

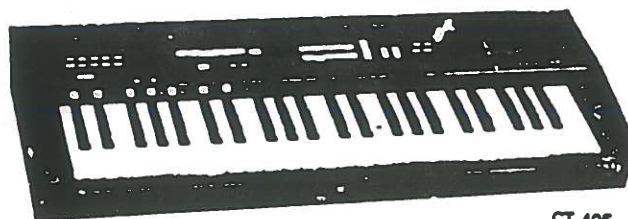
SERVICE MANUAL & PARTS LIST

ELECTRONIC KEYBOARD

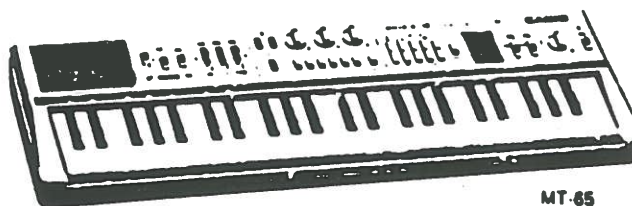
Casiotone CT-405(MX-41)

MT-65 (MX-40)

MT-68



CT-405



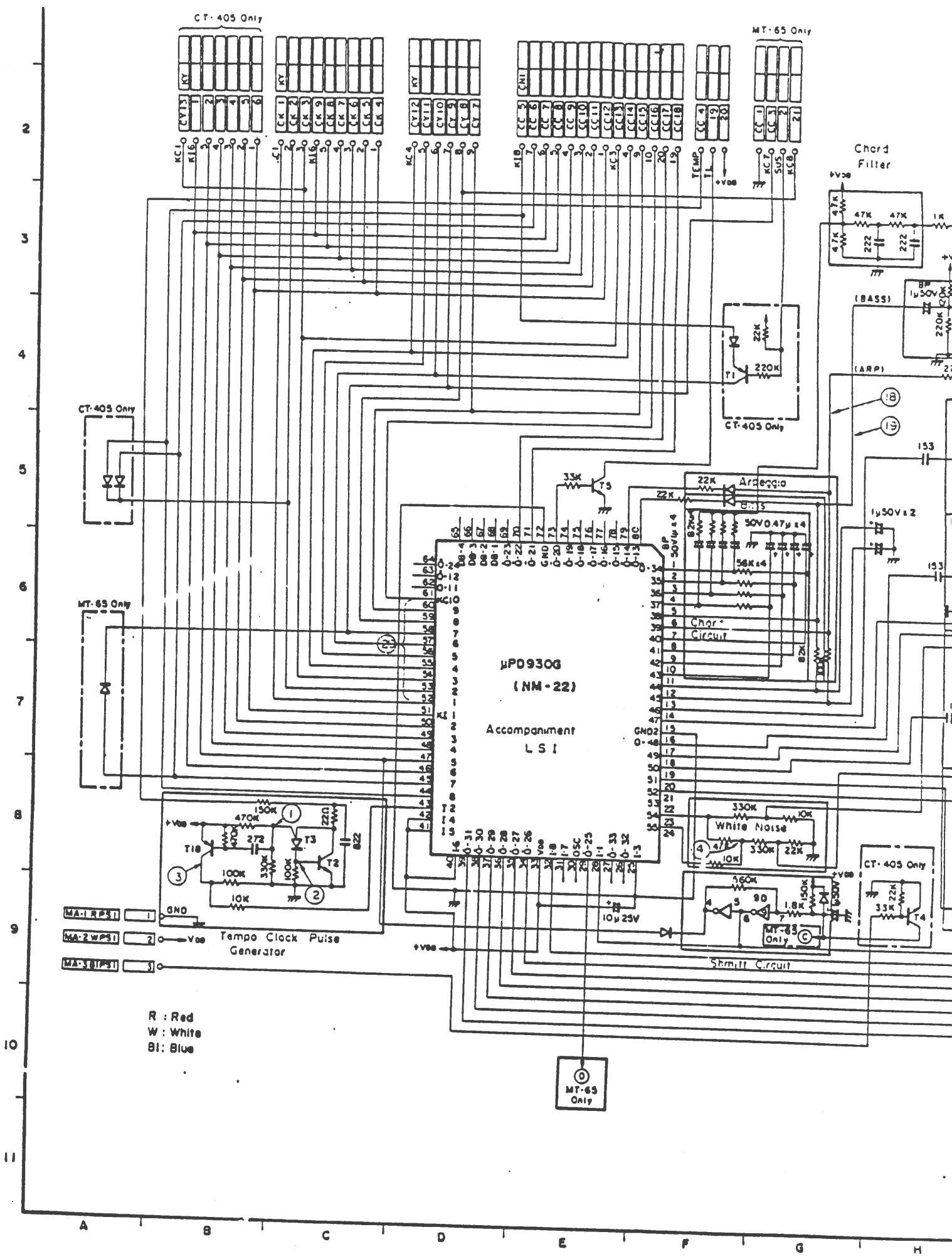
MT-65

MT68 is the same as MT65 but has different color case.

CASIO.

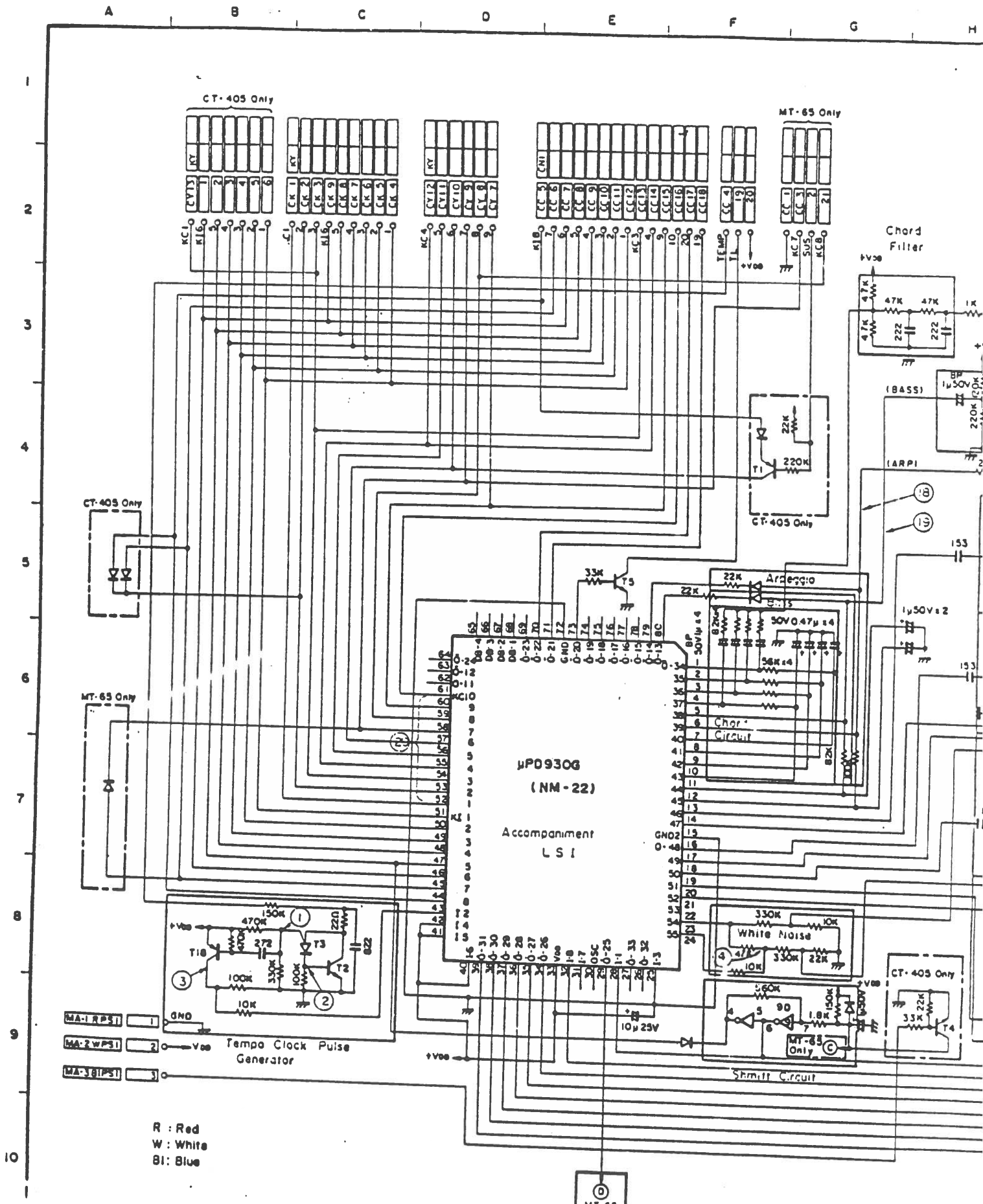
Contents
MT-65 MT-68 CT-405

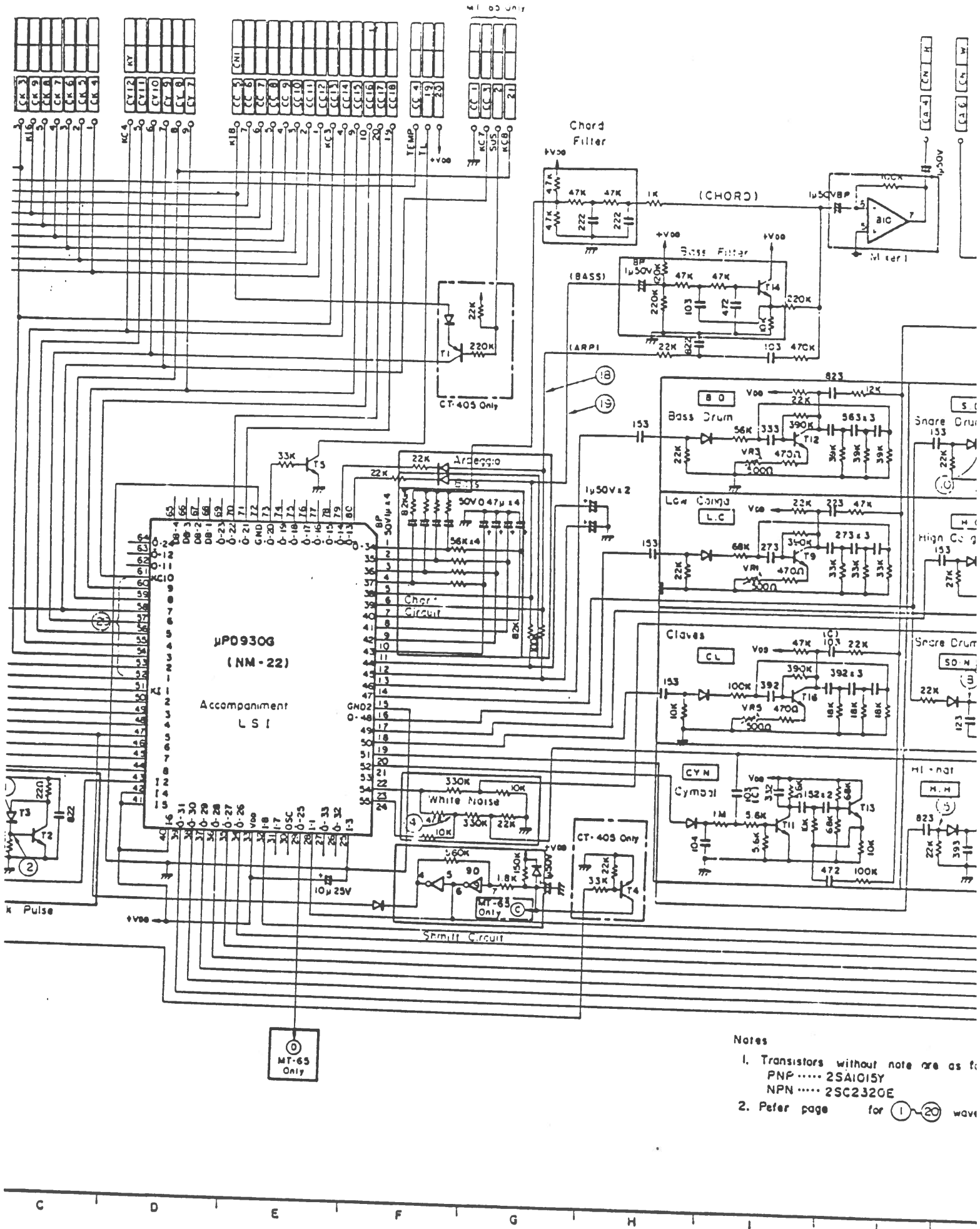
	Page	Cell//
1. CIRCUIT DIAGRAM	1	A3
1-1. Main PCB M440-MA1M (M-65), M441-MA1M (CT-405)	1	A3
1-2. Console (A) PCB No. 441-CN1M, M441-CN3	2	A5
1-3. Console (B) PCB No. M441-CN2M	3	A7
1-4. Amplifier PCB No. M441-AS1M	4	A9
1-5. Power Supply PCB No. M435-PS1, M441-PS2M	5	A11
1-6. Keyboard PCB No. M435-KY3	6	A13
1-7. Keyboard PCB M435-KY1	6	A13
1-8. Keyboard PCB M435-KY2	7	B1
1-9. Console (A) PCB No. M440CN-1M	9	B2
1-10. Console (B) PCB No. M440CN1M	10	B4
1-11. Amplifier PCB No. M443-MA2M	11	B6
1-12. M440-PW	12	B8
1-13. Keyboard PCB No. M432-KY2	12	B1
1-14. Keyboard PCB No. M432-KY1	13	B:0
2. PCB LAYOUT and MAJOR WAVEFORMS	15	B11
3. BLOCK DIAGRAM ¹	16	B13
4. KEYBOARD MATRIX	16	B13
5. ACCOMPANIMENT LSI (μ PD930G)	17	C1
6. MELODY LSI (μ PD931C)	18	C2
7. D/A CONVERTER BLOCK	18	C2
8. SAMPLE/HOLD CIRCUIT	19	C3
9. FILTER BLOCK	20	C4
10. ACCOMPANIMENT	21	C5
10-1. Bass, Chord, Arpeggio Circuits	21	C5
10-2. Percussions	22	C6
11. OTHER CIRCUITS	23	C7
11-1. Muting Circuit (CT405 only)	23	C7
11-2. Auto Power Off Circuit (M 65 only)	23	C7
12. ADJUSTMENT	24	C8
12-1. Bit Compensation	24	C8
12-2. Percussions	25	C9
Parts List CT-405	27	D1
Parts List MT-65	39	E1
Parts List MT-68	49	E11
Enlarged Schematic of Main PCB M440-MA1M	1	D12
TECHNICAL BULLETIN Parts Change Information on MT-65 & MT-68	51	E13



1. CIRCUIT DIAGRAM

1-1. Main PCB M440-MA1M (M-65), M441-MA1M (CT-405)

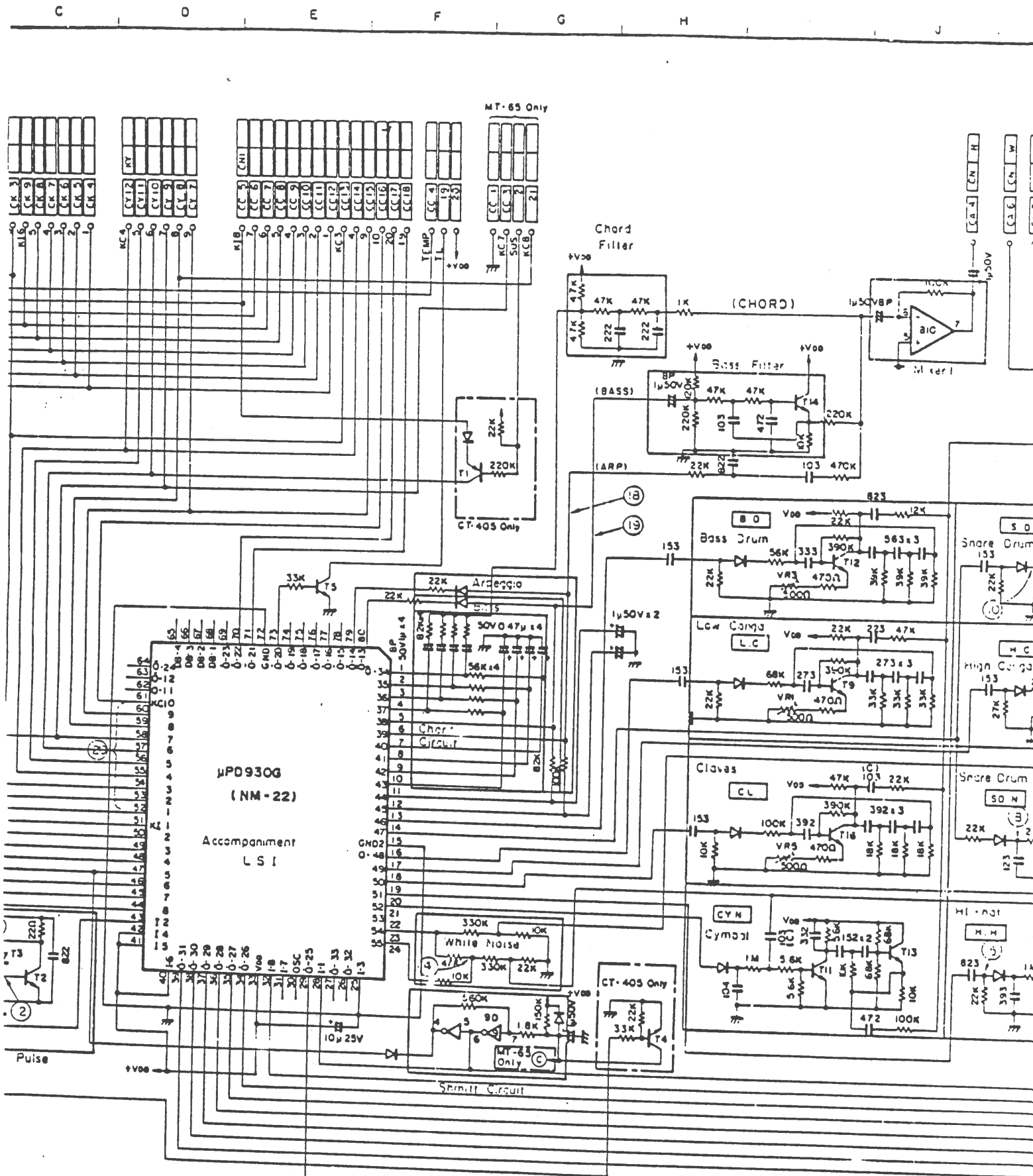




Notes

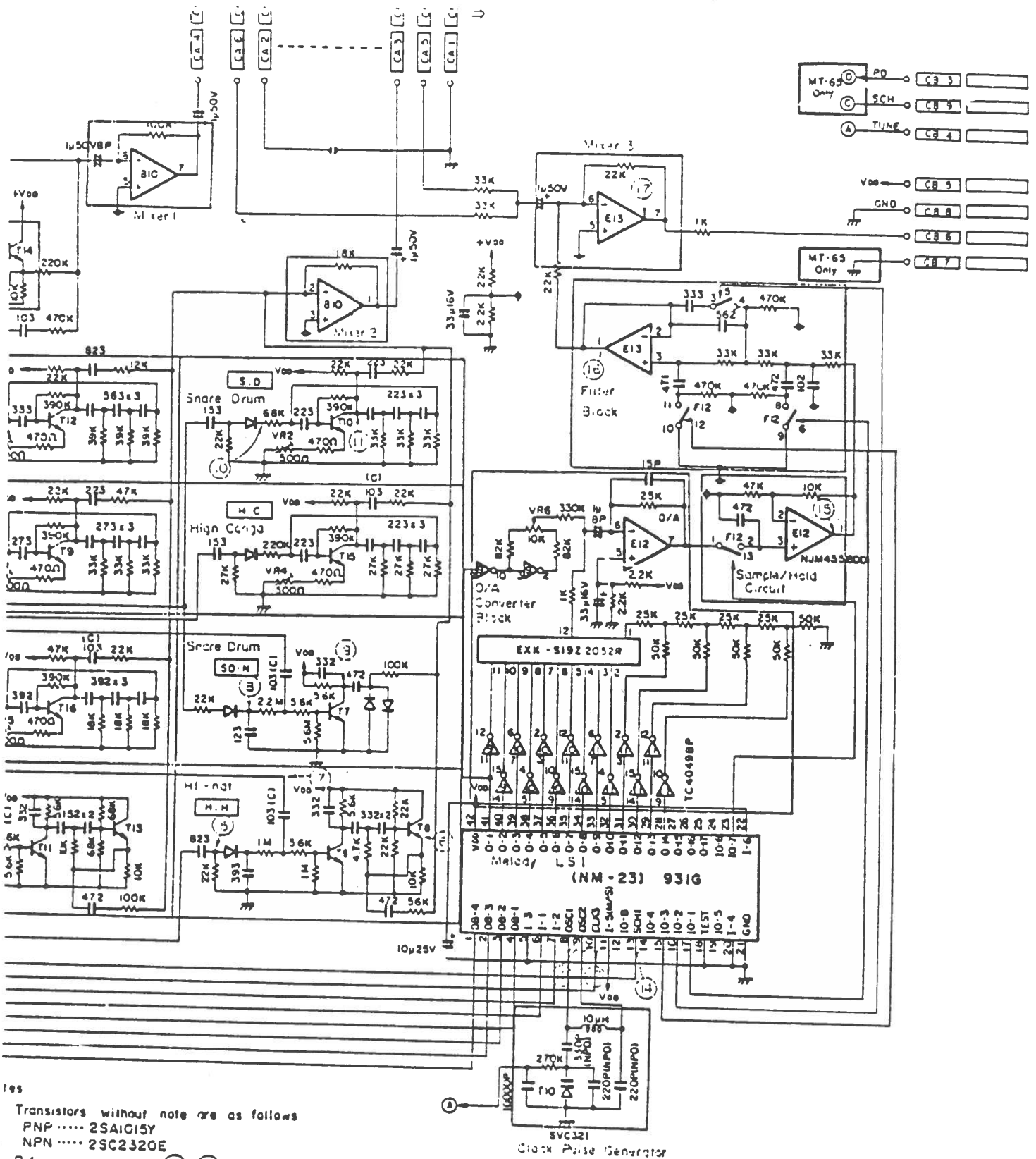
- Transistors without note are as follows:
 PNP 2SA1015Y
 NPN 2SC2320E
- Refer page for (1)-(20) wave

1M (M-65), M441-MA1M (CT-405)



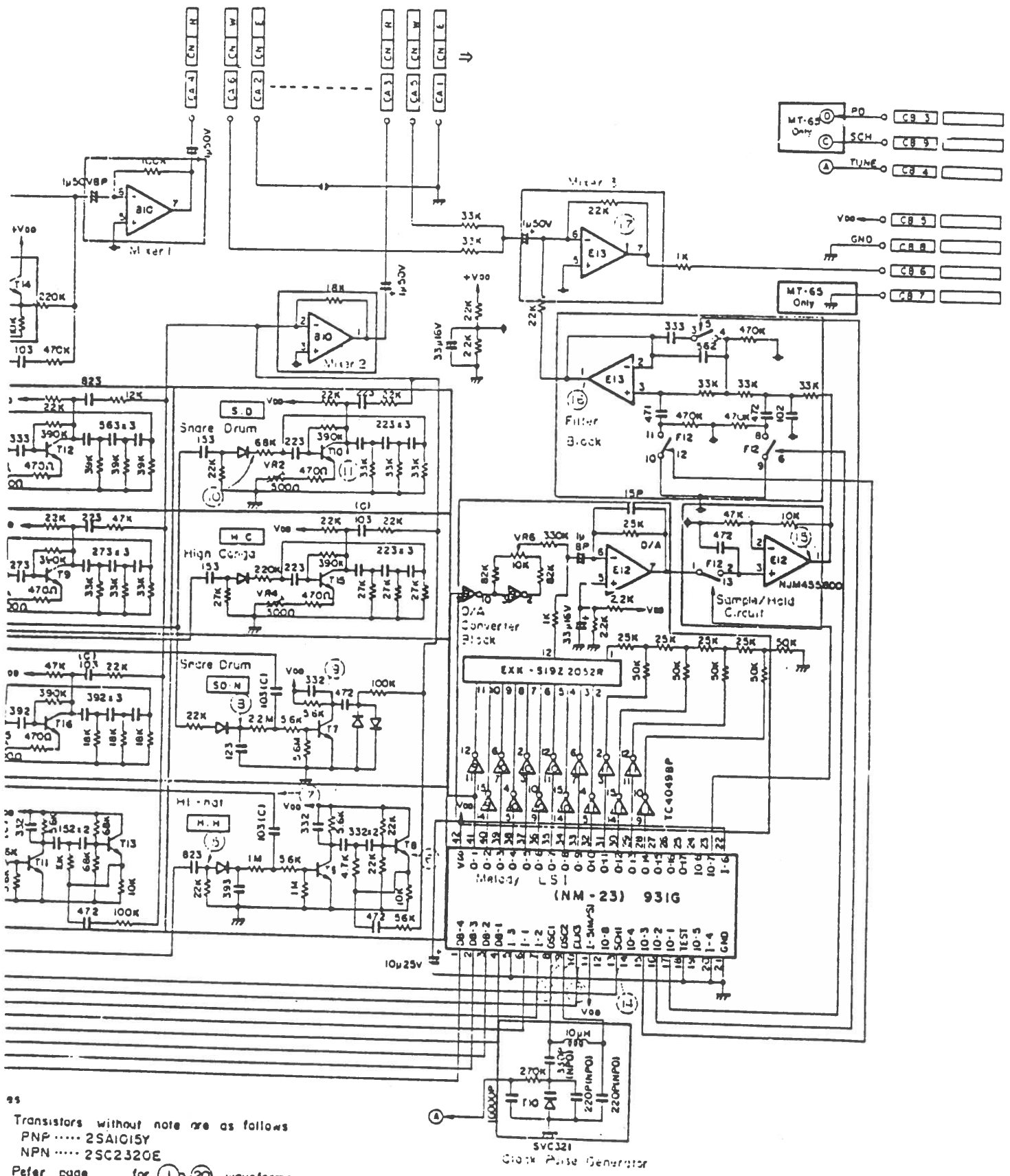
Notes
 1. Transistors without note are as for

MT-65



199
 Transistors without note are as follows
 PNP 2SA1015Y
 NPN 2SC2320E
 Refer page for (1)-(20) waveforms

Clock Pulse Generator

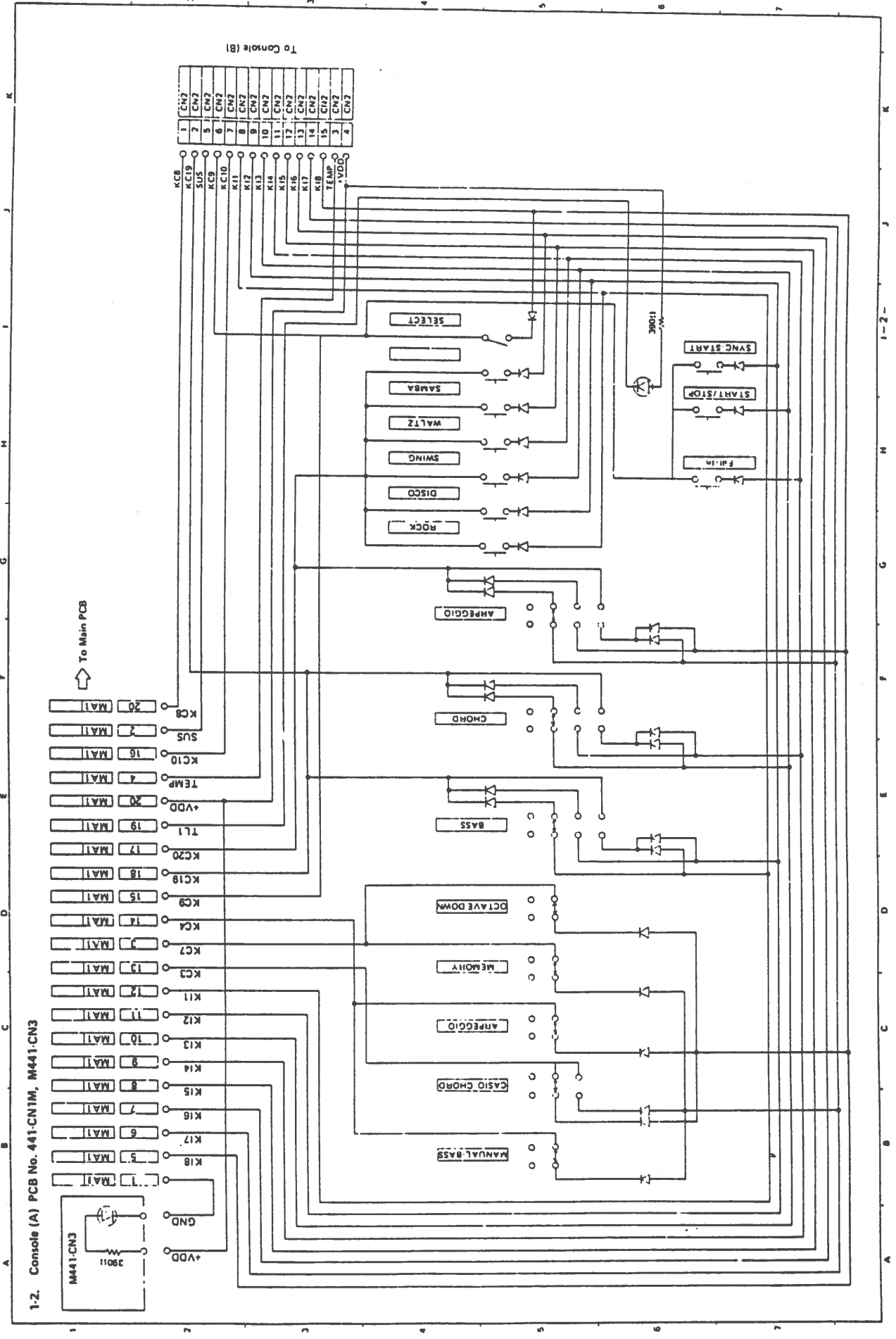


95
 Transistors without note are as follows
 PNP 2SA1015Y
 NPN 2SC2320E
 Refer page for (1) (20) waveforms

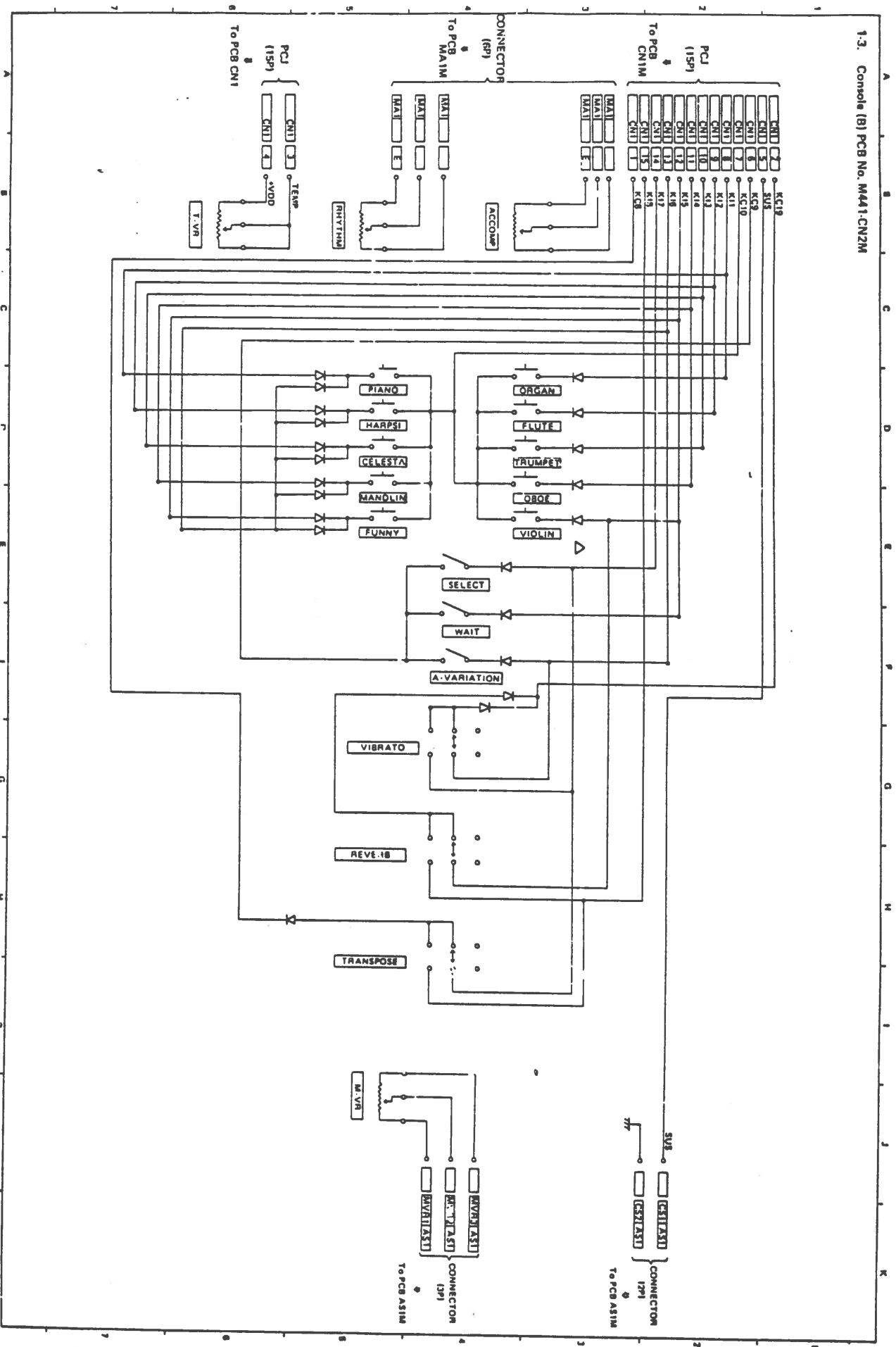
Clock Pulse Generator

2
3
4
5
6
7
8
9
10
11

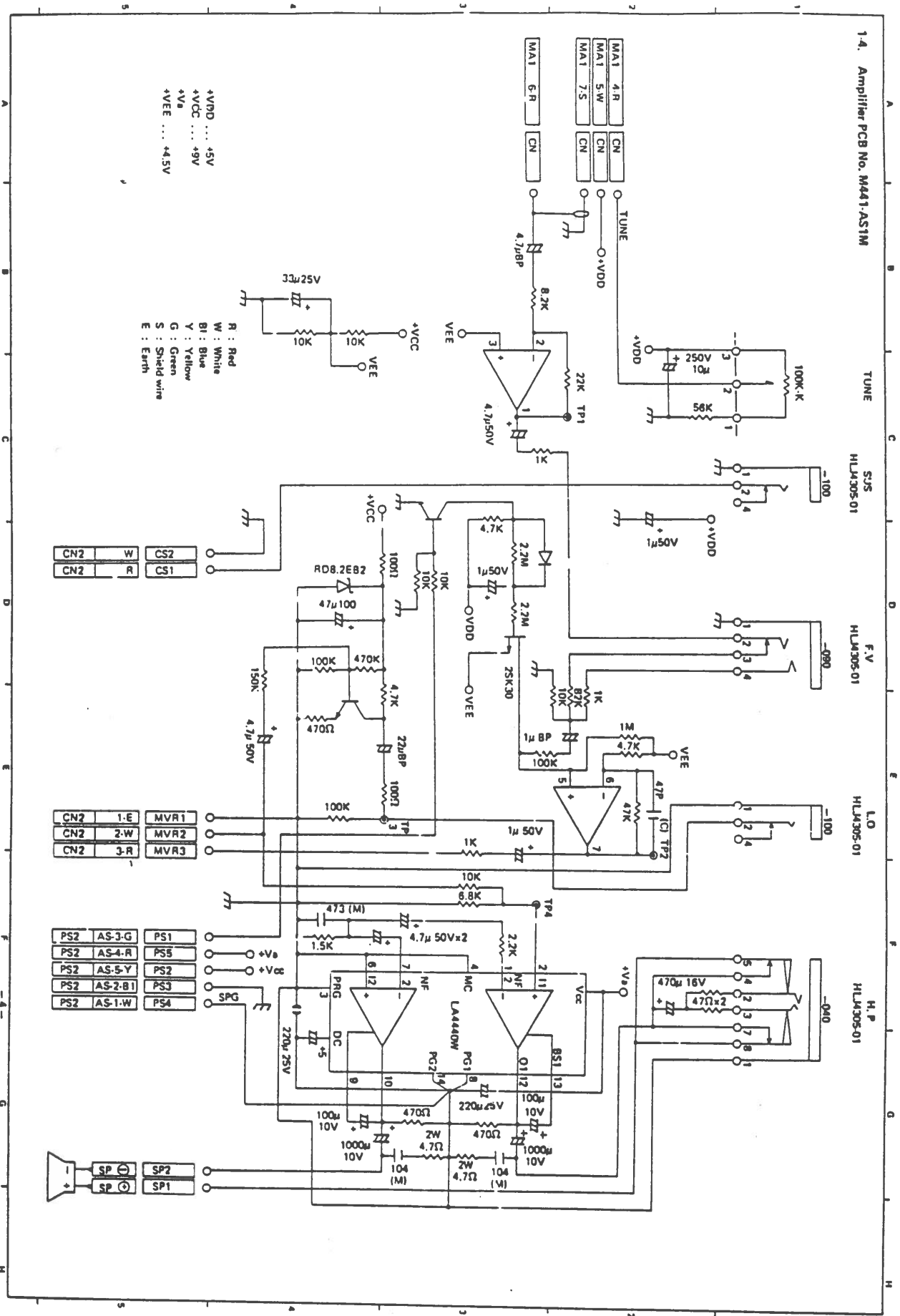
1-2. Console (A) PCB No. 441-CN1M, M441-CN3



1-3. Console (B) PCB No. M441-CN2M



1.4. Amplifier PCB No. MA41-AS1M



- +VDD ... 45V
 - +VCC ... 49V
 - +Ve ... 4.5V
 - +VEE ... 4.5V
-
- R : Red
 - W : White
 - Bl : Blue
 - Y : Yellow
 - G : Green
 - S : Shield wire
 - E : Earth

