

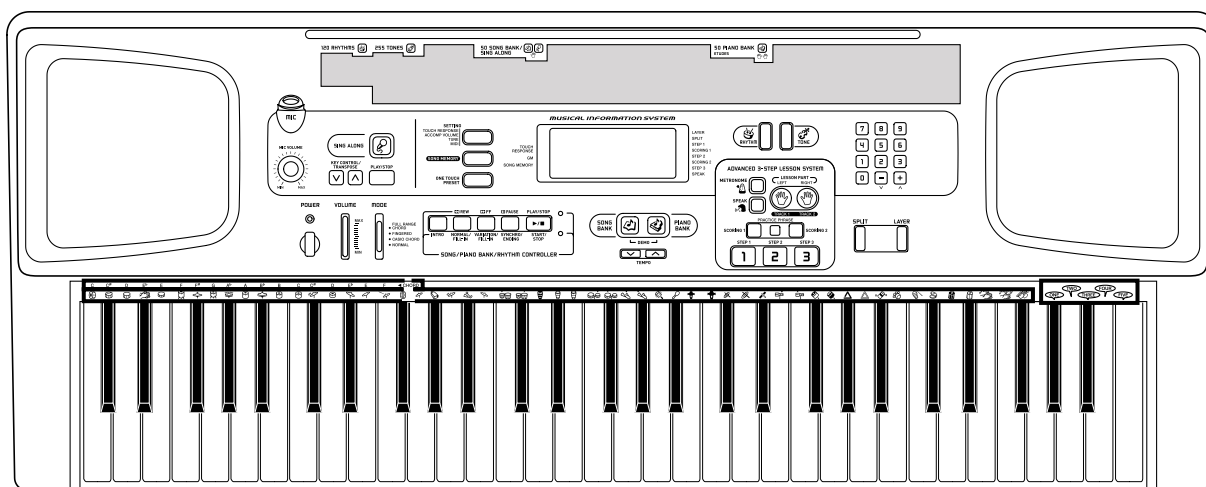
CASIO®

Service Manual

(without price)

CTK-591

APR. 2003



CTK-591

ELECTRONIC KEYBOARD

INDEX

Ver.1 : Dec. 2003

CONTENTS

	Page
Specifications	1
Block Diagram	3
Circuit Description	4
Adjustment	5
Printed Circuit Boards	6
Disassemble/Assemble	8
Diagnostic program	14
Schematic Diagrams	17
Exploded View	22
Parts List	23

SPECIFICATIONS

GENERAL

Keyboard:	61 standard-size keys, 5 octaves (with touch response on/off)
Tones:	255 (118 panel tones + 128 General MIDI tones + 9 drum sets); with layer and split
Rhythm Instrument Tones:	61
Polyphony:	24 notes maximum (12 for certain tones)
Auto Accompaniment	
Rhythm Patterns:	120
Tempo:	Variable (216 steps, = 40 to 255)
Chords:	3 fingering methods (CASIO CHORD, FINGERED, FULL RANGE CHORD)
Rhythm Controller:	START/STOP, INTRO, NORMAL/NORMAL FILL-IN, VARIATION/VARIATION FILL-IN, SYNCHRO/ENDING
Accomp Volume:	0 to 127 (128 steps)
One Touch Presets:	Recalls settings for tone, tempo, layer, split, and accompaniment volume in accordance with rhythm.
<Advanced 3-Step Lesson System>	
3-step Lesson:	3 lessons (Step 1, 2, 3)
Playback:	Repeat play of a single tune
Evaluation Mode:	Scoring 1, Scoring 2, Phrase Practice
Voice Fingering Guide:	On/Off
Song Bank, Piano Bank	
Number of Tunes:	100 (Song Bank/Sing Along: 50, Piano Bank: 50)
Controllers:	PLAY/STOP, PAUSE, FF, REW, LEFT/RIGHT
Musical Information Function:	Tone, Auto Accompaniment, Song Bank, Piano Bank, Sing Along numbers and names; staff notation, tempo, metronome, measure and beat number, step lesson display, chord name, fingering, pedal operation, Keyboard, Song Bank icon, Piano Bank icon, Sing Along icon, Voice Fingering Guide, Evaluation Mode
Sing Along Mode	
Number of Tunes:	Song Bank/Sing Along: 50
Controllers:	PLAY/STOP, KEY CONTROL (25 steps, -12 semitones to +12 semitones)
Metronome:	On/Off
Beat Specification:	1 to 6
Song Memory	
Songs:	2
Recording Tracks:	2
Recording Method:	Real-time
Memory Capacity:	Approximately 5,100 notes (total for two songs)
MIDI:	16 multi-timbre receive, GM Level 1 standard

Other Functions

Transpose: 25 steps (–12 semitones to +12 semitones)
Tuning: 101 steps (A4 = approximately 440Hz ±50Cents)

Terminals

MIDI Terminals: IN, OUT
Assignable Jack: Standard jack (sustain, sostenuto, soft, rhythm start/stop)
Headphone/Output Terminal: Stereo standard jack
Output Impedance: 100Ω
Output Voltage: 4V (RMS) MAX
Microphone In: Standard jack (with microphone volume knob)
Input impedance: 3KΩ
Input sensitivity: 10mV

Power Jack: 9V DC

Power Supply: 2-way

Batteries: 6 D-size batteries

Battery Life: Approximately 6 hours continuous operation on manganese batteries

AC Adaptor: AD-5

Auto Power Off: Turns power off approximately 6 minutes after last key operation.
Enabled under batter power only, can be disabled manually.

Speaker Output: 2.5W + 2.5W

Power Consumption: 9V ≈ 7.7W

Dimensions: 96.0 × 37.5 × 14.5 cm (37 ¹³/₁₆ × 14 ³/₄ × 5 ¹¹/₁₆ inch)

Weight: Approximately 5.3 kg (11.7 lbs)(without batteries)

ELECTRICAL

Current drain with 9 V DC:

No sound output 175 mA ± 20 %

Maximum volume 660 mA ± 20 %

with 12 keys from C1 to G2 pressed in 104 SINE LEAD

Volume: maximum, Velocity: maximum

Speaker output level (Vrms with 4 Ω load each channel):

with key G1 in 104 SINE LEAD

Volume: maximum, Velocity: maximum

L/R: 1400 mV ± 20 %

Phone output level (Vrms with 32 Ω load each channel):

with key, G1 in 104 SINE LEAD

Volume: maximum, Velocity: maximum

L/R: 293 mV ± 20 %

Output level (Vrms with 47 Ω load each channel):

