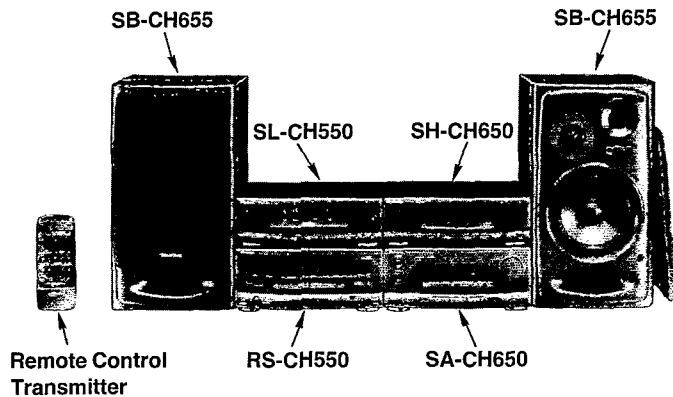


Service Manual

Sound Processor

SH-CH650

Sound Processor



Colour

(K) Black Type

Areas

Suffix for Model No.	Area	Colour
(E)	Europe and Oceania	(K)
(GC)	Asia, Latin America, Middle Near East and Africa	

System: SC-CH650

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

■ SPECIFICATIONS

(DIN 45 500)

■ PRE AMP. SECTION

Input sensitivity and impedance

For (E) area	
PHONO	2.5 mV/47 k Ω
DAT	250 mV/15 k Ω
MIC	0.6 mV/12 k Ω
For (GC) area	
DAT, AUX	250 mV/15 k Ω
MIC	0.6 mV/12 k Ω
Output level	
DAT REC OUT (ANALOG)	150 mV/1.5 k Ω

■ EQUALIZER, SOUND FIELD PROCESSOR SECTION

Equalizer

Center frequency 63, 160, 400, 1 k, 2.5 k, 6.3 k, 12.5 k(Hz)

Fixed mode

SPACE (3 modes) HALL, LIVE, DISCO

GEQ (3 modes) HEAVY, CLEAR, SOFT

CAR/H.P (2 modes) CARST, HP ST

Frequency response

For (E) area

TUNER, CD, TAPE, DAT 15 Hz–20 kHz

PHONO (RIAA STANDARD CURVE) 30 Hz–15 kHz/+1.5, –2.0 dB

For (GC) area

TUNER, CD, TAPE, DAT, AUX 15 Hz–20 kHz

■ GENERAL

Dimensions (W×H×D)

270×89.5×271 mm

Weight

1.7 kg

Notes:

- Specifications are subject to change without notice.
- Weight and dimensions are approximate.
- Total harmonic distortion is measured by the digital spectrum analyzer.

System	Sound processor	Tuner amplifier	Compact disc player	Cassette deck	Speakers
SC-CH650	SH-CH650	SA-CH650	SL-CH550	RS-CH550	*SB-CH655

*(E) area...Made in PAES.

Technics

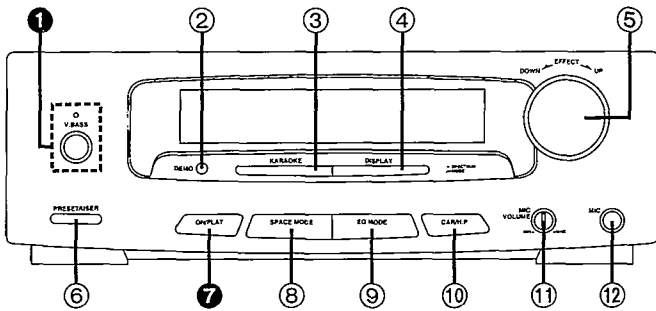
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• DISASSEMBLY INSTRUCTIONS	3, 4	• BLOCK DIAGRAM	15, 16
• SCHEMATIC DIAGRAM	5~10	• FUNCTION OF IC TERMINALS	17
• PRINTED CIRCUIT BOARD DIAGRAM	11~13	• REPLACEMENT PARTS LIST	18, 19, 21, 22
• WIRING CONNECTION DIAGRAM	13	• CABINET PARTS LOCATION	20

NOTES:

Refer to the service manual for Model No. SA-CH650, Order No. AD9211362C2 for information on ACCESSORIES, STACKING THE COMPONENTS, CONNECTIONS and PACKAGING.