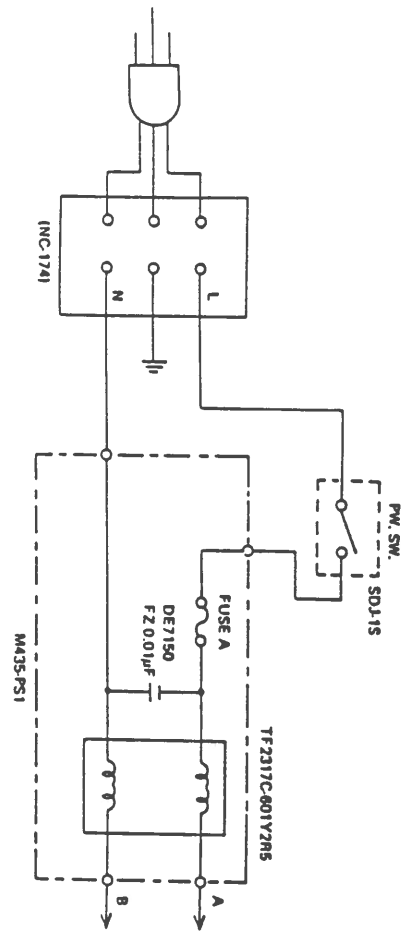
TUNE
HLM305-01

F.V
HLM305-01

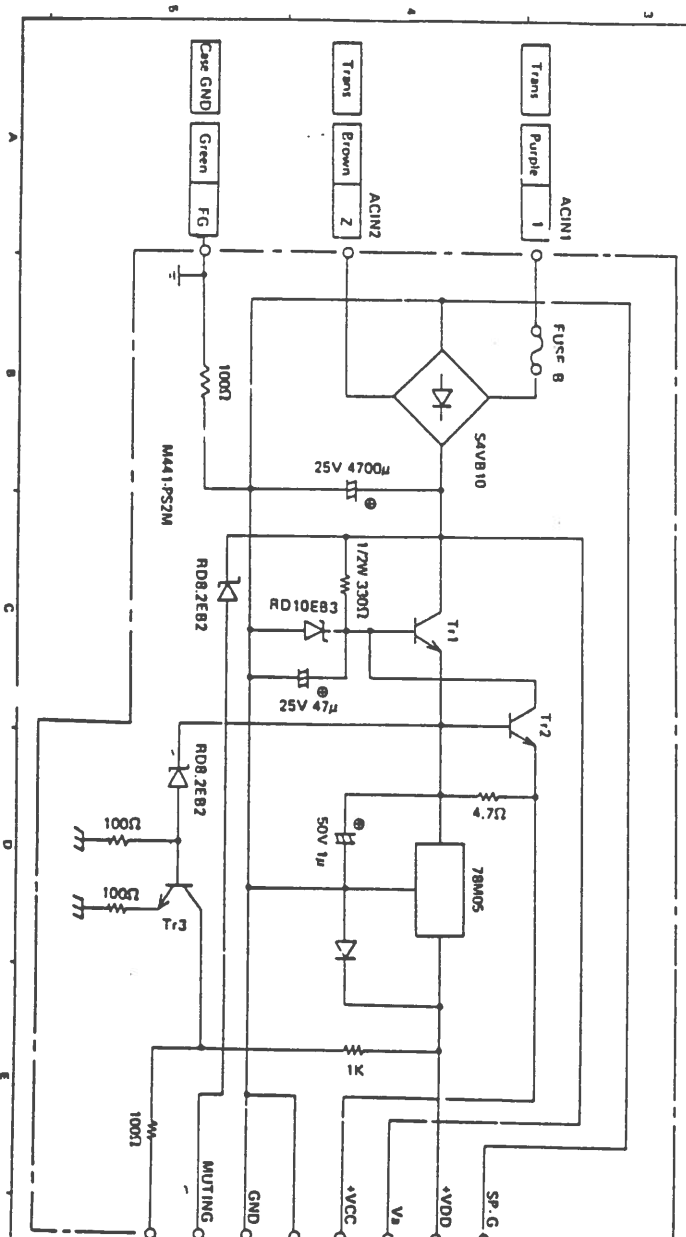
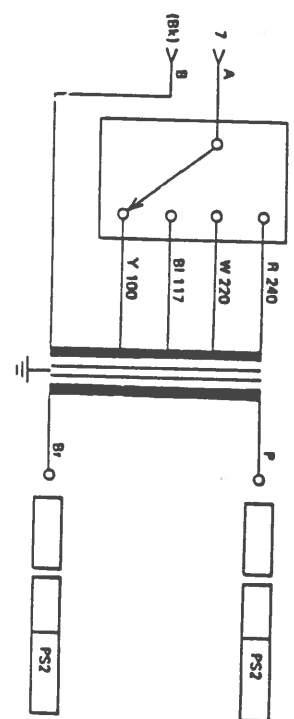
L.O
HLM305-01

H.P
HLM305-01

1. Power Supply PCB No. MA35-PS1, MA41-PS2M



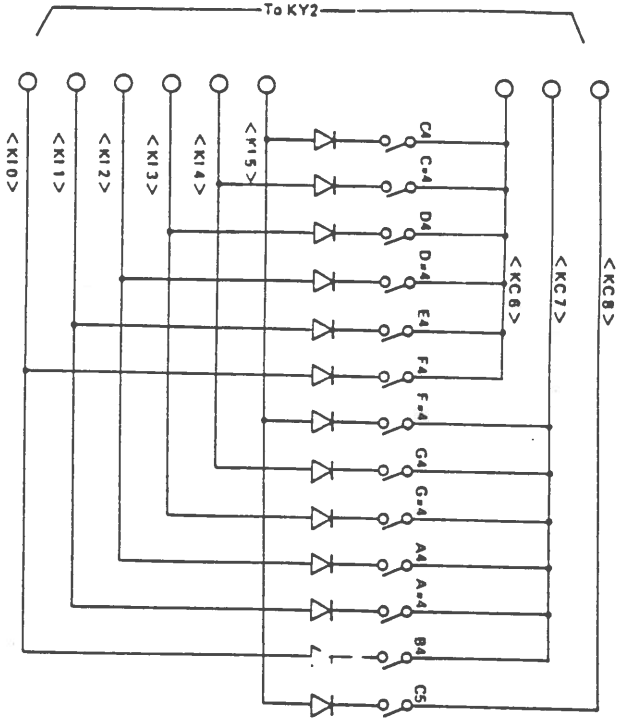
R : Red G : Green
 W : White P : Purple
 Bl : Blue BK : Black
 Y : Yellow Br : Brown



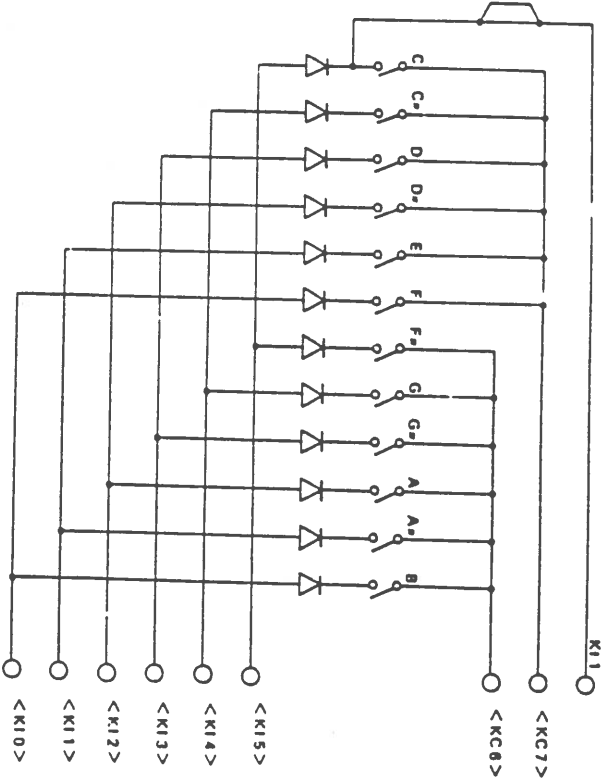
AS-1	4-V	AS1
MA-2	2-W	MA1
AS-4	5-G	AS1
AS-5	2-W	AS1
AS-2	3-B1	AS1
MA-1	1-R	MA1
AS-3	1-R	AS1
MA-3	3-B1	MA1

- Standard voltages
 ACIN1 ~ ACIN2 ... A, U, 2V
 V_a DC 12 ~ 14V
 V_{ce} DC 9V
 VDD DC 5.0V
- T₁... 2SD0880 (or 2SD0211)
 T₂... 2SC2320E (or 2SC1815)
 T₃... 2SC2320E (or 2SC1815)
- FUSE A ... 1A (0.03A)
 FUSE B ... 2A (2A)
 Fuse In () are for northern Europe models.

1-6. Keyboard PCB No. M435-KY3



1-7. Keyboard PCB M435-KY1

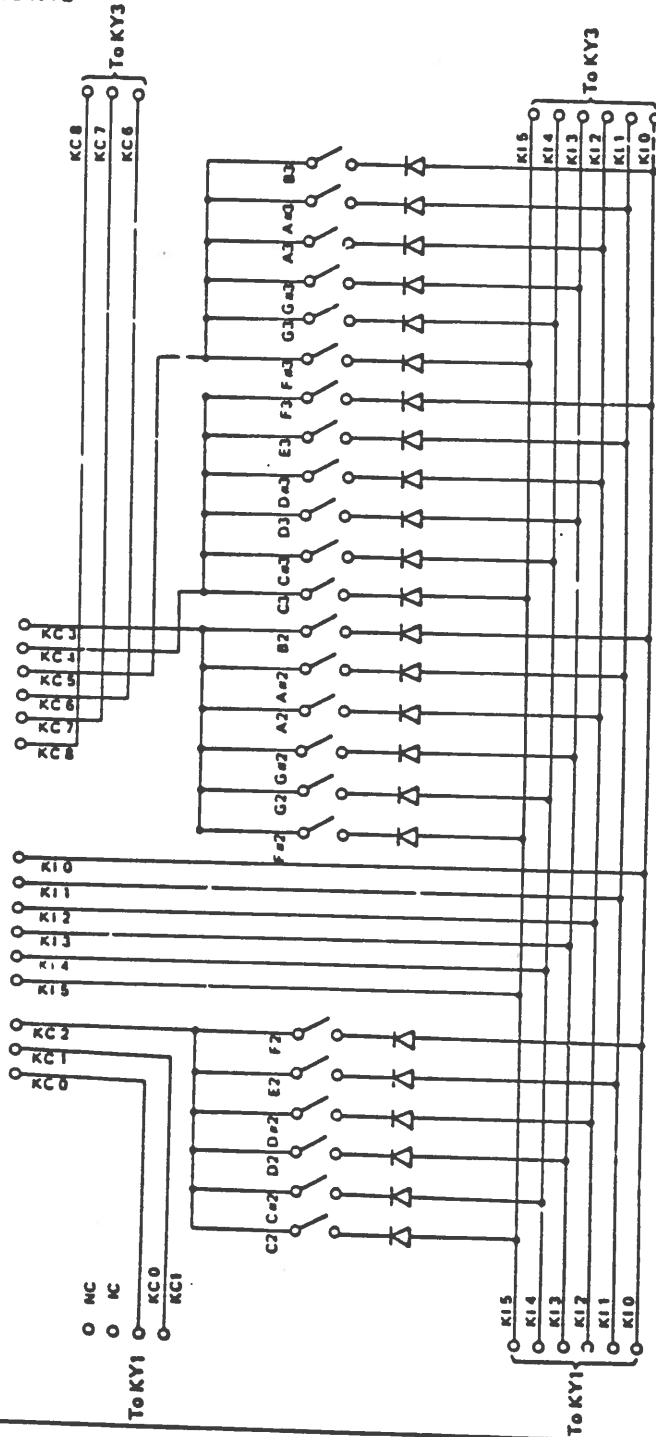


1-8. Keyboard PCB M435-KY2

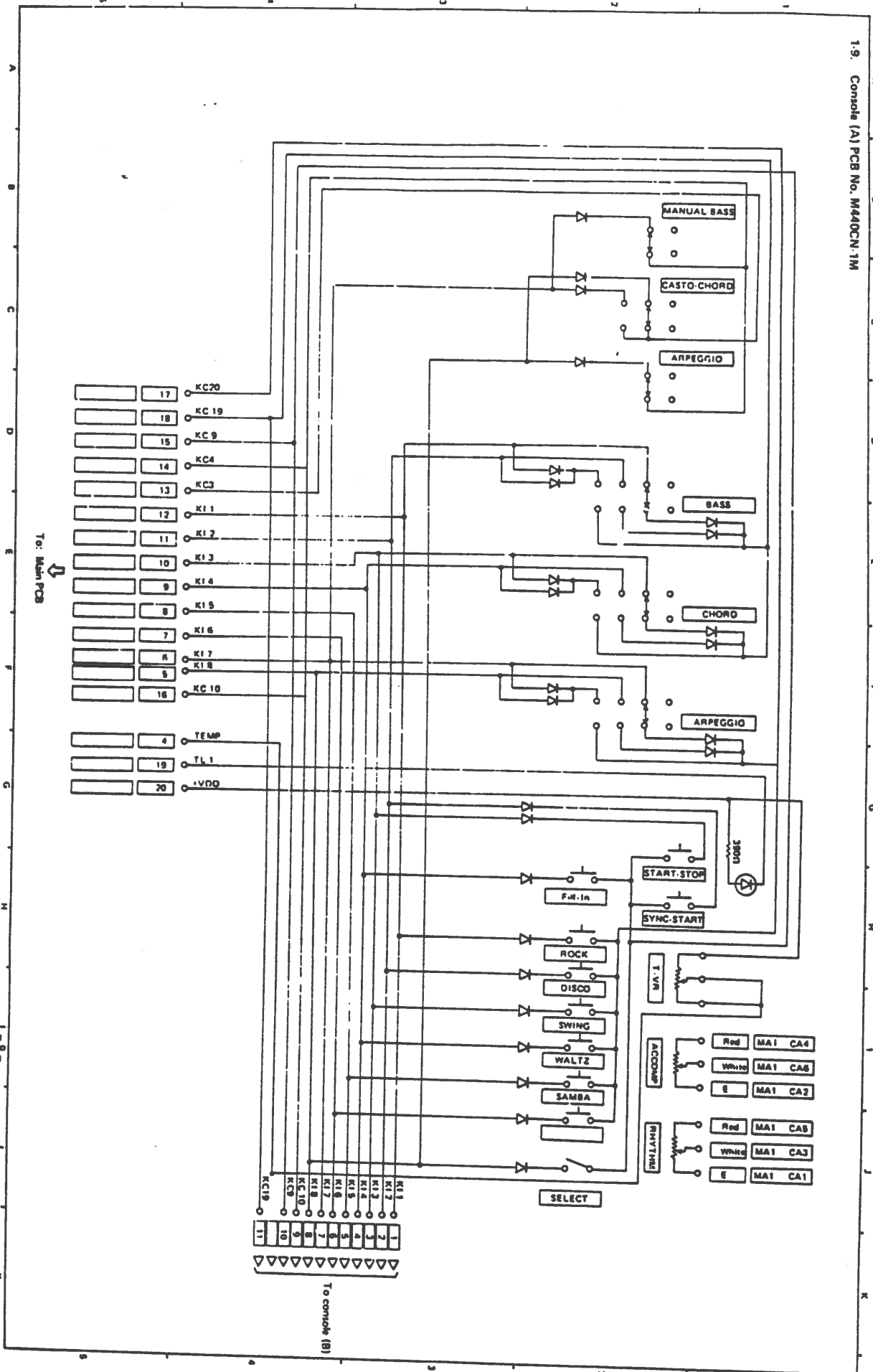
- MAIM CY-12
- MAIM CY-11
- MAIM CY-10
- MAIM CY-9
- MAIM CY-8
- MAIM CY-7

- MAIM CK-9
- MAIM CK-8
- MAIM CK-7
- MAIM CK-6
- MAIM CK-5
- MAIM CK-4

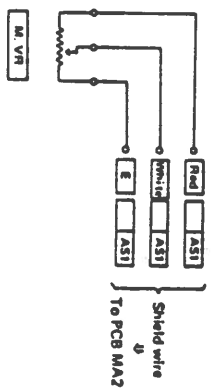
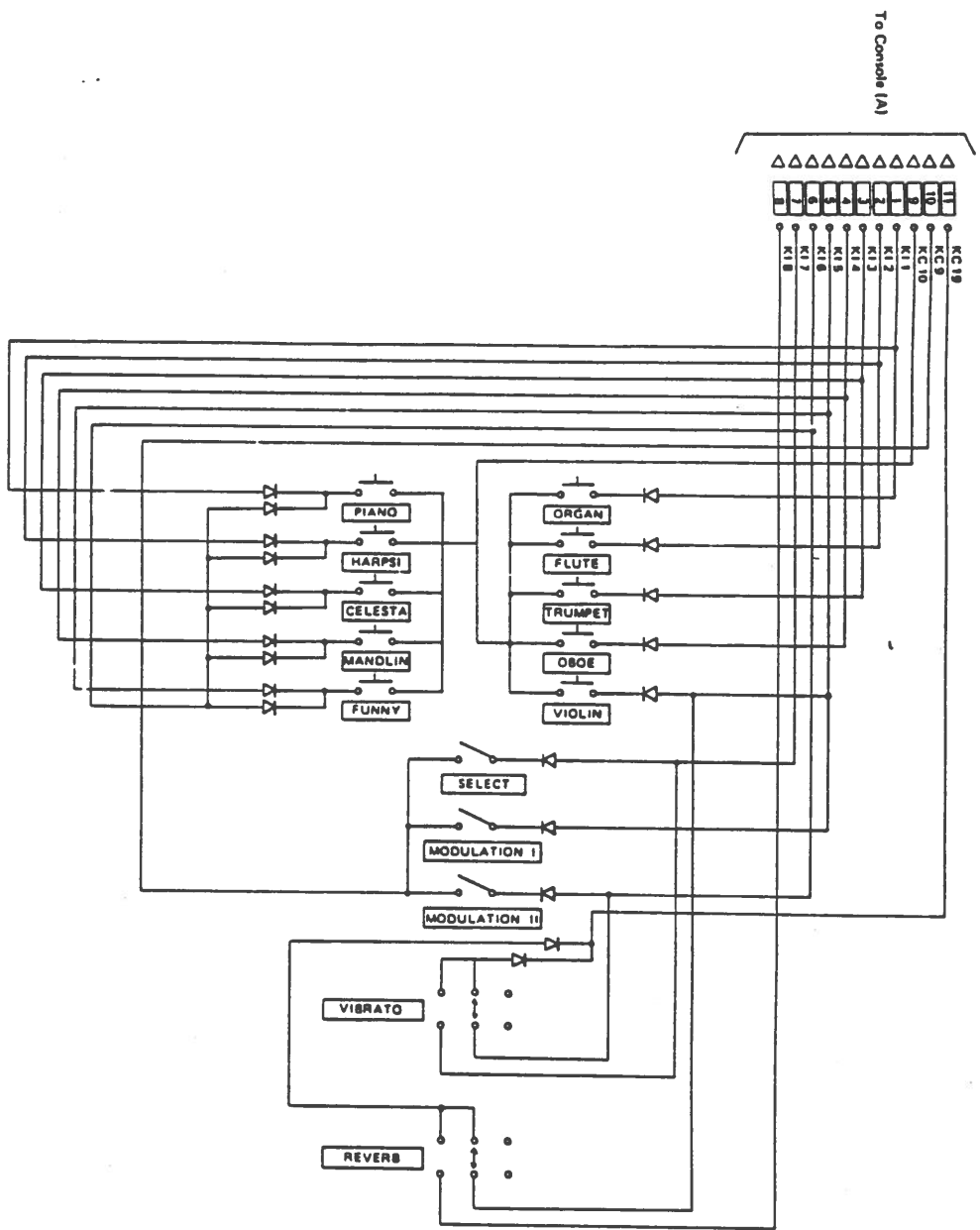
- MAIM CK-3
- MAIM CK-2
- MAIM CK-1



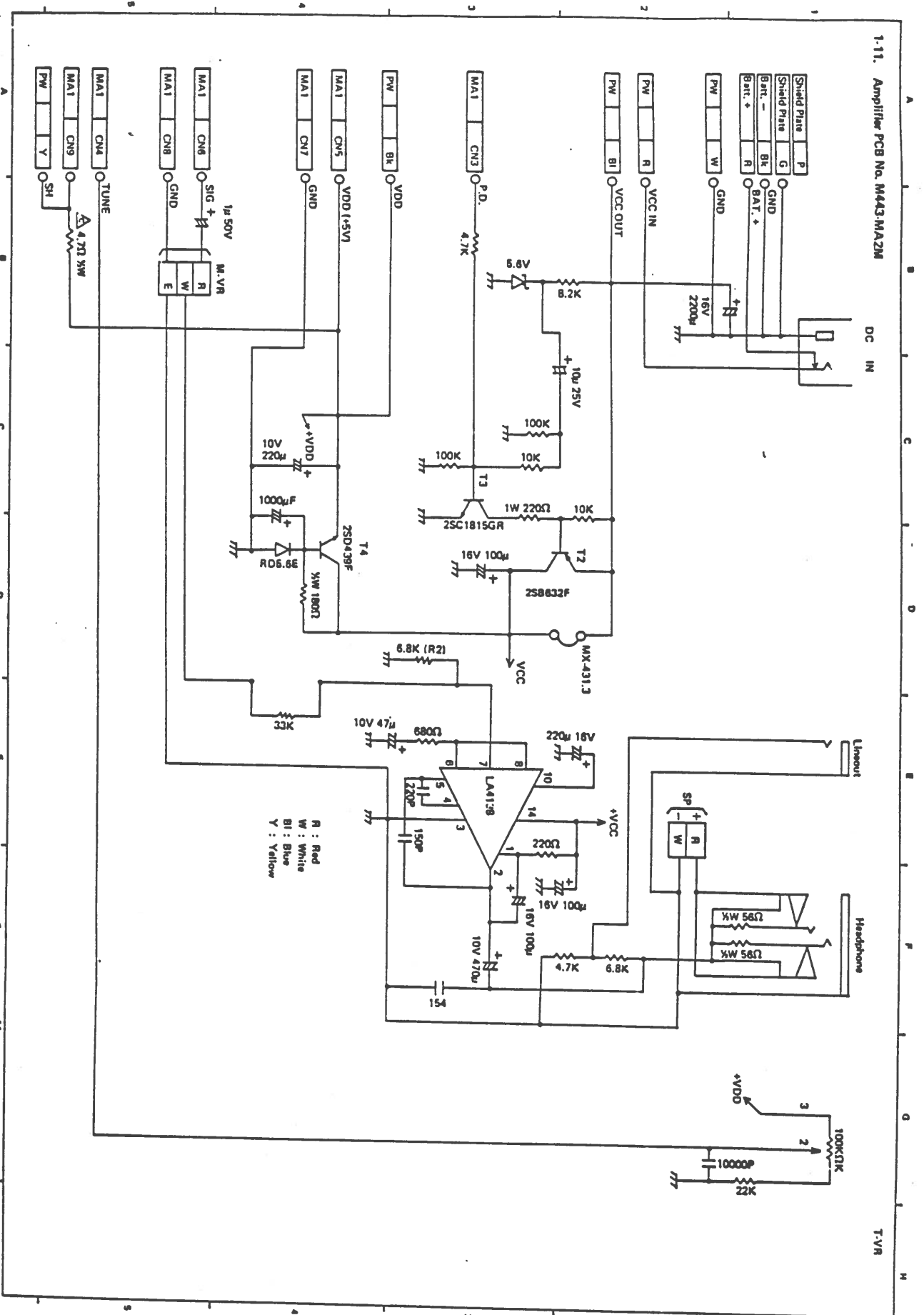
1-9 Console (A) PCB No. M440CN-1M



1:10. Console (B) PCB No. M440CN1M



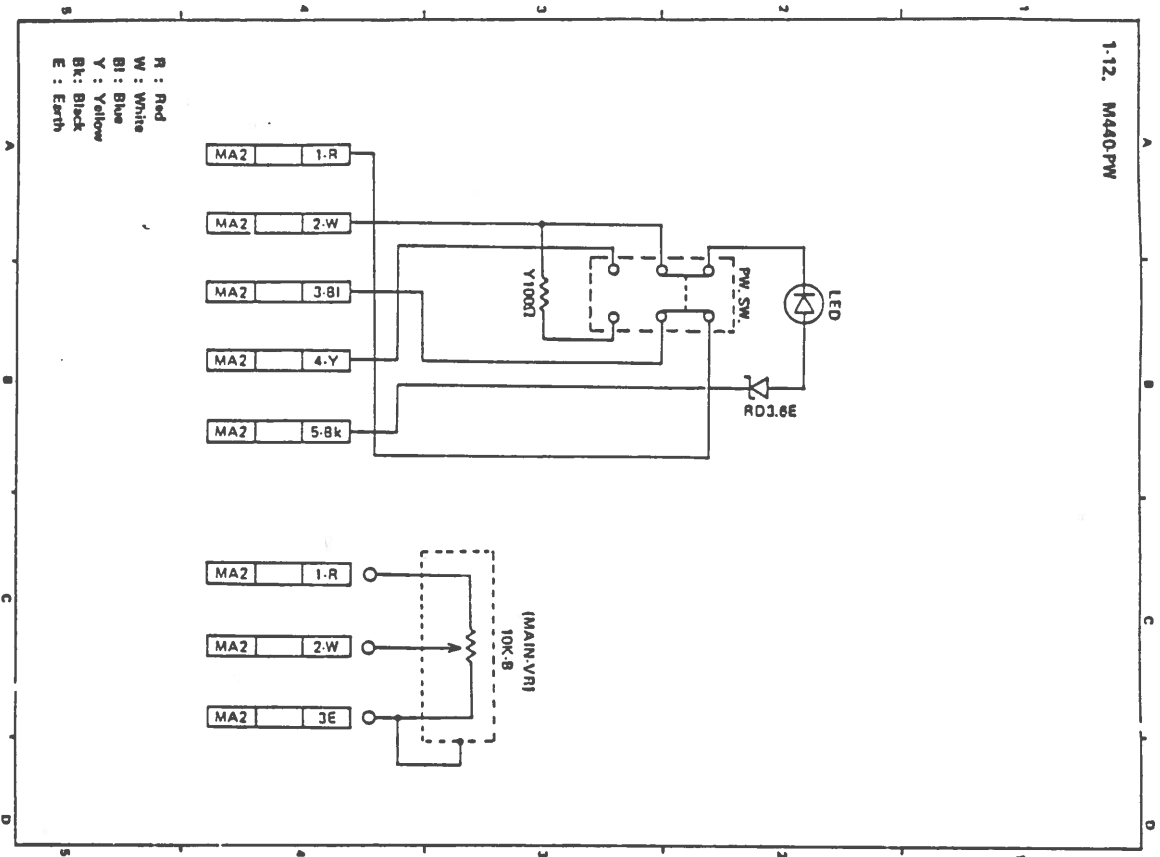
1-11. Amplifier PCB No. MA43-MA2M



R : Red
 W : White
 BI : Blue
 Y : Yellow

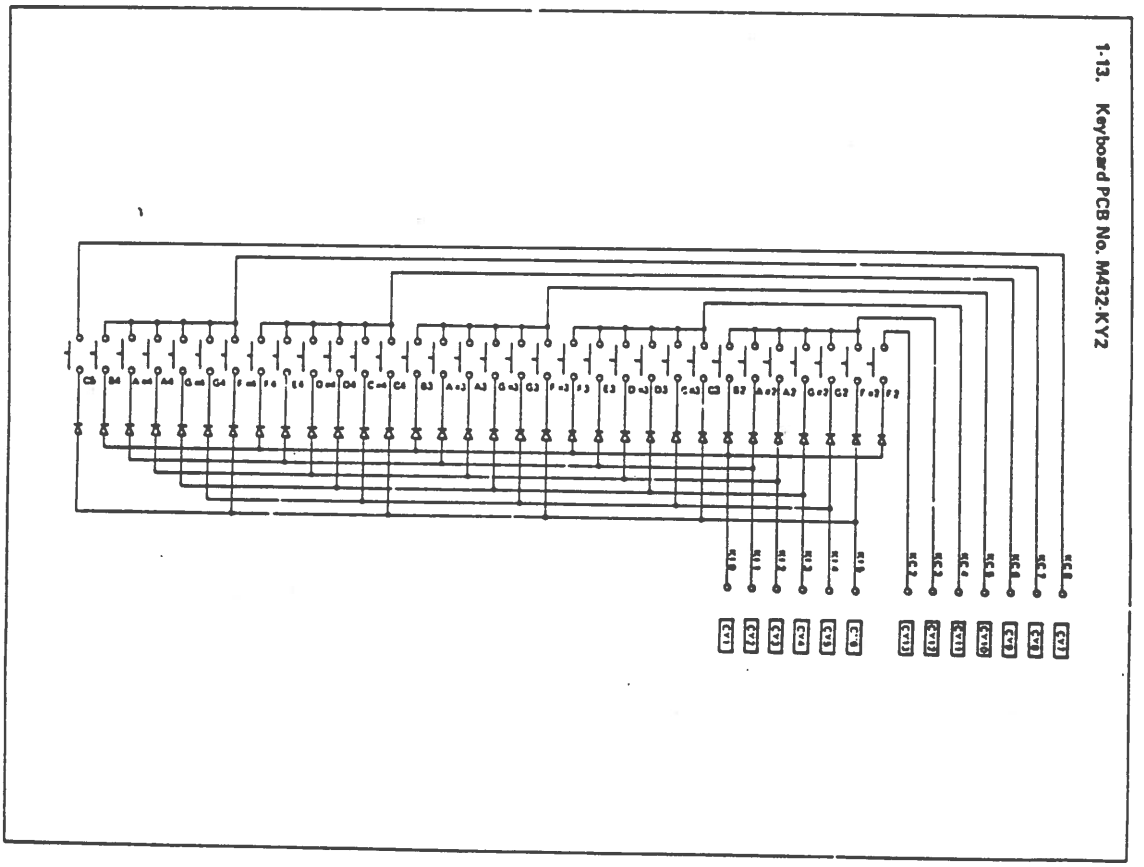
T-VR

1-12. MA40-PW

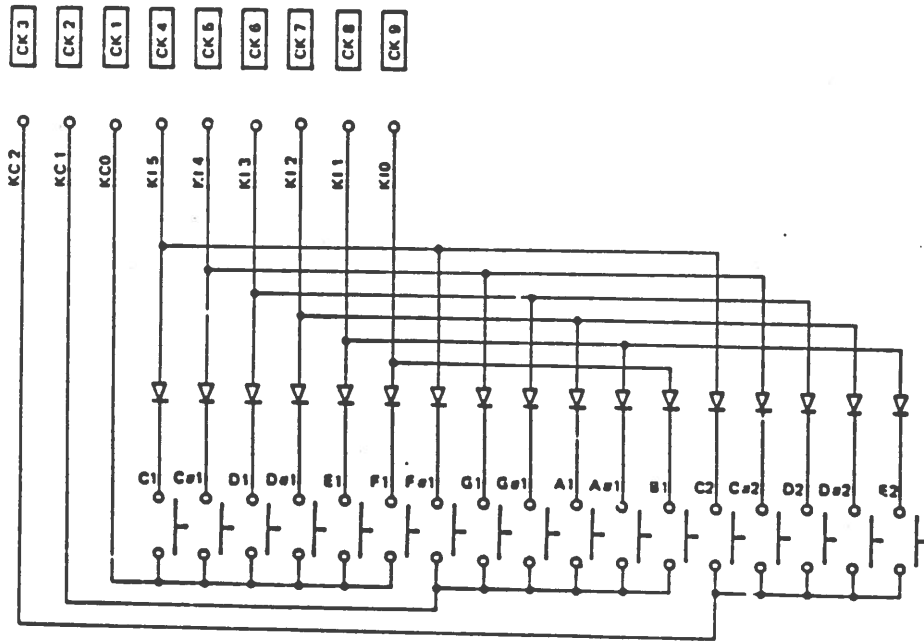


R : Red
 W : White
 BI : Blue
 Y : Yellow
 Bk : Black
 E : Earth

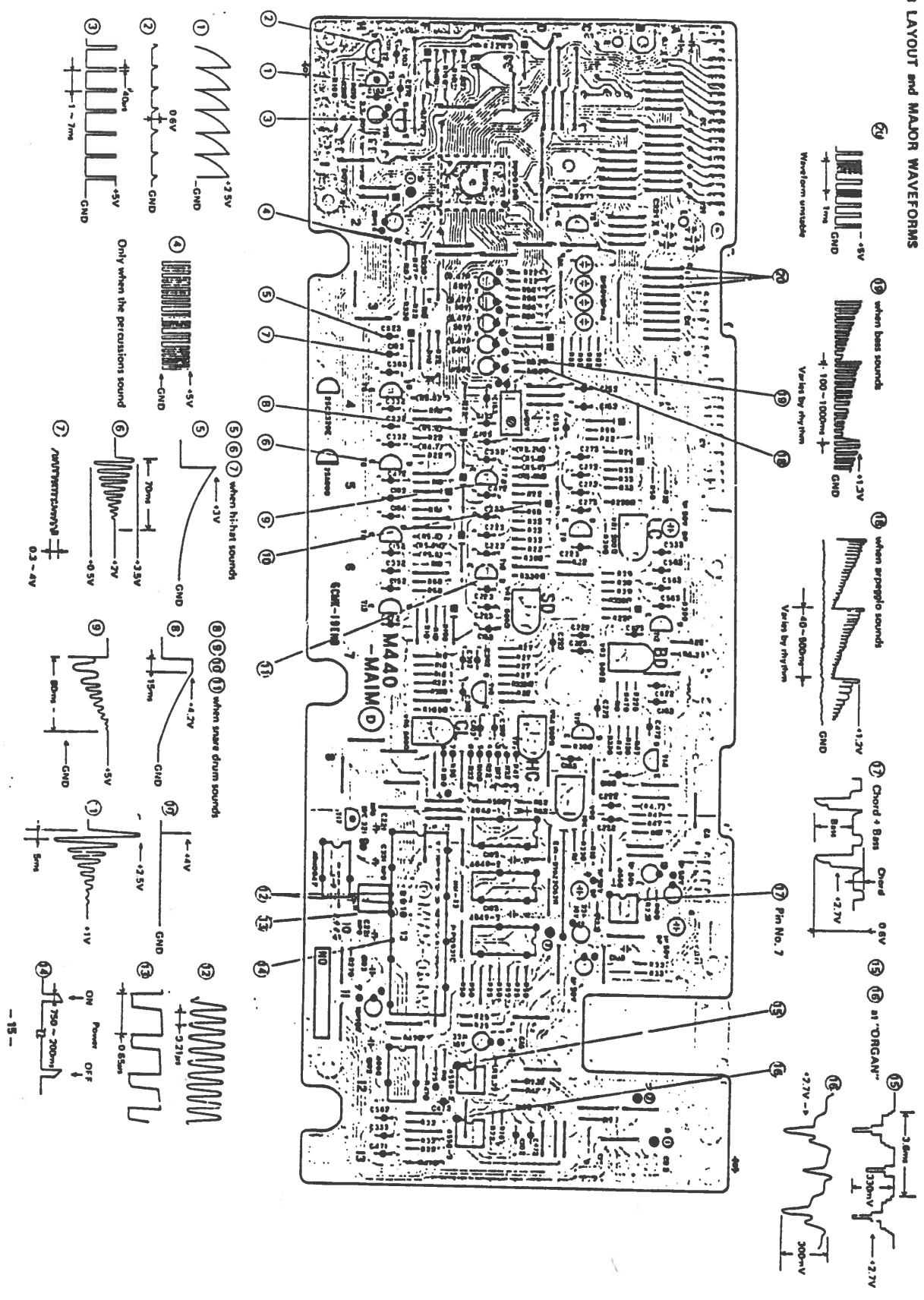
1-13. Keyboard PCB No. MA32-KY2



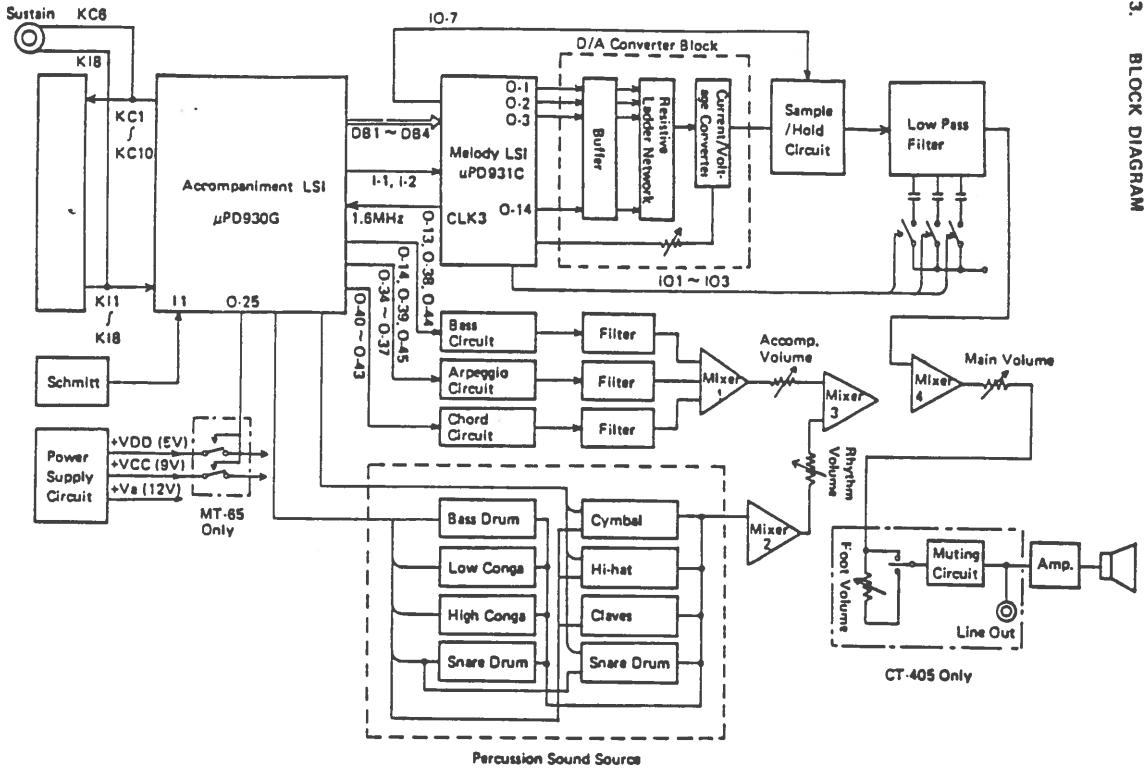
1-14. Keyboard PCB M432-KY1



2. PCB LAYOUT and MAJOR WAVEFORMS



3. BLOCK DIAGRAM



4. KEYBOARD MATRIX

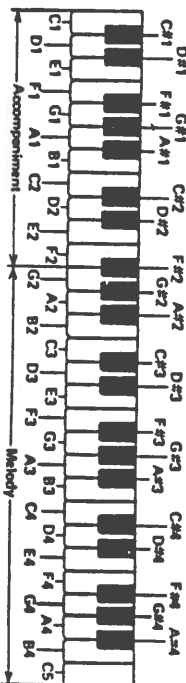
	K11	K12	K13	K14	K15	K16	K17	K18
KC1	C1	C#1	D1	D#1	E1	F1		
KC2	F#1	G1	G#1	A1	A#1	B1		
KC3	C2	C#2	D2	D#2	E2	F2	Chord	Fing'd
KC4	F#2	G2	G#2	A2	A#2	B2	Manual	Arpeggio
KC5	C3	C#3	D3	D#3	E3	F3		
KC6	F#3	G3	G#3	A3	A#3	B3		
KC7	C4	C#4	D4	D#4	E4	F4		
KC8	F#4	G4	G#4	A4	A#4	B4		
KC9	C5	Synchro	Stem/ Stop	Fil'in	Modu- lation I	Modu- lation II		
KC10	Organ (Piano)	Flute (Harp)	Trumpet (Celest)	Oboe (Mandl.)	Violin (Funny)	Tone Change		
KC19	Bass 2	Bass 3	(Chord 4)		Sustain	Vibrato	Delayed Vibrato	Reverb.
			Chord 2	Chord 3				
KC20	Rock	Pop	Disco	16 Beat	Swing	Latin Swing	(Arpeggio 4)	
							App. 2	App. 3

Notes: 1. Tones within () are selected with "Tone Change". For example to set Piano, signal KC10 is applied to K11 and K16 terminals while Organ is set by applying KC10 to K11 terminal.

- Tones which are not shown in this table are set with "Tone Select" position. For instance, Pipe Organ is set by applying KC10 to K11 and KC9 to K17, Electric Piano is set by sending KC10 to K11 and K16 and also KC9 to K17.
- To set Bass 1 to Bass 4.

- Bass 1: No connection.
- Bass 2: Sending KC19 to K11.
- Bass 3: Sending KC19 to K12.
- Bass 4: Sending KC19 to K11 and K12.

Nomenclature of keys



5. ACCOMPANIMENT LSI (μ PD930G)

Specifications:

- 80-pin flat packaged CMOS LSI
- 6-note polyphonic (4 chord sounds, 1 bass sound, 1 arpeggio sound)
- 7 trigger pulses for percussions (bass drum, snare drum, low conga, high conga, claves, hi-hat and cymbal)
- 2 noise outputs (white noise and metallic sound noise)
- Auto Power Off (APO) function

This LSI generates arpeggio, bass, chord and percussion trigger signals in accordance with selected rhythm. The following shows the purpose of each terminal.