with key G1 in 104 SINE LEAD

Volume: maximum, Velocity: maximum

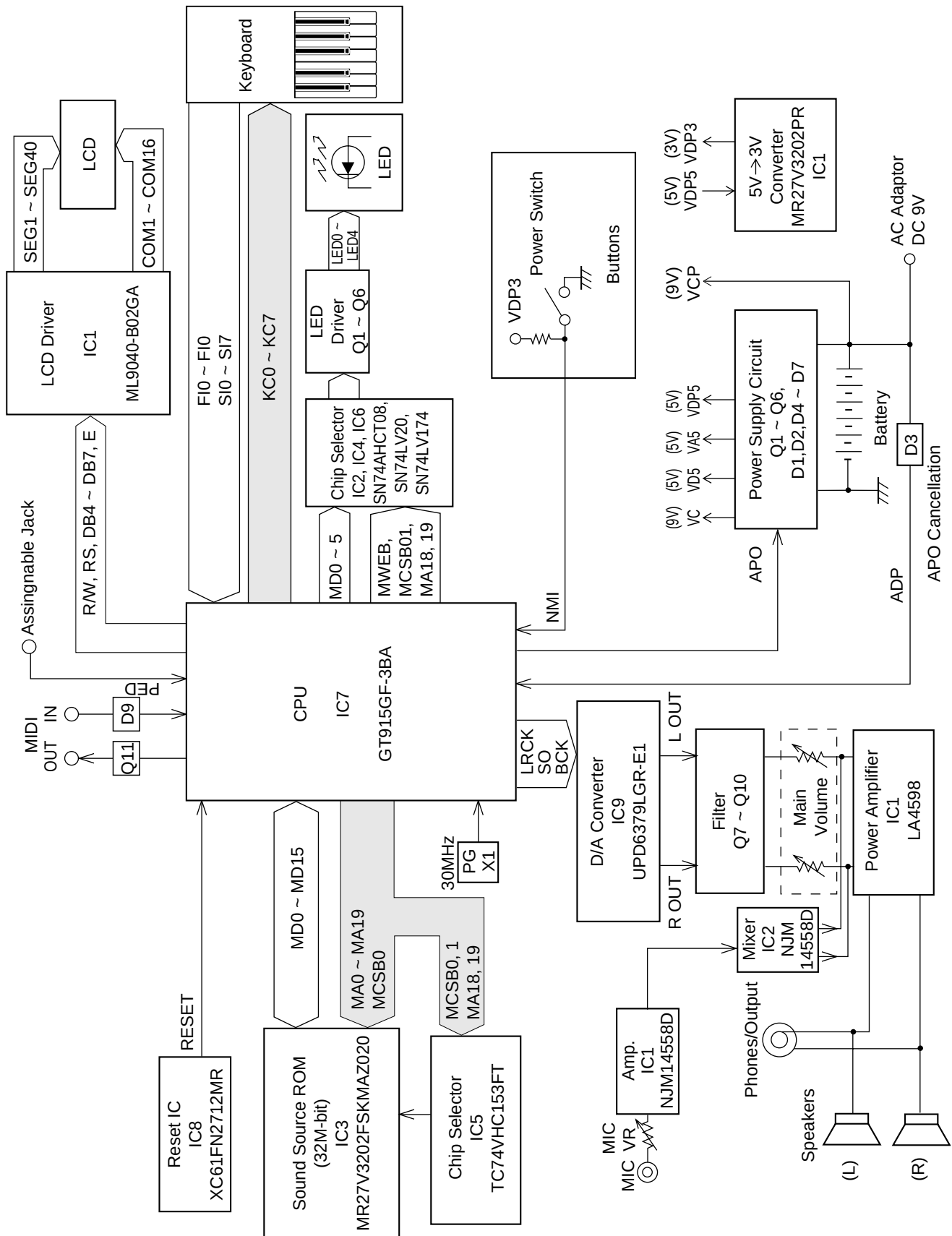
L/R: 1350 mV ± 20 %

About General MIDI

General MIDI standardizes MIDI data for all sound source types, regardless of manufacturer. General MIDI specifies such factors as tone numbering, drum sounds, and available MIDI channels for all sound sources. This standard makes it possible for all MIDI equipment to reproduce the same nuances when playing General MIDI data, regardless of the manufacturer of the sound source.

This keyboard supports General MIDI, so it can be used to play commercially available pre-recorded General MIDI data and General MIDI data send to it from a personal computer.

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

KEY MATRIX

	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7-
FI0	C2 (1)	C#2(1)	D2 (1)	D#2 (1)	E2 (1)	F2 (1)	F#2 (1)	G2 (1)
SI0	C2 (2)	C#2 (2)	D2 (2)	D#2 (2)	E2 (2)	F2 (2)	F#2 (2)	G2 (2)
FI1	G#2 (1)	A2 (1)	A#2 (1)	B2 (1)	C3 (1)	C#3 (1)	D3 (1)	D#3 (1)
SI1	G#2 (2)	A2 (2)	A#2 (2)	B2 (2)	C3 (2)	C#3 (2)	D3 (2)	D#3 (2)
FI2	E3 (1)	F3 (1)	F#3 (1)	G3 (1)	G#3 (1)	A3 (1)	A#3 (1)	B3 (1)
SI2	E3 (2)	F3 (2)	F#3 (2)	G3 (2)	G#3 (2)	A3 (2)	A#3 (2)	B3 (2)
FI3	C4 (1)	C#4 (1)	D4 (1)	D#4 (1)	E4 (1)	F4 (1)	F#4 (1)	G4 (1)
SI3	C4 (2)	C#4 (2)	D4 (2)	D#4 (2)	E4 (2)	F4 (2)	F#4 (2)	G4 (2)
FI4	G#4 (1)	A4 (1)	A#4 (1)	B4 (1)	C5 (1)	C#5 (1)	D5 (1)	D#5 (1)
SI4	G#4 (2)	A4 (2)	A#4 (2)	B4 (2)	C5 (2)	C#5 (2)	D5 (2)	D#5 (2)
FI5	E5 (1)	F5 (1)	F#5 (1)	G5 (1)	G#5 (1)	A5 (1)	A#5 (1)	B5 (1)
SI5	E5 (2)	F5 (2)	F#5 (2)	G5 (2)	G#5 (2)	A5 (2)	A#5 (2)	B5 (2)
FI6	C6 (1)	C#6 (1)	D6 (1)	D#6 (1)	E6 (1)	F6 (1)	F#6 (1)	G6 (1)
SI6	C6 (2)	C#6 (2)	D6 (2)	D#6 (2)	E6 (2)	F6 (2)	F#6 (2)	G6 (2)
FI7	G#6 (1)	A6 (1)	A#6 (1)	B6 (1)	C7 (1)			
SI7	G#6 (2)	A6 (2)	A#6 (2)	B6 (2)	C7 (2)			

BUTTON MATRIX

	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7
KI0	SCORING 1	STEP 2	3	TONE	5	PLAY/ STOP		SYNCHRO/ FILL-IN
KI1	PRACTICE PHRASE	STEP 3	—	7	6	KEY CONTROL /TRANPOSE ▼	KEY CONTROL /TRANPOSE ▲	SING ALONG
KI2	STEP 1	0	+	4	MODE FULL RANGE CHORD	MODE FINGERED	MODE CASIO CHORD	MODE NORMAL
FI8	SCORING 2	SPEAK		METRO- NOME	INTRO	NORMAL /FILL-IN	VAR /FILL-IN	START/STOP
FI9	LAYER	RIGHT /TRACK2	2	RHYTHM	9	SONG MEMORY	OPEN TOUCH PRESET	SETTING
FI10	SPLIT	LEFT /TRACK1	1	SONG BANK	8	TEMPO ▼	TEMPO ▲	PIANO BANK

