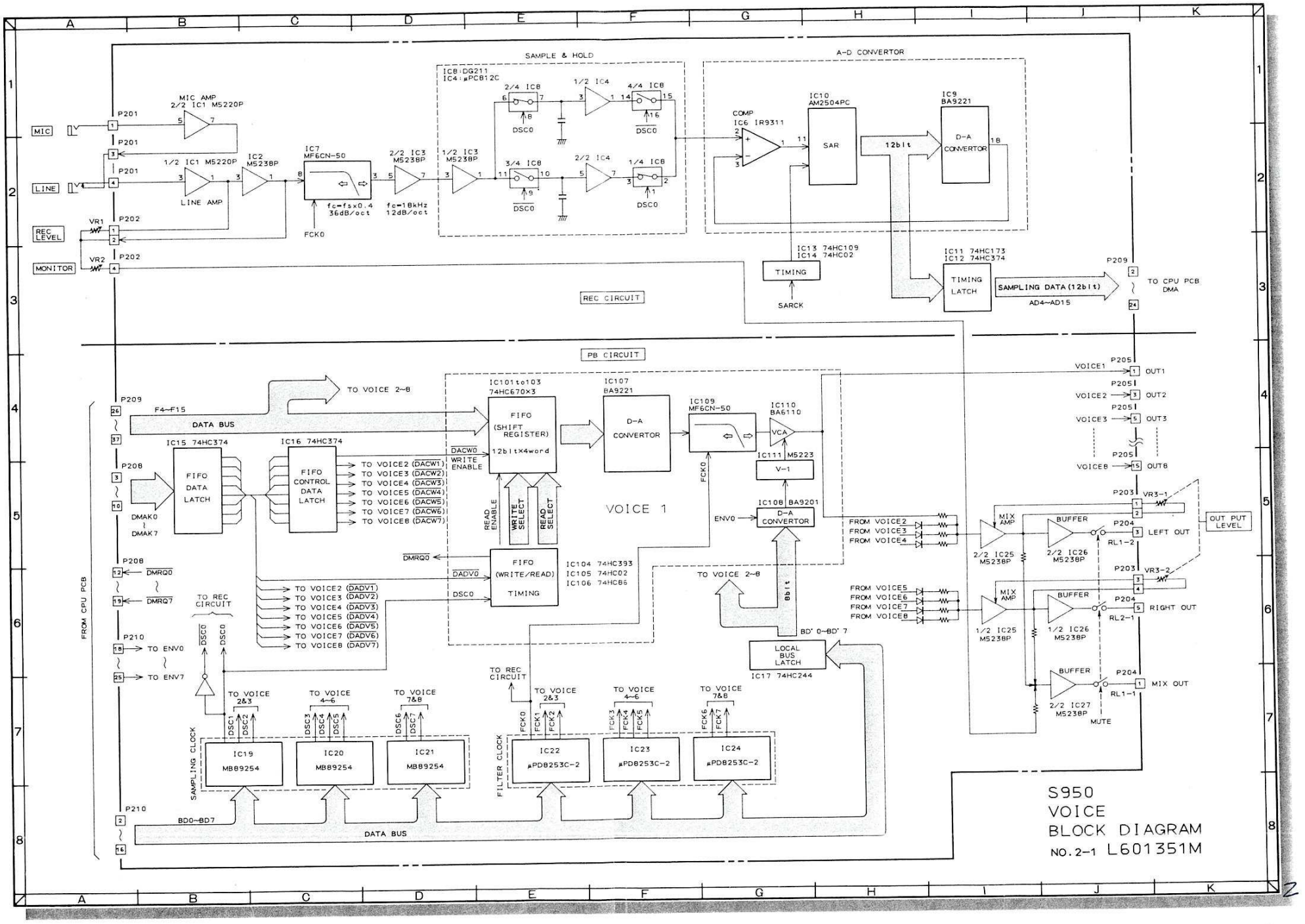
AKAI

MODEL S950

SCHEMATIC DIAGRAMS AND PC BOARDS

TABLE OF CONTENTS


SAMPLE & HOLD
IC8:DG211
IC4:μPC812C
A-D CONVERTOR
MIC AMP
2/2 IC1 M5220P
MIC
LINE
LINE AMP
REC LEVEL
MONITOR
VR1
VR2
P201
P202
IC2 M5238P
IC7 MF6CN-50
fc=fsx0.4
36dB/oct
fc=18kHz
12dB/oct
FCK0
2/2 IC3 M5238P
DSC0
COMP IC6 IR9311
IC10 AM2504PC
SAR
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IC9 BA9221
D-A CONVERTOR
IC13 74HC109
IC14 74HC02
TIMING
SARCK
IC11 74HC173
IC12 74HC374
TIMING LATCH
SAMPLING DATA (12bit)
AD4~AD15
P209
TO CPU PCB
DMA
REC CIRCUIT
PB CIRCUIT
FROM CPU PCB
P209
F4~F15
DATA BUS
TO VOICE 2~8
IC101to103
74HC670X3
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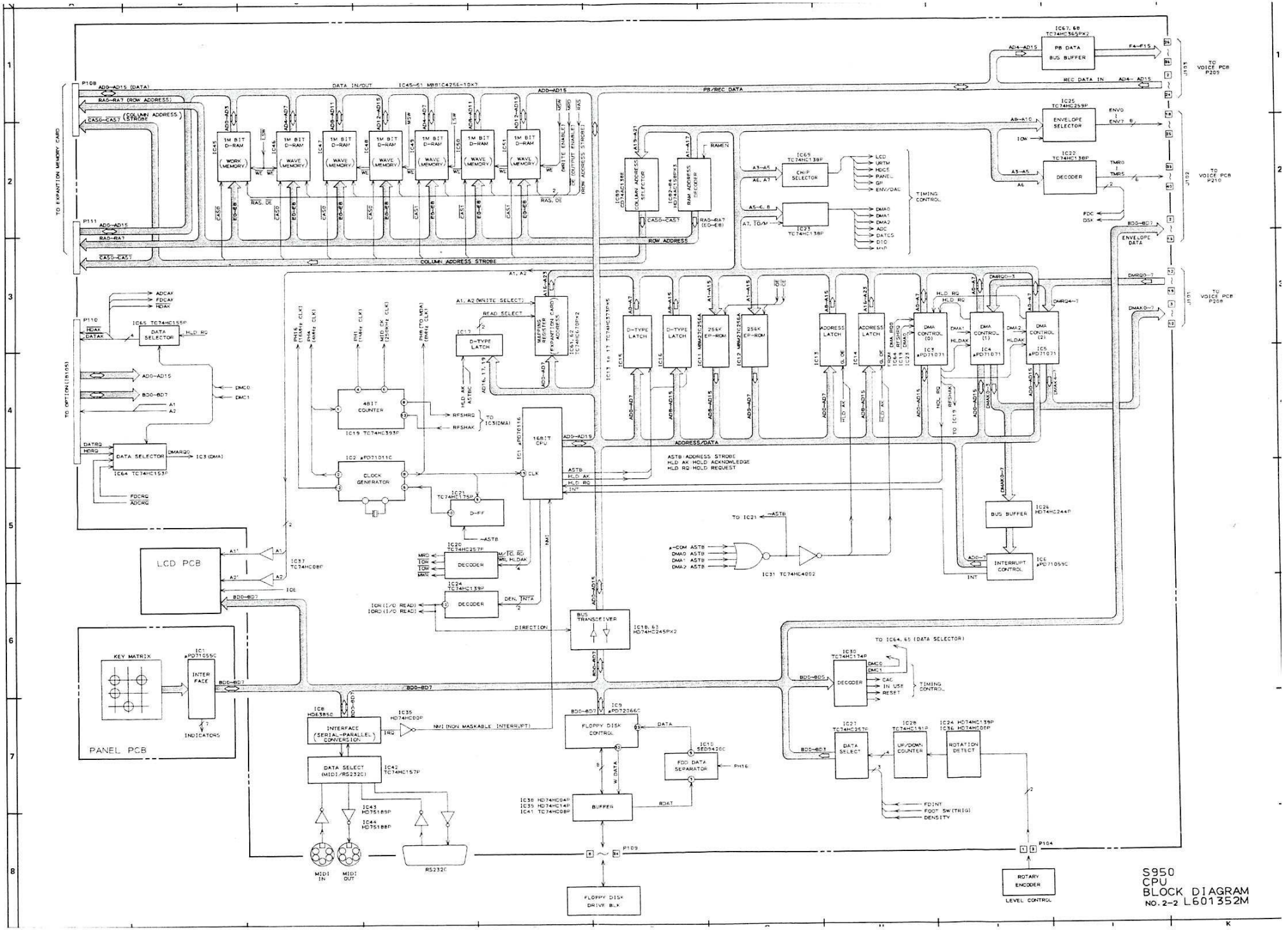
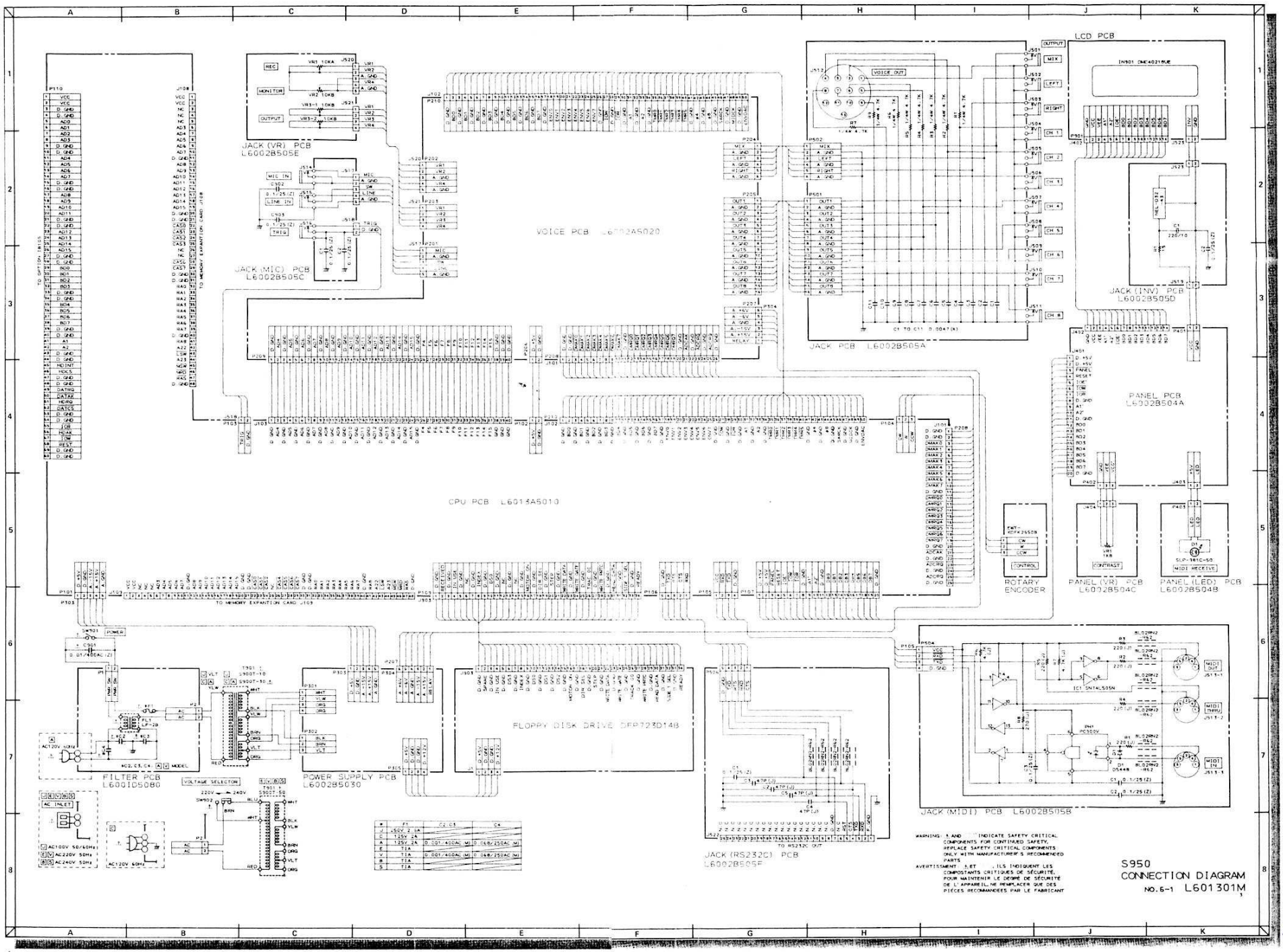
(SHIFT REGISTER)
12bitx4word
IC107
BA9221
D-A CONVERTOR
IC109
MF6CN-50
IC110
BA6110
VCA
IC111 M5223
V-1
IC108 BA9201
D-A CONVERTOR
ENV0
FCK0
DACW0
WRITE ENABLE
READ ENABLE
WRITE SELECT
READ SELECT
VOICE 1
IC15 74HC374
FIFO DATA LATCH
IC16 74HC374
FIFO CONTROL DATA LATCH
DMAK0
~
DMAK7
TO VOICE2 (DACW1)
TO VOICE3 (DACW2)
TO VOICE4 (DACW3)
TO VOICE5 (DACW4)
TO VOICE6 (DACW5)
TO VOICE7 (DACW6)
TO VOICE8 (DACW7)
DMRQ0
DADV0
DSC0
FIFO (WRITE/READ) TIMING
IC104 74HC393
IC105 74HC02
IC106 74HC86
TO VOICE2 (DADV1)
TO VOICE3 (DADV2)
TO VOICE4 (DADV3)
TO VOICE5 (DADV4)
TO VOICE6 (DADV5)
TO VOICE7 (DADV6)
TO VOICE8 (DADV7)
TO REC CIRCUIT
DSC0
DSC0
TO VOICE 2~8
8bit
BD' 0~BD' 7
LOCAL BUS LATCH
IC17 74HC244
P210
TO ENV0
~
TO ENV7
TO VOICE 2&3
TO VOICE 4~6
TO VOICE 7&8
SAMPLING CLOCK
DSC1
DSC2
DSC3
DSC4
DSC5
DSC6
DSC7
IC19 MB89254
IC20 MB89254
IC21 MB89254
FILTER CLOCK
FCK1
FCK2
FCK3
FCK4
FCK5
FCK6
FCK7
IC22 μPD8253C-2
IC23 μPD8253C-2
IC24 μPD8253C-2
BD0~BD7
DATA BUS
P205
VOICE1
OUT1
VOICE2
OUT2
VOICE3
OUT3
VOICE8
OUT8
FROM VOICE2
FROM VOICE3
FROM VOICE4
FROM VOICE5
FROM VOICE6
FROM VOICE7
FROM VOICE8
MIX AMP
2/2 IC25 M5238P
1/2 IC25 M5238P
BUFFER
2/2 IC26 M5238P
1/2 IC26 M5238P
2/2 IC27 M5238P
MUTE
P203
VR3-1
VR3-2
P204
LEFT OUT
RIGHT OUT
MIX OUT
RL1-2
RL2-1
RL1-1
OUT PUT LEVEL
S950
VOICE
BLOCK DIAGRAM
NO.2-1 L601351M


