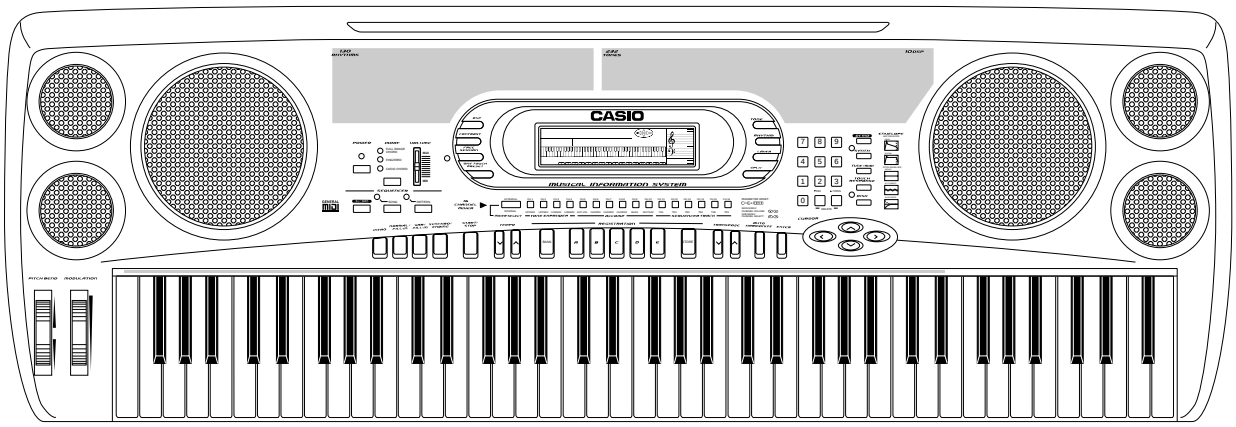
CASIO®

Service Manual

(without price)

WK-1800

MAY.2000



WK-1800

HIGH-GRADE KEYBOARD

INDEX

Ver.1 : Apr. 2007

CONTENTS

Specifications ---------- 2

Important Operation ---------- 4

Block Diagram ---------- 5

Circuit Description ---------- 6

Diagnostic Program ---------- 22

Major Waveformes ---------- 28

Printed Circuit Board ---------- 29

Exploded View ---------- 34

Parts List ---------- 35

Schematic Diagrams ---------- 38

SPECIFICATIONS

GENERAL

Keyboard:	76 standard-size keys, 6 octaves (with touch response on/off; ExLight/Light/Normal/Heavy touch)
Tones:	232 (128 General MIDI, 64 variation, 8 drum, 32 user); with layer and split
Rhythm instrument tones:	53
Polyphony:	32 notes maximum (16 for certain tones)
Digital effects:	10 (REVERB 1, 2, 3; CHORUS; TREMOLO; PHASE SHIFTER; ORGAN SPEAKER; ENHANCER; FLANGER; EQ LOUDNESS)
Auto accompaniment	
Rhythm patterns:	130 (120 + 10 user rhythms)
Tempo:	Variable (226 steps, ♩ = 30 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, and Auto Harmonize in accordance with rhythm.
Auto harmonize:	Automatic addition of notes that harmonize with melody note in accordance with specified Auto Accompaniment chords.
Free session	
Number of patterns:	120 (Auto Accompaniment function based on preset chord progressions.)
Song sequencer	
Songs:	2
Recording tracks:	6 (2 through 6 are melody tracks)
Recording method:	Real-time
Memory capacity (total for two songs):	Approximately 8,000 notes
Punch in:	Supported
Pattern sequencer	
Number of patterns:	10 (Rhythm numbers 120 to 129)
Memory capacity:	Approximately 6,800 notes
Elements:	Intro, Normal, Variation, Normal Fill-In, Variation Fill-In, Ending
Parts:	Chord 1, 2, 3; Bass; Rhythm
Recording method:	Real-time
Registration memory	
Number of setups:	20 (5 setups × 4 banks)
Memory contents:	Tone, Rhythm, Tempo, Split on/off, Split point, Layer on/off, Auto Harmonize on/off, Mixer settings, Keyboard channel on/off, DSP (digital effect) on/off, DSP (digital effect) settings, Accompaniment mode, Touch Response settings, Assignable jack setting, Transpose, Tuning, Pitch Bend range, Sound range shift on/off
Demo tunes:	2
Synthesizer	
Parameters:	PCM set, amp envelope set, attack rate, release rate, pitch envelope set, pitch, level, touch sensitivity, pan, filter sensitivity, filter level, transpose
Mixer	
Channels:	32(Internal 16, External 16)
Modes:	Internal, External, External/Solo, External/Play
Parameters:	Program change number, volume, expression, pan, coarse tuning, fine tuning, Effect Send
MIDI:	16-channel multi-timbre receive, General MIDI Level 1

Other functions

Pitch bend range:	Adjustable (12 semitones upwards and downwards)
Modulation:	Equipped
Transpose:	25 steps (–12 semitones to +12 semitones)
Tuning:	Adjustable (A4 = approximately 440Hz ± 50 cents)

Terminals

MIDI terminal:	IN, OUT
Sustain/Assignable jack:	Standard jack (sustain, sostenuto, soft, rhythm start/stop)
Line out	L(MONO)/R Output Impedance: 3 kΩ Output Voltage: 1.5 V (RMS) MAX
Headphones	Stereo standard jack Output Impedance: 200 Ω Output Voltage: 220 mV (RMS) MAX 12 V DC

Floppy disk drive

Type:	3.5" FDD
Formats:	2DD (720KB MS-DOS format) 2HD (1.44MB MS-DOS format)
Functions:	Save and load of user tones, user rhythms, sequencer, and registration data; playback of SMF; disk formatting; file delete; accompaniment pattern style conversion

Power supply:	Dual power supply system
Batteries	Six D-size batteries
Battery life	Approximately 2 hours continuous operation on alkaline batteries
AC adapter:	AD-12
Auto power off:	Turns power off approximately six minutes after last key operation. Enabled under battery power only, can be disabled manually.
Speaker output:	5 W + 5 W
Power consumption:	12 V ⎓ 18 W
Dimensions:	122.5 × 42.3 × 16.7 cm (48 1/4 × 16 11/16 × 6 9/16 inch)
Weight (without batteries):	Approximately 9.8 kg (21.6 lbs)
Standard accessories:	Music Stand; Pattern Conversion Disk

ELECTRICAL

Current drain with 12 V DC:

No sound output		480 mA ± 20 %
Maximum volume with 24 keys from C3 to B4 pressed in Synth-Bass 4 tone Volume: MAX., Velocity: MAX. DSP0: Reverb1		1765 mA ± 20 %

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

with tone Synth-Bass 4 tone	L-ch (Key C3)	590 mV ± 20 %
Volume: MAX., Velocity: MAX.	R-ch (Key F3)	590 mV ± 20 %
DSP0: Reverb1		

Speaker output level (Vrms with 8 Ω load each channel):

with tone Synth-Bass 4 tone	L-ch (Key C3)	7900 mV ± 20 %
Volume: MAX., Velocity: MAX.	R-ch (Key F3)	7350 mV ± 20 %
DSP0: Reverb1		

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

with tone Synth-Bass 4 tone	L-ch (Key C3)	605 mV ± 20 %
Volume: MAX., Velocity: MAX.	R-ch (Key F3)	510 mV ± 20 %
DSP0: Reverb1		

Minimum operating voltage: 6.1 V

IMPORTANT OPERATION

Full Initialization
Use this procedure to return all keyboard settings to what they were when you purchased it. Note that this procedure clears all data from memory.

- While holding down the ENTER button, turn on keyboard power.

- Press YES to initialize the keyboard or NO to turn on power without changing any settings.

Parameter Initialization
Use this procedure to return all keyboard settings to what they were when you purchased it. Note that this procedure does not affect user tones, user rhythms, registration memory contents, and display contrast settings.

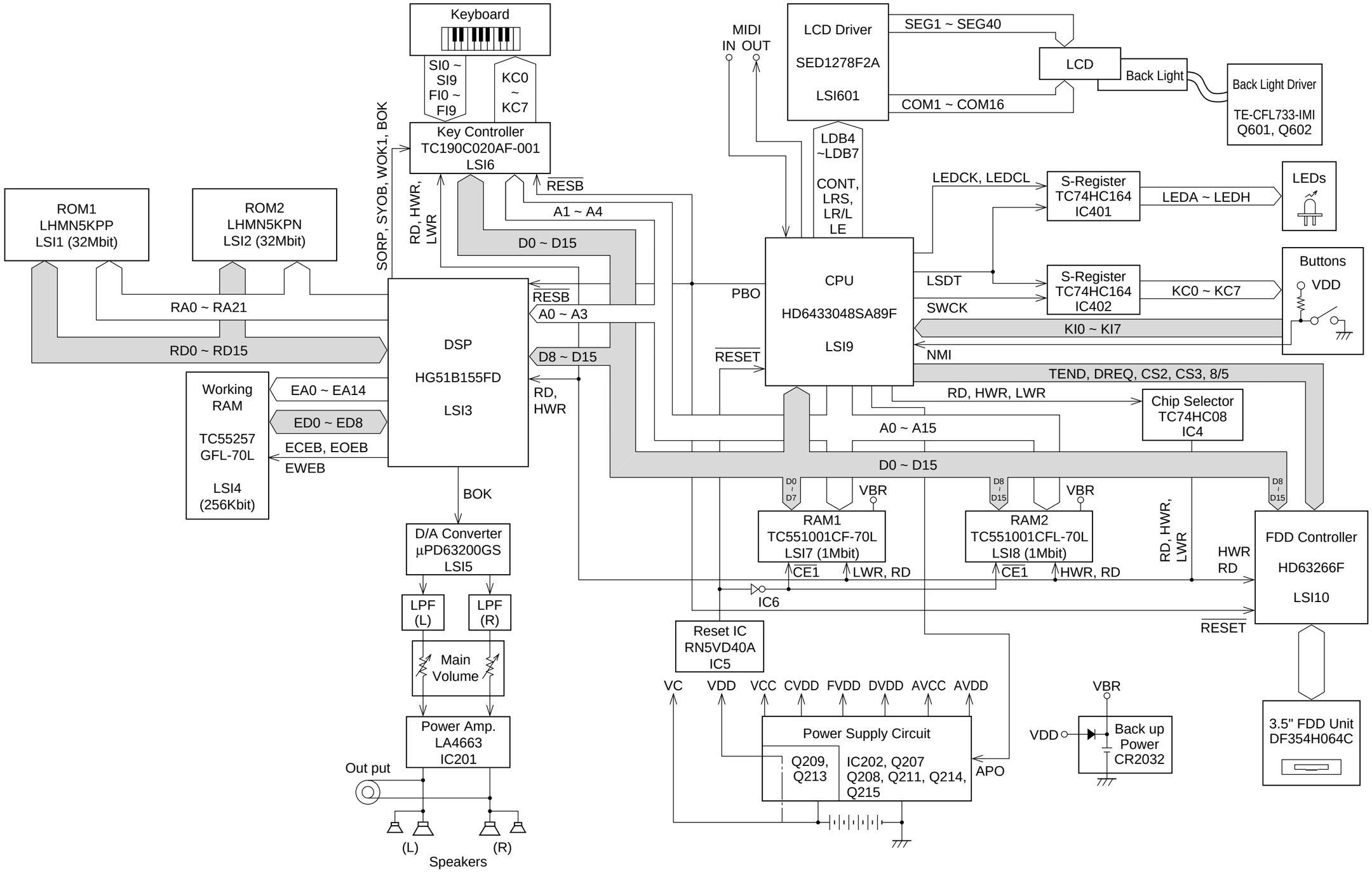
- While keyboard power is on, press the [+], [–], and ENTER buttons at the same time.

Adjusting Display Contrast
- Display contrast can be adjust to one of 100 levels for easy viewing.
- Adjusting display contrast helps to make figures easier to read from any viewing angle.
- Within five seconds after pressing the CONTRAST button, press [+] to increase the contrast value (making the display darker) or [–] to decrease it (making the display lighter).
- After you release CONTRAST, the message “Contrast” remains on the display for a few moments, during which you can change the contrast setting further using [+] and [–] or by inputting a contrast value with the number keys.
  The contrast can be set to a value from 0 to 99. The initial default setting is 50.

GM (General MIDI):
General MIDI standardizes MIDI data to play music with same nuance between different MIDI instruments. Among GM conformed MIDI instruments, or commercially available musical data, music can be played with similar tones.

SMF (Standard MIDI File):
SMF is a standard file format for MIDI instruments and computer music software. SMF formatted data can be played and transported easily among SMF complied instruments or musical data of different manufacturers.

BLOCK DIAGRAM

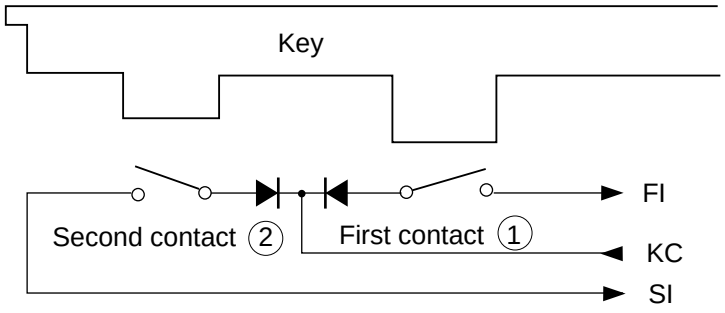


CIRCUIT DESCRIPTION

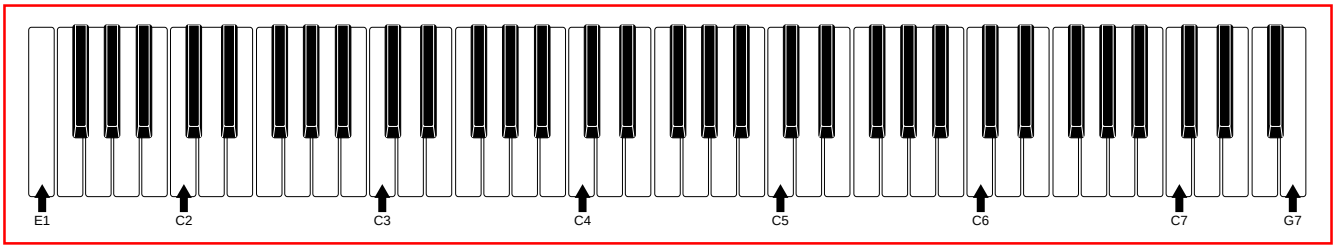
KEY MATRIX

	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7
FI0		E1①	F1①	F#1①	G1①	G#1①	A1①	A#1①
SI0		E1②	F1②	F#1②	G1②	G#1②	A1②	A#1②
FI1	B1①	C2①	C#2①	D2①	D#2①	E2①	F2①	F#2①
SI1	B1②	C2②	C#2②	D2②	D#2②	E2②	F2②	F#2②
FI2	G2①	G#2①	A2①	A#2①	B2①	C3①	C#3①	D3①
SI2	G2②	G#2②	A2②	A#2②	B2②	C3②	C#3②	D3②
FI3	D#3①	E3①	F3①	F#3①	G3①	G#3①	A3①	A#3①
SI3	D#3②	E3②	F3②	F#3②	G3②	G#3②	A3②	A#3②
FI4	B3①	C4①	C#4①	D4①	D#4①	E4①	F4①	F#4①
SI4	B3②	C4②	C#4②	D4②	D#4②	E4②	F4②	F#4②
FI5	G4①	G#4①	A4①	A#4①	B4①	C5①	C#5①	D5①
SI5	G4②	G#4②	A4②	A#4②	B4②	C5②	C#5②	D5②
FI6	D#5①	E5①	F5①	F#5①	G5①	G#5①	A5①	A#5①
SI6	D#5②	E5②	F5②	F#5②	G5②	G#5②	A5②	A#5②
FI7	B5①	C6①	C#6①	D6①	D#6①	E6①	F6①	F#6①
SI7	B5②	C6②	C#6②	D6②	D#6②	E6②	F6②	F#6②
FI8	G6①	G#6①	A6①	A#6①	B6①	C7①	C#7①	D7①
SI8	G6②	G#6②	A6②	A#6②	B6②	C7②	C#7②	D7②
FI9	D#7①	E7①	F7①	F#7①	G7①			
SI9	D#7②	E7②	F7②	F#7②	G7②			

Note: Each key has two contacts, the first conatct ① and second contact ②.



