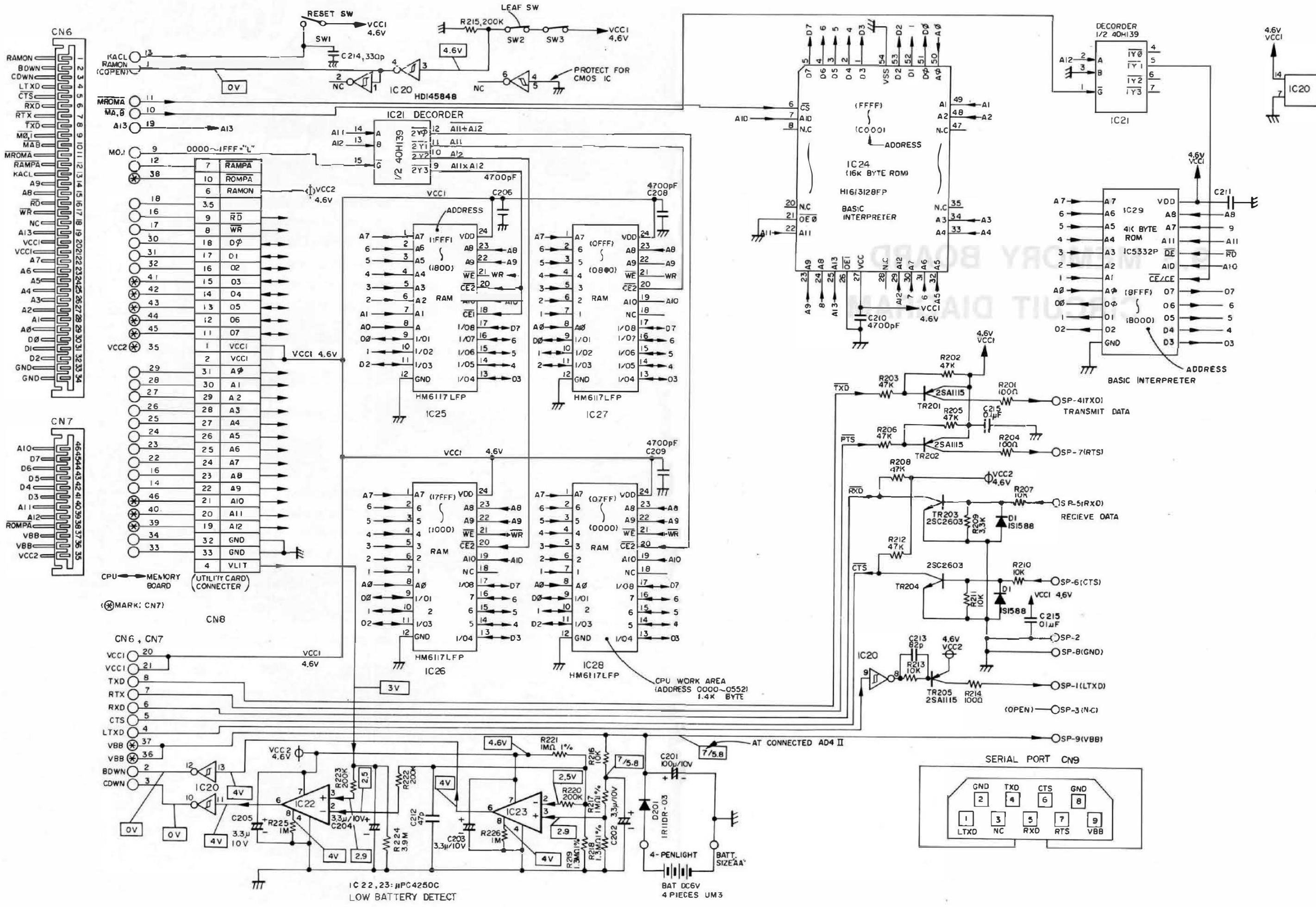
# TAPE RECORDER SAVE



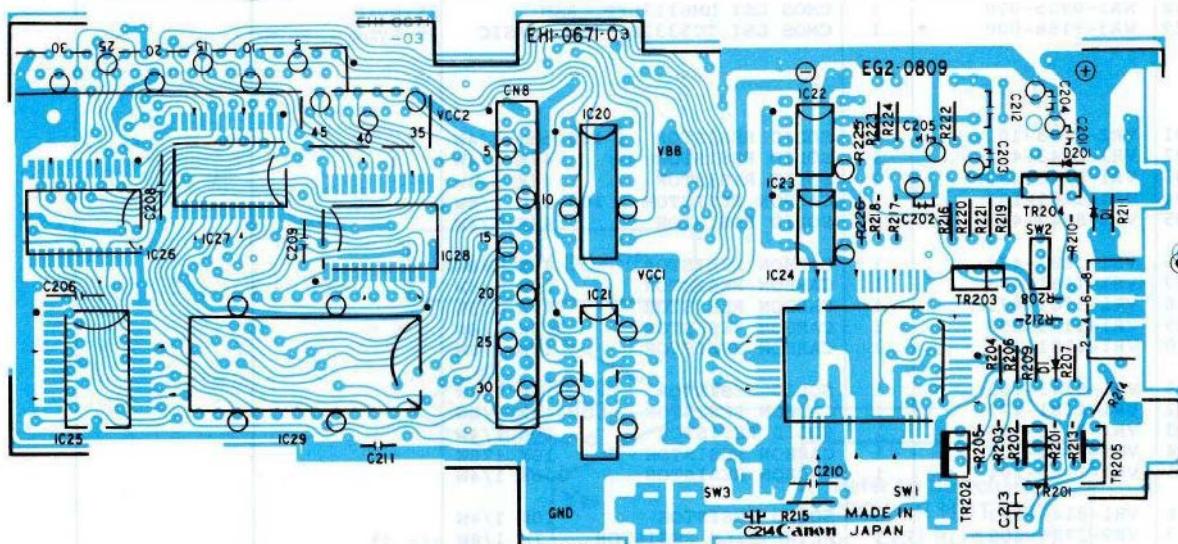
## CPU BOARD TROUBLESHOOT



## **9.3 MEMORY BOARD CIRCUIT DIAGRAM**



## CARD LAYOUT

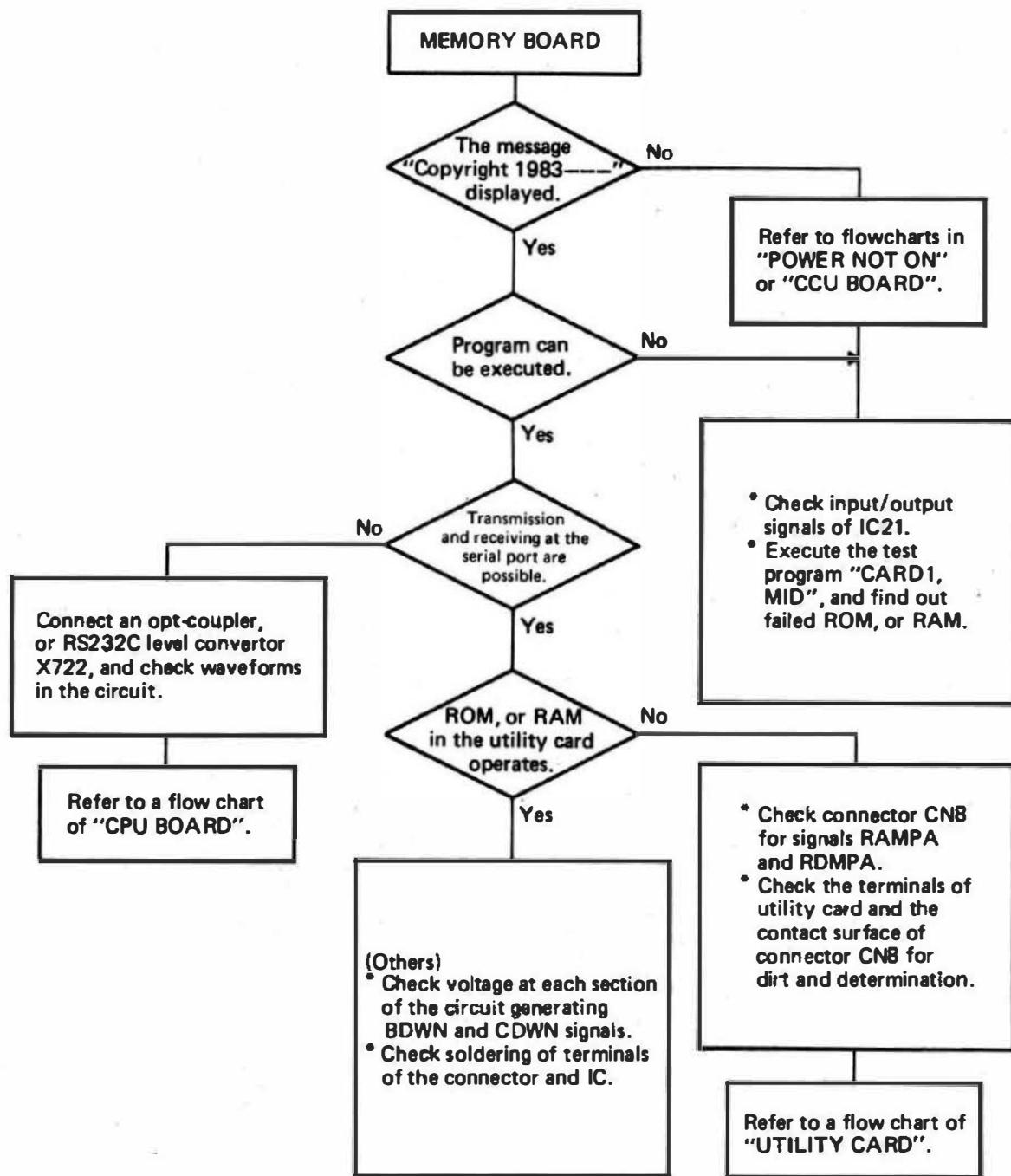


KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
C201	VC9-0983-000	1	ELECTROLYTIC CAPACITOR	100uF	
C202	VC9-0840-000	1	TANTALUM CAPACITOR	3.3uF	10V
C203	VC9-0840-000	1	TANTALUM CAPACITOR	3.3uF	10V
C204	VC9-0840-000	1	TANTALUM CAPACITOR	3.3uF	10V
C205	VC9-0840-000	1	TANTALUM CAPACITOR	3.3uF	10V
C206	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V
C207	----				
C208	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V
C209	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V
C210	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V
C211	VC9-1010-000	1	CERAMIC CAPACITOR	4700pF	50V
C212	VC4-2502-470	1	CERAMIC CAPACITOR	47pF	50V
* C213	VC4-2502-820	1	CERAMIC CAPACITOR	82pF	50V
C214	----				
C215	VC9-1060-000	1	CERAMIC CAPACITOR	0.1uF	50V
* CN6	VS1-0149-012	1	CONNECTOR, 12P	MEMORY-CPU BOARD	
* CN7	VS1-0149-034	1	CONNECTOR, 34P	MEMORY-CPU BOARD	
* CN8	WS8-9007-000	1	CONNECTOR, 33P	UTILITY CARD	
* CN9	WS1-0221-000	1	CONNECTOR, 9P	SERIAL PORT	
D1	X65-5032-000	2	DIODE 1S1588		
D201	WA1-0355-000	1	DIODE 11D0-03		
IC20	WA3-0976-000	1	CMOS IC HD14584B, INVERTOR		
IC21	WA3-0959-000	1	CMOS IC TC40H139P, DECODER		
IC22	WA4-0283-000	1	CMOS IC uPC4250C, DETECTOR		
IC23	WA4-0283-000	1	CMOS IC uPD4250C, DETECTOR		
* IC24	WA3-9169-000	1	CMOS LSI HM613128FP, ROM, BASIC	16k-Byte	
IC25	WA3-0955-000	1	CMOS LSI HM6117LFP, RAM	2k-byte	
IC26	WA3-0955-000	1	CMOS LSI HM6117LFP, RAM	2k-byte	
IC27	WA3-0955-000	1	CMOS LSI HM6117LFP, RAM	2k-byte	

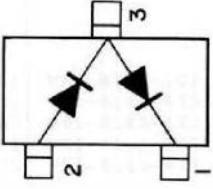
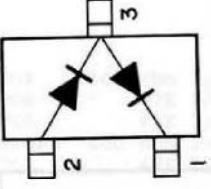
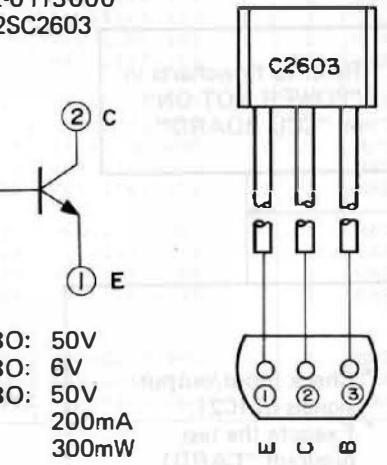
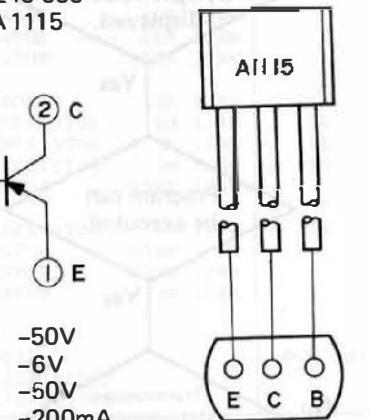
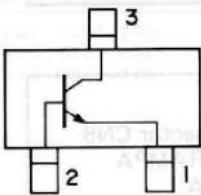
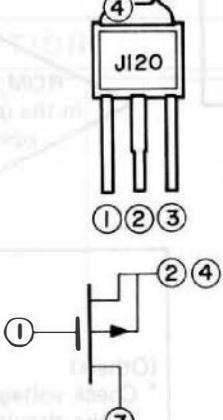
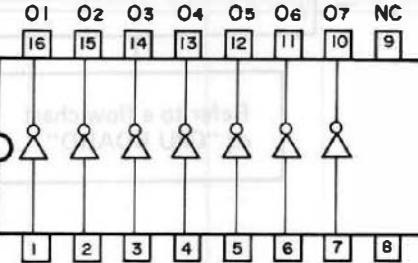
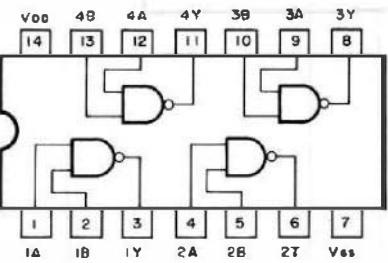
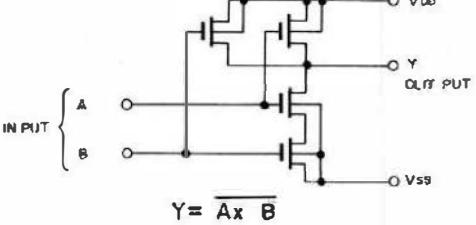
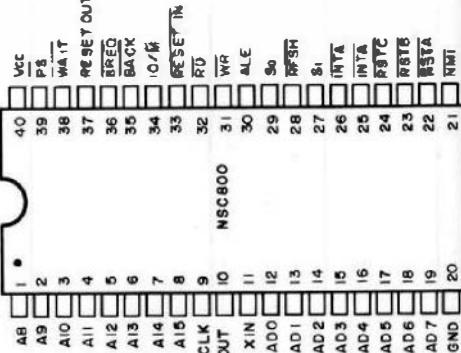
KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	IC28 WA3-0955-000	1	CMOS LSI HM6117LFP, RAM	2k-byte	
*	IC29 WA3-9168-000	1	CMOS LSI TC5332P, ROM, BASIC	4k-byte	
R201	VR1-8143-101	1	SOLID RESISTOR	100 ohm 1/4W	
R202	VR1-8143-473	1	SOLID RESISTOR	47K 1/4W	
R203	VR1-8143-473	1	SOLID RESISTOR	47K 1/4W	
R204	VR1-1181-101	1	CARBON RESISTOR	100 ohm 1/8W	
R205	VR1-8143-473	1	SOLID RESISTOR	47K 1/4W	
R206	VR1-1181-473	1	CARBON RESISTOR	47K 1/8W	
R207	VR1-1181-103	1	CARBON RESISTOR	10K 1/8W	
R208	VR1-1181-473	1	CARBON RESISTOR	47K 1/8W	
R209	VR1-1181-332	1	CARBON RESISTOR	3.3K 1/8W	
R210	VR1-1181-103	1	CARBON RESISTOR	10K 1/8W	
R211	VR1-8143-103	1	SOLID RESISTOR	10K 1/4W	
R212	VR1-1181-473	1	CARBON RESISTOR	47K 1/8W	
R213	VR1-8143-103	1	SOLID RESISTOR	10K 1/4W	
R214	VR1-1181-103	1	CARBON RESISTOR	10K 1/8W	
R215	VR1-1143-204	1	CARBON RESISTOR	200K 1/4W	
R216	VR1-8143-103	1	SOLID RESISTOR	10K 1/4W	
R217	VR9-2781-000	1	METAL FILM RESISTOR	1M 1/8W	+/- 1%
R218	VR9-2780-000	1	METAL FILM RESISTOR	1.3M 1/8W	+/- 1%
R219	VR9-2780-000	1	METAL FILM RESISTOR	1.3M 1/8W	+/- 1%
R220	VR1-1143-204	1	CARBON RESISTOR	200K 1/4W	
R221	VR9-2781-000	1	METAL FILM RESISTOR	1M 1/8W	+/- 1%
R222	VR1-1143-204	1	CARBON RESISTOR	200K 1/4W	
R223	VR1-1143-204	1	CARBON RESISTOR	200K 1/4W	
R224	VR1-1143-395	1	CARBON RESISTOR	3.9M 1/4W	
*	SW3 WC3-0039-000	1	SWITCH, SSS312		
TR201	WA2-0240-000	1	TRANSISTOR 2SA1115(F)	LOCK SWITCH	
TR202	WA2-0240-000	1	TRANSISTOR 2SA1115(F)		

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
TR203	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR204	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR205	WA2-0240-000	1	TRANSISTOR 2SA1115(F)		

## TROUBLESHOOTING

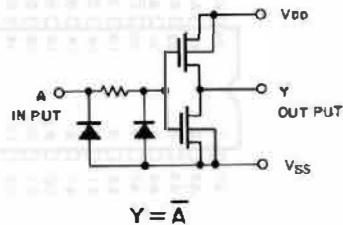
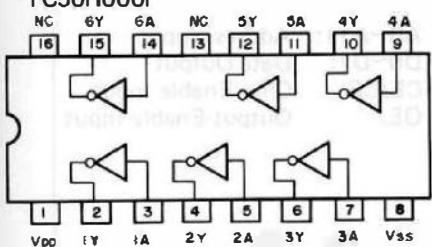


## 10. IC & TR TERMINALS

<p><b>WA10357-000 DIODE MA153</b></p>  <p>I forward: 0.2A I rectified: 0.1A V reverse: 40V</p>	<p><b>WA1-0380-000 DIODE MA157</b></p>  <p>I forward: 0.225A I rectified: 0.1A V reverse: 40V</p>																																																																																																											
<p><b>WA2-0113000 TR 2SC2603</b></p>  <p>VCBO: 50V VCBO: 6V VCBO: 50V IC: 200mA PC: 300mW</p>	<p><b>WA2-0240-000 TR 2SA1115</b></p>  <p>VCBO: -50V VCBO: -6V VCBO: -50V IC: -200mA PC: 300mW</p>	<p><b>WA2-0297-000 TR 2SB892</b></p>  <p>VCBO: -60V VCBO: -6V VCBO: -50V IC: -2A PC: 1W</p>																																																																																																										
<p><b>WA2-0343-000 TR 2SC2712</b></p>  <p>VCBO: 60V, VCBO: 50V VCBO: 5V, IC: 150mA PC: 150mW</p>	<p><b>WA2-0375-000 TR 2SJ120</b></p>  <p>① GATE ② ④ DRAIN ③ SOURCE VDSS: -40V VGSS: ±20V ID: -2A Pch: 10W</p>	<p><b>WA2-0399-000 TR ARRAY M54514AP</b></p>  <p>01 02 03 04 05 06 07 NC 16 15 14 13 12 11 10 9 IN1 IN2 IN3 IN4 IN5 IN6 IN7 GND</p>																																																																																																										
<p><b>WA3-0800000 NAND GATE TC40H000F</b></p> 	 <p>Y = Ax B</p>	<p><b>WA3-0956-000 CPU NSC800</b></p>  <table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td>Vcc</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>GND</td></tr> <tr><td>AB</td><td>A9</td><td>A10</td><td>A11</td><td>A12</td><td>A13</td><td>A14</td><td>A15</td><td>CLK</td><td>XOUT</td><td>XIN</td><td>AD0</td><td>AD1</td><td>AD2</td><td>AD3</td><td>AD4</td><td>AD5</td><td>AD6</td><td>AD7</td><td>AD8</td><td></td></tr> <tr><td></td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td></td><td></td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td></td></tr> <tr><td></td><td>IA</td><td>IB</td><td>1Y</td><td>2A</td><td>2B</td><td>2T</td><td>Vdd</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Vcc	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	GND	AB	A9	A10	A11	A12	A13	A14	A15	CLK	XOUT	XIN	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD8			14	13	12	11	10	9	8			11	12	13	14	15	16	17	18	19	20			IA	IB	1Y	2A	2B	2T	Vdd														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21																																																																																								
Vcc	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	GND																																																																																								
AB	A9	A10	A11	A12	A13	A14	A15	CLK	XOUT	XIN	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD8																																																																																									
	14	13	12	11	10	9	8			11	12	13	14	15	16	17	18	19	20																																																																																									
	IA	IB	1Y	2A	2B	2T	Vdd																																																																																																					

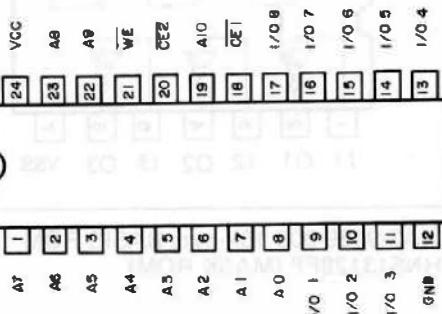
### WA3-0957-000 INVERTER

TC50H000F

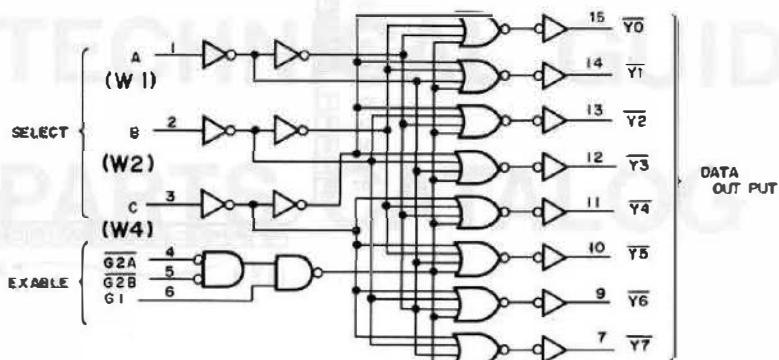
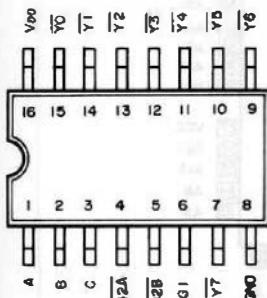


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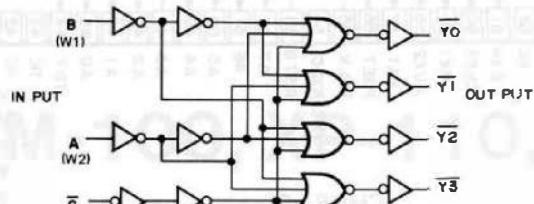
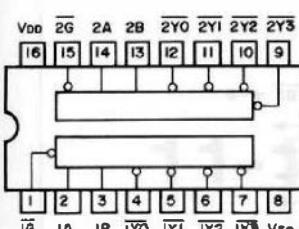
STATIC RAM 2k byte  
HM6117LFP-4



### WA3-0958-000 DECODER TC40H138F

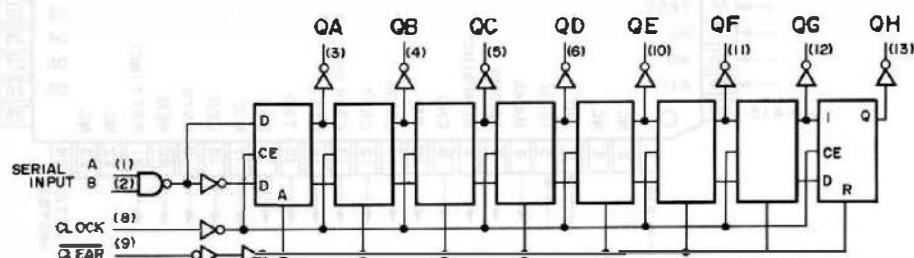
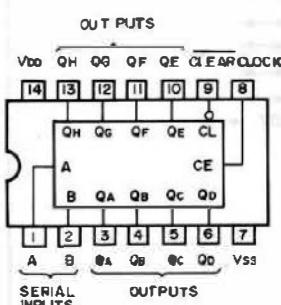


### WA3-0959-000 DECODER TC40H139P

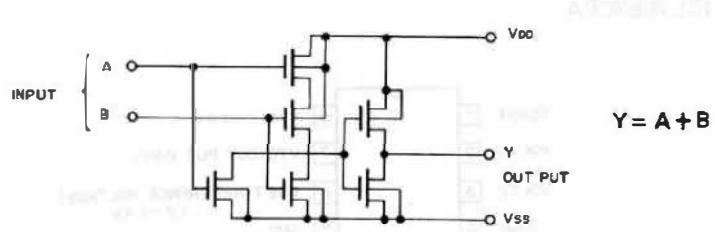
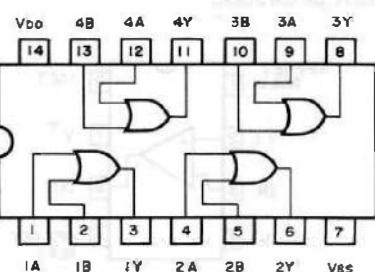


### WA3-0960-000 8-bit SHIFT REGISTER (SERIAL-IN, PARALLEL-OUT)

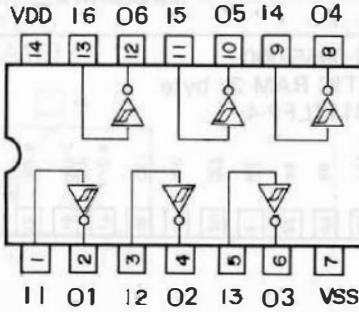
TC40H164F



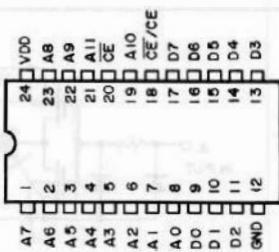
### WA3-0963-000 TC40H032F



WA3-0976-000  
INVERTER HD14584B

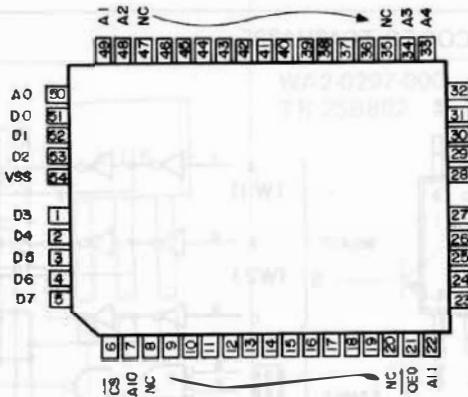


WA3-9168-000 4k-byte BASIC ROM  
TC5332P (MASK ROM)

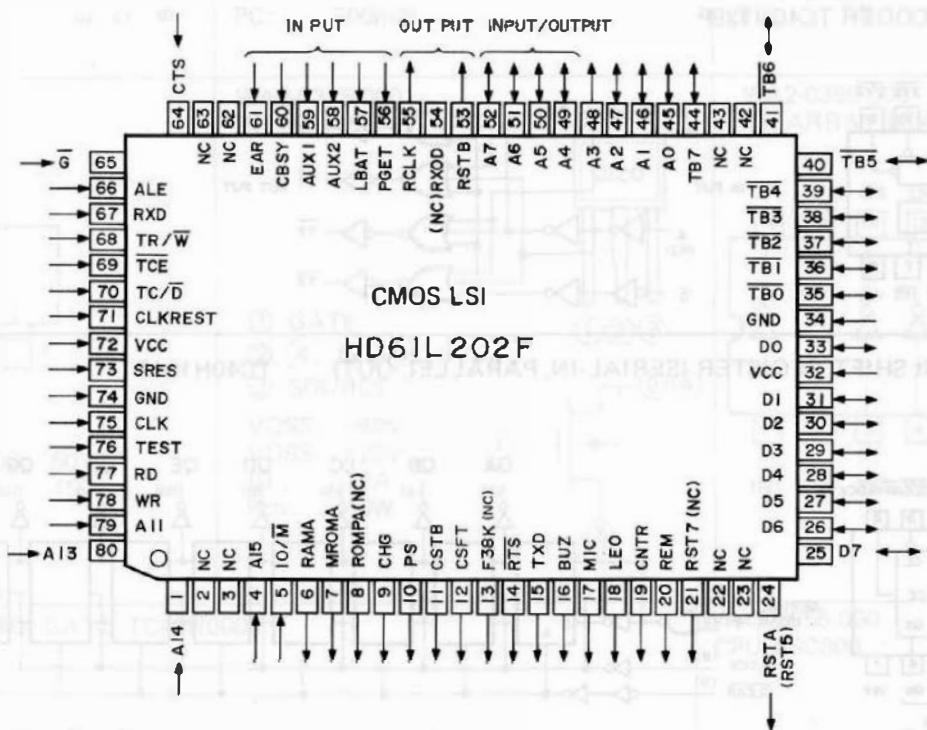


A0~A11: Address Input  
D0~D7: Data Output  
CE/CE: Chip Enable Input  
OE: Output-Enable Input