S950
CPU
BLOCK DIAGRAM
NO. 2-2 L601352M
TO EXPANTION MEMORY CARD
TO VOICE PCB P209
TO VOICE PCB P210
TO VOICE PCB P208
TO OPTION(I/O105)
LCD PCB
PANEL PCB
KEY MATRIX
INDICATORS
MIDI IN
MIDI OUT
RS232C
FLOPPY DISK DRIVE BLK
ROTARY ENCODER
LEVEL CONTROL
PB DATA BUS BUFFER
REC DATA IN
ENVELOPE SELECTOR
DECODER
CHIP SELECTOR
TIMING CONTROL
ENVELOPE DATA
DATA IN/OUT
PB/REC DATA
ROW ADDRESS
COLUMN ADDRESS STROBE
ADDRESS/DATA
ASTB ADDRESS STROBE
HLD AK HOLD ACKNOWLEDGE
HLD RQ HOLD REQUEST
1M BIT D-RAM
WORK MEMORY
WAVE MEMORY
COLUMN ADDRESS SELECTOR
RAM ADDRESS DECODER
D-TYPE LATCH
256K EP-ROM
ADDRESS LATCH
DMA CONTROL (0)
DMA CONTROL (1)
DMA CONTROL (2)
BUS BUFFER
INTERRUPT CONTROL
DATA SELECTOR
4BIT COUNTER
CLOCK GENERATOR
16BIT CPU
BUS TRANSCEIVER
INTERFACE (SERIAL-PARALLEL CONVERSION)
DATA SELECT (MIDI/RS232C)
FLOPPY DISK CONTROL
FDD DATA SEPARATOR
BUFFER
UP/DOWN COUNTER
ROTATION DETECT
NMI (NON MASKABLE INTERRUPT)


JACK (VR) PCB
L6002B505E
JACK (MIC) PCB
L6002B505C
VOICE PCB L6003A5020
JACK PCB L6002B505A
LCD PCB
JACK (INV) PCB
L6002B505D
PANEL PCB
L6002B504A
CPU PCB L6013A5010
ROTARY
ENCODER
PANEL (VR) PCB
L6002B504C
PANEL (LED) PCB
L6002B504B
FLOPPY DISK DRIVE DFP723D14B
FILTER PCB
L6001D5080
POWER SUPPLY PCB
L6002B5030
JACK (MIDI) PCB L6002B505B
JACK (RS232C) PCB
L6002B505F
S950
CONNECTION DIAGRAM
NO.6-1 L601301M

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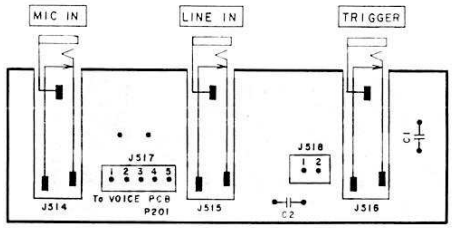
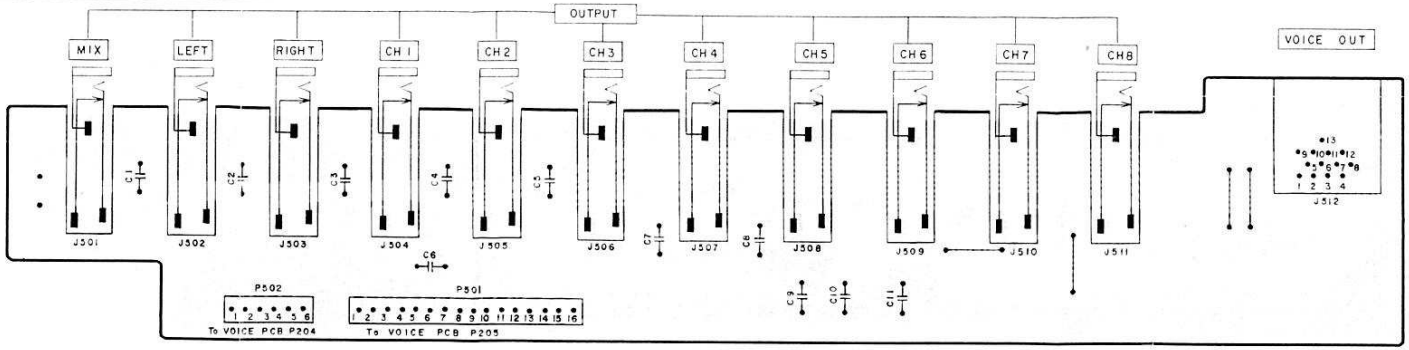
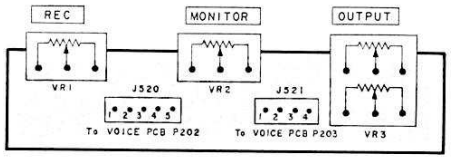


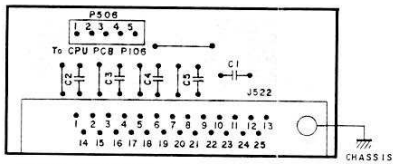
JACK (MIC) PCB L6002B505C



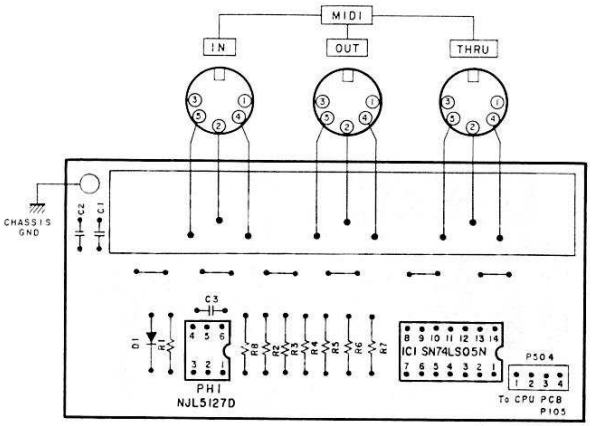
JACK PCB L6002B505A



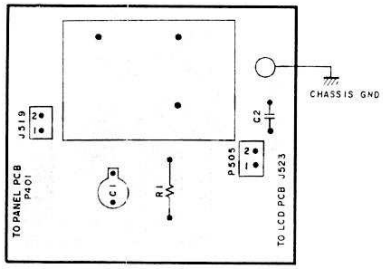
JACK (VR) PCB L6002B505E



JACK (RS232C) PCB L6002E505F

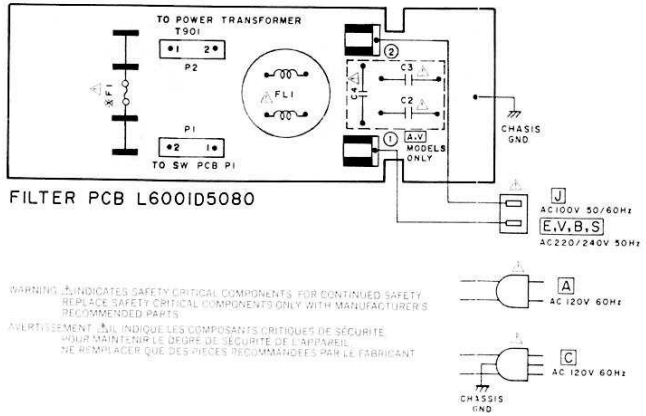


JACK (MIDI) PCB L6002B505B



JACK (INV) PCB L6002B505D

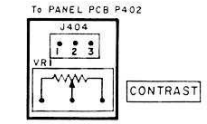
※	J	C.A	E.V.S.B
F1	1.25A250V	1.6A 125A	T500mA 250V



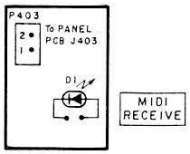
FILTER PCB L6001D5080

WARNING ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

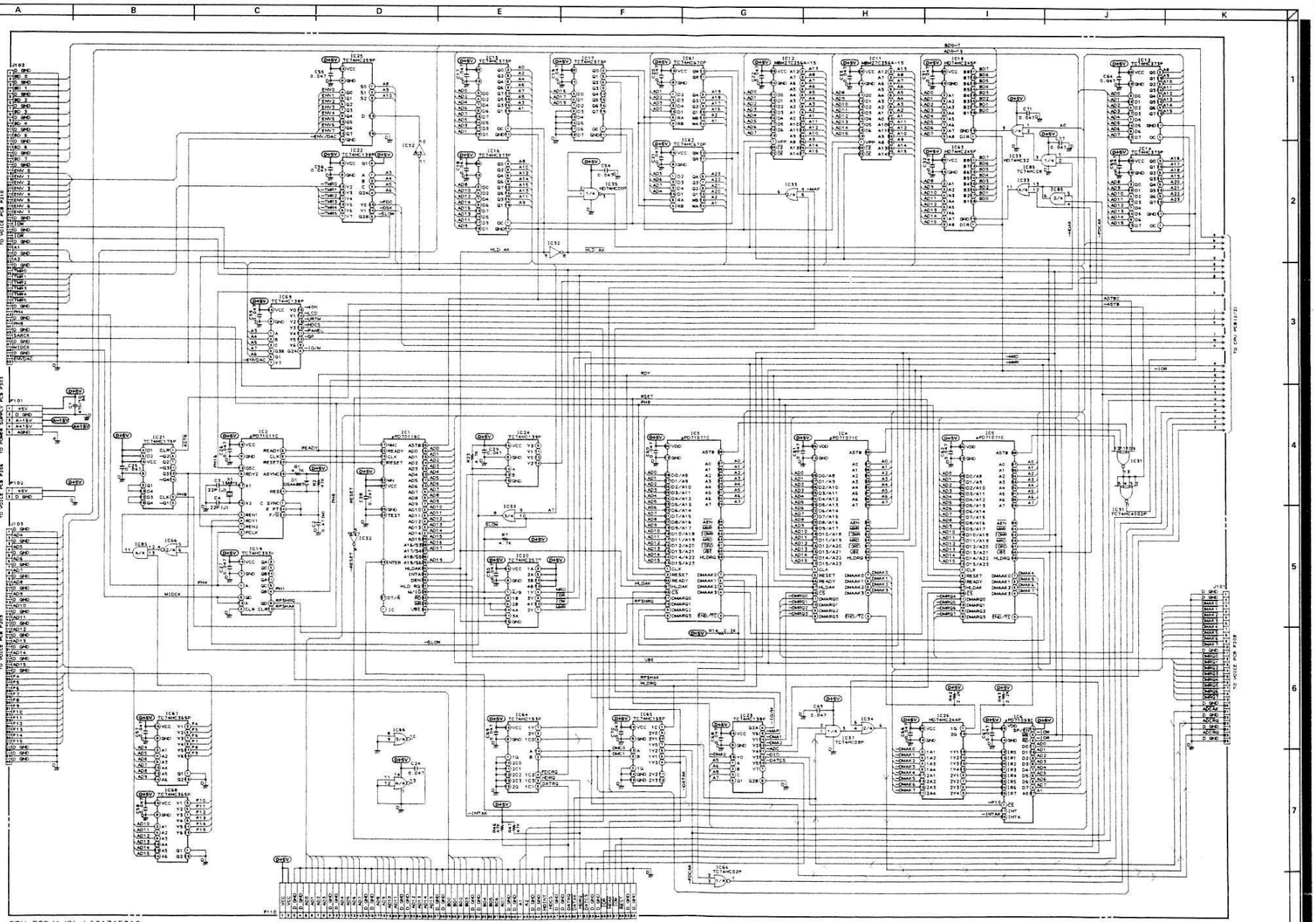
AVERTISSEMENT ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.