NOMENCLATURE OF KEYS



BUTTON MATRIX

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7	KI8
KC0	MODE	INTRO	MIXER SELECT	CHORD3 CH8	A	TR6 CH16	SPLIT	▼/NO —	DEMO
KC1	RECORD	NORMAL/ FILL-IN	UPPER1 CH1	BASS CH9	B	AUTO HARMONIZE	LAYER	2	SYNTH
KC2	SONG	VARIATION/ FILL-IN	UPPER2 CH2	RHYTHM CH10	C	ENTER	RHYTHM	5	TUNE/ MIDI
KC3	PATTERN	SYNCHRO/ ENDING	LOWER1 CH3	TR1 CH11	D	▲	TONE	8	TOUCH RESPONSE
KC4	DSP	START/ STOP	LOWER2 CH4	TR2 CH12	E	►	0	▲/YES +	
KC5	CON- TRAST	TEMPO ▼	ACC VOL CH5	TR3 CH13	STORE	◄	1	3	
KC6	FREE SESSION	TEMPO ▲	CHORD1 CH6	TR4 CH14	TRANSPOSE ▼	▼	4	6	
KC7	ONE TOUCH PRESET	BANK	CHORD2 CH7	TR5 CH15	TRANSPOSE ▲	DISK	7	9	

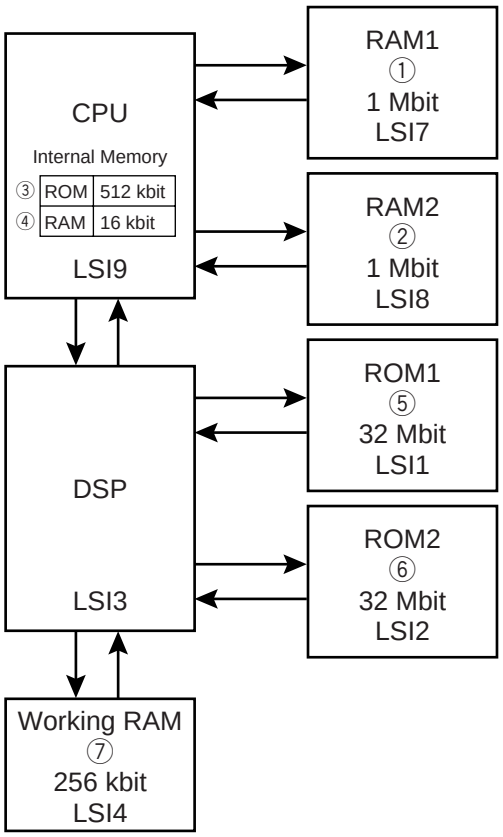
PWSW	POWER

LED MATRIX

LED-A	LED-B	LED-C
FULL RANGE CHORD	FINGERD	CASIO CHORD

MEMORY DEVICES

Each memory device has the following data.



① RAM1 :
S-RAM for operation program, Register, Pattern, Song and SMF data from FDD. (Lower part of data bus)

② RAM2 :
S-RAM for operation program, Register, Pattern, Song and SMF data from FDD. (Upper part of data bus)

③ Internal ROM of CPU :
Main program data for system operation

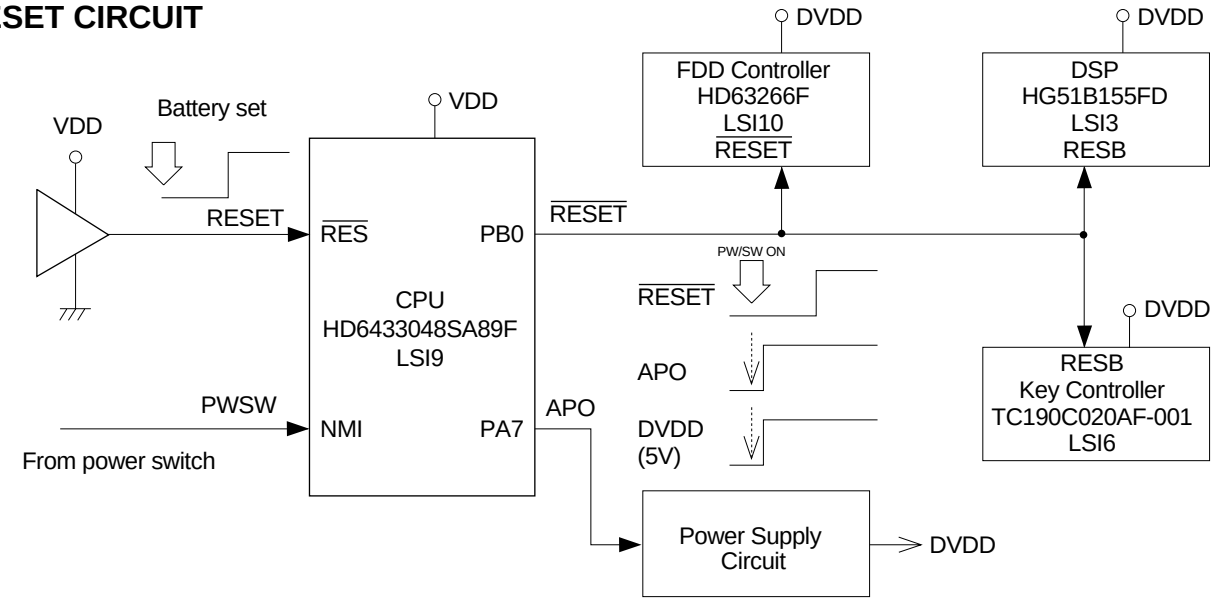
④ Internal RAM of CPU :
Work area for system operation

⑤ ROM1 :
Demo, Accompaniment data, Song, Pattern, Synth, Disk mode

⑥ ROM2 :
Sound Waveforms/Tone data Digital sound effect

⑦ Working RAM :
Work area for DSP

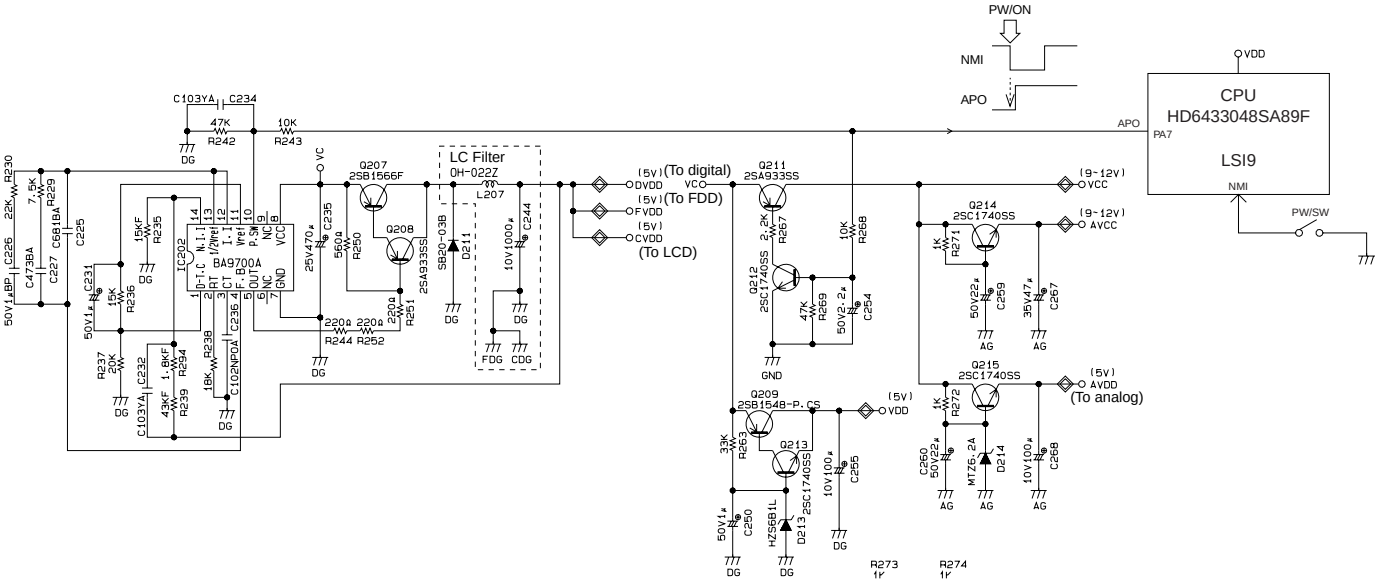
RESET CIRCUIT



Initial reset
When batteries are set or an AC adapter is connected, the reset IC provides a low pulse to the CPU. When the power switch is pressed, the CPU receives a low pulse of POWER signal. The CPU first raises APO signal to +5 V to generate DVDD voltage, then raises RESET signal to +5 V. During this period the DSP, the key controller and FDD controller LSIs initialize their internal circuits.

POWER SUPPLY CIRCUIT

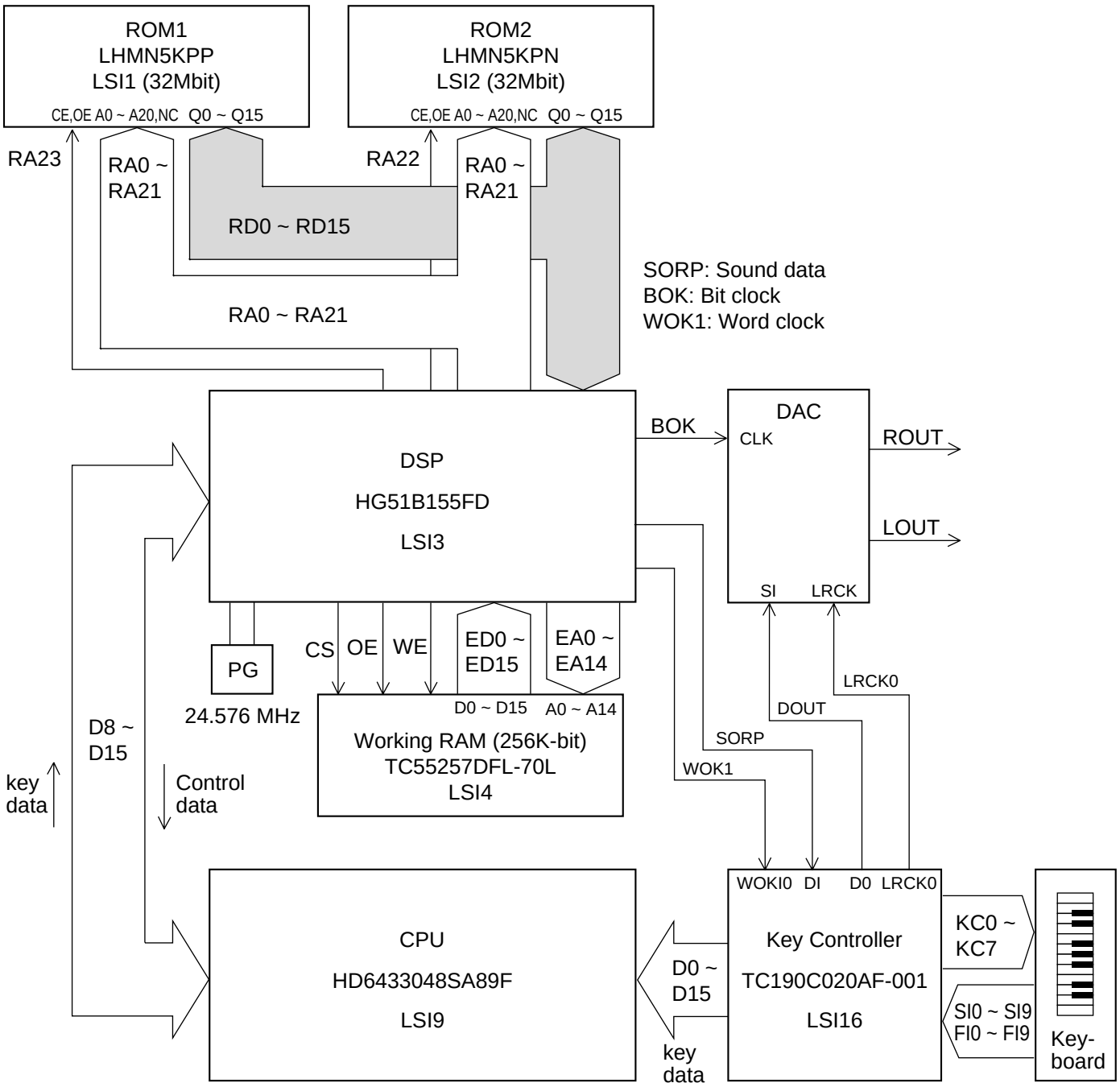
The power supply circuit provides various voltages as shown below.
The voltage VDD (+5 V) is provided as long as batteries or AC adaptor is set.
Other voltages are controlled by APO (Auto Power Off) signal from CPU.



The regulator IC BA9700A generates square waveform from pin 5 as PWM (Pulse Wide Modulation).
The LC filter makes stable output voltage (+5 V) for each circuit as shown above.

DSP and DAC CIRCUIT

The DSP (Digital Signal Processor) and DAC (Digital Analog Converter) consists of the following circuits.