Pin No.	Signal Name	Function
1 ~ 4	O34 ~ O37	Chord output terminals. Pin No. 4 (O37) outputs only at 7th chords.
5	O38	Bass pitch signal output.
6	O39	Arpeggio pitch signal output.
7 ~ 10	O40 ~ O43	Chord envelope signals outputs.
11	O44	Bass envelope signal output.
12	O45	Arpeggio envelope signal output.
13	O46	Bass drum trigger pulse output.
14	O47	Snare drum trigger pulse output.
18	O50	Claves trigger pulse output.
19	O51	Hi-hat trigger pulse output.
20	O52	Cymbal trigger pulse output.
22, 23	O54, O55	White noise (for cymbal, hi-hat and snare drum) outputs.
28	I 1	Schmitt trigger pulse input. The LSI's internal circuits are set at initial position when the power switch is turned on.
32	I 8	Clock pulse input.
43	I 2	Tempo clock pulse input.
44~51	K18 ~ K11	Chord keys and switch input terminals.
52~55	O 1 ~ O 4	Chord key and switch common signals outputs. (KC1A ~ KC4A)
58, 60, 70, 71	O7, O9, O27, O21	Switch common outputs. (KC7A, KC9A, KC20A, KC19A)
73	O20	Tempo LED lighting signal. The tempo LED lights up when the terminal is at HIGH level (+5V).
79	O14	Arpeggio volume control signal.
80	O13	Bass volume control signal.

6. MELODY LSI (μ PD931C)

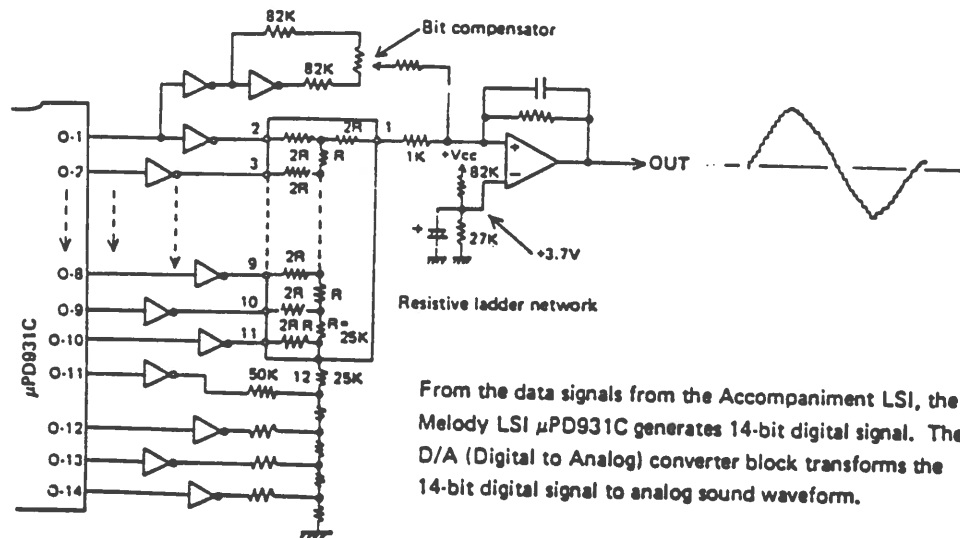
Specifications

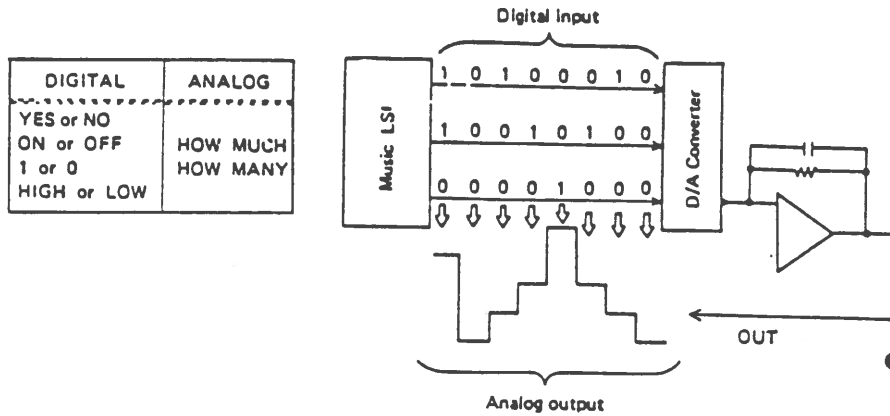
- o 42-pin DIP N-MOS LSI
- o 8-note polyphonic
- o Controlled by outer CPU (does not have control circuits inside)
- o Has new features of digital reverberation, delayed vibrato.

By receiving control signals from the Accompaniment LSI, μ PD931C generates digital melody sound signals.

Pin No.	Signal Name	Function
1 ~ 4	DB4 ~ DB1	Data signals from Accompaniment LSI input terminals.
6, 7	I-1, I-2	Timing pulses to read data signals from Accompaniment LSI.
8, 9	OSC1, OSC2	4.9MHz clock pulse input terminals.
10	OSC3	1.6MHz (1/3 of 4.9MHz clock pulse) output.
13	SCH1	Schmitt trigger pulse which initializes the internal circuits of the LSI input terminal.
15~17	IO-3 ~ IO-1	Filter's cutoff frequency change-over signal.
21	GND	GND (0V) input terminal.
23	IO-7	Sample/Hold timing pulse output.
25~41	O-17 ~ O1	Digital sound outputs.
42	VDD	VDD (+5V) input terminal.

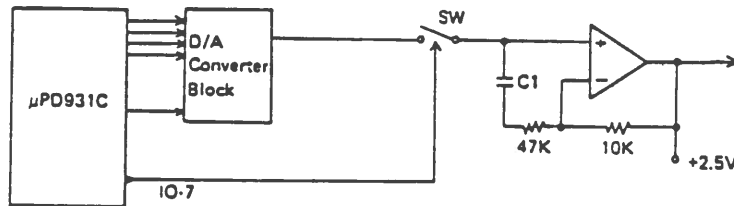
7. D/A CONVERTER BLOCK





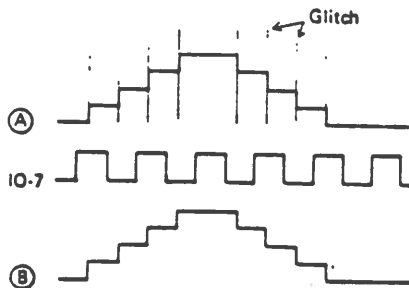
The above figure is an example of 3-bit D/A converter. In accordance with the combinations of input voltage levels, the D/A converter outputs corresponding amount of current and the current is converted into a voltage level by the OP amp.

8. SAMPLE/HOLD CIRCUIT

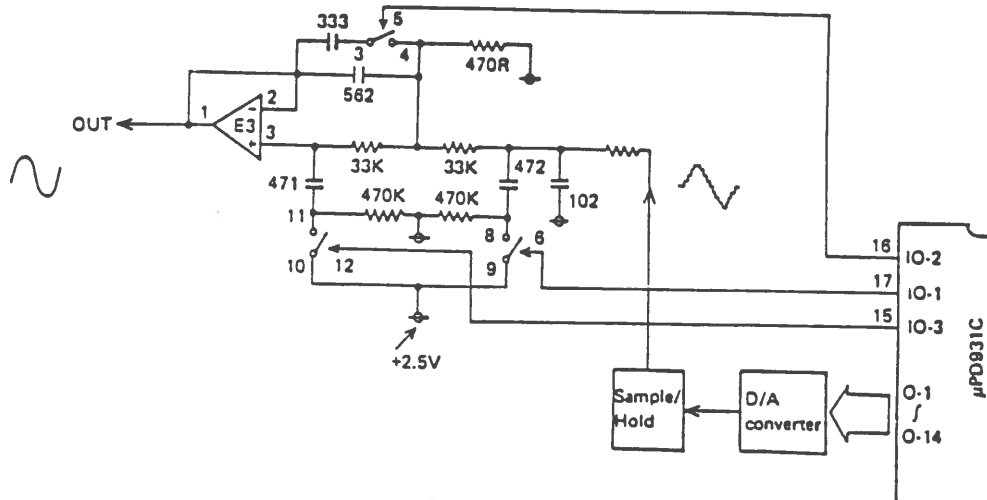


Output of D/A converter incorporates glitch noise which is generated when digital input of D/A converter varies. The circuit removes the glitch.

Signal IO-7 from the Melody LSI is at "L" (LOW=0V) level when glitch is generated so that the switch SW turns OFF causing the glitches not to pass through. While the switch SW is OFF, the voltage level is kept by the hold capacitor C1.



9. FILTER BLOCK

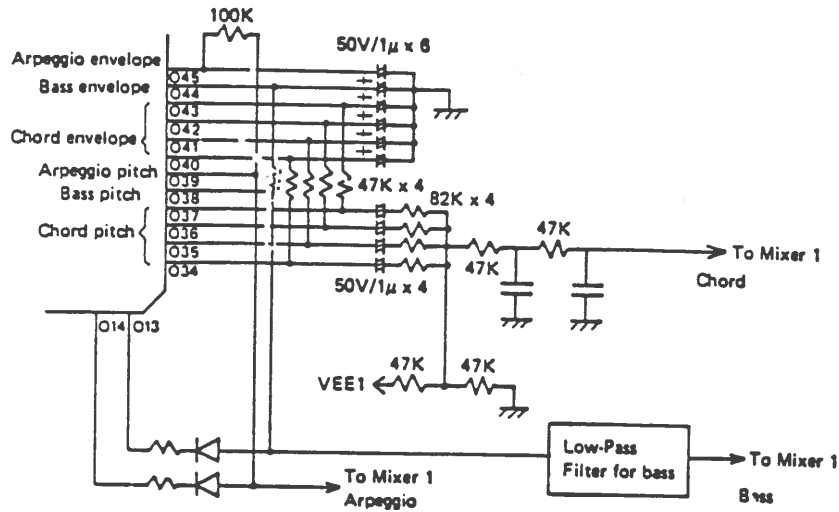


The block is low pass filter which smooths the stepped waveform of D/A converter output and cuts unnecessary high frequency signals. The cutoff frequencies of the filter are varied by turning switches SW1 and SW3 ON or OFF. In accordance with selected tone, signals IO-1 and IO-3 turn ON or OFF the switches so that the block selects adequate cutoff frequency.

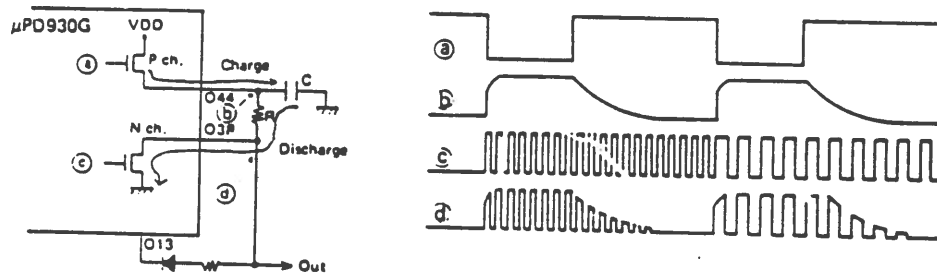
Tone	IO-1	IO-2	IO-3	Tone	IO-1	IO-2	IO-3
Pipe Organ	L	L	L	Piano	H	H	H
Organ	L	L	H	Electric Piano	L	L	H
Flute	H	L	H	Celesta	L	L	L
Clarinet	L	L	H	Vibraphone	H	H	H
Trumpet	H	H	L	Mandlin	L	H	L
Horn	H	H	H	Electric Guitar	L	L	H
Oboe	H	L	H	Harpsi-Chord	L	L	L
Violin	L	H	L	Harp	H	L	H
Cello	H	H	L	Funny	L	L	L
Accordion	L	L	L	Cosmic Tone	L	L	L

10. ACCOMPANIMENT

10-1. Bass, Chord, Arpeggio circuits



The Accompaniment LSI μ PD930G generates four chord sounds, one bass sound and one arpeggio sound signals. Each sound is made by mixing pitch signal and envelope signal.

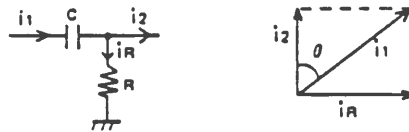


Taking bass sound circuit as an example, bass pitch signal appears from terminal O38 of μ PD930. From terminal O44, bass envelope signal is output and it is integrated by capacitor C and resistor R so that the pulse becomes smooth reducing envelope curve. Terminal O13 controls bass volume. By the voltage level of O13, current flow in the circuit is controlled so that the volume of bass sound signal is varied.

10-2. Percussions

(1) Bass drum, Snare drum, Claves, Low conga, High conga

Those percussion sounds are generated from CR oscillation circuits. A CR (capacitor and resistor) circuit has a characteristic that current leads as shown below.



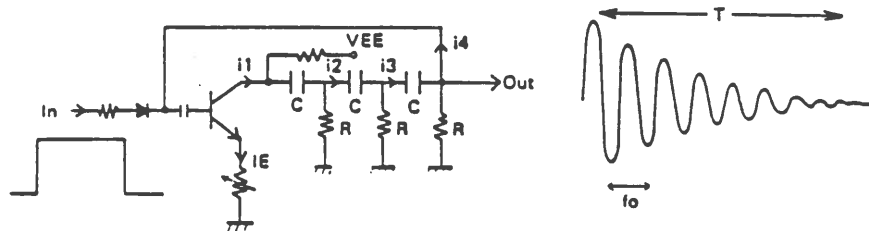
The angle of lead θ varies by capacitance and resistance.

In those percussion circuits, capacitance and resistance are designed to lead 60 degrees therefore in the following figure. Current i_4 leads 180 degrees from i_1 , namely, inverted current feed-backed to the base of the transistor and thus oscillation is made.

Trigger pulse for the oscillation is given from Accompaniment LSI μ PD930G and oscillating frequency f_o is calculated by . . .

$$f_o = \frac{1}{2\pi\sqrt{6}CR} \text{ [Hz]} \text{ while } C; \text{ farads and } R; \text{ ohms}$$

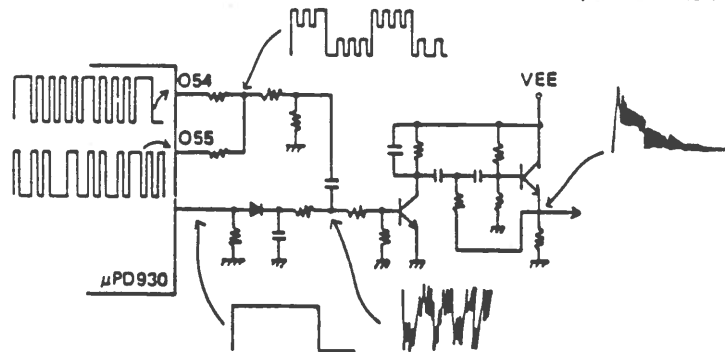
Reducing time T is controlled by variable resistor VR as emitter current I_E drains to ground through it.



(2) Cymbal, Hi-hat, Snare drum

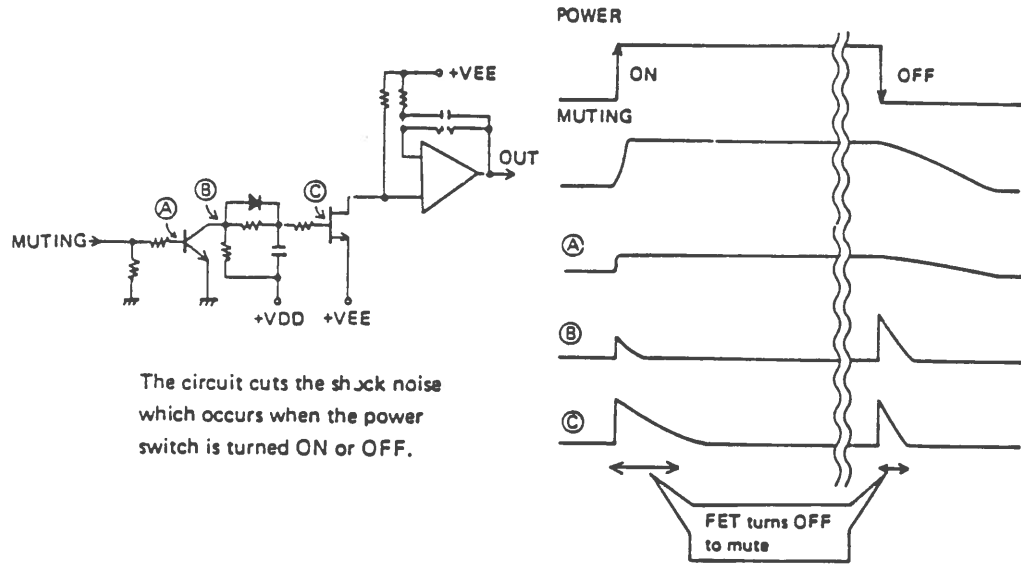
These percussion sounds are generated from white (hiss) noise.

The white noise is made by two random pulses from the Accompaniment LSI.

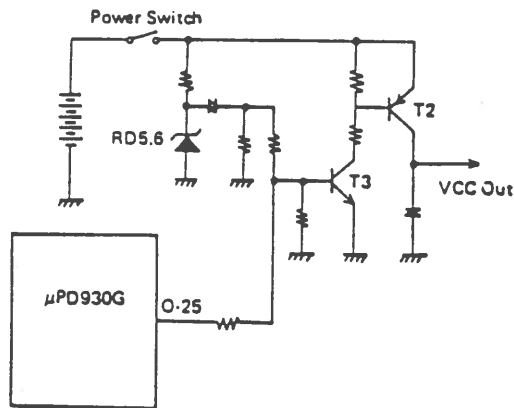


11. OTHER CIRCUITS

11-1. Muting Circuit (CT405 only)



11-2. Auto Power Off Circuit (MT-65 only)

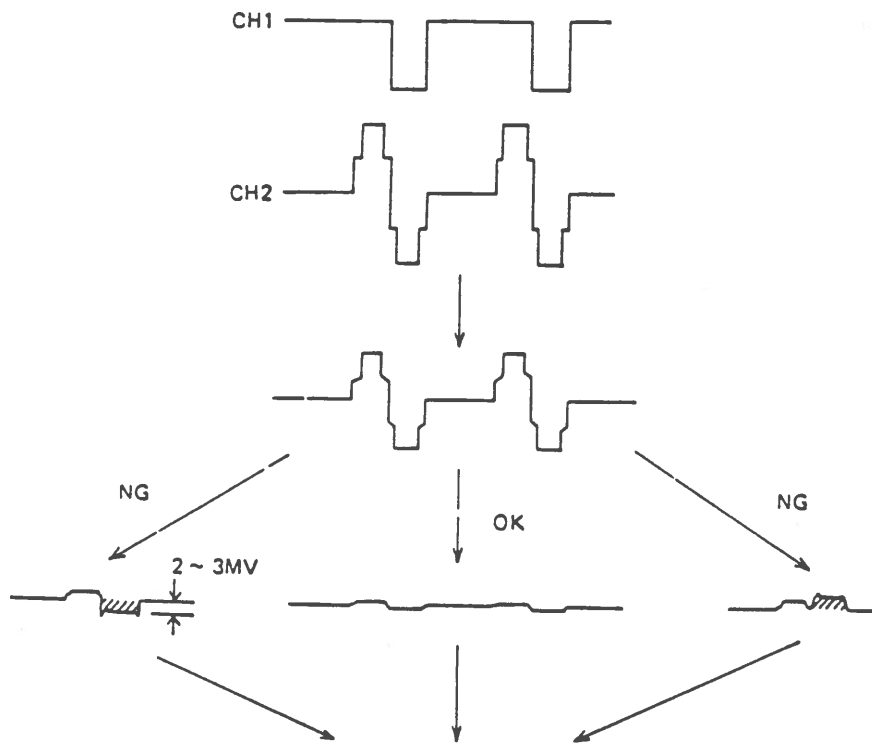


The circuit cuts off the voltage VCC when keys are not hit for about six minutes. When the keys are not hit for approximately 6 minutes, signal O-25 from the Accompaniment LSI drops to "L" (GND) level and the transistors T2 and T3 turn off so that VCC is not supplied to the circuit.

12. ADJUSTMENT

12.1. Bit Compensation

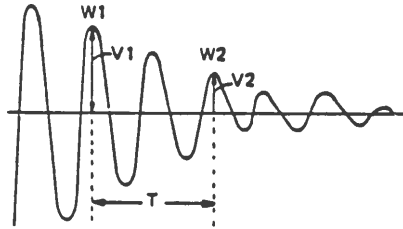
- (1) Set the tone at "FUNNY".
- (2) Attach channel 1 (Triggering channel) to pin number 41 of μ PD931C.
- (3) Attach channel 2 (AC range) to pin number 1 of IC E12.
- (4) Hit a melody key and adjust the variable resistor VR6 so that the waveform of channel 2 declines smoothly.



12.2. Percussions

- (1) Pick up any wave w1 and check its voltage v1.
- (2) Find a wave w2 whose voltage v2 is about half of v1.
- (3) Set the length T between w1 and w2 as mentioned below by turning the variable resistor VR.

Percussion	Check point	VR to adjust	T
Bass Drum	Collector of T12	VR3	15ms \pm 10%
Low conga	Collector of T9	VR1	27ms \pm 10%
High conga	Collector of T15	VR4	16ms \pm 10%
Claves	Collector of T18	VR5	3.9ms \pm 10%
Snare drum	Collector of T10	VR2	7ms \pm 10%



- 1) Price Codes subject to change without notice.
- 2) Refer to current Technical News Bulletins for price code values.

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
		M441-MA1M-PCB Ass'y				
	2001 2001	LSI	μ PD930G-011	1	BK	B
	2001 2043	LSI	μ PD931C	1	BD	B
	2100 3255	Mos IC	TC4049BP	3	AE	A
	2100 3549	Mos IC	TC4066BP	1	AF	A
	2100 3786	Mos IC	TC40H004P	1	AE	A
	2121 0013	OP amp	NJM4558DD	3	AD	A
	2240 6019	PUT	N13T1	1	AD	B
	2340 0022	Vari cap	SV321	1	AE	B
	2760 2011	Semi fixed resistor	V8K4-1B500	5	AB	B
	2760 2029	Semi fixed resistor	V8K4-1B10K	1	AB	B
	★ 2808 0310	Electrolytic capacitor	SM50VB-1(M) (1 μ F, 50V)	1	N/A	X
	2818 0055	Ceramic capacitor	HE40SJYB221K (220pF, 50V)	8		
	★ 2818 3259	Ceramic capacitor	HE11SJCH221J (220pF, 50V)	2		
	★ 2819 0441	Ceramic capacitor	HE12SJPH331J (330pF, 50V)	1		
	2830 6121	Mylar capacitor	AMZ-472K50 (4,700pF, 50V)	1		
	★ 3060 6035	Ladder Network	EXK-S19Z2052R	1	AO	A
	3500 3215	PCB connector	1L4P-S3EN2	1	-	X
	3510 2574	Pin ass'y 3P	5277-03A	1	AB	X
	3510 6324	6P connector	1L6P-S3EN2	1	-	X
	3511 0844	PCB connector	5229-9-CPB	1	-	X
	3511 0852	PCB connector	5229-6-CPB	1	-	X
	★ 3511 0895	PCB connector	5229-21-CPB	1	-	X
	★ 3841 0106	Coil	R12-3034X	1	AC	C
	2200 3534	Transistor	2SA1015 (Y)	2	AD	A
	★ 2221 2010	"	2SC2320E	14	AD	A
	2301 3002	Diode	DS-442	17	AA	C
	2600 7313	Carbon film resistor	R-25-10K-J (10Kohm, $\frac{1}{4}$ W, \pm 5%)	10	N/A	X
	2600 9715	"	R-25-100K-J (100Kohm, $\frac{1}{4}$ W, \pm 5%)	6		
88	2600 5515	"	R-25-1.8K-J (1.8Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 7917	"	R-25-18K-J (18Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	★ 2600 8514	"	R-25-33K-J (33Kohm, $\frac{1}{4}$ W, \pm 5%)	13		

Notes: ★ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Qty	Price Code	RANK
	2601 1515	Carbon film resistor	R-25-560K-J (560Kohm, 1/4W, ±5%)	1	N/A	X
	2600 6511	"	R-25-4.7K-J (4.7Kohm, 1/4W, ±5%)	3		
	2601 8111	"	R-25-2.2M-J (2.2Mohm, 1/4W, ±5%)	1		
	2601 1311	"	R-25-470K-J (470Kohm, 1/4W, ±5%)	3		
	2600 9511	"	R-25-82K-J (82Kohm, 1/4W, ±5%)	7		
	2600 0912	"	R-25-22-J (22ohm, 1/4W, ±5%)	1		
	2601 6231	"	R-25-25K-J (25Kohm, 1/4W, ±5%)	5		
	2601 6339	"	R-25-50K-J (50Kohm, 1/4W, ±5%)	5		
	2601 0217	"	R-25-160K-J (160Kohm, 1/4W, ±5%)	1		
	2601 6550	"	R-25-5.6M-J (5.6Mohm, 1/4W, ±5%)	2		
*	2808 1014	Electrolytic capacitor	SMC50VB-118P-T (1μF, 50V)	7		
*	2808 1031	"	SMC50VB-1 (M)-T (1μF, 50V)	5		
*	2808 1057	"	SMC16VB-10 (M)-T (10μF, 16V)	2		
*	2808 1120	"	SMC50VB-R47 (M)-T (0.47μF, 50V)	4		
*	2808 1138	"	SMC16VB-33 (M)-T (33μF, 16V)	2		
	2818 21J2	Ceramic capacitor	RT-HE70TKYF103Z-T (0.01μF, 50V)	6		
*	2819 0492	"	RT-HE40TKSL150K-T (15pF, 50V)	1		
*	2830 6229	Mylar capacitor	AMZV-104K50-T (0.1μF, 50V)	1		
*	2830 6237	"	AMZV-102K50-T (1,000pF, 50V)	1		
*	2830 6245	"	AMZV-272K50-T (2,700pF, 50V)	1		
*	2830 6253	"	AMZV-563K50-T (0.056μF, 50V)	3		
*	2830 6261	"	AMZV-103K50-T (0.01μF, 50V)	9		
*	2830 6270	"	AMZV-223K50-T (0.022μF, 50V)	10		
*	2830 6288	"	AMZV-273K50-T (0.027μF, 50V)	4		
*	2830 6296	"	AMZV-332K50-T (3,300pF, 50V)	5		
*	2830 6312	"	AMZV-471K50-T (470pF, 50V)	1		
*	2830 6321	"	AMZV-152K50-T (1,500pF, 50V)	2		
*	2830 6339	"	AMZV-222K50-T (2,200pF, 50V)	2		
*	2830 6347	"	AMZV-392K50-T (3,900pF, 50V)	4		
*	2830 6355	"	AMZV-472K50-T (4,700pF, 50V)	5		
*	2830 6363	"	AMZV-822K50-T (8,200pF, 50V)	1		
*	2830 6371	"	AMZV-123K50-T (0.012μF, 50V)	1		
*	2830 6380	"	AMZV-1E3K50-T (0.015μF, 50V)	5		
*	2830 6398	"	AMZV-333K50-T (0.033μF, 50V)	2		
*	2830 6401	"	AMZV-393K50-T (0.039μF, 50V)	1		
*	2830 6410	"	AMZV-823K50-T (0.082μF, 50V)	2		
*	2830 6428	"	AMZV-562K50-T (5,600pF, 50V)	1		

Notes: * - The parts newly employed
 Qty - Qty used per unit

Rank A : Essential
 B : Stock recommended
 C : Others
 X : No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
		M441-AS1M-PCB Ass'y M2534*1				
	2120 8337	Monolithic IC	LA4440W	1	AL	A
	2121 0013	OP amp	NJM4568DD	1	AD	A
	2240 5110	FET	2SK30A	1	AD	B
	2310 3168	Zener diode	RD8, 2E	1	AA	B
89	2770 6622	Volume Pitch Control	K161A0054-100KK	1	AC	B
	2804 5514	Electrolytic capacitor	10RE1000 (1,000 μ F, 10V)	2	N/A	X
	2808 0280	Electrolytic capacitor	SMC25VB-220(M) (220 μ F, 25V)	2	N/A	X
	2221 2010	Transistor	2SC2320-E	2	AD	A
	2301 3002	Diode	DS-442	1	AA	C
	2600 7313	Carbon film resistor (P)	R-25-10K-J (10Kohm, $\frac{1}{4}$ W, \pm 5%)	7	N/A	X
	2600 9715	"	R-25-100K-J (100Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 5311	"	R-25-1.5K-J (1.5Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 9111	"	R-25-56K-J (56Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 2516	"	R-25-100-J (100ohm, $\frac{1}{4}$ W, \pm 5%)	2		
	2601 5715	"	R-25-4.7-J (4.7ohm, $\frac{1}{4}$ W, \pm 5%)	2		
	2600 4918	"	R-25-1K-J (1Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2601 2112	"	R-25-1M-J (1Mohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 5710	"	R-25-2.2K-J (2.2Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 8115	"	R-25-22K-J (22Kohm, $\frac{1}{4}$ W, \pm 5%)	2		
	2600 8112	"	R-25-3.3K-J (3.3Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 8913	"	R-25-47K-J (47Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 1714	"	R-25-47-J (47ohm, $\frac{1}{4}$ W, \pm 5%)	2		
	2601 0110	"	R-25-150K-J (150Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 6511	"	R-25-4.7K-J (4.7Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 4110	"	R-25-470-J (470ohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2601 8111	"	R-25-2.2M-J (2.2Mohm, $\frac{1}{4}$ W, \pm 5%)	2		
	2601 1311	"	R-25-470K-J (470Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 9511	"	R-25-82K-J (82Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2808 1014	Electrolytic capacitor	SMC50VB-1M8P-T (1 μ F, 50V)	1		
	2808 1031	"	SMC50VB-1 (M)-T (1 μ F, 50V)	3		
	2808 1081	"	SMC10VB-47 (M)-T (47 μ F, 10V)	1		
	2808 1090	"	SMC10VB-100 (M)-T (100 μ F, 10V)	2		
	2808 1146	"	SMC25VB-10 (M)-T (10 μ F, 25V)	1		
	2808 1154	"	SMC50VB-4R7 (M)-T (4.7 μ F, 50V)	4		
	2808 1162	"	SMC25VB-33 (M)-T (33 μ F, 25V)	1		
	2808 1197	"	SMC50VB-2R2M8P-T (2.2 μ F, 50V)	1		
	2808 1201	"	SMC35VB-4R7M8P-T (4.7 μ F, 35V)	1		

Notes: * - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
★	2808 0298	Electrolytic capacitor	SMC18VB-470 (M) (470 μ F, 16V)	1	N/A	X
85	3500 3223	PCB connector	1L-3P-S3FP2	1	-	X
84	3500 3444	PCB connector	1L-2P-S3FP2	2	-	X
★	3500 3720	4P connector M41A	1L-4P40-M41	1	-	X
83	3511 0838	PCB connector	5276-05A	1	-	X
86	3612 0070	Phone jack Sustain/Lineout	H LJ-4305-01-100	2	AG	B
87	3612 0088	Phone jack Ft. Vol.	H LJ-4305-01-090	1	AG	B
88	3612 0096	Phone jack Headphone	H LJ-4305-01-040	1	AG	B
	6901 4900	Heat sink	M4755-1	1	-	X
	6901 5230	Sponge	M4814-1	1	-	X
	6901 5241	Shield plate	M4812A-1	1	-	X
	2830 6438	Mylar capacitor	AMZV-473K50-T (0.047 μ F, 50V)		N/A	X
M441-PS2M-PCB Ass'y M2538*1						
	2120 8639	Monolithic IC	NJM78M05A (UA78M05H)	1	AG	A
	2221 2010	Transistor	2SC2320-E	2	AD	A
	2230 3023	Transistor	2SD313 (E.F)	1	AD	A
	2310 3178	Zener diode	RD10EB3	1	AA	B
	2310 3168	Zener diode	RD8, 2EB2	2	AA	B
	2330 1075	Diode	SAV810	1	AE	C
	2301 3002	Diode	DS-442	1	AA	C
	3630 2526	UL time lag fuse	2.0 Amp (5)	1	AC	B
	3640 2331	Fuse holder clip	UF-0033	2	AA	C
	2820 3317	Carbon film resistor (P)	R-50X-220-J (220ohm, $\frac{1}{2}$ W, \pm 5%)	1	N/A	X
	2808 0001	Electrolytic capacitor	25RPE4700 (4,700 μ F, 25V)	1		
	2808 0301	Electrolytic capacitor	SMC25VB-47 (M) (47 μ F, 25V)	1		
	2808 0310	Electrolytic capacitor	SMC50VB-1 (M) (1 μ F, 50V)	1		
	2808 0328	Electrolytic capacitor	SMC18VB-22 (M) (22 μ F, 16V)	1		
	3510 2898	PCB connector	5273-03A	1	AB	C
	3520 7121	5P connector M41A	5265-5P43-M41	1	-	C
	3520 7139	3P connector M41B	5265-3P23-M41	1	-	C
	3660 3011	Terminal	1, 25-4	1	-	C
	3660 3046	Terminal	2-4	2	-	C
	5560 0368	Insulator band	T-185	3	-	C
	6901 4980	Heat sink DG3S	M4756-1	1	-	C
	2801 0110	Carbon film resistor (P)	R-25-150K-J (150Kohm, $\frac{1}{2}$ W, \pm 5%)	1	N/A	X

Notes: ★ - The parts newly employed
Q'ty - Q'ty used per unit

Rank: A: Essential
B: Stock recommended
C: Others
X: No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
		M441-CN1M-PCB Ass'y M2496*1				
66	2320 7028	LED	SLP-1358	1	AB	C
64*	3720 9654	PC Joiner M41A	PCJ-UV-21-230	1	AF	C
63*	3720 9662	PC Joiner M41B	PCJ-JPSS-15-165	1	AD	C
	6901 7320	Wire M41	M4959-1	1	-	C
	2301 3002	Diode	DS-442	28	AA	C
		M441-CN2M-PCB Ass'y M2497*1				
58	2770 5049	Volume Main/accomp/rhythm	VO16L12-4N B10K (VO16B-4NB10K)	3	AD	C
57	2770 5057	Volume Tempo	VO16L12-4N C1M (VO16B-4NC1M)	1	AD	C
	3500 3690	6P connector M41A	1L-6P23-M41	1	-	C
	3500 3703	2P connector M41B	1L-2P13-M41	1	-	C
	3500 3711	3P connector M41A	1L-3P19-M41	1	-	C
	6901 6443	Switch Board S10	M3725C*1	1	AH	C
	2301 3002	Diode	DS-442	21	AA	C
		M441-CN3M-PCB Ass'y M2495*1				
10	2320 7028	LED	SLP-1358	1	AB	C
	2600 3911	Carbon film resistor	R-25-390-J (390ohm, 1/2W, ±5%)	1	N/A	X
		M441-PS1-PCB Ass'y M3774*1				
	2818 2601	Ceramic capacitor	DE7150FZ103PVA1 (0.01μF, 50V)	1	N/A	C
	3020 2104	Noise filter	TE2317C-601Y2R5	1	AG	C
	3631 0049	UL time lag fuse	MT4-1A	1	AC	C
	3640 2331	Fuse clip	UF-0033	2	AA	C
		Keyboard PCB Ass'y M313*2				
81	3720 9236	PC Joiner M35A	PCJ-UV-9-75	1	AC	C
82	3720 9244	PC Joiner M35B	PCJ-UV-6-85	1	AB	C
79	3720 9309	PC Joiner M35H	PCJ-JPSS-3-22	2	AA	C
80	3720 9317	PC Joiner M35J	PCJ-JPSS-6-22	2	AA	C
	6901 7340	Shield plate KY41	M3825-1	1	-	C
	2301 3002	Diode	DS-442	49	AA	C
76	4307 0146	PCB-M425-KY1M	M3461B-1	1	AG	X

Notes: * - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
78	4307 0148	PCB-M425-KY3M	M3462A-1	1	AF	X
77*	4307 0451	PCB-M435-KY2M	M2423-1	1	AJ	X
		Power Supply				
	3000 5139	Power transformer	TE-35-2M1	1	BB	X
	3600 1160	Voltage selector	ESE-371 (ESE-37)	1	AE	X
9	3440 5255	Power switch	SDJ1S	1	AI	A
	5560 0368	Insulation band	T-185	4	-	C
	3670 1161	Receptacle	NC-174	1	AD	C
	5560 0368	Connector band	T-185	3	-	C
	6901 5580	Receptacle supporter	M4850-1	1	-	C
	6901 6470	Transformer support metal	M4887-1	1	-	C
		Key Board Unit				
67	6900 9120	Key stopper	M4421-1	1	-	X
59	6900 9290	Key A (Ivory)	M3404-1	4	AH	C
60	6900 9300	Key B, E (Ivory)	M3405-1	8	AH	C
61	6900 9310	Key C, F (Ivory)	M3406-1	8	AH	C
62	6900 9320	Key D (Ivory)	M3407-1	4	AH	C
63	6900 9330	Key G (Ivory)	M3408-1	4	AH	C
64	6900 9340	Key S (Ivory)	M3409-1	1	AH	C
65	6900 9350	Key black	M3410-1	20	AH	C
66	6900 9360	KB spring	M4419-1	49	AA	C
		Console 41R Ass'y M2538*1				
32*	6901 6433	SW sub ass'y	M4910C*1	1	AF	B
31*	6901 6443	Switch board S10 sub ass'y	M3725C*1	1	AH	C
33*	6901 6560	Switch board F	M3699-1	1	AB	C
35	6901 6570	Switch contact rubber	M4839-1	3	AB	B
36*	6901 6580	CN contact 413	M4825-1	1	AB	C
37*	6901 6590	CN spacer 413	M4822-1	1	AA	C
38*	6901 6611	Switch button 41	M3702A-2	1	AC	C
39*	6901 6621	"	M3702A-3	1	AC	C
40*	6901 6631	"	M3702A-4	1	AC	C
41*	6901 6641	"	M3702A-5	1	AC	C
42*	6901 6651	"	M3702A-6	1	AC	C
43*	6901 6661	"	M3702A-7	1	AC	C
44*	6901 6671	"	M3702A-8	1	AC	C

Notes: * - The parts newly employed
Q'ty - Q'ty used per unit

Rank: A: Essential
B: Stock recommended
C: Others
X: No stock recommended

Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
45*	6901 6681	Switch button 41 Celesta	M3702A-9	1	AC	C
46*	6901 6691	" Randall Ln	M3702A-10	1	AC	C
47*	6901 6701	" Funny	M3702A-11	1	AC	C
50*	6901 6711	VR blind 41	M4837A-1	4	-	X
51*	6901 6720	Sea saw spacer	M4890-1	3	-	X
49*	6901 7080	Upper blind plate 3	M4671-3	3	-	X
34	6910 4840	Switch contact rubber COM	M3693-1	1	AB	B
48*	6910 5300	Blind plate 3	M4670-3	3	-	X
Console 41L Ass'y M2437*1						
14*	6901 6462	Switch board S6 sub ass'y	M37268*1	1	AG	B
30*	6901 6600	Switch button 41	M3702-1	7	AC	B
11*	6901 6730	Switch board D	M3697-1	1	AB	B
12*	6901 6740	Switch board E	M3698-1	1	AB	C
13*	6901 6750	Switch board G	M3700-1	1	AB	C
16*	6901 6760	CN contact 411	M4823-1	1	AB	X
17*	6901 6770	CN contact 412	M4824-1	1	AB	X
18*	6901 6780	CN spacer 411	M4820-1	1	-	X
19*	6901 6790	CN spacer 412	M4821-1	1	-	X
20	6901 6800	Contact rubber COM	M3693-2	1	AB	X
21	6901 6810	Contact rubber 41	M3696-1	1	AB	B
29	6901 6820	Contact rubber COM	M3693-4	1	AA	B
28*	6901 6890	Push button 41	M4834-1	2	AC	C
27*	6901 6900	Push button 41	M4834-3	1	AC	C
25*	6901 7080	Upper blind plate 3	M4671-3	1	-	X
22*	6901 7090	Blind plate 2	M4672-3	4	-	X
26*	6901 7300	Upper blind plate 4	M4687-2	3	-	X
24*	6910 5220	Blind plate 4	M4686-2	3	-	X
23*	6910 5300	Blind plate 3	M4670-3	1	-	X
N Key Ass'y M2466*2						
74*	6900 8730	Felting seal P	M4599-1	1	-	X
70	6900 9130	Key contact rubber	M3412-1	3	AD	X
71	6900 9140	Key contact rubber	M3413-1	1	AD	X
72	6900 9162	Guide felt A	M34288-1	3	-	X
73	6900 9172	Guide felt S	M34298-1	1	-	C
69	6900 9180	Stopper felt 49	M3425-1	1	-	B
68	6901 4800	KB chassis 49-35	M1329-1	1	-	C