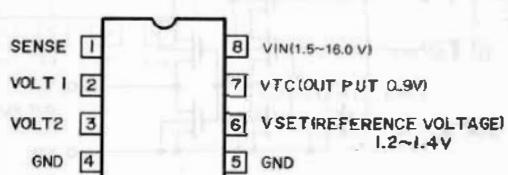
WA3-9169-000 16k-byte BASIC ROM  
HN613128FP (MASK ROM)



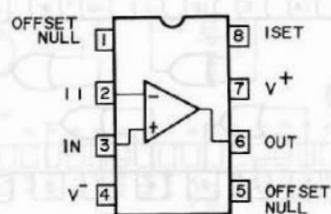
WA3-9170-000 INTERFACE LSI HD61L202F



WA40261-000  
CMOS VOLTAGE REGULATOR  
ICL7663CPA



WA40283-000  
AMPLIFIER  $\mu$ PC4250C

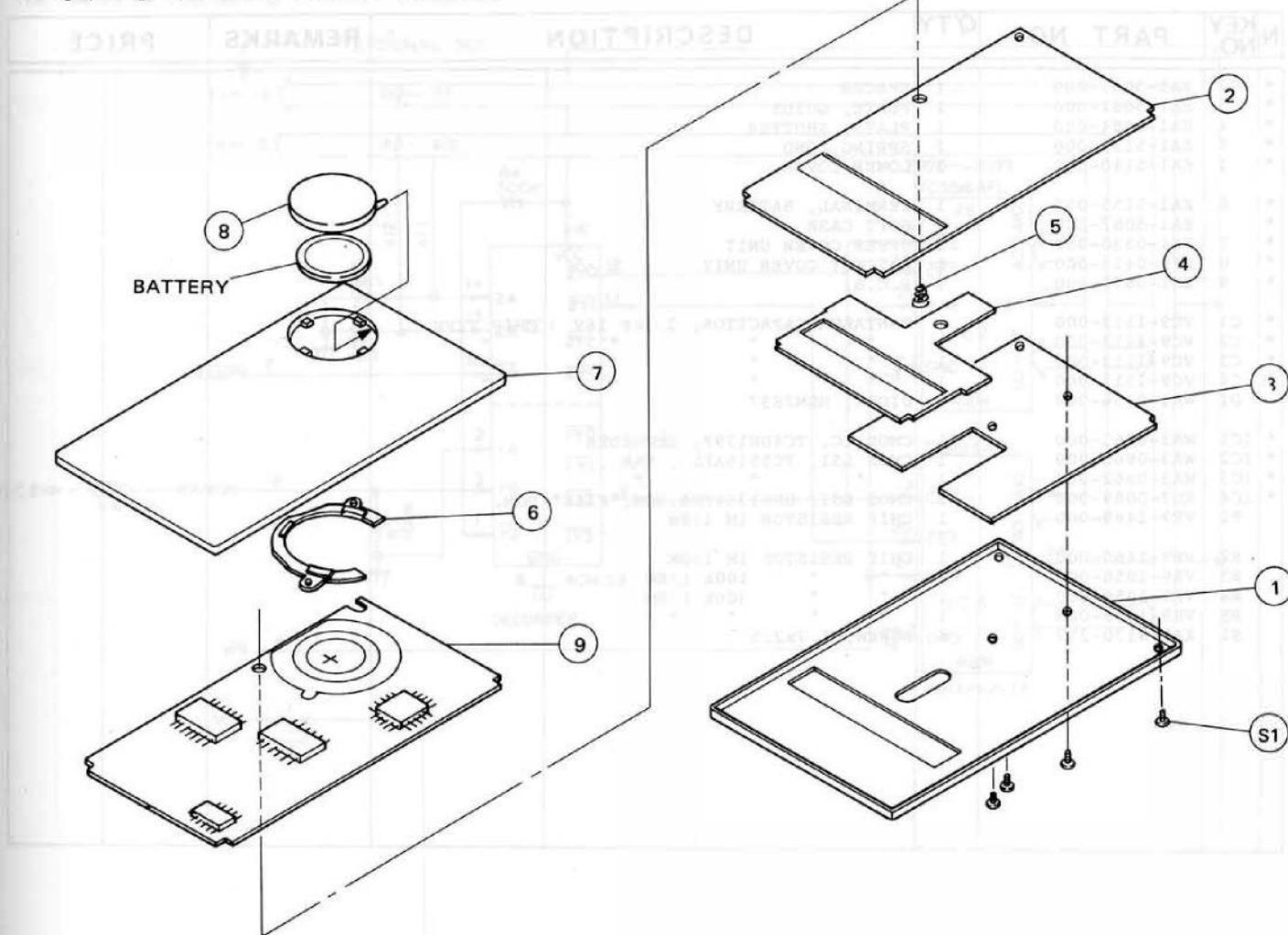


# **11. OPTION TECHNICAL GUIDE PARTS CATALOG**

**11-1 XM-100, XP-110, XP-120**

# EXPLODED VIEW

001 MX



XP-120

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	1 EAL-5080-000	1	LOWER COVER		
*	2 EAL-5081-000	1	SPACER		
*	3 EAL-5082-000	1	PLATE, GUIDE		
*	4 EAL-5084-000	1	PLATE, SHUTTER		
*	5 SAL-5135-000	1	SPRING, GND		
*	6 EAL-5155-000	1	TERMINAL, BATTERY		
*	EAL-8087-000	1	SOFT CASE		
*	7 EF1-0328-000	1	UPPER COVER UNIT		
*	8 EF9-0415-000	1	BATTERY COVER UNIT		
*	9 EH1-0677-000	1	P.C.B.		
C1	VC9-1113-000	1	TANTALUM CAPACITOR, 3.3uF 16V	CHIP TYPE	
C2	VC9-1113-000	1	-	-	
C3	VC9-1113-000	1	-	-	
C4	VC9-1113-000	1	-	-	
D1	WA1-0356-000	1	DIODE, HSM2837		
IC1	WA3-0961-000	1	CMOS IC, TC40H139F, DECORDER		
IC2	WA3-0962-000	1	CMOS LSI, TC5516AFL, RAM		
IC3	WA3-0962-000	1			
IC4	EH7-0087-000	1	CMOS LSI, HN61364FP4, ROM, "TABLE"	DOM.	
R1	VR9-1460-000	1	CHIP RESISTOR, 1M 1/8W		
R2	VR9-1460-000	1	CHIP RESISTOR, 1M 1/8W		
R3	VR9-1058-000	1	- , 100k 1/8W		
R4	VR9-1059-000	1	- , 300k 1/8W		
R5	VR9-1059-000	1	- , 300k 1/8W		
S1	XAI-3170-257	6	SCREW, 1.7x2.5		

## XM-100

EXPLoded VIEW

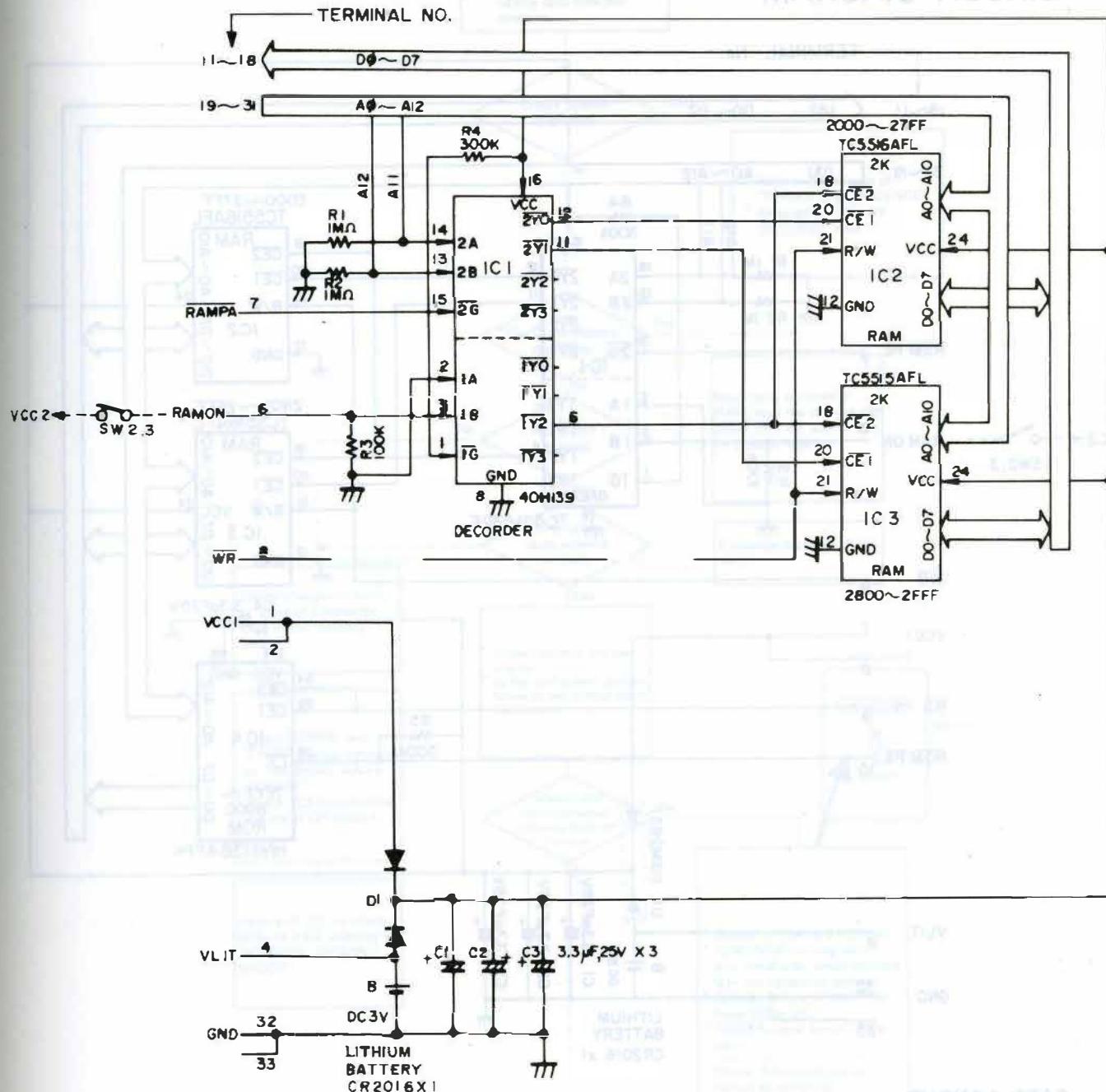
KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	2 EA1-5081-000	1	SPACER		
*	3 EA1-5082-000	1	PLATE, GUIDE		
*	4 EA1-5084-000	1	PLATE, SHUTTER		
*	5 EA1-5135-000	1	SPRING, GND		
*	1 EA1-5140-000	1	LOWER COVER		
*	6 EA1-5155-000	1	TERMINAL, BATTERY		
*	EA1-8087-000	1	SOFT CASE		
*	7 EF1-0330-000	1	UPPER COVER UNIT		
*	8 EF9-0415-000	1	BATTERY COVER UNIT		
*	9 EH1-0677-000	1	P.C.B.		
*	C1 VC9-1113-000	1	TANTALUM CAPACITOR, 3.3uF 16V	CHIP TYPE	
*	C2 VC9-1113-000	1	"	"	
*	C3 VC9-1113-000	1	"	"	
*	C4 VC9-1113-000	1	"	"	
D1	WA1-0356-000	1	DIODE, HSM2837		
IC1	WA3-0961-000	1	CMOS IC, TC40H139F, DECORDER		
IC2	WA3-0962-000	1	CMOS LSI, TC5516AFL , RAM		
IC3	WA3-0962-000	1	"		
IC4	EH7-0089-000	1	CMOS LSI, HN61364FP4,ROM,"FILE"	DOM.	
R1	VR9-1460-000	1	CHIP RESISTOR 1M 1/8W		
R2	VR9-1460-000	1	CHIP RESISTOR 1M 1/8W		
R3	VR9-1058-000	1	" 100k 1/8W		
R4	VR9-1059-000	1	" 300k 1/8W		
R5	VR9-1059-000	1	" "		
S1	XAI-3170-257	6	SCREW, 1.7x2.5		

## XP-110

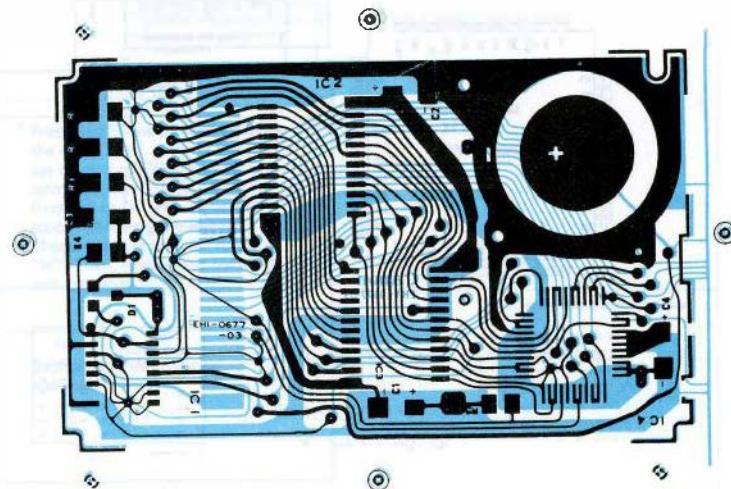
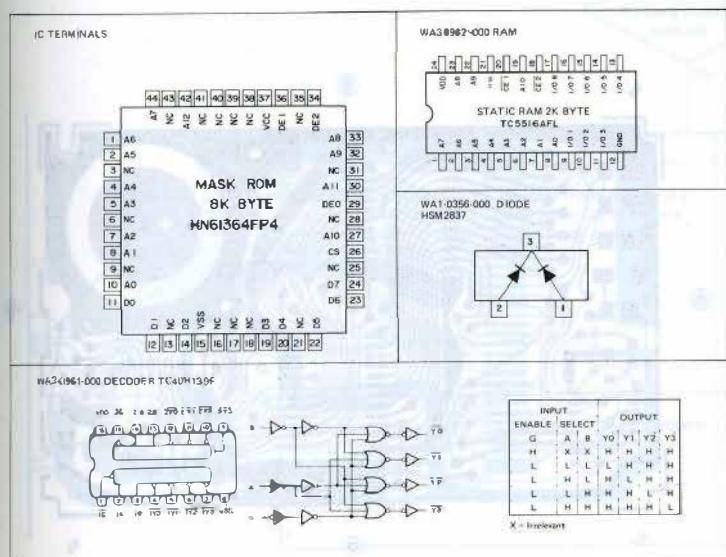
Exploded View

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	2 EA1-5081-000	1	SPACER		
*	3 EA1-5082-000	1	PLATE, GUIDE		
*	4 EA1-5084-000	1	PLATE, SHUTTER		
*	5 EA1-5135-000	1	SPRING, GND		
*	1 EA1-5140-000	1	LOWER COVER		
*	6 EA1-5155-000	1	TERMINAL, BATTERY		
*	EA1-8087-000	1	SOFT CASE		
*	7 EF1-0332-000	1	UPPER COVER UNIT		
*	8 EF9-0415-000	1	BATTERY COVER UNIT		
*	9 EH1-0677-000	1	P.C.B.		
*	C1 VC9-1113-000	1	TANTALUM CAPACITOR, 3.3uF 16V	CHIP TYPE	
*	C2 VC9-1113-000	1	"	"	
*	C3 VC9-1113-000	1	"	"	
D1	WA1-0356-000	1	DIODE, HSM2837		
IC1	WA3-0961-000	1	CMOS IC, TC40H139F, DECORDER		
IC2	WA3-0962-000	1	CMOS LSI, TC5516AFL , RAM		
IC3	WA3-0962-000	1	"		
R1	VR9-1460-000	1	CHIP RESISTOR, 1M 1/8W		
R2	VR9-1460-000	1	"		
R3	VR9-1058-000	1	" 100k 1/8W		
R4	VR9-1059-000	1	CHIP RESISTOR, 300k 1/8W		
S1	XAI-3170-257	6	SCREW, 1.7x2.5		

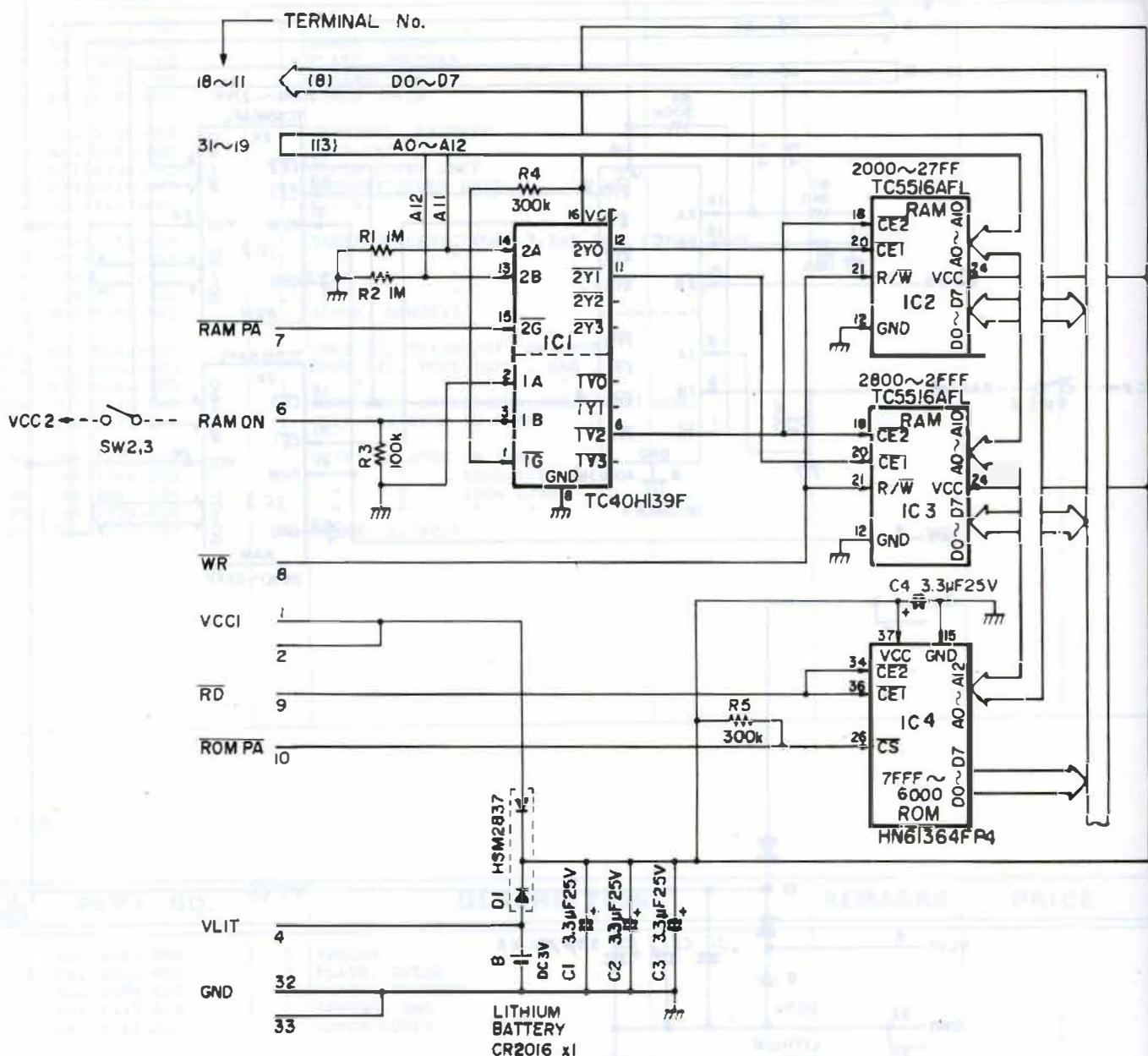
# XM-100 RAM (4k) CARD CIRCUIT DIAGRAM



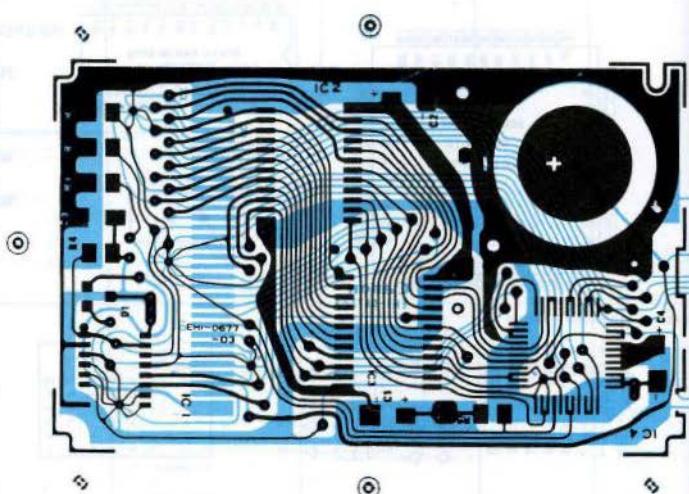
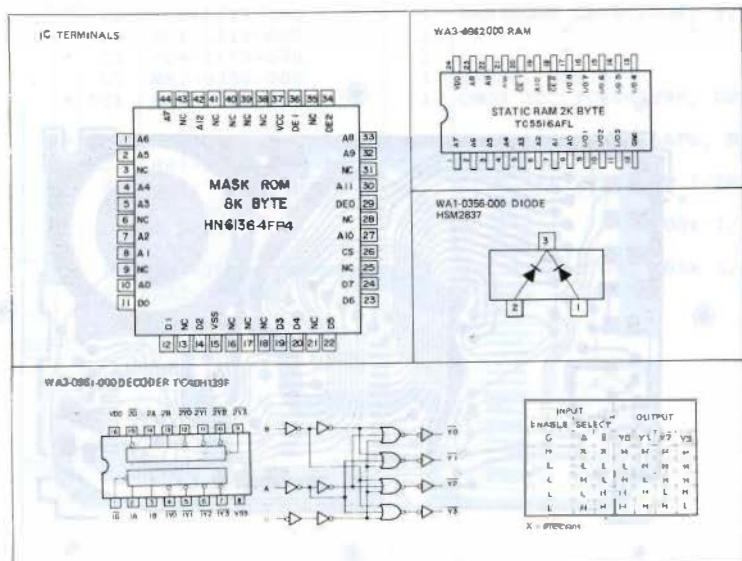
## CARD LAYOUT



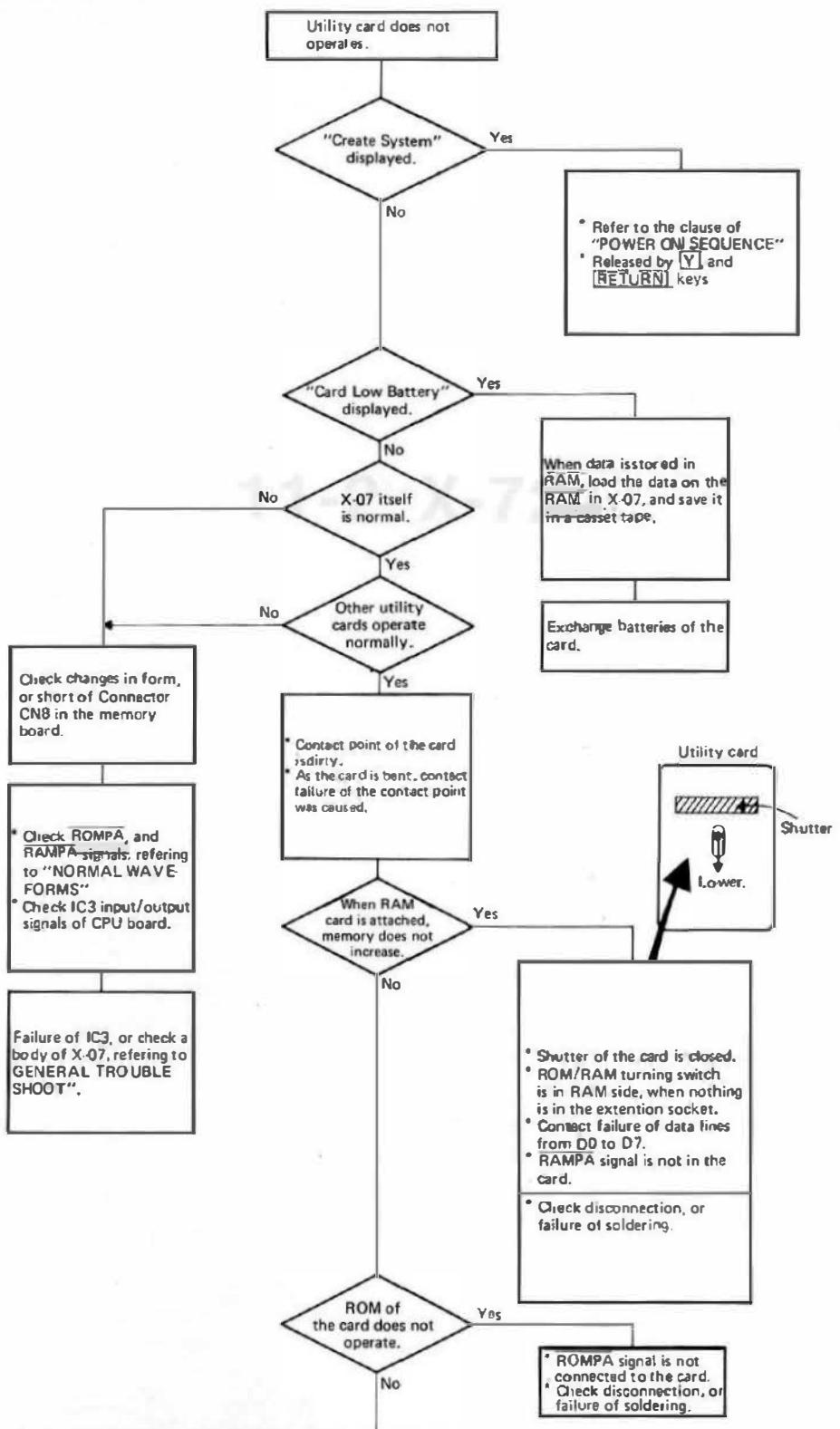
# XP-110, XP-120 CIRCUIT DIAGRAM



## CARD LAYOUT



## TROUBLESHOOTING

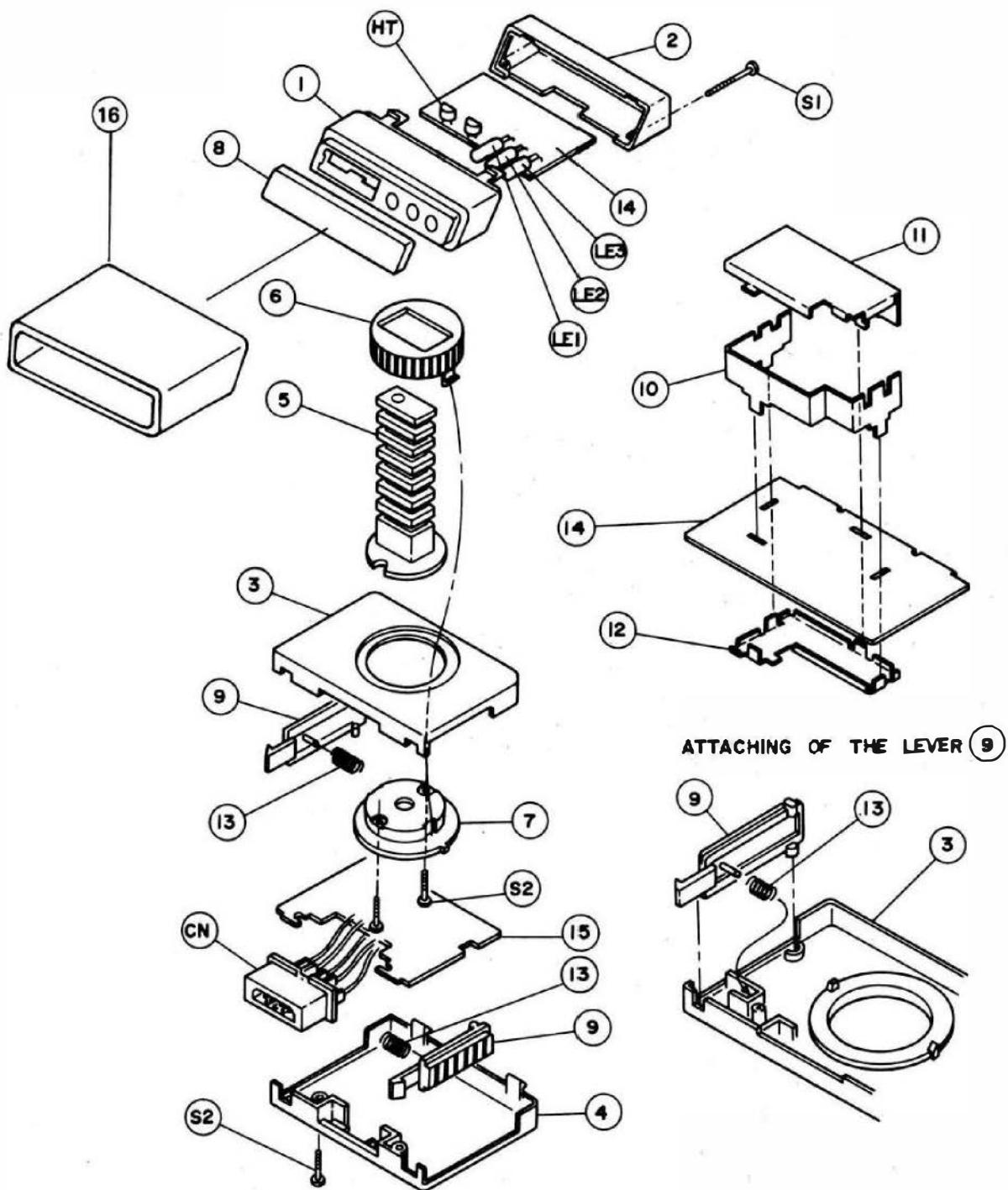


Phenomenon	Check	Repair
When power source is on, it can not be switched off by [OFF] key. (The message “Copyright 1983—” is not displayed)	Signals from A0 to A12, and from D0 to D7 are kept being output.	<ul style="list-style-type: none"> <li>Press RESET switch and take out the card. Then, connect the package of card to GND, and observe terminals from A0 to A12, and from D0 to D7 with an oscilloscope. Check signals in “H”.</li> <li>Check which terminals’ IC are “H”. Then, remove the terminals, and exchange IC in “H”.</li> </ul>
The message “Copyright 1983—” is displayed when power is on, but RAM of the card does not operate normally.	Execute the check program “JMEM. X07”.	Exchange RAMs of error addresses.