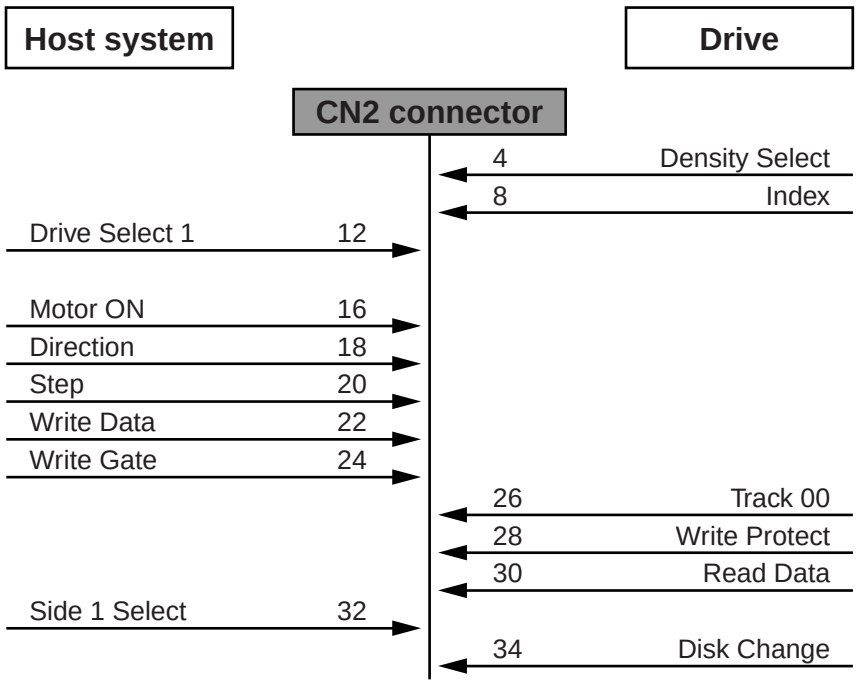


FDD UNIT (DF354H064C)

FDD Specifications:

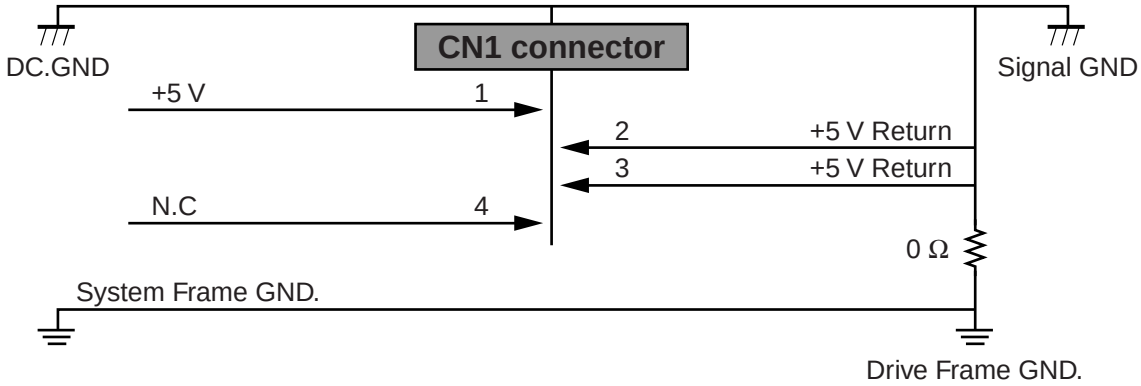
① Memory Capacity (under un-format) : 1.6 MByte
② Density of track : 5.33 track/mm (135 TPI)
③ Number of track : 77 track/side
④ Number of head : 2
⑤ Rate of data transfer : 500 kbps
⑥ Access time (between two tracks) : 3 m seconds
⑦ Compensation of writing data : 125 n second (all tracks)
⑧ Rotation speed : 360 Min^{-1} (rpm) ± 1.5 %

FDD Interface:

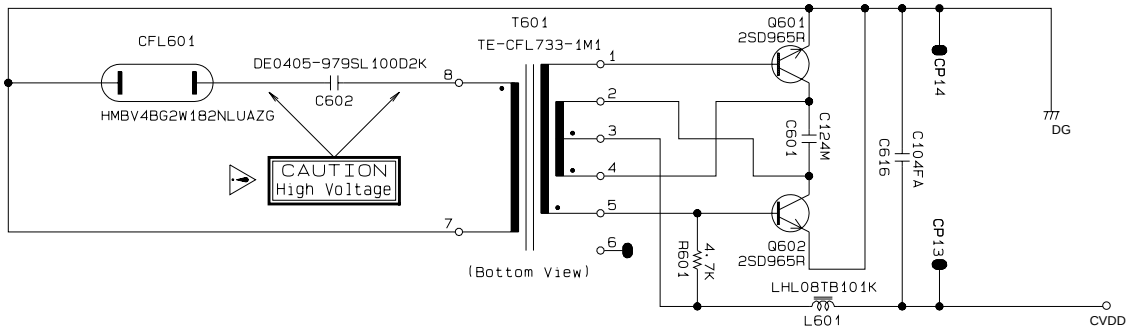


GND Pin Numbers of CN2:
1, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33

Non connected Pin Numbers of CN2:
2, 6, 10, 14 (Pin #3 is removed to prevent erroneous insertion)



LCD BACKLIGHT



When voltage CVDD is supplied, transistors Q601 and Q602 start oscillation.
From the oscillation voltage, transformer T601 generates about 600 V which is necessary for lighting the backlight.

CPU (LSI9: HD6433048SA89F)

The 16 bit CPU contains a 1M-bit ROM, a 16K-bit RAM, eleven 8-bit I/O ports, an A/D converter, a D/A converter and serial interfaces. The CPU accesses to the RAM1, RAM2, DSP, Key controller, FDD controller and LCD driver LSI. The CPU also controls buttons, LEDs, bender input and MIDI input/output.

Pin No.	Terminal	In/Out	Function
1	VCC	In	VCC (5 V) source.
2 ~ 5	PB0 ~ PB3	Out	Data bus for LCD driver.
6	PB4	Out	Chip enable signal for LCD driver.
7	PB5	Out	Read/write signal for LCD driver.
8	$\overline{\text{DREQ0}}$	—	DMA (Direct Memory Access) request.
9	PB7	Out	Register selection signal for LCD driver.
10	$\overline{\text{RES0}}$	In	Not used.
11	VSS	In	Ground terminal (0 V).
12	TXD0	Out	MIDI signal output.
13, 15 ~ 17	P91, P93~P95	In	Key input signal from buttons.
14	RXD0	In	MIDI signal input.
18 ~ 21 23 ~ 34	D0 ~ D15	In/Out	Data bus.
22	VSS	In	Ground terminal (0 V).
35	VCC	In	Vcc (5 V) source.
36 ~ 43, 45 ~ 56	A0 ~ A19	Out	Address bus.
44, 57	VSS	In	Ground terminal (0 V).
55, 59, 60	P52, P61, P62	In	Key input signal from buttons.
58	$\overline{\text{WAIT}}$	—	Not used.
61	CLKOUT	Out	Clock signal (16 MHz).
62	$\overline{\text{STBY}}$	—	Not used.
63	$\overline{\text{RES}}$	In	Reset signal at VDD (5 V) supplied.
64	NMI	In	Power ON signal input.
65	VSS	In	Ground terminal (0 V).
66, 67	EXTAL, XTAL	In	Clock (16 MHz) input.
68	VCC	In	Vcc (5 V) source.
69	$\overline{\text{AS}}$	—	Not used.
70	$\overline{\text{RD}}$	Out	Read signal.
71	$\overline{\text{HWR}}$	Out	Write signal for upper data bus.
72	$\overline{\text{LWR}}$	Out	Write signal for lower data bus.
73 ~ 75	MD0 ~ MD2	In	Mode selection terminals.
76, 77	AVCC, VREF	In	Power source and reference voltage for internal A/D, D/A.
78	P70	In	Key input signal from buttons.
79	AN1	In	Pitch bender voltage detection.

Pin No.	Terminal	In/Out	Function
80	P72	In	AC adaptor detection terminal.
81	P73	In	Modulation signal input.
82	P74	In	Pedal signal input.
83	P75	In	FD sheet type (2HD, 2DD) signal input.
84	P76	In	Key input signal from buttons.
85	DA1	Out	LCD contrast control voltage output.
86	AVSS	In	Ground terminal (0 V).
87	PB0	Out	Reset signal for DSP, Key controller, FDD controller.
88	$\overline{CS3}$	Out	Chip select signal for FDD.
89	$\overline{CS2}$	Out	Acknowledge signal FDD DMA function.
90	$\overline{CS1}$	Out	Chip select signal for Key controller.
91	$\overline{CS0}$	Out	Chip select signal for DSP.
92	VSS	In	Ground terminal (0 V).
93	$\overline{TEND0}$	Out	End signal for data transfer of FDD.
94	PA1	Out	Change signal for data transfer speed of FDD.
95	PA2	Out	Key input signal for DEMO button.
96	PA3	Out	Clock signal for shift register of KC signal.
97	PA4	Out	Clear signal for shift register of LED.
98	PA5	Out	Control signal for KC signal and LED.
99	PA6	Out	Clock signal for shift register of LED.
100	PA7	Out	APO (Auto Power Off) signal.

DIGITAL SIGNAL PROCESSOR (LSI3:HG51B155FD)

Upon receipt of note numbers and their velocities, the DSP (Digital Signal Processor) reads sound and velocity data from the sound source ROM in accordance with the selected tone; the DSP can read rhythm data simultaneously when a rythm pattern is selected. Then it provides 16-bit serial signals containing data of the melody, chord, bass, and percussion to the DAC. The DSP also adds the selected effect to the sound data using a 256k-bit RAM.
The following table shows the pin functions of the DSP.

Pin No.	Terminal	In/Out	Function
1 ~ 8	CD0 ~ CD7	In/Out	Data bus
9, 10			Not used.
11	GND7	In	Ground (0 V) source
12	CK16	Out	24.576 MHz clock output
13	VCC6	In	+5 V source
14	CK0	In	Clock input. Connected to terminal CK16.
15	TCKB		Not used.
16	VCC1	In	+5 V source
17	GND1	In	Ground (0 V) source
18, 19	XT0, XT1	In/Out	24.576 MHz clock input/output. Connected to a crystal oscillator.
20	SGL	In	System control terminal. Single chip system: Open
21	CCSB	In	Chip select signal input
22 ~ 25	CA0 ~ CA3	In	Address bus
26	CE0	In	Not used. Connected to ground.
27	CWRB	In	Write enable signal
28	CRDB	In	Read enable signal
29 ~ 32			Not used.
33	RESB	In	Reset signal input
34	TESB	In	Not used. Connected to +5 V
35 ~ 39			Not used.
40 ~ 49 52 ~ 57	RD0 ~ RD15	In	Data bus for the ROM1 and ROM2
58	RA23	Out	Chip select signal for the ROM1
59	RA22	Out	Chip select signal for the ROM2
60 ~ 73 75 ~ 82	RA0 ~ RA21	Out	Address bus for the ROM1 and ROM2
74	GND5	In	Ground (0 V) source
83	WOK2	Out	Word clock output. Not used.
84	VCC3	In	+5 V source
85	GND3	In	Ground (0 V) source
86	WOK1	Out	Word clock for the DAC
87	SOLM	Out	Serial data output. Not used.
88	SOLP	Out	Serial data output for the DAC
89	BOK	Out	Bit clock output for the DAC

Pin No.	Terminal	In/Out	Function
90 ~ 92			Not used.
93	VCC	In	+5 V source
94, 95 97 ~ 105 107, 109 110, 112	EA0 ~ EA14	Out	Address bus for the working RAM
96	EWEB	Out	Write enable signal output for the working RAM
106	EOEB	Out	Read enable signal output for the working RAM
108	VCC7	In	+5 V source
111	ECEB	Out	Chip select signal output for the working RAM
113 ~ 117			Not used.
118	VCC4	In	+5 V source
119	GND4	In	Ground (0 V) source
120 ~ 122			Not used.
123 ~ 130	ED0 ~ ED7	In/Out	Data bus for the working RAM
131	GND5	In	Ground (0 V) source
132 ~ 134			Not used. Connected to ground.
135, 136			Not used.

FDD CONTROLLER (LSI10:HD63266F)

The FDD (Floppy Disk Drive) controller can control the FDD unit.
The controller contains not only analog VFO (Variable Frequency Oscillator) circuit but also driver/receiver, input/output port and oscillation circuit internally.

Pin No.	Terminal	In/Out	Function
1	8/ - 5	In	Change of data transfer speed.
2	XTALSEL	—	Not used. Connected to ground (0 V).
3	$\overline{\text{RESET}}$	In	Reset signal input.
4	E, -RD	In	Read signal.
5	R/-W, -WR	In	Write signal.
6	$\overline{\text{CS}}$	In	Chip select signal.
7	$\overline{\text{DACK}}$	In	Acknowledge signal of DMA (Direct Memory Access).
8, 9	RS0, RS1	In	Register selection for read/write.
10, 11	VSS1, VSS2	In	Ground terminal (0 V).
12 ~ 19	D0 ~ D7	In/Out	Data bus.
20	$\overline{\text{DREQ}}$	In	Request signalof DMA.
21	$\overline{\text{IRQ}}$	—	Not used.
22	$\overline{\text{DEND}}$	In	End signal for data transfer.
23	VSS3	In	Ground terminal (0 V).
24	1/2 EX1	—	Not used.
25	VCC1	In	DVDD (5 V) source.
26, 27, 28	NUM1, NUM2 IFS	—	Not used. Connected to ground (0 V).
29	SFORM	In	Selection signal for formatting.

Pin No.	Terminal	In/Out	Function
30	$\overline{\text{INP}}$	In	Disk detection signal.
31	$\overline{\text{READY}}$	In	Ready signal from FDD. (Connected to ground (0V).)
32	$\overline{\text{WPRT}}$	In	Write protect signal from FDD.
33	$\overline{\text{TRKO}}$	In	Track0 signal from FDD.
34	$\overline{\text{INDEX}}$	In	Index signal from FDD.
35	$\overline{\text{RDATA}}$	In	Read data signal from FDD.
36, 37, 38 39	XTAL2, EXTAL2 NC, XTAL1	—	Not used.
40	EXTAL1	In	Clock signal input from CPU (16 MHz).
41, 42	VSS4, VSS5	In	Ground terminal (0 V).
43	NC	—	Not used.
44 ~ 46	VCC2, VCC3, VCC4	In	DVDD (5 V) source.
47	$\overline{\text{WGATE}}$	Out	Write gate signal to FDD.
48	$\overline{\text{WDATA}}$	Out	Write data signal to FDD.
49	VSS6	In	Ground terminal (0 V).
50	$\overline{\text{STEP}}$	Out	Step signal for FDD head.
51	$\overline{\text{HDIR}}$	Out	Head direction signal for FDD.
52	HLOAD	Out	Not used.
53	$\overline{\text{HSEL}}$	Out	Head selection signal for FDD.
54	VSS7	In	Ground terminal (0 V).
55	$\overline{\text{DS0}}$	Out	Drive selection signal.
56, 57, 58	$\overline{\text{DS1}}$, $\overline{\text{DS2}}$, $\overline{\text{DS3}}$	—	Not used.
59	VSS8	In	Ground terminal (0 V).
60	$\overline{\text{MON0}}$	Out	Motor ON signal for FDD.
61, 62, 63	$\overline{\text{MON1}}$, $\overline{\text{MON2}}$, $\overline{\text{MON3}}$	—	Not used.
64	VSS9	In	Ground terminal (0 V).

KEY TOUCH LSI (LSI6: TC190C020AF-001)

By counting the time between first-key input signal FI and second-key SI from the keyboard unit, the key touch LSI detects key velocity of 256-step. Then the LSI sends the CPU the note number and its velocity data.

Pin No.	Terminal	In/Out	Function
1	WRB	In	Write signal from CPU.
2 ~ 11, 13, 14, 16 ~ 19	D0 ~ D15	In/Out	Data bus.
12	VSS	In	Ground terminal (0 V).
15	VDD	In	VDD (5 V) source.
20 ~ 23	CA0 ~ CA3	In	Address bus.
24	VSS	In	Ground terminal (0 V).
25 ~ 32, 34, 35	FI0 ~ FI4, SI0 ~ SI4	In	Key input signal.
33	VDD	In	VDD (5 V) source.
36 ~ 38, 40 ~ 44	KC0 ~ KC7	Out	Key scan signal.
39	VSS	In	Ground terminal (0 V).
45	VDD	In	VDD (5 V) source.
46 ~ 51	FI5 ~ FI7 SI5 ~ SI7	In	Key input signal.
52	VSS	In	Ground terminal (0 V).
53 ~ 58, 60 ~ 62	FI8 ~ FI10 SI8 ~ SI10 KI0 ~ KI2	In	Key input signal (Not used).
59	VDD	In	VDD (5 V) source.
63, 64	MODE0, MODE1	—	Not used.
65	VSS	In	Ground terminal (0 V).
66	KCKI	In	Clock signal for key common/input.
67 ~ 72, 74 ~ 77		—	Not used.
73	VDD	In	VDD (5 V) source.
78	RESB	In	Reset signal from CPU.
79	CSB	In	Chip selection signal.
80	RDB	In	Read signal from CPU.