Notes: * - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

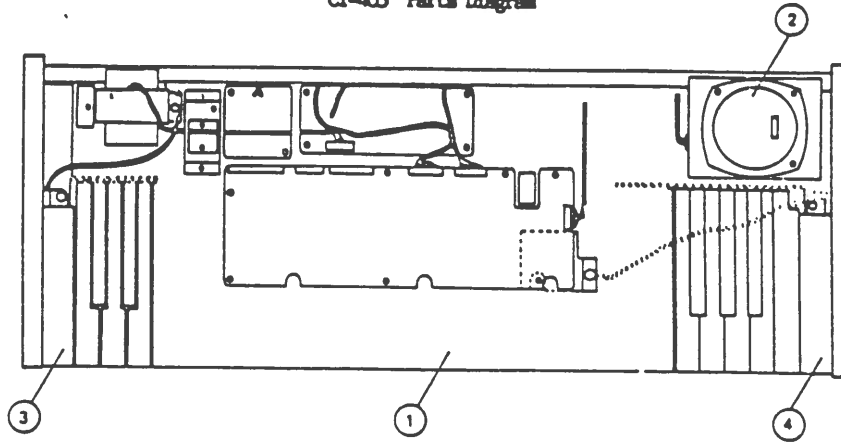
Model CT-405 (MX-41AA)

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
75*	6901 6160	S felt 49C	M4844-1	1	-	
15*	6901 4950	Slide board L	M4746-1	11	AC	B
	6901 4972	Slide contact B	M4797A-1	11	AA	B
	6910 0480	Slide spring	M4491-1	11	AA	X
	5580 1274	Ball Bearing	SUS304-2PI	11	AA	
		Upper Case Unit M2541*1				
5	6901 6350	Upper case sub ass'y	M2539*1	1	BD	C
6*	6901 6480	Volume knob	M3656-2	4	AC	C
7*	6901 6490	Slide knob	M3701-1	7	AC	C
8*	6901 6500	Slide knob 41	M3701-2	4	AC	C
		Lower Case Unit				
*	3500 3738	2P connector M41A	1L-2P-48-M41	1	-	X
2	3830 3023	Speaker	C085K03C4312 (C85K03CA311)	1	AT	B
	5560 0368	Insulation band	T-185	7	-	X
	6900 8440	SP felt	M4434-1	1	-	X
*	6900 8631	Rubber bush	M4432A-1	1	-	X
4	6901 4425	Key spacer (R) sub ass'y	M3306E*3	1	AD	X
3	6901 4435	Key spacer (L) sub ass'y	M3307E*3	1	AD	X
1	6901 6250	Lower case sub ass'y	M2540	1	BN	C
*	6901 7310	Shielded wire sub ass'y	M4953*1	1	-	X
		Accessories				
	6900 7820	Note stand	M3373-1	1	AK	C
	6900 9680	Dust cover	M3570A-1	1	AK	X

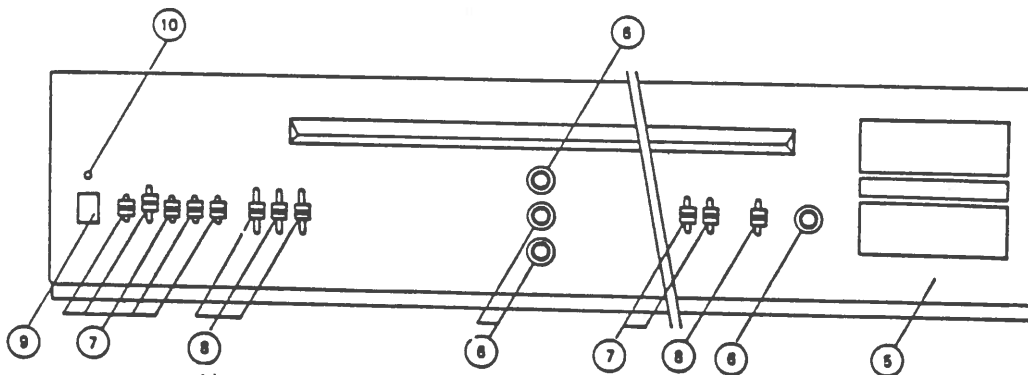
Notes: * - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

CT-405 Parts Diagram

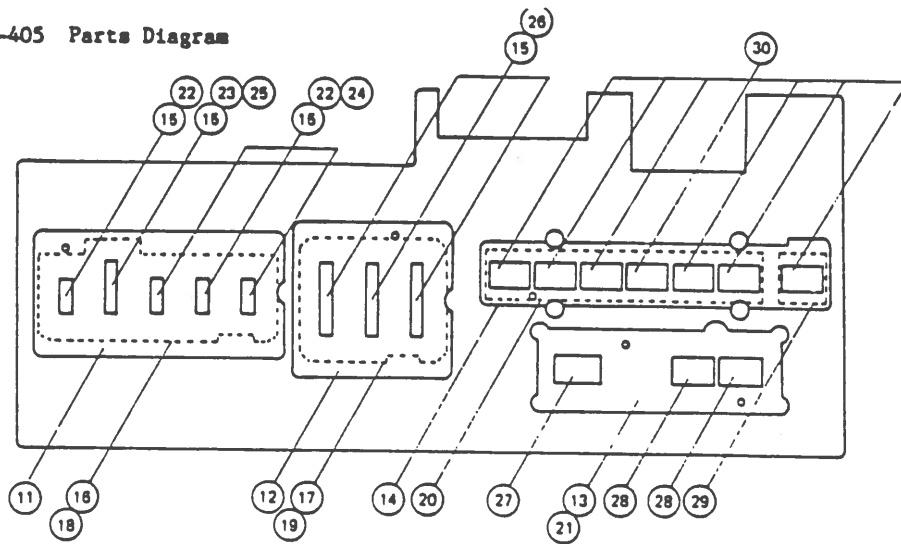


Top Cross-Sectional View of CT-405

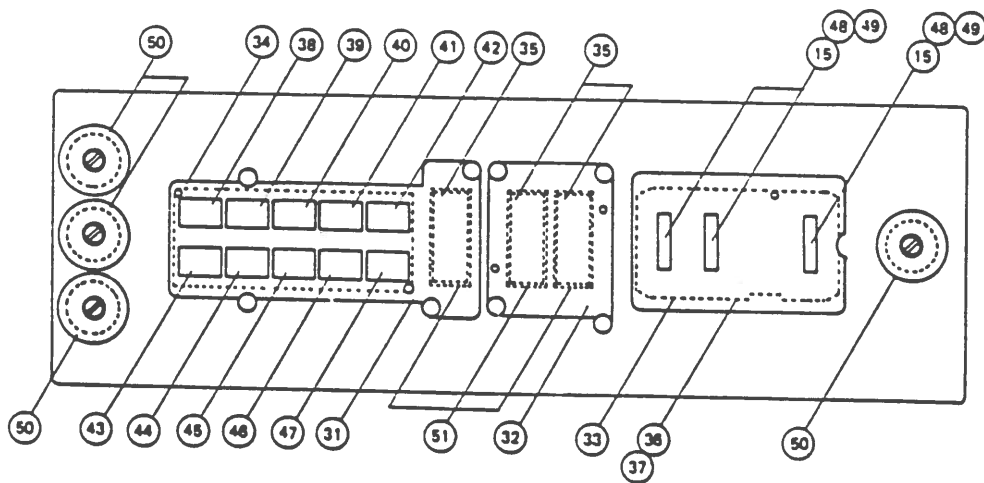


Top View of Upper Case for CT-405

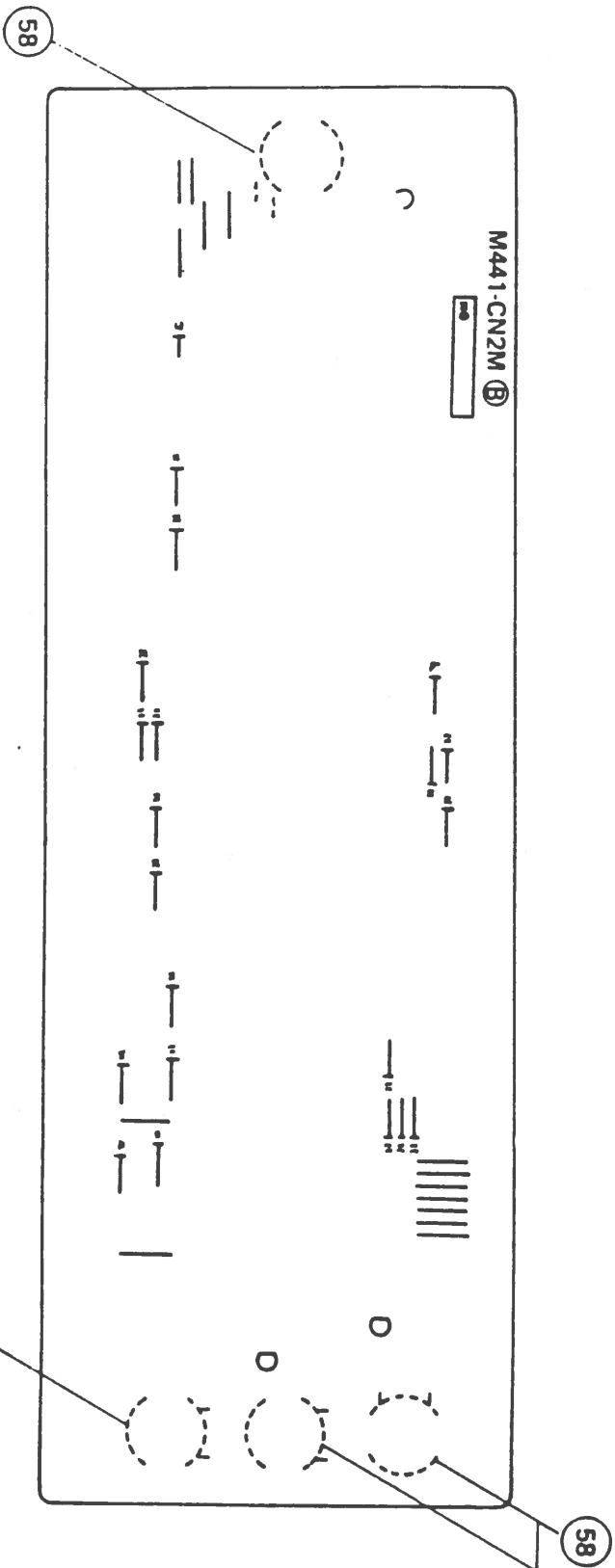
CT-405 Parts Diagram



Top View of Switch Board (Chord, Accomp, Variation & Rhythm)

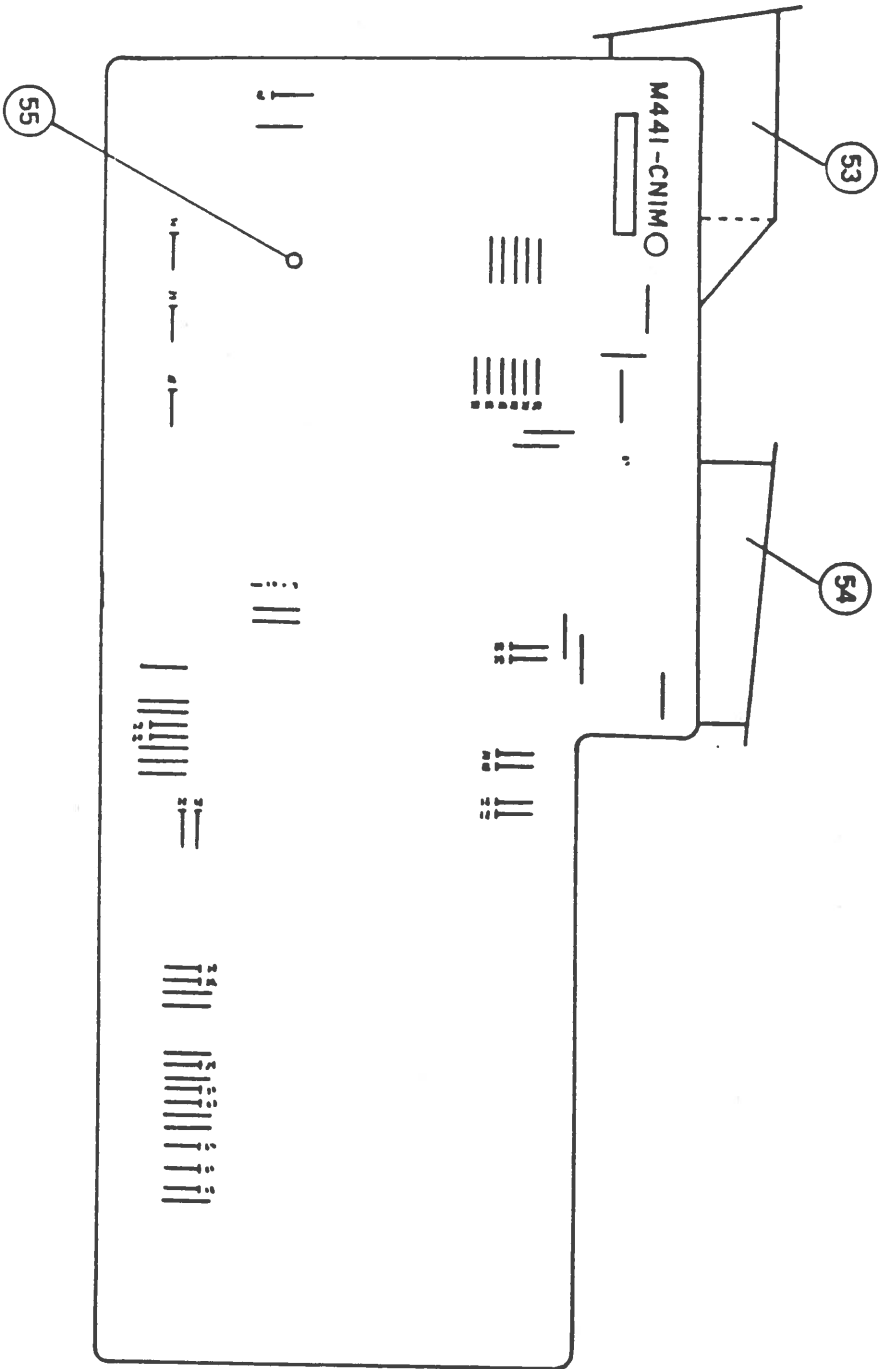


Top View of Switch Board (Tone, Modulation, Transpose & Volume)

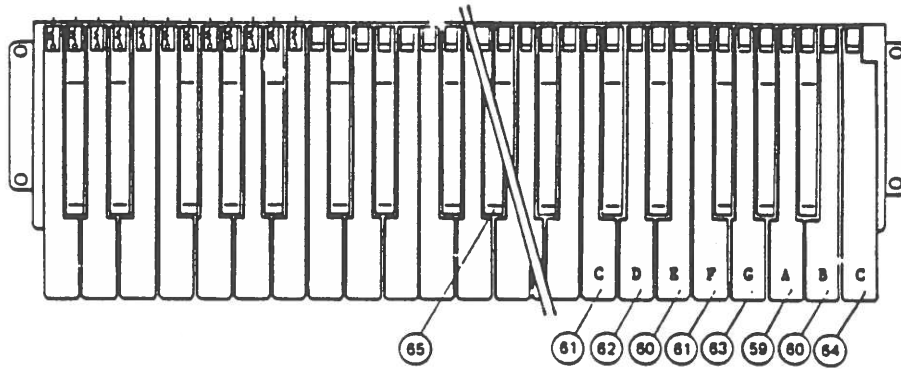


Top View of P.C. Board M441-CN2M (B)

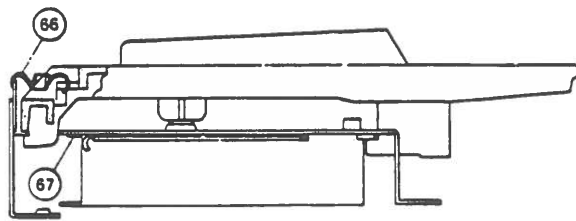
CT-405 Parts Diagram



Top View of P.C. Board M441-CN1M (B)

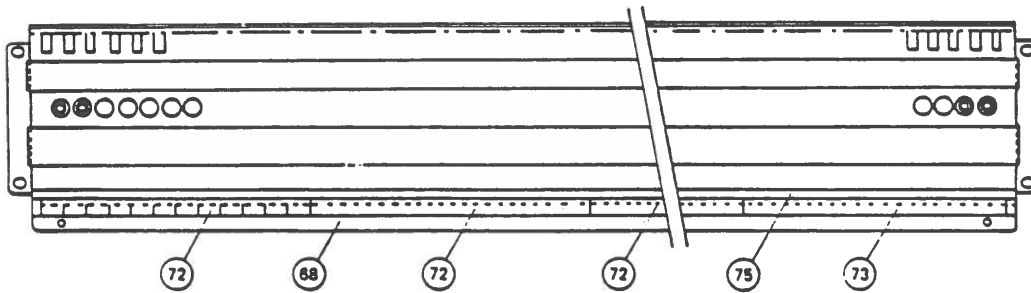


Top View of Keyboard

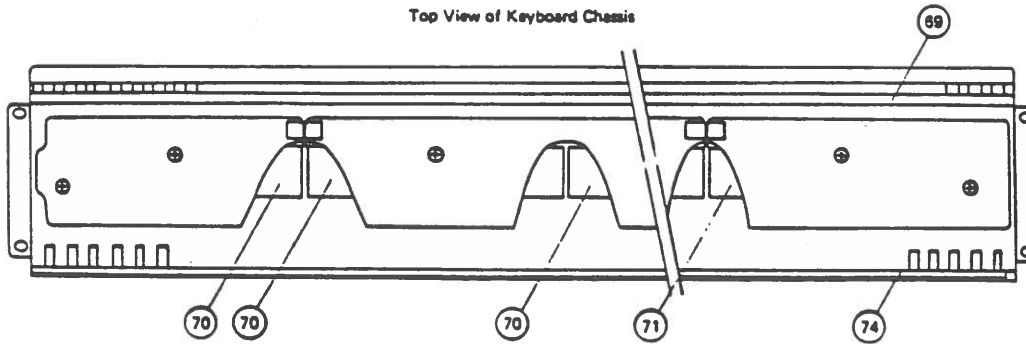


Cross-Sectional View of Keyboard for CT-405

CT-405 Parts Diagram

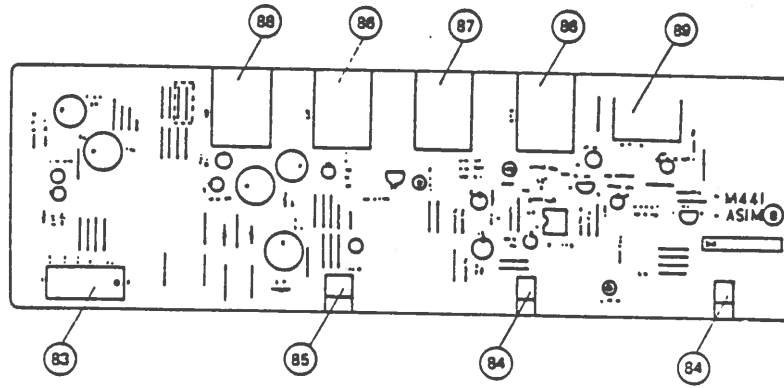


Top View of Keyboard Chassis

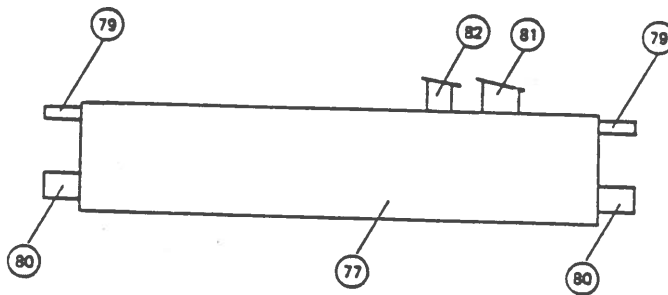


Inside View of Keyboard Chassis

CT-405 Parts Diagram



Top View of P.C. Board M441-AS1M (B)



Top View of P.C. Board KY123

1) Price Codes subject to change without notice.

2) Refer to current Technical News Bulletins for price code values.

Model MT-65 (MX-40) Parts List

Item	Code No.	Parts Name	Standard Name	Qty	Price Code	RANK
		P.C. Board M440-MA1M				
	2001 2001	L S I	μ PD930G-011	1	BK	B
	2001 2043	L S I	μ PD931C	1	BD	B
	2100 3255	MOS IC	TC40498P	3	AE	A
	2100 3549	MOS IC	TC40668P	1	AF	A
	2121 0013	OP amp	NJM4558DD	J	AD	A
	2240 6019	PUT	N13T1	1	AD	
	2340 0022	Variable capacitor	SVC321	1	AE	R
	2760 2011	Semi fixed resistor	V8K4-18500	5	AB	B
	2760 2029	Semi fixed resistor	V8K4-1810K	1	AB	B
☆	2808 0310	Electrolytic capacitor	SMC50VB-1 (M) (1 μ F, 50V)	1	N/A	X
	2818 0055	Ceramic capacitor	HE40SJY8221K (220pF, 50V)	8		
	2819 0271	Ceramic capacitor	HE1-1SJCH331J (330pF, 50V)	1		
	2830 8121	Mylar capacitor	AMZ-472K50 (4,700pF, 50V)	1		
☆	3060 6035	Ladder network	EXK-S19Z2052R	1	AO	B
☆	3841 0105	Coil	R12-3034X	1	AC	X
	2200 3534	Transistor	2SA1015	1	AD	A
	22203401	Transistor	2SC1815	13	AD	A
	2301 3002	Diode	DS-442	15	AA	C
	2600 7313	Carbon film resistor	R-25-10K-J (10Kohm, $\frac{1}{4}$ W, \pm 5%)	10	N/A	X
	2600 9715	"	R-25-100K-J (100Kohm, $\frac{1}{4}$ W, \pm 5%)	7		
	2600 5515	"	R-25-1.8K-J (1.8Kohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 7917	"	R-25-18K-J (18Kohm, $\frac{1}{4}$ W, \pm 5%)	5		
	2600 8514	"	R-25-33K-J (33Kohm, $\frac{1}{4}$ W, \pm 5%)	12		
	2601 0918	"	R-25-330K-J (330Kohm, $\frac{1}{4}$ W, \pm 5%)	4		
	2600 8719	"	R-25-39K-J (39Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 6716	"	R-25-5.6K-J (5.6Kohm, $\frac{1}{4}$ W, \pm 5%)	6		
	2600 9111	"	R-25-56K-J (56Kohm, $\frac{1}{4}$ W, \pm 5%)	6		
	2600 2518	"	R-25-100-J (100ohm, $\frac{1}{4}$ W, \pm 5%)	1		
	2600 3717	"	R-25-330-J (330ohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 4918	"	R-25-1K-J (1Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2601 2112	"	R-25-1M-J (1Mohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 5710	"	R-25-2.2K-J (2.2Kohm, $\frac{1}{4}$ W, \pm 5%)	4		
	2600 8115	"	R-25-22K-J (22Kohm, $\frac{1}{4}$ W, \pm 5%)	20		
	2601 0519	"	R-25-220K-J (220Kohm, $\frac{1}{4}$ W, \pm 5%)	3		
	2600 3318	"	R-25-220-J (220ohm, $\frac{1}{4}$ W, \pm 5%)	1		

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

MT-65 Parts List

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
	2600 8310	Carbon film resistor	R-25-27K-J (27Kohm, 1/4W, ±5%)	4	N/A	X
	2601 1118	"	R-25-390K-J (390Kohm, 1/4W, ±5%)	5		
	260C 8913	"	R-25-17K-J (47Kohm, 1/4W, ±5%)	6		
	2600 9318	"	R-25-68K-J (68Kohm, 1/4W, ±5%)	4		
	2600 7518	"	R-25-12K-J (12Kohm, 1/4W, ±5%)	1		
	2600 9910	"	R-25-120K-J (120Kohm, 1/4W, ±5%)	1		
	2601 0110	"	R-25-150K-J (150Kohm, 1/4W, ±5%)	1		
	2601 0713	"	R-25-270K-J (270Kohm, 1/4W, ±5%)	1		
	2601 1515	"	R-25-560K-J (560Kohm, 1/4W, ±5%)	1		
	2600 6511	"	R-25-4.7K-J (4.7Kohm, 1/4W, ±5%)	3		
	2601 8111	"	R-25-2.2M-J (2.2Mohm, 1/4W, ±5%)	1		
	2601 1311	"	R-25-470K-J (470Kohm, 1/4W, ±5%)	6		
	2600 9511	"	R-25-82K-J (82Kohm, 1/4W, ±5%)	8		
	2600 0912	"	R-25-22-J (22ohm, 1/4W, ±5%)	1		
	2601 6231	"	R-25-25K-J (25Kohm, 1/4W, ±5%)	5		
	2601 5111	"	R-25-50K-J (50Kohm, 1/4W, ±5%)	5		
	2601 0217	"	R-25-160K-J (160Kohm, 1/4W, ±5%)	1		
☆	2601 6550	"	R-25-5.6M-J (5.6Mohm, 1/4W, ±5%)	2		
☆	2808 1014	Electrolytic capacitor	SMC50VB-1MBP-T (1μF, 50V)	7		
☆	2808 1031	"	SMC50VB-1 (M)-T (1μF, 50V)	5		
☆	2808 1057	"	SMC16VB-10 (M)-T (10μF, 50V)	2		
☆	2808 1120	"	SMC50VB-R47 (M)-T (0.47μF, 50V)	4		
☆	2808 1138	"	SMC16VB-33 (M)-T (33μF, 16V)	2		
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T (0.01μF, 50V)	6		
☆	2819 0492	"	RT-HE40TKSL150K-T (15μF, 50V)	1		
☆	2819 0506	"	RT-HE11TKCH221J-T (220pF, 50V)	2		
☆	2830 6229	Mylar capacitor	AMZV-104K50-T (0.1μF, 50V)	1		
☆	2830 6237	"	AMZV-102K50-T (1,000pF, 50V)	1		
☆	2830 6245	"	AMZV-272K50-T (2,700pF, 50V)	1		
☆	2830 6253	"	AMZV-563K50-T (0.056μF, 50V)	3		
☆	2830 6261	"	AMZV-103K50-T (0.01μF, 50V)	9		
☆	2830 6270	"	AMZV-223K50-T (0.022μF, 50V)	10		
☆	2830 6288	"	AMZV-273K50-T (0.027μF, 50V)	4		
☆	2830 6296	"	AMZV-332K50-T (3,300pF, 50V)	5		
☆	2830 6312	"	AMZV-471K50-T (470pF, 50V)	1		
☆	2830 6321	"	AMZV-152K50-T (1,500pF, 50V)	2		
☆	2830 6339	"	AMZV-222K50-T (2,200pF, 50V)	2		
☆	2830 6347	"	AMZV-392K50-T (3,900pF, 50V)	4		

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

MT-65 Parts List

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
☆	2830 6355	Mylar capacitor	AMZV-472K50-T (4,700pF, 50V)	5	N/A	X
☆	2830 6363	"	AMZV-822K50-T (8,200pF, 50V)	1		
☆	2830 6371	"	AMZV-123K50-T (0.012μF, 50V)	1		
☆	2830 6380	"	AMZV-153K50-T (0.015μF, 50V)	5		
☆	2830 6398	"	AMZV-333K50-T (0.033μF, 50V)	2		
☆	2830 6401	"	AMZV-393K50-T (0.039μF, 50V)	1		
☆	2830 6410	"	AMZV-823K50-T (0.082μF, 50V)	2		
☆	2830 6428	"	AMZV-562K50-T (5,600pF, 50V)	1		
		P.C. Board M440-MA2M				
	2120 8329	Linear IC	LA4138	1	AG	A
	2210 5078	Transistor	2SB632	1	AD	A
	2230 3015	Transistor	2SD325	1	AD	A
	2310 3273	Zener diode	RD5.6E	2	AA	B
	2220 3401	Transistor	2SC1815	1	AD	A
14	2770 8622	Volume Pitch Control	K161A0054-100KB	1	AC	B
	3612 0169	Jack Board	TCX3321-01-101	1	AL	B
15	6910 3112	Feltling seal J3	MA400B-3	2	-	X
☆	2808 0239	Electrolytic capacitor	SMC10VB-470 (M) (470μF, 10V)	1	N/A	X
☆	2808 0247	"	SMC10VB-1000 (M) (1,000μF, 10V)	1		
☆	2808 0255	"	SMC16VB-2200 (M) (2,200μF, 16V)	1		
☆	2808 0263	"	SMC16VB-220 (M) (220μF, 16V)	1		
	2600 7313	Carbon film resistor	R-25-10K-J (10Kohm, ¼W, ±5%)	2		
	2600 9715	"	R-25-100K-J (100Kohm, ¼W, ±5%)	1		
	2600 8514	"	R-25-33K-J (33Kohm, ¼W, ±5%)	1		
	2600 9111	"	R-25-56K-J (56Kohm, ¼W, ±5%)	1		
	2600 6911	"	R-25-6.8K-J (6.8Kohm, ¼W, ±5%)	2		
	2600 3318	"	R-25-220-J (220ohm, ¼W, ±5%)	1		
	2600 7119	"	R-25-8.2K-J (8.2Kohm, ¼W, ±5%)	1		
	2600 8511	"	R-25-4.7K-J (4.7Kohm, ¼W, ±5%)	2		
	2600 4519	"	R-25-680-J (680ohm, ¼W, ±5%)	1		
☆	2808 1031	Electrolytic capacitor	SMC50VB-1 (M)-T (1μF, 50V)	1		
☆	2808 1081	"	SMC10VB-47 (M)-T (47μF, 10V)	1		
☆	2808 1103	"	SMC10VB-220 (M)-T (220μF, 10V)	1		
☆	2808 1111	"	SMC16VB-100 (M)-T (100μF, 16V)	3		
☆	2808 1146	"	SMC25VB-10 (M)-T (10μF, 25V)	1		
	2818 0390	Ceramic capacitor	RT-HE40TKYB221K-T (220pF, 50V)	1		

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

MT-65 Parts List

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T (0.01 μ F, 50V)	1	N/A	X
	☆ 2818 0378	"	RT-HE40TKYB151K-T (150pF, 50V)	1	N/A	X
	☆ 2830 6211	Mylar capacitor	AM2V-154K50-T (0.15 μ F, 50V)	1	N/A	X
	37209538	PC Joiner	PCJ-JVU-7-50	1	AC	X
		P.C. Board M440-CN1M				
	2320 7028	LED	SLP-135B	1	AB	A
47	2770 5049	Volume Rhythm/accomp	V016L8-4N B10K	2	AD	B
48	2770 5057	" Tempo	V016L8-4N C1M	1	AD	B
45	☆ 3720 9548	PC joiner M40B	PCJ-JVU-17-65	1	AC	C
	5560 0368	Insulation band	T-18S	3	-	X
	☆ 6910 5210	Wire M40-2	M4958-2	1	-	X
48	☆ 6910 5230	Shield plate 40A	M4955-1	1	-	X
	☆ 6910 5240	Shielded wire M40 sub ass'y	M4957*1	1	-	X
	☆ 6910 5250	Shielded wire M40 sub ass'y	M4957*2	1	-	X
	2301 3002	Diode	DS-442	46	AA	C
	2600 3911	Carbon film resistor	R-25-380-J (390ohm, 1/4W, \pm 5%)	1	N/A	X
		P.C. Board M440-PW				
	23102862	Zener diode	RD3.6EB2	1	AA	A
	2320 7028	LED	SLP-135B	1	AB	A
	2620 2515	Carbon film resistor	R-50X-100-J	1	N/A	X
	2770 5049	Volume Main	V01618-4N B10K	1	AD	B
	3420 3784	Slide switch	SP-20202-1011	1	AD	B
	☆ 6910 5200	Wire M40-1	M4958-1	1	-	X
	☆ 6910 5260	Shielded wire M40 sub ass'y	M4957*3	1	-	X
	2600 3717	Carbon film resistor	R-25-330-J (330ohm, 1/4W, \pm 5%)	1	N/A	X
	43070822	P.C. board (without component)	M1348A-2	1	AC	X
		P.C. Board M432-KY1				
51	3720 9201	PC joiner M32-D	PCJ-JVU-9-67	1	AB	C
	2301 3002	Diode	DS-442	17	AA	C
49	4307 0330	P.C. board ** (without component)	M432-KY1	1	AG	X

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

** See Technical Bulletin on page 51 on parts changes.
(Call E13)

MT-65 Parts List

Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
52	372G 9091	P.C. Board M432-KY2				
		PC Joiner M32-C	PCJ-JVU-13-67	1	AB	C
	2301 3002	Diode	DS-442	32	AA	C
50	4307 0340	P.C. board ** (without component)	M432-KY2	1	AK	X
		Key Board Unit 40				
☆	3660 2066	Lug terminal	B-4	1	-	C
41	6910 0261	Key contact rubber A **	M2303A-1	3	AE	B
42	6910 0271	Key contact rubber B **	M2304A-1	1	AE	B
43 ☆	6910 4850	Shield plate 40B	M3778-1	1	-	X
2	6910 0290	Key Black	M3416-1	20	AF	C
3	6910 0301	Key A (Ivory) **	M3417A-1	4	AF	C
4	6910 0311	Key B (Ivory) **	M3418A-1	4	AF	C
5	6910 0321	Key C (Ivory) **	M3419A-1	4	AF	C
6	6910 0331	Key D (Ivory) **	M3420A-1	4	AF	C
7	6910 0341	Key E (Ivory) **	M3421A-1	4	AF	C
8	6910 0351	Key F (Ivory) **	M3422A-1	4	AF	C
9	6910 0361	Key G (Ivory) **	M3423A-1	4	AF	C
10	6910 0371	Key S (Ivory) **	M3424A-1	1	AF	C
11 ☆	6910 1750	Felting seal V	M4669-1	1	-	X
53	6910 1820	Key supporter 32	M2403-1	1	-	X
55 ☆	6910 1830	Felting seal U	M4668-1	1	-	X
54	6910 1800	Key supporter 32B	M3617-1	1	-	X
56 ☆	6910 1810	Felting seal UB	M4715-1	1	-	X
		Slide Board 40 Ass'y				
	69014972	Slide contact B	M4797A-1	8	AA	B
	6910 0480	Slide spring	M4491-1	8	AA	C
23 ☆	6910 4860	Slide board 40	M3704-1	8	AC	C
	55801274	Ball Bearing 40 Upper Case Unit	SUS304-2PI	8	AA	
☆	3720 9538	PC joiner M40A	PCJ-JVU-7-50	1	AC	C
	5560 0368	Insulation band	T-18S	3	-	C

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

** See Technical Bulletin on page 51 on parts changes.
(Call E13)

MT-65 Parts List

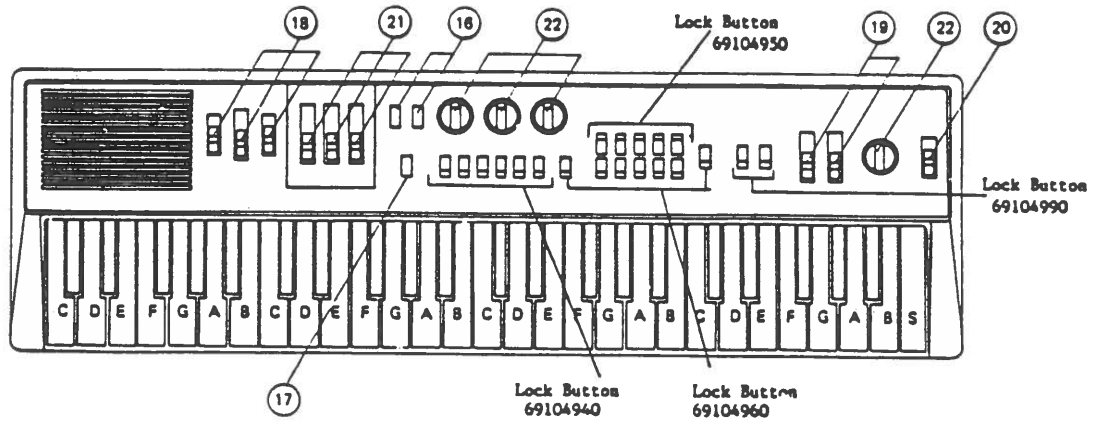
Item	Code No.	Parts Name	Standard Name	Q'ty	Price Code	RANK
40	3830 1098	Speaker	EAS-8P109SB	1	AL	B
☆	6900 5770	Felting seal D	M4382-1	1	-	X
38	6910 1350	SP cushion	M4718-1	1	-	X
39	6910 1860	Key contact rubber 31 (for fill in key)	M4675-1	3	AB	B
33	6910 1932	Upper blind plate 3	M46718-1	3	-	C
34	6910 2232	Upper blind plate 4	M46878-1	3	-	C
24 ☆	6910 4602	Switch board M10S sub ass'y	M3722B*1	1	AH	C
25 ☆	6910 4612	Switch board M6S sub ass'y	M3723B*1	1	AG	C
26 ☆	6910 4622	Switch board 2S sub ass'y	M3724B*1	1	AE	C
16 ☆	6910 4710	Rhythm button 40	M4827-1	2	AC	C
17 ☆	6910 4720	Rhythm button 40	M4827-2	1	AC	C
18 ☆	6910 4730	Slide knob 40	M3705-1	3	AC	C
19 ☆	6910 4740	Slide knob 40	M3705-2	2	AC	C
20 ☆	6910 4750	Slide knob 40	M3705-3	1	AC	C
21 ☆	6910 4760	Slide knob 40	M3705-4	3	AC	C
22 ☆	6910 4770	VR knob 40	M3703-1	4	AC	C
27 ☆	6910 4780	CN spacer 401	M4829-1	1	AA	X
28 ☆	6910 4790	CN spacer 402	M4830-1	1	AA	X
29 ☆	6910 4800	CN contacter 401	M4831-1	1	AB	C
30 ☆	6910 4810	CN contacter 402	M4832-1	1	AB	C
35	6910 4820	Key contact rubber M10S	M3691-1	1	AD	B
36	6910 4830	Key contact rubber M6S	M3692-1	1	AC	B
37	6910 4840	Key contact rubber COM	M3693-1	1	AB	B
32 ☆	6910 5220	Blind plate 4	M4686-2	3	-	X
31 ☆	6910 5300	Blind plate 3	M4670-3	3	-	X
1	6910 4660	Upper case sub ass'y **	M3767*1	1	AY	C
		40 Lower Case				
12 ☆	6910 4520	Lower case sub ass'y	M2530*1	1	AW	C
13 ☆	6910 4531	Battery cover 32 sub ass'y	M3663A*3	1	AF	C
		Screws				
	5111 5023	Tapping screw (+)	3x8 ZMC-3	15	-	X
☆	5150 0911	Tapping screw (+)	2.6x6 ZMC-3	54	-	X
☆	5150 0920	Tapping screw (+)	3x8 ZMC-3	5	-	X
	5111 5180	Tapping screw (+)	3x6 ZMC-3	4	-	X
☆	5321 1054	Washer	D = 3mm	2	-	X