PANEL (VR) PCB
L6002B504C

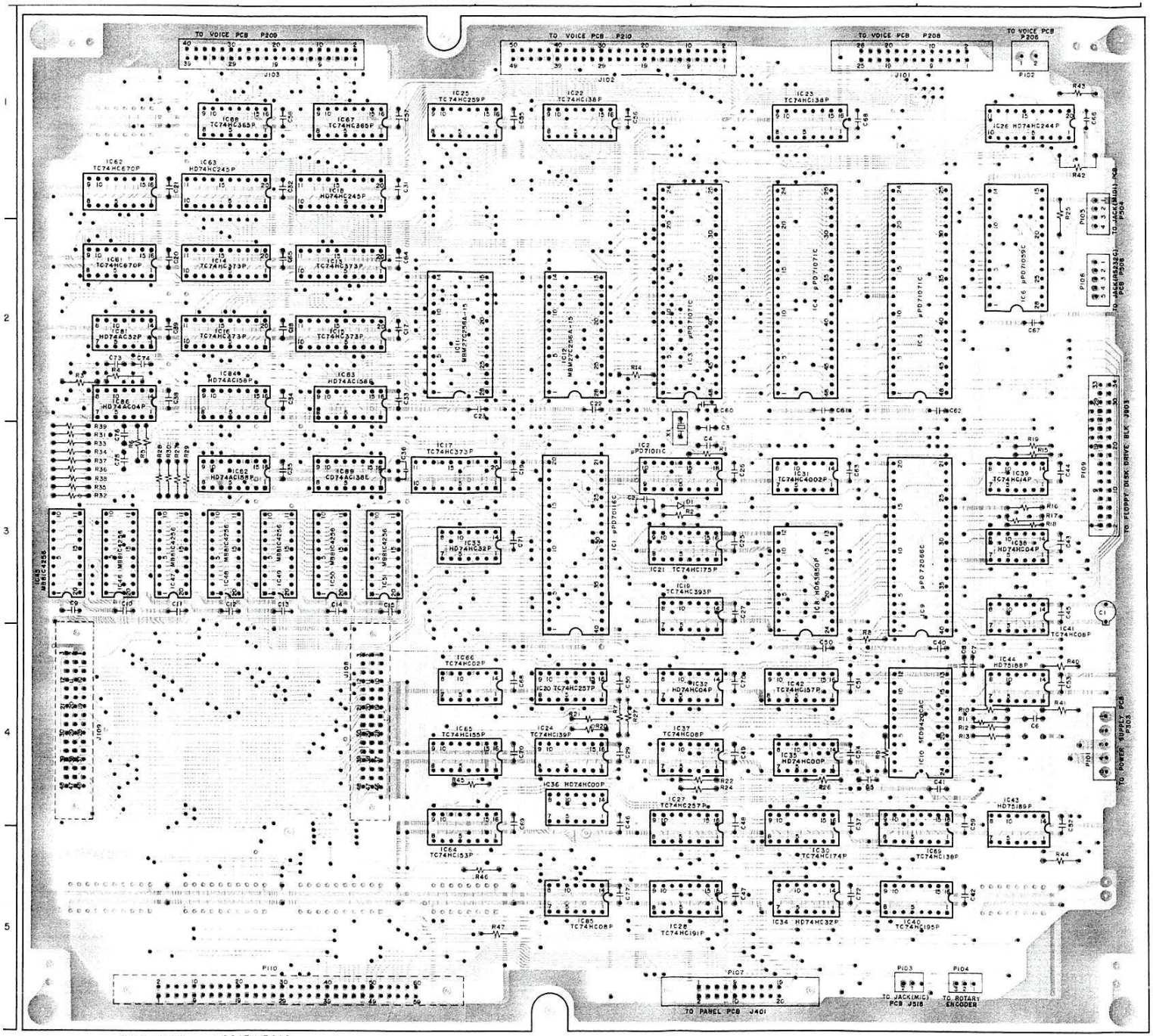


PANEL (LED) PCB
L6002B504B



CPU PCB (1/2) L6013A5010

S950
CPU PCB (1/2)
SCHEMATIC DIAGRAM
NO.6-2 L601302M



CPU PCB L6013A5010

LOCATION OF COMPONENTS

ICs

IC1....C3	IC36....C4	
IC2....B,C3	IC37....B,C4	
IC3....B,C2	IC38....A3	
IC4....B2	IC39....A3	
IC5....A,B2	IC40....A,B5	
IC6....A1,2	IC41....A3	
IC8....B3	IC42....B4	
IC9....A,B3	IC43....A4,5	
IC10....A,B4	IC44....A4	
IC11....D2	IC45....E3	
IC12....C2	IC46....E3	
IC13....D2	IC47....E3	
IC14....D,E2	IC48....E3	
IC15....D2	IC49....D3	
IC16....D,E2	IC50....D3	
IC17....C,D3	IC51....D3	
IC18....D1	IC61....E2	
IC19....B,C3	IC62....E1	
IC20....C4	IC63....D,E1	
IC21....B,C3	IC64....D4,5	
IC22....C1	IC65....C,D4	
IC23....B1	IC66....C,D4	
IC24....C4	IC67....D1	
IC25....C,D1	IC68....D,E1	
IC26....A1	IC69....A4,5	
IC27....B,C5	IC81....E2	
IC28....B,C5	IC82....E3	
IC30....B4,5	IC83....D2	
IC31....B3	IC84....D,E2	
IC32....B,C4	IC85....C5	
IC33....C,D3	IC86....E2	
IC34....B5	IC89....D3	
IC35....B4		

CONNECTORs

J101....A,B1
P101....A4
J102....B1
P102....A1
J103....D,E1
P103....A,B5
P104....A5
P105....A1,2
P106....A2
P107....B,C5
J109....E2
P109....A3
P110....D,E5
P208....A,B1