**11-2 X-721**

## 11-2) Optical Coupler X-721

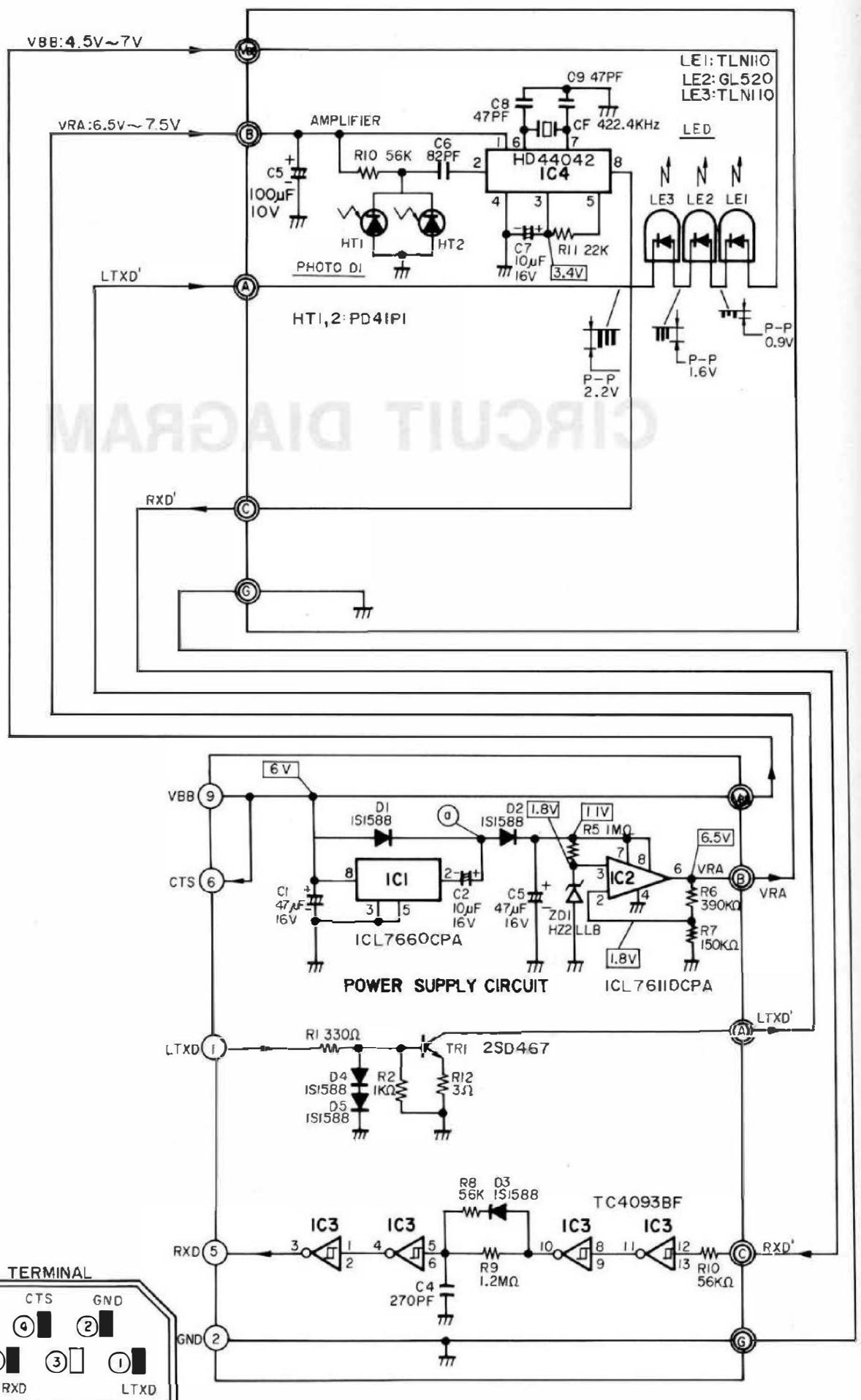
### EXPLODED VIEW



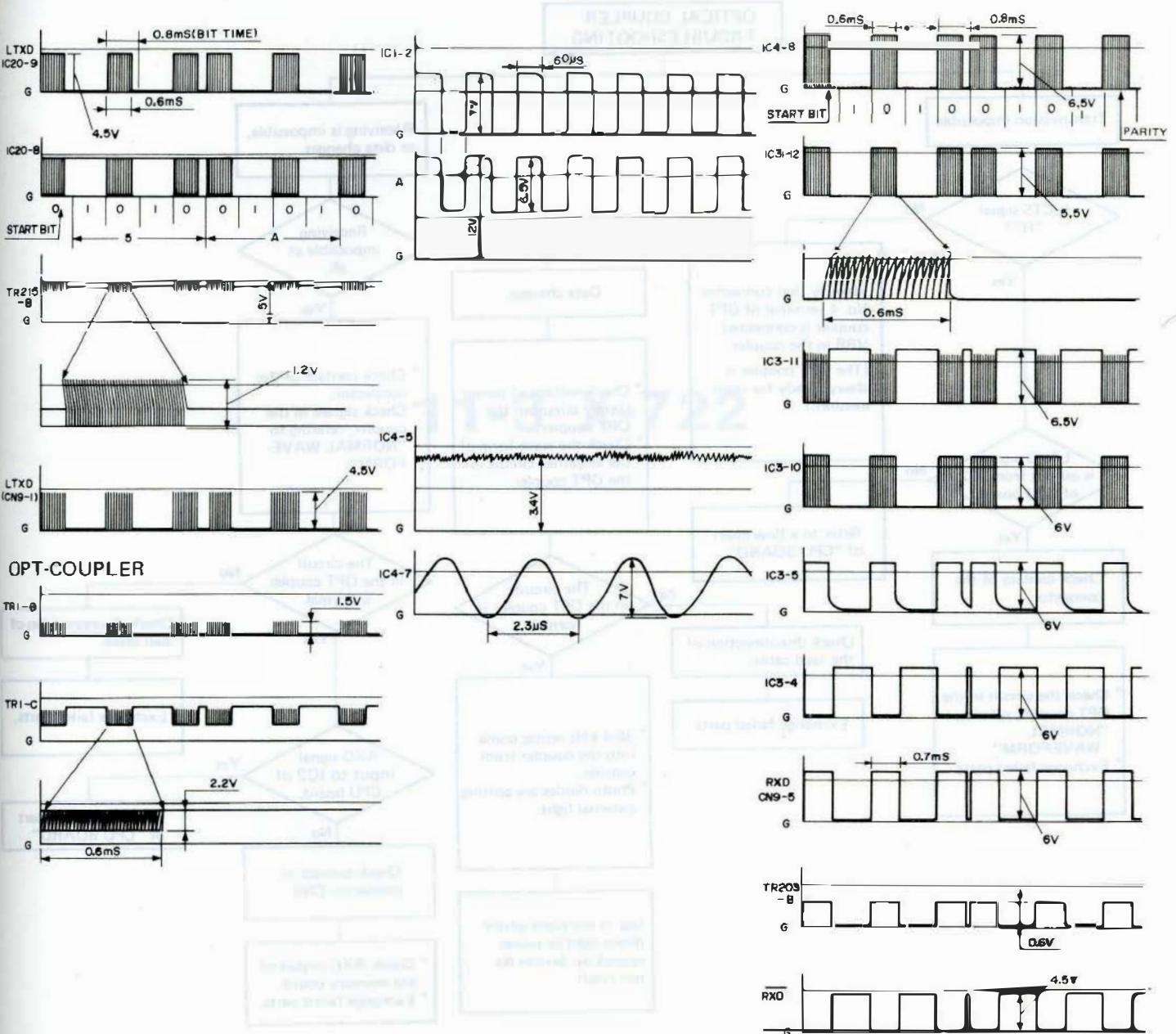
KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	1 EA1-5062-000	1	COVER(A)		
*	2 EA1-5063-000	1	COVER(B)		
*	3 EA1-5064-000	1	UPPER COVER, BASE		
*	4 EA1-5065-000	1	LOWER COVER, BASE		
*	5 EA1-5066-000	1	SNAKE SHAFT,RUBBER		
*	6 EA1-5067-000	1	BUSHING(A), ROTATORY		
*	7 EA1-5068-000	1	BUSHING(B), ROTATORY		
*	8 EA1-5069-000	1	ACRYL, WINDOW		
*	9 EA1-5070-000	2	LEVER, ATTACHING		
*	10 EA1-5071-000	1	PLATE, SHIELD		
*	11 EA1-5072-000	1	SHIELD COVER(A)		
*	12 EA1-5073-000	1	SHIELD COVER(B)		
*	13 EA1-5074-000	2	COIL SPRING		
*	14 EH1-0674-000	1	P.C.B, AMPLIFIER		
*	15 EH1-0675-000	1	P.C.B, POWER SUPPLY		
*	16 EA1-5348-000	1	HOOD, RUBBER		
*	EA1-5352-000	1	RUBBER SHEET, CONDUCTIVE		
*	C 1 VC9-1210-000	1	ELECTROLYTIC CAPACITOR 47uF 16V		
*	C 2 VC9-1112-000	1	ELECTROLYTIC CAPACITOR 10uF 16V		
C 3					
C 4	VC4-3503-271	1	CERAMIC CAPACITOR 270PF 50V		
*	C 5 VC9-1210-000	1	ELECTROLYTIC CAPACITOR 47uF 16V		
*	C 6 VC4-2502-820	1	CERAMIC CAPACITOR 82PF 50V		
C 7					
C 8	VC4-2502-470	1	CERAMIC CAPACITOR 47PF 50V		
C 9	VC4-2502-470	1	CERAMIC CAPACITOR 47PF 50V		
CF	WK2-9002-000	1	CERAMIC FILTER 422.4kHz		
*	CN WS1-0222-000	1	CONNECTOR, 9P		
D 1	X65-5032-000	1	DIODE, 1S1588		
D 2	X65-5032-000	1	DIODE, 1S1588		
D 3	X65-5032-000	1	DIODE, 1S1588		
D 4	X65-5032-000	1	DIODE, 1S1588		
D 5	X65-5032-000	1	DIODE, 1S1588		

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
HT1	WG3-0025-000	1	PHOTO DIODE, PD-41PI		
HT2	WG3-0025-000	1	PHOTO DIODE, PD-41PI		
IC1	WA4-0262-000	1	CMOS IC L 7660CPA		
IC2	WA4-0263-000	1	CMOS IC L7611DCPA		
IC3	WA3-0982-000	1	CMOS IC TC4093BF		
IC4	WA4-0260-000	1	CMOS IC HD44042		
*	LE1 WG1-0189-000	1	LED TLN110		
*	LE2 WG1-0171-000	1	LED GL-520		
*	LE3 WG1-0189-000	1	LED TLN110		
R 1	VR1-8143-331	1	SOLID RESISTOR 330 ohm 1/4W		
R 2	VR1-8143-102	1	SOLID RESISTOR 1k 1/4W		
R 3					
R 4					
R 5	VR1-8143-105	1	SOLID RESISTOR 1M 1/4W		
R 6	VR9-2980-000	1	RESISTOR 390k 1/4W		
R 7	VR9-2779-000	1	RESISTOR 150k 1/4W		
R 8	VR1-8143-563	1	SOLID RESISTOR 56k 1/4W		
R 9	VR1-1143-125	1	CARBON RESISTOR 1.2M 1/4W		
R10	VR1-8143-563	1	SOLID RESISTOR 56k 1/4W		
R11	VR9-1037-000	1	RESISTOR 22k 1/4W		
R12	VR1-1143-309	1	CARBON RESISTOR 3 ohm 1/4W		
TR1	X65-6369-000	1	TRANSISTOR 2SD467		
ZD1	WA1-0287-000	1	ZENER DIODE HZ2LLB		
	SCREW				
S 1	XA9-0183-000	2	SCREW, TAPPING, M2x28		
S 2	XA3-1201-007	4	SCREW, TAPPING, PH2x10		

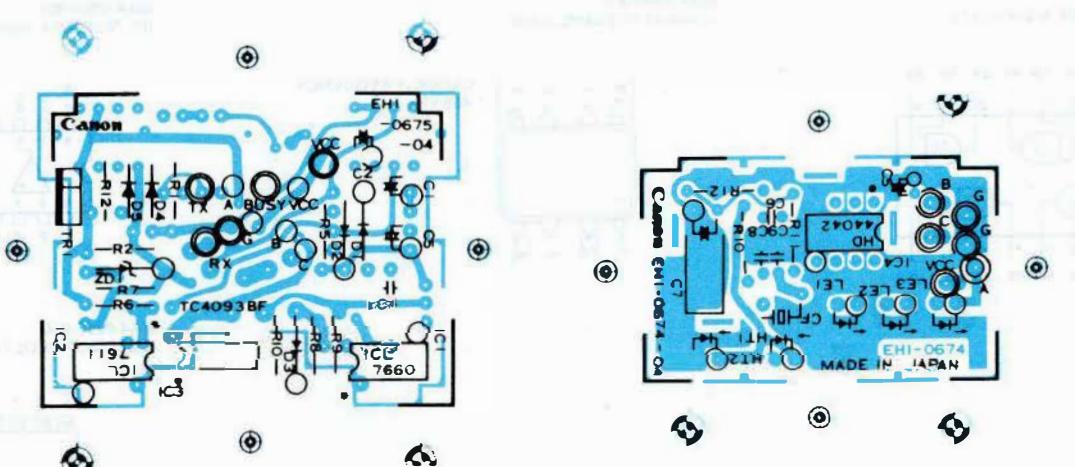
# CIRCUIT DIAGRAM



## **NORMAL WAVEFORM**

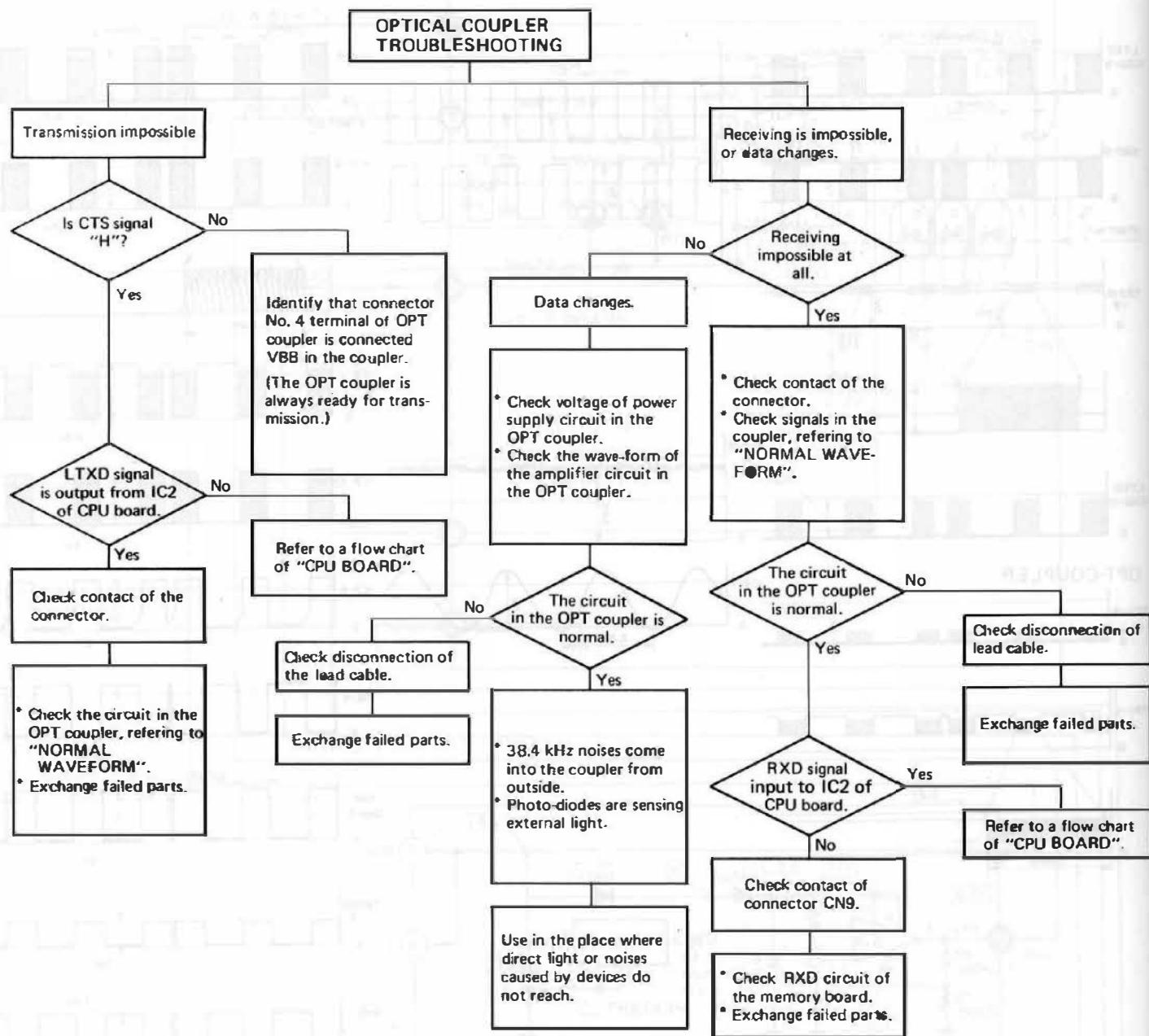


## CARD LAYOUT



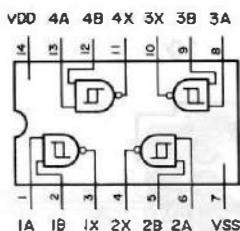
## TROUBLESHOOTING

MOTOROLA - JAPAN

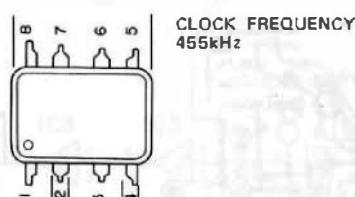


## IC TERMINALS

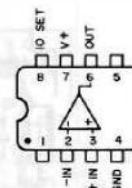
WAS-0982-000  
CMOS TC4093BF NAND GATE



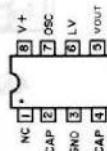
WA4-0260-000  
HD44042 PREAMPLIFIER



WA4-0263-000  
ICL7611DCPA AMPLIFIER



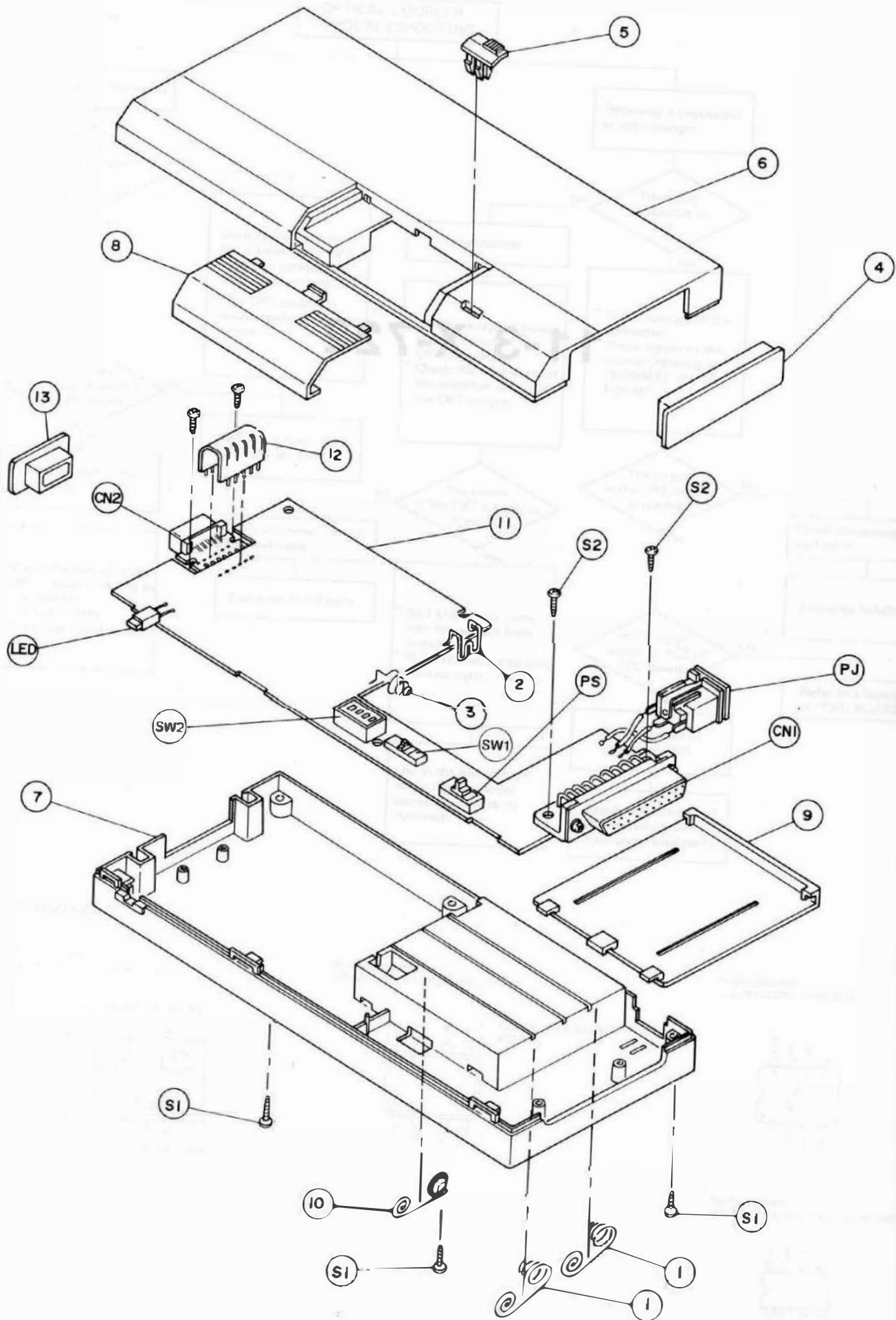
WA4-0262-000  
ICL7660CPA VOLTAGE CONVERTER



**11-3 X-722**

### 11-3) RS232-C LEVEL CONVERTER X-722

#### EXPLODED VIEW



KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
1	EA1-3750-000	2	TERMINAL, BATTERY, C1		
2	EA1-4560-000	1	TERMINAL (+)		
3	EA1-4561-000	1	" (-)		
4	EA1-4866-000	1	CAP, CONNECTOR		
5	EA1-5061-000	1	KNOB, SWITCH		
6	EA1-5075-000	1	UPPER COVER		
7	EA1-5076-000	1	LOWER COVER		
8	EA1-5077-000	1	COVER, SWITCH		
9	EA1-5136-000	1	BATTERY COVER		
	EA1-5318-000	1	PLATE(C), SHIEL.D		
10	EA9-0119-000	1	TERMINAL, BATTERY, C2		
11	EH1-0676-000	1	P.C.B.		
12	EH2-0398-000	1	FLAT CABLE, BP		
13	WS9-0025-000	1	CAP, CONNECTOR		
C1	VC9-1124-000	1	ELECTROLYTIC CAPACITOR, 330uF 16V		
C2	VC9-0822-000	1	ELECTROLYTIC CAPACITOR, 47uF 16V		
C3	VC9-0834-000	1	" , 33uF 16V		
C4	VC9-1125-000	1	" , 22uF 16V		
C5	VC4-3503-222	1	CERAMIC CAPACITOR 2200PF 50V		
C6	VC4-3503-101	1	" , 100PF 50V		
C7	VC4-3503-101	1	CERAMIC CAPACITOR 100PF 50V		
C11	VC4-2502-820	1	CERAMIC CAPACITOR 82PF 50V		
CF	WK2-9005-000	1	CERAMIC FILTER 460.8kHz		
CN1	VS1-0158-025	1	CONNECTOR, 25P		
CN2	WS1-0221-000	1	" , 9P		
D1	X65-5032-000	1	DIODE, 1S1588		
D2	X65-5032-000	1	" "		
D3	X65-5032-000	1	" "		
D4	X65-5032-000	1	" "		
D5	WA1-0078-000	1	" , ER812-01		
D6	WA1-0204-000	1	DIODE, 1S954		
D7	WA1-0267-000	1	" , W06B		
D8	WA1-0204-000	1	" , 1S954		

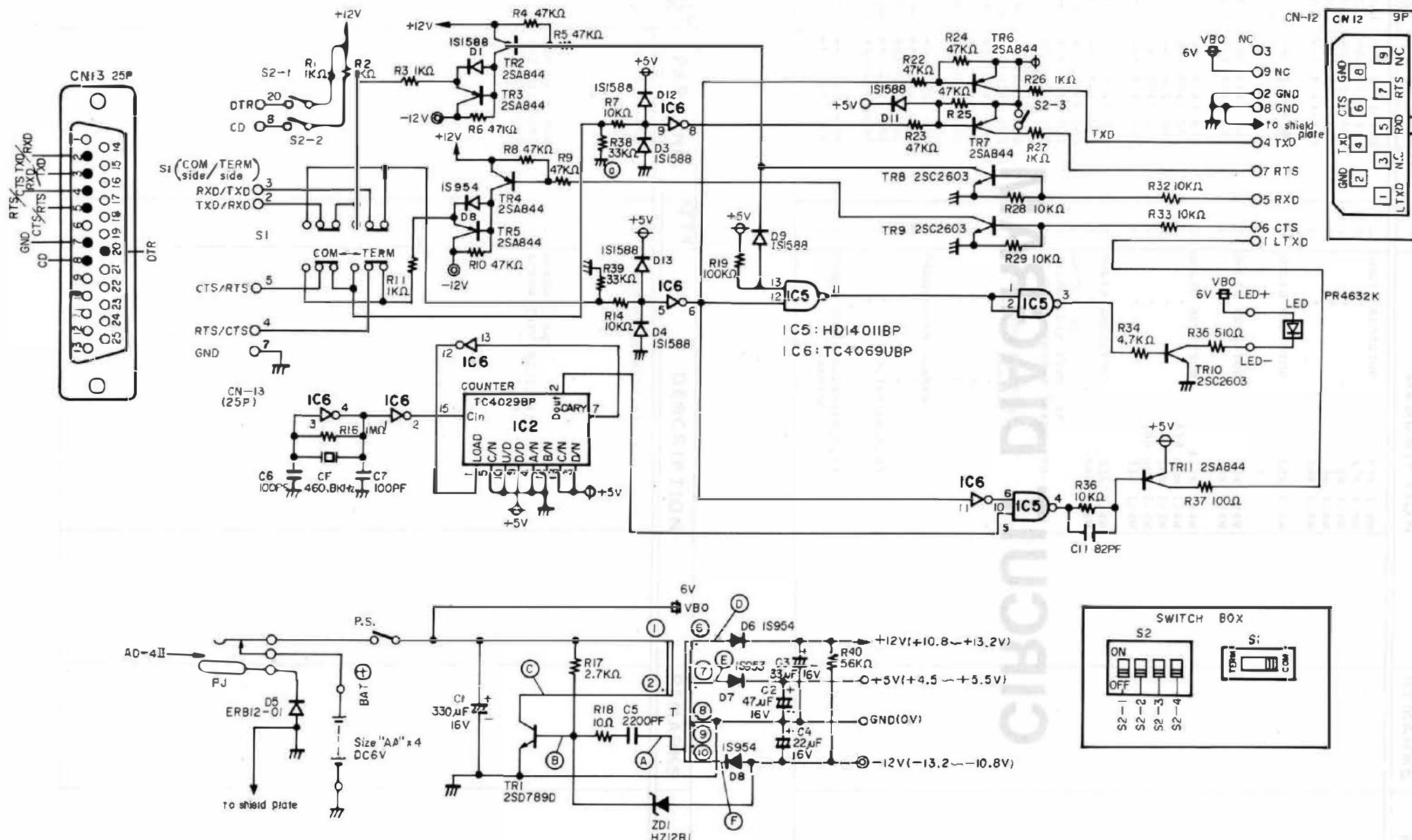
KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
D9	X65-5032-000	1	DIODE, 1S1588		
D11	X65-5032-000	1	" "		
D12	X65-5032-000	1	" "		
D13	X65-5032-000	1	" "		
IC2	WA3-0311-000	1	CMOS IC, TC4029BP		
IC5	WA3-0633-000	1	CMOS IC, HD14011BP		
IC6	WA3-0561-000	1	CMOS IC, TC4069BP		
L LED1	WG1-0178-000	1	LED, PR4632K		
PJ	WS6-9010-000	1	POWER JACK		
PS	WC3-9013-000	1	SL IDE SWITCH, 2P		
R 1	VR1-8143-102	1	SOLID RESISTOR 1k 1/4W		
R 2	VR1-8143-102	1	" 1k 1/4W		
R 3	VR1-8143-102	1	" 1k 1/4W		
R 4	VR1-8143-473	1	" 47k 1/4W		
R 5	VR1-8143-473	1	" 47k 1/4W		
R 6	VR1-8143-473	1	SOLID RESISTOR 47k 1/4W		
R 7	VR1-8143-103	1	" 10k 1/4W		
R 8	VR1-8143-473	1	" 47k 1/4W		
R 9	VR1-8143-473	1	" 47k 1/4W		
R10	VR1-8143-473	1	" 47k 1/4W		
R11	VR1-8143-102	1	SOLID RESISTOR 1k 1/4W		
R12					
R13					
R14	VR1-8143-103	1	SOLID RESISTOR 10k 1/4W		
R15					
R16	VR1-8143-105	1	SOLID RESISTOR 1M 1/4W		
R17	VR1-8143-272	1	" 2.7k 1/4W		
R18	VR1-8143-100	1	" 10 ohm 1/4W		
R19	VR1-8143-104	1	" 100k 1/4W		
R20					
R21					
R22	VR1-8143-473	1	SOLID RESISTOR 47k 1/4W		
R23	VR1-8143-473	1	" 47k 1/4W		