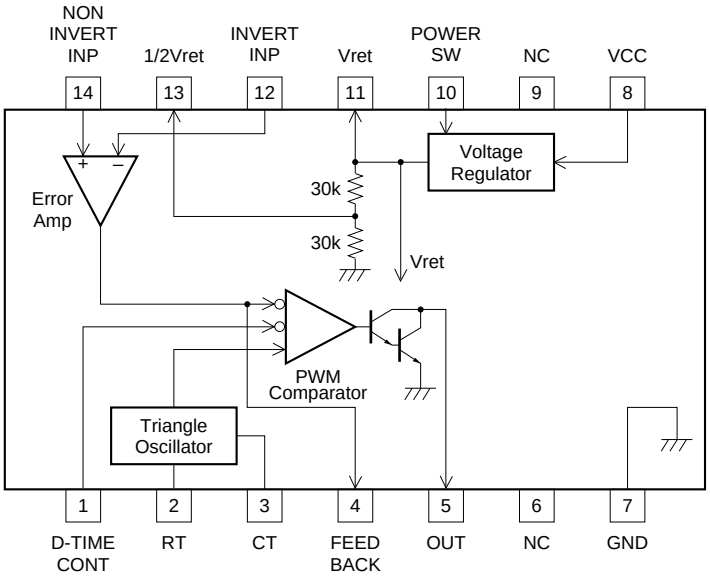
LCD DRIVER (LSI601: SED1278F2A)

The LCD driver can drive a dot matrix LCD having 40 segment and 16 common lines. The LSI contains 240 graphic symbols in the built-in character generator ROM, and stores 80 characters in the built-in display data RAM. In accordance with command from the CPU, the LSI is capable of displaying up to 16 characters simultaneously. The following table shows the pin functions of LSI 601.

Pin No.	Terminal	In/Out	Function
1 ~ 22, 63 ~ 80	SEG1 ~ SEG40	Out	Segment signal output
23	VSS	—	GND (0 V) source
24, 25	OSC1, OSC2	In/Out	Terminals for the built-in clock pulse generator. The external resistor connected determines the oscillation frequency.
26 ~ 30	V1 ~ V5	In	LCD drive voltage input. Those voltages are used for generating the stepped pulse of the LCD drive signals.
31, 32	LP, XSCL	—	Not used
33	VDD	In	LVDD (+5 V) source
34, 35	FR, DO	—	Not used
36	RS	In	Data/command determination terminal.High: data, Low: command
37	R/W	In	Read/write terminal. High: read, Low: write
38	E	In	Chip enable signal. High: enable, the writing is done at fall edge. Low: disenable
39 ~ 42	DB0 ~ DB3	—	Not used. Connected to GND (0 V)
43 ~ 46	DB4 ~ DB7	In/Out	Data bus
47 ~ 62	COM1 ~ COM16	Out	Common signal/output

REGULATOR IC (IC202: BA9700A)

The regulator IC controls the output voltage by PWM (Pulse Wide Modulation) with outer switching transistors and LC filters (integration circuit).



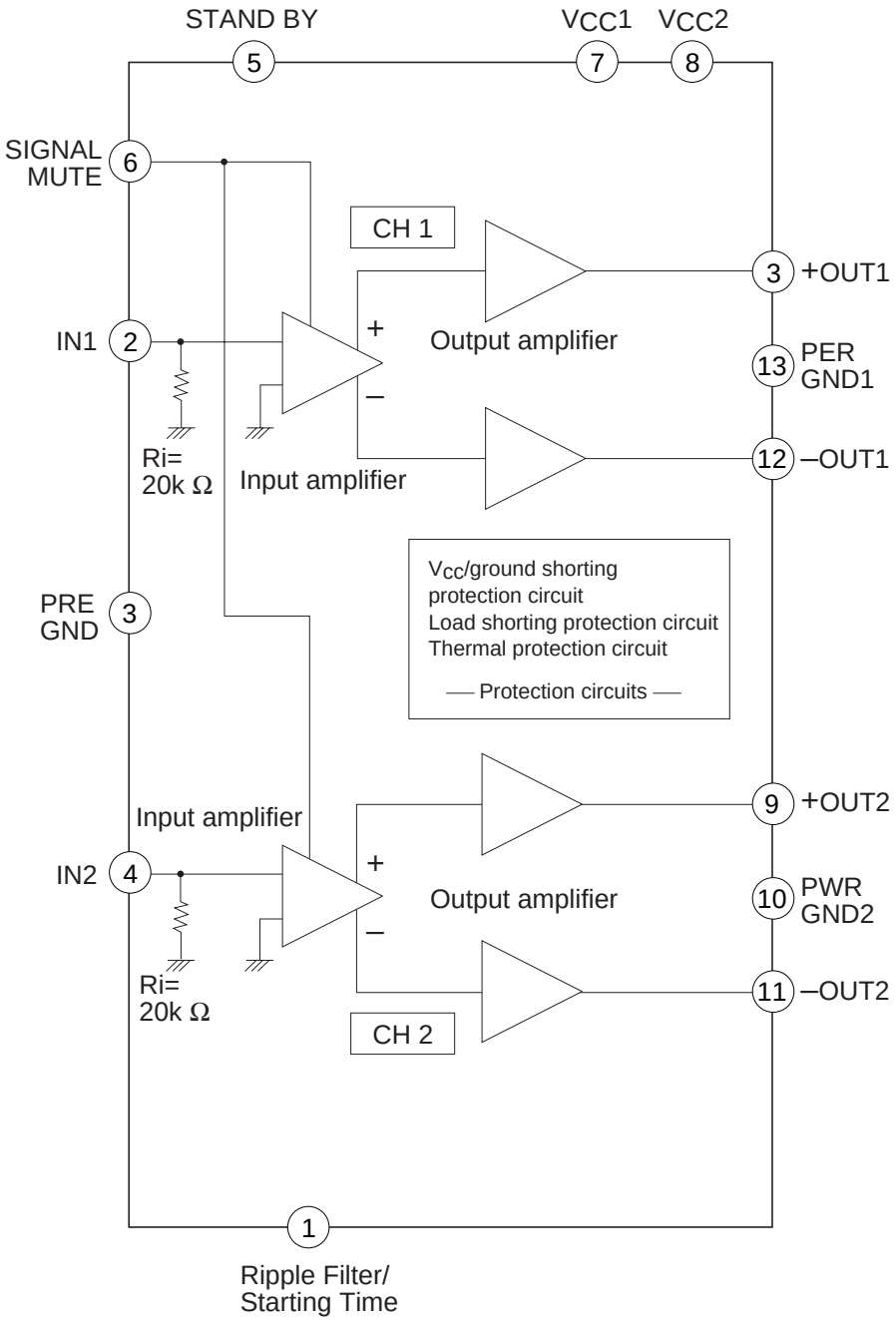
DAC (LSI5: UPD63200GS)

UPD63200GS is a two-channel 16-bit Digital to Analog Convertor consisting of resistor string, output amplifier and zero offset circuit.
The DAC receives 16-bit serial data output from the DSP. The data contains digital sound data of the melody, chord, bass, and percussion for the right and left channels. The DAC converts the data into analog waveforms by each channel and output them separately.

Pin No.	Terminal	In/Out	Function
1	fs SEL	In	Mode selection terminal. Connected to ground.
2	D.GND	In	Ground (0 V) source for internal digital circuit
3	Bit SEL		Not used.
4	DVDD	In	+5 V source for internal digital circuit
5	A.GND	In	Ground (0 V) source for internal analog circuit
6	R.OUT	Out	Sound waveform output
7	A.VDD	In	+5 V source for internal analog circuit
8	A.VDD	In	+5 V source for internal analog circuit
9	R.REF	In	Reference voltage terminal. Connected to a capacitor.
10	L.REF	In	Reference voltage terminal. Connected to a capacitor.
11	L.OUT	Out	Left channel sound waveform output
12	A.GND	In	Ground (0 V) source for internal analog circuit
13	LRCK	In	Word clock (L/R separation signal) input.
14	LRSEL	In	Not used. Connected to ground.
15	SI	In	Sound data input
16	CLK	In	Bit clock input

POWER AMPLIFIER (IC201: LA4663)

The power amplifier is a two-channel amplifier with standby switch.



DIAGNOSTIC PROGRAM

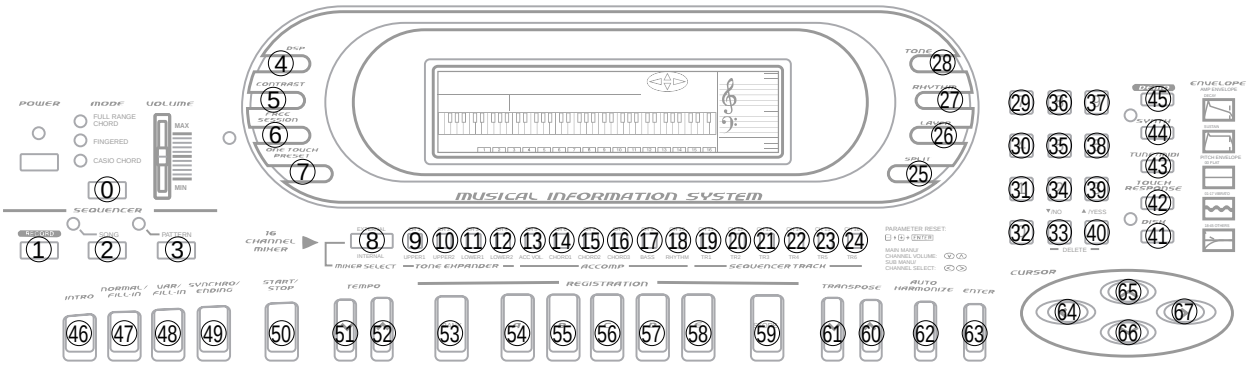
■ To enter diagnostic mode

1. While pressing down “0” and “MODE” buttons, press “POWER” button for turning on.
2. The instrument is set in diagnostic mode and display indicates “Test”.

■ Button check

1. Press “INT/EXT” button.
2. Display indicates “00 Console”.
3. Press buttons in the following order

⓪ MODE button
① RECORD button
② SONG button
③ PATTERN button
④ DSP (digital effect) button
⑤ CONTRAST button
⑥ FREE SESSION button
⑦ ONE TOUCH PRESET button
⑧ MIXER SELECT button
⑨ CHANNEL button CH1
⑩ CH2
⑪ CH3
⑫ CH4
⑬ CH5
⑭ CH6
⑮ CH7
⑯ CH8
⑰ CH9
⑱ CH10
⑲ CH11
⑳ CH12
㉑ CH13
㉒ CH14
㉓ CH15
㉔ CH16
㉕ SPLIT button
㉖ LAYER button
㉗ RHYTHM button
㉘ TONE button
㉙ Number key 7
㉚ Number key 4
㉛ Number key 1
㉜ Number key 0
㉝ Number key –
㉞ Number key 2
㉟ Number key 5
㊱ Number key 8
㊲ Number key 9
㊳ Number key 6
㊴ Number key 3
㊵ Number key +
㊶ DISK button
㊷ TOUCH RESPONSE button
㊸ TUNING/MIDI button
㊹ SYNTH button
㊺ DEMO button
㊻ INTRO button
㊼ NORMAL/FILL-IN button
㊽ VARIATION/FILL-IN button
㊾ SYNCHRO/ENDING button
㊿ START/STOP button
(51) TEMPO button down
(52) TEMPO button up
(53) BANK button
(54) REGISTRATION buttons A
(55) REGISTRATION buttons B
(56) REGISTRATION buttons C
(57) REGISTRATION buttons D
(58) REGISTRATION buttons E
(59) STORE button
(60) TRANSPOSE button up
(61) TRANSPOSE button down
(62) AUTO HARMONIZE button
(63) ENTER button
(64) Cursor key Left
(65) Cursor key Up
(66) Cursor key Down
(67) Cursor key Right



Display shows the button number to be pressed. When the pressed button functions properly, the instrument emits a verification signal and indicates next button number.
If the button malfunctions, an error alarm sounds and display indicates “Cons ER”.
When wrong button is pressed, the alarm sound is also emitted. In that case, re-press the correct button.
All buttons is pressed correctly, an OK alarm sonds and display indicates "Cons OK".

■ Pitch Bender check

1. Press “CH12” button.
2. Display indicates “Bender”.
3. Rotate the pitch bender to the following order
   Max → Center → Min → Center
   When the pitch bender is proper, an OK alarm sounds and display indicates "OK".

■ AC adaptor detection check.

1. Press “CH14” button.
2. DIsplay indicates "Jack".
3. When the instrument detects that an AC adaptor is plugged in, an OK alarm sounds and indicates “OK” on the display.

■ Keyboard and pedal check

1. Press “CH10” button.
2. Display indicates “Tch & Pd1”.
   In accordance with key, depressions, display indicates velocity value (hexadecimal values 01 to 127), and in accordance with pedal depressions, display indicates "SUS".

■ ROM check

1. Press “CH2” button.
2. Display indicates "ROM", the diagnostic program counts check sums of 1Mbit ROM(inside of CPU) and 64Mbit ROMs.
3. In accordance with ROMs functions, display indicates;

   “ROM H80K” ---------- 1Mbit ROM OK
   “ROM 64MOK”---------- 64Mbit ROMs OK
   “ROM H8NG” ---------- 1Mbit ROM NG
   “ROM 64MNG” ---------- 64Mbit ROMs NG

■ RAM check

1. Press “CH15” button.
2. Display indicates "RAM Test".
3. The program executes write/read test in all the RAM area.
4. When the RAM is proper, display indicates “RAM OK”.
   If the RAM malfunctions, “RAM NG” is shown on the display.

■ Small sound output

1. Press “CH5” button.
2. The instrument emits a sound in small volume and indicates “sound MIN” on the display.

■ Medium sound output

1. Press “CH6” button.
2. The instrument emits a medium volume sound and indicates “sound MID” on the display.

■ Large sound output

1. Press “CH7” button.
2. The instrument emits a large volume sound and indicates “sound MAX” on the display.

■ Large sound left channel output

1. Press “CH8” button.
2. The instrument emits a large volume sound from the left speaker and indicates “sound L” on the display.

■ Large sound right channel output

1. Press “CH9” button.
2. The instrument emits a large volume sound from the right channel and indicates “sound R” on the display.

■ MIDI IN/OUT test

1. Connect MIDI IN and MIDI OUT terminals with a MIDI cable.
2. Press “CH11” button.
3. When the MIDI circuit is normal, display indicates “MIDI OK” whereas “MIDI ER” will be shown if the MIDI circuit is abnormal.

■ Modulation bender check

1. Press “CH13” button.
2. Display indicates “Modulat”
3. Rotate the modulation bender to the following order.
   Max → Min → Max
   When the modulation bender is proper, on OK alarm sounds and display indicates “OK”.