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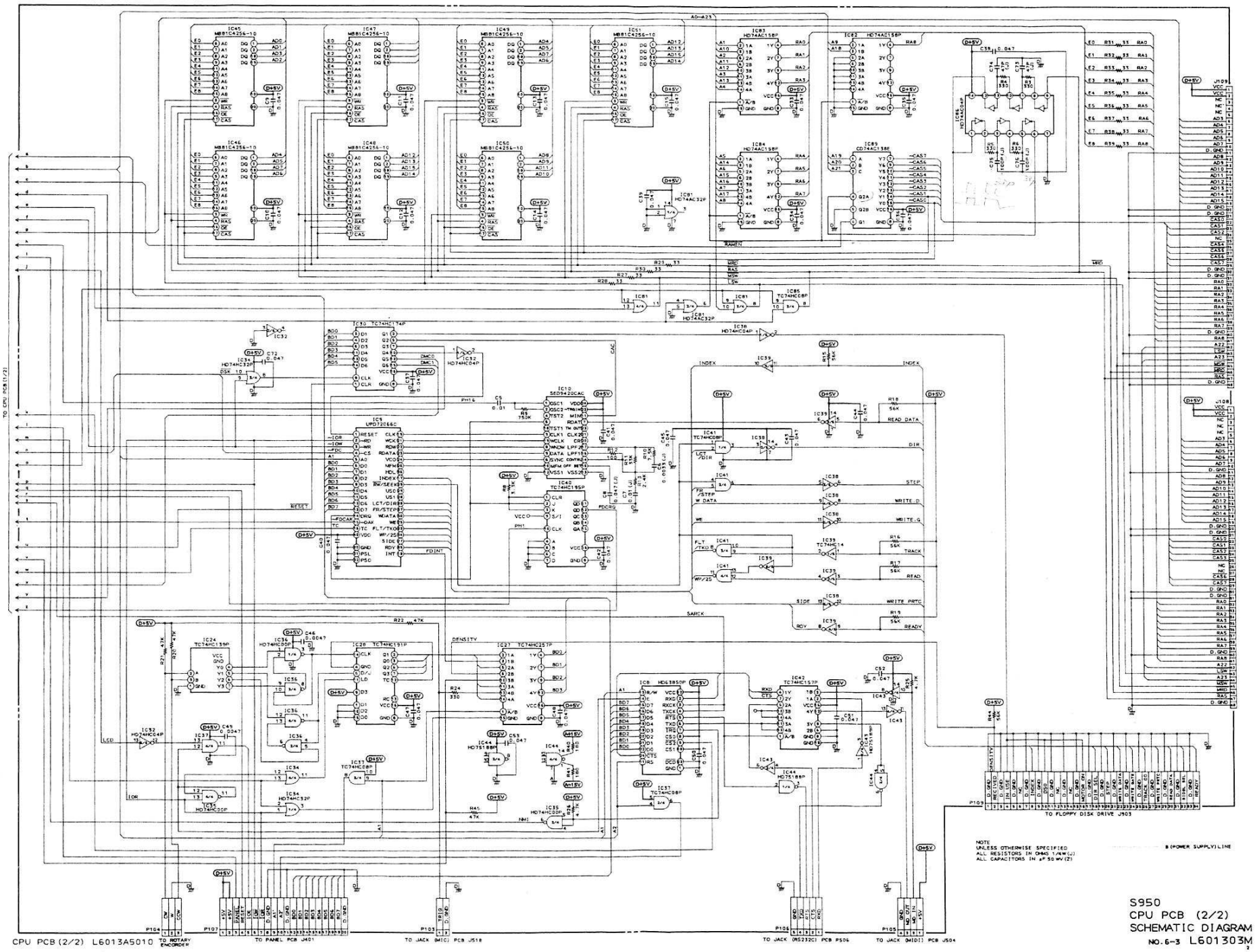
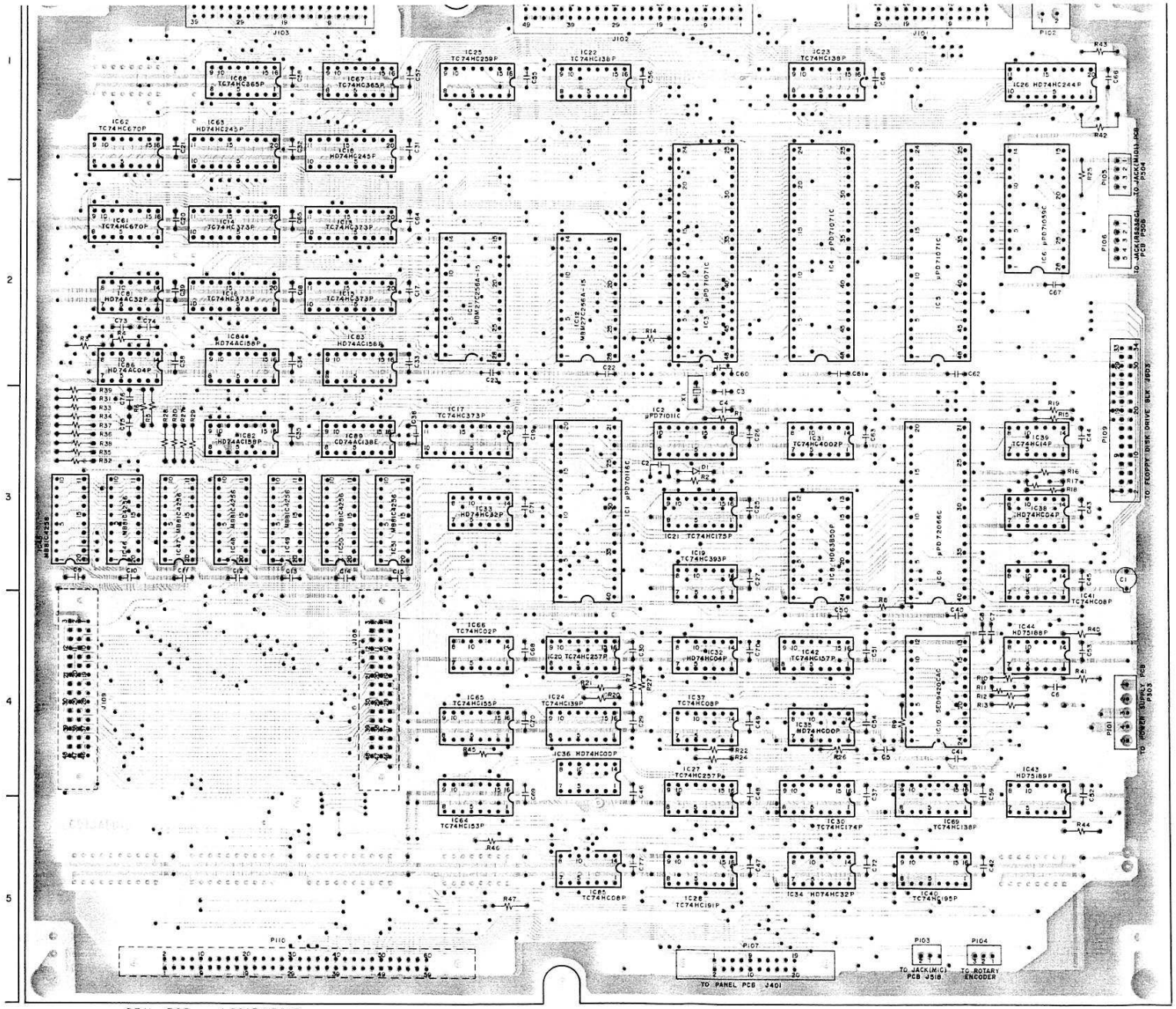
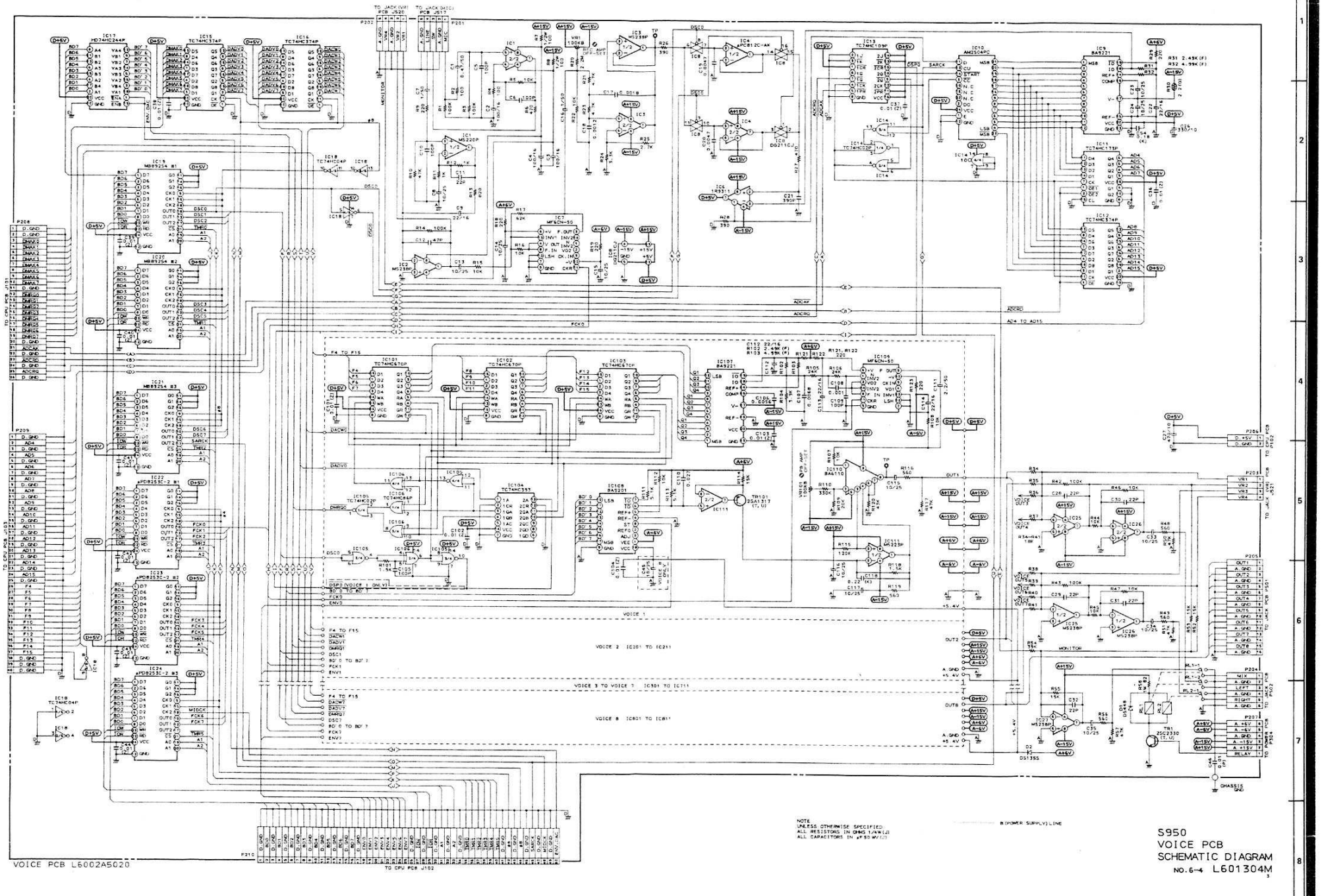
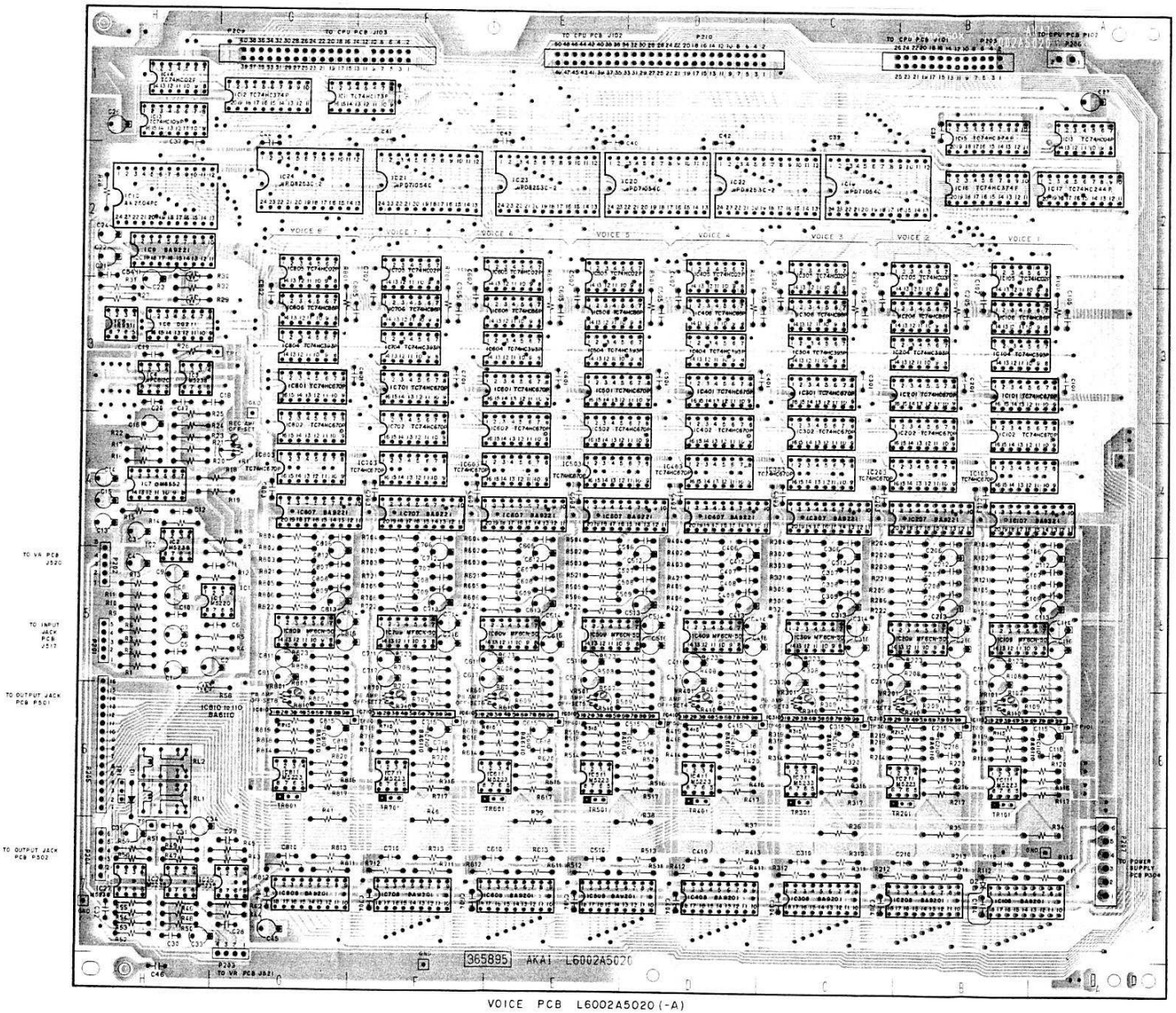

S950
CPU PCB (2/2)
SCHEMATIC DIAGRAM
NO.6-3 L601303M
CPU PCB (2/2) L6013A5010
TO CPU PCB(1/2)
TO FLOPPY DISK DRIVE J503
TO ROTARY ENCODER
TO PANEL PCB J401
TO JACK (MIC) PCB J518
TO JACK (RS232C) PCB PS06
TO JACK (MIDI) PCB J504
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W (J)
ALL CAPACITORS IN μF 50 WV (Z)
B (POWER SUPPLY) LINE



CPU PCB L6013A5010

IC1.....C3
IC2.....B,C3
IC3.....B,C2
IC4.....B2
IC5.....A,B2
IC6.....A1,2
IC8.....B3
IC9.....A,B3
IC10....A,B4
IC11....D2
IC12....C2
IC13....D2
IC14....D,E2
IC15....D2
IC16....D,E2
IC17....C,D3
IC18....D1
IC19....B,C3
IC20....C4
IC21....B,C3
IC22....C1
IC23....B1
IC24....C4
IC25....C,D1
IC26....A1
IC27....B,C5
IC28....B,C5
IC30....B4,5
IC31....B3
IC32....B,C4
IC33....C,D3
IC34....B5
IC35....B4
IC36....C4
IC37....B,C4
IC38....A3
IC39....A3
IC40....A,B5
IC41....A3
IC42....B4
IC43....A4,5
IC44....A4
IC45....E3
IC46....E3
IC47....E3
IC48....E3
IC49....D3
IC50....D3
IC51....D3
IC61....E2
IC62....E1
IC63....D,E1
IC64....D4,5
IC65....C,D4
IC66....C,D4
IC67....D1
IC68....D,E1
IC69....A4,5
IC81....E2
IC82....E3
IC83....D2
IC84....D,E2
IC85....C5
IC86....E2
IC89....D3
J101....A,B1
P101....A4
J102....B1
P102....A1
J103....D,E1
P103....A,B5
P104....A5
P105....A1,2
P106....A2
P107....B,C5
J109....E2
P109....A3
P110....D,E5
P208....A,B1