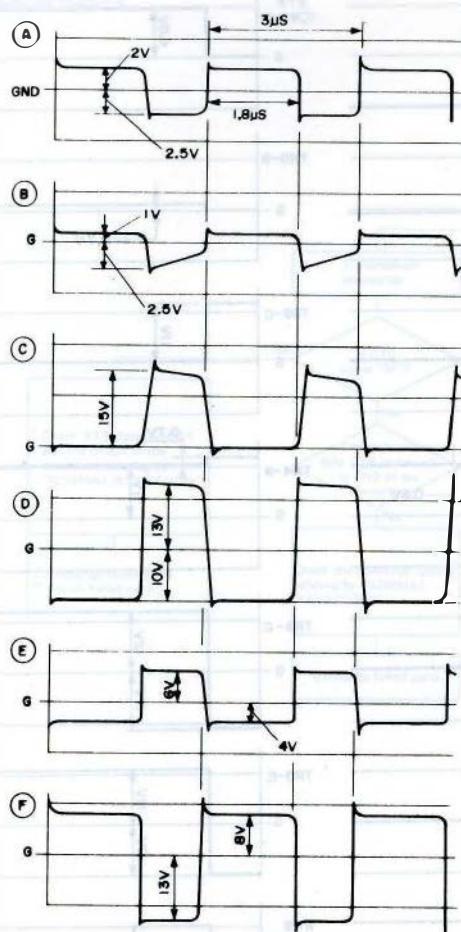
N	KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
	R24	VR1-8143-473	1	SOLID RESISTOR 47k 1/4W		
	R25	VR1-8143-473	1	- 47k 1/4W		
	R26	VR1-8143-102	1	- 1k 1/4W		
	R27	VR1-8143-102	1	- 1k 1/4W		
	R28	VR1-8143-103	1	- 10k 1/4W		
	R29	VR1-8143-103	1	SOLID RESISTOR 10k 1/4W		
	R30					
	R31					
	R32	VR1-8143-103	1	SOLID RESISTOR 10k 1/4W		
	R33	VR1-8143-103	1	- 10k 1/4W		
	R34	VR1-8143-472	1	SOLID RESISTOR 4.7k 1/4W		
	R35	VR1-8143-511	1	- 510 ohm 1/4W		
	R36	VR1-8143-103	1	- 10k 1/4W		
	R37	VR1-8143-101	1	- 100 ohm 1/4W		
	R38	VR1-8143-333	1	- 33k 1/4W		
	R39	VR1-8143-333	1	SOLID RESISTOR 33k 1/4W		
	R40	VR1-8143-563	1	- 56k 1/4W		
*	SW1	WC3-0049-000	1	SWITCH,4P		
*	SW2	WC8-0049-000	1	SWITCH,DIP TYPE ,4P		
T		E113-5128-000	1	DC-DC CONVERTOR TRANS. TB-69		
	TR1	WA2-0374-000	1	TRANSISTOR 2SD789D		
	TR2	WA2-0282-000	1	- 2SA844C		
	TR3	WA2-0282-000	1	-		
	TR3	WA2-0282-000	1	-		
	TR4	WA2-0282-000	1	-		
	TR5	WA2-0282-000	1	TRANSISTOR 2SA844C		
	TR6	WA2-0282-000	1	-		
	TR7	WA2-0282-000	1	-		
	TR8	WA2-0113-000	1	- ZSC2603(D,E,F)		
	TR9	WA2-0113-000	1	-		
	TR10	WA2-0113-000	1	TRANSISTOR ZSC2603(D,E,F)		
	TR11	WA2-0282-000	1	- 2SA844C		

N	KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
	ZD1	WA1-0230-000	1	ZENER DIODE,HZ12-B1		
		SCREW				
		XAG-0178-000	1	SCREW,2.6x5		
		XB3-126L-007	3	SCREW,TAPPING,2.6x10		
		XB3-230L-007	2	" " 3x10		

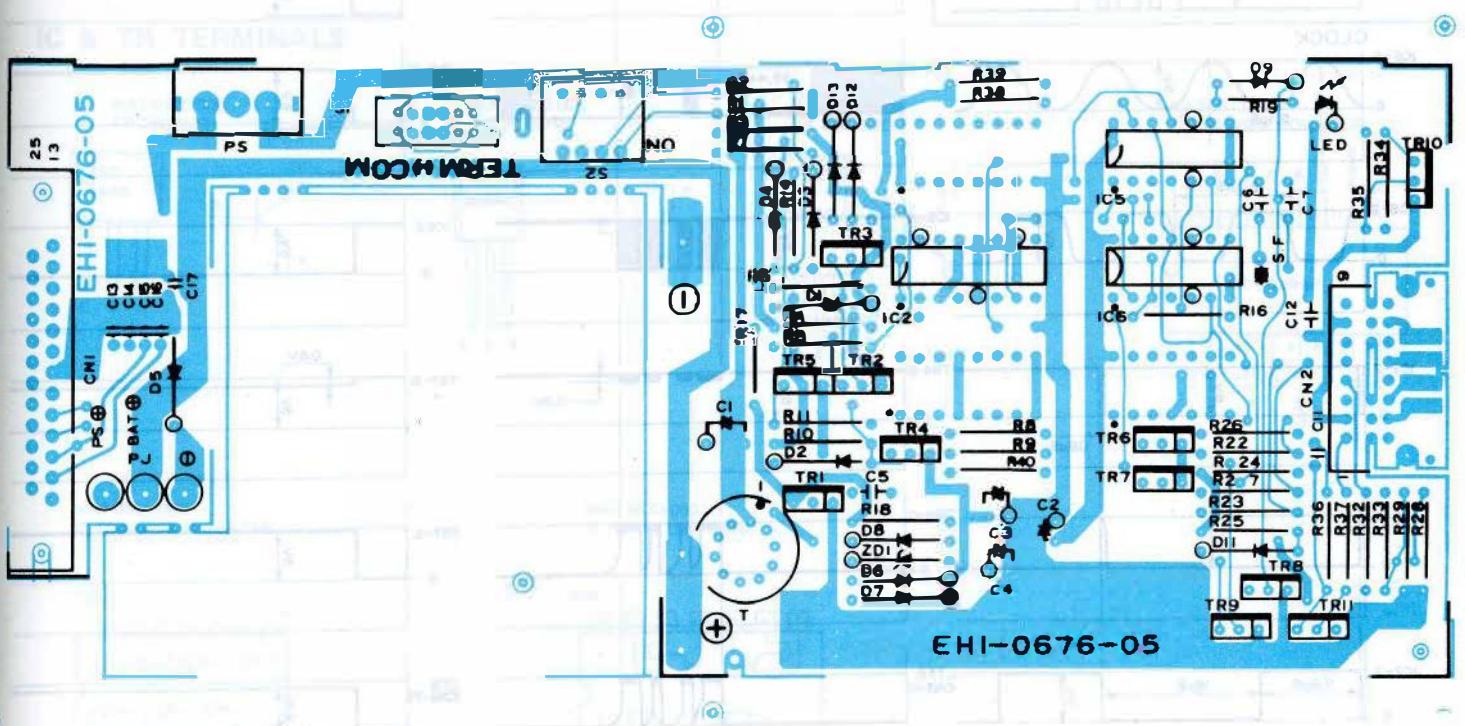
# CIRCUIT DIAGRAM

## CIRCUIT DIAGRAM



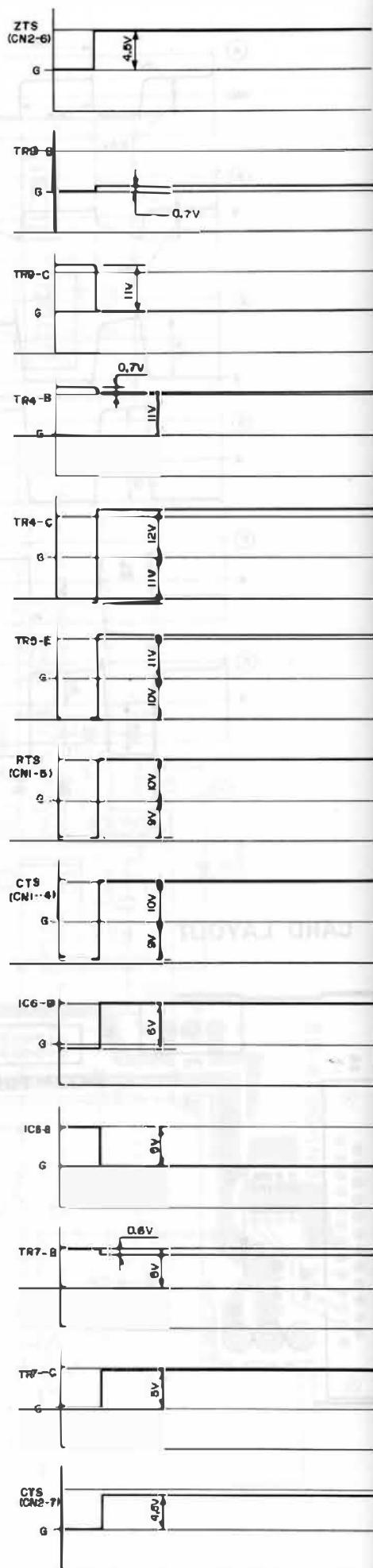
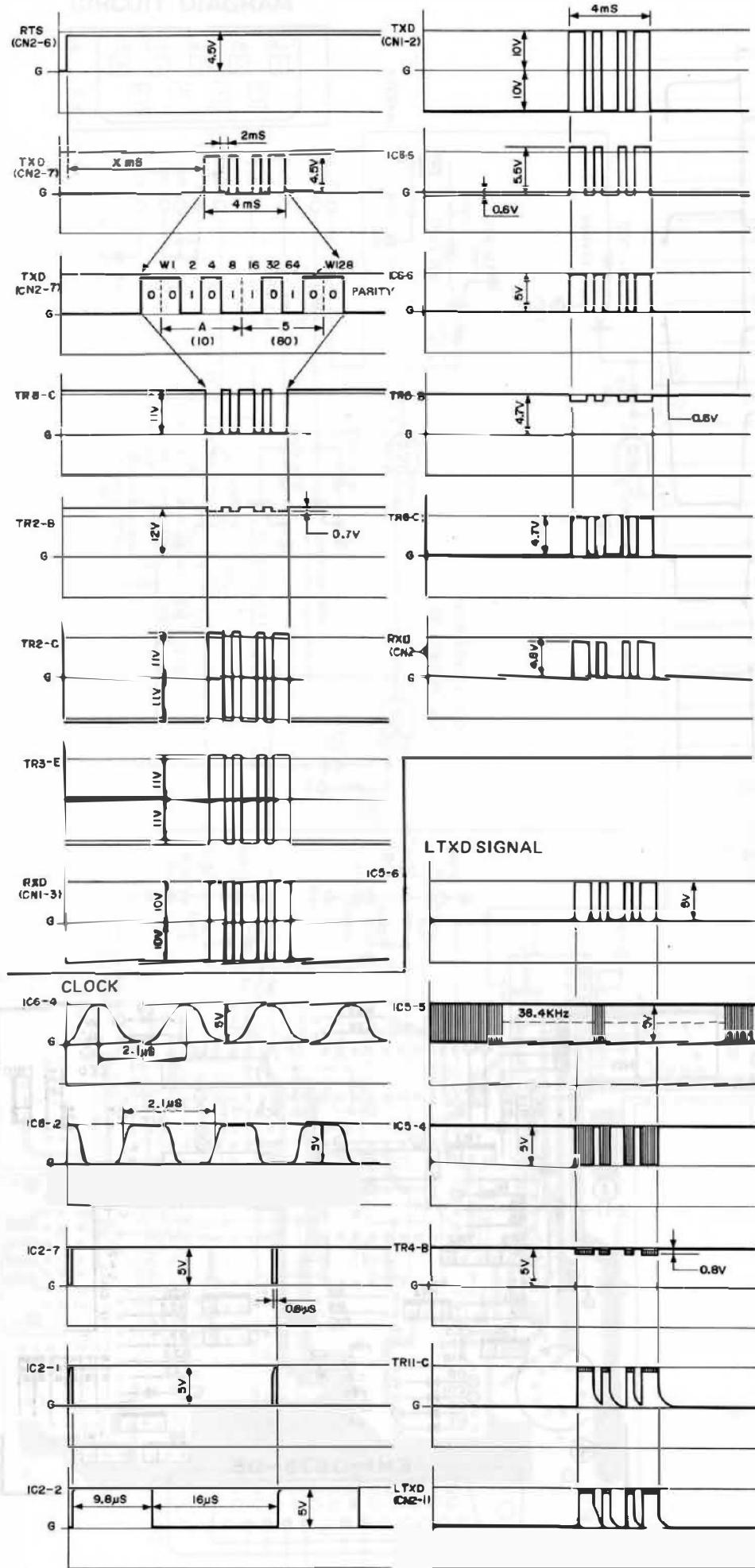


## CARD LAYOUT

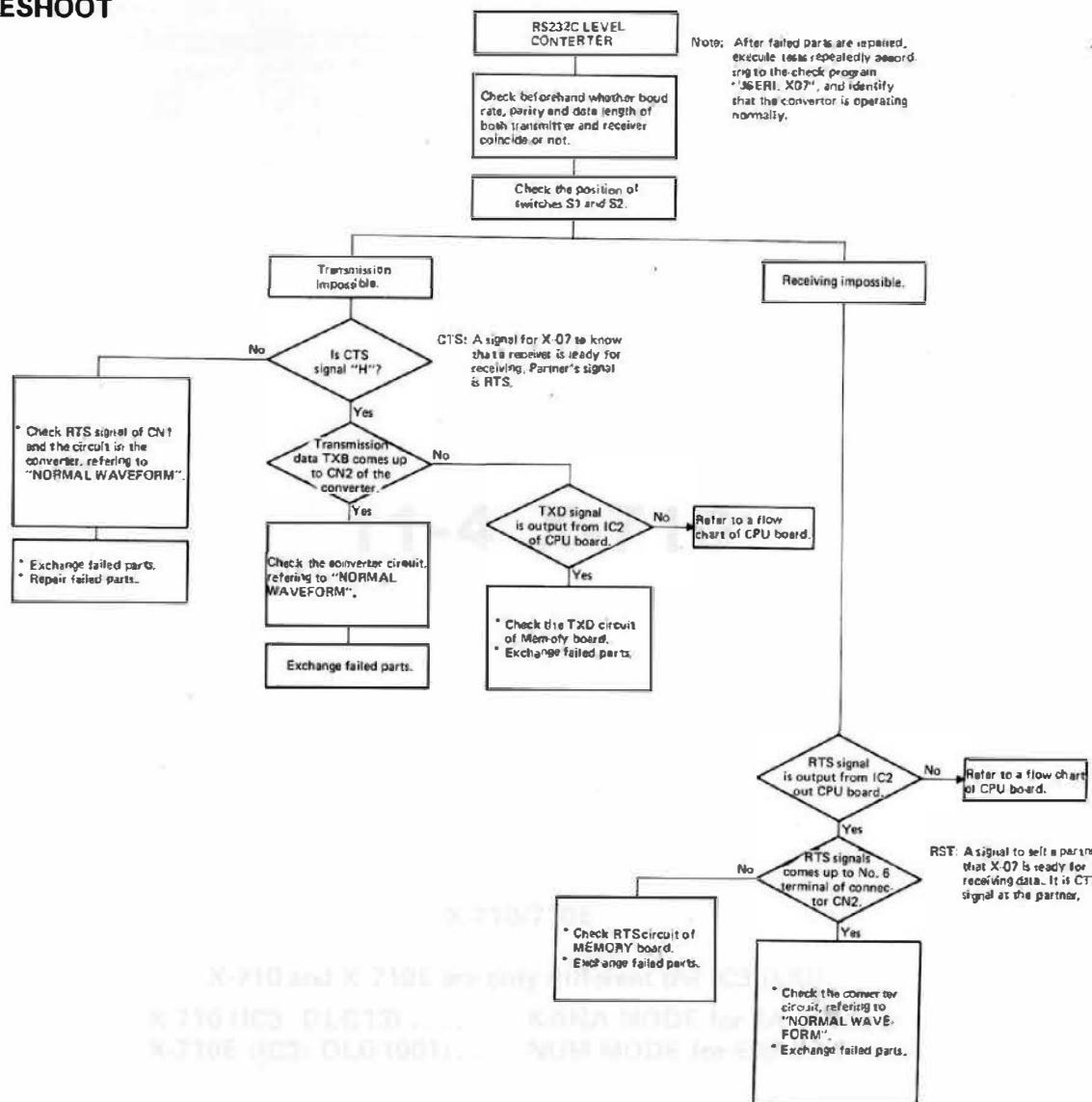


## NORMAL WAVEFORM-1

RTS/CTS (Connected No. 4 & No. 5 terminals of CN1)

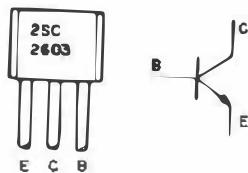


## TROUBLESHOOT

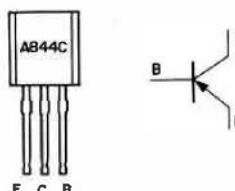


## IC & TR TERMINALS

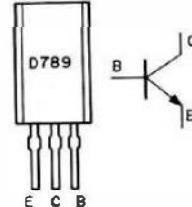
WA2-0113-000  
TR 2SC2603



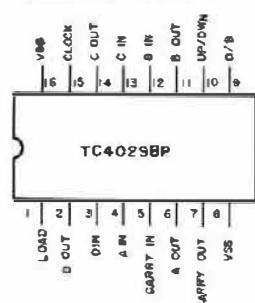
WA2-0282-000  
TR 2SA844C



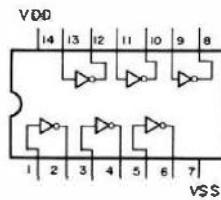
WA2-0374-000  
TR 2SD789D



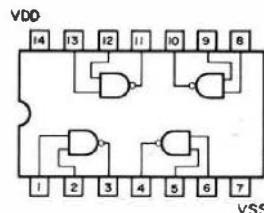
WA3-0311-000  
IC TC4029BP COUNTER



WA3-0561-000  
IC TC4069BP INVERTER



WA3-0633-000  
IC HD14011BP NAND



## 11-4 X-710

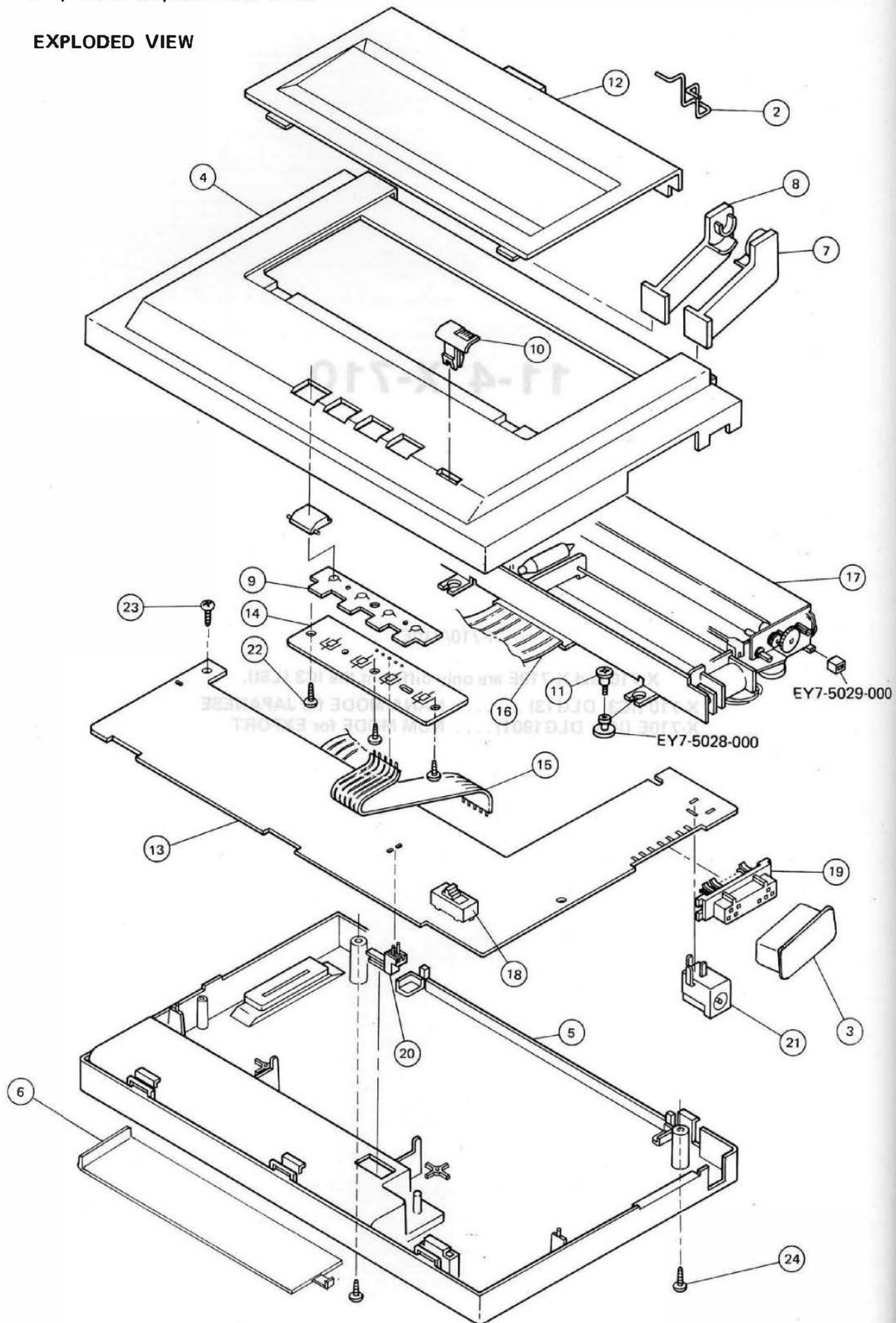
X-710/710E

X-710 and X-710E are only different the IC3 (LSI).

X-710 (IC3: DLG13) ..... KANA MODE for JAPANESE  
X-710E (IC3: DLG1901) .... NUM MODE for EXPORT

## 11-4) Color Graphic Printer X-710

### EXPLODED VIEW



KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
1	EA1-2452-000	1	DAMPER(B), URETHANE FORM		
2	EA1-4905-000	1	HOOK, PAPER DEFLECTION		
* 3	EA1-5046-000	1	CAP(B), CONNECTOR		
* 4	EA1-5053-000	1	UPPER COVER		
* 5	EA1-5054-000	1	LOWER COVER		
* 6	EA1-5057-000	1	BATTERY COVER		
* 7	EA1-5058-000	1	ARM(A), PAPER HOLDER		
* 8	EA1-5059-000	1	ARM(B), PAPER HOLDER		
* 9	EA1-5060-000	1	RUBBER PLATE, CONDUCTIVE		
* 10	EA1-5061-000	1	KNOB, SWITCH		
* 11	EA1-5095-000	2	TAP TIGHT SCREW, M2x8		
* 12	EA1-8084-000	1	SETTING CASE		
* 13	EF1-0326-000	1	COVER UNIT, PRINTER		
* 14	EH1-0672-000	1	P.C.B., CONTROL BOARD		
* 15	EH1-0673-000	1	P.C.B., KEYBOARD		
* 16	EH2-0394-000	1	FLAT CABLE, 5P		
* 17	EH2-0407-000	1	FLAT CABLE, 13P		
* 18	ES2-2191-000	4	KEYTOP, LIGHT GRAY		
* 19	ES5-0135-000	1	PRINTER UNIT, DPG2308		
* 20	ES5-0139-000	1	CASE, BALL POINT PEN		
* 21	WS1-0205-000	1	CONNECTOR, 15P		
C 1	WS3-0476-000	1	CONNECTOR, 2P		
C 2	WS6-0026-000	1	POWER JACK		
C 3	VC9-1256-000	1	ELECTROLYTIC CAPACITOR 100uF 10V		
C 4	VC9-1256-000	1	ELECTROLYTIC CAPACITOR 100uF 10V		
C 5	VC4-3503-472	1	CERAMIC CAPACITOR 4700PF 50V		
C 6	VC4-3503-472	1	CERAMIC CAPACITOR 4700PF 50V		
C 7	VC4-3503-221	1	CERAMIC CAPACITOR 220PF 50V		
C 8	VC4-3503-221	1	CERAMIC CAPACITOR 220PF 50V		
C 9	VC4-3503-472	1	CERAMIC CAPACITOR 4700PF 50V		
C 10	VC9-1210-000	1	ELECTROLYTIC CAPACITOR 47uF 16V		
C 11	VC9-0582-000	1	CERAMIC CAPACITOR 100,000PF 25V		

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
C11	VC4-3503-331	1	CERAMIC CAPACITOR 330PF 50V		
D 1	WA1-0355-000	1	DIODE 11DO-03		
D 2	WA1-0078-000	1	DIODE ERB12-01		
D 3	WA1-0078-000	1	DIODE ER812-01		
D 4	WA1-0078-000	1	DIODE ERB12-01		
D 5	WA1-0078-000	1	DIODE ERB12-01		
D 6	WA1-0365-000	1	DIODE HSM2835		
D 7	WA1-0356-000	1	DIODE HSM2837		
D 8	WA1-0078-000	1	DIODE ERB12-01		
D 9	WA1-0078-000	1	DIODE ERB12-01		
D10	WA1-0078-000	1	DIODE ERB12-01		
IC1	WA4-0261-000	1	IC, ICL7663CPA		
IC2	WA3-0634-000	1	CMOS IC HD14013BP		
IC3	WA3-0942-000	1	LSI HD44860(DLG13)		
IC4	WA2-0382-000	1	IC(TRANSISTOR ARRAY) LB1247		
IC5	WA3-0974-000	1	IC TC4011BF		
* R 1	VR1-8013-270	1	CARBON RESISTOR 27 ohm 1W		
R 2	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 3	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 4	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 5	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 6	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 7	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 8	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R 9	VR1-8143-203	1	SOLID RESISTOR 20k 1/4W		
R10	VR9-2777-000	1	RESISTOR 240k 1/4W		
R11	VR9-1034-000	1	RESISTOR 680k 1/4W		
R12	VR9-1460-000	1	CHIP RESISTOR 1M 1/4W		
R13	VR9-2833-000	1	CHIP RESISTOR 2.2k 1/8W		
R14	VR9-2834-000	1	CHIP RESISTOR 4.7k 1/8W		
R15	VR9-2834-000	1	CHIP RESISTOR 4.7k 1/8W		
R16	VR9-2834-000	1	CHIP RESISTOR 4.7k 1/8W		
R17	VR9-2835-000	1	RESISTOR 20k 1/8W		

N KEY NO.	PART NO.	Q'TY	DESCRIPTION		REMARKS	PRICE
R18	VR9-1624-000	2	CHIP RESISTOR	10M 1/8W		
R19	VR1-8143-104	1	SOLID RESISTOR	100Ω 1/4W		
R20	VR1-1143-124	1	CARBON RESISTOR	120k 1/4W		
R21	VR9-2836-000	1	CHIP RESISTOR	51k 1/8W		
R22	VR9-2779-000	1	RESISTOR	150k 1/4W		
R23	VR9-2610-000	1	RESISTOR, METALIC	42.2k 1/4W		
R24	VR9-0963-000	1	CHIP RESISTOR	150k 1/8W		
R25	VR9-3088-000	1	CHIP RESISTOR	56k 1/8W		
R26	VR9-1071-000	1	CHIP RESISTOR	220k 1/8W		
R27	VR9-1071-000	1	CHIP RESISTOR	220k 1/8W		
R28	VR9-1624-000	1	CHIP RESISTOR	10k 1/8W		
R29	VR9-2838-000	1	CHIP RESISTOR	6.8k 1/8W		
R30	VR9-2838-000	1	CHIP RESISTOR	6.8k 1/8W		
R31	VR9-1058-000	1	CHIP RESISTOR	100k 1/8W		
R32	VR9-1058-000	1	CHIP RESISTOR	100k 1/8W		
R33	VR9-2839-000	1	CHIP RESISTOR	220 ohm 1/8W		
R34	VR9-2839-000	1	CHIP RESISTOR	220 ohm 1/8W		
R35	VR1-8143-394	1	SOLID RESISTOR	390k 1/4W		
R36	VR1-8143-821	1	SOLID RESISTOR	820 ohm 1/4W		
RA1	VR9-0948-000	1	RESISTOR ARRAY	10k x 8 1/8W		
SW1	WC3-9013-000	1	SLIDE SWITCH, 2P			
TR1	WA2-0282-000	1	TRANSISTOR 2SA844C			
TR2	WA2-0282-000	1	TRANSISTOR 2SA844C			
TR3	WA2-0283-000	1	TRANSISTOR 2SD788			
TR4	WA2-0283-000	1	TRANSISTOR 2SD788			
TR5	WA2-0282-000	1	TRANSISTOR 2SA844C			
TR6	WA2-0367-000	1	TRANSISTOR 2SB739C			
TR7	WA2-0367-000	1	TRANSISTOR 2SB739C			
TR8	WA2-0282-000	1	TRANSISTOR 2SA844C			
TR9	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)			
TR10	WA2-0195-000	1	TRANSISTOR 2SA844D			
TR11	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)			
TR12	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)			

N KEY NO.	PART NO.	Q'TY	DESCRIPTION		REMARKS	PRICE
XTAL	WK2-9003-000	1	CERAMIC FILTER 600kHz			
ZD1	WA1-0351-000	1	ZENER DIODE HZ11A3			
ZD2	WA1-0412-000	1	ZENER DIODE HZ4LLB			
ZD3	WA1-0410-000	1	ZENER DIODE HZ3LLA			
	SCREW					
	XA9-0154-000	3	SCREW,TAPPING, 2x4			
	XB3-1260-605	1	SCREW,TAPPING, 2.6x6			
	XB3-1261-007	3	SCREW,TAPPING, 2.6x10			

KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
For Modified Power Supply Circuit(Without IC1)					
R10	VR9-3284-000	1	METAL FILM RESISTOR 100K 1/4W		
R11	VR9-1032-000	1	METAL FILM RESISTOR 33K 1/4W		
R37	VR1-1141-823	1	CARBON RESISTOR 82K 1/4W	+/- 5%	
R38	VR1-1141-204	1	CARBON RESISTOR 200K 1/4W	+/- 5%	
R39	VR1-1141-104	1	CARBON RESISTOR 100K 1/4W	+/- 5%	
TR10	WA2-0195-000	1	TRANSISTOR 2SA844D		
TR11	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
TR12	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
ZD2	WA1-0412-000	1	ZENER DIODE H24LLB		
ZD3	WA1-0410-000	1	ZENER DIODE H23LLA		

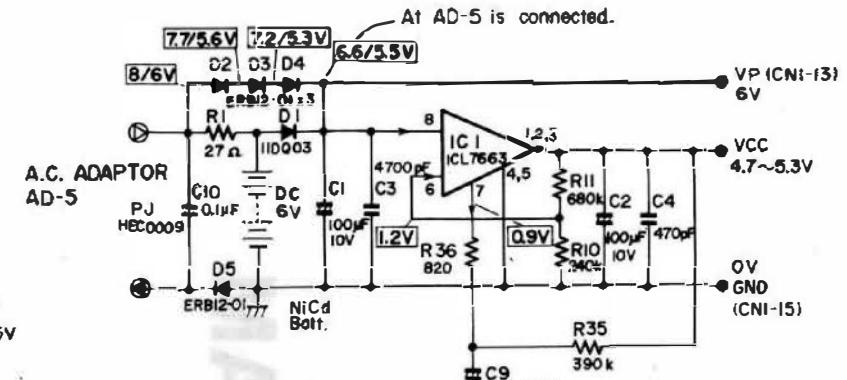
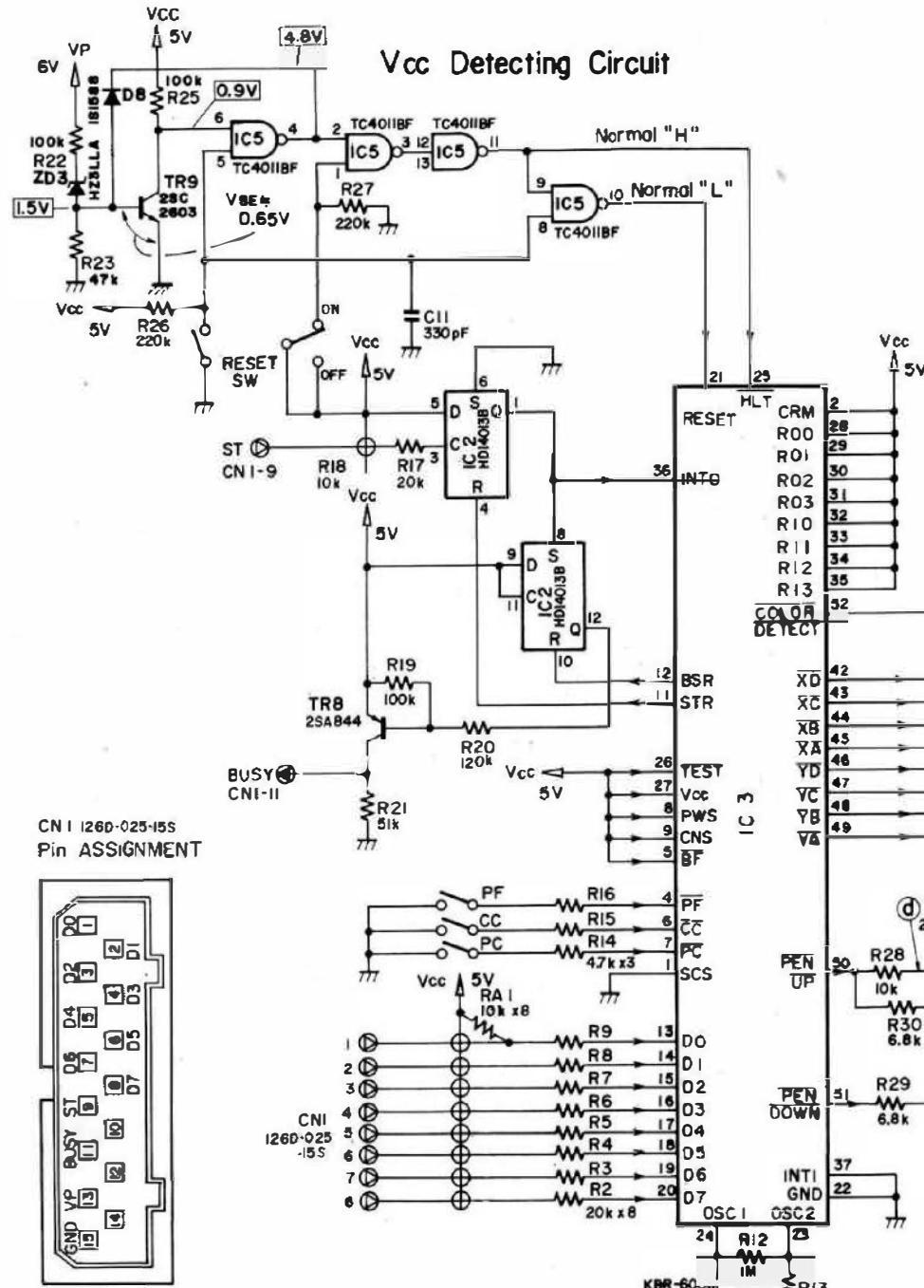
N KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	1 EA1-2452-000	1	DAMPER(B), URETHANE FORM		
*	2 EA1-4905-000	1	HOOK, PAPER DEFLECTION		
*	3 EA1-5046-000	1	CAP(B), CONNECTOR		
*	4 EA1-5053-000	1	UPPER COVER		
*	5 EA1-5054-000	1	LOWER COVER		
*	6 EA1-5057-000	1	BATTERY COVER		
*	7 EA1-5058-000	1	ARM(A), PAPER HOLDER		
*	8 EA1-5059-000	1	ARM(B), PAPER HOLDER		
*	9 EA1-5060-000	1	RUBBER PLATE, CONDUCTIVE		
*	10 EA1-5061-000	1	KNOB, SWITCH		
*	11 EA1-5095-000	2	TAPTIGHT SCREW, M2x8		
*	EA1-8084-000	1	SETTING CASE		
*	12 EP1-0326-000	1	COVER UNIT, PRINTER		
*	13 EH1-0672-000	1	P.C.B., CONTROL BOARD		
*	14 EH1-0673-000	1	P.C.B., KEYBOARD		
*	15 EH2-0394-000	1	FLAT CABLE, 5P		
*	16 EH2-0407-000	1	FLAT CABLE, 13P		
*	ES2-2191-000	4	KEYTOP, LIGHT GRAY		
*	17 ES5-0135-000	1	PRINTER UNIT, DPG2308		
*	18 ESS-0139-000	1	SHAFT, ROLL PAPER		
*	19 WS1-0205-000	1	CONNECTOR, 15P		
*	20 WS3-0476-000	1	CONNECTOR, 2P, BATTERY		
*	21 WS6-0026-000	1	POWER JACK, AD-5		
* C 1 VC9-1256-000	1	ELECTROLYTIC CAPACITOR	100uF	10V	
* C 2 VC9-1256-000	1	ELECTROLYTIC CAPACITOR	100uF	10V	
C 3 VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V	
C 4 VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V	
C 5 VC4-3503-221	1	CERAMIC CAPACITOR	220pF	50V	
C 6 VC4-3503-221	1	CERAMIC CAPACITOR	220pF	50V	
C 7 VC4-3503-472	1	CERAMIC CAPACITOR	4700pF	50V	
C 8 ----					

N KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
C 9 ----					
C10 VC9-0582-000	1	CERAMIC CAPACITOR	100,000pF	25V	
C11 VC4-3503-331	1	CERAMIC CAPACITOR	330pF	50V	
D 1 WA1-0355-000	1	DIODE, 1N50-03			
D 2 WA1-0078-000	1	DIODE, ERB12-01			
D 3 WA1-0078-000	1	DIODE, ERB12-01			
D 4 WA1-0078-000	1	DIODE, ERB12-01			
D 5 WA1-0078-000	1	DIODE, ERB12-01			
* D 6 WA1-0365-000	1	DIODE, HSM2835(BLACK)			
* D 7 WA1-0356-000	1	DIODE, HSM2837(GREEN)			
D 8 X65-5032-000	1	DIODE, 1S1588			
D 9 WA1-0078-000	1	DIODE, ERB12-01			
D10 WA1-0078-000	1	DIODE, ERB12-01			
IC1 ----	1				
IC2 WA3-0634-000	1	CMOS IC HD14013BP			
* IC3 WA3-1151-000	1	CMOS LSI DLG190IE, CONTROLLER			
* IC4 WA2-0382-000	1	IC LB1247, TRANSISTOR ARRAY			
* IC5 WA3-0974-000	1	CMOS IC TC4011BF			
* R 1 VR1-8013-270	1	CARBON RESISTOR	27ohm 1 W		
R 2 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 3 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 4 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 5 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 6 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 7 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 8 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
R 9 VR1-8143-203	1	SOLID RESISTOR	20k 1/4W		
* R10 VR9-3284-000	1	RESISTOR, METALIC	100k 1/4W		
R11 VR9-1201-000	1	RESISTOR, METALIC	33k 1/4W		
* R12 VR9-3100-000	1	RESISTOR, CHIP TYPE	1M 1/8W		
* R13 VR9-3077-000	1	RESISTOR, CHIP TYPE	2.2k 1/8W		

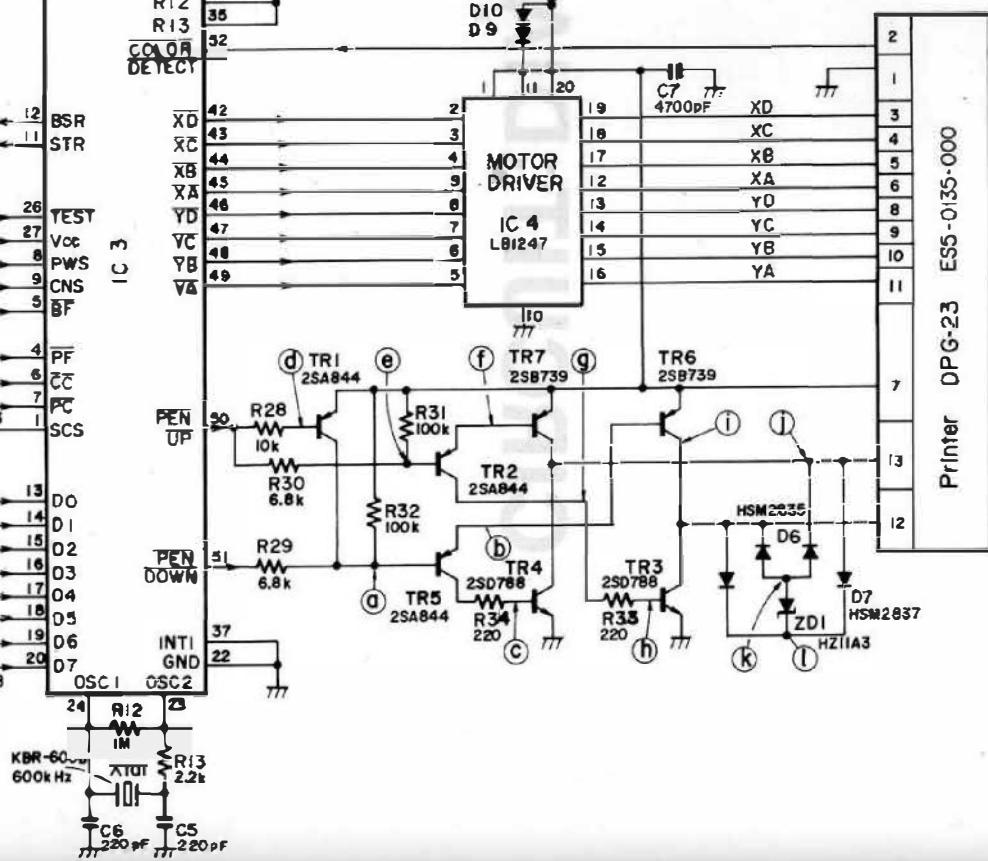
N	KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
*	R14	VR9-3079-000	1	RESISTOR, CHIP TYPE	4.7k 1/8W	
*	R15	VR9-3079-000	1	RESISTOR, CHIP TYPE	4.7k 1/8W	
*	R16	VR9-3079-000	1	RESISTOR, CHIP TYPE	4.7k 1/8W	
*	R17	VR9-3083-000	1	RESISTOR, CHIP TYPE	20k 1/8W	
*	R18	VR9-3081-000	1	RESISTOR, CHIP TYPE	10k 1/8W	
*	R19	VR1-1143-104	1	CARBON RESISTOR	100k 1/4W	
*	R20	VR1-1143-124	1	CARBON RESISTOR	120k 1/4W	
*	R21	VR9-3087-000	1	RESISTOR, CHIP TYPE	51k 1/8W	
*	R22	VR9-3284-000	1	RESISTOR, METALIC	100k 1/4W	+/- 1%
*	R23	VR9-2778-000	1	RESISTOR, METALIC	47k 1/4W	+/- 1%
	R24	----				
	R25	VR9-2141-000	1	RESISTOR, CHIP TYPE	100k 1/8W	
*	R26	VR9-3093-000	1	RESISTOR, CHIP TYPE	220k 1/8W	
*	R27	VR9-3093-000	1	RESISTOR, CHIP TYPE	220k 1/8W	
*	R28	VR9-3081-000	1	RESISTOR, CHIP TYPE	10k 1/8W	
*	R29	VR9-3080-000	1	RESISTOR, CHIP TYPE	6.8k 1/8W	
*	R30	VR9-3080-000	1	RESISTOR, CHIP TYPE	6.8k 1/8W	
	R31	VR9-2141-000	1	RESISTOR, CHIP TYPE	100k 1/8W	
	R32	VR9-2141-000	1	RESISTOR, CHIP TYPE	100k 1/8W	
*	R33	VR9-3075-000	1	RESISTOR, CHIP TYPE	220ohm1/8W	
*	R34	VR9-3075-000	1	RESISTOR, CHIP TYPE	220ohm1/8W	
	R35	----				
	R36	----				
	R37	VR1-8143-823	1	SOLID RESISTOR	82k 1/4W	
*	R38	VR1-1143-204	1	CARBON RESISTOR	200k 1/4W	
*	R39	VR1-1143-104	1	CARBON RESISTOR	100k 1/4W	
*	R40	VR1-1143-204	1	CARBON RESISTOR	200k 1/4W	
	RA1	VR9-0948-000	1	RESISTOR ARRAY	10k x 8 1/8W	

N	KEY NO.	PART NO.	Q'TY	DESCRIPTION	REMARKS	PRICE
	SW1	WC3-9013-000	1	SLIDE SWITCH, 2P, POWER		
	TR1	WA2-0282-000	1	TRANSISTOR 2SA844(C,D)		
	TR2	WA2-0282-000	1	TRANSISTOR 2SA844(C,D)		
*	TR3	WA2-0283-000	1	TRANSISTOR 2SD788		
*	TR4	WA2-0283-000	1	TRANSISTOR 2SD788		
	TR5	WA2-0282-000	1	TRANSISTOR 2SA844(C,D)		
*	TR6	WA2-0367-000	1	TRANSISTOR 2SB739		
*	TR7	WA2-0367-000	1	TRANSISTOR 2SB739		
	TR8	WA2-0282-000	1	TRANSISTOR 2SA844(C,D)		
	TR9	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
	TR10	WA2-0195-000	1	TRANSISTOR 2SA844(D)		
	TR11	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
	TR12	WA2-0113-000	1	TRANSISTOR 2SC2603(D,E,F)		
	XTAL	WK2-9003-000	1	CERAMIC FILTER 600kHz		
*	ZD1	WA1-0351-000	1	ZENER DIODE HZ11A3		
*	ZD2	WA1-0412-000	1	ZENER DIODE HZ4LLB		
*	ZD3	WA1-0410-000	1	ZENER DIODE HZ3LLA		
		SCREWS				
*		EAL-5095-000	2	TAPTIGHT SCREW M2 x 8, PRINTER		
		XAA-0154-000	3	SCREW, TAPPING M2 x 4, P.C.B.,	KEYBOARD	
		XB3-1260-605	1	SCREW, TAPPING 2.6x 6, P.C.B.,	CONTROLL BOARD	
		XB3-1261-007	3	SCREW, TAPPING 2.6x10, COVER		

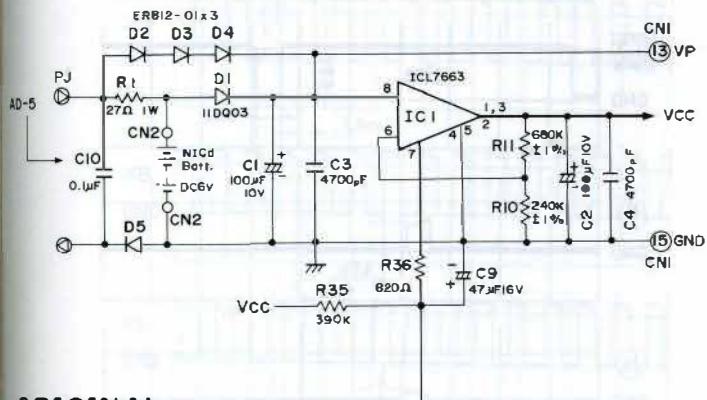
# CIRCUIT DIAGRAM



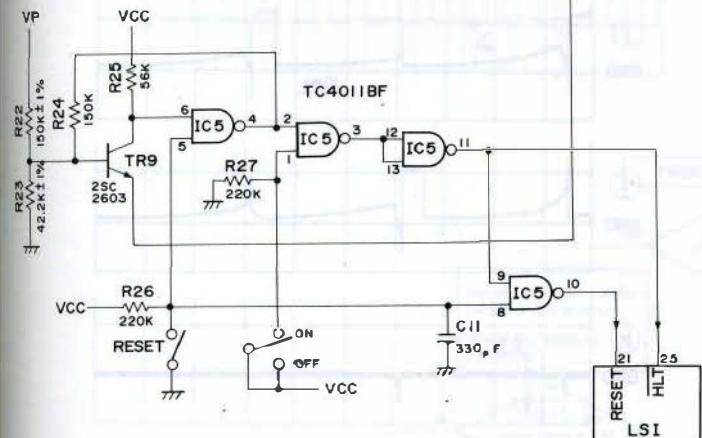
## Power Supply Circuit (Modify)



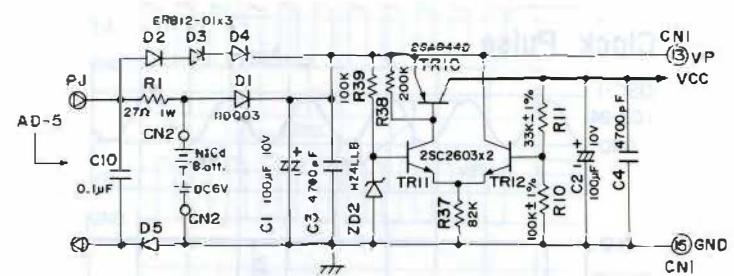
**ORIGINAL  
POWER SUPPLY CIRCUIT (IC 1 is used)**



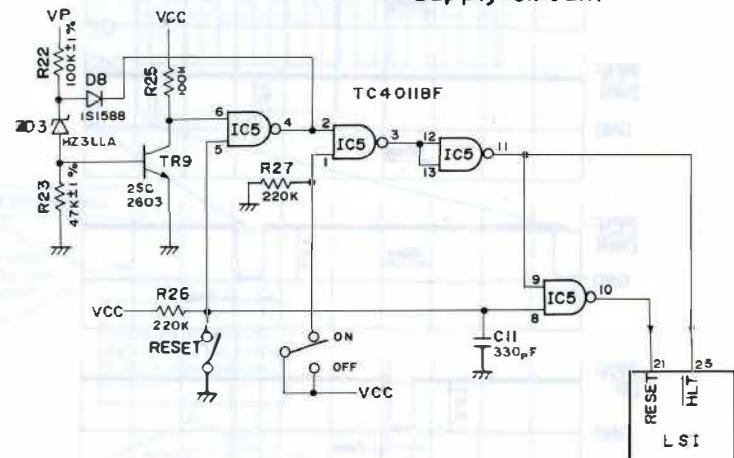
**ORIGINAL  
VP DETECTIVE CIRCUIT**



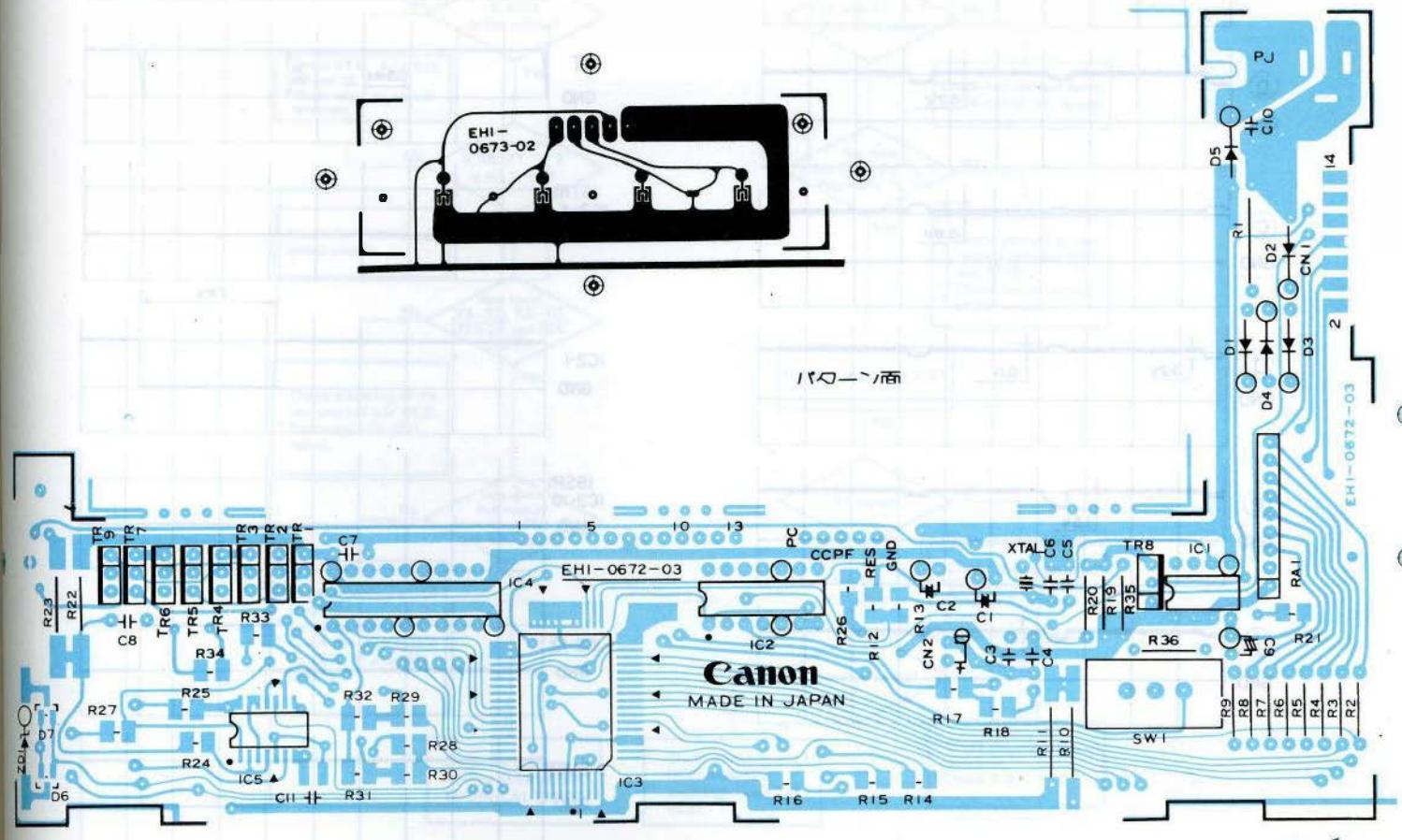
**MODIFIED  
POWER SUPPLY CIRCUIT (IC 1 is removed)**



**MODIFIED  
VP DETECTIVE CIRCUIT (For modified power supply circuit)**

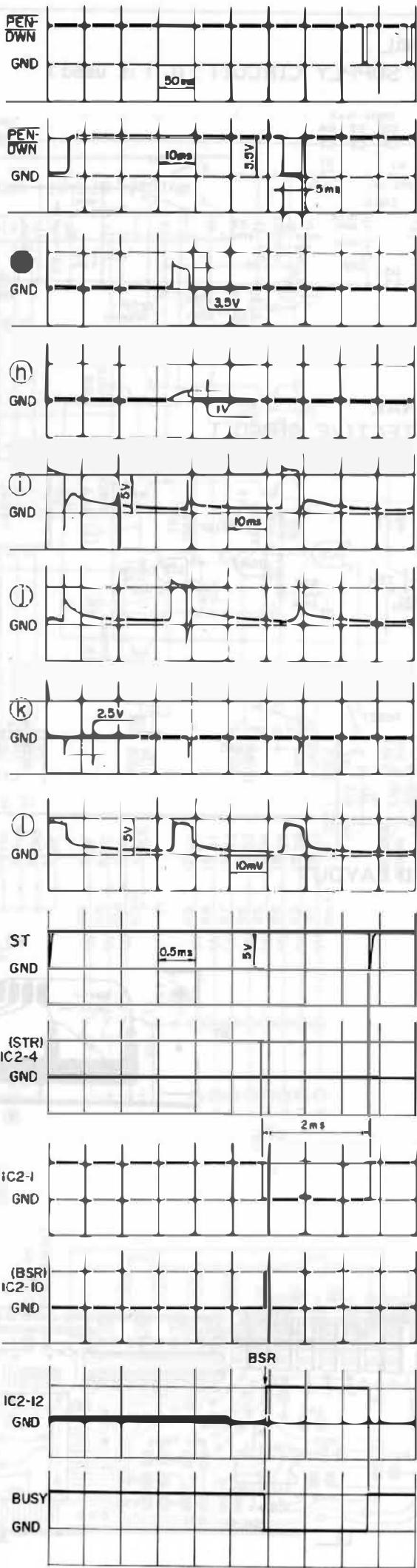
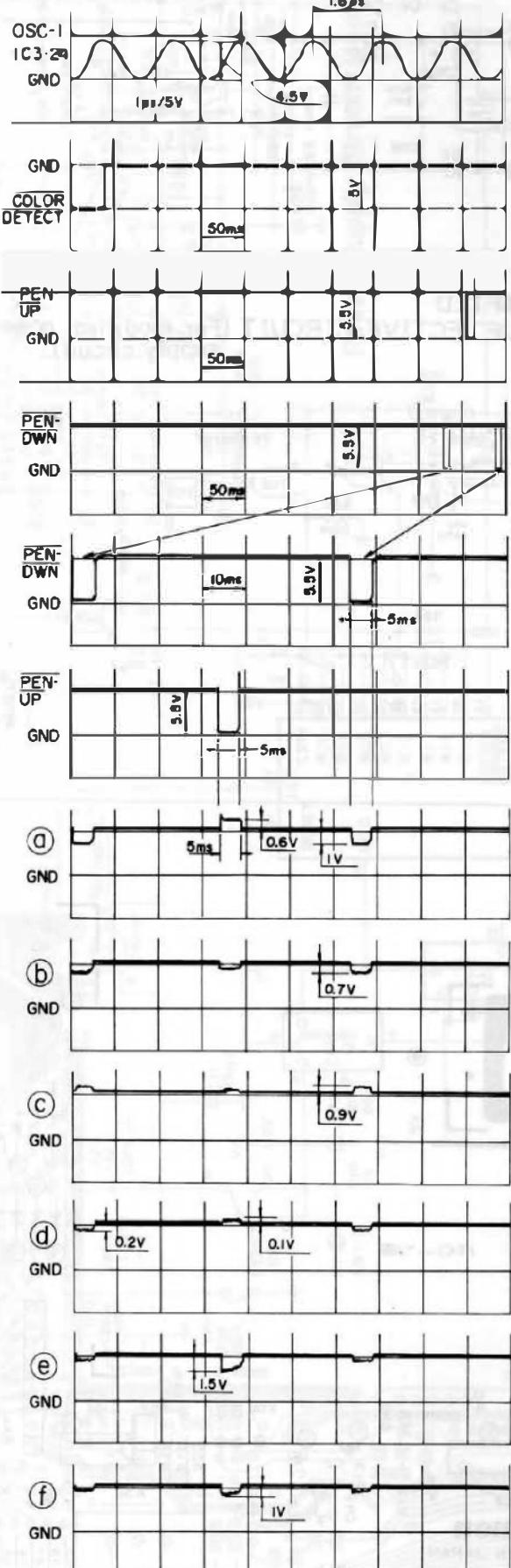