■ LCD test

1. Press “CURSOR ←” button.
2. Display indicates “LCD Test”.
3. Each pressing of “CURSOR ←” button, displays following patterns in the following order with verification sound.

   a. All dots indication
   b. No dots indication
   c. Checker on 8 character block : pattern A
   d. Checker on 8 character block : pattern B
   e. Checker on pixel block : pattern A
   f. Checker on pixel block : pattern B
   g. Displays each pixel (or dot) block in turn + all dots indication
   h. Displays each dot in turn + all dots indication

■ LED test

1. Press “CH1” button.
2. Display indicates “LED Test” and LEDs illuminate in the following order with verification sound.

   a. FULL RANGE CHORD
   b. FINGERED
   c. CASIO CHORD
   d. SONG
   e. PATTERN
   f. FREE SESSION
   g. SYNTH
   h. DISK

■ FDD test

1. Press “DISK” button.
2. Display indicates “Dsk0-9E” (which means numeral key 0 to 9 and ENTER button.)
   This test executes floppy disk’s write/read test and entering a number selects sectors to be tested. Larger the number, narrower the check area namely, entering 0 checks all the sectors of the disk.
3. Press “ENTER” button to clean the FDD with cleaning disk. Wet type cleaning disk is recommended.

■ To exit from the diagnostic program

Pressing “CURSOR ↓” button sets the instrument in Reset power off state.

If you wish to use the instrument continually after this diagnostic program, perform “System reset” described below.

<Other utilities>

■ System reset

1. While pressing down “ENTER” button, turn power on.
2. Display indicates “Reset?”.
3. Pressing “+” button initializes the instrument.
   Pressing “–” button invalidates system reset.
4. The instrument turns on automatically.

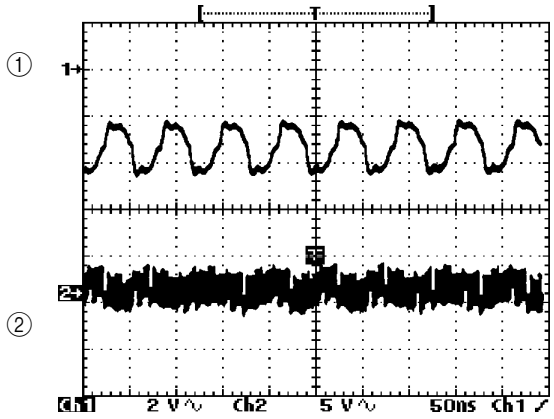
■ Touch off max

1. While pressing down “RHYTHM” and “MODE” buttons, turn the power on.
2. Display indicates “TouchMax”.
3. The instrument is set in touch off max mode.
   In this state, sound volume in touch response off mode becomes maximum.

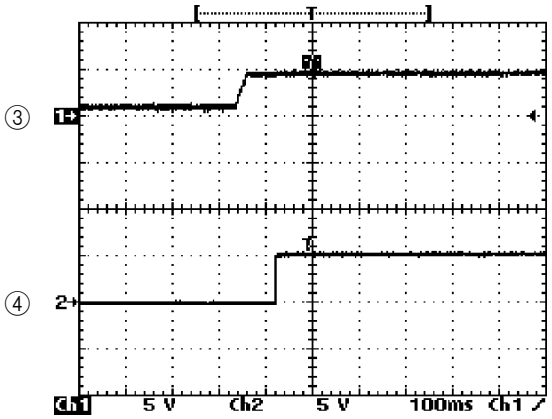
FDD ERROR MESSAGE

Error Message	Reason of Error
Err ReadOnly	The file being written to is read-only.
Err Format	The disk format is not one supported by this keyboard.
Err Disk R/W	Error occurred during reading from the disk.
Err DiskFull	Disk is full.
Err Mem Full	Not enough memory to perform the process. No memory is available to load data.
Err Not SMF0	An attempt was made to play data that is not SMF FORMAT 0.
Err No Disk	An attempt was made to access a disk while no disk is loaded in the drive.
Err No File	There is no file that corresponds to the file that was specified.
Err Protect	A save or delete operation was attempted with a disk that is write protected.
Err Convert	The attempted file conversion was not successful.
Err WrongDat	Something is wrong with the data you are trying to load.

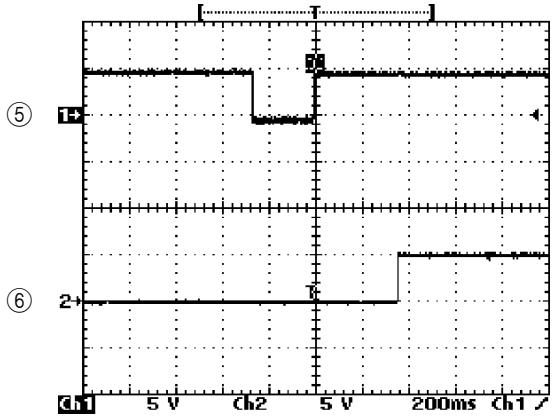
MAJOR WAVEFORMS



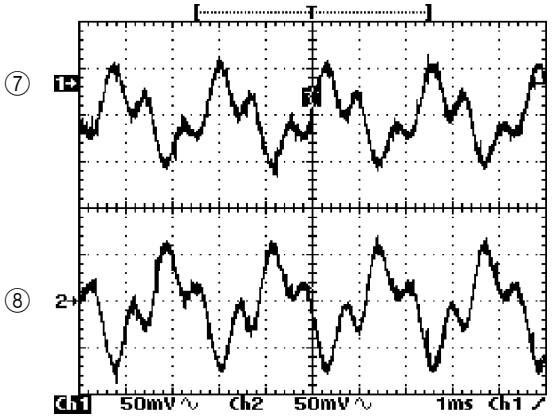
① Clock signal for CPU
Check point CP1
② Clock signal for DSP
LSI3 pin 14



③ Voltage VDD
IC5 pin 2
④ Reset signal $\overline{\text{RES}}$
IC5 pin 1

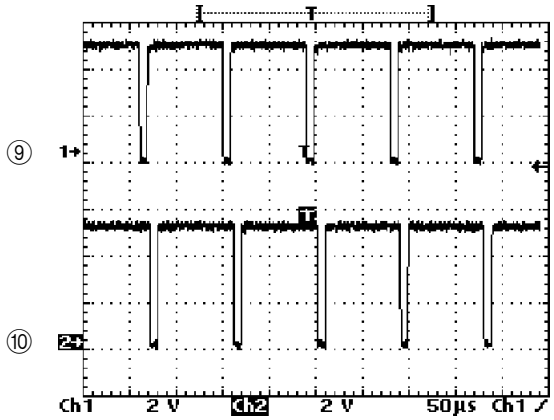


⑤ NMI signal
LSI9 pin 64
⑥ Reset signal RESB
LSI9 pin 87



⑦ Sound signal L-OUT
SIELD-WIRE PE-W
⑧ Sound signal L-VOL0OUT
JJ connector pin 1

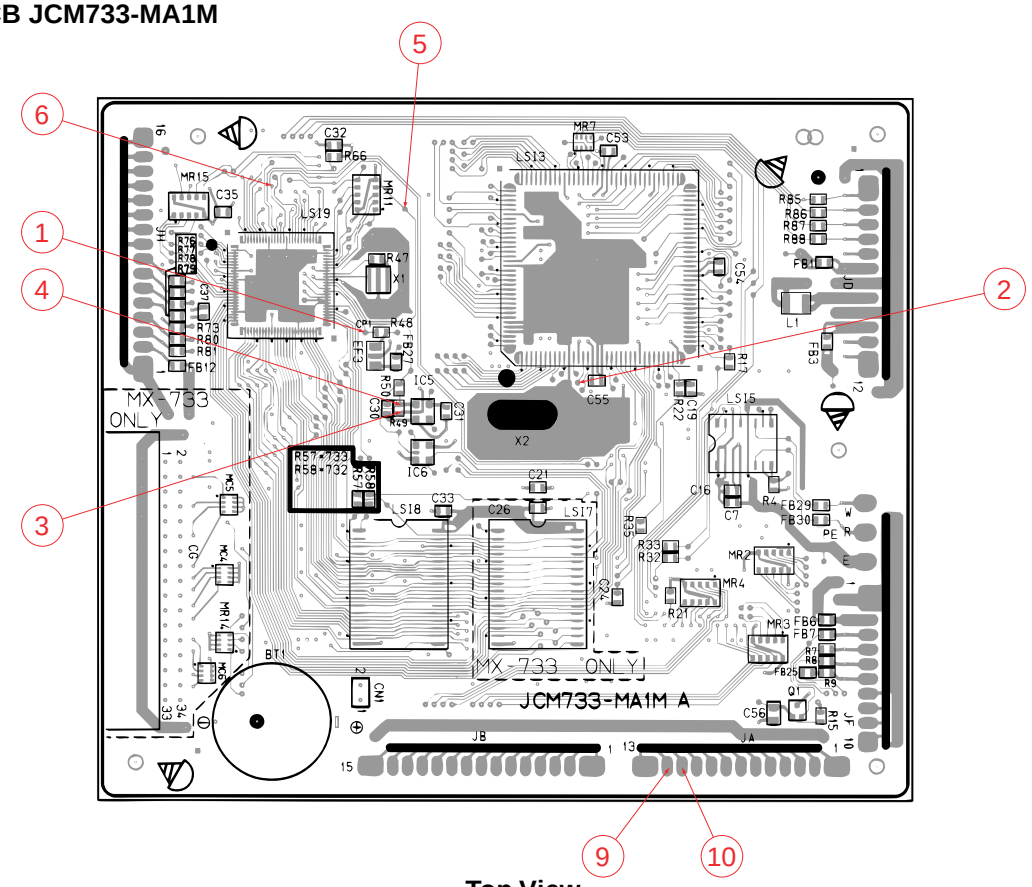
Tone: Grand Piano (No. 000), Volume: Max.
Touch speed: Max., Key: A4



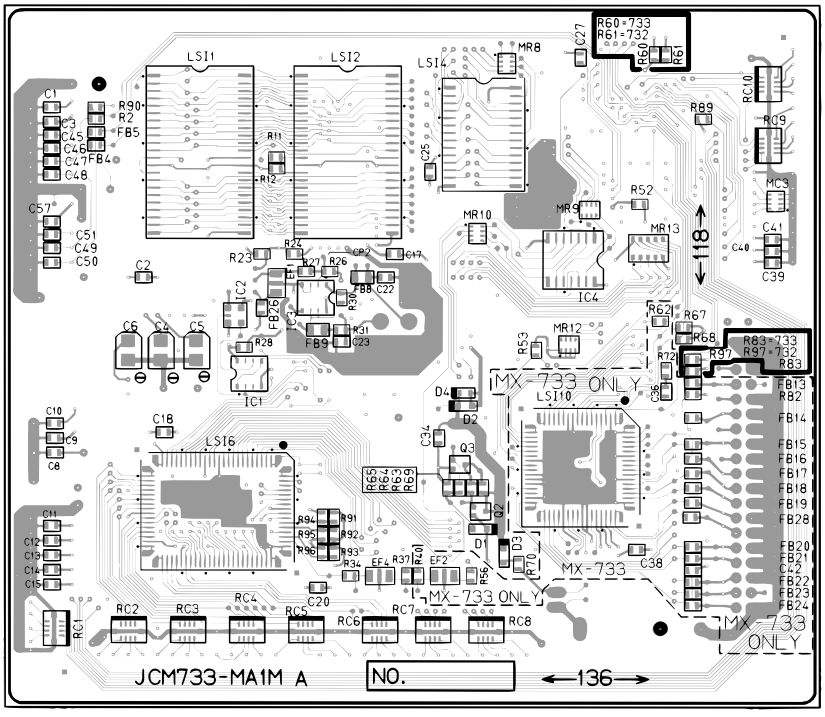
⑨ Key common signal KC0
JA connector pin 11
⑩ Key common signal KC1
JA connector pin 12