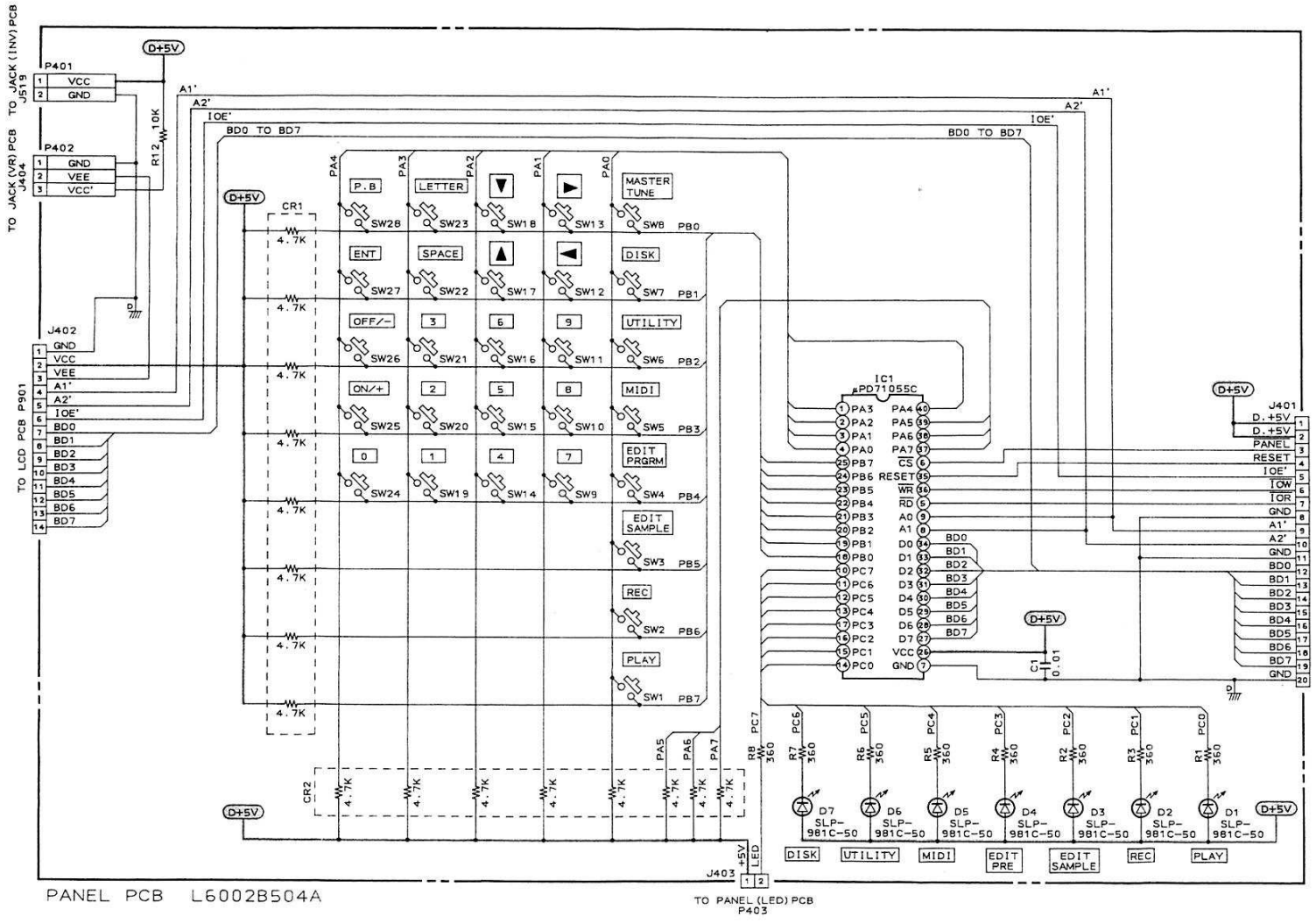

VOICE PCB L6002A5020
S950
VOICE PCB
SCHEMATIC DIAGRAM
NO.6-4 L601304M
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W (J)
ALL CAPACITORS IN µF 50 WV (J)
B (POWER SUPPLY) LINE
TO CPU PCB J102
TO CPU PCB J103
TO CPU PCB J101
TO JACK PCB J521
TO JACK PCB J511
TO JACK PCB J501
TO PANEL PCB J202
TO PANEL PCB J203
CHASSIS GND
VOICE 1
VOICE 2 IC201 TO IC211
VOICE 3 TO VOICE 7 IC301 TO IC711
VOICE 8 IC801 TO IC811
MONITOR



VOICE PCB L6002A5020(-A)

B
: NPN TRANSISTOR
: PNP TRANSISTOR

E C B
2SA1317
2SC2330

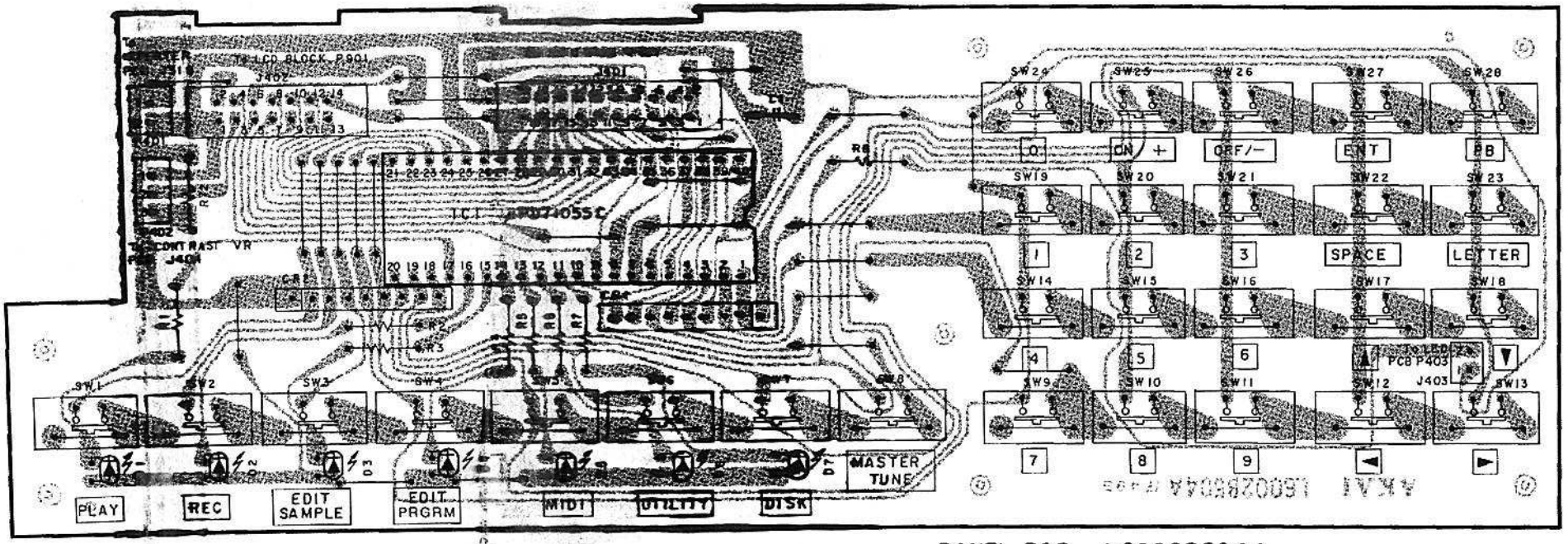


PANEL PCB L6002B504A

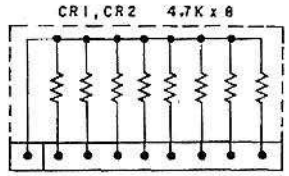
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W (J)
ALL CAPACITORS IN μF 50WV (P)

B (POWER SUPPLY) LINE

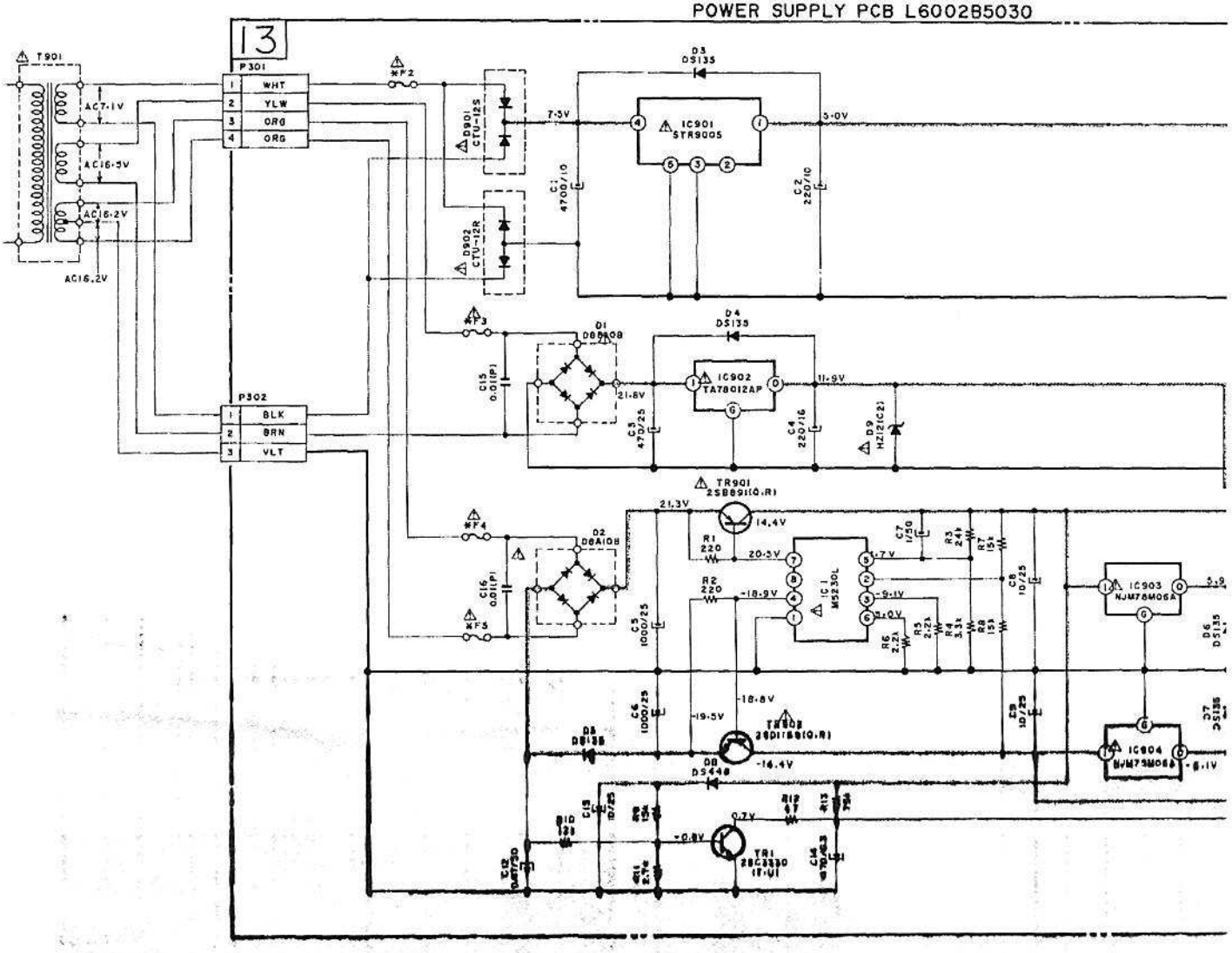
S950
PANEL PCB
SCHEMATIC DIAGRAM
NO. 6-5 L601305M
2



PANEL PCB L6002B504A



POWER SUPPLY PCB L600285030



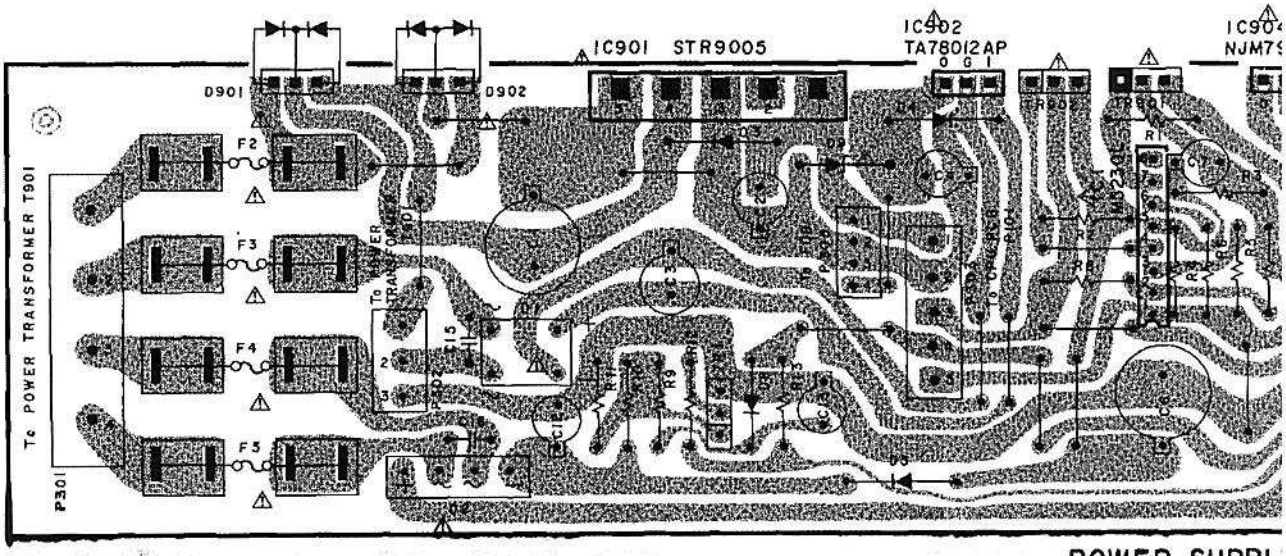
⚠	F2	F3	F4	F5
U	250V 4A	250V 630mA	250V 1A	250V 1A
C, A	125V 4A	125V 630mA	125V 1A	125V 1A
E, V, T, B	T3.15A	T630mA	T800mA	T800mA

+B (POWER SUPPLY) LINE

NOTES
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50 WV(J)
(FS) = FAIL SAFE RESISTORS

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFE REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTU RECOMMENDED PARTS

AVERTISSEMENT: ⚠ IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACEF COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SI QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT



POWER SUPPL

: PNP TRANSISTOR

: NPN TRANSISTOR

2SD3330

2SB891
2SD1188

WARNING: ⚠INDICATES SAFETY CRIT
REPLACE SAFETY CRITIC
RECOMMENDED PARTS

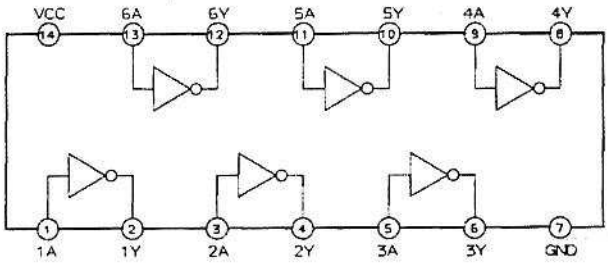
AVERTISSEMENT: ⚠IL INDIQU LES C
MAINTENIR LE DEGRE DE
CONPOSANTS DONT LE F
QUE PAR DES PIECES RE