**CARD LAYOUT**

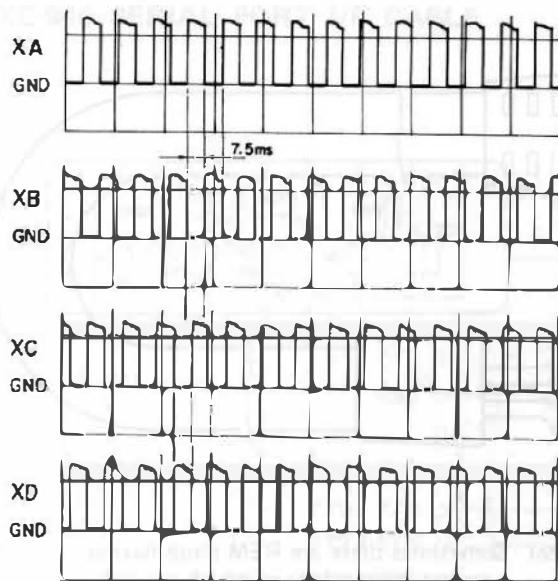


## NORMAL WAVEFORM

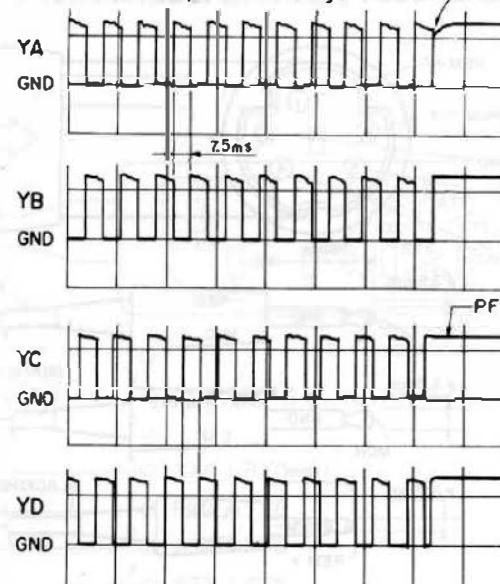
### Clock Pulse



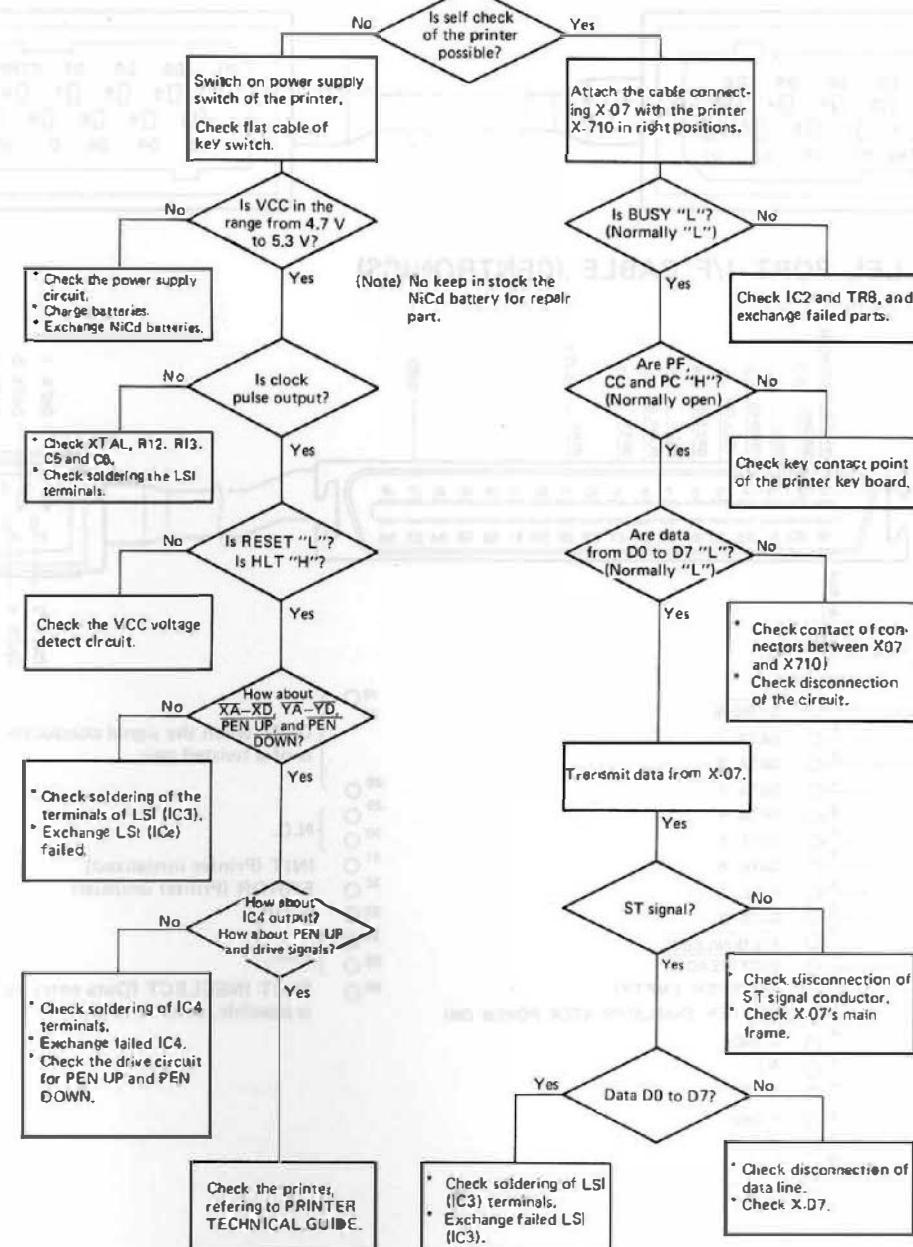
## X-MOTOR



## Y-MOTOR (Depress PF key)

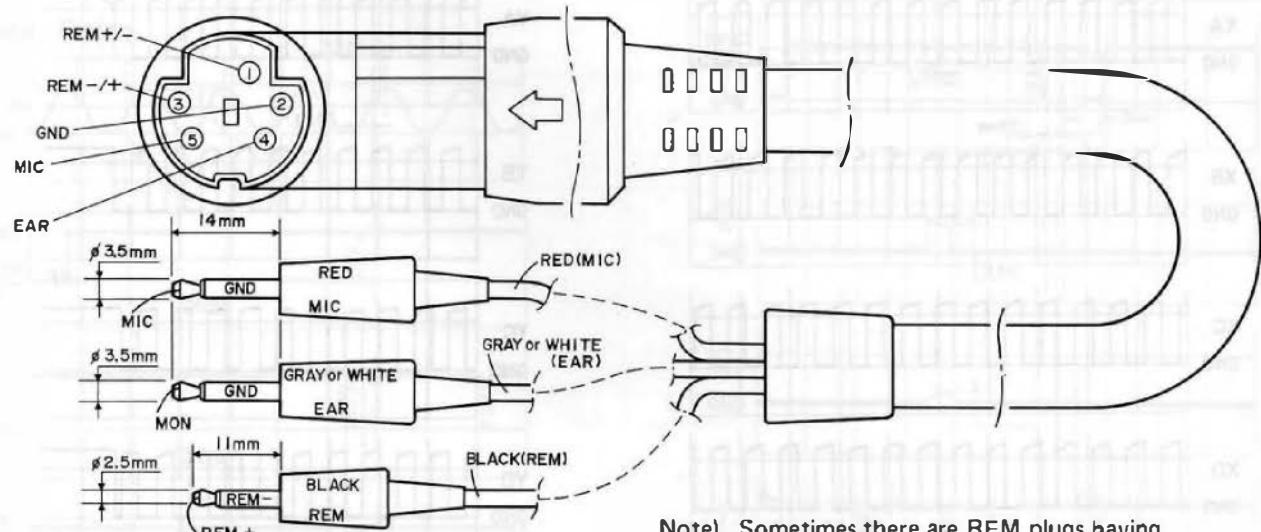


### TROUBLESHOOTING



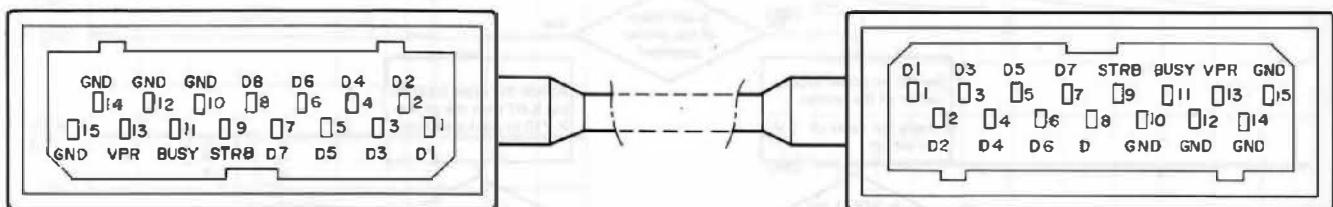
## 12. CABLE FOR OPTION

### XC-910 CASSETTE I/F CABLE

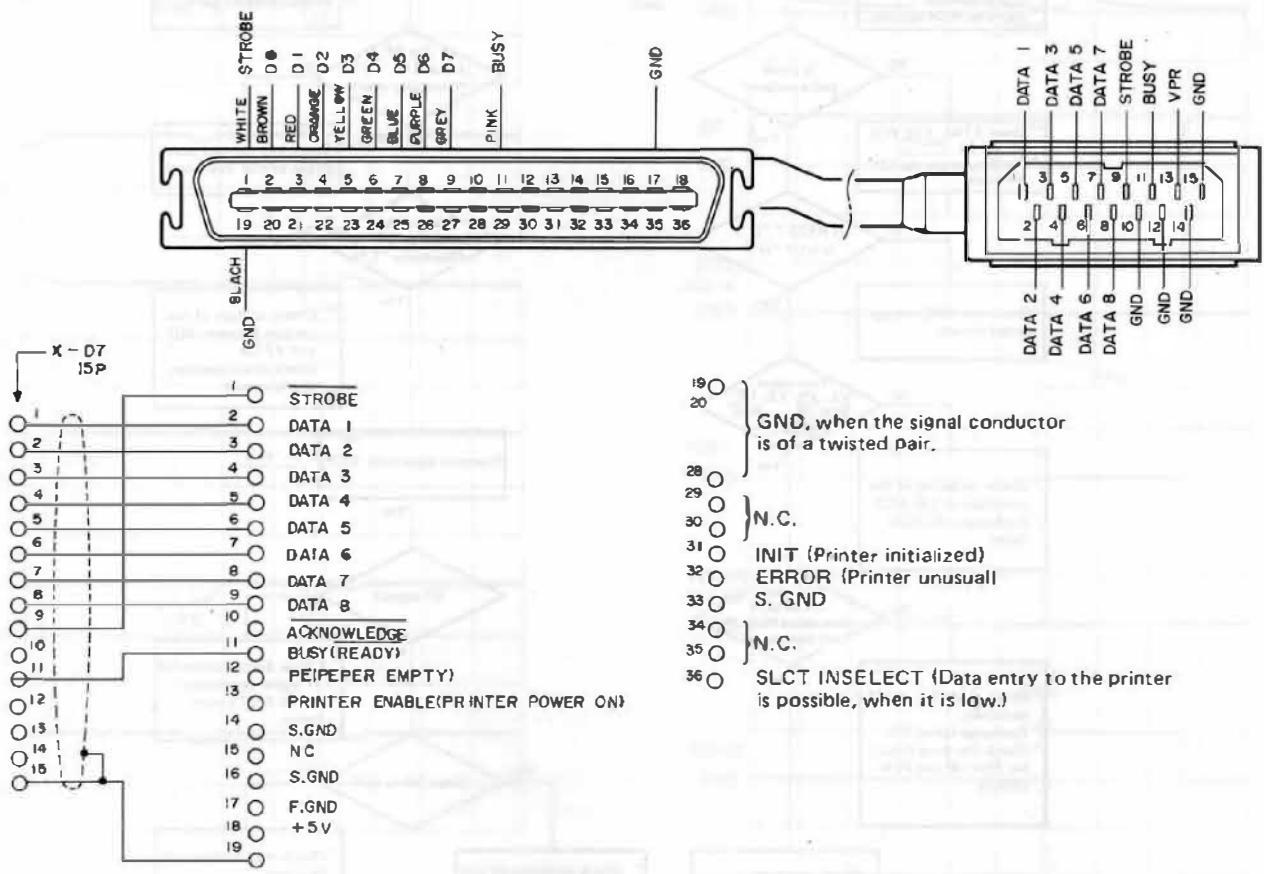


Note) Sometimes there are REM plugs having a socket, dimensions of which are not suitable for tape recorders manufactured by several makers.

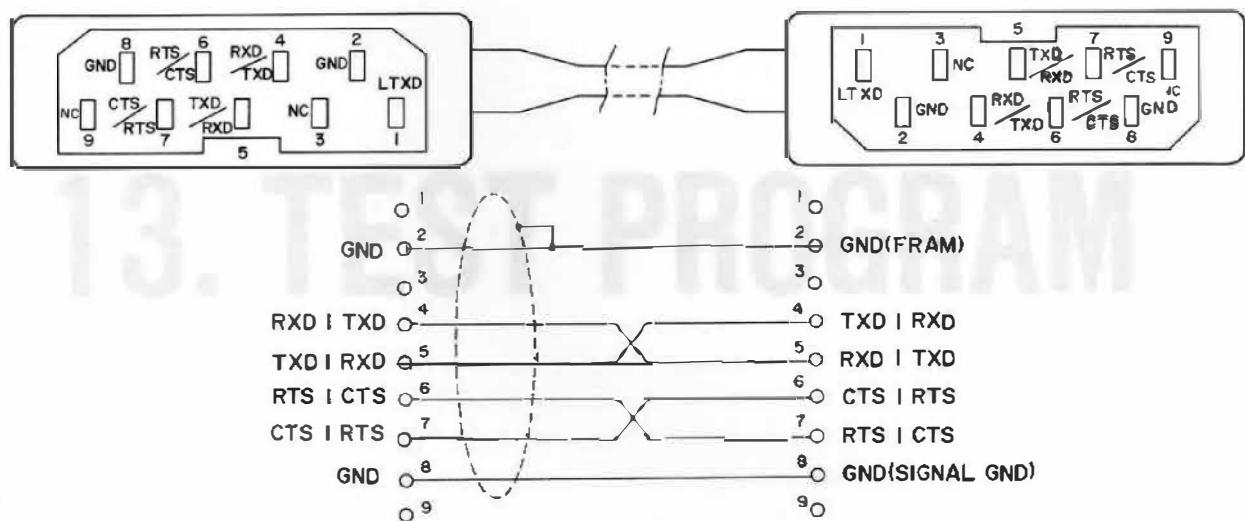
### XC-920 PRINTER X-710 I/F CABLE



### XC-930 PARALLEL PORT I/F CABLE (CENTRONICS)



## XC-940 SERIAL PORT I/F CABLE



# 13. TEST PROGRAM

• 13.1 Kegelation  
• 13.2 Anisotropy  
• 13.3 Cyclic Properties  
• 13.4 Stress Relaxation  
• 13.5 Creep Curves  
• 13.6 Strength Tests  
• 13.7 Dynamic Mechanical Properties  
• 13.8 Thermal Properties  
• 13.9 Electrical Properties  
• 13.10 Optical Properties

## X-07 TEST PROGRAM SPECIFICATIONS

The X-07 test program is stored on the X-07 TEST AS-100 floppy disk (3-inch diameter) and resupplied to the user.

### CONTENTS

The user transforms the X-07 test program to the X-07 by using one of the AS-100 RS232C ports (COMM1 or COMM2). See chapter 4 for details.

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1. JCARDS. BAS      RAM card data interpretation

2. JFDUMP. BAS      File dump

3. X07. BAS      X07 command output program

4. TTY3D. SUB      Intermediate code data reception RSINIT and intermediate code data transmission RSPINIT

5. TTY3DN. SUB      ASCII data mapping RSINIT and AS-100 data transmission RSPINIT

## 1. INTRODUCTION

The X-07 test program is stored in the X-07 TEST in an AS-100 floppy disk (8-inch diameter) and is supplied to the user.

The user transfers the X-07 test program to the X-07 by using one of the AS-100 RS232C ports (COM2). (See Section 4 for details.)

Then, the transferred X-07 test program is stored in the pertinent RAM card. The program stored in the RAM card is used to test an X-07 to be checked.

### (1) X07 test programs

- |                 |   |
|-----------------|---|
| 1. JMEM. X07    | RAM card and 8k byte optional<br>RAM read/write check |
| 2. JOPRAM. X07  | RAM card and 8k byte optional RAM galloping check     |
| 3. JUSER. X07   | RAM card and 8k byte optional RAM read/write check    |
| 4. JDUMPI. X07  | Memory dump   |
| 5. JSERI. X07   | COM and OPT check                                     |
| 6. JPRINT. X07  | GPR check   |
| 7. JKEY. X07    | Keyboard check  |
| 8. JCAS. X07    | Cassette check  |
| 9. JSBRAM. X07  | Sub-CPU RAM check                                     |
| 10. JCUNIT. X07 | Sub-CPU check   |
| 11. JRAM. X07   | X-07 RAM, and ROM check support program               |
| 12. CARD1. MID  | X-07 RAM and ROM check program                        |
| 13. JRAM2. X07  | RAM and ROM check support program for other than X-07 |
| 14. CARD2. MID  | RAM and ROM check program for other than X-07         |

### (2) X-07 $\not\geq$ AS-100, X-07 $\not\geq$ X-07 RAM card transfer program (X-07 side)

- |                |                            |
|----------------|----------------------------|
| 1. JCARDS. X07 | RAM card data transmission |
| 2. JCARDR. X07 | RAM card data reception    |

### (3) AS-100 program utility

- |                 |  |
|-----------------|--|
| 1. JTRANSA. BAS | ASCII data transmission and reception  |
| 2. JCARDR. BAS  | RAM card data reception  |
| 3. JCARDS. BAS  | RAM card data transmission   |
| 4. JFDUMP. BAS  | File dump  |
| 5. X07. BAS     | X-07 command output program  |
| 6. TTY3D. SUB   | Intermediate code data reception RSINIT and intermediate code data transmission RSINIT |
| 7. TTY3DN. SUB  | ASCII data reception RSINIT and ASCII data transmission RSINIT                         |

## 2. X-07 TEST PROGRAM OPERATIONS

### 2.1 JMEM, X07

**Purpose:** Checks read/write operations or only the read operation in the RAM card and optional RAM spaces.

**Requirements:** The X-07 must be normal.

The test area must be reserved with an FSET command before JMEM, X07 execution.

(Output message/operation)	(Explanation)
* JMEM V1.00	Start message
RW--> 0 R--> 1	Read/write or read check specification 0 : Read check after write operation 1 : Read and compare check
START (HEX) =	Test start address (hexadecimal) (Note 1)
STOP (HEX) =	Test end address
INIT (HEX) =	Data at the test start address (Note 2)
ADD (HEX) =	Data at the address (test start address + 1)
LOOP (DEC) =	Test count (decimal)
ST = xxxx SP = xxxx	Confirmation message
IV = xx AV = xx	ST for start and SP for stop
LP = xx	IV for INIT, AV for add, and LP for loop
* OK (Y/N)	Displayed and monitored on the screen? (Note 3)
* DISP (Y/N)	
*** CHECK OK !!	Normal end
* ERROR !!	Error message
* ADR = xxxx	ADR: Error address
* RD = xx TST = xx	RD for read data and TST for calculation value

**Notes:** 1. HEX: Hexadecimal data

2. The data string is as follows (for ST = 2000, SP = 27FF, IV = 00, and AV = 01):

M 2000H → 00H (IV)	2000H → 01H (IV+AV)	2000H → 02H (IV+AV+AV)
E 2001H → 01H (IV+AV)	2001H → 02H (IV+AV+AV)	2001H → 03H (IV+AV+AV+AV)
M	⋮	⋮
O	⋮	⋮
R 27FEM → FEH	27FEM → FFH	27FEH → 00H
Y 27FFH → FFH	27FFH → 00H	27FFH → 01H
(LOOP = 1)	(LOOP = 2)	(LOOP = 3)

3. Monitored data to be displayed:

\* WRITE LP = x  
\* xxxx TST = xx  
    ↑           ↑  
    Address   Write data

\* READ LP = x  
\* xxxx RD = xx TST = xx  
    ↑           ↑           ↑  
    Address   Read data   Calculation data (correct data)

## Other

Processing time (time period required for one loop operation)

Area size	With display		Without display	
	R	RW	R	RW
2k bytes	1.3 m	2.3 m	13 m	23.5 m
4k bytes	1.3 m x 2	Same as in the left column.	Same as in the left column.	Same as in the left column.
8k bytes	2.3 m x 4	Same as in the left column.	Same as in the left column.	Same as in the left column.

## 2.2 JOPRAM. X07

Purpose: Performs RAM card and optional RAM galloping checks.  
(The RAM card is checked in 2k byte units, whereas the optional RAM is checked in 8k byte units.)

Requirements: The X-07 must be normal.  
To stop the check being executed, press the RESET switch.

(Output message/operation)	(Explanation)
* GAL-OPTION, CARD V1.00	Start message
2000–2FFF (CARD) 2000–3FFF (OPTION) 4000–4FFF (CARD) 1. OPTION 2. CARD (1/2)	Checks whether the RAM is mounted, then outputs this message for the mounted address space. Select one of the RAM cards and optional RAMs, if both are mounted.
START?	Press the RETURN key to start the test.
* END	Test end message
2000–2FFF (CARD) 2000–3FFF (OPTION) 4000–4FFF (CARD)	Displays the tested area's contents
OK!	Normal end
ERROR! ADR = xxxx	Error message

Processing time

	Processing time
RAM card (4k bytes)	3 hours (approx.)
Optional RAM	23.5 hours (approx.)

### 2.3 JUSER. X07

**Purpose:** Tests the RAM card and optional RAM. (User-oriented simplified memory test program)

**Requirements:** Start address = H'2000', End address = H'2FFF', Data pattern = H'55', 'AA'

These items are fixed. The user may modify these items if necessary.

The test area must be reserved with an FSET command.

**Modifications:**

1. Address modification

I Optional RAM (8k byte) test

Line No. 20 } &H2FFF → &H3FFF

Line No. 50 }

2 RAM card test when the optional RAM is mounted:

Line No. 20 } &H2000 → &H4000, &H2FFF → &H4FFF

Line No. 50 }

2. Data modification

Example: H'55' → H'00', H'AA' → H'FF'

Line No. 10    &H55 → &H00

Line No. 80    &HAA → &HFF

Line No. 90    &HAA → &HFF

**Output message/operation**

**Explanation**

DATA = 5

55 pattern check OK

DATA = AA

AA pattern check OK

\* END

ADR: End message

ERR xxxx xx

Error message

└ Error data (AA or 55)

└ Error address

**Processing time**

	Processing time
RAM card (4k bytes)	2.6 m
Optional RAM (8k bytes)	5.2 m

**Note:** To check error data, key in PRINT HEX\$ (PEEK (I)) immediately after the error message is output.

## 2.4 JDUMP1. X07

Purpose: Outputs the dump list of an arbitrary address space to the GPR.

Requirements: The X-07 must be normal.

Output message/operation

Explanation

\*\*\* DUMP LIST \*\*\*

Start message

START (hex) =

DUMP start address input (hexadecimal)

STOP (hex) =

DUMP end address input (hexadecimal)

\* xxxx

First address of dumped 16-byte area

GPR output message example:

START = 2000, STOP = 2015

\*\*\* DUMP LIST \*\*\*

@ START 2000 --> 2015 STOP

```
*2000 00 01 16 24 25 4A 41 43      20 20 50 02 0F 00 00 00  
*2010 00 00 00 5E 06 0A 0D BE      4A 43 41 53 00 79 05 14
```

Note: The GPR output is performed according to the [1. 1] specification for reduced character and blue attributes.

## 2.5 JSERI. X07

Purpose: RS232C, level converter, and optocoupler transmission and reception check and RS232C and level converter loop check

Requirements: The BASIC must operate normally.

Output message/operation

Explanation

\* SERIAL VI.00

Start message

COM -> OPT -> 1

Select COM or OPT.

BAUD RATE =

For COM selection: 100 ~ 8000 (increment: 100)

For OPT selection: 100 ~ 2400 (increment: 100)

MODE (A -> H)

MODE	EP	PEN	CBL	EP:	Even parity
A	0	0	0		1: Even 2: ODD
B	0	0	1		
C	0	1	0		
D	0	1	1		
E	1	0	0	PEN:	Parity enable
F	1	0	1		1: Enable 0: Disenable
G	1	1	0	CBL:	Character Bit length
H	1	1	1		1: 8 bits 0: 7 bits

SEND, RECV, SELF ->  
(0/1/2)

Select transmission, reception, or SELF for COM.

DATA

} Note 1

INIT (HEX) =

ADD (HEX) =

COM/OPT = AAA	Confirmation message
BAUD = BBB MODE = CCC	AAA : COM or OPT BBB : BAUD RATE
DDD IV = EE AV = FF	DDD : SELF, RECEIVE, SEND EE : INIT value FF : ADD value
OK (Y/N)	
DISP (Y/N)?	Monitor output assignment (This message is not output for the OPT test. Y is assumed to be specified for transmission and N is assumed to be specified for reception.)

Messages for SELF/SEND/RECEIVE specifications are as follows.

#### (1) SELF specification

\* SELF

HIT RETURN

\* SEND = xx

\* RECV = xx

For positions indicated by an asterisk, an asterisk is displayed for transmission; SPACE is displayed for reception.

The check starts when the RETURN key is pressed.

} Output for DISP = Y.

#### (2) SEND specification

\* SEND

HIT RETURN 2'ND

\* SEND = xx

The asterisk blinks for each transmission.

Press the RETURN key for the reception side first.

} Output for DISP = Y. This is the case for the OPT specification.

#### (3) RECEIVE specification

\* RECEIVE

HIT RETURN 1'st

\* RECEIV = xx TST = YY

The asterisk blinks for each reception.

Press the RETURN key first.

XX: Reception data, YY: Expected value

} Output for DISP = Y. This is not the case for the OPT specification.

#### Error message

ERROR !!

BAUD = xxx MODE = xx

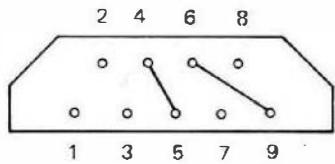
RECV = xx TST = xx

An I/O error message may be output on the BASIC side.

#### Others

Arrange pins as follows to perform the loop test with the SELF specification:

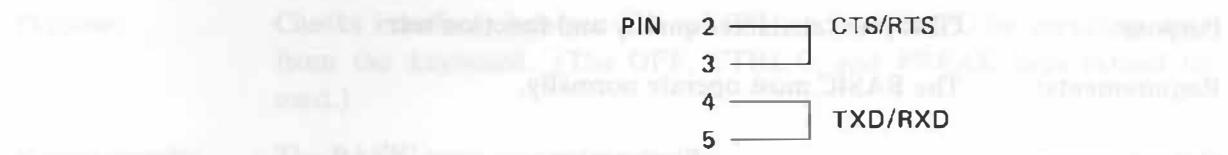
- When looping back with the main frame RS-232C connector



PIN	4 (TXD)	—
	5 (RXD)	—
PIN	6 (CTS)	—
	9 (VCC)	—

- When signals are returned at the level converter:

TOP TRIM. AC



Note: Assume that the first position of the send/receive data is  $IV$  and the  $n$ th data is  $An$ , then

$$An = IV + (n - 1) \times AV$$

However, the value of  $An$  cannot be confined in the 0 to 255 range, the upper limit is specified as 127 ( $H'7F'$ ) for 7-bit data transfer operations and 255 ( $H'FF'$ ) for 8-bit data transfer operations. If the value exceeds the limit, it is set at -128 and -256 respectively.

## 2.6 JPRINT.X07

Purpose: GPR print character quality and function test

**Requirements:** The BASIC must operate normally.

\* PRINT CHECK V1.00 Start message

## Printout example

This page contains several diagrams and tables related to serial communication standards:

- RS-232C:** A diagram showing a 9-pin D-sub connector with pin numbers 1 through 9. It includes a legend:
  - Black
  - Blue
  - Green
  - Red
- SSI:** A diagram showing a 16-pin DIP package with pin numbers 1 through 16. It includes a legend:
  - Black
  - Blue
  - Green
  - Red
- Character Sets:** Two sections showing character sets:
  - The first section shows characters A through L (A, B, C, D, E, F, G, H, I, J, K, L) with a note: "The check starts when the RETURN key is pressed".
  - The second section shows characters M through P (M, N, O, P) with a note: "Put the RETURN key in the reception side first".
- Text Examples:** Two examples of transmitted data:
  - The first example shows data starting with a dollar sign (\$) followed by various characters and numbers.
  - The second example shows data starting with a question mark (?) followed by various characters and numbers.
- Other Diagrams:** A small diagram of a computer monitor and keyboard, and a table with two rows:

Pin 4	4 (RXD1)
Pin 5	5 (TXD1)

## 2.7 JKEY. X07

Purpose: Checks interfaces between the sub-CPU and main CPU by inputting data from the keyboard. (The OFF, CTRL-C, and BREAK keys cannot be used.)

Requirements: The BASIC must operate normally.

Output message/operation	Explanation
*** KEY V1.00	Start message
* INPUT KEY	Press any key. (The OFF, CTRL-C, and BREAK keys cannot be used.)
KEY = x	Input key echo back
CODE = xx	Input key code (ASCII code)

## 2.8 JCAS. X-07

Purpose: Cassette test program.

Test is performed by CSAVE and CLOAD verify operations for a cassette recorder.

Requirements: The BASIC must operate normally.

Output message/operation	Explanation
* CASSETTE V1.00	Start message
WAIT	Wait for data area sum check completion.
* I'm OK !!	DATA AREA SUM CHECK IS OK
* I'm NG!!, A = xx	Data area sum check is not OK: Sum check value = XX (expected value = 00)
PUSH REC. HIT RETURN	Set the cassette deck to the record mode and press the RETURN key, then the CSAVE operation starts.
CSAVE END	Save operation on the cassette has been completed.
REWIND & PUSH PLAY	Rewind the cassette tape and set the play mode.
HIT RETURN	CLOAD verify operation begins.
* CASSET END	Verify end
Error message	
Bad	Verify error
Or, the tape is fed to the end without the following message:	The program name is missing
FOUND: JCAS	

## 2.9 JSBRAM. X07

Purpose: Sub-CPU RAM check

Requirements: The BASIC must operate normally.

Output message/operation

SUB CPU RAM V1.00

Start message

OK

Normal end

\* END

Error message

ERROR

ADR = xxxx

\* END

Processing time: One minute (approx.)

Note: An error may occur if keys are input continuously at random while the test is being executed.

## 2.10 JCUINT. X07

Purpose: Sub-CPU function test

Requirements: The BASIC must operate normally.