PRINTED CIRCUIT BOARD

Main PCB JCM733-MA1M

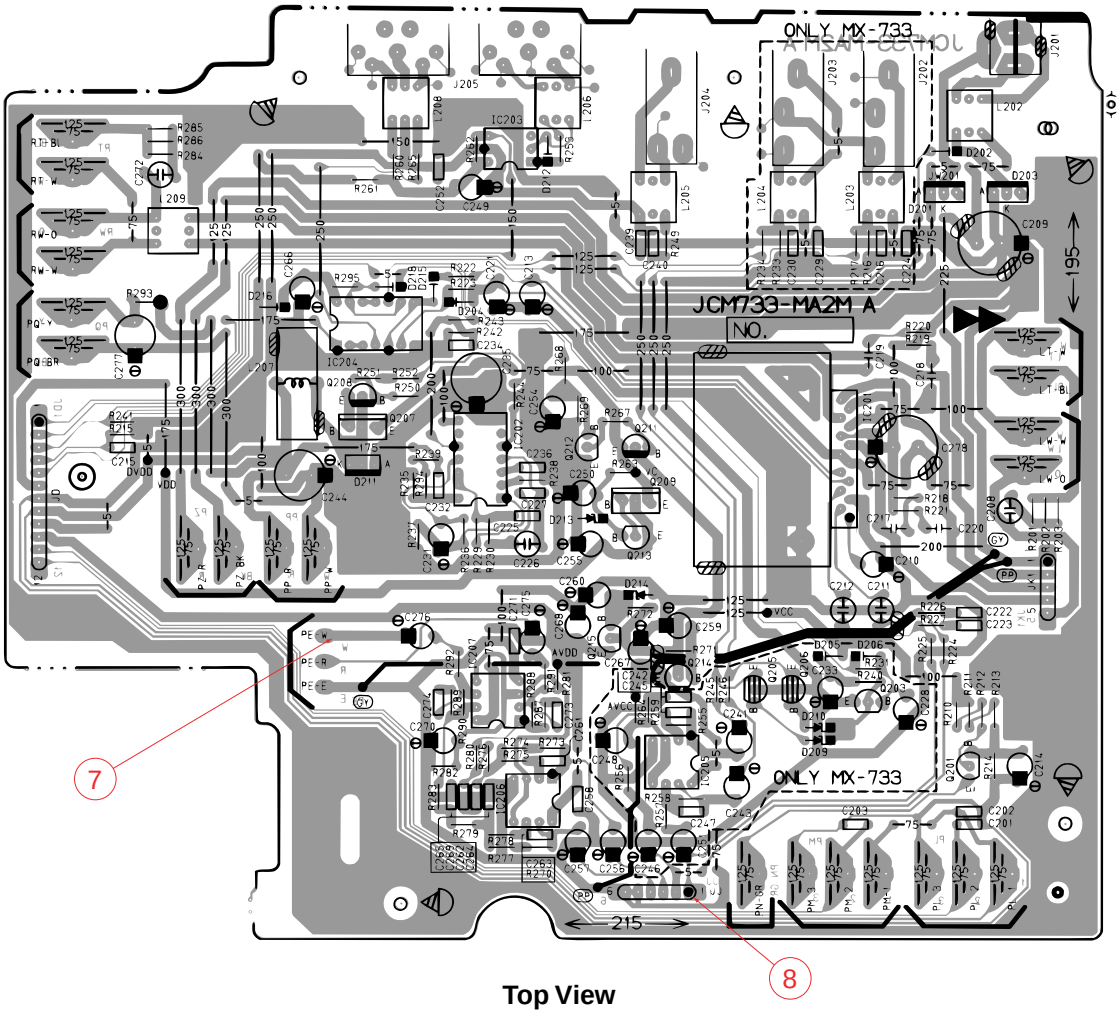


Top View



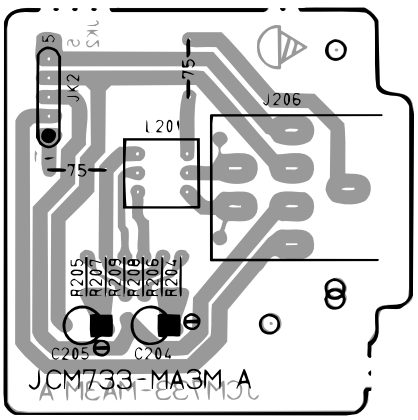
Bottom View

Sub PCB JCM733-MA2M



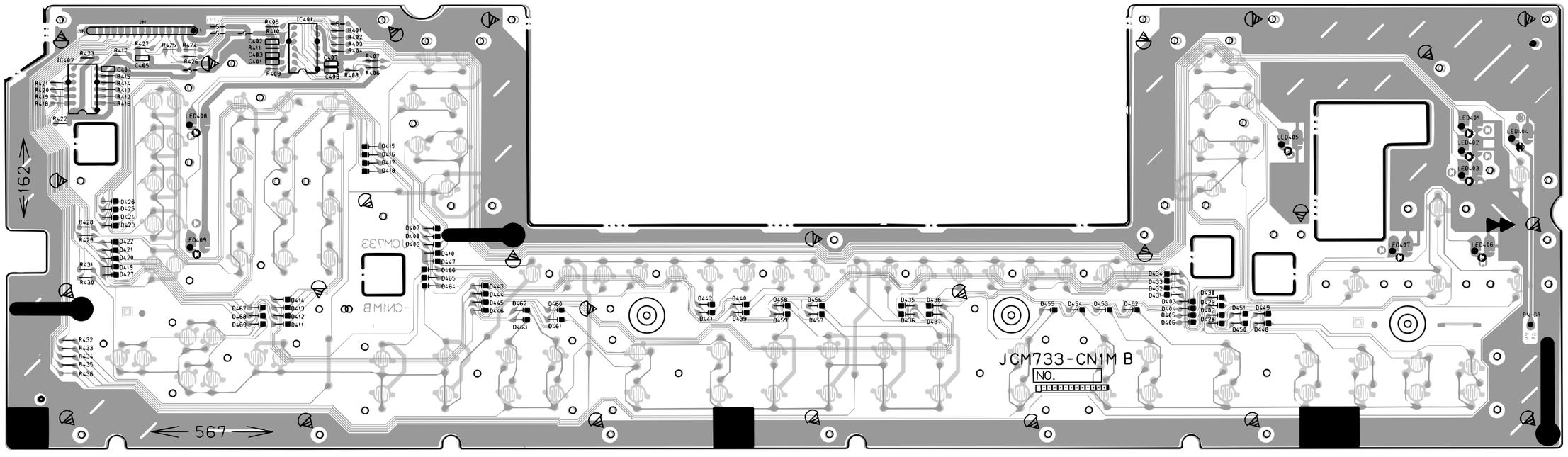
Top View

Sub PCB JCM733-MA3M



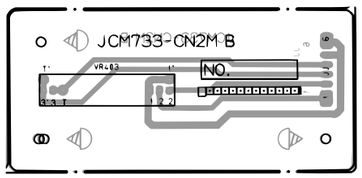
Top View

Console PCBs JCM733-CN1M



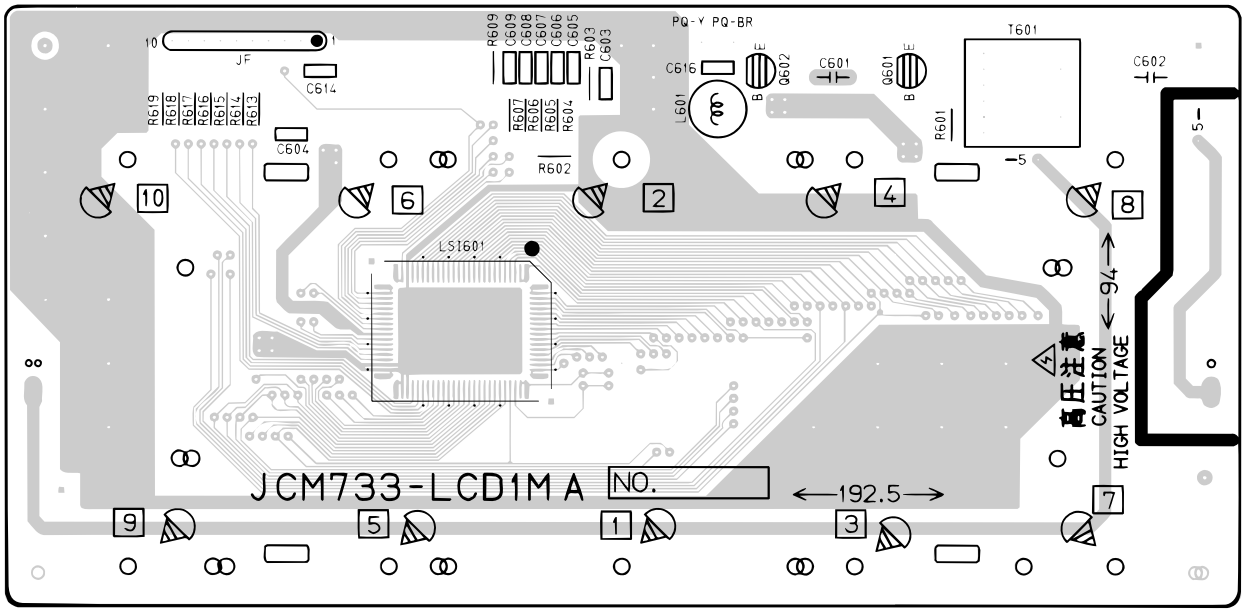
Top View

Console PCBs JCM733-CN2M

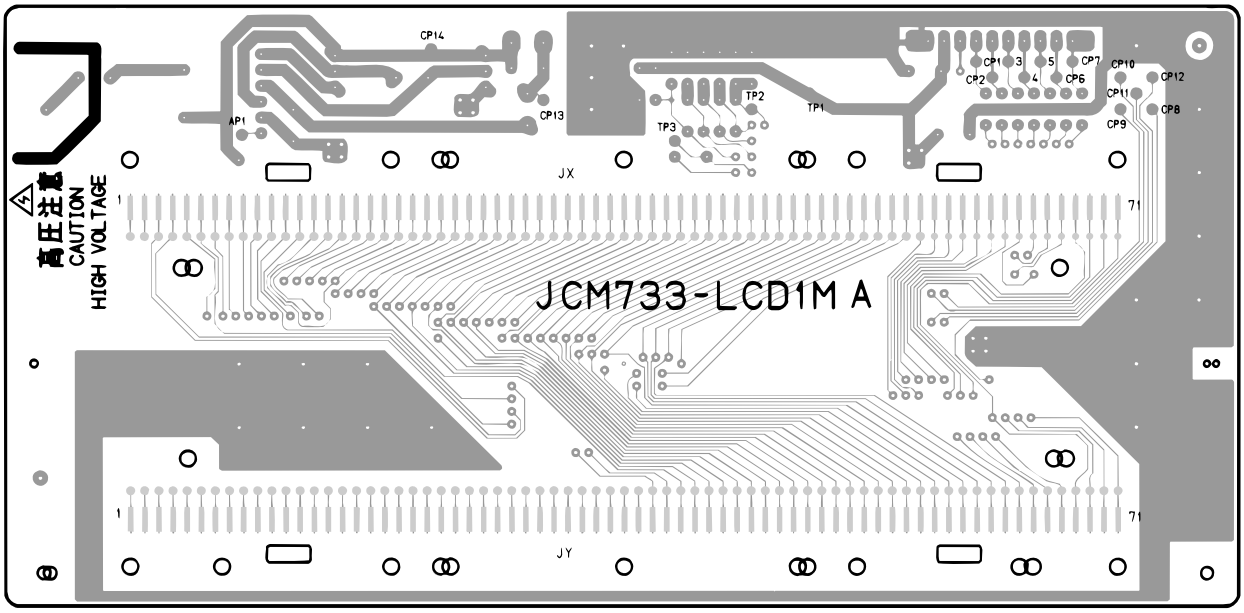


Top View

Display PCB JCM733-LCD1M

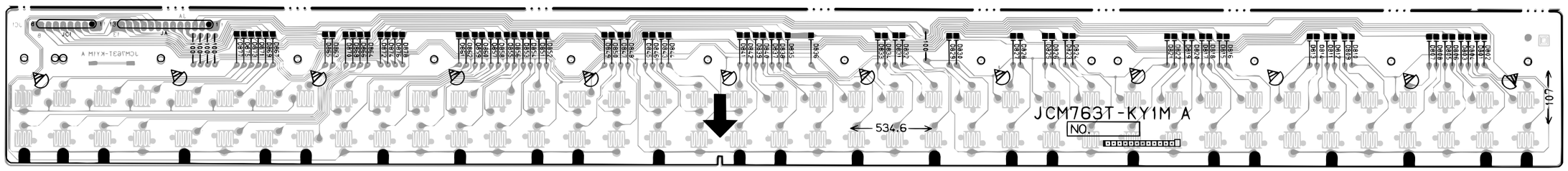


Top View



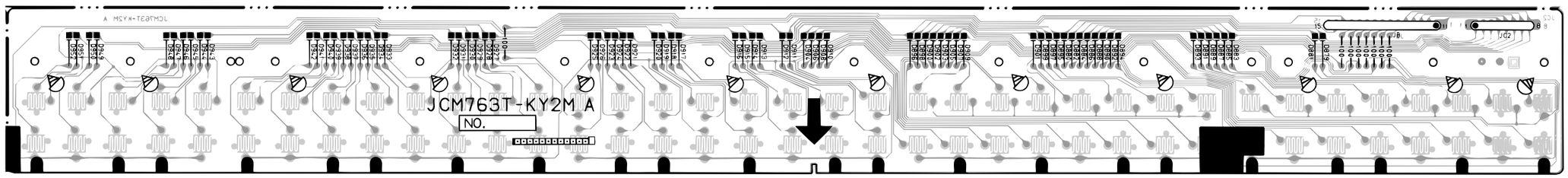
Bottom View

Keyboard PCBs JCM763T-KY1M



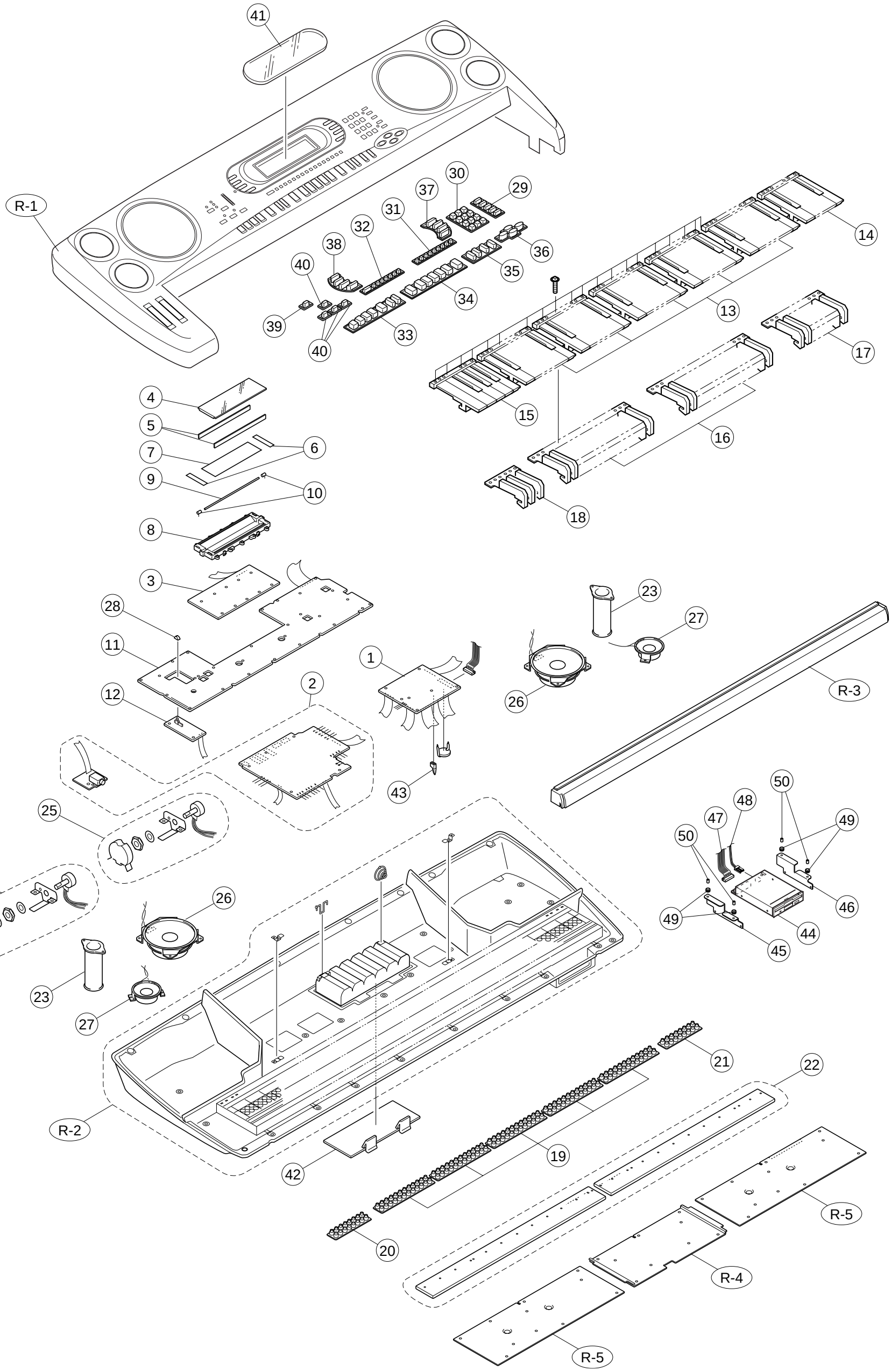
Top View

Keyboard PCBs JCM763T-KY2M



Top View

EXPLODED VIEW



PARTS LIST

WK-1800

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 seperately.