NOMENCLATURE OF KEYS

NOMENCLATURE OF KEYS																																			
C#2 D#2		F#2 G#2 A#2				C#3 D#3		F#3 G#3 A#3				C#4 D#4		F#4 G#4 A#4		C#5 D#5		F#5 G#5 A#5		C#6 D#6		F#6 G#6 A#6													
C2	D2	E2	F2	G2	A2	B2	C3	D3	E3	F3	G3	A3	B3	C4	D4	E4	F4	G4	A4	B4	C5	D5	E5	F5	G5	A5	B5	C6	D6	E6	F6	G6	A6	B6	C7

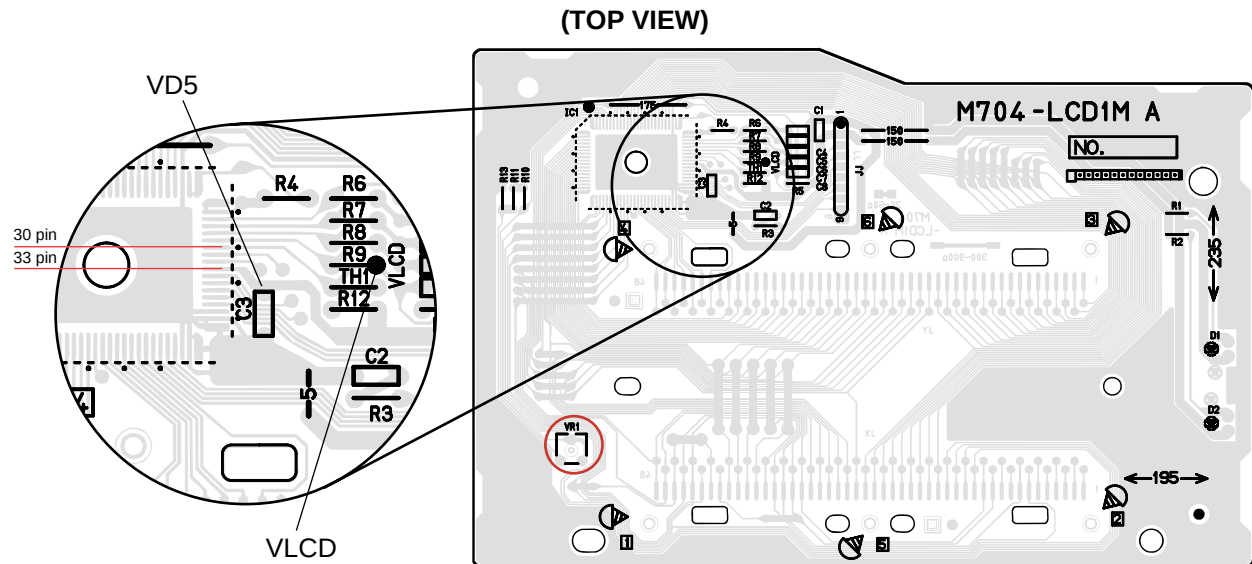
ADJUSTMENT

DISPLAY PCB

1) Items to be adjusted:

Item	Measuring Instrument
Vop voltage setting	Voltmeter

2) Adjustment and Test Point Locations

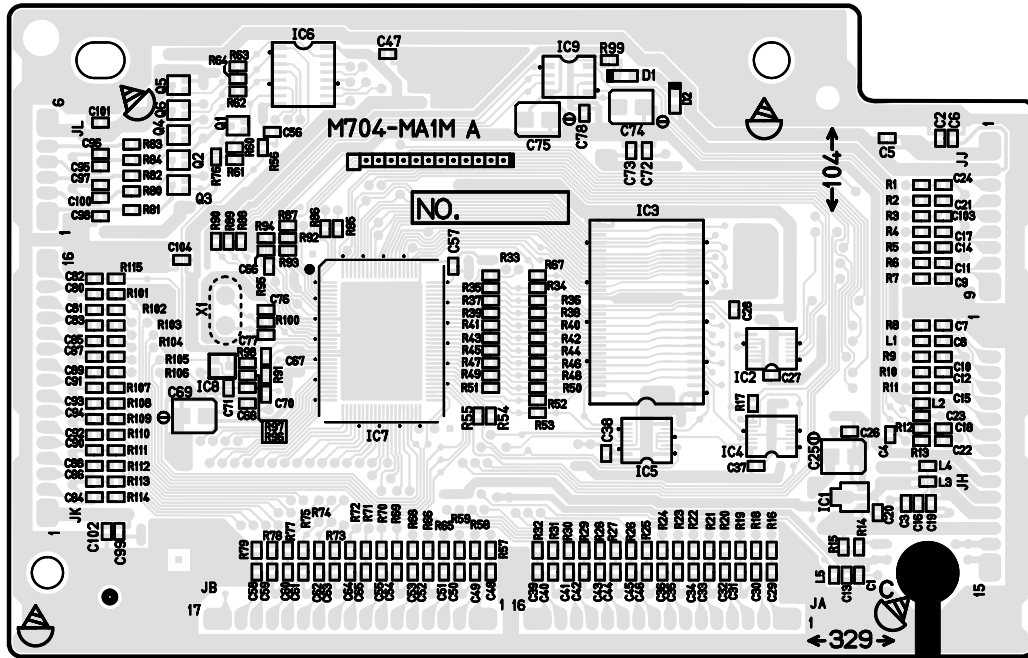


3) Equipment connection/Procedure

Vop voltage setting						
Input Connection	Input Point	Input Signal	Adjust	Output Connection	Output Point	Adjust for
			VR1	Voltmeter	VLCD-VD5	Adjust for 4.2 ~ 4.3 V reading on voltmeter under the temperature 20 ~ 25 °C. Make fine adjustment according to the next instruction.
Watching the LCD at a 34.9° angle to the horizontal, adjust Vop voltage so that unenergized segments are seen dimly.						