Output message

Explanation

\* CCUNIT CHECK V1.00

Start message

HIT RETURN

The test starts when the RETURN key is pressed.

IF BUZZ ON, CTRL-S

An error is assumed if the buzzer does not sound.

AND HIT "Y"

An error is assumed if the buzzer does not stop sounding when the CTRL-S is input.

Input Y.

!"#\$%&' ( ) \*+, -./01234

Displayed approximately two seconds.

56789; < = > ?@ABCDEFGHI

IJKLMNOPQRSTUVWXYZ[¥

]^\_` a b c d e f g h i j k l m n o

Empty screen

Displayed approximately two seconds.

Displayed approximately four seconds.

HIT "F1"

Input F1.

PRINT "X-07 is NO. 1

Displayed approximately one second.

PUSH "< -"

Input arrow mark (◀).

HIT F6

Input F.

HIT SPACE KEY

Input a blank character by pressing the SPACE key.

KEEP PUSHING "U" KEY

Continue pressing the U key.

UNTIL OFF MESSAGE

UUUナナナÜÜÜ 444

Same as above.

TAKE YOUR FINGER OFF

Release the key.



Displayed approximately one second.

♦ tim ♦ cld ♦ loc ♦ 1st ♦ run

Beep sounded (do, re, mi, fa, sol, la, and si, do).

Error message

ERROR I to ERROR 13: See the following explanations:

1. An error is found in the compare check after data is set in TIME\$.
2. An error is found in the compare check after data is set in DATE\$.
3. Horizontal cursor position error
4. Vertical cursor position error
5. Other than B is found in character 3 of line 0 on the screen.
6. Character string ! to 0 was output and the data was read and compared, but a compare error has occurred.
7. The data read after the screen clear operation contains other than blank characters.
8. The data read after dots are output to the screen contains other than dots.
9. The data read after clearing dots on the screen contains dots.
10. Same as error 8.
11. Same as error 8.
12. Character variable initial value error
13. FUNCTION key read error

Others:

An error is assumed if the pertinent screen or sound is not obtained according to operations. For example, an error is assumed if the specified buzzer does not sound.

## 2.11 JRAM. X07

Purpose:	Passes parameters to CARD1. MID (Section 2.12) and outputs reports containing execution results to the GPR. This program does not check data selected according to the following operations, that is, the selected data is passed to CARD1. MID JRAM. X07 is not the test program for the X07.
Requirements:	
Requirements:	The BASIC must operate normally. The ROM/RAM switch must be set to ROM. The RAM card (CARD1) must be mounted. RAM check is performed in a range other than 2000 to 2FFF.
Output message/ operation	Explanation
* SETCARD1 V1.00	Start message
REPORT (Y/N)?	Reports to be output to GPR after CARD1 execution.
* REPORT *	Header message (Note 1)
!! NO REPORT !!	No data is found for the report.
* REPORT END *	Reporting end
INIT. (Y/N)	Initializing CARD1?
* INITIALIZE *	Initialize operation starts. (Note 2)
* INIT END *	Initialize operation end
ROM SUM (Y/N) *** ROM SUM ***	Sum check by using CARD1. ROM sum check start message
DEFAULT ADR B000 -> BFFF C000 -> FFFF	Sum check area after initialization
ADD SUM (Y/N)	Add other area for sum check.
►START ADR =	ROM sum check area start address
AREA SIZE =	Area size (bytes) to be added
OK (Y/N)	Confirmation
NEXT (Y/N)	Other additional data? (Three additional areas may be specified, that is, a total of five areas.)
* ROM SUM END	Sum check area address setting completed
RAM R/W (Y/N)	RAM read/write?
* RAM R/W *	
DEFAULT ADR 0000 -> 1FFF	Check area after initialization
ADR MODIFY (Y/N)	Check area to be modified?
START ADR =	Check start address
END ADR =	Check end address
OK (Y/N)	

PW. ON-OFF (Y/N)	Perform check after power off?
GALLOP (Y/N)	Galloping check?
* GALLOP *	
DEFALT ADR	Check area after initialization
0000 -> 1FFF	
ADR MODIFY (Y/N)	Check area to be modified? or '0000H
START ADR =	Check start address
END ADR =	Check end address
OK (Y/N)	
*** SET RAM END ***	End message
	Card 1 generation end. Turn power off, remove card 1, install it on the X-07 to be checked, turn power on, then the program begins running.

*Notes:* 1. In addition to the message, the question is whether deletion is to be performed after the report is output to the GPR.  
See Section 2.12 for report contents.

2. The contents of initialized card 1

1. Address 2800 contains "love".
2. The following are checked:  
*RAM read/write (0000 to 1FFF)  
ROM sum check (B000 to BFFF and C000 to FFFF)  
Power on/off(0400 to 1FFF)  
Galloping check(0000 to 1FFF)*
3. The report area is deleted and initialized.
4. Display error flag is initialized.

**Others:** The RAM read/write and galloping tests use the same start and end address areas, that is, the same address space is checked. The last specified start and end addresses are used.

## 2.12 CARD1. MID (See Section 4.4.1 for Preparations.)

**Purposes:** When the BASIC does not operate normally, this program allows operations to be performed with a minimum of resources under control by using the keyword love.

The system RAM is checked and the system ROM sum check value is obtained. In this case, the RAM area other than the space from address H'2000' to address H'2FFF' can be checked.

**Requirements:** Control must be passed by using the keyword love.  
The ROM/RAM switch must be set to ROM.

### Functions

1. Obtains the contents of interface chip registers saved before control is passed to the BASIC. (See Table 2.12.1, Interface Chip Registers for details.)
2. Performs sum check for memory devices such as the system ROM.
3. Performs read/write check for memory devices such as the system RAM (other than the range from 2000 to 2FFF).
4. Data holding check after:  
Power off → on → off → on
5. Performs system RAM galloping check.
6. Performs reporting (See Section 2.12 (Report Output Example) for details).

*Note: Tests for items 2–5 are specified by support program JRAM. X07.*

*Areas must be specified for items 2, 3, and 5.*

*For item 6, data can be output to the GPR by using JRAM. X07.*

Output message/operation	Explanation
* C. RAM-CARD V1.00	Start message
* REG 00, 02, A2, E3, * 80, C3, 05, A5	Contents of interface chip registers 0 ~ 7
—ROM SUM START B000H → BFFFH = 24H C000H → FFFFH = AEH —ROM SUM END	Sum check value display
—RAM R/W START ST= 0000, SP = 1FFF DATA (1) END DATA (2) END —RAM R/W END	Start and end addresses Test order: DATA (1): 00, 01, ...., FF Test order: DATA (2): FF, FE, ...., 00 Read/write operations by incrementing addresses
—P ON/OFF START (1) 400H --> 1FFFF	Address fixed: H'400' to H'1FFF' Writes data pattern 00, 01, ...., FF in this order by incrementing addresses. After this message is output, the X-07 system is set to the off state. Press the ON key when necessary.
—P ON/OFF END (1) RESET !	After the ON key is pressed, the read check is performed. If the check is OK, this message is output. Press the RESET switch.

## Start message

### REG message

-P ON/OFF START (2)

400H --> 1FFFH

-P ON/OFF END (2)

-GALLOP START

ST = 0000, SP = 1FFF

LOOP = 00

DATA (00)

DATA (FF)

Writes data pattern FF, FE, ...., 00.

Press the ON key when necessary.

If the test is OK, the message is output.

Loop test starts with the initial value 00.

The test is carried out with data items set to 00 except for the target address.

The test is carried out with data items set to FF except for the target address.

The loop has no end point. Press the RESET to stop the test.

*Note: The same start and end address areas are used for the RAM read/write and galloping check; hence, the same values are used respectively.*

Reg	Test	Value												
00	0000	0000	01	0000	0000	02	0000	0000	03	0000	0000	04	0000	0000
05	0000	0000	06	0000	0000	07	0000	0000	08	0000	0000	09	0000	0000
0A	0000	0000	0B	0000	0000	0C	0000	0000	0D	0000	0000	0E	0000	0000
0F	0000	0000	10	0000	0000	11	0000	0000	12	0000	0000	13	0000	0000
14	0000	0000	15	0000	0000	16	0000	0000	17	0000	0000	18	0000	0000
19	0000	0000	1A	0000	0000	1B	0000	0000	1C	0000	0000	1D	0000	0000
1E	0000	0000	1F	0000	0000	20	0000	0000	21	0000	0000	22	0000	0000
23	0000	0000	24	0000	0000	25	0000	0000	26	0000	0000	27	0000	0000
28	0000	0000	29	0000	0000	2A	0000	0000	2B	0000	0000	2C	0000	0000
2D	0000	0000	2E	0000	0000	2F	0000	0000	30	0000	0000	31	0000	0000
32	0000	0000	33	0000	0000	34	0000	0000	35	0000	0000	36	0000	0000
37	0000	0000	38	0000	0000	39	0000	0000	3A	0000	0000	3B	0000	0000
3C	0000	0000	3D	0000	0000	3E	0000	0000	3F	0000	0000	40	0000	0000
41	0000	0000	42	0000	0000	43	0000	0000	44	0000	0000	45	0000	0000
46	0000	0000	47	0000	0000	48	0000	0000	49	0000	0000	4A	0000	0000
4B	0000	0000	4C	0000	0000	4D	0000	0000	4E	0000	0000	4F	0000	0000
50	0000	0000	51	0000	0000	52	0000	0000	53	0000	0000	54	0000	0000
55	0000	0000	56	0000	0000	57	0000	0000	58	0000	0000	59	0000	0000
5A	0000	0000	5B	0000	0000	5C	0000	0000	5D	0000	0000	5E	0000	0000
5F	0000	0000	60	0000	0000	61	0000	0000	62	0000	0000	63	0000	0000
64	0000	0000	65	0000	0000	66	0000	0000	67	0000	0000	68	0000	0000
69	0000	0000	6A	0000	0000	6B	0000	0000	6C	0000	0000	6D	0000	0000
6E	0000	0000	6F	0000	0000	70	0000	0000	71	0000	0000	72	0000	0000
73	0000	0000	74	0000	0000	75	0000	0000	76	0000	0000	77	0000	0000
78	0000	0000	79	0000	0000	7A	0000	0000	7B	0000	0000	7C	0000	0000
7D	0000	0000	7E	0000	0000	7F	0000	0000	80	0000	0000	81	0000	0000
82	0000	0000	83	0000	0000	84	0000	0000	85	0000	0000	86	0000	0000
87	0000	0000	88	0000	0000	89	0000	0000	8A	0000	0000	8B	0000	0000
8C	0000	0000	8D	0000	0000	8E	0000	0000	8F	0000	0000	90	0000	0000
91	0000	0000	92	0000	0000	93	0000	0000	94	0000	0000	95	0000	0000
96	0000	0000	97	0000	0000	98	0000	0000	99	0000	0000	9A	0000	0000
9B	0000	0000	9C	0000	0000	9D	0000	0000	9E	0000	0000	9F	0000	0000
100	0000	0000	101	0000	0000	102	0000	0000	103	0000	0000	104	0000	0000
105	0000	0000	106	0000	0000	107	0000	0000	108	0000	0000	109	0000	0000
10A	0000	0000	10B	0000	0000	10C	0000	0000	10D	0000	0000	10E	0000	0000
10F	0000	0000	110	0000	0000	111	0000	0000	112	0000	0000	113	0000	0000
114	0000	0000	115	0000	0000	116	0000	0000	117	0000	0000	118	0000	0000
119	0000	0000	11A	0000	0000	11B	0000	0000	11C	0000	0000	11D	0000	0000
11E	0000	0000	11F	0000	0000	120	0000	0000	121	0000	0000	122	0000	0000
123	0000	0000	124	0000	0000	125	0000	0000	126	0000	0000	127	0000	0000
128	0000	0000	129	0000	0000	130	0000	0000	131	0000	0000	132	0000	0000
133	0000	0000	134	0000	0000	135	0000	0000	136	0000	0000	137	0000	0000
138	0000	0000	139	0000	0000	140	0000	0000	141	0000	0000	142	0000	0000
143	0000	0000	144	0000	0000	145	0000	0000	146	0000	0000	147	0000	0000
148	0000	0000	149	0000	0000	150	0000	0000	151	0000	0000	152	0000	0000
153	0000	0000	154	0000	0000	155	0000	0000	156	0000	0000	157	0000	0000
158	0000	0000	159	0000	0000	160	0000	0000	161	0000	0000	162	0000	0000
163	0000	0000	164	0000	0000	165	0000	0000	166	0000	0000	167	0000	0000
168	0000	0000	169	0000	0000	170	0000	0000	171	0000	0000	172	0000	0000
173	0000	0000	174	0000	0000	175	0000	0000	176	0000	0000	177	0000	0000
178	0000	0000	179	0000	0000	180	0000	0000	181	0000	0000	182	0000	0000
183	0000	0000	184	0000	0000	185	0000	0000	186	0000	0000	187	0000	0000
188	0000	0000	189	0000	0000	190	0000	0000	191	0000	0000	192	0000	0000
193	0000	0000	194	0000	0000	195	0000	0000	196	0000	0000	197	0000	0000
198	0000	0000	199	0000	0000	200	0000	0000	201	0000	0000	202	0000	0000
203	0000	0000	204	0000	0000	205	0000	0000	206	0000	0000	207	0000	0000
208	0000	0000	209	0000	0000	210	0000	0000	211	0000	0000	212	0000	0000
213	0000	0000	214	0000	0000	215	0000	0000	216	0000	0000	217	0000	0000
218	0000	0000	219	0000	0000	220	0000	0000	221	0000	0000	222	0000	0000
223	0000	0000	224	0000	0000	225	0000	0000	226	0000	0000	227	0000	0000
228	0000	0000	229	0000	0000	230	0000	0000	231	0000	0000	232	0000	0000
233	0000	0000	234	0000	0000	235	0000	0000	236	0000	0000	237	0000	0000
238	0000	0000	239	0000	0000	240	0000	0000	241	0000	0000	242	0000	0000
243	0000	0000	244	0000	0000	245	0000	0000	246	0000	0000	247	0000	0000
248	0000	0000	249	0000	0000	250	0000	0000	251	0000	0000	252	0000	0000
253	0000	0000	254	0000	0000	255	0000	0000	256	0000	0000	257	0000	0000
258	0000	0000	259	0000	0000	260	0000	0000	261	0000	0000	262	0000	0000
263	0000	0000	264	0000	0000	265	0000	0000	266	0000	0000	267	0000	0000
268	0000	0000	269	0000	0000	270	0000	0000	271	0000	0000	272	0000	0000
273	0000	0000	274	0000	0000	275	0000	0000	276	0000	0000	277	0000	0000
278	0000	0000	279	0000	0000	280	0000	0000	281	0000	0000	282	0000	0000
283	0000	0000	284	0000	0000	285	0000	0000	286	0000	0000	287	0000	0000
288	0000	0000	289	0000	0000	290	0000	0000	291	0000	0000	292	0000	0000
293	0000	0000	294	0000	0000	295	0000	0000	296	0000	0000	297	0000	0000
298	0000	0000	299	0000	0000	300	0000	0000	301	0000	0000	302	0000	0000
303	0000	0000	304	0000	0000	305	0000	0000	306	0000	0000	307		

## Error messages

**! RAM R/W ERR**

E. ADR = xxxx

E. DAT = xx T. DAT = xx

## Report output example

**\*\*\* REPORT \*\*\***

\*C.RAM-CARD V1.00

\* REG 00,02,A2,C3,  
\* 80,C3,05,0A

--ROM SUM START

B000H->BFFFH = 24H

C000H->FFFFH = AEH

--ROM SUM END

--RAM R/W START

ST=0000, SP=1FFF

DATA(1) END

DATA(2) END

--RAM R/W END

--P ON/OFF START(1)

400H-->1FFFH

\*C.RAM-CARD V1.00

\* REG 00,02,A2,C3,  
\* 80,C3,05,0A

--P ON/OFF END(1)

RESET !

\*C.RAM-CARD V1.00

\* REG 00,02,A2,C3,  
\* 80,C3,05,0A

--P ON/OFF START(2)

400H-->1FFFH

\*C.RAM-CARD V1.00

\* REG 00,02,A2,C3,  
\* 80,C3,05,0A

--P ON/OFF END(2)

--GALLOP START

ST=0000, SP=1FFF

LOOP=00

DATA(00)

--P ON/OFF END(3)

--P ON/OFF END(4)

--P ON/OFF END(5)

--P ON/OFF END(6)

--P ON/OFF END(7)

--P ON/OFF END(8)

--P ON/OFF END(9)

--P ON/OFF END(10)

--P ON/OFF END(11)

--P ON/OFF END(12)

--P ON/OFF END(13)

--P ON/OFF END(14)

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--P ON/OFF END(153)

--P ON/OFF END(154)

--P ON/OFF END(155)

--P ON/OFF END(156)

--P ON/OFF END(157)

--P ON/OFF END(158)

--P ON/OFF END(159)

--P ON/OFF END(160)

--P ON/OFF END(161)

--P ON/OFF END(162)

--P ON/OFF END(163)

--P ON/OFF END(164)

--P ON/OFF END(165)

--P ON/OFF END(166)

--P ON/OFF END(167)

--P ON/OFF END(168)

--P ON/OFF END(169)

--P ON/OFF END(170)

--P ON/OFF END(171)

--P ON/OFF END(172)

--P ON/OFF END(173)

--P ON/OFF END(174)

--P ON/OFF END(175)

--P ON/OFF END(176)

--P ON/OFF END(177)

--P ON/OFF END(178)

--P ON/OFF END(179)

--P ON/OFF END(180)

--P ON/OFF END(181)

--P ON/OFF END(182)

--P ON/OFF END(183)

--P ON/OFF END(184)

--P ON/OFF END(185)

--P ON/OFF END(186)

--P ON/OFF END(187)

--P ON/OFF END(188)

--P ON/OFF END(189)

--P ON/OFF END(190)

--P ON/OFF END(191)

--P ON/OFF END(192)

--P ON/OFF END(193)

--P ON/OFF END(194)

--P ON/OFF END(195)

--P ON/OFF END(196)

--P ON/OFF END(197)

--P ON/OFF END(198)

--P ON/OFF END(199)

--P ON/OFF END(200)

--P ON/OFF END(201)

--P ON/OFF END(202)

--P ON/OFF END(203)

--P ON/OFF END(204)

--P ON/OFF END(205)

--P ON/OFF END(206)

--P ON/OFF END(207)

--P ON/OFF END(208)

--P ON/OFF END(209)

--P ON/OFF END(210)

--P ON/OFF END(211)

--P ON/OFF END(212)

--P ON/OFF END(213)

--P ON/OFF END(214)

--P ON/OFF END(215)

--P ON/OFF END(216)

--P ON/OFF END(217)

--P ON/OFF END(218)

--P ON/OFF END(219)

--P ON/OFF END(220)

--P ON/OFF END(221)

--P ON/OFF END(222)

--P ON/OFF END(223)

--P ON/OFF END(224)

--P ON/OFF END(225)

--P ON/OFF END(226)

## Report output message

This is output when the display output message cannot be read or display output becomes impossible because of X-07 failure.

Generally, the display output messages are used.

The following are unique as report output messages:

**! DISP ERROR X**

X = 1: Report output is impossible because data is being output from the sub-CPU.

X = 2: Report output is impossible because the data to be output to the sub-CPU is not received by the sub-CPU.

**\* C. RAM CARD END**

This message is additionally output when the galloping check is not performed.

**Table 2.12.1 Interface Chip Registers**

Bit name Name (Address)	D7	D6	D5	D4	D3	D2	D1	D0
R0 (F0)	(TS0) TRQ1	(TS1) TRQ0	BIE	ALMIE	XTIE	XRIE	TIE	RIE
R1 (F1)	—TB7	—TB6	—TB5	—TB4	—TB3	—TB2	—TB1	—TB0
R2 (F2)	CBSY	ALRM	AUX1	AUX2	0	BGI	XTRE	XRRF
R3 (F3)	Meaningless							
R4 (F4)	FCAS	BRGST	CNTR	LEO	MD1	MDO	BZON	REM
R5 (F5)	Meaningless							
R6 (F6)	CTS	0	FE	OE	PE	TXE	RXRDY	TXRDY
R7 (F7)	D7	D6	D5	D4	D3	D2	D1	D0

\* Interrupt control REG

\* External BUS receive REG

\* Flag REG

\* Mode REG

\* UART status REG

\* UART data REG

## Report message correspondence

Example R0 ~ R3

\* REG 00, 02, A2, C3,

\* 80, C3, 05, 0A

R4 ~ R7

## Processing time

### Galloping

Area size	Time	Explanation
2k bytes	1 hour	30 minutes for each DATA (00) and DATA (FF)
8k bytes	16 hours	8 hours for each DATA (00) and DATA (FF)

## 2.13 JRAM2. X07

Purpose:	Passes parameters to CARD2. MID (Section 2.14). This program only sets data selected according to the following operations in CARD2. MID. JRAM2. X07 is not the test program for the X07.
Requirements:	The BASIC must operate normally. The ROM/RAM switch must be set to ROM. The RAM card (card 2) must be installed. RAM check range: Mounted range other than that from 1000 to IFFF.
Output message/operation	Explanation
* SET CARD2 V1.00	Start message
ROM SUM (Y/N)	Performs the sum check on card 2.
*** ROM SUM ***	ROM sum check set start message
DEFAULT ADR	
4000 -> 5FFF	The sum check value is output unconditionally for each of these areas.
6000 -> 7FFF	
A000 -> AFFF	
ADD SUM (Y/N)	Add other area.
→START ADR =	ROM sum check start address
AREA SIZE =	Area size (bytes) to be added
OK (Y/N)	Confirmation
NEXT (Y/N)	Other additional areas? (Up to two areas may be added, a total of five areas.)
* ROM SUM END	Sum check area set end
RAM R/W (Y/N)	Performs RAM read/write operations.
* RAM R/W *	
DEFAULT ADR	
8000 -> 97FF	
ADR MODIFY (Y/N)	Check area to be modified?
START ADR =	Check start address
END ADR =	Check end address
OK (Y/N)	
PW. ON-OFF (Y/N)	To be checked after power is turned off?
* POWER ON -> OFF	
DEFAULT ADR	
8000 -> 97FF	
ADR MODIFY (Y/N)	
START ADR =	
END ADR =	
OK (Y/N)	

```

GALLOP (Y/N)      no/yes/no?  Galloping check to be carried out?
* GALLOP *
DEFAULT ADR
8000 -> 97FF
ADR MODIFY (Y/N)

START ADR =
END ADR =
OK (Y/N)

*** SET RAM END ***

```

- Notes:*
1. Since the same start and end addresses are used for the RAM read/write, power on/off, and galloping checks, the same address space is tested.  
The last specified start and end addresses are used.  
Card 2 is automatically initialized when this program is executed.
  2. Card 2 contents after initialization
    1. RAM read/write (8000 to 97FF)
      - ROM sum check (4000 to 5FFF, 6000 to 7FFF, and A000 to AFFF)
      - Power on/off check (8000 to 97FF)
      - Galloping check (8000 to 97FF)
    2. Display error flag is initialized.
    3. Printer error flag is initialized.

#### 2.14 CARD2.MID {See Section 4.4.2 for Preparations}

**Purpose:** Performs RAM and ROM sum check for other than the X-07. These tests can be carried out by receiving control by means of the keyword love even if "love" has been written at an address greater than 2000 (on the FFFF side). If the printer is connected, the message is output to the printer and display device.

**Requirements:** Control must be passed by means of the keyword love.  
The X-07 must be normal.

**Functions:**

1. Performs ROM sum check.
2. Performs RAM read/write check (other than the range 1000 to 1FFF).
3. Data holding check in other than the range 1000 to 1FFF under the following condition:  
Power off → on → off → on
4. Performs a RAM galloping check (other than the range 1000 to 1FFF).

**Note:** Tests 1 ~ 4 can be specified by support program JRAM2.X07.  
Test areas can be specified for tests 1 ~ 4.

A 131000 131000	match word	WHL 3	WHL 4
A 131001 131001	match word	TBL 3	TBL 4
A 131010 131010	match word	TBL 1	TBL 2

After the X-07 and A8-100 (CPU2) are sent power up the A8-100 will receive the command listed above.  
Send A8-100 file to be transferred and the download file A8-100 will be executed.  
Then you can run the program.

Output message/operation	Explanation
*OPTION MEM V1.00	
-ROM SUM START	
4000H->5FFFH = 00H	
6000H->7FFFH = 00H	
A000H->AFFFH = 00H	
B000H->BFFFH = 24H	
C000H->FFFFH = AEH	
-ROM SUM END	
-RAM R/W START	
ST=8000, SP=97FF	
?RAM R/W ERR	
E.ADR=8000	
E.DAT=FF T.DAT=00	
DATA(1) END	
?RAM R/W ERR	
E.ADR=8001	
E.DAT=FF T.DAT=FE	
DATA(2) END	
-RAM R/W END	
-P ON/OFF START(1)	
8000->97FF	
*OPTION MEM V1.00	
?RAM R/W ERR	
E.ADR=8000	
E.DAT=FF T.DAT=00	
-P ON/OFF END(1)	
RESET ?	
*OPTION MEM V1.00	
-P ON/OFF START(2)	
8000->97FF	
*OPTION MEM V1.00	
?RAM R/W ERR	
E.ADR=8001	
E.DAT=FF T.DAT=FE	
-P ON/OFF END(2)	
-GALLOP START	
ST=8000, SP=97FF	
LOOP=00	Output the loop count (00 to FF).
DATA(00)	Set 00 in area except for the target address.
?GALLOP ERR	
E.ADR=8001	
E.DAT=FF T.DAT=00	

Note: E.ADR: Error address  
 E.DAT: Error data  
 T.DAT: Write data

Other messages	Explanation
<b>! DISP ERR X</b>	X = 1: Output is impossible because data is being output from the sub-CPU. X = 2: Output is impossible because the data to be output to the sub-CPU cannot be received by the sub-CPU.
	The message is output to the printer.
<b>* OPTION MEM END</b>	This message is output when the galloping check is not carried out.
<b>! GPR ERR</b>	Output is impossible because the GPR is busy. This message is output to the display device.

#### Processing time

##### Galloping

Area size	Time	Explanation
2k bytes	1 hour	30 minutes for each DATA (00) and DATA (FF)
8k bytes	16 hours	8 hours for each DATA (00) and DATA (FF)

#### 2.15 JCARDS.X-07

- Purpose: Transfers the RAM card contents to the AS-100 without alteration.
- Requirements: The ROM/RAM switch must be set to ROM.
- Operation procedures: The following must be set by the AS-100 before it is executed:

A > RSHND  
A > SUBMIT TTY3D or SUBMIT TTY3DN  
A > BASIC JCARDR

Connect the X-07 and AS-100 COM2 via level converter RS-232C and input the commands listed above in the AS-100.  
Specify the file to be received and storing file to be used on the AS-100 side by using JCARDR, then execute the program.

#### Output message

**\*\* CARD SEND END** Transmission end message

#### 2.16 JCARDR.X-07

- Purpose: Transfers data from the AS-100 to the X-07 without alteration.
- Requirements: The ROM/RAM switch must be set to ROM.
- Operation procedures: The following must be set on the AS-100 side before program execution:

A > RSHND  
A > SUBMIT TTY3D  
A > BASIC JCARDS

Connect the X-07 and AS-100 COM2 via level converter RS-232C and input the commands listed above.  
Specify the file to be transferred and its destination on the AS-100 side by using JCARDS, then execute the program.

Output message

\*\* CARD RECEIVE

XXXX Monitor and output the number received bytes.

\*\* RECEIVE END End message

### 3. AS-100 PROGRAM OPERATIONS

#### 3.1 JTRANS.A.BAS

Purpose: ASCII data transmission and reception

Operation procedures: Operate according to the following messages:

\*\*\*\*\* TRANSFER ASCII DATA \*\*\*\*\*

- IF YOU GET ASCII DATA FROM TTY:, USE TTY30N
- IF YOU PUT ASCII DATA TO TTY:, USE TTY30 OR TTY3DN

TTY30N : RSINIT TTY: 300 80S BUFSIZE(4096,4096) NOWAIT  
TTY30 : RSINIT TTY: 300 80S BUFSIZE(4096,4096) WAIT NOAUTON

- IF YOU USE X07 AS SOURCE OR DESTINATION  
X07 OPERATION

```
DATA --> X07
: INIT $5,"COM:",300,"D"
: EXEC &HEEIF
DATA <- X07
: INIT $1,"COM:",300,"D"
: LIST #
```

- SOURCE (TTY:/XXXXXX.XXX) = JCARDS.X07
- DESTINATION (TTY:/LST:/CRT:/XXXXXX.XXX) = 7CRT:

!! OK (Y/N) ??

\*\*\*\*\* START GET &PUT ASCII DATA \*\*\*\*\*

SOURCE FILE = JCARDS.X07

Note: Do not execute this program  
with the following specifications:  
Input = TTY and output = LST.

```
10 REM CARD->AS-100
20 INIT $1,"COM:",300,"D"
30 I=CH2000
40 FOR J=I TO CH2FFF
50 A=PEEK(J)
60 OUT $1,A
70 NEXT J
100 PRINT"** CARD SEND END"
110 END
```

\*\*\*\*\* END TRANSFER \*\*\*\*\*

TRANSFER SIZE = 163

SOURCE FILE = JCARDS.X07

DESTINATION FILE = CRT:

### 3.2 JCARDR. BAS

**Purpose:** Stores the card-unit information received from the X07 in a XXXXXX.MID file. Or X07's program unit data may be stored.

**Operation procedures:** Operate according to the following messages:

```
***** RECEIVE MID-DATA FROM " X07 "
• AS-100 : RSHMD
    TTY3D : RSINIT TTY: 300 BDS BUFSIZ(4096,4096) WAIT NOAUTOK

• X07      : JCARDS / SAVE "COM:",300,"D"
• RECEIVE DATA-FILE          = ?TEST
• 1. DATA-SIZE   2. 13-NUL (1/2) ?1
• RECEIVE DATA-NUM.          = 70096
    OK (Y/N)                  ?Y

***** START RECEIVING *****
DATA FILE NAME = TEST
TRANSFER DATA = 4096
***** END RECEIVING *****
MID-DATA SIZE = 4096

DATA-FILE NAME = TEST.MID
```

*Note: For program-unit data reception, select 2.13-NULL.*

*Mid* is automatically appended, so do not specify *MID* in the *XXXXXX MID*.