3. The numbers in item column correspond to the same numbers in drawing.

PARTS PRICE LIST

WK-1800

N	Item	Code No.	Part Name	Specification	Q	Price Code	R	Remarks
		MA1M PCB						
N	1	10023172	PCB ASSY/MA1M	TK-M241341*1(M733)	1	EI	A	
N	BT1	38150679	BATTERY/LITHIUM	CR2032/1HF1	1	AG	X	
	D3	23901820	DIODE	1SS355TE-17	1	AA	C	
N	D4	79114127	DIODE	RB520S-30TE61	1	AA	C	
	IC1,IC6	21054543	IC/LMOS	TC7W32F(TE12L)	2	AC	C	
	IC2	21052821	IC/LMOS	TC7S04F(TE85R)	1	AC	C	
	IC301,302	21056083	IC/LMOS	TC7WU04F(TE12L)	2	AD	C	
	IC4	21010642	IC/CMOS	TC74HC08AF(TP1)	1	AC	C	
	IC5	20121883	IC/CMOS	RN5VD40AA-TR	1	AE	C	
N	LSI1	10014314	LSI	LHMN5KPP	1	BG	B	
	LSI2	10014313	LSI	LHMN5KPN	1	BG	B	
	LSI3	20117434	LSI	HG51B155FD	1	BU	B	
	LSI4	20125572	LSI	TC55257DFL-70L(EL)	1	AS	B	
	LSI5	21056665	LSI	UPD63200GS-E1	1	AX	B	
	LSI6	20125987	LSI	TC190C020AF-001	1	BC	B	
	LSI7	20126186	LSI	TC551001CF-70L(EL)	1	BK	B	
	LSI8	20126186	LSI	TC551001CF-70L(EL)	1	BK	B	
N	LSI9	10014312	LSI	HD6433048SA89F	1	CB	B	
	LSI10	20109990	LSI	HD63266F	1	BT	B	
	Q1	22521169	TRANSISTOR	2SC4081T106S	1	AA	C	
N	X1	10025033	OSCILLATOR/CERAMIC	CSTCV16.00MXJ2C3-T	1	AD	C	
	X2	25902788	OSCILATOR/CRYSTAL	AT-49-24.576MHZ	1	AS	C	
		MA2M PCB						
N	2	10023173	PCB ASSY/MA2,3M	TK-M241342*1(M733)	1	DK	B	
	D202,D204,D212 D215,D218	23901344	DIODE	1SS133T-77-T	5	AA	C	
	D203,D211	23901463	DIODE/SCHOTTKY	SB20-03B	2	AD	C	
	D205,D206	23901344	DIODE	1SS133T-77-T	2	AA	C	
N	D209,D210	10025045	DIODE/ZENER	MTZJT-777.5B	2	AA	C	
	D213	23601085	DIODE/ZENER	HZS6B1L-TD	1	AA	C	
N	D214	10025044	DIODE/ZENER	MTZJT-776.2A	1	AA	C	
	D216	23902828	DIODE/SCHOTTKY	RB441Q-40T-77	1	AA	C	
N	IC201	10022651	IC/MONOLITHIC	LA4663	1	AV	C	
	IC202	21130084	IC/MONOLITHIC	BA9700A	1	AK	C	
	IC203	21141421	PHOTO COUPLER	PC900V	1	AK	C	
	IC204	21051092	IC/CMOS	TC74HC04AP	1	AC	C	
	IC205	21210072	IC/MONOLITHIC	NJM2068DD	1	AD	C	
	IC206,IC207	21210072	IC/MONOLITHIC	NJM2068DD	2	AD	C	
	J201	35015012	JACK/DC	HEC2305-01-920	1	AC	C	
	J202,J203	36120584	JACK	YKB21-5012	2	AD	C	
	J204	36120789	JACK	YKB21-5010	1	AC	C	
	J205	35014816	JACK/DIN	YKF51-5051	1	AH	C	
	J206	36120665	JACK/PHONE	YKB21-5006	1	AG	C	
N	Q201,Q212-Q215	22501627	TRANSISTOR	2SC1740STPS	5	AA	C	
	Q203	22501627	TRANSISTOR	2SC1740STPS	1	AA	C	
N	Q205,Q206	10025042	TRANSISTOR	2SD1468STPR	2	AA	C	
	Q207	22521253	TRANSISTOR	2SB1566F	1	AC	C	
N	Q208,Q211	10025037	TRANSISTOR	2SA933STPS	2	AA	C	
	Q209	22510672	TRANSISTOR	2SB1548-P.CS	1	AD	C	
		BL ass'y						
N	3	10023177	PCB ASSY/LCD1M	TK-M241343*1(M733)	1	CS	B	
N	4	10014320	LCD	LD-B10608E	1	BZ	C	
N	5	10025053	CONNECTOR	M441032-1	2	AR	C	
N	6	10025056	PACKING	M441122-1	2	AB	X	
N	7	10025057	PC-FILM	M441031-1	1	AE	X	
N	8	10021742	REFLECTOR	M141035-1	1	AM	X	

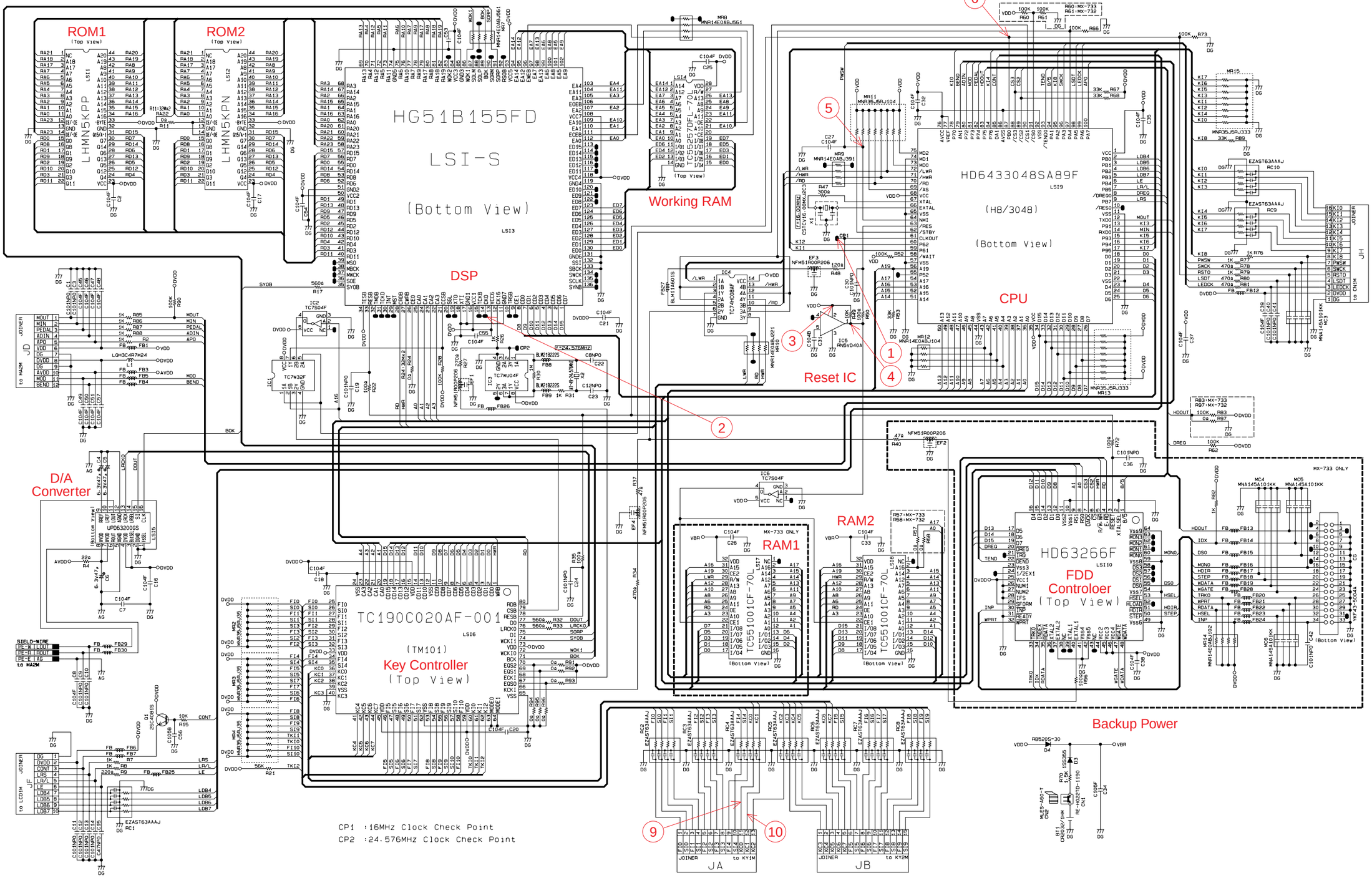
Notes : Q - Quantity per unit
R - Rank

N	Item	Code No.	Part Name	Specification	Q	Price Code	R	Remarks
N	9	10014316	CFL	HMBV4BG2W182NLU AZG	1	AX	B	
	10	69273420	HOLDER/RUBBER	M440758-1	2	AA	X	
	LSI601	2012 6018	LSI	SED1278F2A	1	AV	B	
	Q601,Q602	2253 0710	TRANSISTOR	2SD965-R(TA)	2	AB	C	
N	T601	10025034	TRANSISTOR	TE-CFL733-1M1	1	BB	C	
		CN1 ~ CN2 PCBs						
N	11	10023168	PCB ASSY/CN1M	TK-M241344*1(M732)	1	CI	B	
N	12	10023171	PCB ASSY/CN2M	TK-M341305*1(M732)	1	BY	B	
	D402-D469	23901344	DIODE	1SS133T-77	68	AA	C	
	IC401,IC402	21051239	IC/CMOS	TC74HC164AP	2	AH	C	
N	LED401,LED402 LED405,LED408	10022652	LED	SLZ-281B-22-T2	4	AA	C	
N	LED403,LED406 LED407,LED409	10022653	LED	SLZ-281B-13-T1	4	AA	C	
N	LED404	10022654	LED	SLZ-181B-22-AB-T2	1	AB	C	
		Keyboard						
	13	69222720	KEY SET/LT WHITE	M312118*1	5	AP	B	
	14	69237900	KEY SET/LT76R WHITE	M340231*1	1	AO	B	
	15	69237910	KEY SET/LT76L WHITE	M340230*1	1	AO	B	
	16	69068482	KEY SET/LS BLACK	M140369B-3	2	AJ	B	
N	17	10025058	KEY SET/LSK-8P BLACK	M140369-8	1	AH	B	
N	18	10025059	KEY SET/LSK-3P BLACK	M140369-7	1	AN	B	
N	19	10025055	RUBBER/CONTACT CB	M241297-1	5	AJ	B	
N	20	10025054	RUBBER/CONTACT EB	M241298-1	1	AH	B	
N	21	10025060	RUBBER/CONTACT CG	M241299-1	1	AH	B	
N	22	10023178	PCB ASSY/KY1,2M	TK-M241345*1(M732)	1	CO	B	
		Panel						
N	23	10025062	PORT/SPEAKER	M241300-1	2	AD	X	
N	24	10025077	BND-ASS'Y	TK-M340804*4(M732)	1	BV	C	Bender
N	25	10025078	BND-ASS'Y	TK-M340804*5(M732)	1	BU	C	Modulation
	26	38311105	SPEAKER	S12J96A	2	BM	C	Woofer
	27	38311106	SPEAKER	S05JH48A	2	AT	C	Twitter
	28	69215030	KNOB/SLIDE	M311859-1	2	AA	C	
	29	69269280	RUBBER/BUTTON	M240800-1	1	AU	C	
N	30	10025052	RUBBER/BUTTON	M240801-2	1	AC	C	
	31	69269310	RUBBER/BUTTON	M240803-1	1	AU	C	
	32	69269320	RUBBER/BUTTON	M240804-1	1	AU	C	
N	33	10019019	RUBBER/BUTTON	M241285-1	1	AF	C	
	34	10019021	RUBBER/BUTTON	M241286-1	1	AF	C	
N	35	10019022	RUBBER/BUTTON	M241289-1	1	AC	C	
N	36	10019023	RUBBER/BUTTON	M241290-1	1	AC	C	
N	37	10019025	RUBBER/BUTTON	M241291-1	1	AC	C	
N	38	10019026	RUBBER/BUTTON	M241292-1	1	AC	C	
	39	69259380	RUBBER/BUTTON	M240641-1	1	AB	C	
	40	69259410	RUBBER/BUTTON	M240640-1	4	AB	C	
N	41	10025049	PLATE/DISPLAY	M341269-1	1	AD	C	
N	42	10025069	COVER/BATTERY	M341288*1	1	AV	C	
	43	35022318	CONNECTOR/LITHIUM BATT.	MLES-A60-T	1	AA	X	
	44	10151485	FDD	DF354H064C	1	CW	B	
N	45	10025048	BLACKET L/FDD	M341272-1	1	AD	X	
N	46	10025046	BLACKET R/FDD	M341273-1	1	AD	X	
N	47	10014321	CABLE/FDD	YAF11-0892	1	AT	X	
N	48	10025064	2P CONNECTOR	AMP-2P-105-M733	1	AF	X	
	49	69269420	RUBBER/DAMPER	M440598-2	4	AB	X	
	50	69269431	SPACER	M440597A-1	4	AC	X	
		Accessory						
N		10034272	STAND/MUSIC	M140744-2	1	AI	X	
N		10034273	FLOPPY DISK	WK1800FD-1	1	AV	X	