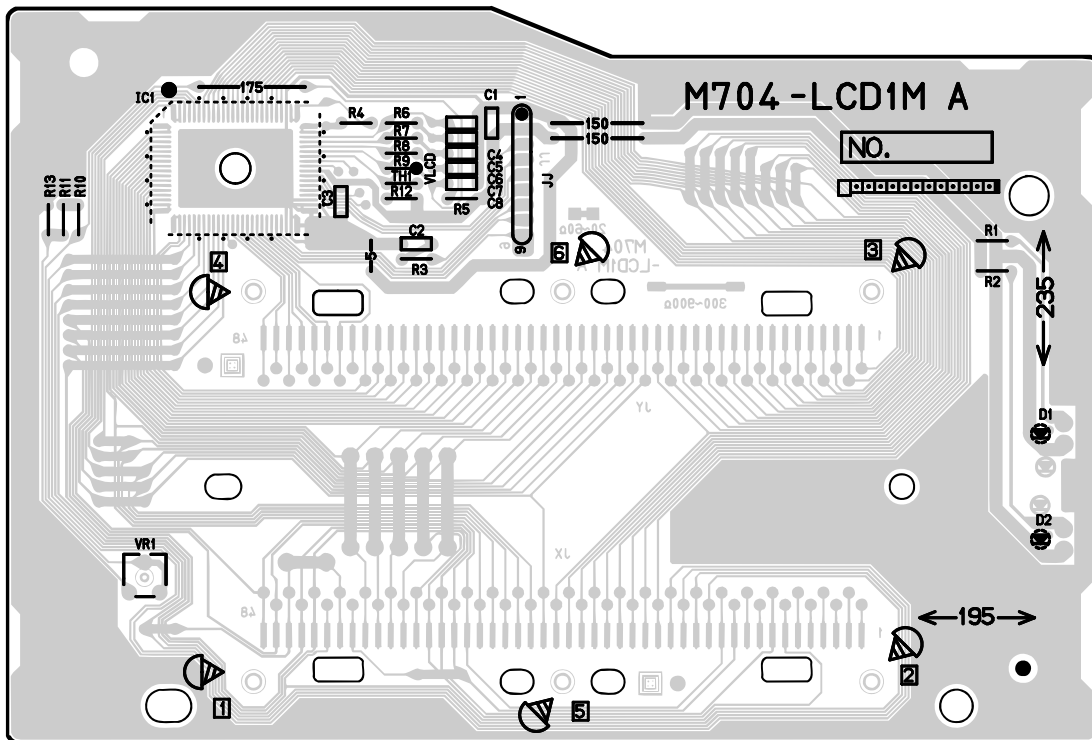
PRINTED CIRCUIT BOARDS

Main PCB M704-MA1M



Top View

LCD PCB M704-LCD1M



Top View

— 7 —

DIAGNOSTIC PROGRAM

■ Initial Setup

- Connect an AC cord.
- Connect a Pedal cord.
- "MODE" switch: NORMAL
- "Main" volume: MAX
- Connect a MIDI cable (In-Out).

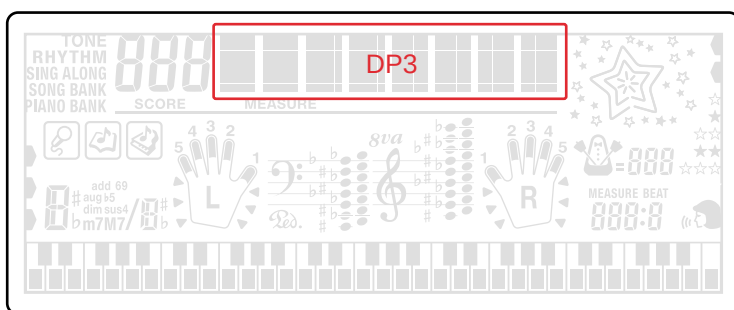
Note: If there is no pedal or MIDI cable, pedal or MIDI check can be skipped.

■ How to start diagnostic program

- While pressing "0" button, turn "POWER" switch ON.
- Confirm "00" message on top of LCD.
- If everything is OK, release "0" buttons.
- As for the details of each diagnostic procedure, refer to the attached sheets.

NOTE:

Refer to the figure below for the LCD messages that appear during the diagnostic program.



■ Diagnostic program

Message on LCD

1. Console check

- ① Press "0" button to enter "Console check".

*Confirmation sound sounds.

DP3: 00

- ② Press buttons in the order from No.1 to No2C.

DP3: BUTTON NO.

NOTE: The button numbers are written in hexadecimal numerals.

Press the "SPLIT" button the last.

DP3: COK

* Confirmation sound sounds.

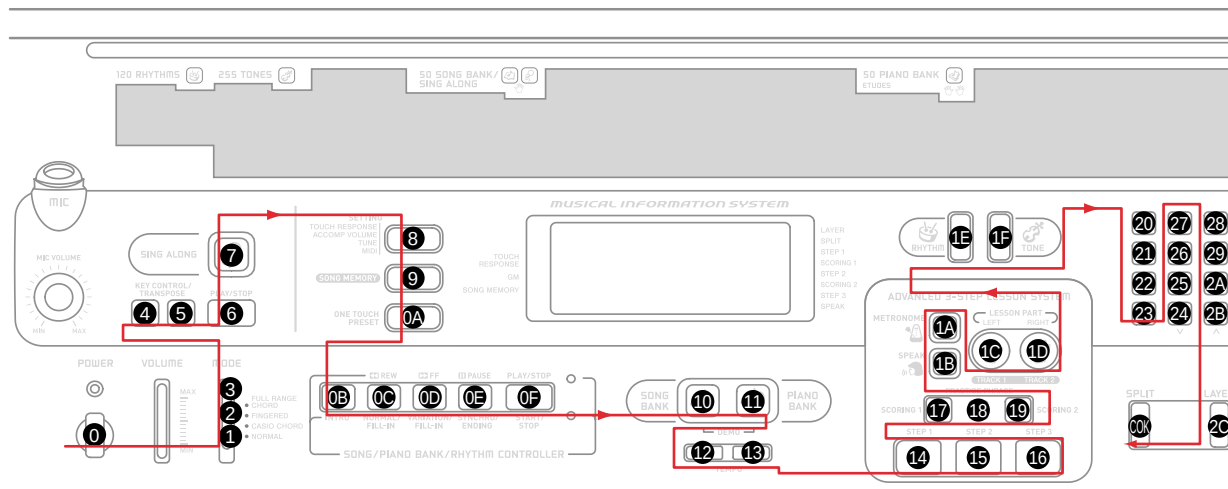
* The Button number appears on the LCD (DP3).

DP3: BUTTON NO.

* A buzzer sounds if buttons are pressed in a wrong order, and "CER" appears on LCD (DP3).

DP3: CER

NOTE: This check cannot be aborted in mid-course.



Message on LCD

2. AC adaptor check

- ① Press "-" button to enter "AC adaptor check".

DP3: JOK

3. Pedal check (If no pedal, this check can be skipped)

- ① Press "1" button to enter "Pedal check".

DP3: TCH

- ② Step on the "SUSTAIN" PEDAL.

DP3: SUS

- ③ Release the "SUSTAIN" PEDAL.

4. ROM check

- ① Press "2" button to enter "ROM check".

DP3: 111

* Confirmation sound sounds.

DP3: OOK

Message on LCD

5. Sound check

- ① Press the "4" button to enter "Sound check". DP3: MIN
 - * When standing in the center, the judge hears the minimum test sound in an equal volume from both right and left speakers.
- ② Press the "5" button. DP3: MID
 - * When standing in the center, the judge hears the medium test sound in an equal volume from both right and left speakers.
- ③ Press the "6" button. DP3: MAX
 - * When standing in the center, the judge hears the maximum test sound in an equal volume from both right and left speakers.
- ④ Press the "7" button. DP3: L
 - * When standing in the center, the judge hears the maximum test sound from the left speaker.
- ⑤ Press the "8" button. DP3: R
 - * When standing in the center, the judge hears the maximum test sound from the right speaker.

6. MIDI check (If there is no MIDI cable, this check can be skipped)

- ① Press "9" button to enter "MIDI check". DP3: DOK

7. LCD check

- ① Press the "STEP1" button to enter "LCD check".
 - * All dots and characters of LCD turn on.
 - * There is no lack of the dot and the character.