### 3.3 JCARDS.BAS

**Purpose:** Transmits the file received and stored with JCARDR.BAS to the X-07.

**Operating procedures:** Operate according to the following messages:

..... SEND MID-DATA TO " X-07 "

- AS-100 : RSHND  
TTY3DW : RSINIT TTY: 300 005 BUFSIZE(4096,4096) NOWAIT  
TTY3D : RSINIT TTY: 300 005 BUFSIZE(4096,4096) WAIT NOAUTOD
  - X07 : JCARDR / LOAD "COM:",300,"D"
  - SEND MID-DATA FILE = ?TEST
  - 1. DATA-SIZE 2. 13-NUL (1/2) ?1
  - SEND DATA-NUM. = ?4096  
OK (Y/N) ?Y

\*\*\*\*\* START SENDING \*\*\*\*\*

**MR-DATA NAME = TEST**

TRANSFER DATA = 4996

\*\*\*\*\* END SENDING \*\*\*\*\*

PROGRAM SIZE = 4096  
MID DATA NAME = TEST MID

Note: For program-unit data reception, select 2.13-NULL.

For card-unit data reception, select 1. DATA-SIZE.

*MID is automatically appended, so do not specify MID in XXXXXX.MID.*

### 3.4 JFDUMP.BAS

240 50K 8E

Purpose: Edits contents of each file in the list format and outputs the resultant data. Use this program to check whether the contents of XXXXXX.MID received from the X-07 is correct.

Operation procedures: Operate according to the following messages:

\*\*\*\*\* FILE DUMP START \*\*\*\*\*  
• IF YOU GET DUMP DATA FROM TTY1, USE TTY3D  
TTY3D : RSINIT TTY1: 300 BPS BUFSIZ(4096,4096) WAIT NOAUTOK

• IF YOU USE X07 AS SOURCE

X07 OPERATION

X07 (RAM-CARD) --> MID-CODE DATA  
: • USE PROGRAM JCARDS IN X07  
X07'S PROGRAM  
: • SAVE "COM1",300,"D"

SOURCE FILE (TTY:/XXXXXX.XXX) = ?JCARDS.X07  
DESTINATION FILE (CRT:/LST:/XXXXXX.XXX) = ?CRT:

DUMP ADDR = ?0  
1. DATA SIZE 2. 13-NUL (1/2) ?1  
DUMP SIZE = ?200

IS OK (Y/N) ?Y

(X07 selected. RAM CARD selected)  
X07 RAMON New (2804+2804) selected 208 006 ready to use  
RS232C cable used to A5 for COM port)

-00000 00 00 0A 31 30 20 52 45 40 20 43 41 52 44 20 3E  
-00010 41 53 20 31 30 30 00 0A 32 30 20 49 4E 49 54 20  
-00020 23 31 2E 22 43 4F 40 3A 22 2C 33 30 30 2C 22 44  
-00030 22 0D 0A 33 30 20 49 30 26 4B 32 30 30 30 00 0A  
-00040 34 30 20 46 4F 52 4A 3D 49 20 54 4F 20 26 4B 32  
-00050 46 46 46 00 0A 35 30 20 20 41 30 50 45 45 40 26  
-00060 4A 29 00 0A 36 30 20 20 4F 55 54 20 23 31 2C 41  
-00070 0D 0A 37 30 20 4E 45 56 54 2B 4A 80 0A 31 30 30  
-00080 20 50 52 49 4E 54 22 2A 2A 20 43 41 52 44 20 53  
-00090 45 4E 44 20 45 4E 44 22 00 0A 31 31 30 20 45 4E  
-000A0 44 00 0A 00 00 00 00 00 00 00 00 00 00 00 00 00  
-000B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
-000C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

\*\*\* FILE DUMP END \*\*\*

Note: DUMP ADR: Dump start address

It is advisable to select 2.13-NULL to check XXXXXX.MID stored in program units.  
Do not use this program with specifications input = TTY and output = LST.

Purpose: This is prepared to use AS-100 keyboard instead of X-07.

Operation procedures: No special instructions to be given.

Execute after the following:

RSHND

SUBMIT TTY3D or SUBMIT TTY3DN

X-07 preparation: INIT#5, "COM:", 300, "D"

EXEC & HEEIF

*Note: Press the CANCEL key to terminate the program.*

#### \*\*\*\*\* AS-100 TO X07 \*\*\*\*\*

```
* SET MESSAGE TO X07
?10 REM TEST
?20 ?"*** CANON ***"
?30 ?" X-07"
?40 LOCATE 0,0;"EE";
?50 GOTO 20
?RUN
?EXEC &HEE33
?LPRINT[0,1]
?
```

### 3.6 TTY3D.SUB

```
rsinit tty: 300 80s bufsiz(4096,4096) wait noautox
```

### 3.7 TTY3DN.SUB

```
rsinit tty: 300 80s bufsiz(4096,4096) nowait
```

*Note: RSINIT command (RS232C port assignment) is used for these two programs, where:*

*tty: COM2 is used.*

*300: Baud rate*

*80S: Equivalent to mode D of X-07*

*BUFSIZ: Send/receive buffer size*

*WAIT/NOWAIT: Specifies whether null codes are stored in the buffer when there is no reception data, when data transmission to the AS-100 takes.*

*WAIT: Waits for a reception interrupt.*

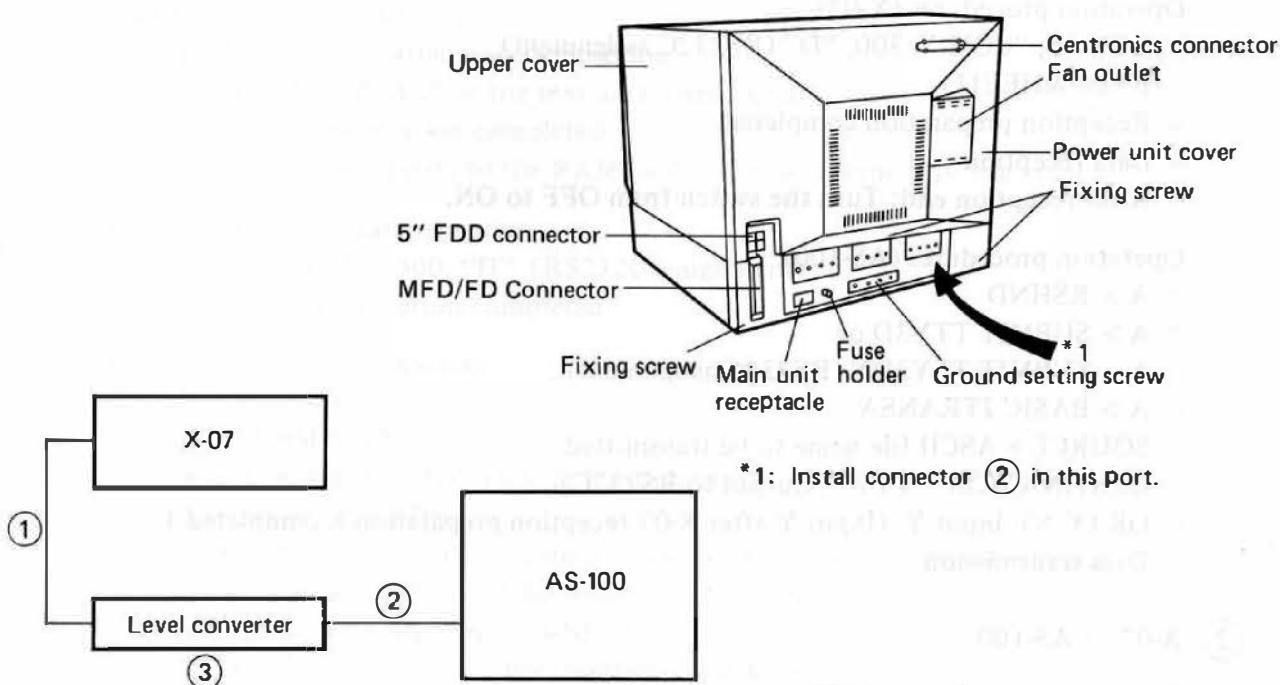
*NOAUTOX: Specifies whether the &H11 and &H13 codes (for the select and deselect assignment) are to be ignored. This is valid only for reception.*

*NOAUTOX: &H11 and &H13 are treated as data items.*

*Others: For faster transfer or for 8ES transmission, specify the respective parameters in the X-07 and AS-100.*

## 4. OTHERS

### 4.1 RS232C Cables and Connectors

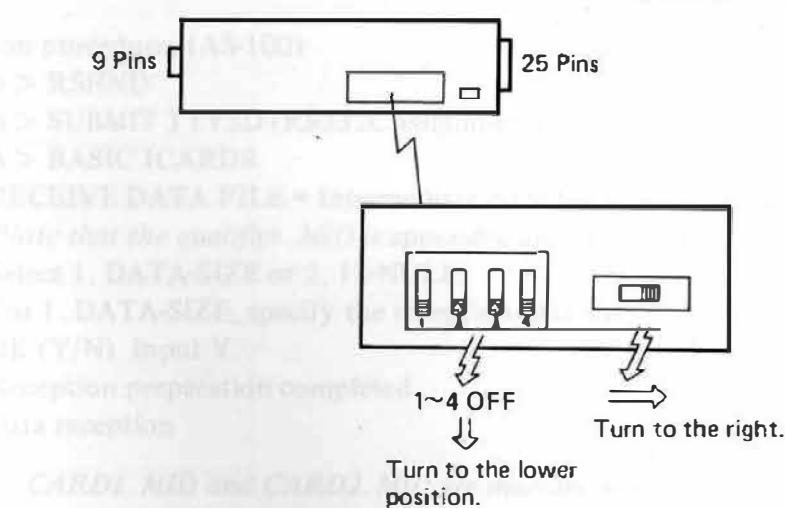


(1) X-07 associated RS232C cable (9 pins)

(2) RS232C cable used in AS-100 (25 pins)

X-07		AS-100
1	1	PROTECTIVE GROUNDS
2	2	TRANSMITTED DATA
3	3	RECEIVED DATA
4	4	REQUEST TO SEND
5	5	CLEAR TO SEND
6	6	DATA SET READY
7	7	SIGNAL GROUND
8	8	RECEIVED LINE SIGNAL DETECTOR
20	20	DATA TERMINAL READY

(3) Switches on level converter panel



#### 4.2 ASCII File Transfer (XXXXXX,X-07)

2RENTO ,A

##### ① AS-100 → X-07

###### Operation procedures (X-07)

- INIT #5, "COM:", 300, "D" (RS232C assignment)
- EXEC &HEE1F
- Reception preparation completed.
- Data reception
- After reception end: Turn the switch from OFF to ON.

###### Operation procedures (AS-100)

- A > RSHND
- A > SUBMIT TTY3D or  
A > SUBMIT TTY3DN (RS232C assignment)
- A > BASIC JTRANSA
- SOURCE = ASCII file name to be transmitted
- DESTINATION = TTY: (Output to RS232C)
- OK (Y/N) Input Y. (Input Y after X-07 reception preparation is completed.)
- Data transmission

##### ② X-07 → AS-100

###### Operation procedures (X-07)

- Load the program in the text area.
- INIT #1, "COM:", 300, "D" (RS232C assignment)
- LIST #1 (Execute after AS-100 reception preparation is completed.)
- Data transmission

###### Operation procedures (AS-100)

- A > RSHND
- A > SUBMIT TTY3DN (RS232C assignment)
- A > BASIC JTRANSA
- SOURCE = TTY: (Input from RS232C)
- DESTINATION = ASCII file name to be received
- OK (Y/N) Input Y.
- Reception preparation completed.
- Data reception

*Note: Start X-07 data transmission about in less than 10 seconds after AS-100 reception preparation is completed.*

#### 4.3 Intermediate (Machine) Code File Transfer (XXXXXX.MID)

##### ① AS-100 → X-07

###### Operation procedures (X-07)

###### ① -1 RAM card data (4096 bytes) reception

- Load JCARDR. X07 in the text area, then execute it.
- Reception preparation completed.
- Transfer received data to the RAM card at the same time it is received.

###### ① -2 Program-unit data reception

- LOAD "COM:", 300, "D" (RS232C assignment)
- Reception preparation completed.

###### Operation procedures (AS-100)

- A > RSHND
- A > SUBMIT TTY3D or
- A > SUBMIT TTY3DN (RS232C assignment)
- A > BASIC JCARDS
- SEND MID-DATA FILE = Intermediate code file name to be transmitted  
*(Note that the qualifier .MID is appended automatically.)*
- Select 1. DATA-SIZE or 2.13-NUL.
- For DATA-SIZE, specify the transmission data size.
- OK (Y/N) Input Y. (Input after the X-07 reception preparation is completed.)
- Data transmission

Note: Select 1. DATA-SIZE for card-unit data transmission.

Select 2. 13-NUL for program-unit data transmission.

##### ② X-07 → AS-100

###### Operation procedures (X-07)

###### ② -1 RAM card data (4096 bytes) transmission

- Load JCARDS. X07 in the text area, then execute it.  
*(Execute after AS-100 reception preparation is completed.)*
- Data transmission

###### ② -2 Transmitting a program from the text area

- SAVE "COM:", 300, "D" (RS232C assignment)  
*(Execute after the AS-100 reception preparation is completed.)*
- Data transmission

###### Operation procedures (AS-100)

- A > RSHND
- A > SUBMIT TTY3D (RS232C assignment)
- A > BASIC JCARDR
- RECEIVE DATA FILE = Intermediate code file name to be received  
*(Note that the qualifier .MID is appended automatically.)*
- Select 1. DATA-SIZE or 2. 13-NUL.
- For 1. DATA-SIZE, specify the reception data size.
- OK (Y/N) Input Y.
- Reception preparation completed.
- Data reception

Note: CARD1. MID and CARD2. MID are machine language programs and are referred to as intermediate code files for convenience.

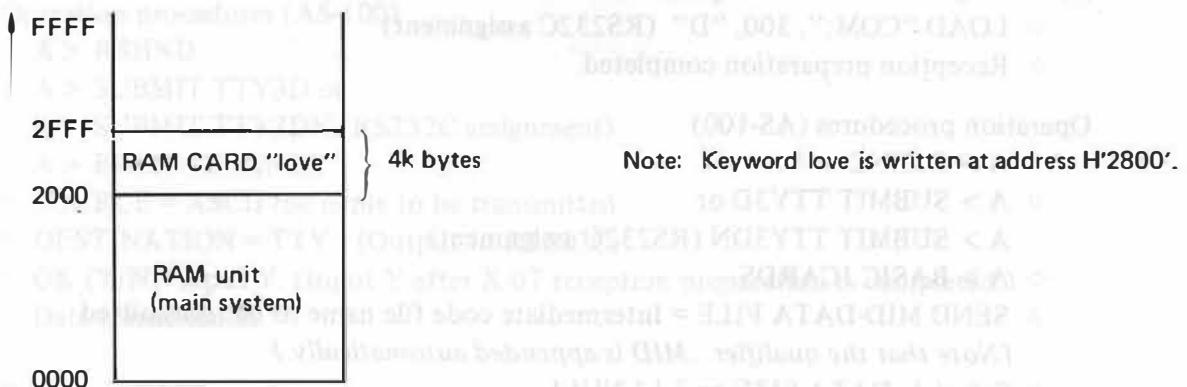
#### 4.4 CARD1.MID, CARD2.MID Preparations and Procedures

Store CARD1.MID or CARD2.MID in the RAM card (with 4k byte backup) by using JCARDR.X07 on the X-07 side with the ROM/RAM switch set to ROM.

##### 4.4.1 CARD1. MID outline

This program (machine language) is written in the 4k byte RAM card to check devices such as the RAM.

Before control is transferred to the BASIC, execute this program by use of the love keyword.



##### 4.4.2 CARD1. MID generation

1. Load the JCARDR. X07 in the normal X07, then execute the program. (ROM/RAM switch must be set to ROM.)
2. Transfer the CARD1. MID from the AS-100. (See Figure 1 for details.)
3. Initialize the text area by using the NEW command, then load the JRAM. X07 in the text area execute it.  
(When the JRAM. X07 is executed, parameters are written in the CARD1. MID and keyword love is prepared. (See Figure 2 for details.)

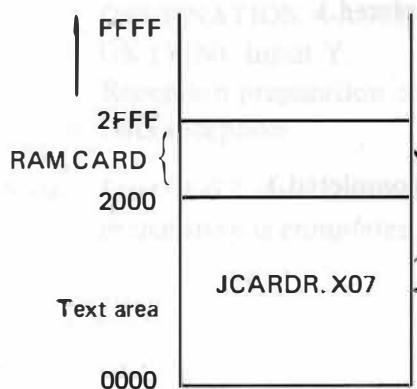


Fig. 1

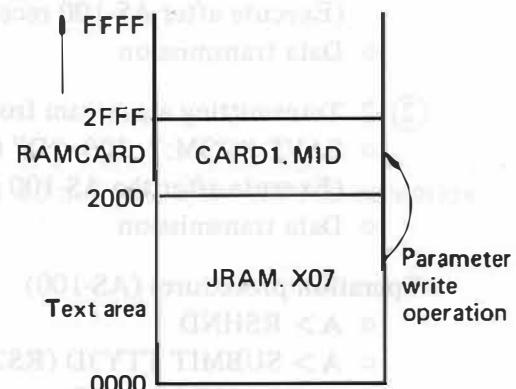


Fig. 2

#### 4.4.3 CARD1. MID execution

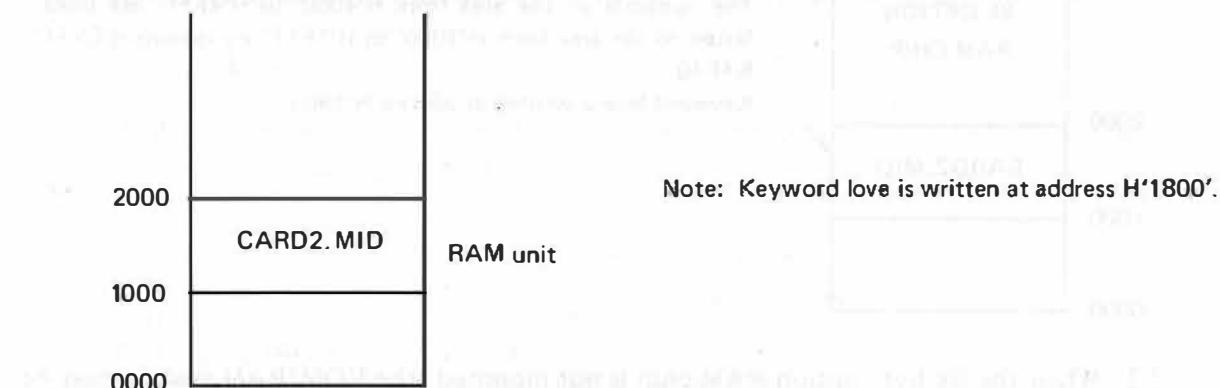
1. Install the RAM card generated as explained in Section 4.4.2 in the X-07 to be checked. The ROM/RAM switch of the X-07 must be set to ROM.
2. Turn power on, then control is passed to the CARD1. MID in the RAM card through keyword love.
3. To terminate the program, press the RESET switch.
4. To output a report, remove the RAM card from the X-07 to be checked, then install it in the normal X-07 and execute the JRAM. X07.

*Note: Execute the FSET4096 before generating the CARD1. MID.*

#### 4.4.4 CARD2. MID outline

This program (machine language) is written in the RAM to check the RAM card and 8k byte option chip.

Execute this program by use of keyword love before control is passed to the BASIC.



#### 4.4.5 CARD2. MID generation

1. Load the JCARDR. X07 in the normal X-07 and execute the program. (The ROM/RAM switch must be set to ROM.)
2. Transfer the CARD2. MID from the AS-100. (See Figure 3 for details.)
3. Initialize the text area by using the NEW command, then load the JRAM2.X07 in the text area and execute it.  
(When the program is executed, parameters are written in the CARD2. MID in the RAM card. Keyword love has not been written yet.) (See Figure 4 for details.)

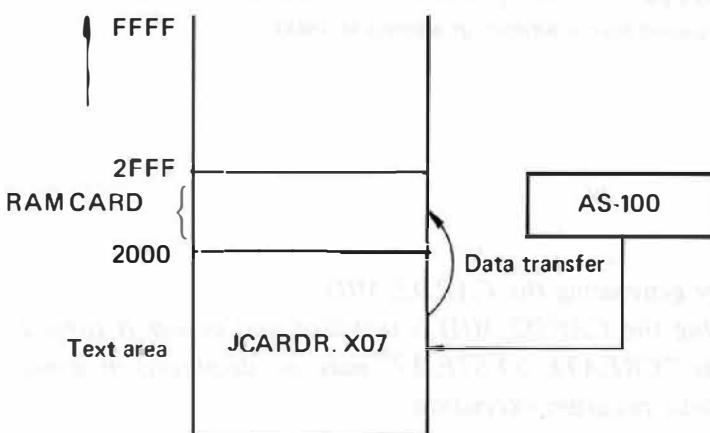


Fig. 3

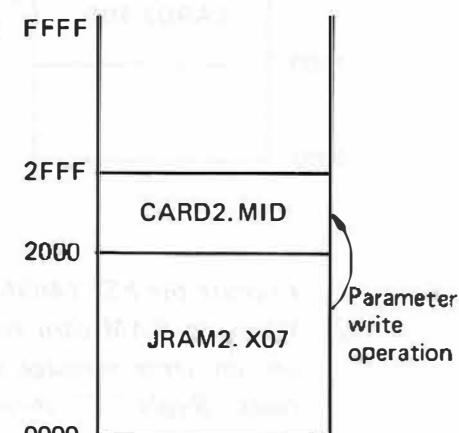
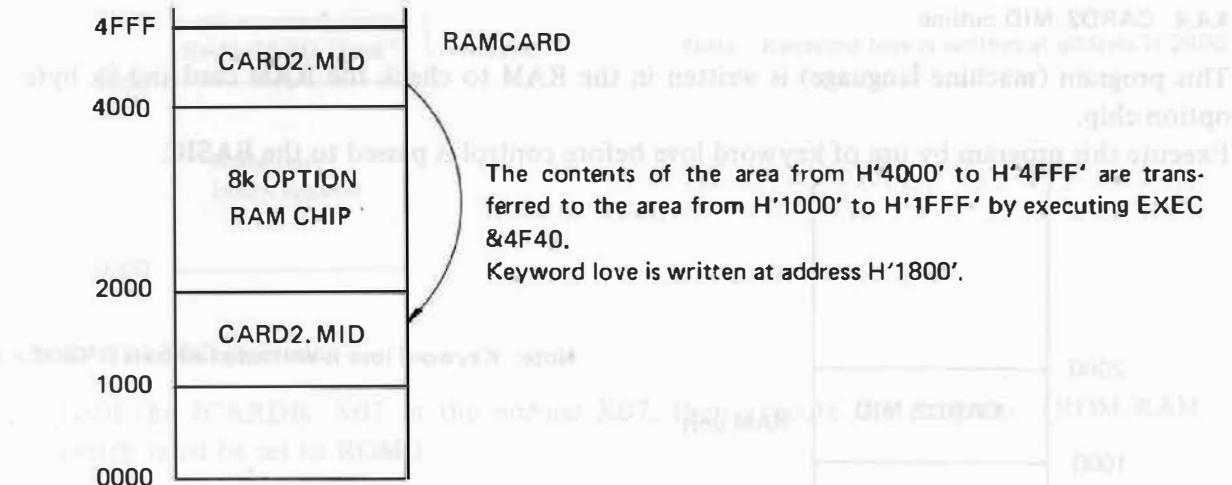


Fig. 4

#### 4.4.6 CARD2.MID execution

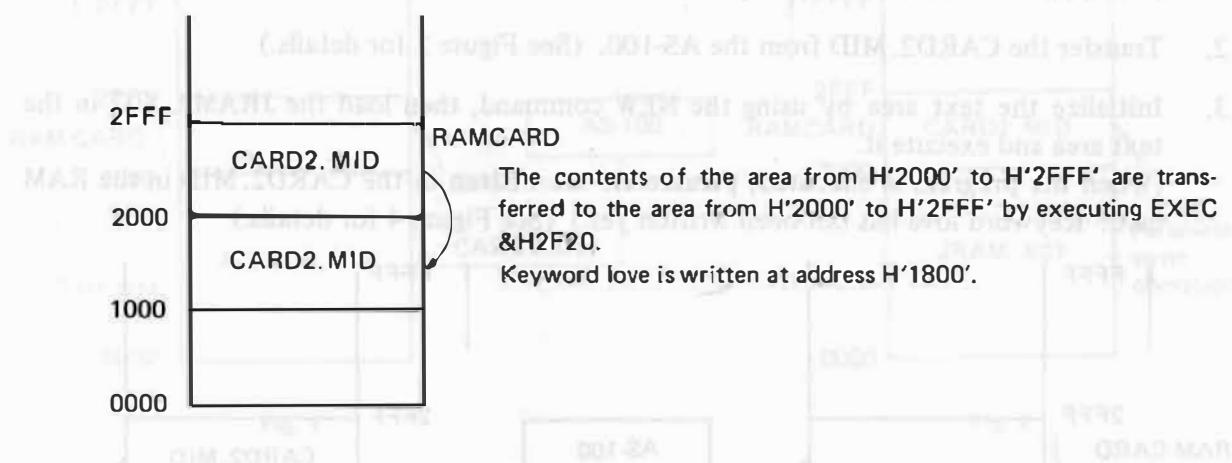
1. Install the RAM card generated as explained in Section 4.4.5 in the X-07 to be checked. The ROM/RAM switch of the X-07 to be checked may be set to ROM or RAM.
2. The following two operations are used depending on whether the 8k byte option RAM chip is mounted or not.
  - 2.1 When the 8k byte option RAM chip is mounted (the ROM/RAM switch must be set to RAM)

Since the RAM card address ranges from H'4000' to H'4FFF', execute the EXEC &H4F40 and load the CARD2.MID from the RAM card in the RAM of the main system beginning from an address greater than H'1000'.



- 2.2 When the 8k byte option RAM chip is not mounted (the ROM/RAM switch must be set to ROM.)

Since the RAM card address ranges from H'2000' to H'2FFF', execute EXEC &H2F20 to load the CARD2.MID from the RAM card in the RAM of the main system beginning from an address greater than H'1000'.



- Notes:**
1. Execute the FSET4096 before generating the CARD2.MID.
  2. When an RAM card containing the CARD2.MID is installed and power is turned on, an error message such as "CREATE SYSTEM?" may be displayed in some cases. Reply "Y", then continue program execution.

## 5. SIMPLIFIED CHECKS

### 5.1 Simplified RAM Check (JUSER)

RAM read/write operations can be performed by inputting and executing the following program when the X-07 is operating normally:

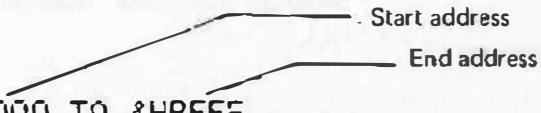
```
10 CLS:PRINT"RAM CHECK":A=&H55:PRINT"DATA=";HEX$(A)
20 FOR I=&H2000 TO &H3FFF
30 POKE I,A
40 NEXT I
50 FOR I=&H2000 TO &H3FFF
60 IF A<>PEEK(I)THEN PRINT"ERR ";HEX$(I);";HEX$(A):END
70 NEXT I
75 PRINT"* OK"
80 IF A=&HAA THEN PRINT "*END":END
90 A=&HAA:PRINT"DATA=";HEX$(A):GOTO 20
```

See Section 2.3 JUSER.X07 for details.

### 5.2 Simplified ROM Check

The ROM sum check value can be obtained by inputting and executing the following program when the X-07 is operating normally:

```
10 A=0
20 FOR I=&H8000 TO &HBFFF
30 A=PEEK(I)+A:IF A>=256 THEN A=A-256
40 NEXT I
50 PRINT HEX$(A):END
```



### 5.3 Simplified Parallel Port Check

Connect the color graphic printer (X-710), then operate as follows:

- ① LPRINT [\*1,\*2] [RETURN]  
where: \*1 is the character size (1~16).  
\*2 is the color assignment (0 for black, 1 for blue, 2 for green, and 3 for red).
- ② Load or generate the pertinent program in the text area.
- ③ LLIST [RETURN]

## 5.4 Simplified Serial Port Check

### (1) Loop test

Arrange pin connections for the loop test in which signals are returned in the serial port or level converter in the system. (See Section 2.5 JSERI.X07 for details.)

Execute the following program:

```
10 INIT #1, "COM:", 300, 'D'  
20 FOR I = 1 TO 10  
30 OUT #1, &H55  
40 PRINT HEX$(INP(#1)); I  
50 NEXT I  
60 END
```

Input/output count is 10.

Data value is 55 in hexadecimal notation.

### (2) Communication check

Connect two X-07s, then operate as follows:

X-07 (A)	X-07 (B)
1. Load or generate the program in the text area.	1. NEW [RETURN]
2. Execute SAVE "COM:" or SAVE "OPT:"	2. Execute LOAD "COM:" or LOAD "OPT:"
	3. Execute a LIST command to confirm that the program has been transferred from the X-07 (A).

## 5.5 Simplified Cassette Check

Execute the CSAVE and CLOAD commands to confirm that the program has been stored normally in the tape cassette.

1. Load or generate the program in the text area.
2. Prepare the cassette recorder for recording.
3. CSAVE "TST" [RETURN]
4. After SAVE is completed, rewind the cassette tape, then CLOAD? "TST" [RETURN]
5. If normal, the FOUND message is output and the cursor blinks.  
If abnormal or if an error occurs, the FOUND message is not output. A BAD message is output in this case.

Note: 1. Leave the F1 function before generating the CARD2 MID.

2. When an RAM card containing the CARD2 MID is inserted and power is turned on, an error message such as "CREATE SYSTEM" may be displayed. In some cases, after "XT" disappears, program execution

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