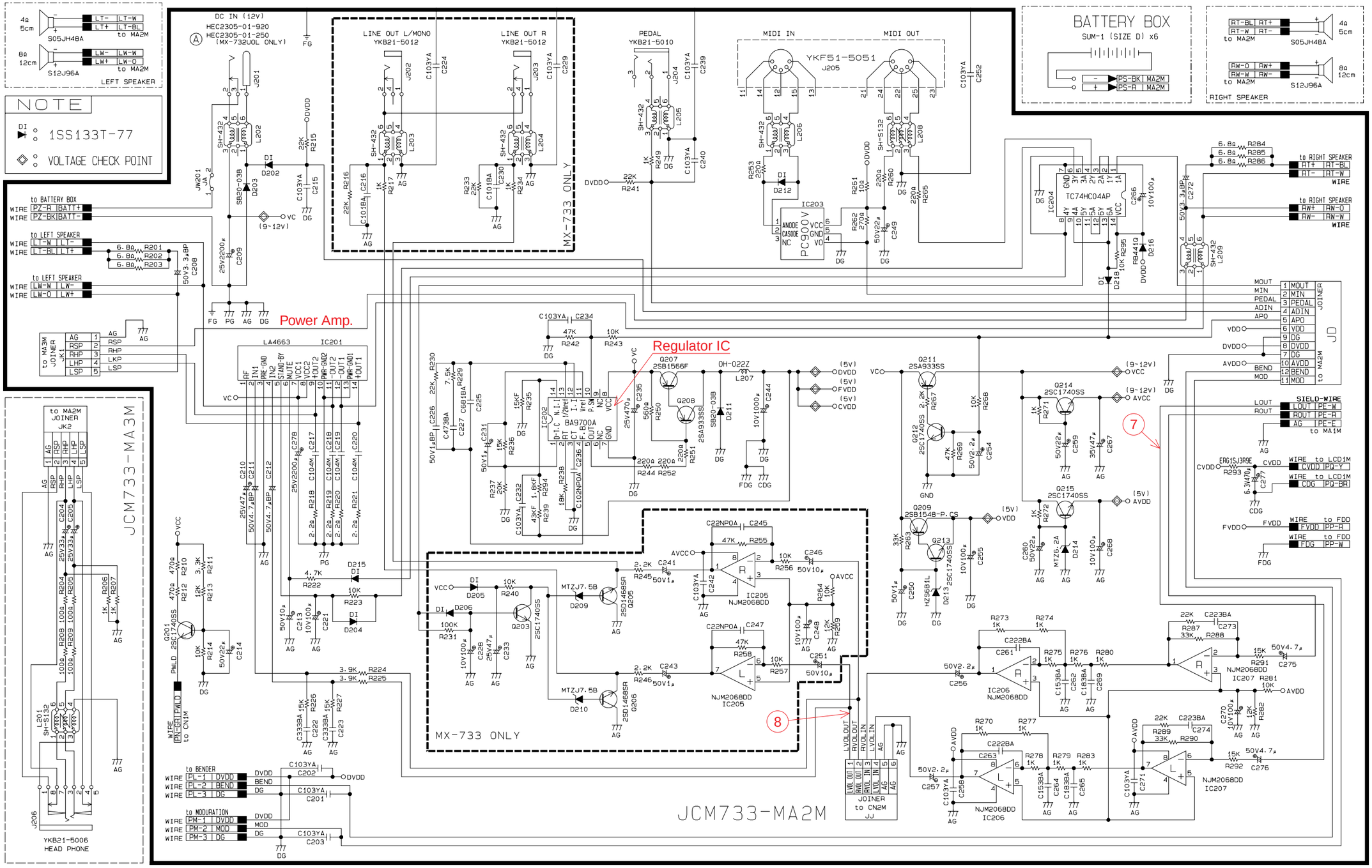
Notes : Q - Quantity per unit
R - Rank

SCHEMATIC DIAGRAMS

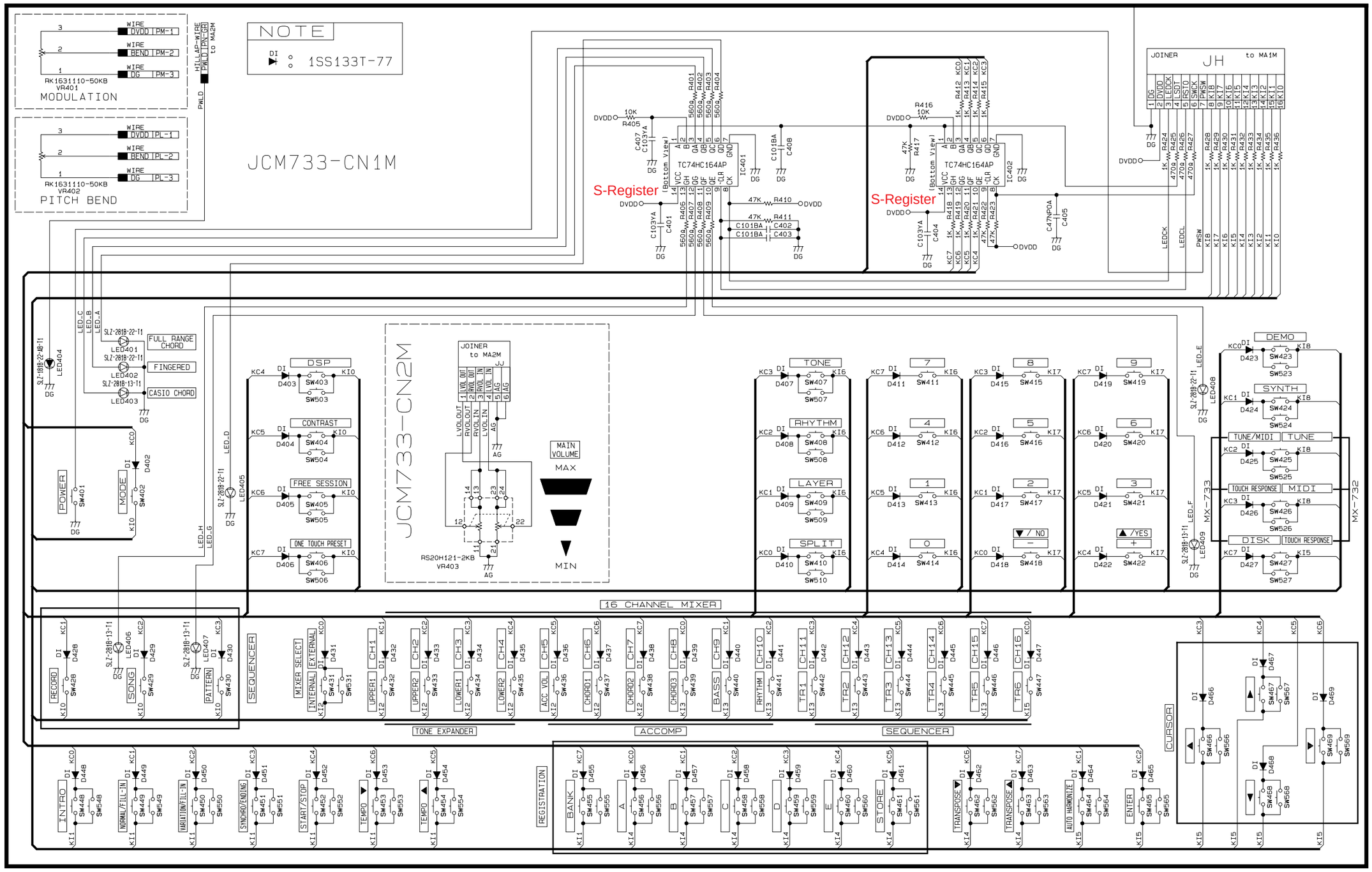
MainPCB JCM733-MA1M



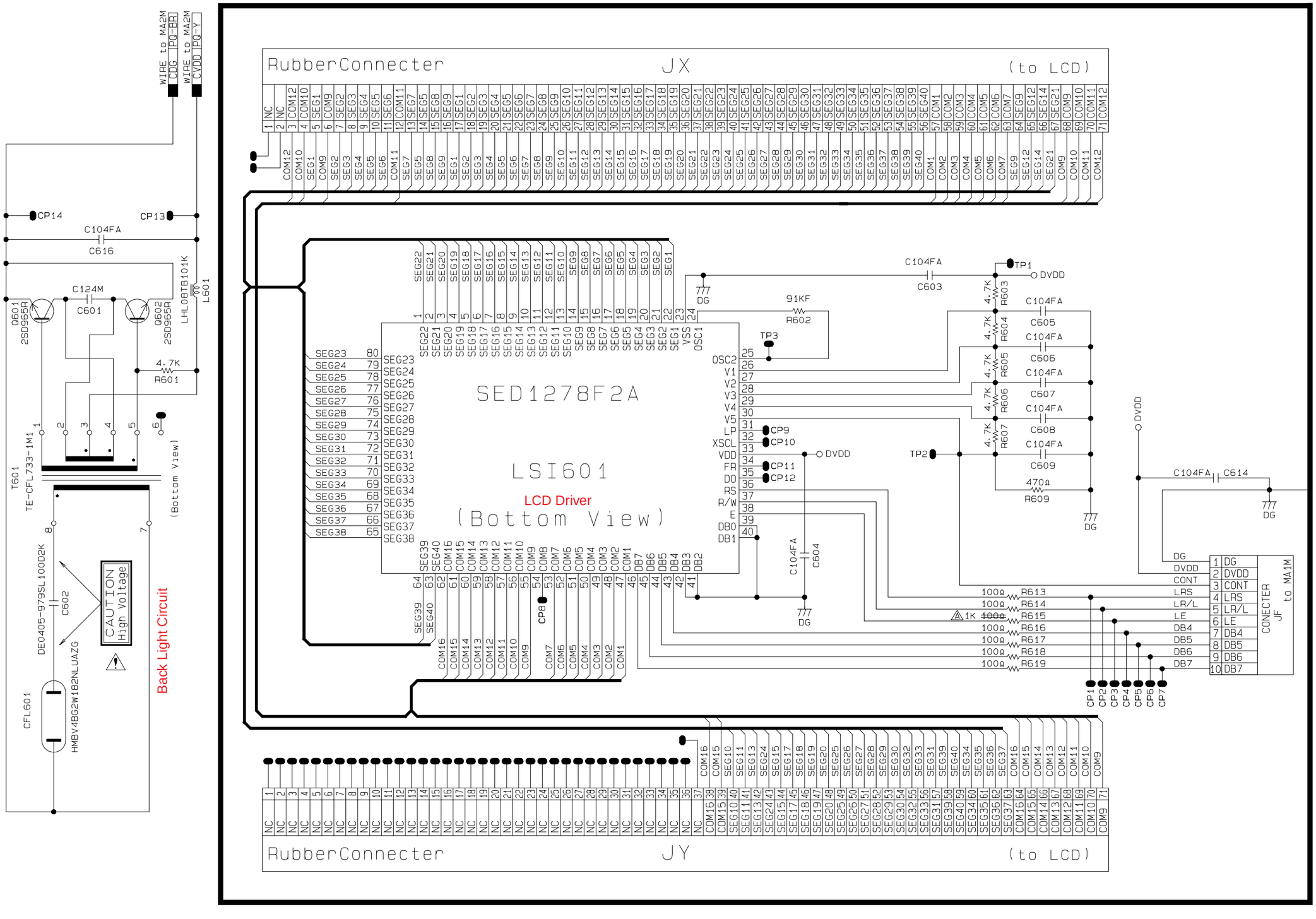
SubPCB JCM733-MA2M/MA3M



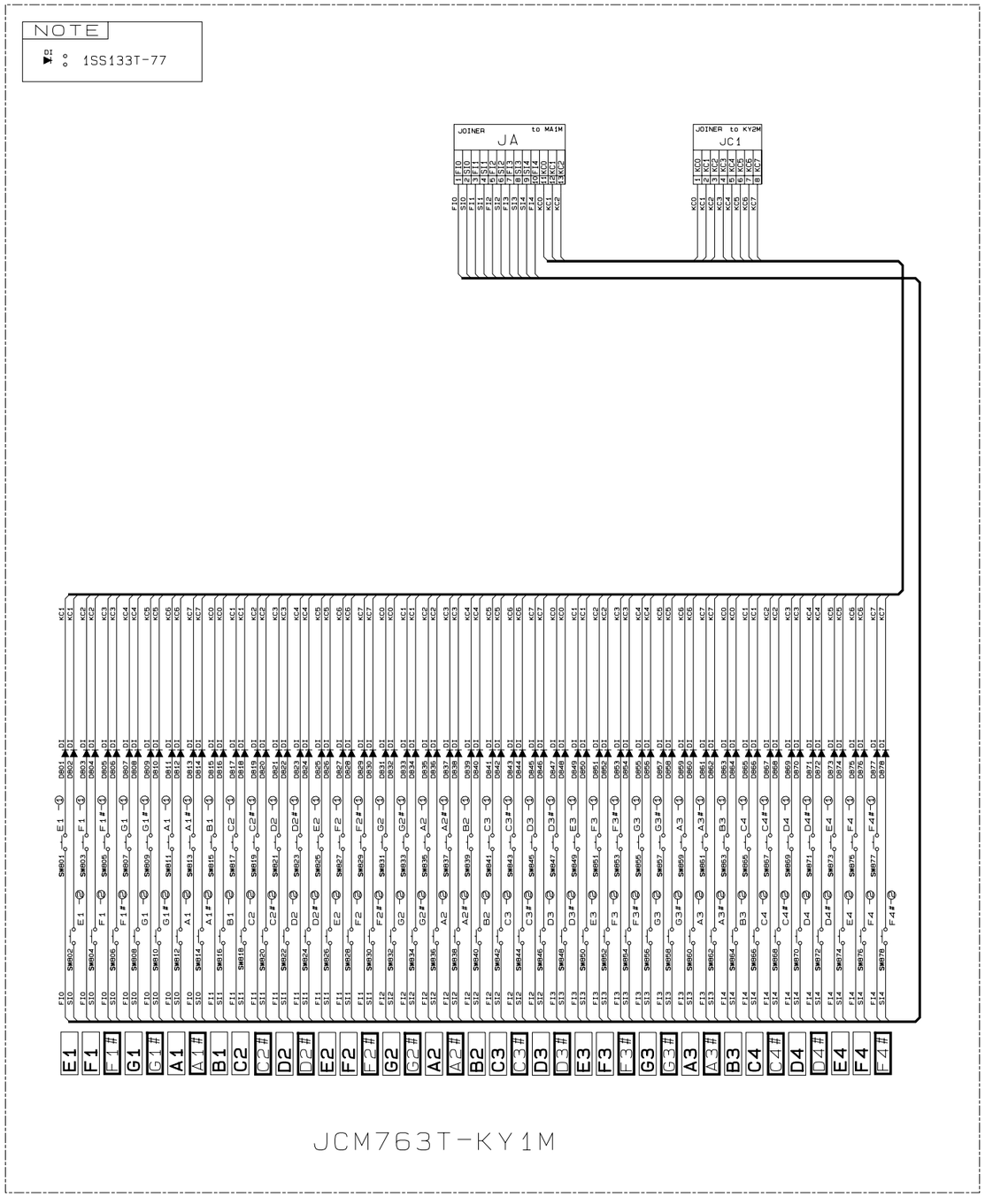
Console PCBs JCM733-CN1M/CN2M

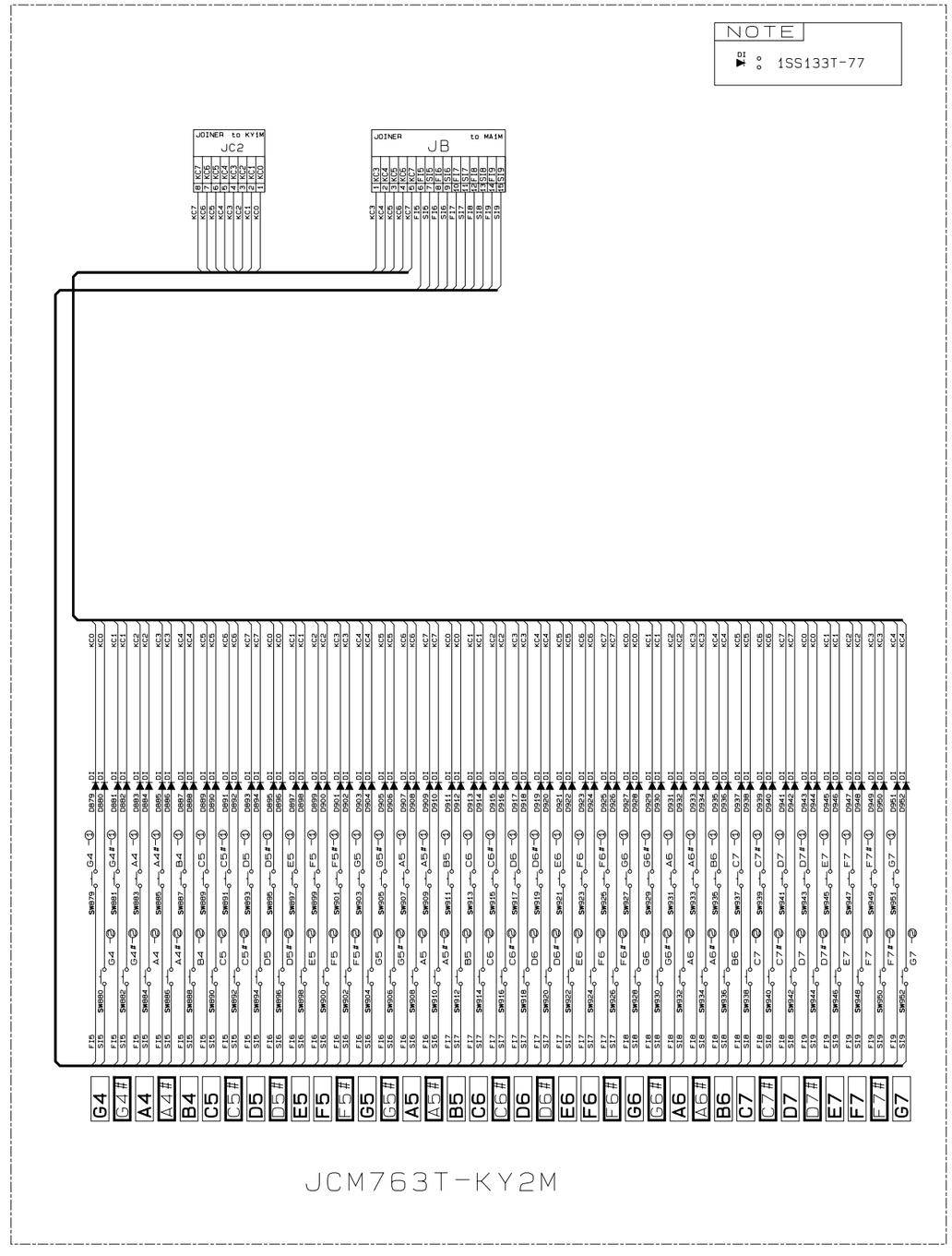


LCD Driver PCB JCM733-LCD1M



Keyboard PCBs JCM763T-KY1M/KY2M





Ver.1 : Apr. 2007

- Correction of the CIRCUIT DESCRIPTION (P6)

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