INFORMATION OF IC's

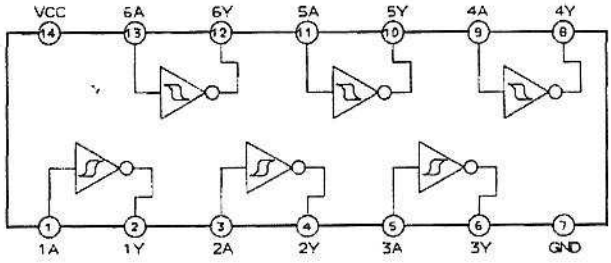
NAME OF IC	FUNCTION
HD74HC00P	Quad 2-Input NAND Gate
TC74HC02P	Quad 2-Input NOR Gate
HD74AC04P	Hex Inverter (Hi-speed)
HD74HC04P	Hex Inverter
SN74LS05P	Hex Inveter (Open COLLECTOR)
TC74HC08P	Quad 2-Input AND Gate
TC74HC14P	Hex Schmitt Inverter
HD74AC32P	Qund 2-Input OR Gate (Hi-speed)
HD74HC32P	Quad 2-Input OR Gate
TC74HC86P	Quad 2-Input Exclusive OR Gate
TC74HC109P	Dual JK Flip-Flop with Preset and Clear
CD74AC138E	3 to 8-Line Decoder/Demultiplexer (INV)
TC74HC138P	3 to 8-Line Decoder
TC74HC139P	Dual 2 to 4-Line Decoder
TC74HC153P	Dual 4 to 1-Line Multiplexer
TC74HC155P	Dual 2 to 4-Line Decoder/Demultiplexer
TC74HC157P	Quad 2 to 1-Line Multiplexer
HD74AC158P	Quad 2 to 1-Line Multiplexer(INV)
TC74HC173P	3 State Quad D-Type Register
TC74HC174P	Hex D-Type Flip-Flop
TC74HC175P	Quad D-Type Flip-Flop
TC74HC191P	Presetable 4-Bit Binary UP/DOWN counter
TC74HC195P	4-Bit Parallel Shift Register
HD74HC244P	Octal 3-State Bus Buffer
HD74HC245P	Octal 3-State Bus Transceiver
TC74HC257P	Quad 2-Channel 3 State Line Multiplexer
TC74HC259P	8-Bit Addressable Latch / 3 to 8 Line Decoder
TC74HC365P	Hex 3 State Bus Buffer
TC74HC373P	3 State Octal D-Type Latch
TC74HC374P	3 State Octal D-Type Flip-Flop
TC74HC393P	Dual 4-Bit Binary Counter
TC74HC670P	4-Ward × 4-Bit Register File
TC74HC4002P	Dual 4-Input NOR Gate
AM2504PC	8 Bit/12Bit Successive Approximation Register
BA6110	Voltage Controlled Low Noise OP-Amp
BA9201	8 Bit D/A Convertor with Latch
BA9221	12 Bit D/A Convertor
DG211CJ	Quad Analog Switch
HD63B50	Asynchronous Communicatios Interface Adapter
HD75188P	Quad Line (RS232C) Driver
HD75189P	Quad Line (RS232C) Receiver
IR9311	Comparator
M5220P	Quad Low Noise Voltage Amplifire
M5223P	Dual J-FET Input OP-Amp
M5230L	Regulator(Variable output,+ — tracking type)
M5238P	Dual FET Input OP Amp
MB81C4256-10	1M-Bit Dynamic RAM

NAME OF IC	FUNCTION
MBM27C256A-15	256K-Bit EP-ROM
MF6CN-50	6th order switched capacitor Butter worth Low pass filter
NJM78M06A	+6V Regulator
NJM79M06A	−6V Regulator
SED9420CAC	VFO Type FDD Data Separator
STR9005	Molded Series Regulator
TA78012P	+12V Regulator
UPC812C-AK	Dual Low Drift J-FET Input OP-Amp
UPD8253C	Programmable Interval timer
UPD70116C	16-Bit Micro Processor
UPD71011C	Clock Pulse Generator Drive
UPD71055C	Parallel Interface unit
UPD71059C	Interrupt Control Unit
UPD71071C	Direct Memory Access Controller
UPD72066C	Programmable Floppy Disk Controller
UPD89254	Programmable timer counter

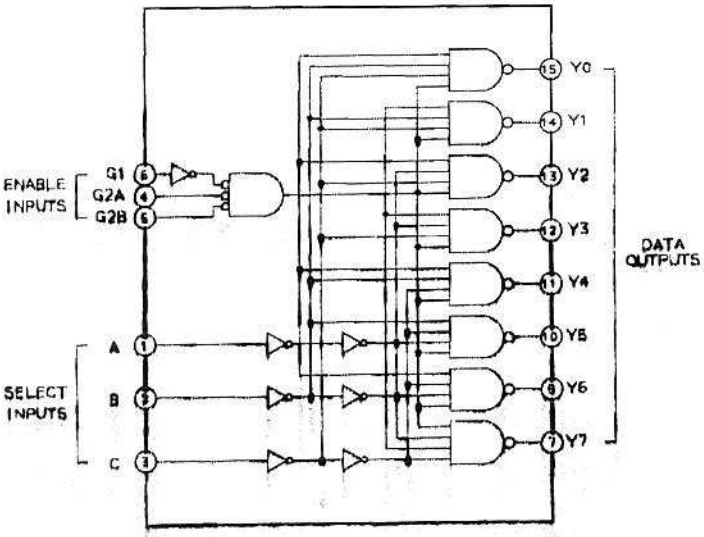
HD74HC04P (HEX INVERTER)



TC74HC14P (HEX SCHMITT TRIGGER, INVERTER)



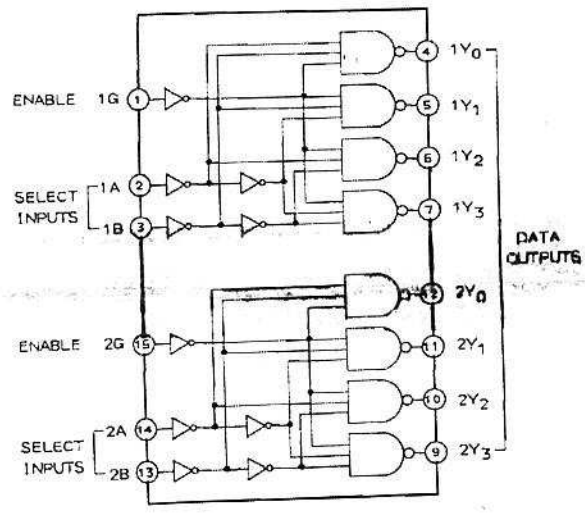
TC74HC138P (3 TO 8 DEMULTIPLEXER)



TRUTH TABLE

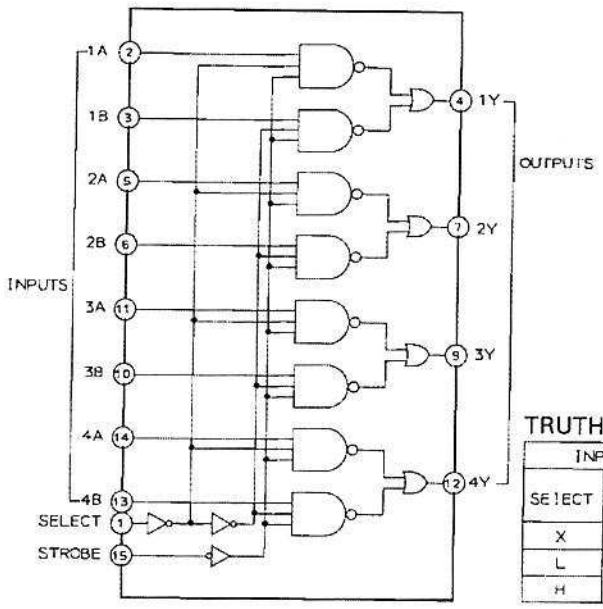
INPUTS					OUTPUTS							
ENABLE		SELECT										
G1	G2	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	H	X	X	X	H	H	H	H	H	H	H	H
L	H	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
X	H	X	X	X	H	H	L	H	H	H	H	H
H	L	L	H	L	H	H	H	L	H	H	H	H
H	L	L	H	H	H	H	H	H	L	H	H	H
H	L	H	L	L	H	H	H	H	H	L	H	H
H	L	H	H	L	H	H	H	H	H	H	L	H
H	L	H	H	H	H	H	H	H	H	H	H	L

TC74HC139P (DUAL 2 TO 4 DEMULTIPLEXER)



TRUTH TABLE

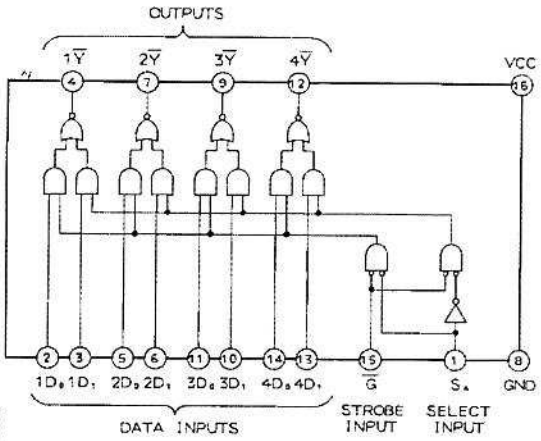
INPUTS			OUTPUTS			
ENABLE	SELECT					
G	B	A	Y0	Y1	Y2	Y3
H	X	X	H	H	H	H
H	X	X	H	H	H	H
H	X	X	H	H	H	H
H	X	X	H	H	H	H
H	X	X	H	H	H	H
H	X	X	H	H	H	H



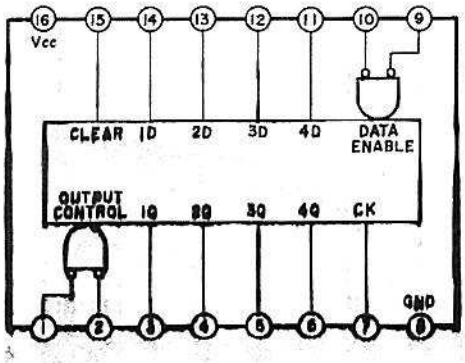
TRUTH TABLE

INPUTS		OUTPUT
SELECT	STROBE G	Y
X	H	L
L	L	A
H	L	B

TC74HC158P (QUAD 2 TO 1 DATA SELECTOR)



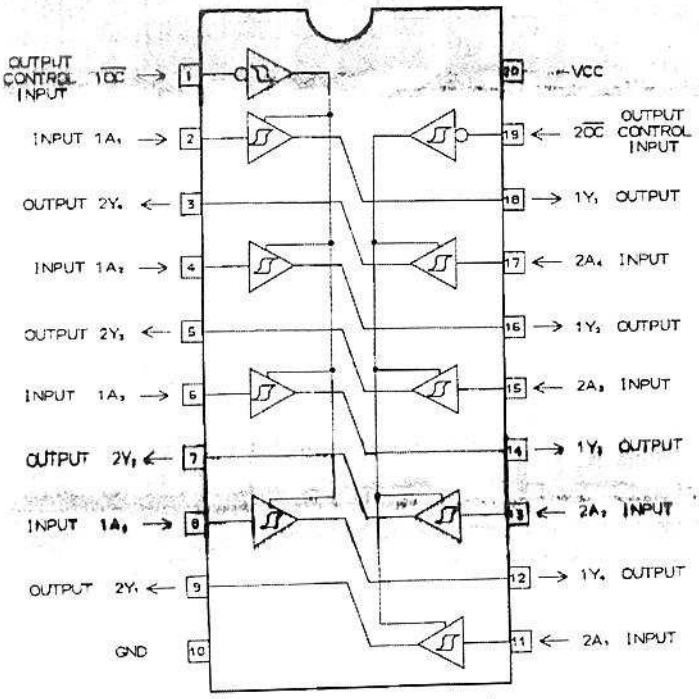
74HC173P



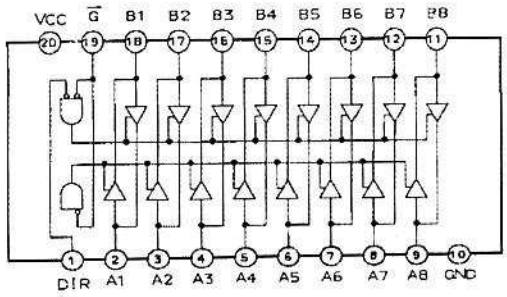
TRUTH TABLE

INPUT						OUTPUT $Q_A \sim Q_D$	OPERATION
CLEAR	CK	ENABLE G1	ENABLE G2	OUTPUT CONTROL M	OUTPUT CONTROL N		
L		L	L	–		1D ~ 4D	DATA SET
L	↓	H	X	–		–	HOLD
L	↓	X	H	–		–	HOLD
H	X	X	X	–		LLLL	CLEAR
–				H	X	Z	–
–				X	H	Z	–