Notes: ☆ - The parts newly employed
Q'ty - Q'ty used per unit

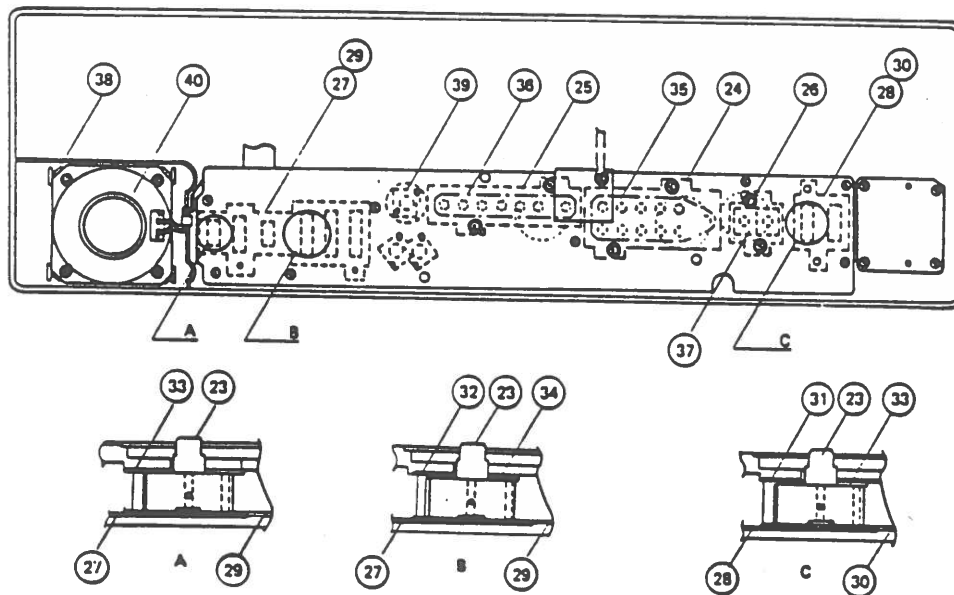
** See Technical Bulletin on page 51 on parts changes.
(Cell E13)

Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

MT-65 Parts Diagram

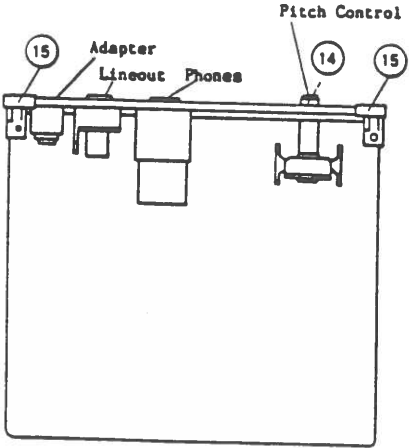
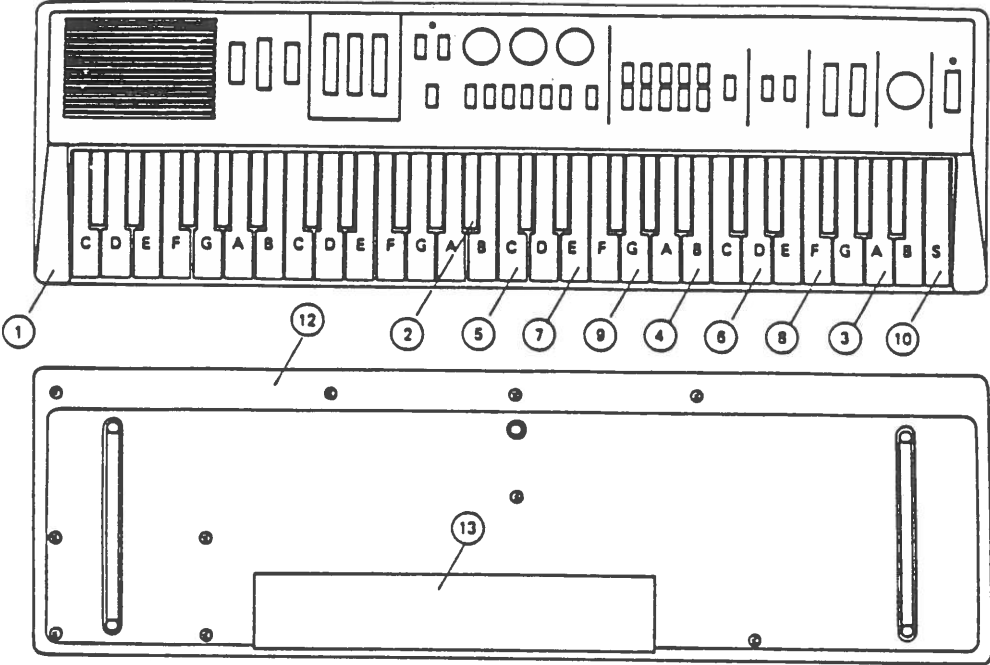


Top View of MT-65



Inside View of Upper Case for MT-65

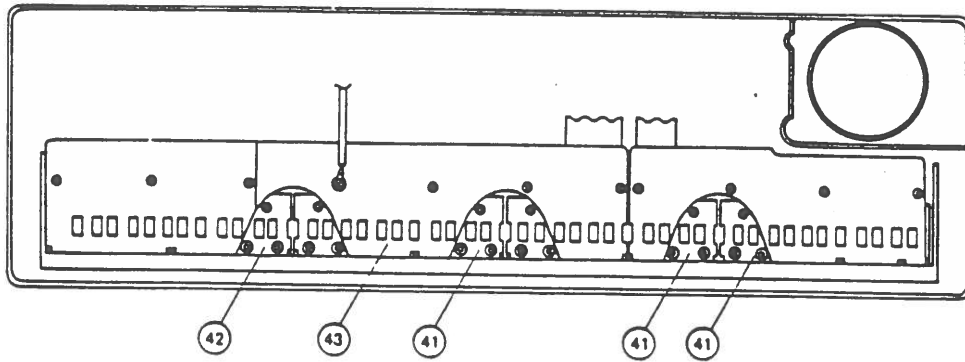
MT-65 Parts Diagram



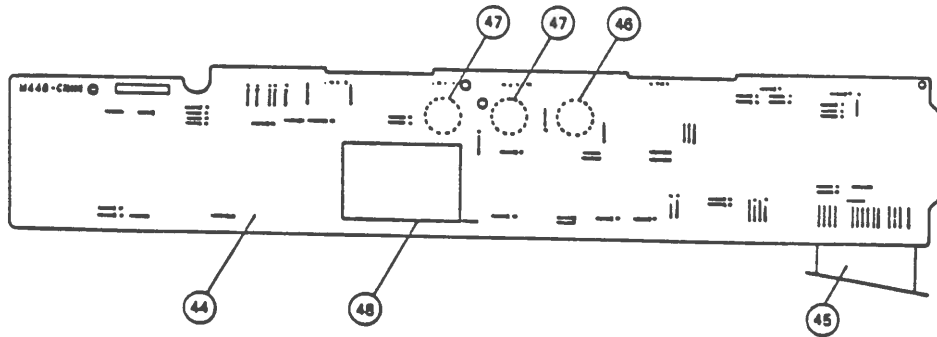
Jack Board includes
Adapter, Lineout & Phones Jacks

View of MA2 UNIT

MT-65 Parts Diagram

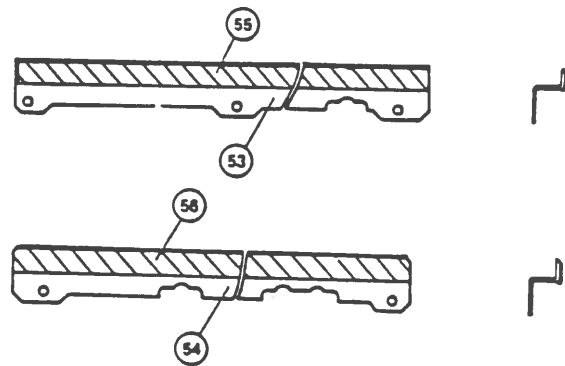
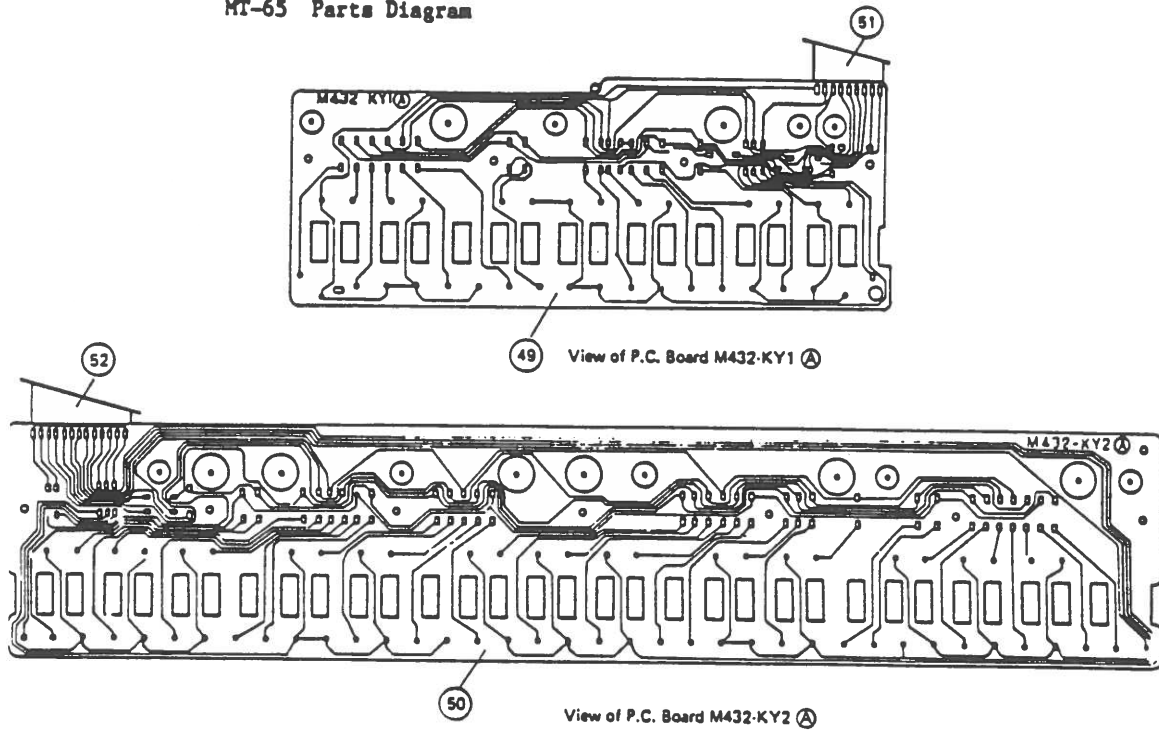


Inside View of Lower Case for MT-65



Top View of P.C. Board M440-CN1M

MT-65 Parts Diagram



View of Key Supporter 32 C 328

- 1) Price Codes subject to change without notice.
- 2) Refer to current Technical News Bulletins for price code values.

MT-68 Parts List

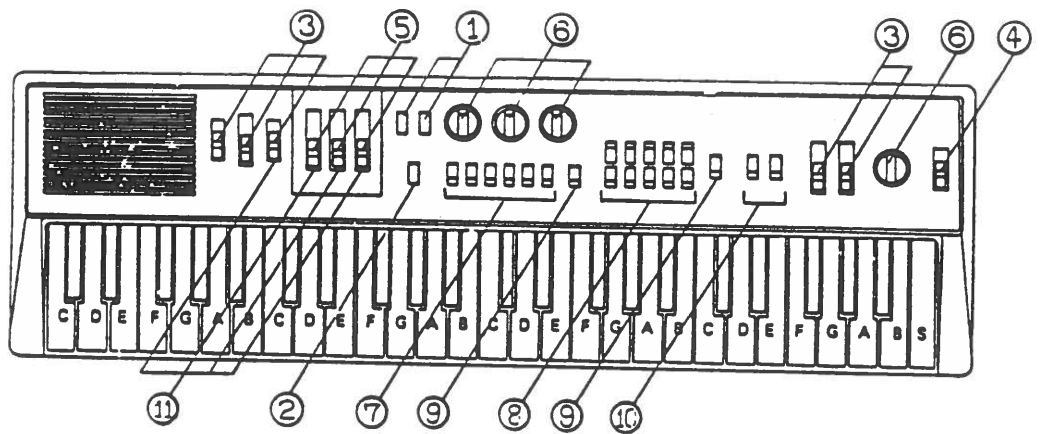
For other parts refer to MT-65 Parts List.
 MT-65 & MT-68 are electronically the same. Case color is only difference.

NOTE: Refer to parts change information on this model. Page 51 (Cell E13)

Code No.	Parts Name	Spec.	Q'ty	Price
-----	-----	-----	-----	-----
A) MA1M-PCB ASSY				
28080387	Electrolytic capacitor	SMC50VB-2R2(M)	1	N/A
28180101	Ceramic capacitor	HE40SJYB681K	2	N/A
B) 40 MA-2 UNIT				
36120410	Terminal Jack Board	TCX-3321-01-103	1	AL
C) UPPER CASE UNIT / LOWER CASE / BATTERY COVER				
1. 69108460	Rhythm button 40	M4827-6	2	AC
2. 69108470	:	M4827-7	1	AC
3. 69108480	Slide knob 40	M3705-5	5	AC
4. 69108490	:	M3705-6	1	AC
5. 69108500	:	M3705-7	3	AC
6. 69108510	VR knob 40	M3703-5	4	AC
7. 69108520	Lock button 40	M4828-5	6	AC
8. 69108530	:	M4828-6	10	AC
9. 69108540	:	M4828-7	2	AC
10. 69108550	:	M4828-8	2	AC
11. 69018680	Blind plate 2	M4672-4	4	-
69105280	Shield plate 40C	M41015-1	1	-
69116004	Battery cover sub assy	M3663C*7	1	AE
69108430	Lower case sub assy	M2530*2	1	AV
69108412	Upper case sub assy	M3767B*2	1	AV

Parts Diagram on next page. (page 50)

MT-68 Parts Diagram



Technical Bulletin

MT-65 and MT-68

There are 2 types of Keyboard assemblies and upper cases.
The old style can be identified by a single 'X' pattern on the underside of the key.
The new style will have a double 'XX' pattern under the key.

Here is a list of the parts changes.

Old Style			New Style		
Upper Case MT-65	69104660	AY	Upper Case MT-65	69104664	AY
Upper Case MT-68	69108413	AV	Upper Case MT-68	69108414	AV
Key contact rubber	69100261	AE	Key contact rubber	69026640	AD
Key contact rubber	69100271	AE	Key contact rubber	69026650	AD
Keyboard PCB KY1	43070330	AG	Keyboard PCB KY1	43072590	AK
Keyboard PCB KY2	43070340	AK	Not used		

The new style replaces the 2 KY Keyboard PCB's with one PCB.

Key changes

Single 'X'

Key A	69100301	AF
Key B	69100311	AF
Key C	69100321	AF
Key D	69100331	AF
Key E	69100341	AF
Key F	69100351	AF
Key G	69100361	AF
Key S	69100371	AF

Double 'XX'

Key A	69026150	AF
Key B	69026160	AF
Key C	69026170	AF
Key D	69026180	AF
Key E	69026190	AF
Key F	69026200	AF
Key G	69026210	AF
Key S	69026220	AF

Black Key remains the same.

SERVICE MANUAL & PARTS LIST

ELECTRONIC KEYBOARD

MT-100



**NOTE: THIS SERVICE MANUAL EXPLAINS ONLY THE GRAPHIC
EQUALIZER CIRCUIT.
FOR THE OTHER CIRCUITS, REFER TO THE MT-65
SERVICE MANUAL.**

CASIO

MT-100
Contents

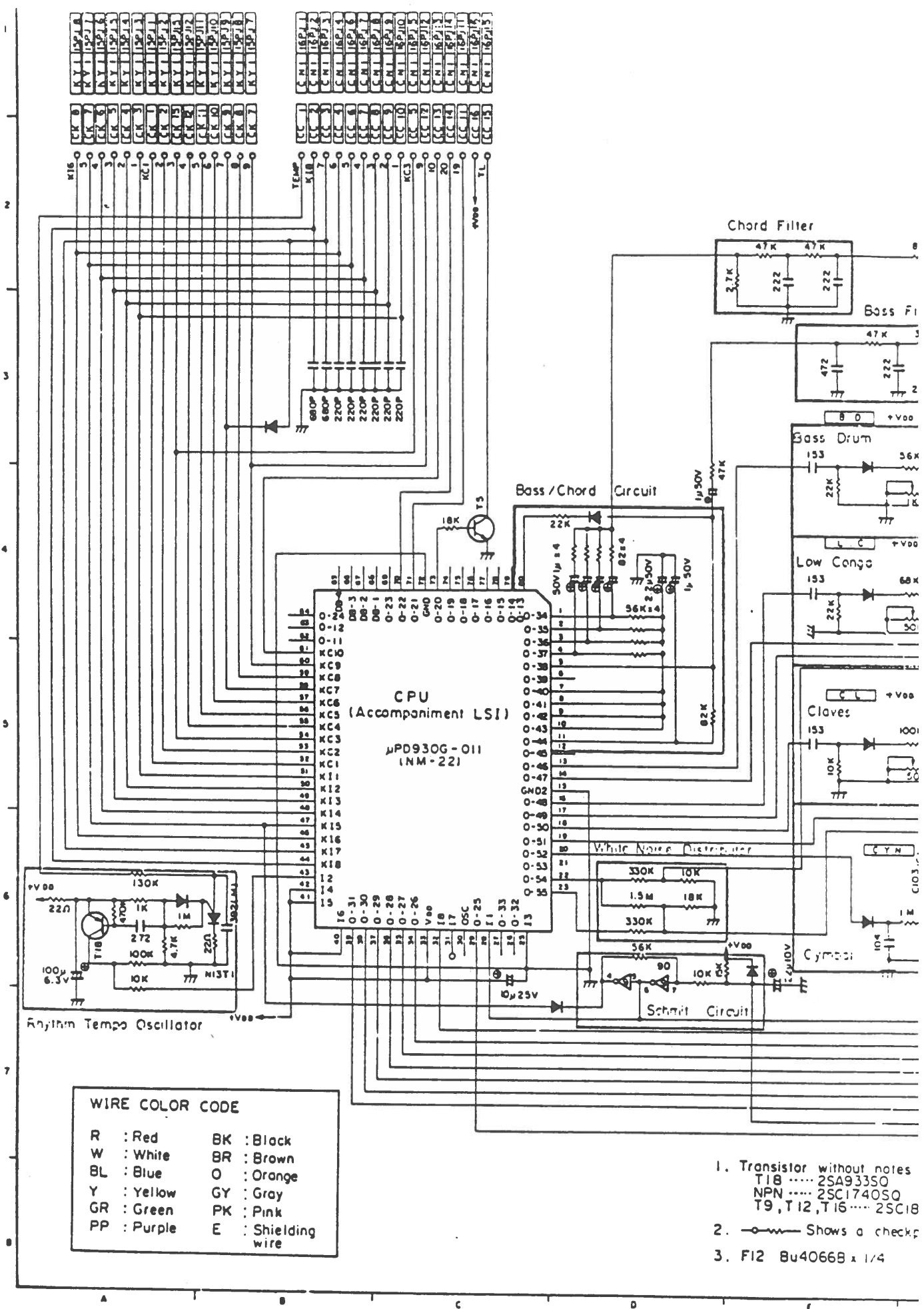
	Page	Cell//
1-1 Schematic Diagram of PCB M486-MA1M Version 1.....	1	F3
1-1A Schematic Diagram of PCB M486-MA1M Version 2.....	1A	F5
1-2 Schematic Diagram of PCB M486-MA2M	2	F7
1-3 Schematic Diagram of PCB M486-CN1M, CN2M	3	F9
1-4 Schematic Diagram of PCB M486-KYi;	4	F11
2-1 PCB View M486-MA1M	5	F13
2-2 PCB View M486-MA2M	6	G1
Major Waveforms	7	G2
Graphic Equalizer	8	G3
Parts List	9	G4
Parts Diagram	18	G12

Only information regarding the Waveforms and Graphic Equalizer are contained in this manual. Refer to MT-65 service manual for other Technical Descriptions.

TECHNICAL BULLETIN *****

The PCB MA1M has been changed in middle of production.
The Ladder network EXK-S19Z2052R in the first version has been changed to EXK-F19Z2064 in the second version.

THESE PARTS ARE NOT INTERCHANGEABLE. The pin configurations are different. Refer to the schematic in this manual.



WIRE COLOR CODE

R : Red	BK : Black
W : White	BR : Brown
BL : Blue	O : Orange
Y : Yellow	GY : Gray
GR : Green	PK : Pink
PP : Purple	E : Shielding wire

1. Transistor without notes
T18 2SA933SO
NPN 2SC1740SO
T9, T12, T16 2SC18
2. —○— Shows a checkp
3. F12 Bu40668 x 1/4

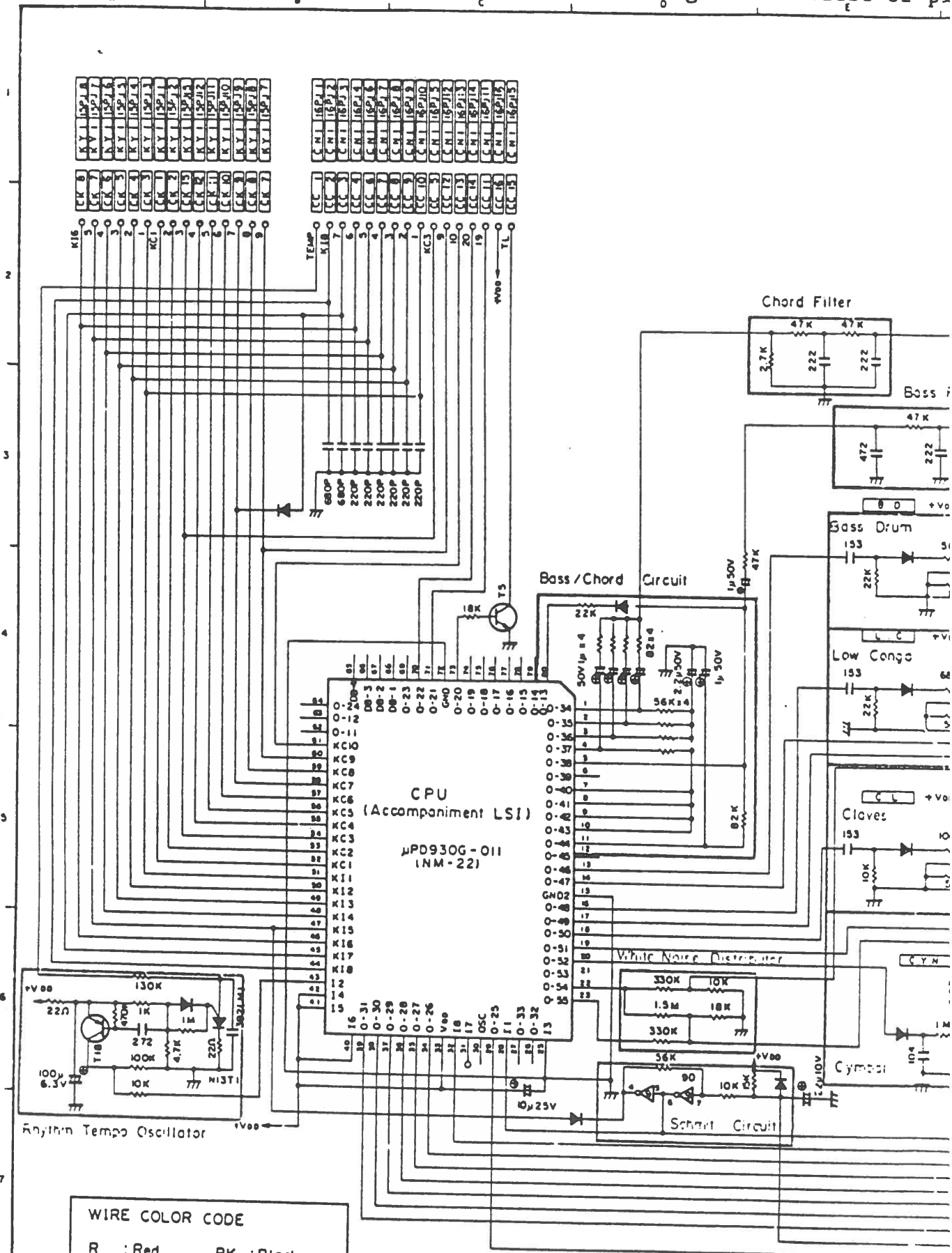
MT-100

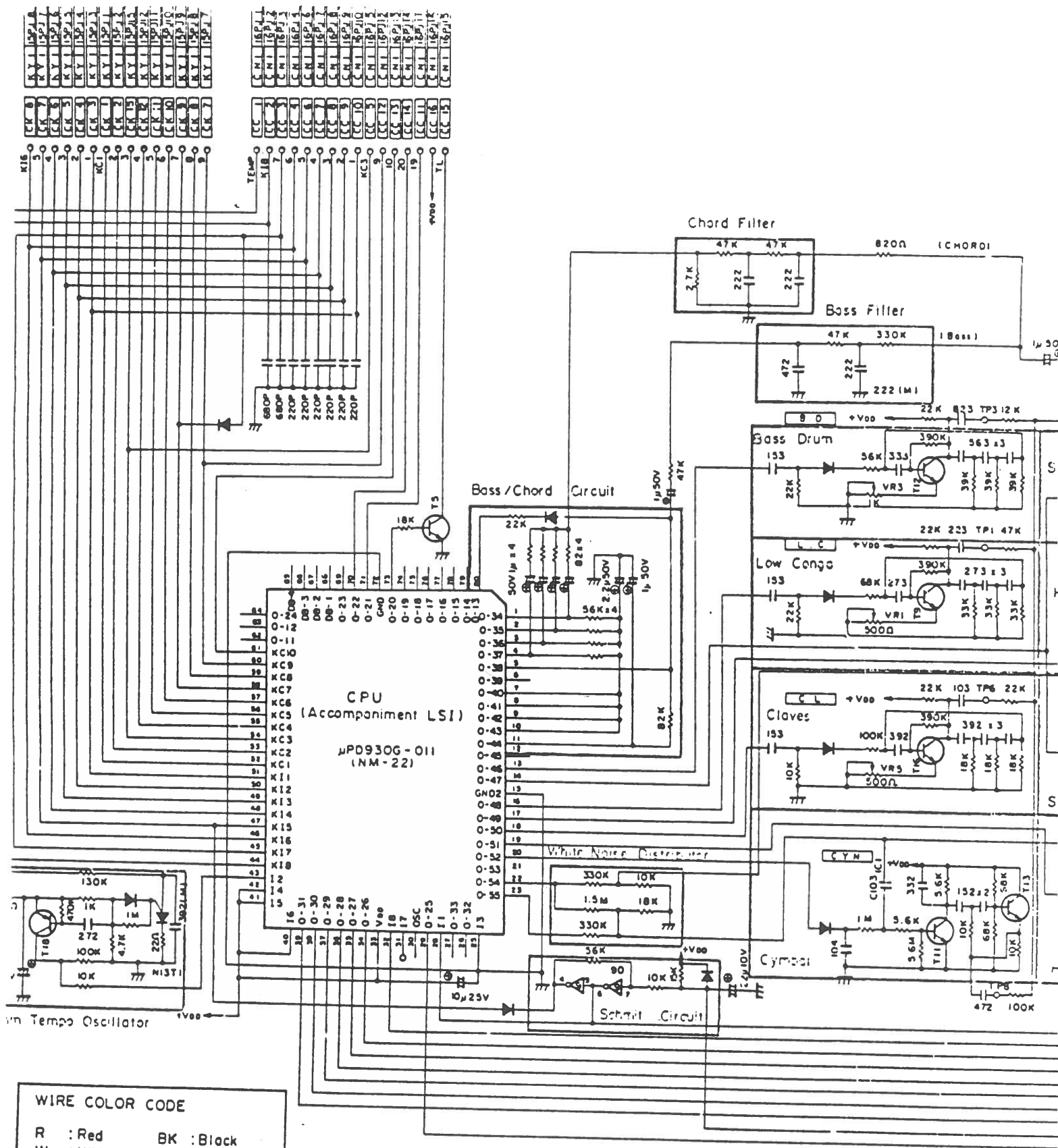
1. SCHEMATIC DIAGRAM

1-1. P.C.B. M486-MA1M

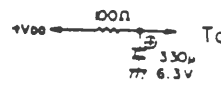
1st Version. Ladder Network = EXK-S19Z2052R

Ladder Networks are not interchangeable because of pi





1. Transistor without notes
 T18 2SA933SO
 NPN 2SC1740SO
 T9, T12, T16 2SC1815Y
2. Shows a checkpoint
3. F12 Bu4066B x 1/4

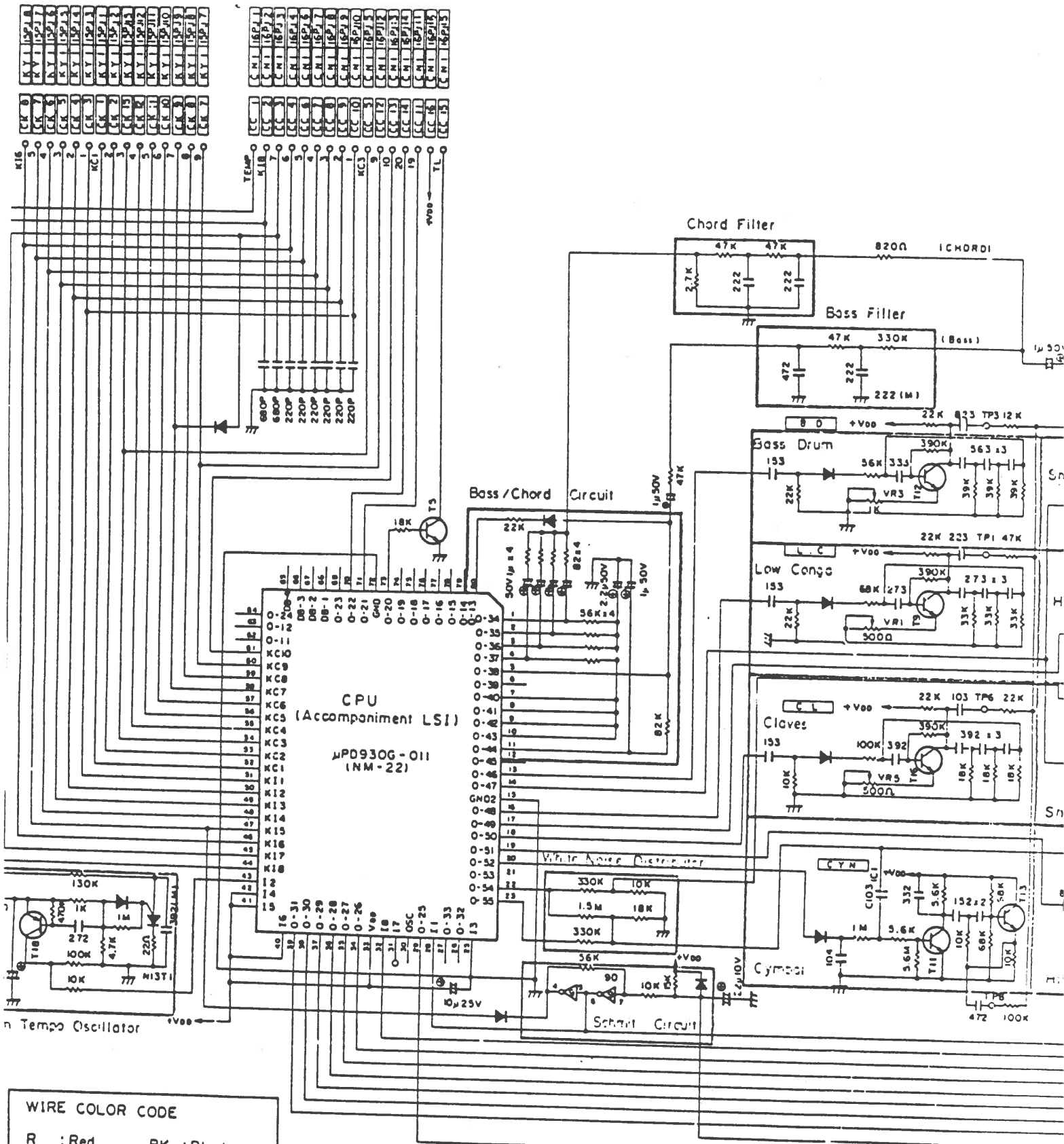


IC DIAGRAM

86-MA1M

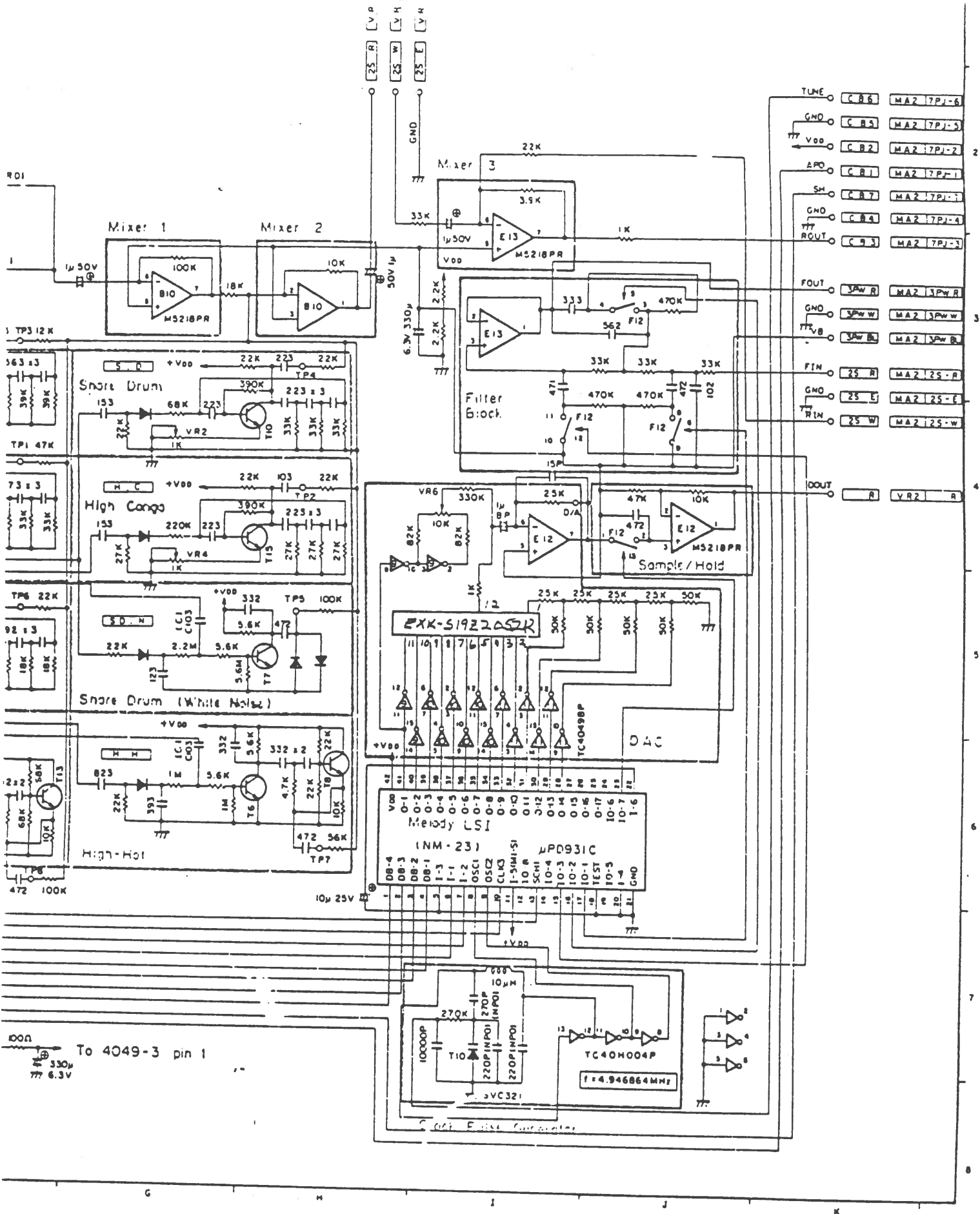
1st Version. Ladder Network = EXK-S19Z2052R

Ladder Networks are not interchangeable because of pin configuration



WIRE COLOR CODE

R	: Red	BK	: Black
W	: White	BR	: Brown
PL	: Blue		



TUNE	C B 6	MA2 7PJ-6
GND	C B 5	MA2 7PJ-5
VDD	C B 2	MA2 7PJ-2
APO	C B 1	MA2 7PJ-1
SM	C B 7	MA2 7PJ-7
GND	C B 4	MA2 7PJ-4
ROUT	C 9 3	MA2 7PJ-3
FOUT	3A W R	MA2 3Pw R
GND	3P W W	MA2 3Pw W
TVB	3A W B L	MA2 3Pw B L
FIN	25 R	MA2 25-R
GND	25 E	MA2 25-E
RIN	25 W	MA2 25-W

To 4049-3 pin 1
 330µF
 6.3V

uration.