8. Corsor LED check

- ① Press the "SPEAK" button to enter "Corsor LED".
 - * Keyboard LED must light in the undermentioned order.
 - 1) PIANO BANK + RHYTHM CONTROLLER
 - 2) SONG BANK + RHYTHM CONTROLLER
 - 3) SING ALONG + RHYTHM CONTROLLER
 - 4) SONG/PIANO BANK CONTROLLER
 - 5) RHYTHM CONTROLLER

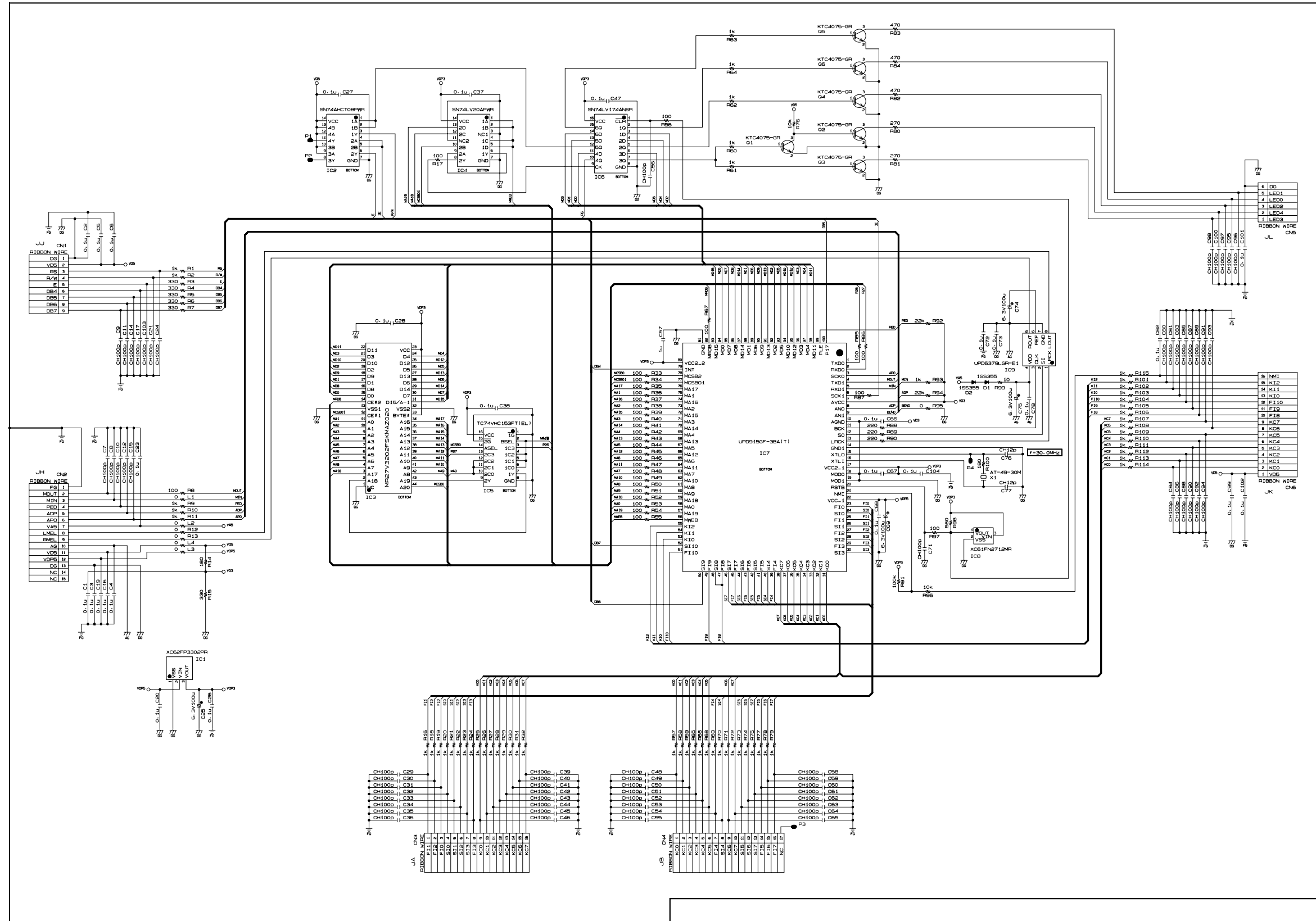
9. APO check

- ① Press the "PRACTICE PHRASE" button.
 - * Go out from TEST mode (Power off).
 - * The LCD turns off.

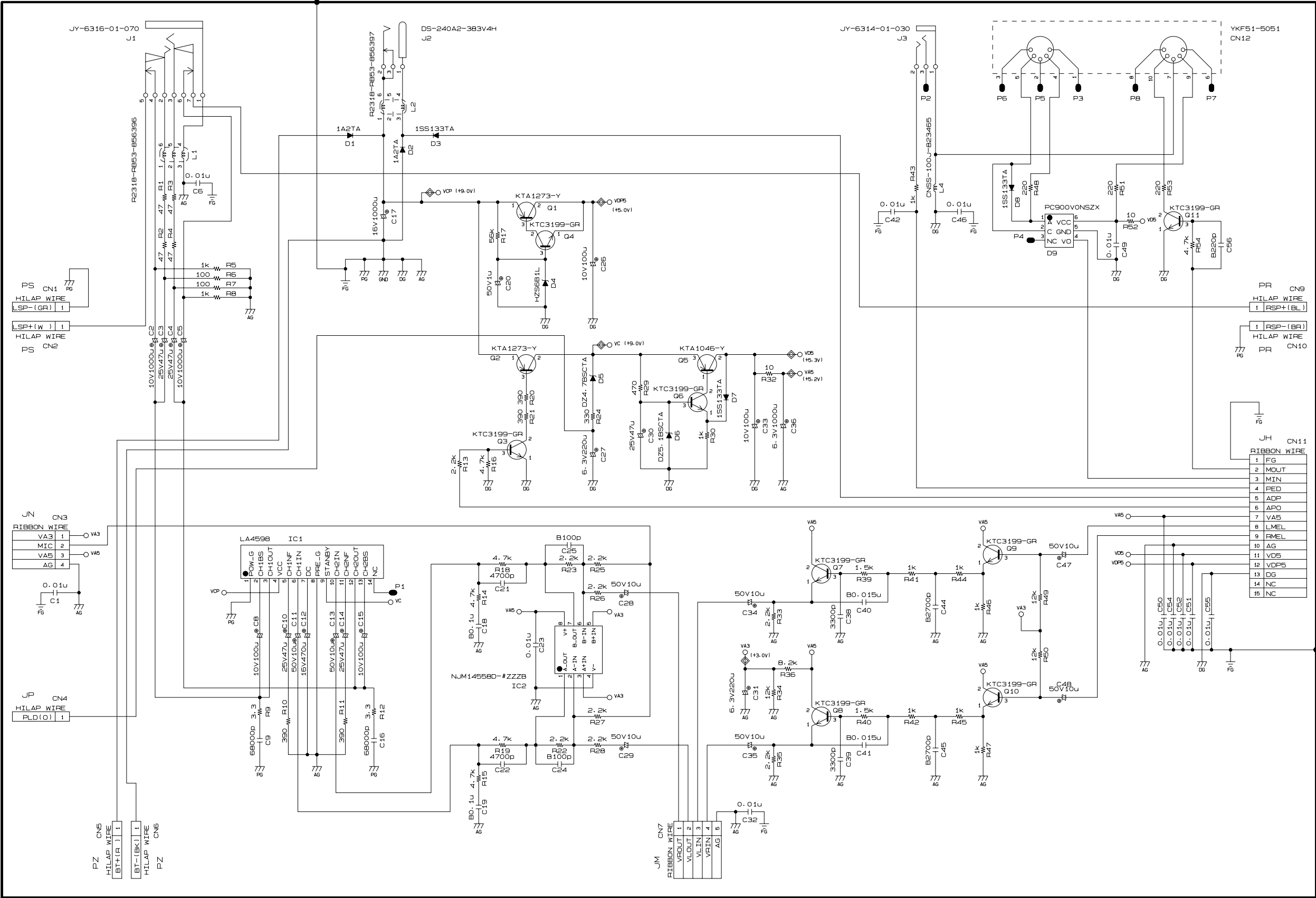
DIAGNOSTIC PROGRAM IS FINISHED.