TC74HC244P (OCTAL 3 STATE BUS BUFFER)



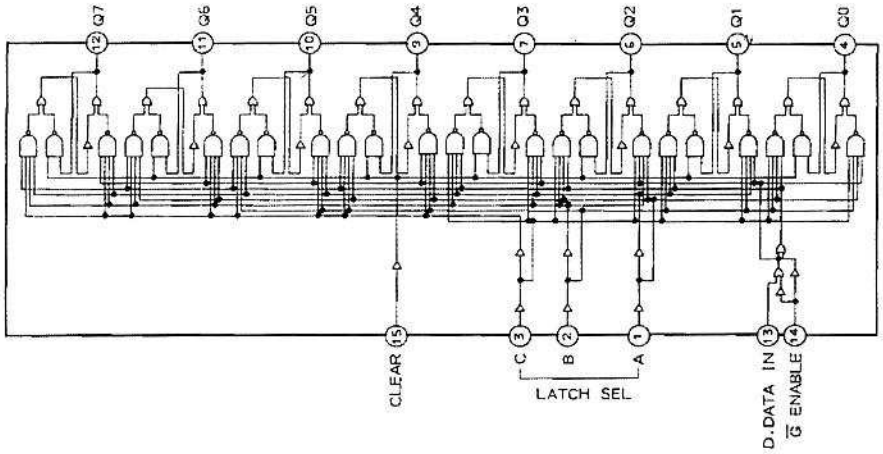
TC74HC245P (OCTAL 3 STATE TRANSCEIVER)



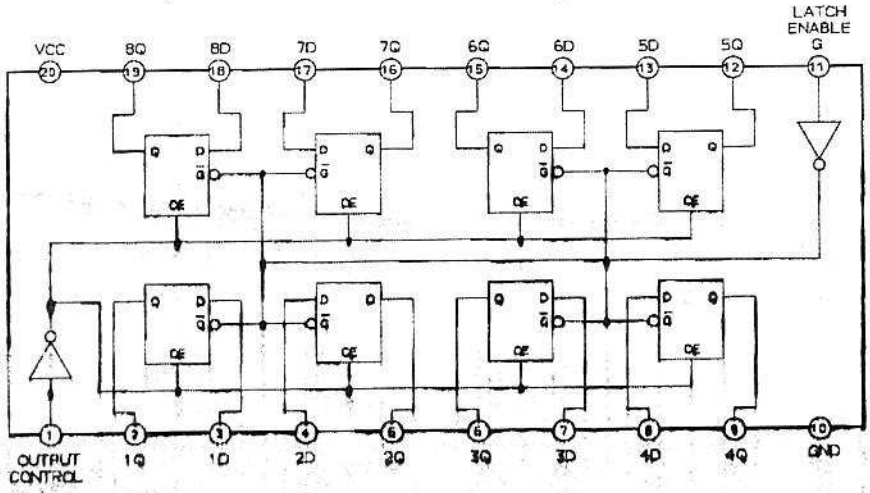
FUNCTION TABLE

CONTROL INPUTS		OPERATION
G	DIR	
L	L	B DATA TO A BUS
L	H	A DATA TO B BUS
H	X	ISOLATION

TC74HC259P (8 BIT ADDRESSABLE LATCHE)(IC25)



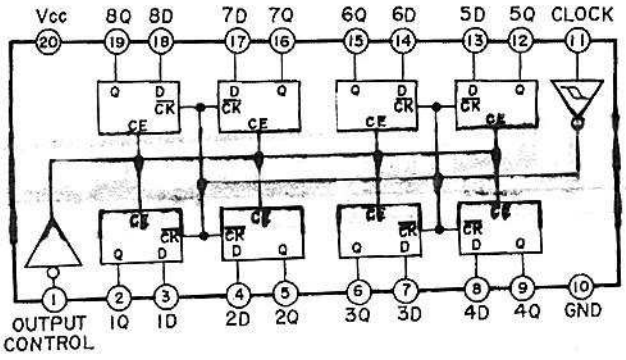
TC74HC373P (3 STATE OCTAL D-TYPE LATCH)



TRUTH TABLE

OUTPUT CONTROL	LATCH ENABLE G	DATA	OUTPUT
L	H	H	H
L	H	L	H
L	L	X	Q_0
H	X	X	Z

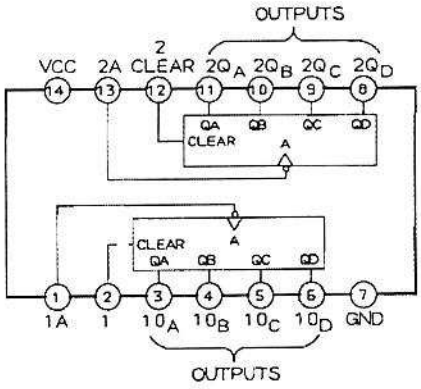
74HC374P



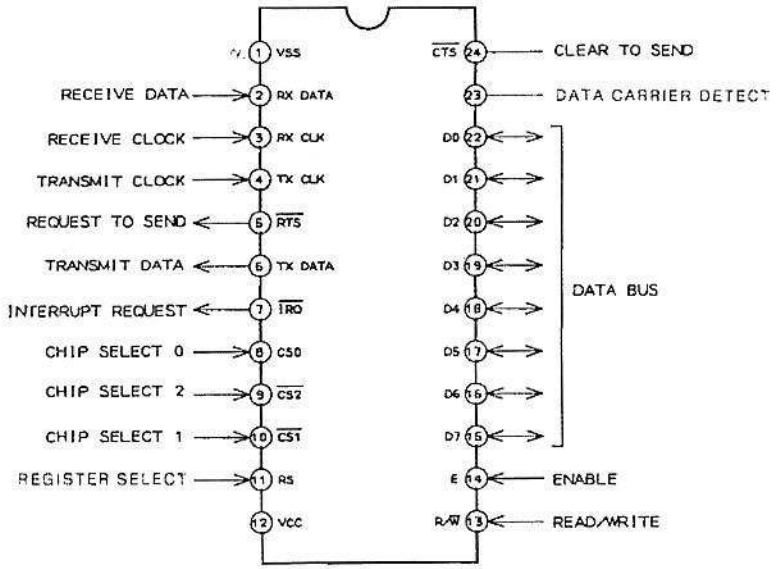
TRUTH TABLE

INPUT		OUTPUT
OUTPUT CONTROL	CK	
X	⎍	DATA SET
H	X	OUTPUT HIGH IMPEDANCE

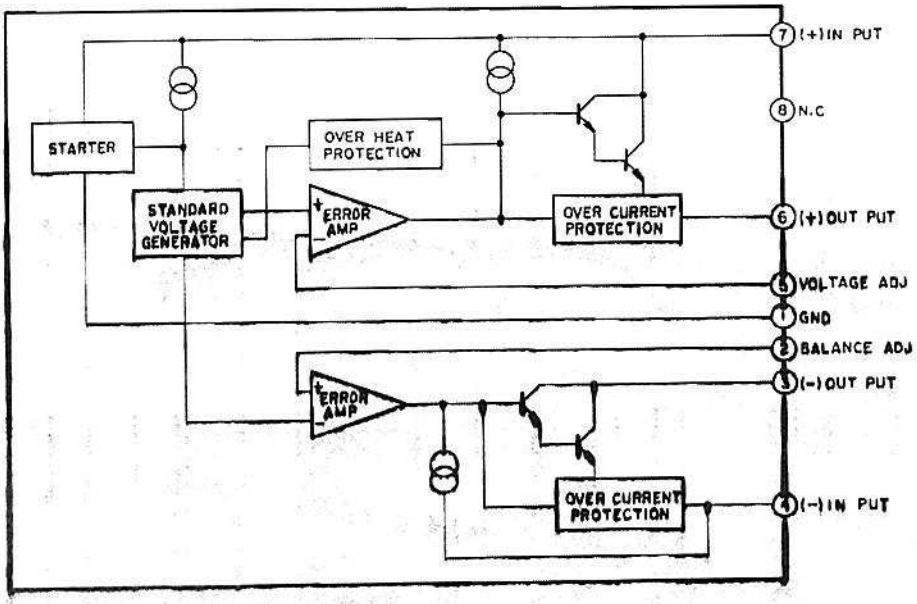
TC74HC393P (DUAL 4-BIT BINARY COUNTER)



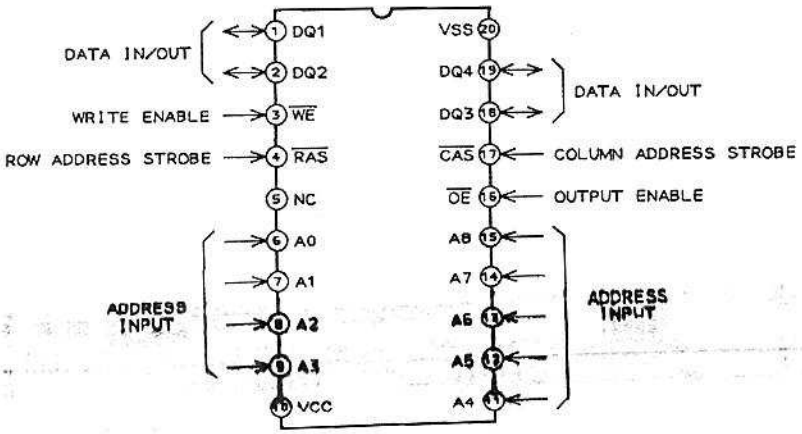
HD63B50P
(COMMUNICATION INTERFACE ADAPTER)



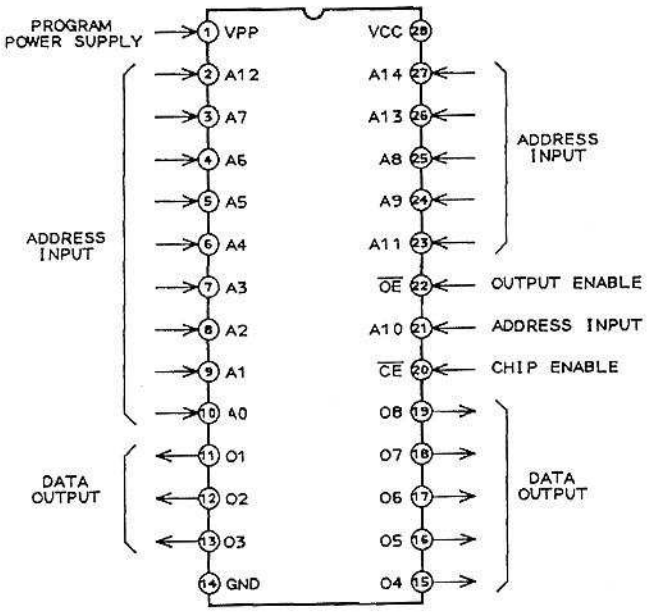
M5230L



MB81C4256-10 (1M BIT DYNAMIC RAM)

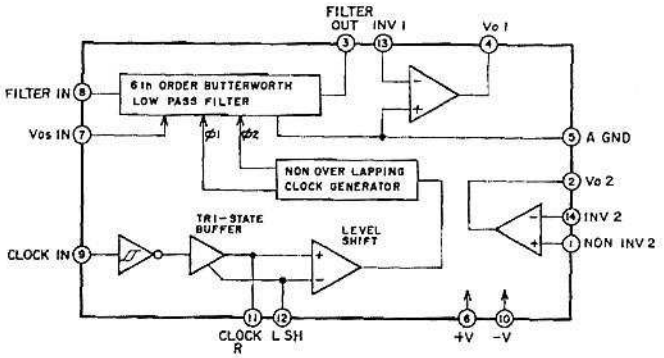


MBM27C256A-15 (256K BIT EP ROM)