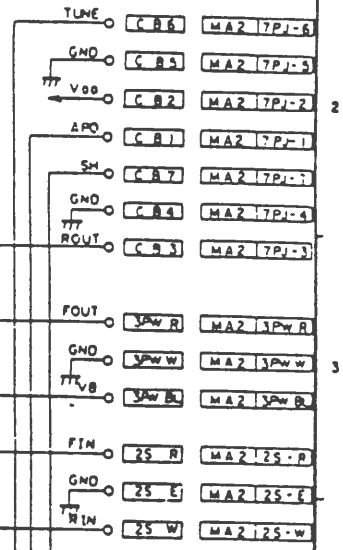
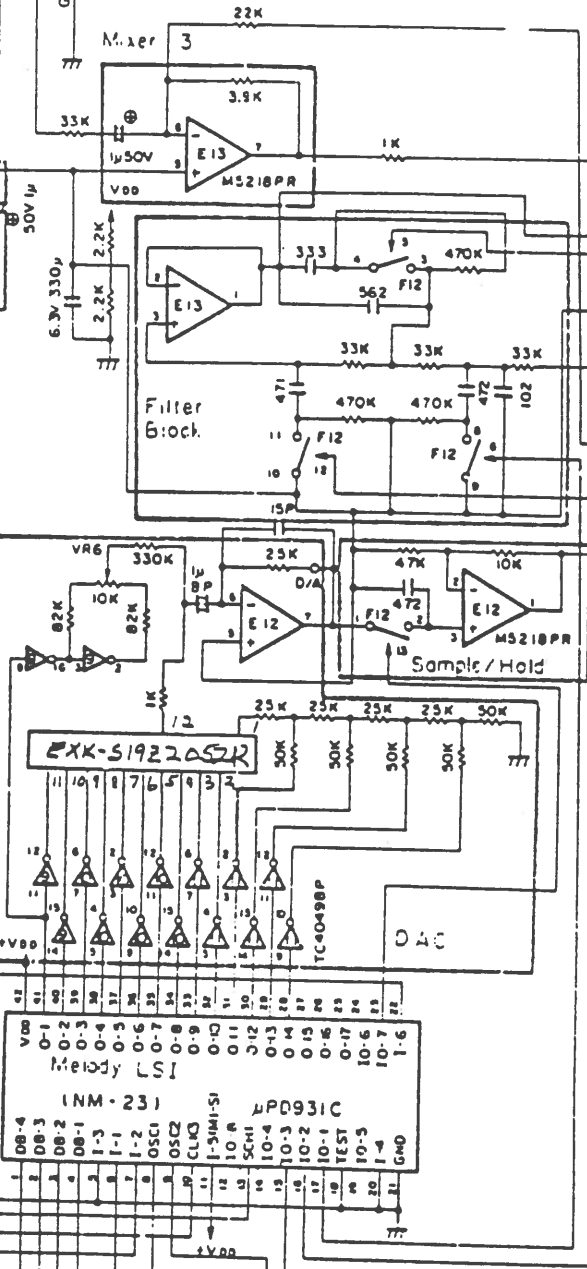
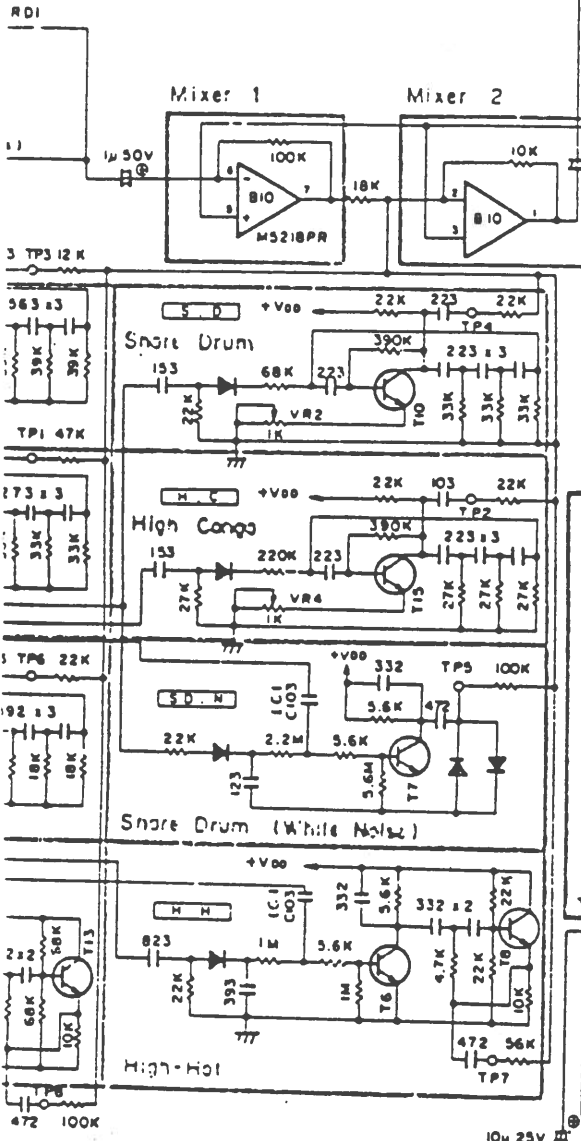
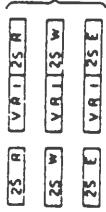
6

11

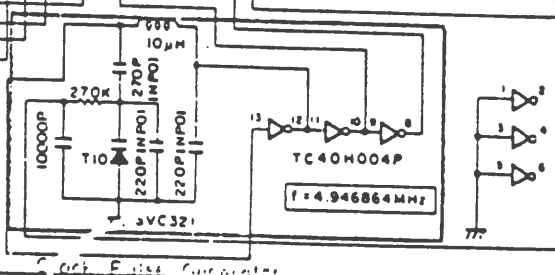
J

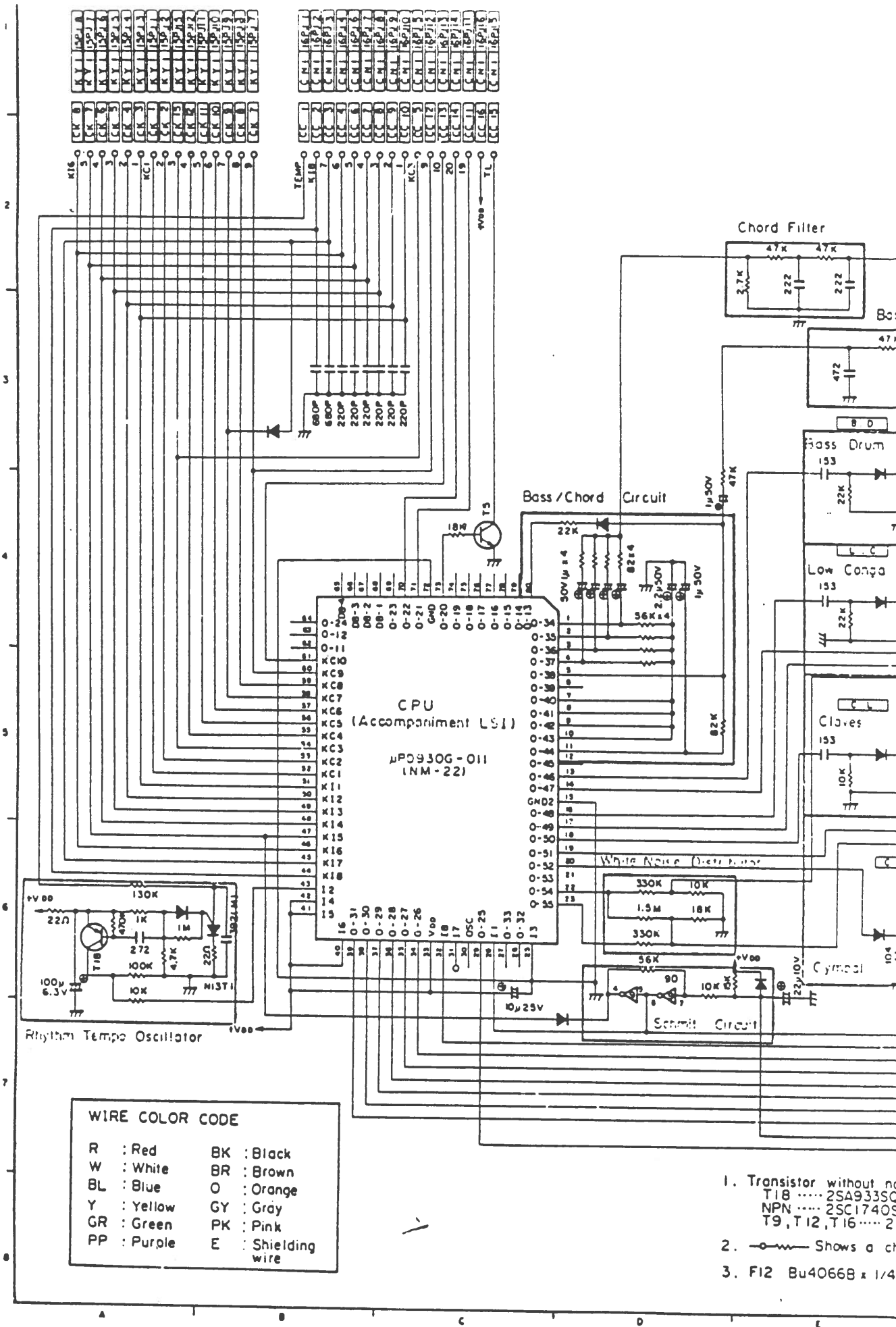
K

TO ACCOMP VR



To 4049-3 pin 1
 330pF
 6.3V





KY1	15P1A
KY2	15P1B
KY3	15P1C
KY4	15P1D
KY5	15P1E
KY6	15P1F
KY7	15P1G
KY8	15P1H
KY9	15P1I
KY10	15P1J
KY11	15P1K
KY12	15P1L
KY13	15P1M
KY14	15P1N
KY15	15P1O
KY16	15P1P
KY17	15P1Q
KY18	15P1R
KY19	15P1S
KY20	15P1T

CC1	16P1
CC2	16P2
CC3	16P3
CC4	16P4
CC5	16P5
CC6	16P6
CC7	16P7
CC8	16P8
CC9	16P9
CC10	16P10
CC11	16P11
CC12	16P12
CC13	16P13
CC14	16P14
CC15	16P15
CC16	16P16
CC17	16P17
CC18	16P18
CC19	16P19
CC20	16P20

K16	0
K15	1
K14	2
K13	3
K12	4
K11	5
K10	6
K9	7
K8	8
K7	9
K6	10
K5	11
K4	12
K3	13
K2	14
K1	15
K0	16
K15	17
K14	18
K13	19
K12	20
K11	21
K10	22
K9	23
K8	24
K7	25
K6	26
K5	27
K4	28
K3	29
K2	30
K1	31
K0	32

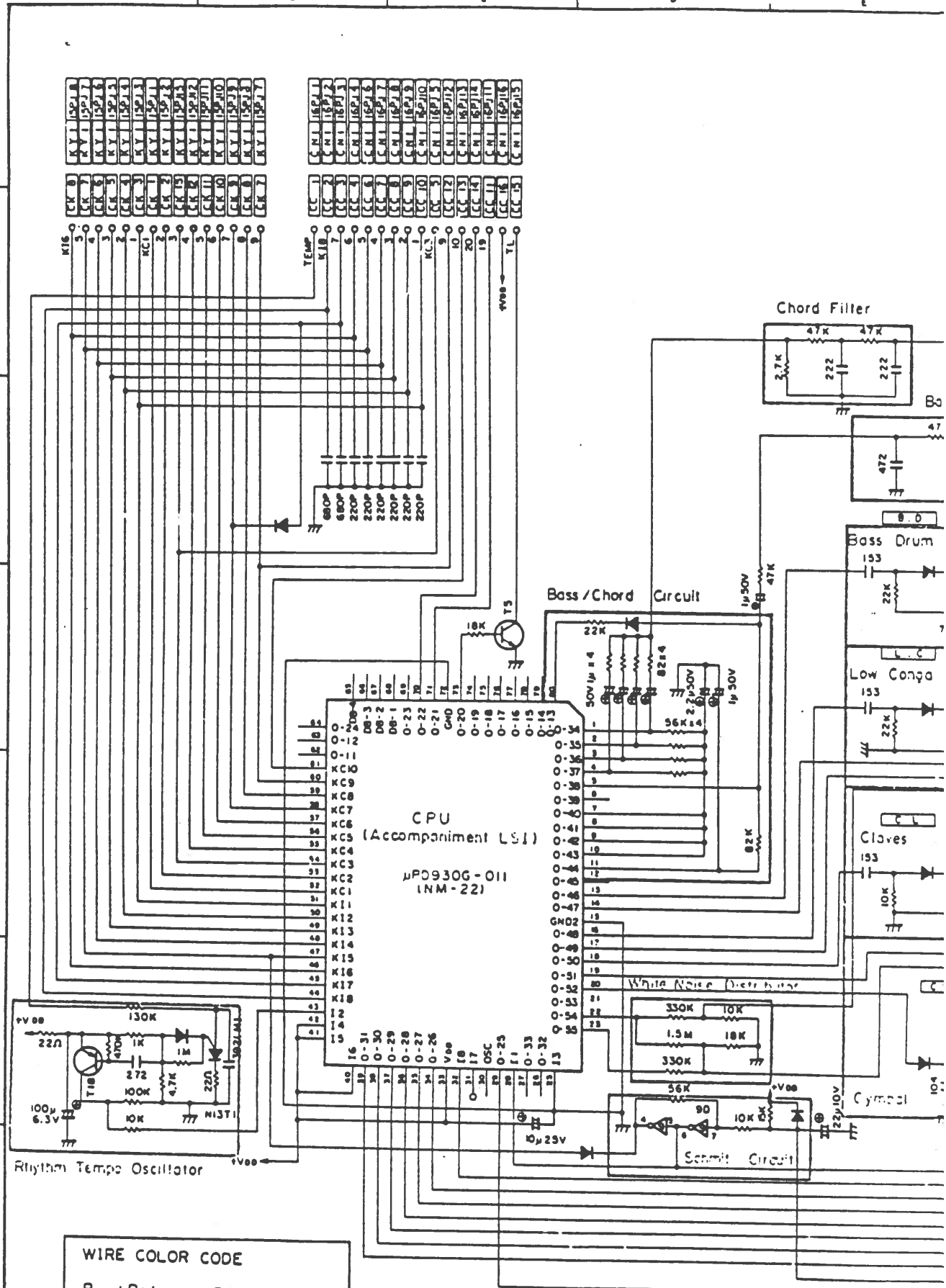
TEMP	K1B	7
	K1C	8
	K1D	9
	K1E	10
	K1F	11
	K1G	12
	K1H	13
	K1I	14
	K1J	15
	K1K	16
	K1L	17
	K1M	18
	K1N	19
	K1O	20
	K1P	21
	K1Q	22
	K1R	23
	K1S	24
	K1T	25
	K1U	26
	K1V	27
	K1W	28
	K1X	29
	K1Y	30
	K1Z	31
	K1A	32

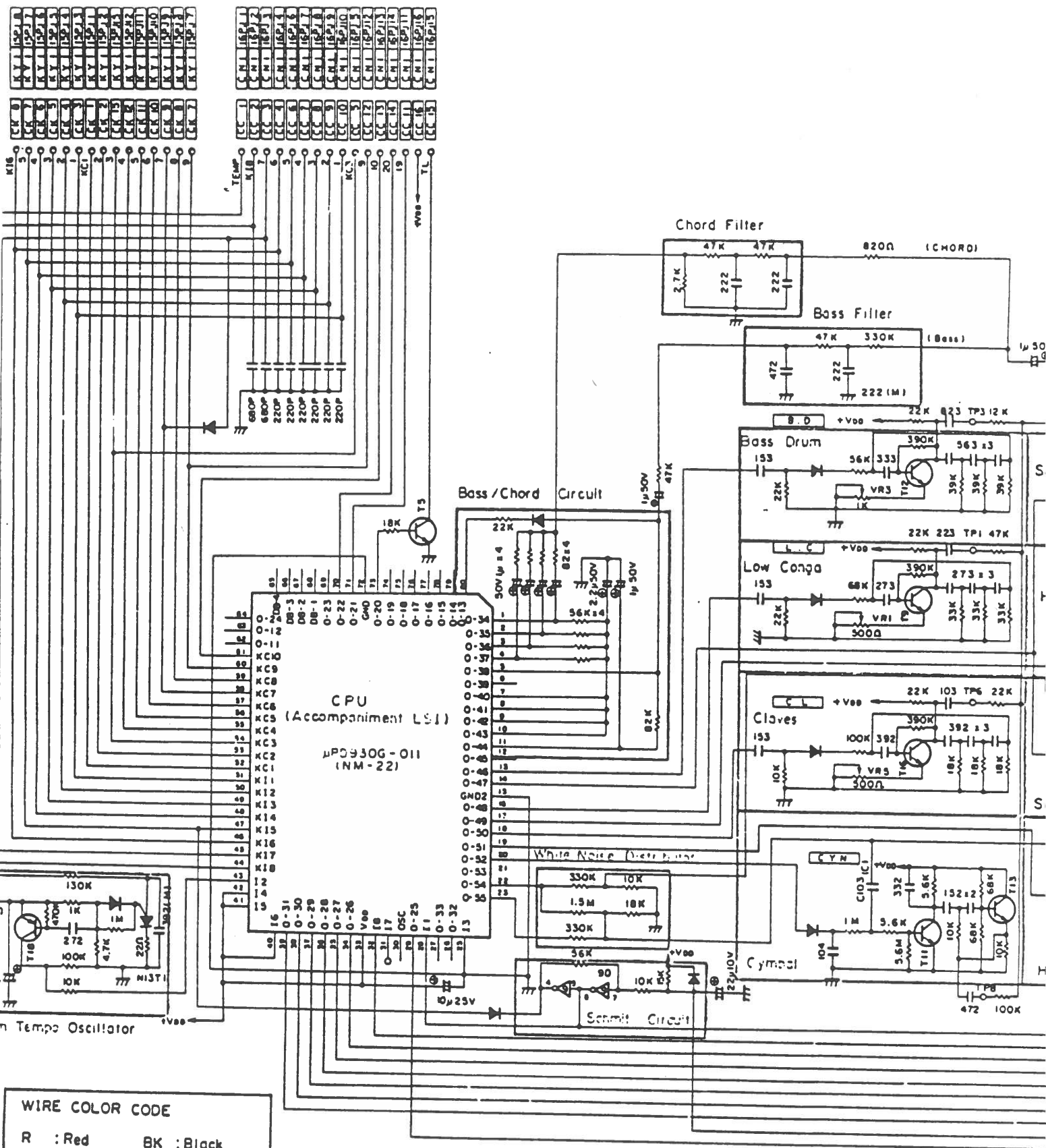
WIRE COLOR CODE	
R	: Red
W	: White
BL	: Blue
Y	: Yellow
GR	: Green
PP	: Purple
BK	: Black
BR	: Brown
O	: Orange
GY	: Gray
PK	: Pink
E	: Shielding wire

1. Transistor without no
T18 2SA933SC
NPN 2SC1740S
T9, T12, T16 2
2. —○— Shows a ct
3. F12 Bu4066B x 1/4

1. SCHEMATIC DIAGRAM

1-1. P.C.B. M486-MA1M 2nd Version. Ladder Network = EXK-19Z2064
Ladder Networks are not interchangeable because of pi





WIRE COLOR CODE

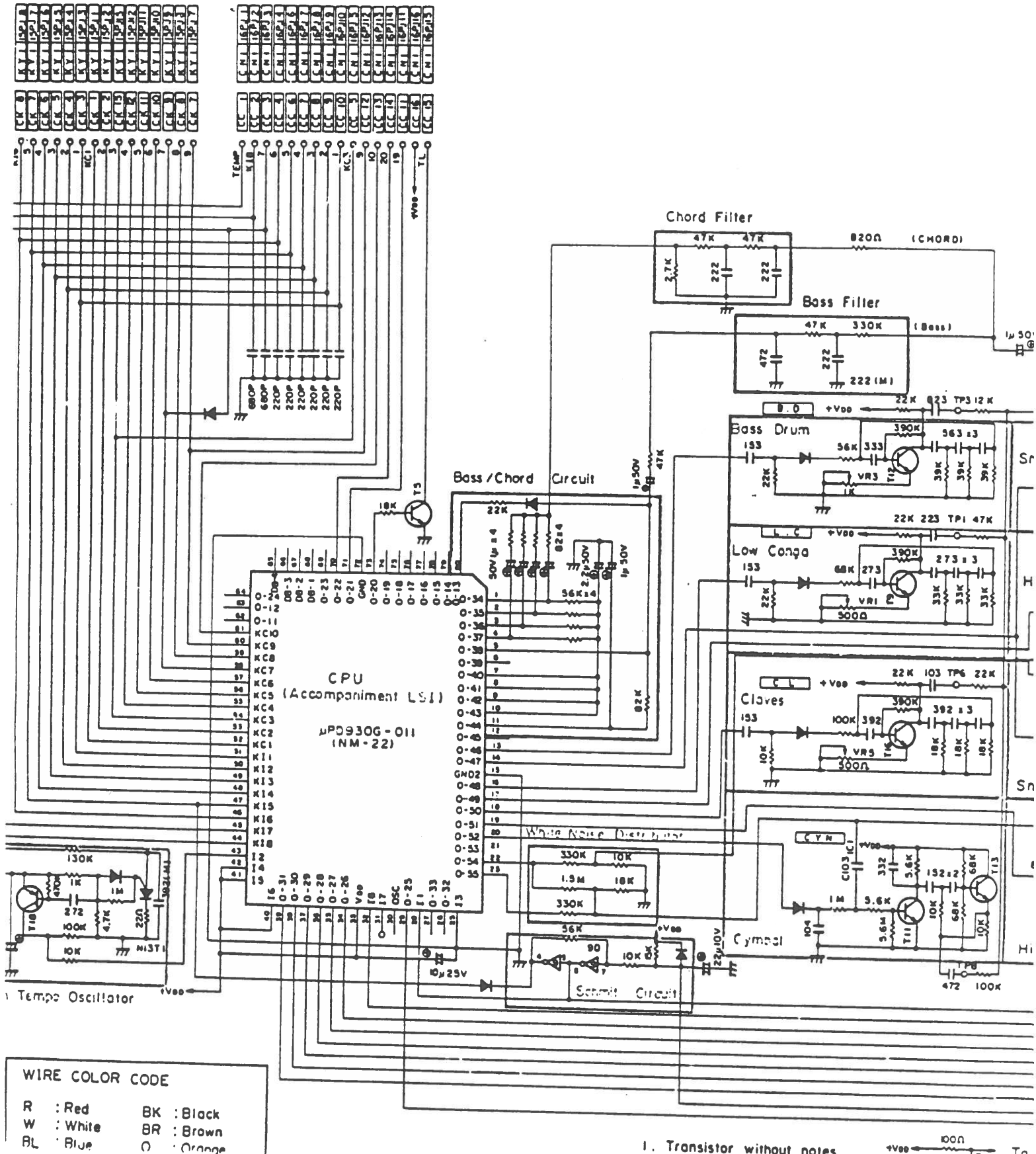
R : Red	BK : Black
W : White	BR : Brown
BL : Blue	O : Orange
Y : Yellow	GY : Gray
GR : Green	PK : Pink
PP : Purple	E : Shielding wire

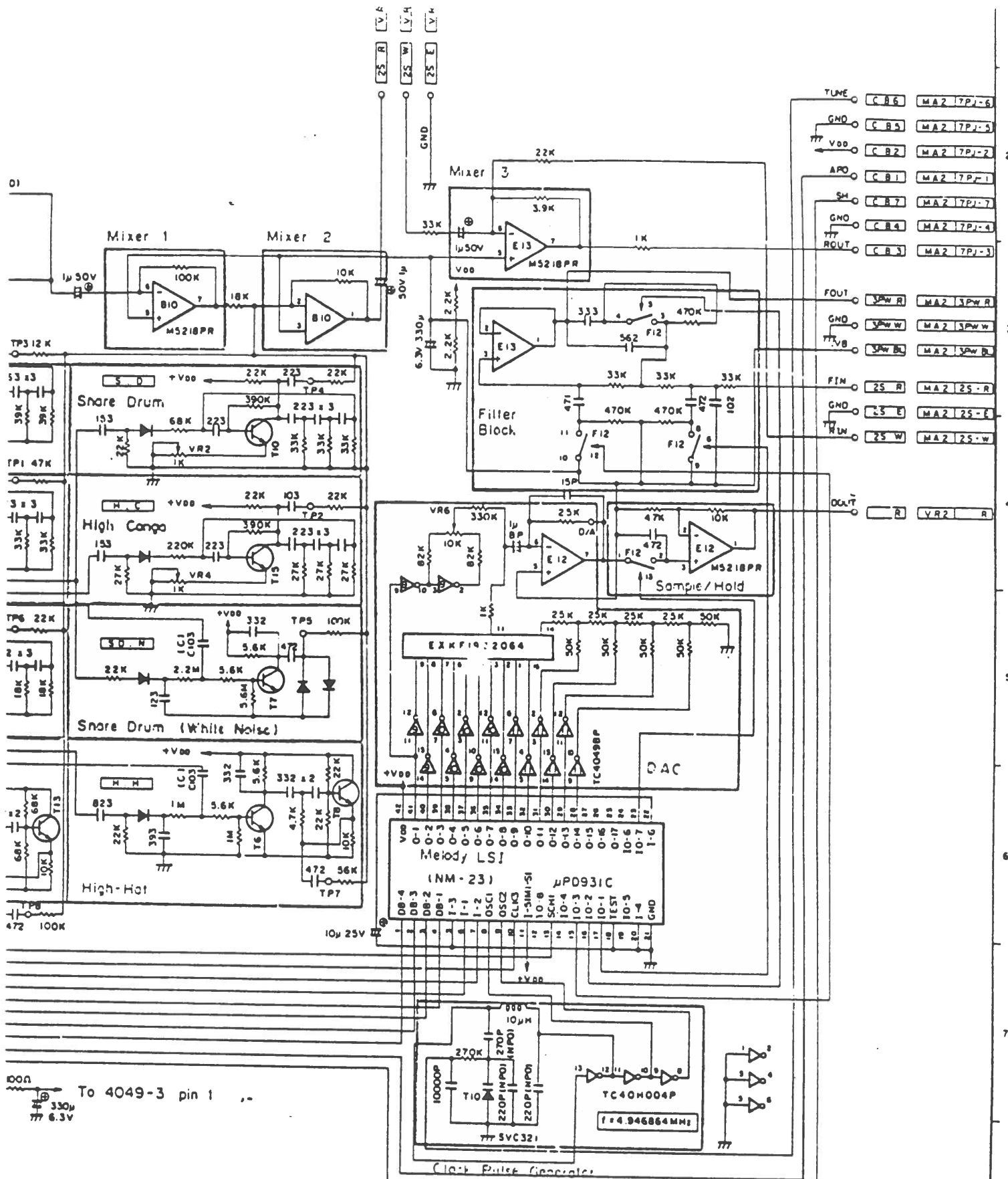
1. Transistor without notes
 T18 2SA933SO
 NPN 2SC1740SO
 T9, T12, T16 2SC1815Y
2. —○— Shows a checkpoint
3. F12 Bu4066B x 1/4

IC DIAGRAM

36-MA1M 2nd Version. Ladder Network = EXK-19Z2064

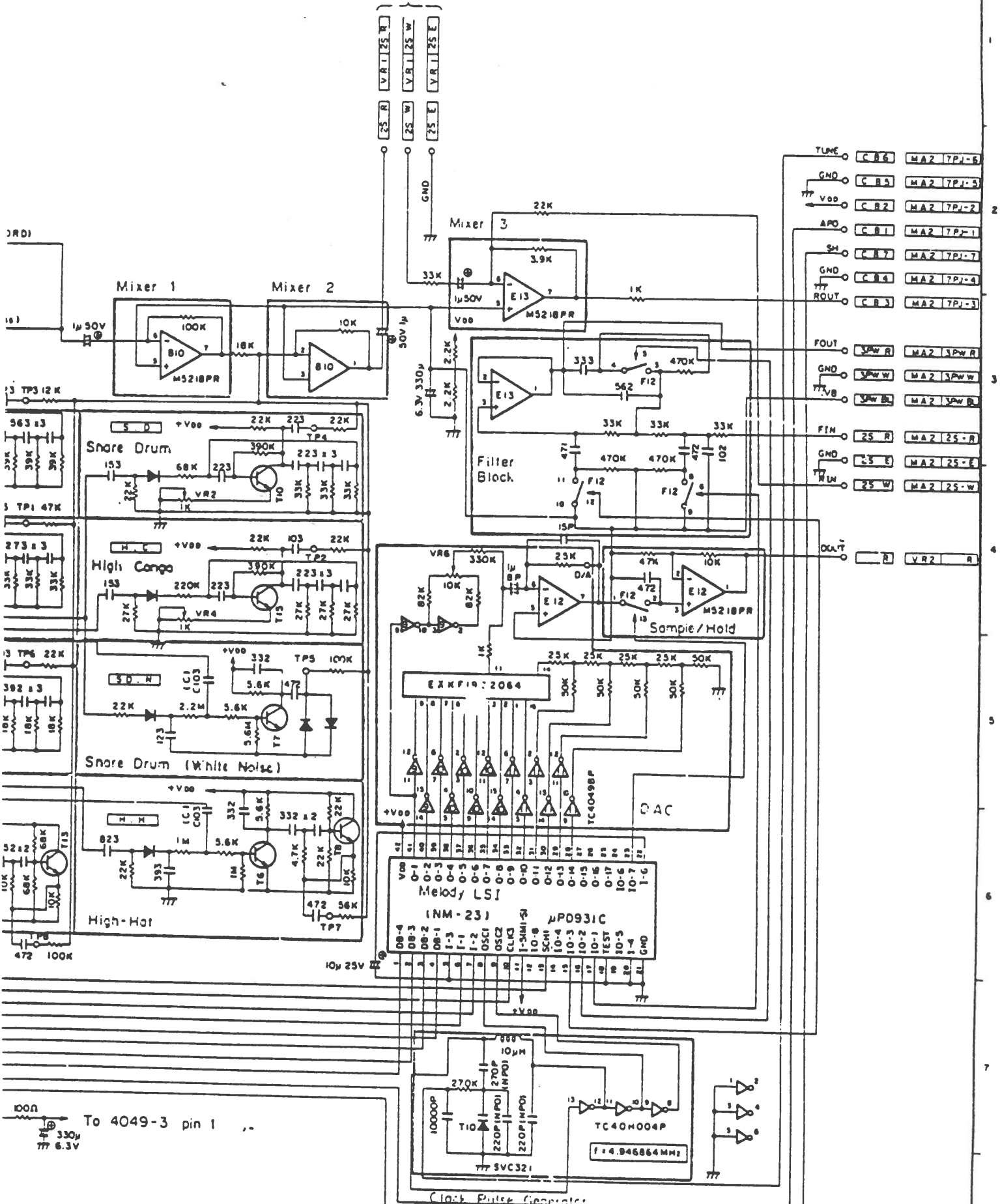
Ladder Networks are not interchangeable because of pin configuration.





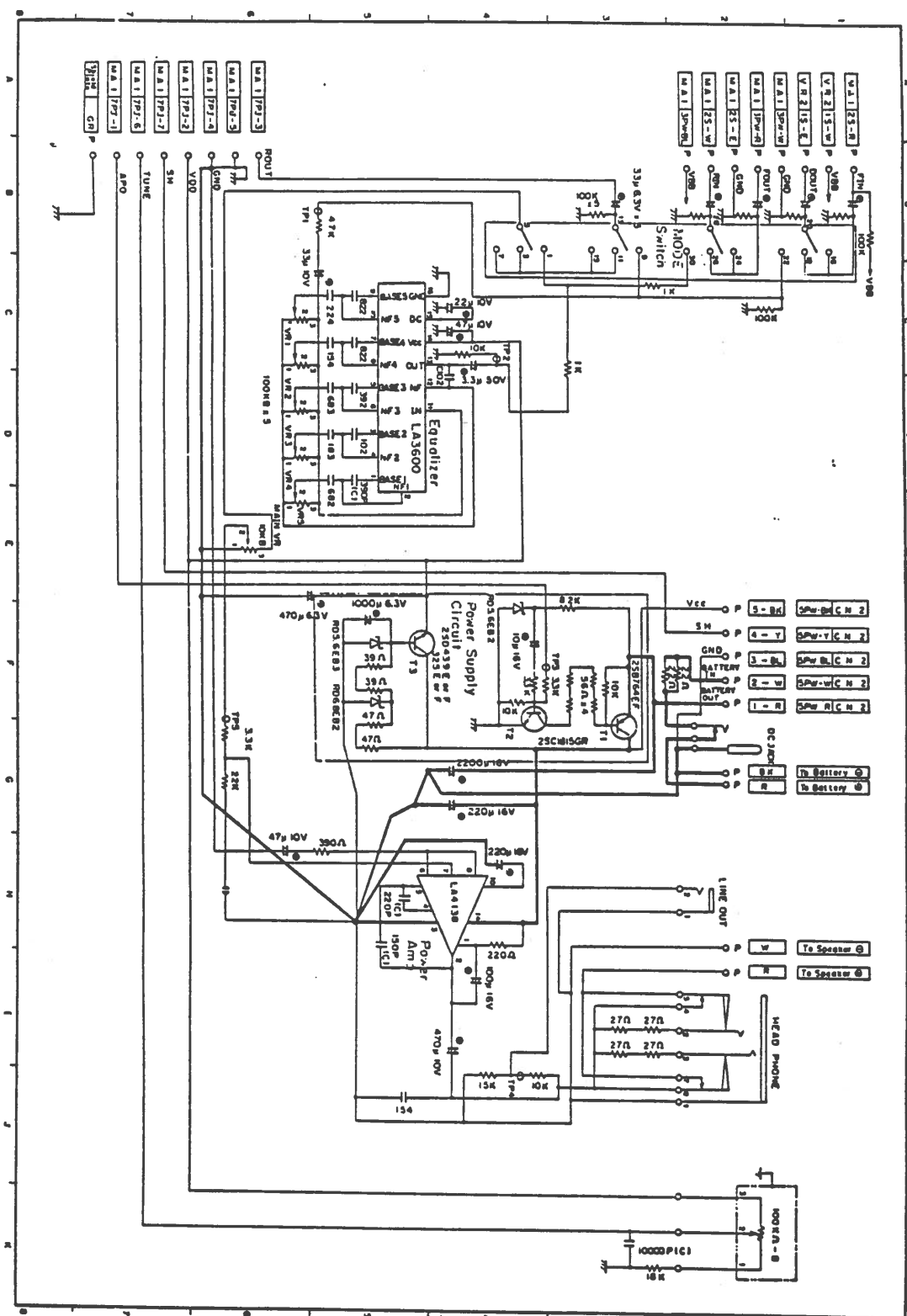
ration.