SCHEMATIC DIAGRAMS

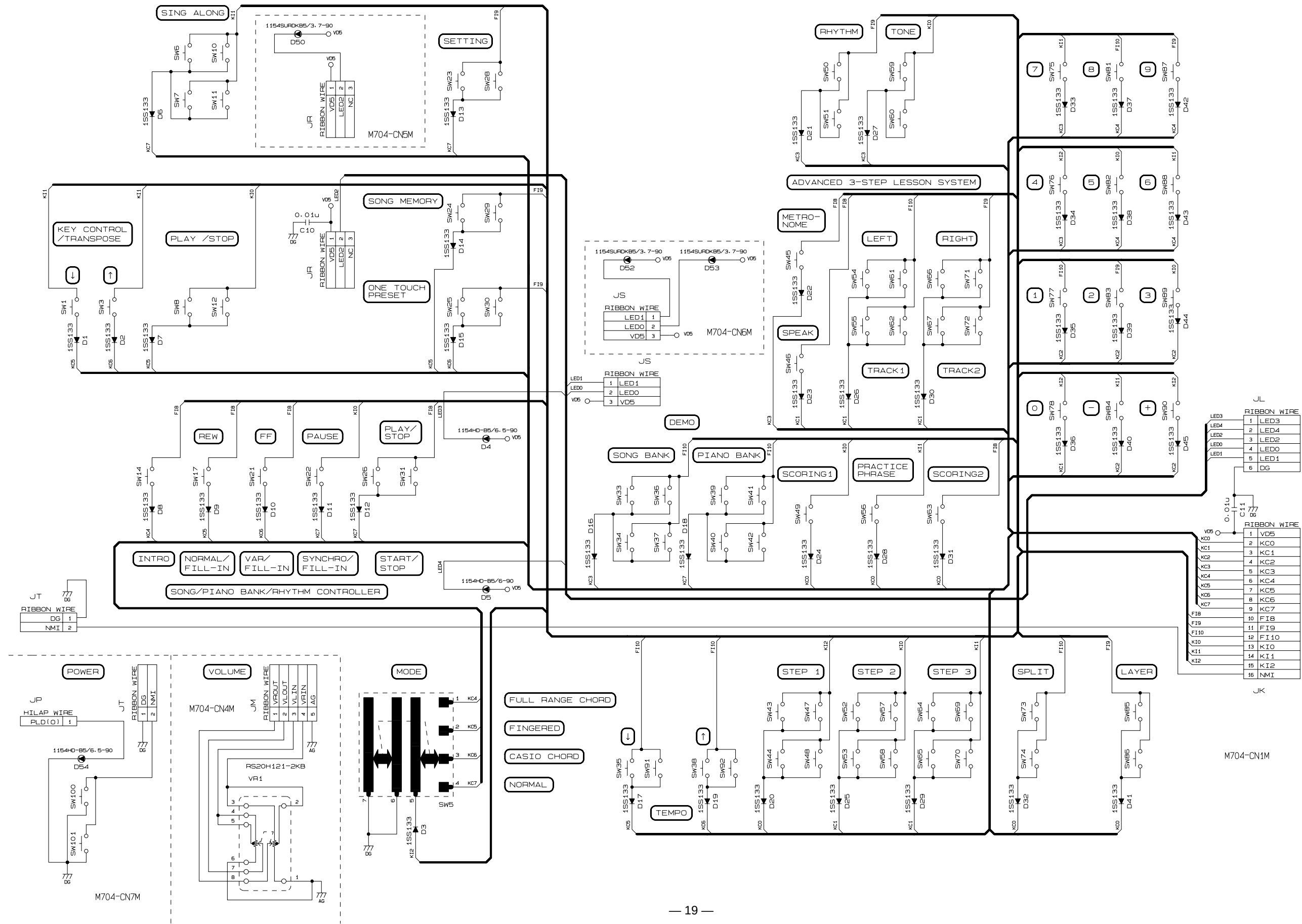
Main PCB M704-MA1M



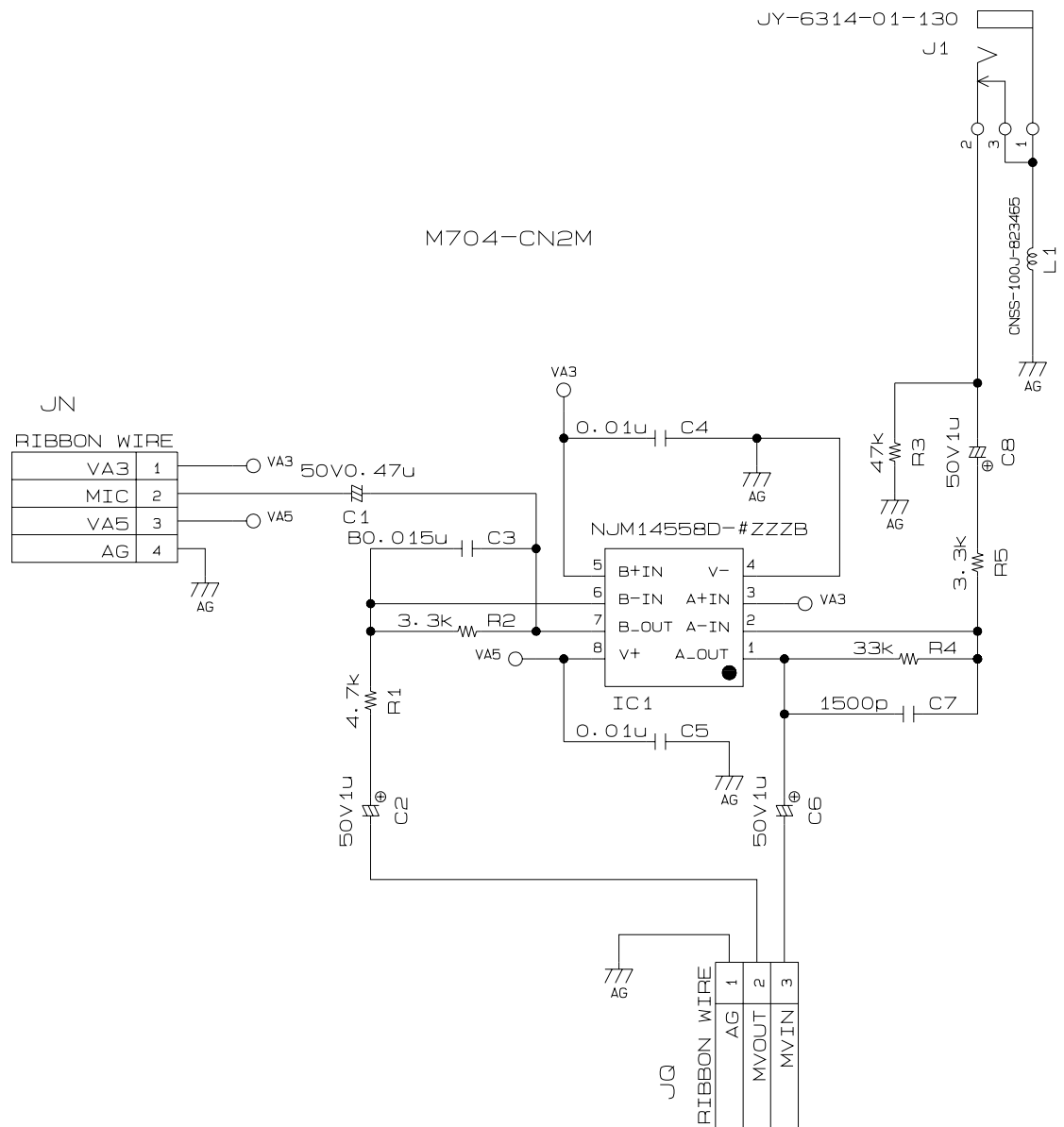
Sub PCB M704-MA2M



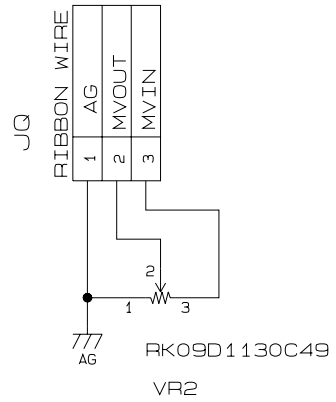
Console PCB M704-CN1M/CN4M/CN5M/CN6M/CN7M



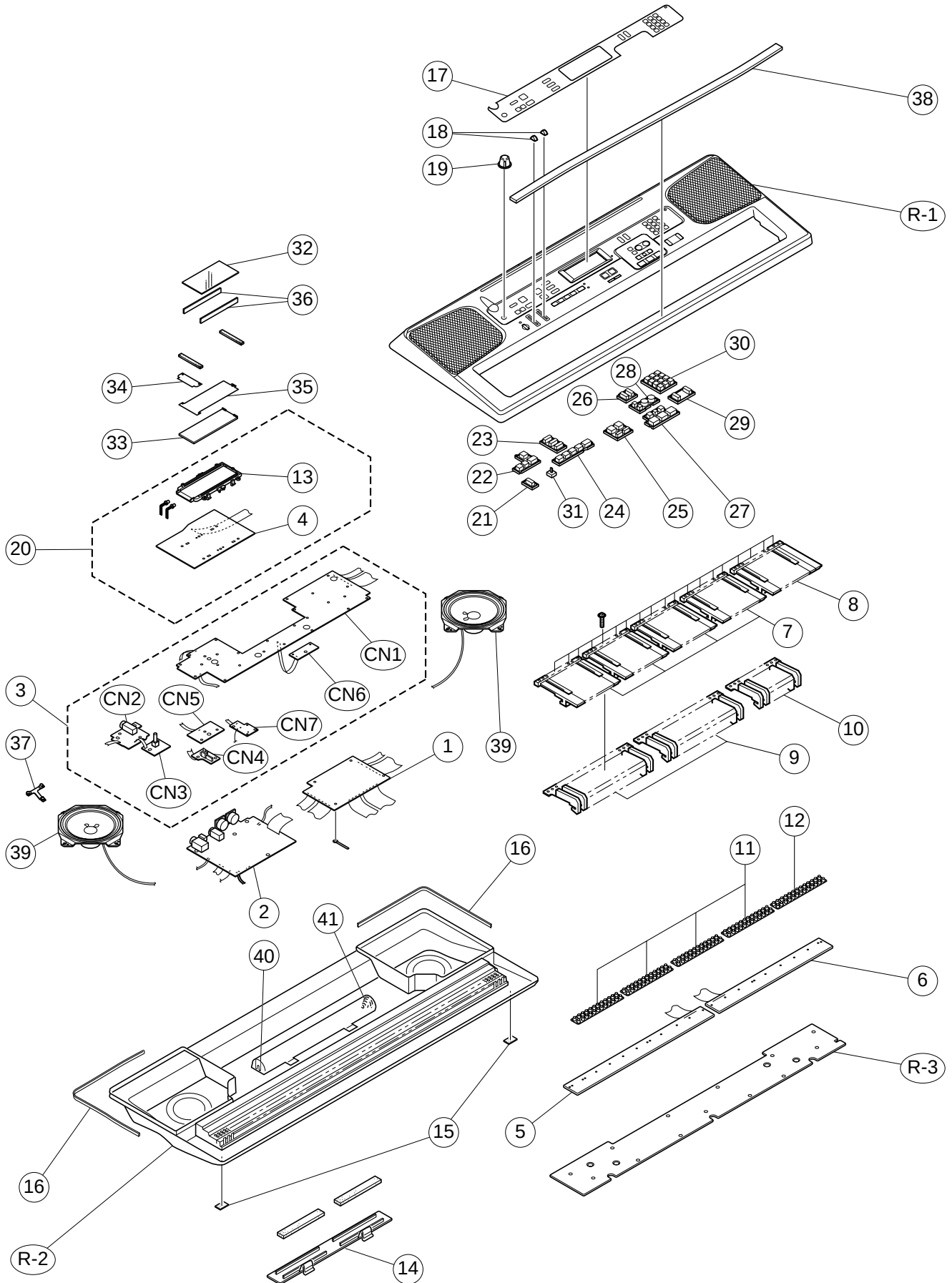
Console PCB M704-CN2M/CN3M



M704-CN3M



EXPLODED VIEW



PARTS LIST

CTK-591

Notes: This parts list does not include the cosmetic parts, which parts are marked with item No. "R-X" in the exploded view.

Contact our spare parts department if you need these parts for refurbish.