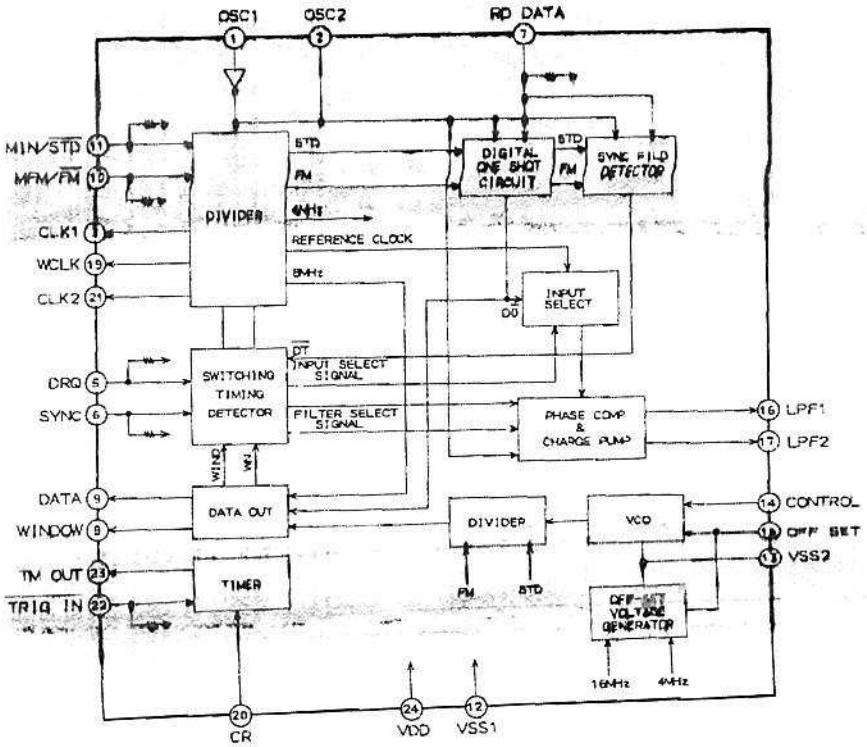


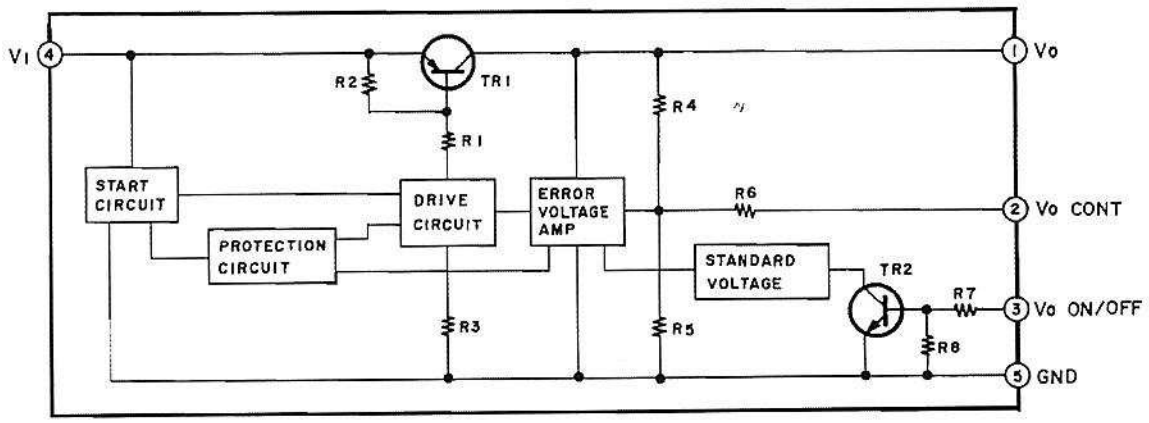
MF6CN-50

(6th ORDER BUTTERWORTH LOW PASS FILTER)

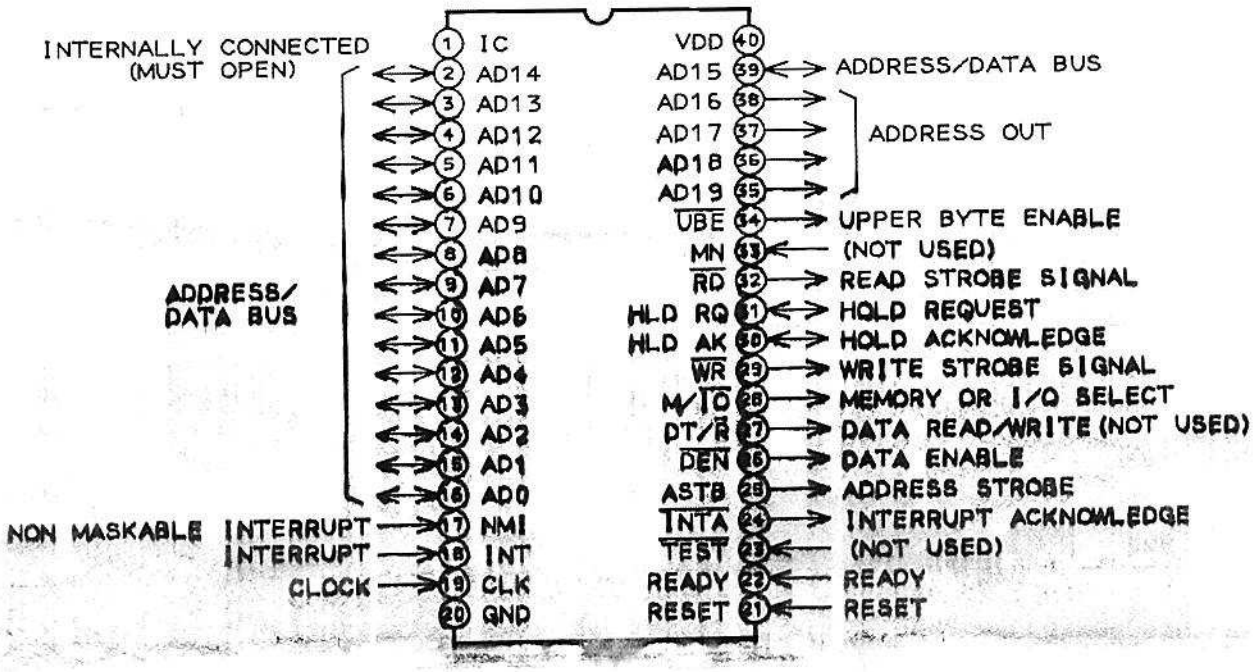


SED9420CAC (VFO TYPE FDD DATA SEPARATOR)

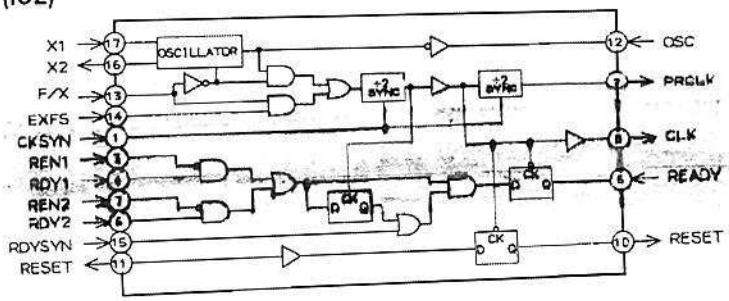




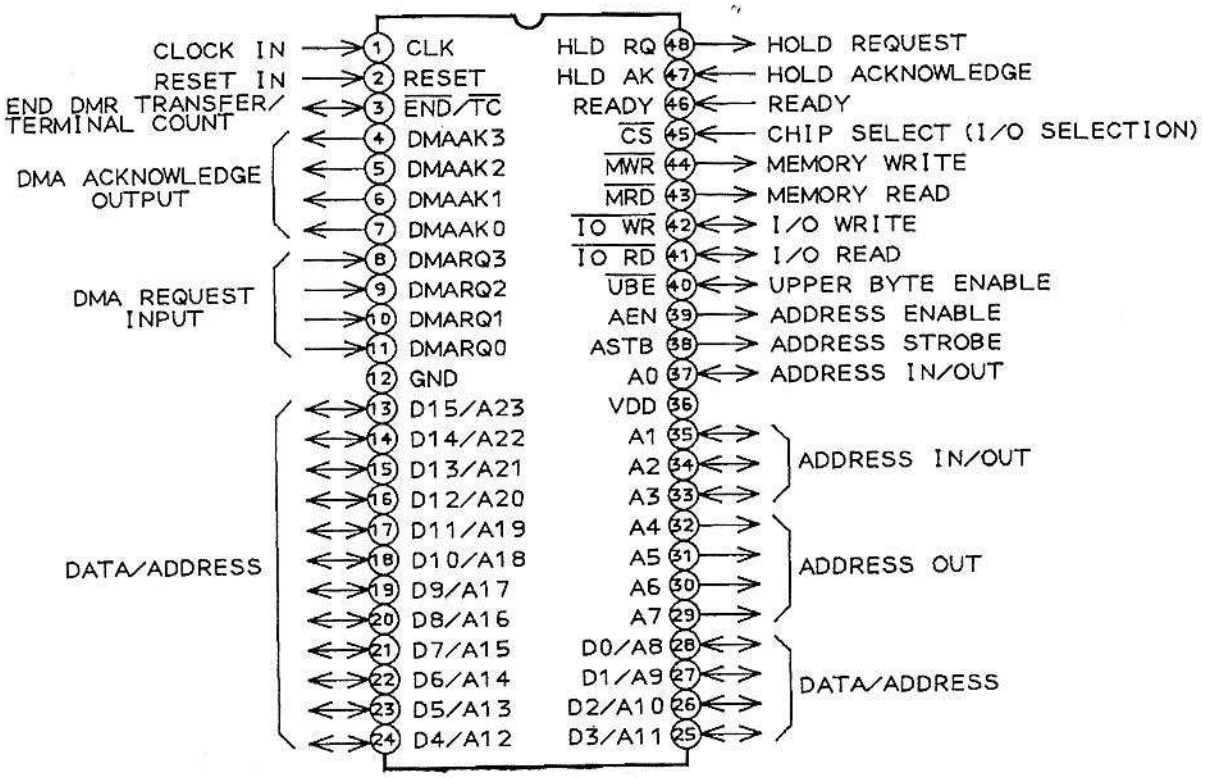
μPD70116 (16BIT MICRO PROCESSOR)



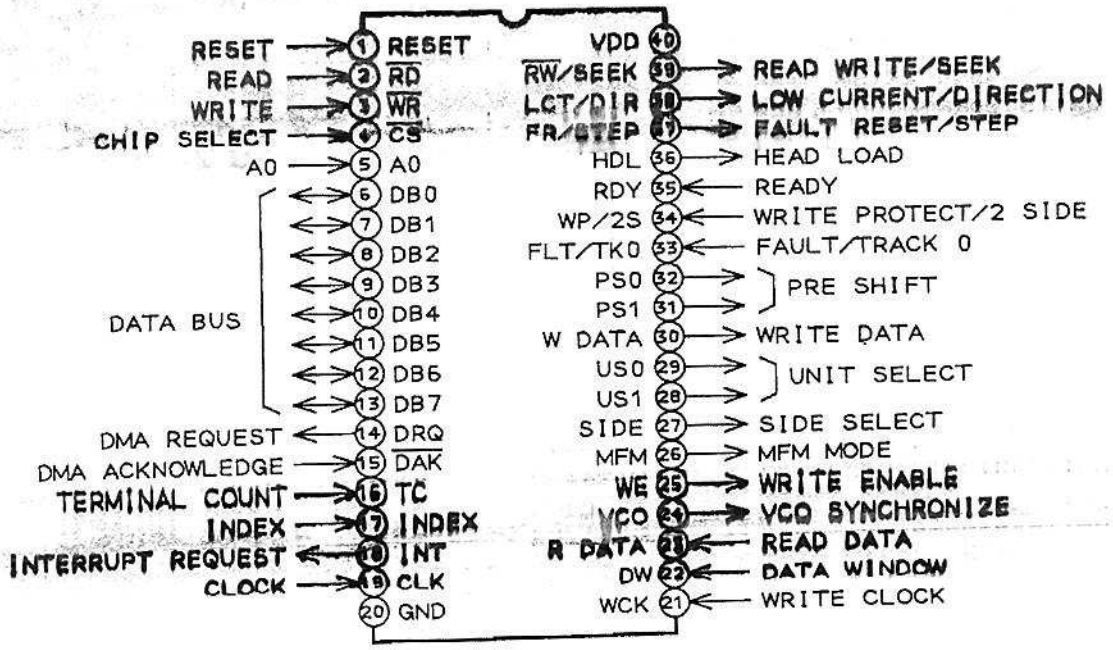
μPD71011C (CLOCK PULS GENERATOR DRIVE)
(IC2)



μPD71071C (DMA CONTROLLER)



μPD72068C (FDD CONTROLLER)



ABBREVIATION FOR SERVICE MANUAL

ABBREVIATION	EXPLANATION	ABBREVIATION	EXPLANATION
ALTER	ALTERnating	MON	MONitor
BUSDIR	BUS DIRection	RFSH	ReFreSH
CASSR	CASSette Read	RXD	Receive Data
CASSW	CASSette Write	RD	ReaD
CH	CHannel	SHOT	one SHOT
CS	Chip Select	SIN	Signal INput
DUB	over DUB	SLTSL	SLoT SeLect
IORQ	I/O ReQuest	TRANS	TRANSpose
LOOP	LOOPing	TRIG	TRIGger
M1	Machin cycle 1	TXD	Transmit Data
MREQ	Memoly REQuest	V.REF	Voltage for REFerence
MIDI	Musical Instrument Digital Interface	WR	WRite

AKAI ELECTRIC CO., LTD.
12-14, 2-Chome, Higashi-Kojiya, Ohta-Ku, Tokyo, Japan
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