TO ACCOMP VR

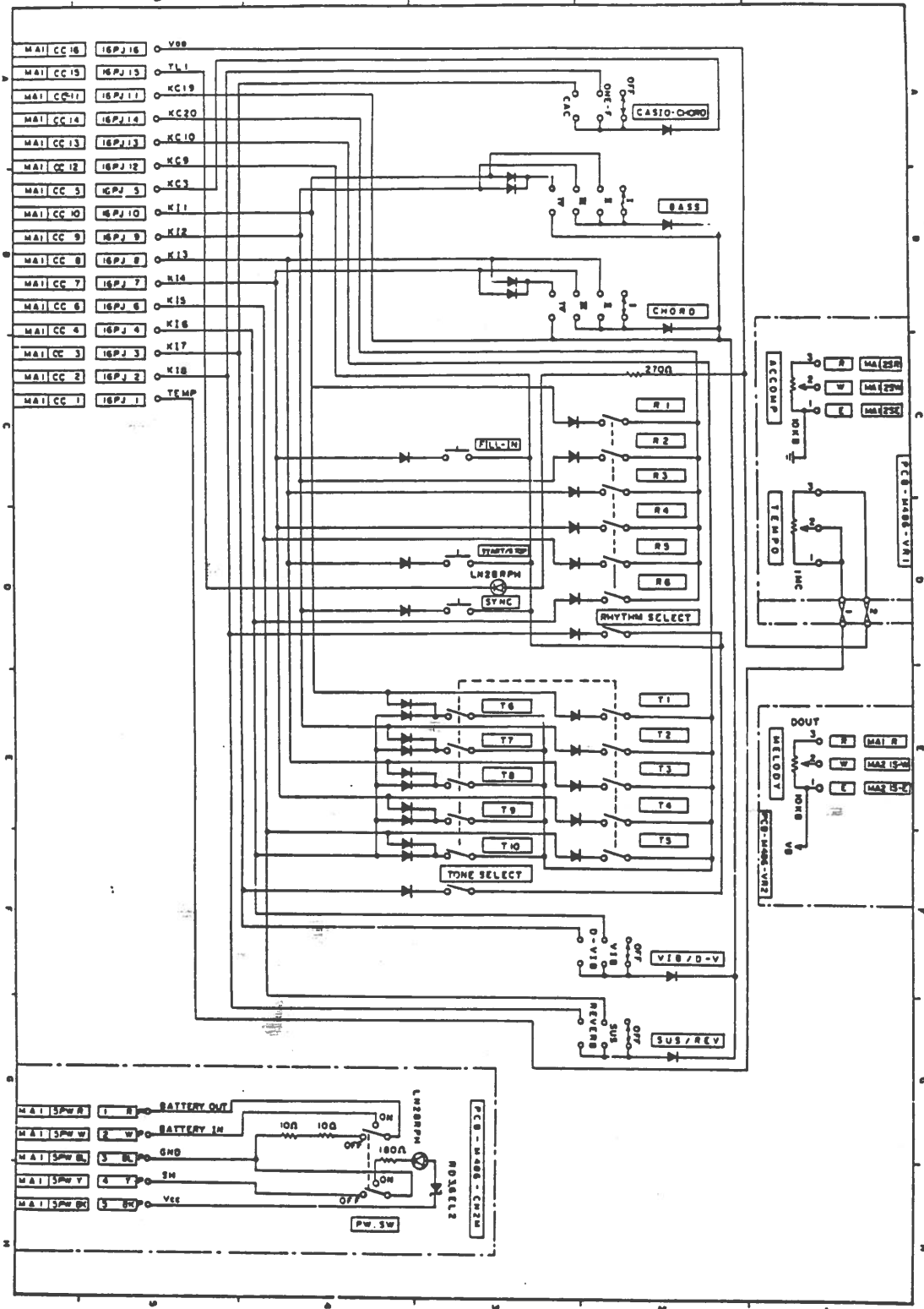


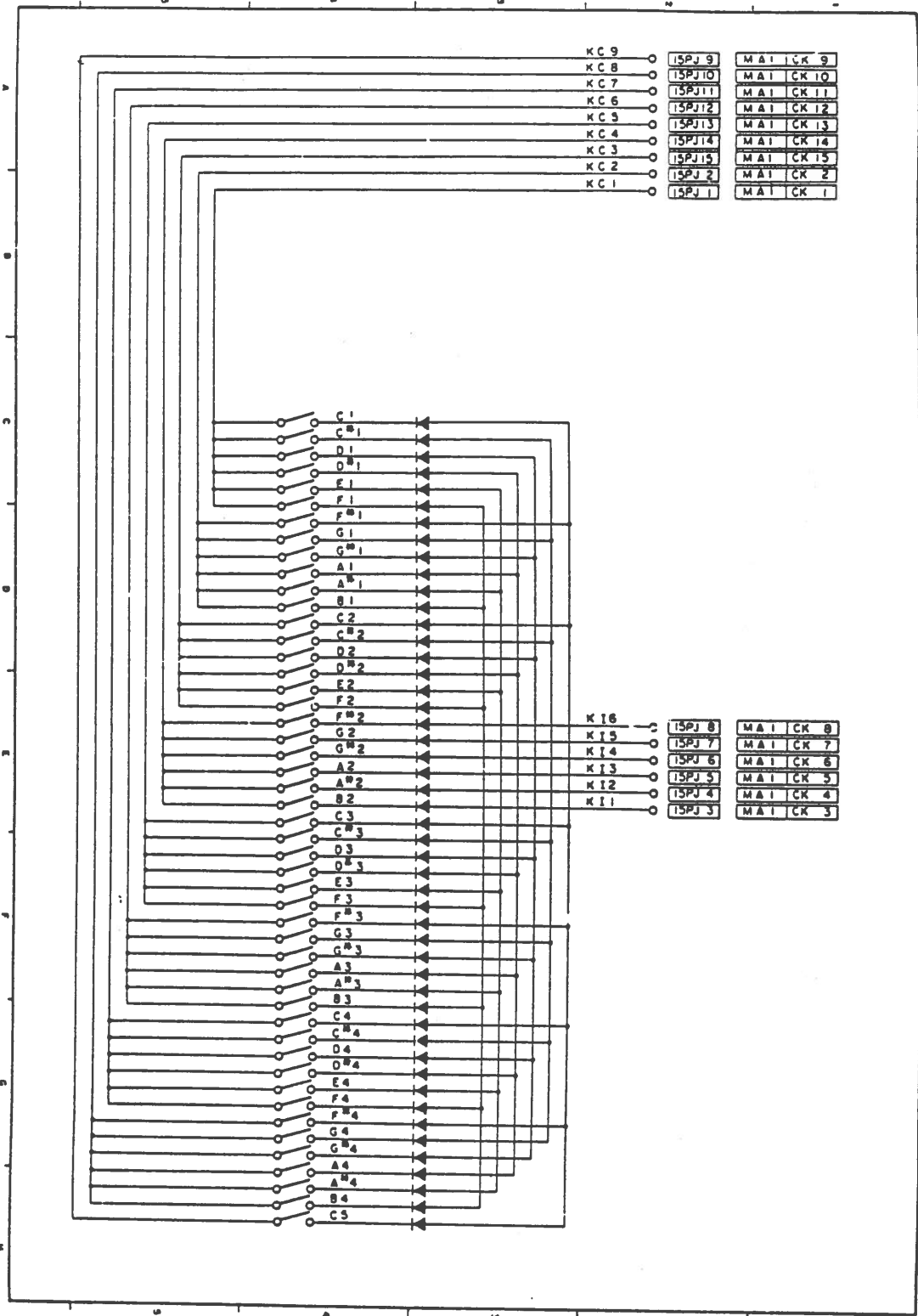
To 4049-3 pin 1

Clock Pulse Generator



HT-100
1-2 P.C.B. MA98-MA2M



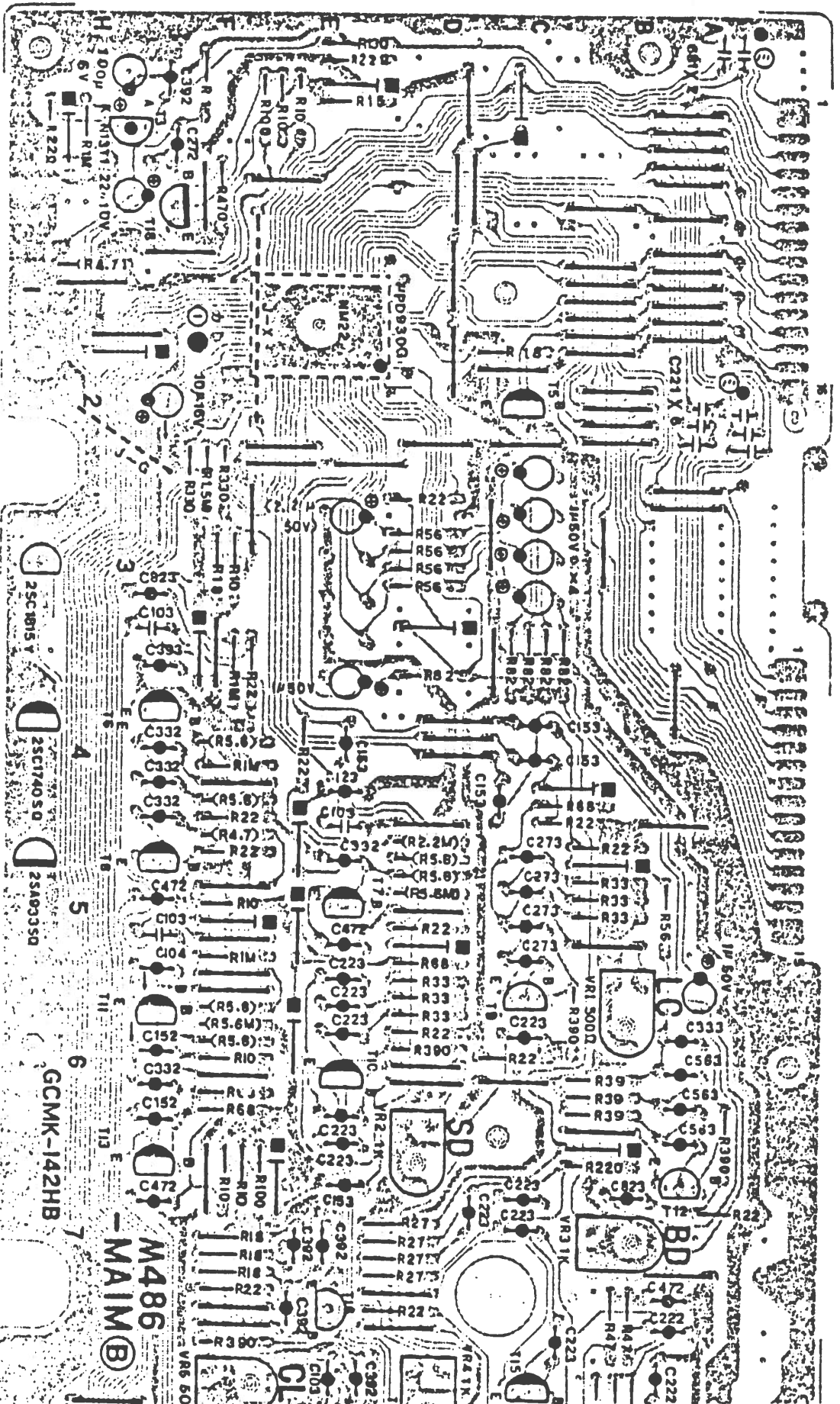


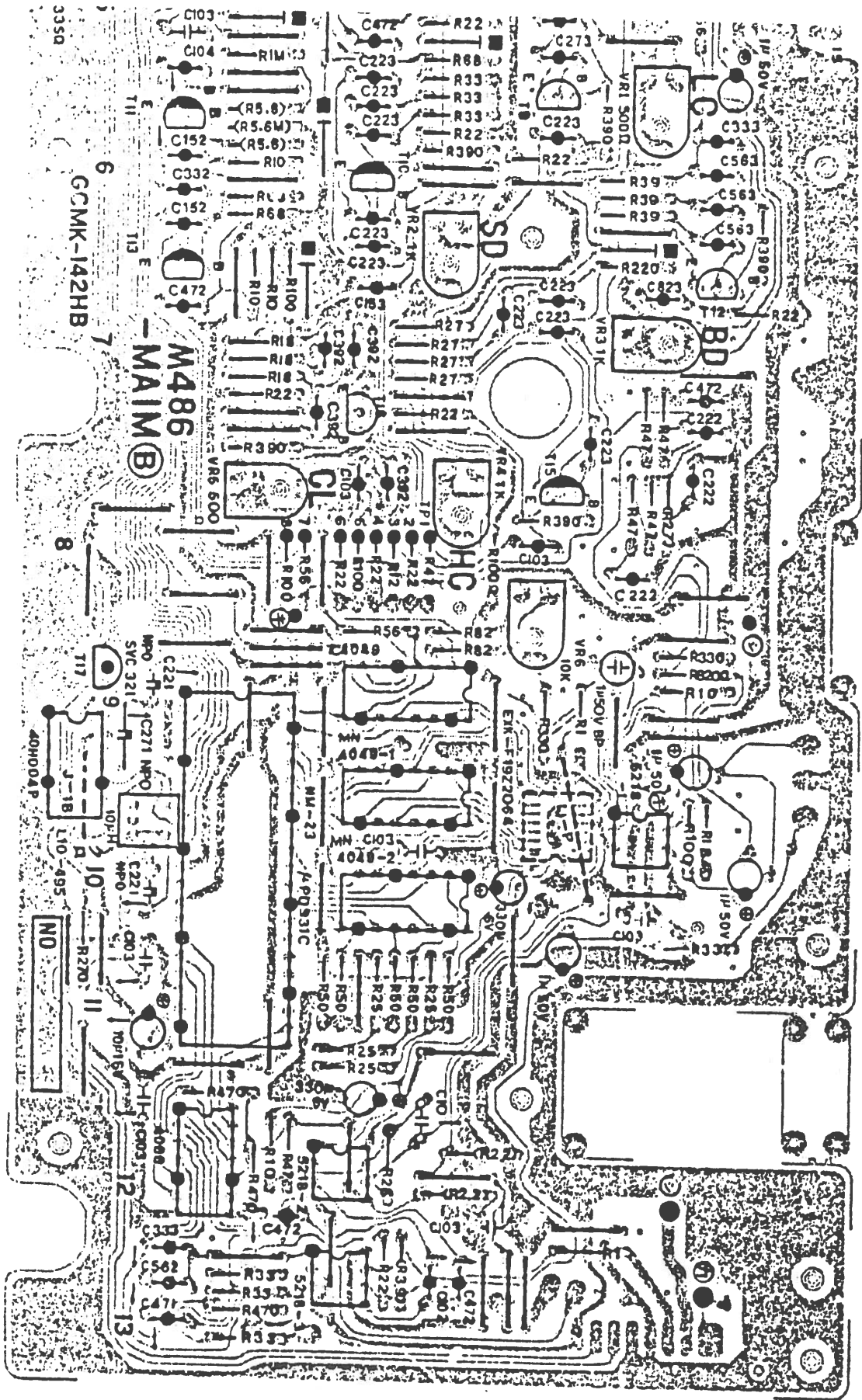
KC 9	15PJ 9	MA1 CK 9
KC 8	15PJ 10	MA1 CK 10
KC 7	15PJ 11	MA1 CK 11
KC 6	15PJ 12	MA1 CK 12
KC 5	15PJ 13	MA1 CK 13
KC 4	15PJ 14	MA1 CK 14
KC 3	15PJ 15	MA1 CK 15
KC 2	15PJ 2	MA1 CK 2
KC 1	15PJ 1	MA1 CK 1

KI 6	15PJ 8	MA1 CK 8
KI 5	15PJ 7	MA1 CK 7
KI 4	15PJ 6	MA1 CK 6
KI 3	15PJ 5	MA1 CK 5
KI 2	15PJ 4	MA1 CK 4
KI 1	15PJ 3	MA1 CK 3

2. P.C.B. VIEW

2.1. P.C.B. M486-MA1M





3350

6 GCMK-142HB

M486 - MAIN (B)

8

9

10

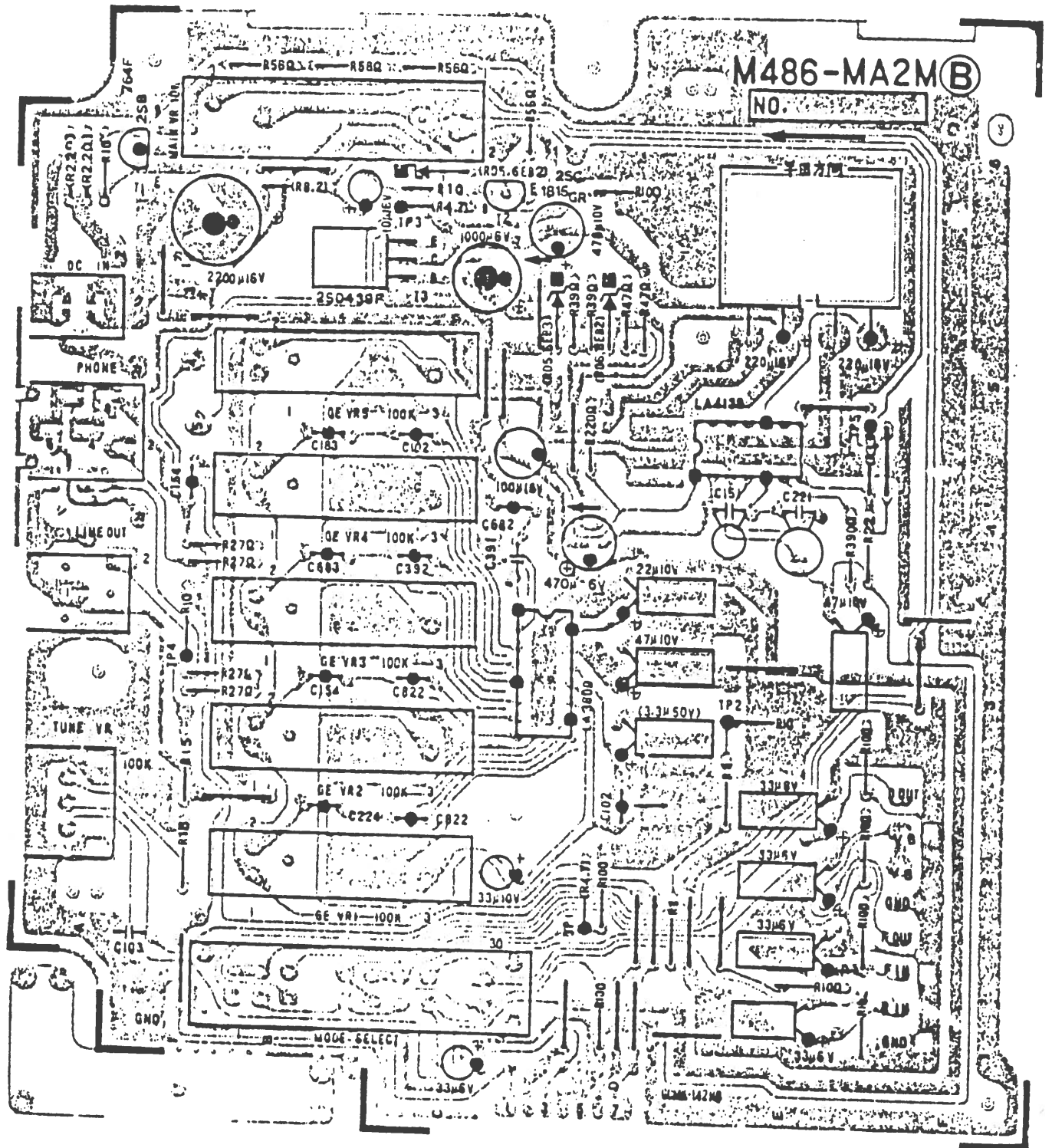
11

12

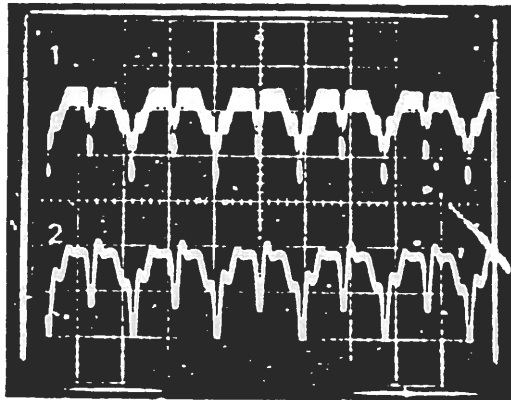
13

NO

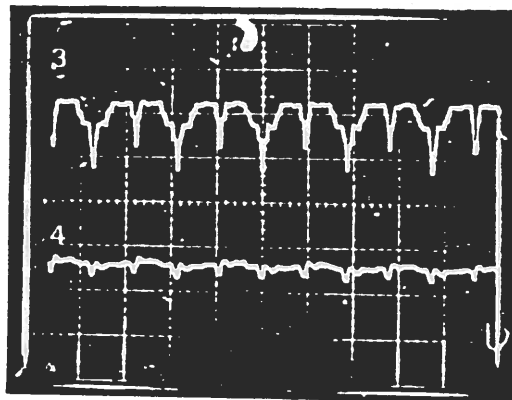
2-2. P.C.B. M486-MA2M



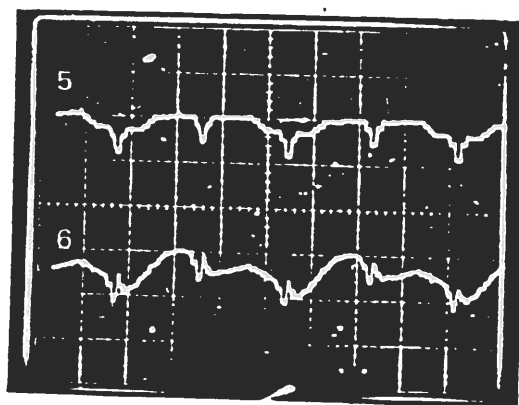
MAJOR WAVEFORMS



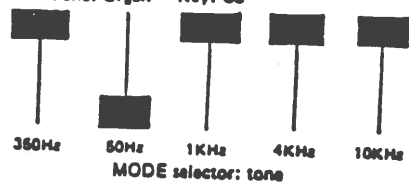
- 1 DAC output (F12 pin 2)
2ms/Div., 0.1V/Div.
Tone: Organ Key: C3
- 2 Filter output (F12 pin 4)
2ms/Div., 50mV/Div.
Tone: Organ Key: C3



- 3 Graphic equalizer input
(PCB M486-MA2M checkpoint TP1)
2ms/Div., 50nV/Div.
Tone: Organ Key: C3
- 4 Graphic equalizer output
(PCB M486-MA2M LA3600 pin 13)
2ms/Div., 50mV/Div.
Tone: Organ Key: C3

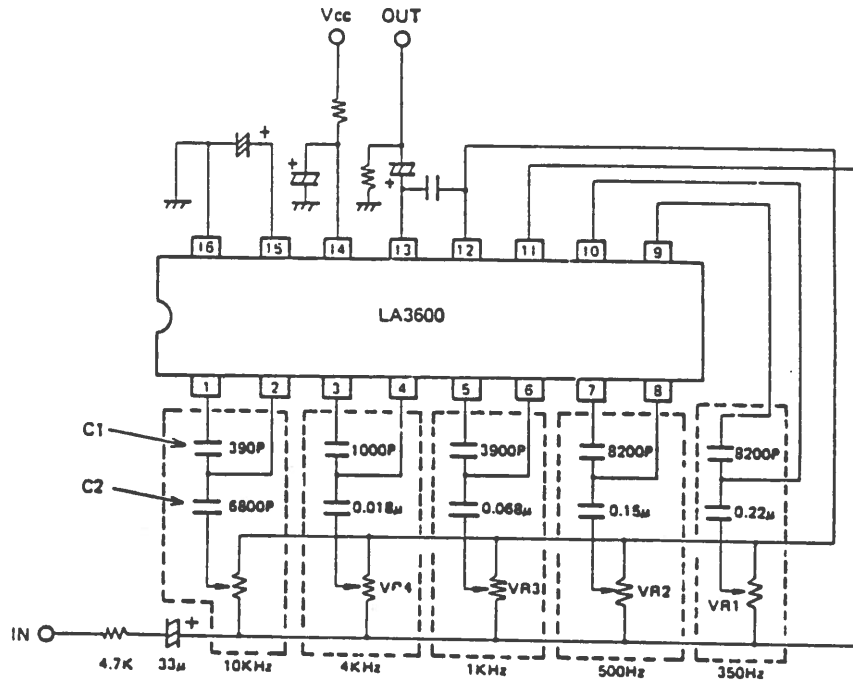


- 5 Graphic equalizer input
(PCB M486-MA2M checkpoint TP1)
1ms/Div., 0.1V/Div.
Tone: Organ Key: C3
- 6 Graphic equalizer output
(PCB M486-MA2M LA3600 pin 13)
1ms/Div., 0.2V/Div.
Tone: Organ Key: C3



GRAPHIC EQUALIZER

MT-100 employs a 5-band graphic equalizer IC LA3600.



The resonance frequency f_0 is determined by the external capacitors C1 and C2.

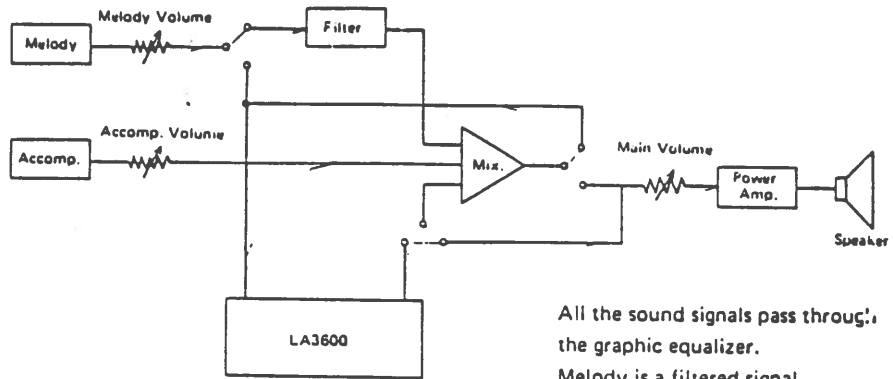
$$f_0 = \frac{1}{2\pi \sqrt{C1 \cdot C2 \cdot R1 \cdot R2}} \text{ [Hz]}$$

where R1 and R2 are the IC's built-in resistors,

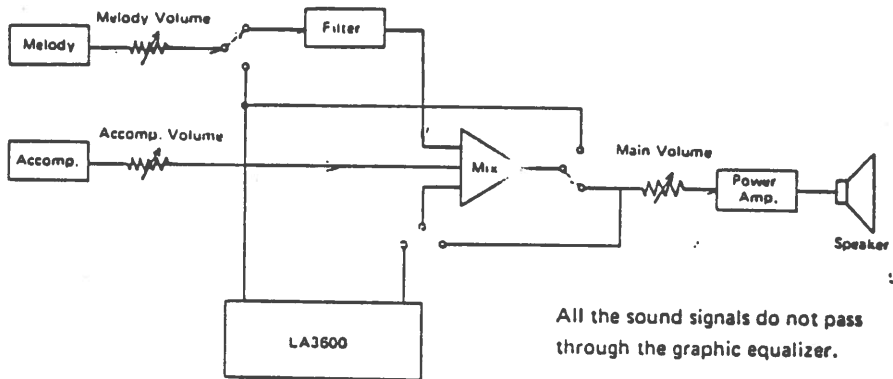
$$R1 = 1.2K\Omega \text{ and } R2 = 68K\Omega$$

Signal Route at Each Position of the Mode Selector Switch

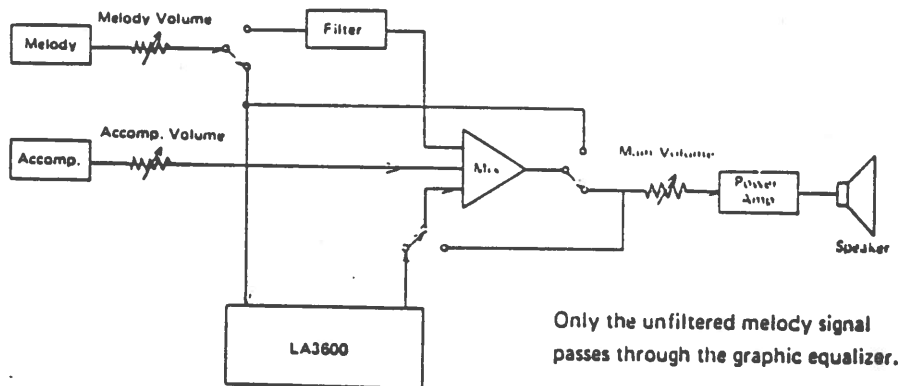
(1) Tone, Rhythm, Accomp.



(2) Off



(3) Tone



PARTS LIST MODEL MT-100 (MX-86)

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK	
		1) P.C. Board (M486-MA1M/M1630*1)					
	2001 2001	LSI	μPD930G-011	1	BK	B	
	2001 2043	"	μPD931C	1	AD	B	
	2100 3255	MOS IC	TC40498P	1	AE	A	
	2100 3786	CMOS-IC	TC40H004P	1	AE	A	
	2100 3255	"	HN4049B (TC40498P)	2	AE	A	
	2100 3549	"	BU4066B (TC40668P)	1	AF	A	
☆	2120 1146	IC	M5218PR	3	AE	A	
	2240 8019	PUT	N13T1	1	AD	C	
	2340 0022	Variable capacitor	SVC321	1	AE	C	
	2760 2177	Semi fixed resistor	V8K4-11810K	1	AB	C	
	2760 2185	"	V8K4-118500	1	AB	C	
☆	2760 2240	"	V8K4-1181K	4	AB	C	
☆	2804 5808	Electrolytic capacitor	6.3RE2-330	1	N/A	X	
	2818 0055	Ceramic capacitor	HE40SJY8221K	6			
	2818 0101	"	HE40SJY8681K	2			
	2819 0221	"	HE12SJCH271J	1			
	3060 6035	Ladder Network **	EXK-S19Z2052R	1	AD	B	
	3060 6043	Ladder Network **	EXK-F19Z206A	1	AE	B	
	2830 8481	Mylar Capacitor	APZ-471K50	1	N/A	X	
	2830 9252	Mylar Capacitor	NNM472K50	1	N/A	X	
☆	3841 0695	Coil	L10-495	1	AC	C	
	2200 9010	Transistor	2SA933	1	AD	A	
	2220 9035	"	2SC1740	8	AD	A	
	2220 3401	"	2SC1815	3	AD	A	
	2301 3002	Diode	DS-442	15	AA	C	
	2600 7313	Carbon film resistor	R-25-10K-J	9	N/A	X	
	2600 9715	"	R-25-100K-J	5			
	2600 7712	"	R-25-15K-J	1			
	2600 7917	"	R-25-18K-J	6			
	2600 8514	"	R-25-33K-J	10			
	2601 0918	"	R-25-330K-J	4			
	2600 8719	"	R-25-39K-J	3			
	2600 6716	"	R-25-5.6K-J	6			
	2600 9111	"	R-25-56K-J	7			
	2600 2516	"	R-25-100-J	1			
	2600 4918	"	R-25-1K-J	3			

** Ladder Network was changed in production and is NOT interchangeable. Pinout is different.
Order correct ladder according to production model you have.

Note: ☆ - New part

Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

MT-100 Parts List

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
	2601 2112	Carbon film resistor	R-25-1M-J	4	N/A	X
	2600 5710	"	R-25-2.2K-J	2		
	2600 8115	"	R-25-22K-J	17		
	2601 0519	"	R-25-220K-J	1		
	2600 8310	"	R-25-27K-J	4		
	2601 1116	"	R-25-390K-J	5		
	2600 8913	"	R-25-47K-J	6		
	2600 9316	"	R-25-68K-J	4		
	2600 4713	"	R-25-820-J	1		
	2600 7518	"	R-25-12K-J	1		
	2601 0713	"	R-25-270K-J	1		
	2600 6511	"	R-25-4.7K-J	2		
	2600 5914	"	R-25-2.7K-J	1		
	2600 6317	"	R-25-3.9K-J	1		
	2601 8111	"	R-25-2.2M-J	1		
	2601 1311	"	R-25-470K-J	4		
	2600 9511	"	R-25-82K-J	7		
	2600 0912	"	R-25-22-J	2		
	2601 6231	"	R-25-25K-J	5		
	2601 5111	"	R-25-50K-J	5		
	2601 5511	"	R-25-1.5M-J	1		
	2601 6550	"	R-25-5.6M-J	2		
☆	2601 6576	"	R-25-130K-J	1		
	2804 4925	Electrolytic capacitor	50RE1	9		
	2804 5051	"	16RE10	2		
	2804 5077	"	10RE22	1		
	2804 9374	"	6.3RE100	1		
	2804 9013	"	50RN88P1	1		
	2804 5336	"	50RE2R2	2		
☆	2804 5808	"	6.3RE2-330	1		
	2818 2040	Ceramic capacitor	HE70SJYF103Z	8		
	2819 0492	"	RT-HE40TKSL150K	1		
	2818 3259	"	HE11SJCH221J	2		
	2830 6024	Mylar capacitor	AMZ-102K50	1		
	0002 8165	"	AMZF-392K50	5		
	2830 6032	"	AMZ-103K50	2		
	2830 6321	"	AMZ-152K50	2		
	2830 6075	"	AMZ-222K50	3		

Note: ☆ - New part
Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

MT-100 Parts List

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
	2830 8105	Mylar capacitor	AMZ-332K50	5	N/A	X
	2830 8121	"	AMZ-472K50	5		
	2830 8148	"	AMZ-562K50	1		
	2830 8681	"	AMZ-123K50	1		
	2830 8059	"	AMZ-153K50	5		
	2830 8083	"	AMZ-223K50	10		
	0002 8164	"	AMZ-273K50	4		
	2830 8113	"	AMZ-333K50	2		
	2830 8690	"	AMZ-393K50	1		
	2830 8156	"	AMZ-563K50	3		
	2830 8164	"	AMZ-823K50	2		
	2830 8041	"	AMZ-104K50	1		
	2830 8091	"	AMZ-272K50	1		
	2) P.C. Board (M486-MA2M/M2949*1)					
☆	2120 6504	IC	LA3600	1	AF	A
	2120 8329	"	LA4138	1	AG	A
☆	2210 2164	Transistor	2S8764	1	AD	A
	2230 3287	"	2SD439	1	AD	A
	2770 6673	Slide volume Main	S3018P603M-10K8	1	AD	B
☆	2770 6878	Volume Graphic Equalizer	S2018P608M-100K8	5	AE	B
☆	2770 9770	" Pitch Control	EVJ-EHAE20815	1	AD	B
	2804 5662	Electrolytic capacitor	6,3RE1000	1	N/A	X
☆	2804 9731	"	16RE2-2200	1	N/A	X
	3420 2257	Slide switch Mode Select	SS8443-K310107	1	AF	B
	3512 3237	Power jack Adapter	HEC0470-01-230	1	AC	B
	3512 4365	Pin jack Line out	YKB11-0098	1	AB	B
	3612 0525	Jack Headphone	YKB21-5055	1	AE	B
☆58	3721 0281	PC joiner-M86A	PCJ-JPSS-7-52	1	AC	C
☆	6911 6630	Shield wire M86 sub ass'y	M42045*3	1	-	C
☆	6911 8720	Paralell wire M86C	M42046-3	1	-	C
	2220 9035	Transistor	2SC1740	1	AD	A
	2310 2471	Zener diode	RD5,6E	2	AA	A
	2310 3273	"	RD6,8E	1	AA	A
	2600 7313	Carbon film resistor	R-25-10K-J	4	N/A	X
	2600 9715	"	R-25-100K-J	8	N/A	X

Note: ☆ - New part
Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

MT-100 Parts List

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
	2600 7712	Carbon film resistor	R-25-15K-J	1	N/A	X
	2600 7917	"	R-25-18K-J	1		
	2600 3911	"	R-25-390-J	1		
	2600 4918	"	R-25-1K-J	2		
	2600 8115	"	R-25-22K-J	1		
	2600 3318	"	R-25-220-J	1		
	2600 6112	"	R-25-3.3K-J	1		
	2600 1510	"	R-25-39-J	2		
	2600 7119	"	R-25-8.2K-J	1		
	2600 1714	"	R-25-47-J	2		
	2600 6511	"	R-25-4.7K-J	2		
	2600 1919	"	R-25-56-J	4		
	2600 1111	"	R-25-27-J	4		
	2601 4417	"	R-25-2.2-J	2		
	2804 5051	Electrolytic capacitor	16RE10	1		
	2804 4933	"	16RE100	1		
	2804 5123	"	10RE33	1		
	2804 5069	"	10RE47	2		
	2804 5026	"	50RE3R3	1		
	2804 5689	"	6,3REA470	1		
	2804 9366	"	6,3RE33	5		
	2804 5077	"	10RE22	1		
☆	2807 0926	"	10RE2-470-T2-T	1		
☆	28070934	"	16RE2-220-T14-T	2		
	2818 0055	Ceramic capacitor	HE40SJY8221K	1		
	2818 2040	"	HE70SJYF103Z	1		
	2819 0310	"	HE80SJSJL391K	1		
	2818 0039	"	HE40SJY8151K	1		
	2830 6024	Mylar capacitor	AMZ-102K50	2		
	0002 8165	"	AMZF-392K50	1		
	0002 8179	"	AMZF-682K50	1		
	2830 6181	"	AMZ-822K50	2		
	2830 6172	"	AMZ-183K50	1		
	2830 6479	"	AMZ-683K50	1		
	2830 6067	"	AMZ-154K50	2		
	2830 6495	"	AMZ-224K50	1		

Note: ☆ - New part
Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

MT-100 Parts List

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
		3) P.C. BOARD (M486-CN-1M/M2950*1)				
	2320 9748	LED	LN28RPH	1	AB	A
☆52	3721 0279	PC joiner M86B	PCJ-JPSS-16-62	1	AC	C
☆53	3721 0287	" M86C	PCJ-JPSS-2-22	1	AC	C
☆	6911 6710	Paralell wire M86B	M42046-2	1	-	C
	2301 3002	Diode	DS-442	35	AA	C
	2600 3512	Carbon film resistor	R-25-270-J	1	N/A	X
		4) P.C. BOARD (M486-CN2M/M42042*1)				
	2320 9748	LED Power Indicator	LN28RPM	1	AB	A
	3480 5431	Push switch Power Switch	SUZ12-M415201	1	AE	A
☆	6911 6710	Paralell wire M86A	M42046-1	1	-	C
	2310 2862	Zener diode	RD3.6E	1	AA	A
	2600 3113	Carbon film resistor	R-25-180-J	1	N/A	X
	2601 2911	"	R-25-10-J	2	N/A	X
☆57	4307 3020	Blank P.C.B. (M486-CN2M)	M1633-2	1	AC	X
		5) P.C. BOARD (M486-KY1M/M1631*1)				
☆47	3721 0295	PC Joiner M86D	PCJ-JPSS-15-62	1	AC	C
	2301 3002	Diode	DS-442	49	AA	C
☆48	4307 3050	Blank P.C.B. M486-KY1M	M1634-1	1	AK	X
		6) P. C. BOARD (M486-VR1/M42043*1)				
	2770 9605	Volume Accomp.	EWA-NF0X05B14	1	AE	B
	2770 9613	" Tempo	EWA-NF0X05C16	1	AE	B
☆	6911 6610	Shield wire M86 sub ass'y	M42045*1	1	-	C
		7) P.C. BOARD (M486-VR-2/M42044*1)				
	2770 9605	Volume Melody	EWA-NF0*05B14	1	AE	B
☆	6911 6620	Shield wire M86 sub ass'y	M42044*2	1	-	C

Note: ☆ - New part
Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

MI-100 Parts List

Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
8) SLIDE BOARD ASS'Y						
59	6901 4972	Slide contact B	M47978-1	5	AA	B
59	6902 6360	Slide board 90	M41207-1	5	AC	C
59	6910 0480	Slide spring	M4491-1	5	AA	C
	5580 1274	Ball Bearing	SUS304-2PI	5	AA	X
9) KEYBOARD ASS'Y						
3	6902 6150	Key 90A	M31055-1	4	AF	C
4	6902 6160	Key 90B	M31056-1	4	AF	C
5	6902 6170	Key 90C	M31057-1	4	AF	C
6	6902 6180	Key 90D	M31058-1	4	AF	C
7	6902 6190	Key 90E	M31059-1	4	AF	C
8	6902 6200	Key 90F	M31060-1	4	AF	C
9	6902 6210	Key 90G	M31061-1	4	AF	C
10	6902 6220	Key 90S	M31062-1	1	AF	C
2	6910 0290	Black key	M3416-1	20	AF	C
45	6902 6640	Key contact rubber 90A	M31038A-1	3	AD	B
44	6902 6650	" 90B	M31039A-1	1	AD	B
*	6911 6650	Shield plate 86B	M21008-1	1	-	C
51	6902 6352	Key fixing rubber 32A	M41254B-1	1	-	X
48	6911 0200	Key fixing plate 32C	M2811-1	1	-	X
50	6902 6332	Key fixing rubber 32B	M41255B-1	1	-	X
49	6911 0210	Key fixing plate 32D	M31300-1	1	-	X
10) UPPER CASE ASS'Y						
11	3830 1098	Speaker	EAS-8P109SF	1	AL	B
12	6901 7080	Blind plate 3	M4671-3	3	-	C
13	6901 7300	" 4	M4687-2	2	-	C
14*	6904 1201	Slide knob	M41350A-2	6	AC	C
15	6910 1860	Fill in contact rubber 31	M4675-1	3	AB	B
16	6910 4820	Key contact rubber M10S	M3691-1	1	AD	B
17	6910 4830	" M65	M3692-1	1	AC	B
18	6910 5220	Blind plate	M4686-2	2	-	C
19	6910 5300	"	M4670-3	3	-	C

Note: * - New part
Q'ty - Quantity used per unit

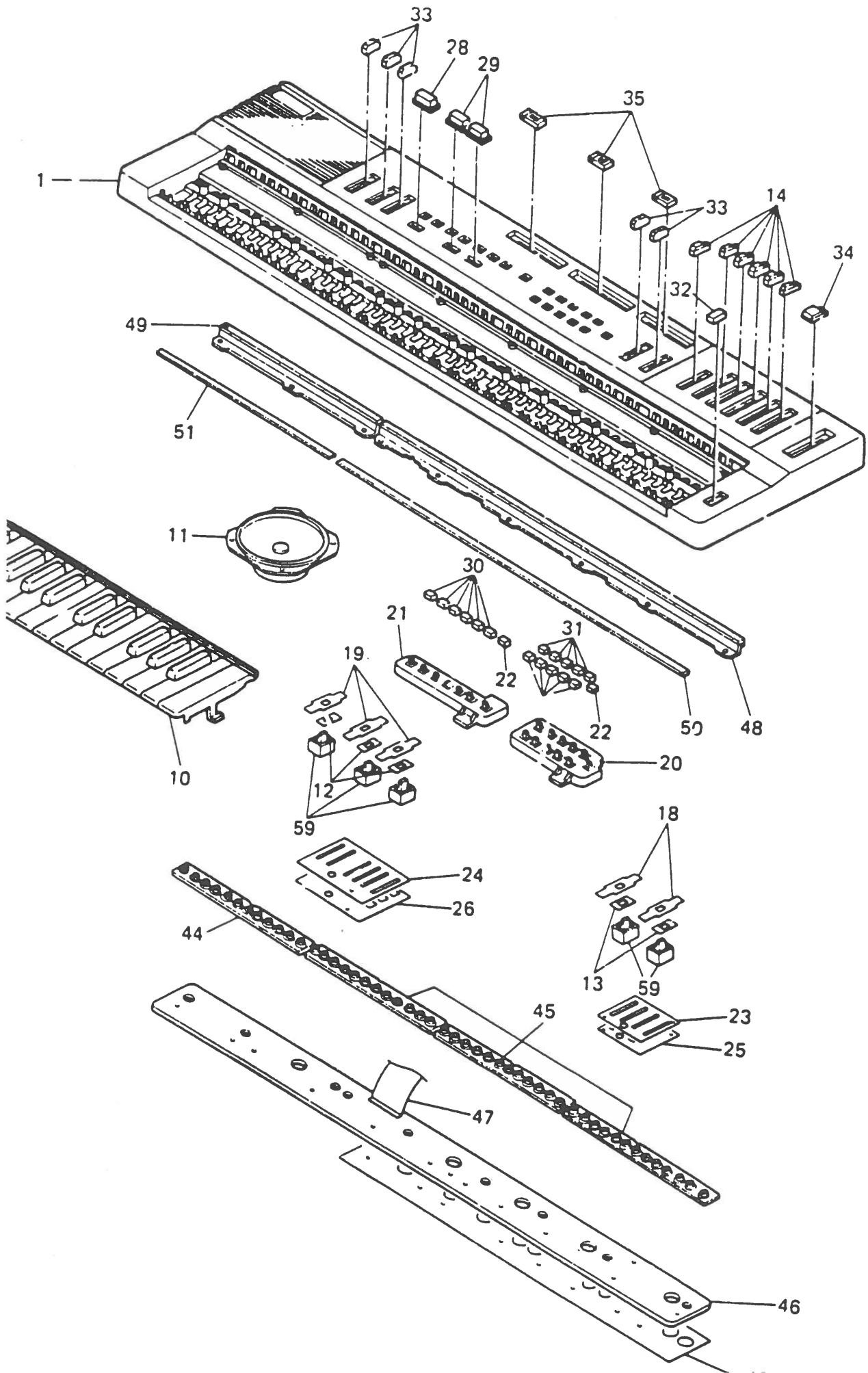
Rank: A Essential
B Stock recommended
C Others
X No stock recommended