1. Prices and specifications are subject to change without prior notice.
2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published separately.
3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Part Name	Specification	Q	Price Code	R	Remarks
Main PCB								
N	1	1011 7066	PCB ASSY/MA1M	TK-RJM502710*001	1	DH	A	
	IC1	2105 6350	IC	XC62FP3302PR	1	AC	C	
	IC2	6930 9981	IC	TC74VHCT08AF (EL)	1	AC	C	
N	IC3	1012 1581	LSI	MR27V3202FSKMAZ020	1	BF	B	
	IC4	1008 9487	IC	SN74LV20APWR	1	AB	C	
	IC5	1011 6471	IC	TC74VHC153FT(EL)	1	AH	C	
	IC6	1011 6470	IC	SN74LV174ANSR	1	AE	C	
	IC7	1007 9244	LSI	UPD915GF-3BA(T)	1	BW	B	
	IC8	1011 6473	IC	XC61FN2712MR	1	AE	C	
N	IC9	2012 5495	LSI	UPD6379LGR-E1	1	AO	B	
	Q1-6	6930 0298	TRANSISTOR	2SC4081T106R	6	AA	C	
	D1-2	2390 1820	DIODE	1SS355TE-17	2	AA	C	
	X1	2590 2742	OSCILLATOR/CRYSTAL	AT-49-30M	1	AG	C	
Sub PCB								
N	2	1011 7067	PCB ASSY/MA2M	TK-RJM502714*001	1	CD	A	
	IC1	2114 2891	IC	LA4598	1	AK	B	
N	IC2	1011 6463	IC	NJM14558D-#ZZZB	1	AB	B	
	Q1-2	2250 1591	TRANSISTOR	2SB1237TV2R	2	AB	C	
	Q3-4, Q6-11	2250 1592	TRANSISTOR	2SC1740STPR	8	AA	C	
	Q5	2251 0672	TRANSISTOR	2SB1548-P.CS	1	AD	C	
	D1-2	2390 3018	DIODE	1T2	2	AA	C	
	D3,D7-8	2315 3132	DIODE	1SS133T-77	3	AA	C	
	D4	2360 1085	DIODE/ZENER	HZS6B1LTD-T	1	AA	C	
	D5	1007 9930	DIODE/ZENER	DZ4.7BSCTA	1	AA	C	
	D6	1004 2160	DIODE/ZENER	MTZJT-775.1C	1	AA	C	
	D9	2114 1421	IC/PHOTO COUPLER	PC900V	1	AK	C	
	CN12	3501 4816	JACK/DIN	YKF51-5051	1	AH	C	
	J1	3612 0665	JACK/PHONE	YKB21-5006	1	AG	C	
	J2	3501 7049	JACK/POWER	HEC2305-01-330	1	AC	C	
	J3	3612 0789	JACK	YKB21-5010	1	AC	C	
N	L1	1005 7360	COIL	R2318-RB53-856396	1	BB	C	
N	L2	1005 6228	COIL	R2318-RB53-856397	1	AB	C	
	L4	3841 2051	COIL	LAN02TA100J	1	AA	C	
Console PCBs								
N	3	1011 7069	PCB ASSY/CN1-7M	TK-RJM502706*001	1	DJ	B	
	IC1	1011 6463	IC	NJM14558D-#ZZZB	1	AB	B	
	D1-3, D6-45	2390 1344	DIODE	1SS133T-77	43	AA	C	
N	D4,D54	1011 6453	LED	1154HD-B5/6.5-90	2	AB	C	
N	D5	1010 6131	LED	1154HD-B5/6-90	1	AA	C	
N	D50,D52, D53	1011 6454	LED	1154SURDKB5/3.7-90	3	AA	C	
	J1	3612 0584	JACK/MIC	JYB21-5012	1	AD	C	
	L1	3841 2051	COIL	LAN02TA100J	1	AA	C	
	VR1	2765 2213	VARIABLE RESISTOR	RS20H121-2KB	1	AD	C	
N	VR2	1012 2622	VARIABLE RESISTOR	RK09D1130C49	1	AE	C	
LCD PCB								
N	4	1011 7070	PCB ASSY/LCD1M	TK-RJM502703*001	1	CA	B	
	IC1	1000 6502	LSI	ML9040-B02GA	1	AU	B	
	VR1	2775 0994	VARIABLE RESISTOR	EVN-D8AA03B53	1	AA	C	

Notes: **Q**-Quantity used per unit
R-Rank

R- A:Essential
B:Stock recommended
C:Others
X:No stock recommended

N	Item	Code No.	Part Name	Specification	Q	Price Code	R	Remarks
Keyboard PCBs								
	5	1005 3891	PCB ASSY/KY1M	M140687*9	1	BK	B	
	D501 - D564	2301 0101	DIODE	1S2473T-77-T	64	AA	C	
	6	1005 3893	PCB ASSY/KY2M	M140688*9	1	BJ	B	
	D565 - D622	2301 0101	DIODE	1S2473T-77-T	58	AA	C	
Keyboard Unit								
	7	6922 2720	KEY SET/LT WHITE	M312118*1	4	AP	B	
	8	6922 2730	KEY SET/LT WHITE	M312118*2	1	AR	B	
	9	6906 8481	KEY SET/LT BLACK 10P	M140369A-3	2	AS	B	
	10	6906 8591	KEY SET/LT BLACK 5P	M140369A-4	1	AF	B	
	11	6922 2762	RUBBER/CONTACT	M211704B-1	4	AF	C	
	12	6922 2772	RUBBER/CONTACT	M211705B-1	1	AF	C	
Panel Unit								
N	13	1011 6367	REFLECTOR	RJM502392-001V01	1	AC	C	
	14	6930 6970	COVER/BATTERY	M341235*3	1	AT	C	
	15	6927 3030	PACKING/10-20	M440775-1	2	AA	X	
	16	6926 6110	PACKING/7-390	M440621-1	2	AB	X	
N	17	1011 1047	PLATE/DISPLAY	RJM502393-001V01	1	AV	C	
	18	9482 7783	KNOB	M311859-1	2	AA	C	
N	19	1011 6368	KNOB/ROTARY	RJM502394-001V01	1	AA	C	
N	20	1012 0178	BL ASSY	TK-RJM502636*001	1	CY	B	
N	21	1011 1049	RUBBER/KEY/A	RJM502382-001V01	1	AA	C	
N	22	1011 1050	RUBBER/KEY/B	RJM502383-001V01	1	AE	C	
N	23	1011 1051	RUBBER/KEY/C	RJM502384-001V01	1	AB	C	
N	24	1011 1021	RUBBER/KEY/D	RJM502385-001V01	1	AD	C	
N	25	1011 1022	RUBBER/KEY/E	RJM502386-001V01	1	AC	C	
N	26	1011 1023	RUBBER/KEY/F	RJM502387-001V01	1	AA	C	
N	27	1011 1024	RUBBER/KEY/G	RJM502388-001V01	1	AE	C	
N	28	1011 1025	RUBBER/KEY/H	RJM502389-001V01	1	AC	C	
N	29	1011 1026	RUBBER/KEY/J	RJM502390-001V01	1	AA	C	
N	30	1011 1027	RUBBER/KEY/K	RJM502391-001V01	1	AE	C	
	31	6927 0510	SWITCH/SLIDE KNOB	CSB-08D	1	AD	C	
N	32	1011 6352	LCD	CG1930-TTP	1	BD	B	
N	33	1011 6369	PLATE/BACK LIGHT	RJM502395-001V01	1	AJ	C	
	34	1008 1190	PIECE/TOP	RJM501982-001V01	1	AA	C	
	35	1008 1189	FILM	RJM501963-001V01	1	AA	C	
N	36	1011 1048	CONNECTOR	RJM502397-001V01	2	AE	C	
N	37	1011 6370	SPACER/PCB	RJM502396-001V01	1	AA	C	
	38	6922 4480	DUMPER/KEY	M412324-1	1	AE	C	
N	39	1009 8332	SPEAKER	S12JA04A	2	AT	B	
	40	6903 2150	SPRING/BATTERY(+)	M41330-1	1	AA	X	
	41	6902 6141	SPRING/BATTERY(-)	M41226A-1	1	AB	X	
Accessory								
N		1010 7083	STAND/MUSIC	M141071-5	1	AW	X	
Refurbish								
N	R-1	1011 7068	PANEL SUB ASSY	TK-RJM502635*001	1	CX	X	
	R-2	1008 6645	CASE SUB ASSY/M	M141274*008	1	CK	X	
	R-3	6906 9252	PLATE / BOTTOM	M240573-2	1	AS	X	

Notes: Q-Quantity used per unit

R-Rank

R- A:Essential

B:Stock recommended

C:Others

X:No stock recommended