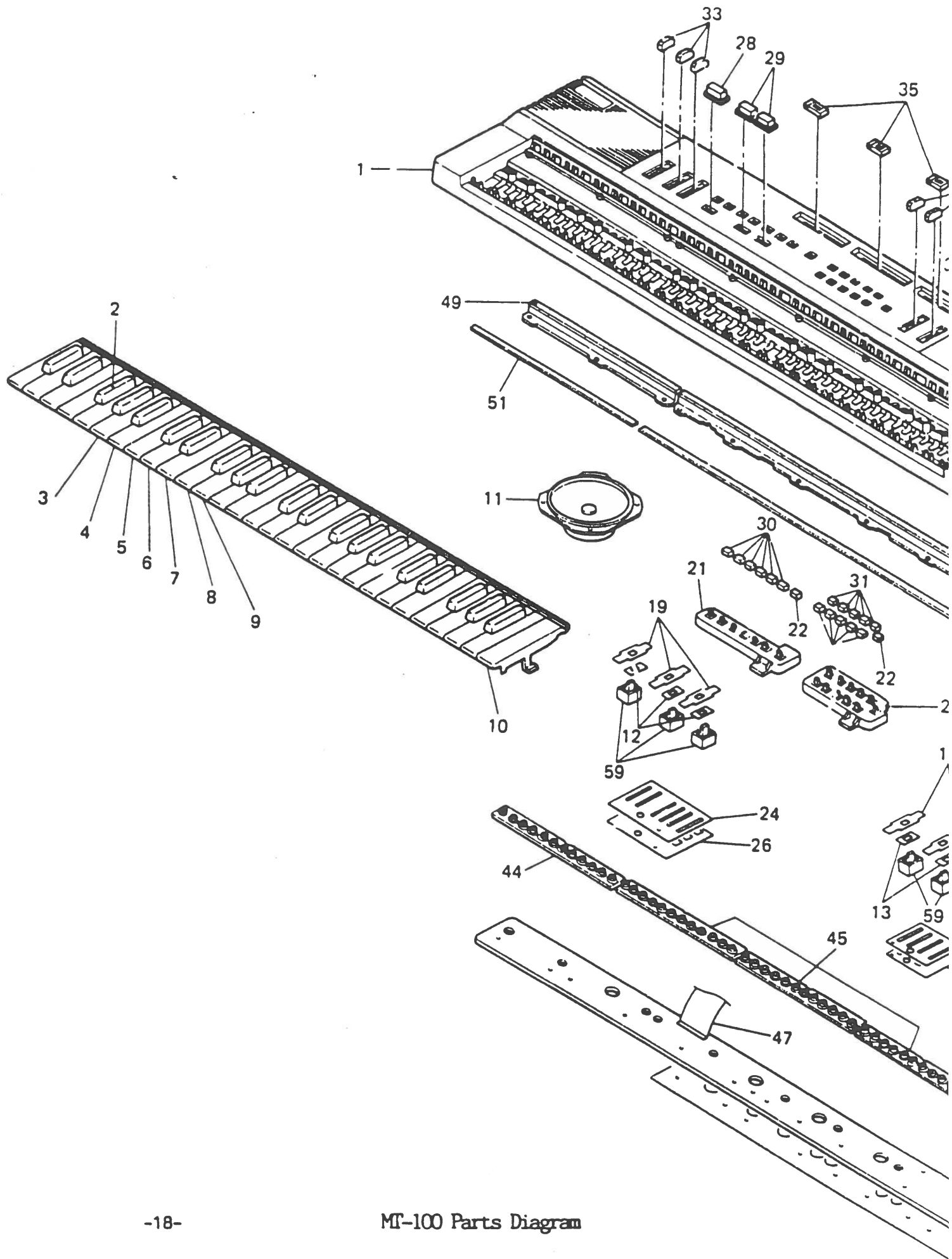
MT-100 Parts List

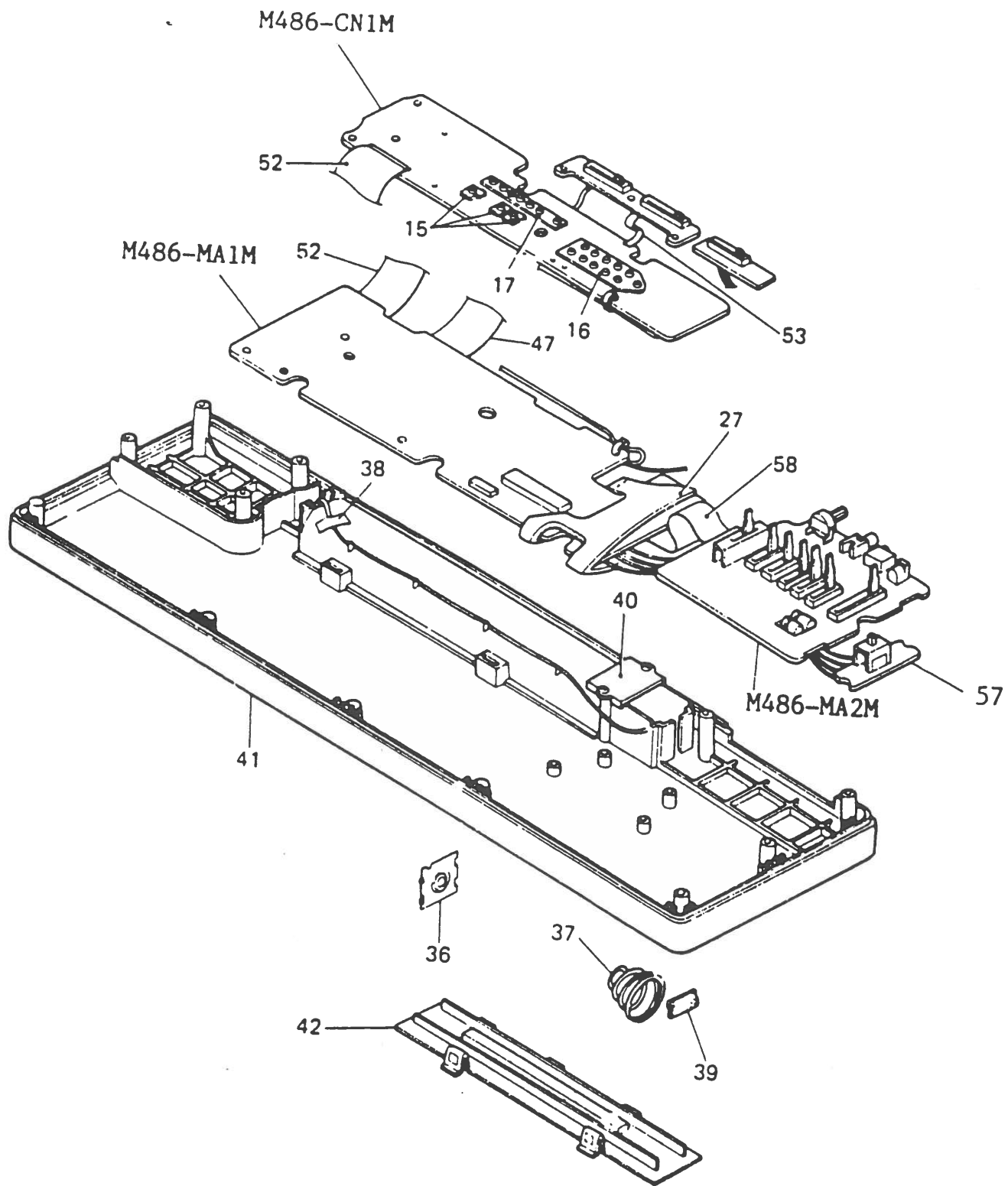
Item	Code No.	Part Name	Specification	Q'ty	Price Code	RANK
20*	6911 5670	M10S2 sub ass'y	M31612*1	1	AK	C
21*	6911 5680	M652 sub ass'y	M31611*1	1	AH	C
43	6910 5280	Shield plate 40C	M41015-1	1	-	X
22*	6911 5850	Lock button 86	M31562-1	2	AC	C
23*	6911 5860	CN contact 861	M42057-1	1	AB	C
24*	6911 5670	" 862	M42058-1	1	AB	C
25*	6911 5880	CN spacer 861	M42059-1	1	-	X
26*	6911 5890	" 862	M42060-1	1	-	X
27*	6911 6660	Shield plate 86A	M42138-1	1	-	X
28*	6911 6730	Rhythm button 86	M42062-1	1	AC	C
29*	6911 6740	"	M42062-2	2	AC	C
30*	6911 6750	Lock button 86	M31562-2	6	AC	C
31*	6911 6760	"	M31562-3	10	AC	C
32*	6911 6820	Power knob	M41093-7	1	AL	C
33*	6911 6830	Slide knob	M31359-4	5	AC	C
34*	6911 6841	Slide VR knob 87	M31443A-4	1	AC	C
35*	6911 6850	" 90-B	M31355-2	3	AC	C
1*	6911 5750	Upper case sub ass'y	M31609*1	1	AW	C
11) LOWER CASE SUB ASS'Y BATTERY COVER SUB ASS'Y						
36	6900 0631	Battery terminal (+)	M4222A-1	1	AB	X
37*	6900 4712	Battery contact spring (-)	M43098-1	1	AB	X
38	6900 5770	Felting seal	M4382-1	1	-	X
39	6900 5860	"	M4387-1	1	-	X
40	6900 6080	"	M4405-1	1	-	X
41*	6911 5620	Lower case sub ass'y	M2987*1	1	AV	C
42*	6911 6004	Battery cover sub ass'y	M3663D*12	1	AE	C

Note: * - New part
Q'ty - Quantity used per unit

Rank: A Essential
B Stock recommended
C Others
X No stock recommended

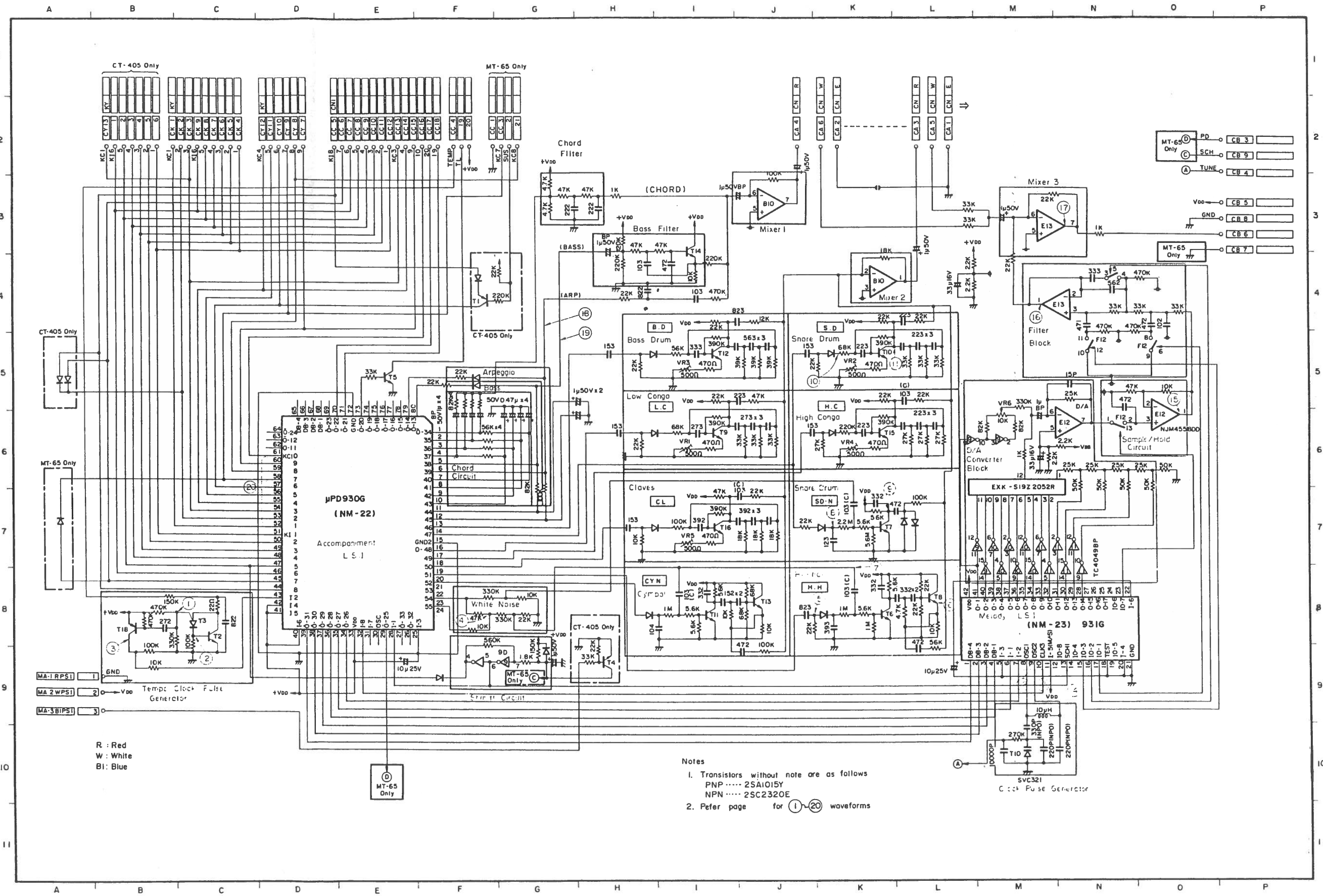




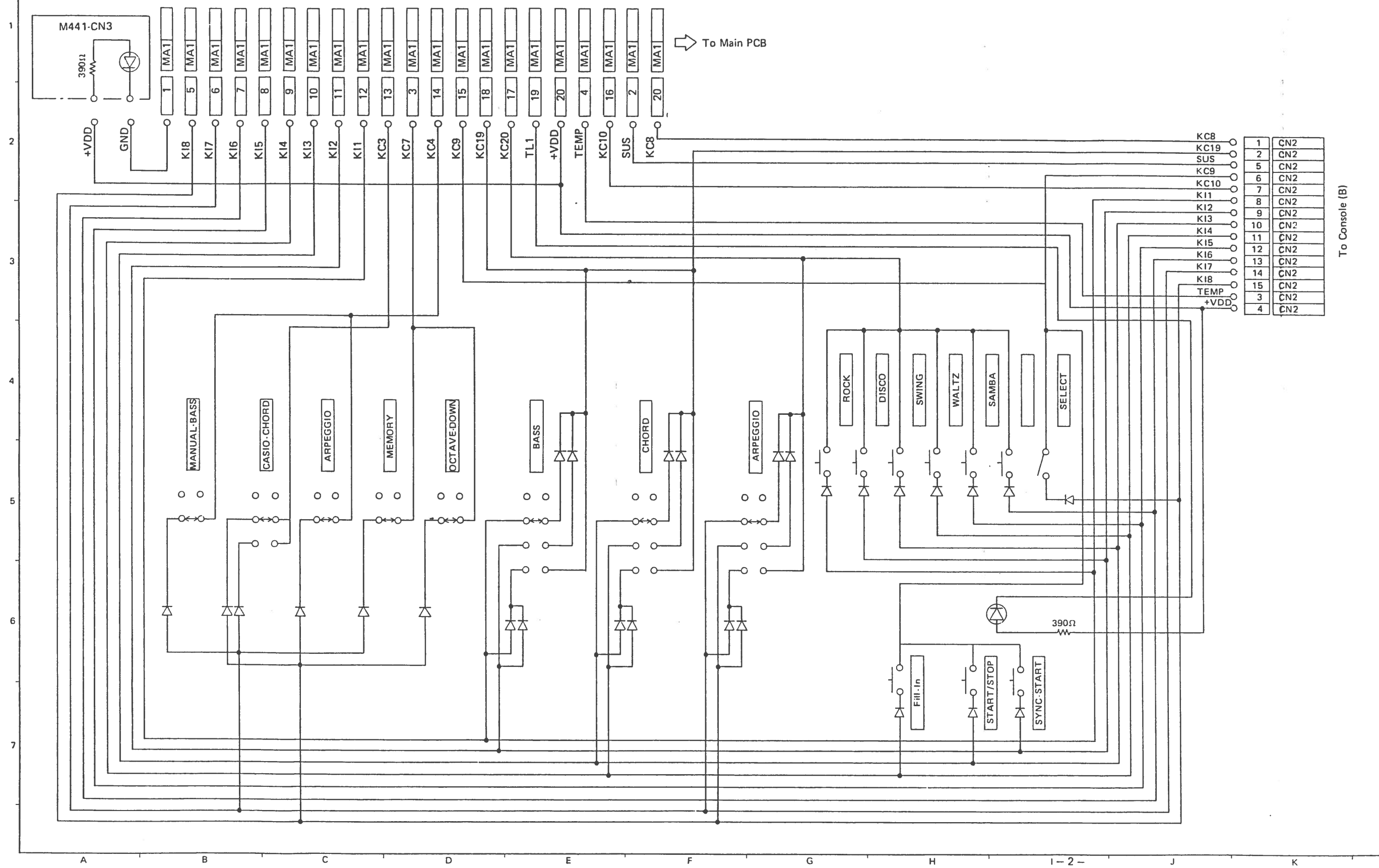


1. CIRCUIT DIAGRAM

1-1. Main PCB M440-MA1M (M-65), M441-MA1M (CT-405)



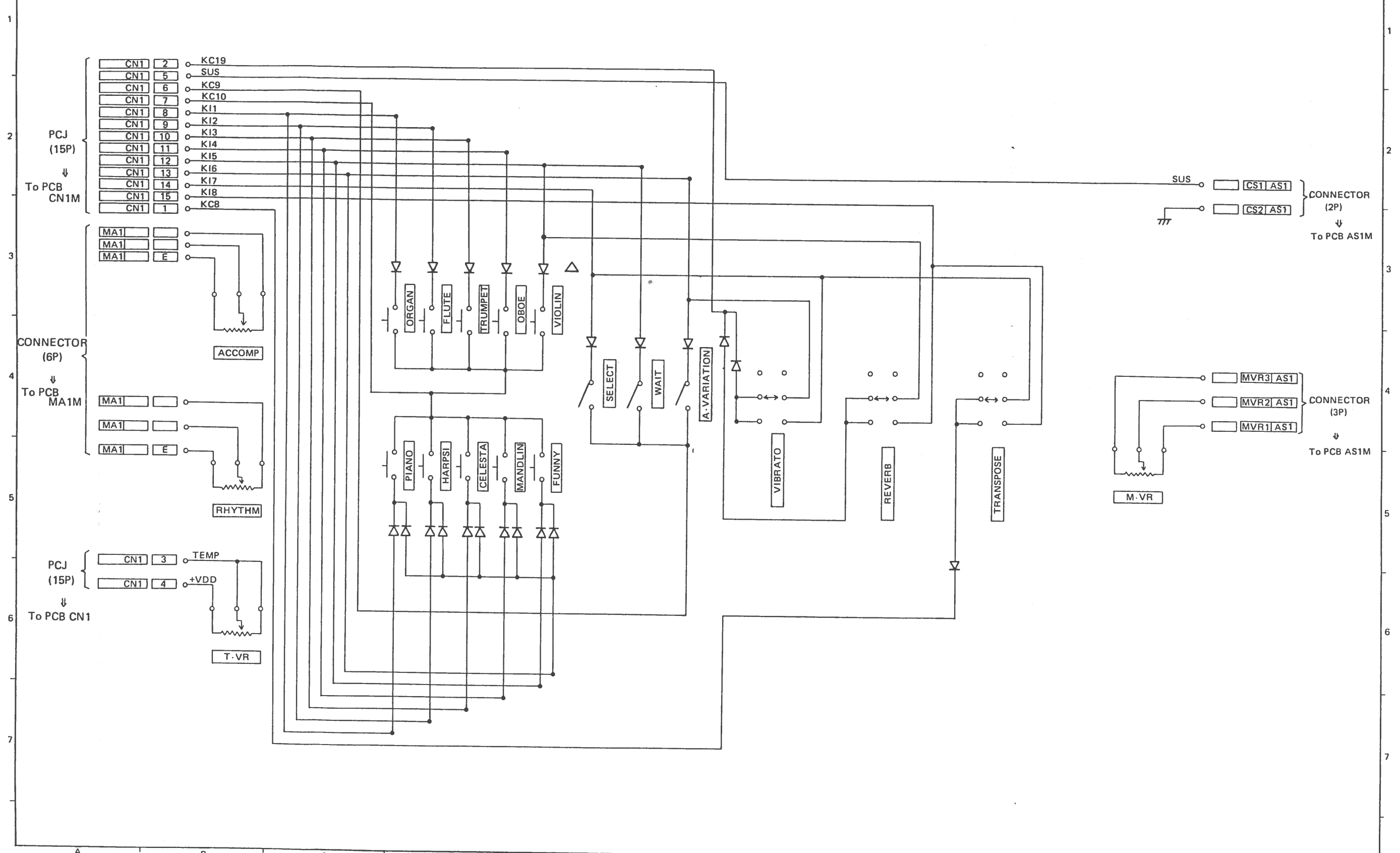
1-2. Console (A) PCB No. 441-CN1M, M441-CN3



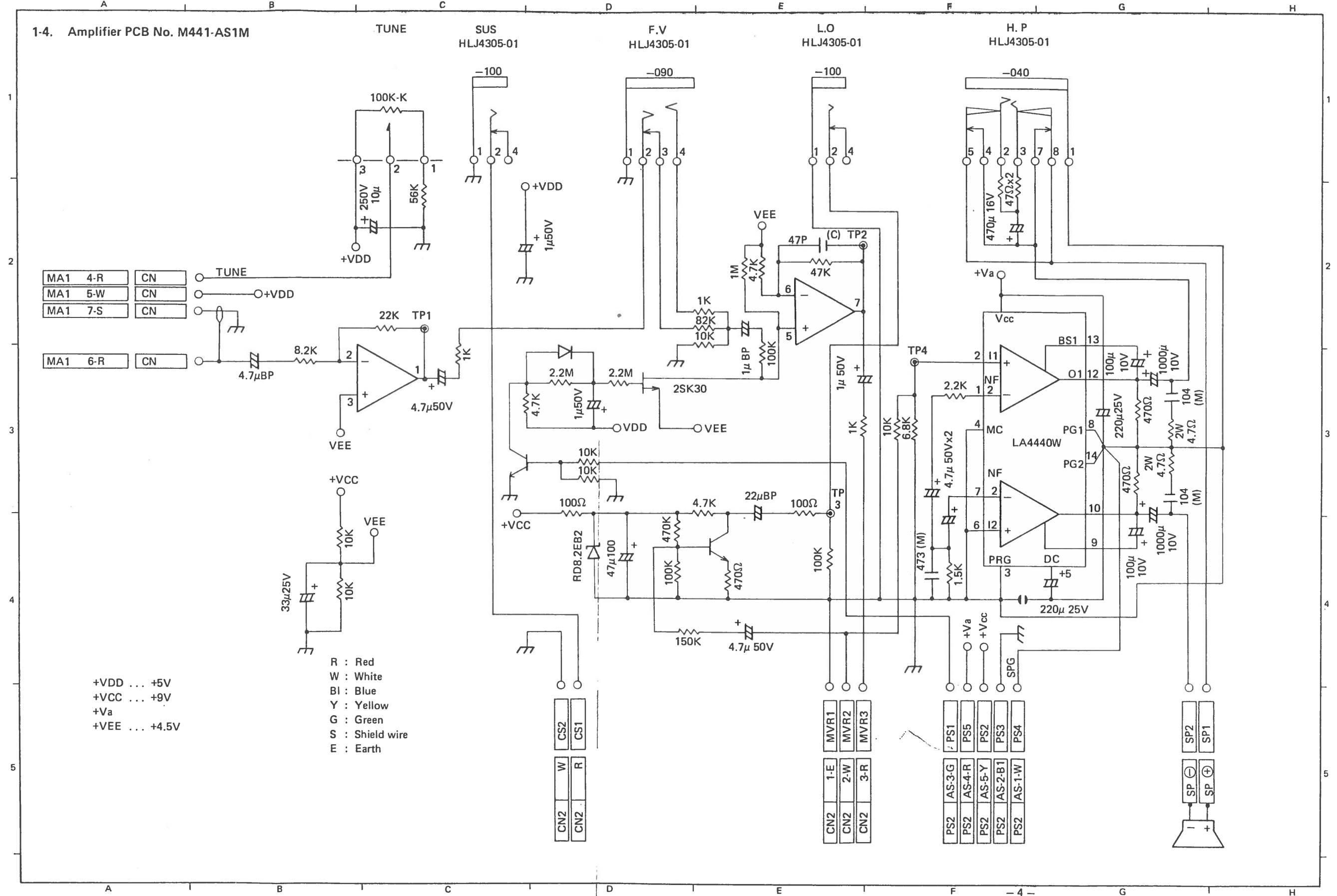
KC8	
KC19	1 CN2
SUS	2 CN2
KC9	5 CN2
KC10	6 CN2
K11	7 CN2
K12	8 CN2
K13	9 CN2
K14	10 CN2
K15	11 CN2
K16	12 CN2
K17	13 CN2
K18	14 CN2
K18	15 CN2
TEMP	3 CN2
+VDD	4 CN2

To Console (B)

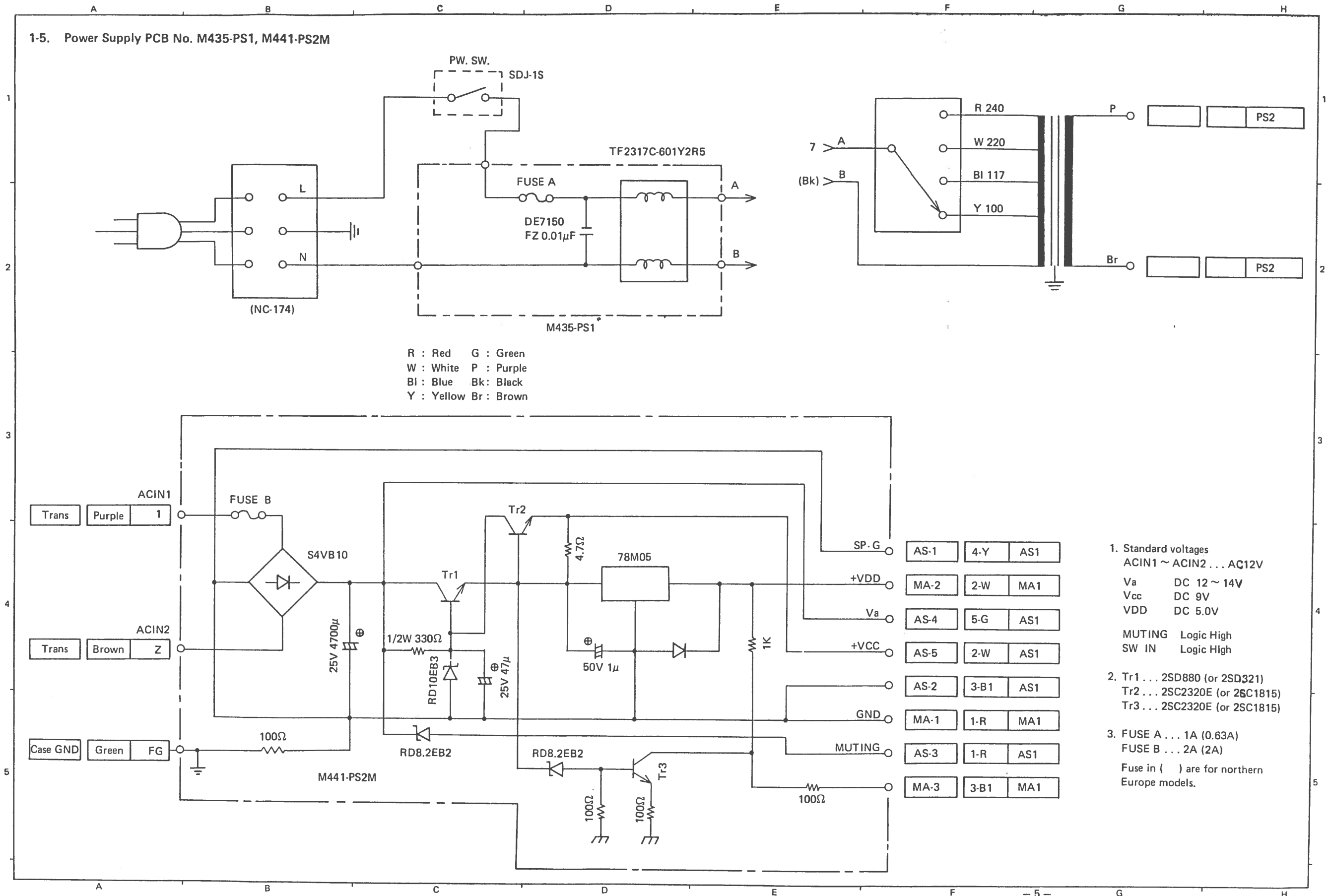
1-3. Console (B) PCB No. M441-CN2M



1-4. Amplifier PCB No. M441-AS1M



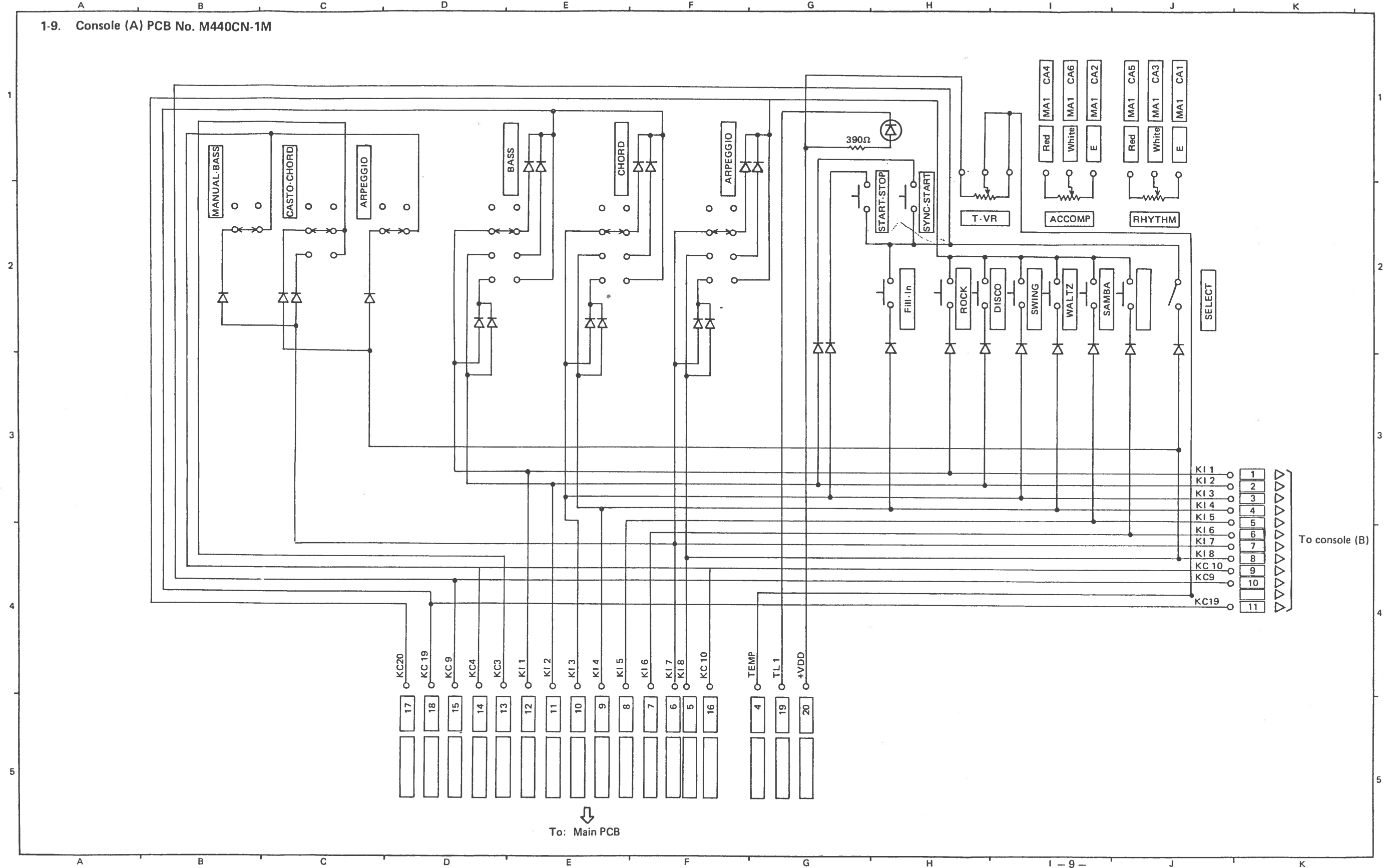
1-5. Power Supply PCB No. M435-PS1, M441-PS2M



R : Red G : Green
 W : White P : Purple
 Bl : Blue Bk : Black
 Y : Yellow Br : Brown

- Standard voltages
 ACIN1 ~ ACIN2 ... AC12V
 Va DC 12 ~ 14V
 Vcc DC 9V
 VDD DC 5.0V
 MUTING Logic High
 SW IN Logic High
- Tr1 ... 2SD880 (or 2SD321)
 Tr2 ... 2SC2320E (or 26C1815)
 Tr3 ... 2SC2320E (or 25C1815)
- FUSE A ... 1A (0.63A)
 FUSE B ... 2A (2A)
 Fuse in () are for northern Europe models.

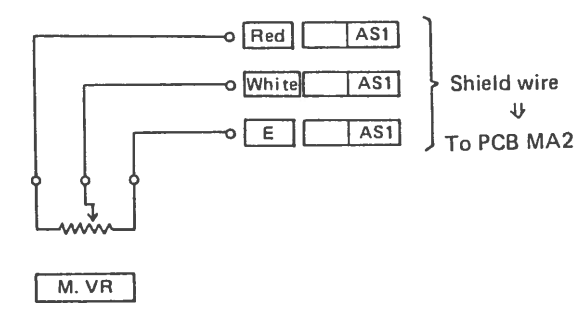
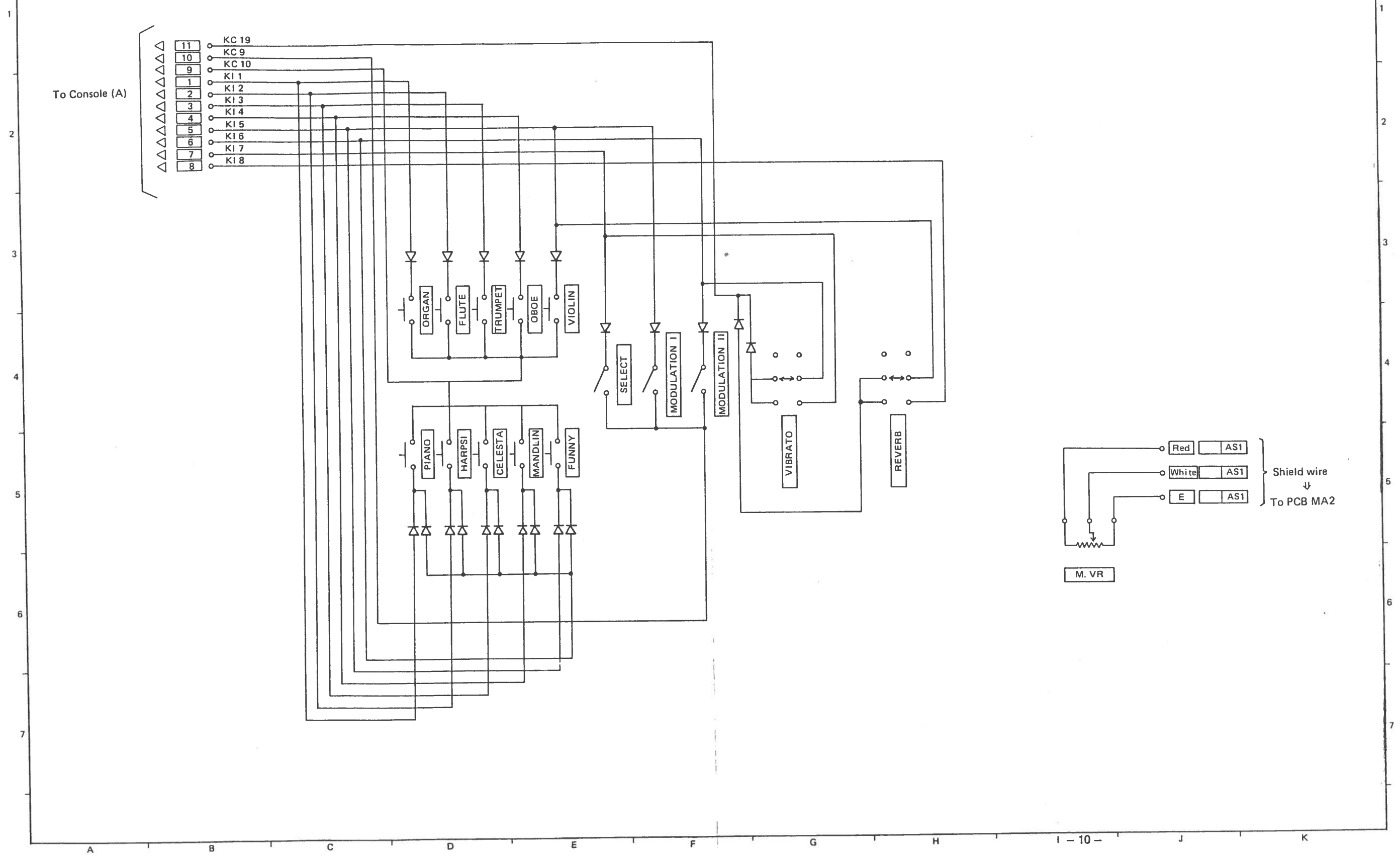
1-9. Console (A) PCB No. M440CN-1M



To: Main PCB

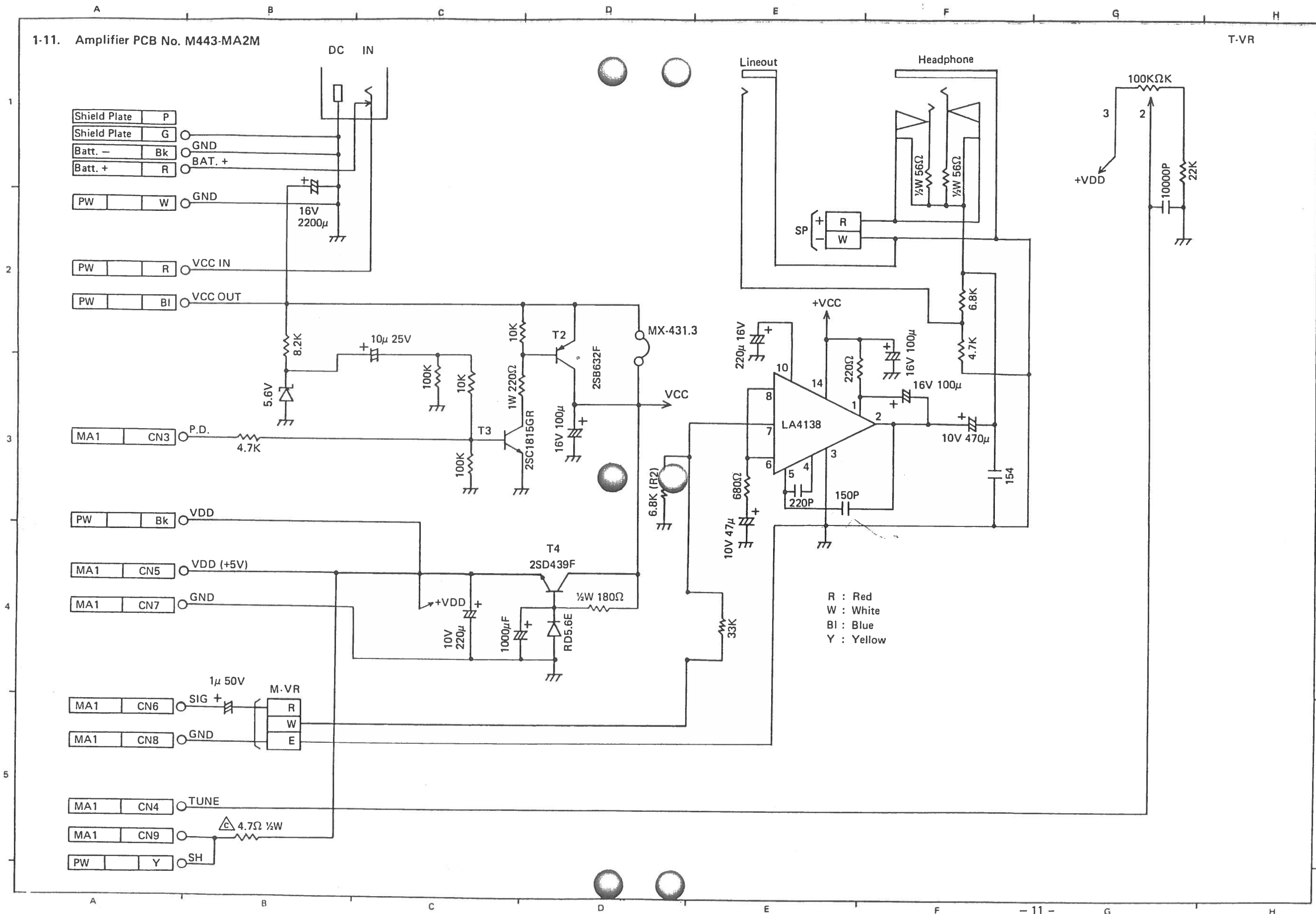
To console (B)

1-10. Console (B) PCB No. M440CN 1M



1-11. Amplifier PCB No. M443-MA2M

T-VR



R : Red
W : White
Bl : Blue
Y : Yellow