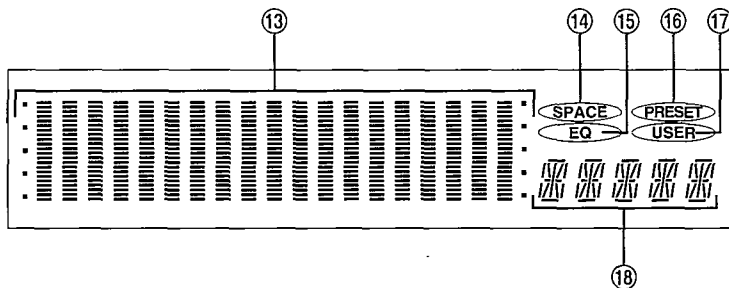
LOCATION OF CONTROLS



The functions indicated by the numbers with black background (for example ①) can also be activated from the remote control.

- ① **V. Bass button and indicator (V. BASS)**
Press to boost the dynamic low-frequency ranges.
- ② **Demonstration button (DEMO)**
Use for reference of the adjustments of equalization curves and SPACE mode sounds. The pre-programmed equalization curves and SPACE mode sounds will be heard sequentially for adjustment example.
- ③ **Voice mute button (KARAOKE)**
Press to perform "KARAOKE" (microphone mixing with an accompaniment).

• Display section



- ⑬ **Multi level display**
Shows the equalization/spectrum analysis level.
- ⑭ **SPACE mode indicator (SPACE)**
Lights when you select the SPACE mode (DISCO, LIVE, HALL).
- ⑮ **Equalizer mode indicator (EQ)**
Lights when you select the equalizer mode (HEAVY, CLEAR, SOFT).
- ⑯ **Preset mode indicator (PRESET)**
Lights when you select the preset mode.
- ⑰ **USER mode indicator (USER)**
Lights when you adjust the level of SPACE mode or equalizer level.
- ⑱ **Sound mode display**
Shows the selected mode of equalization curve or SPACE mode sound.

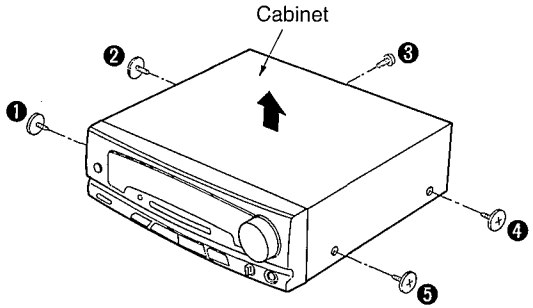
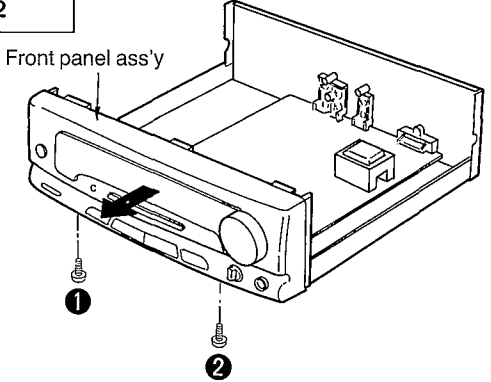
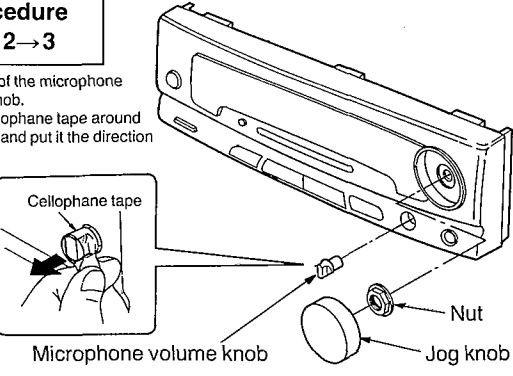
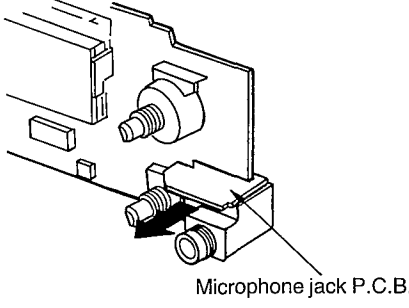
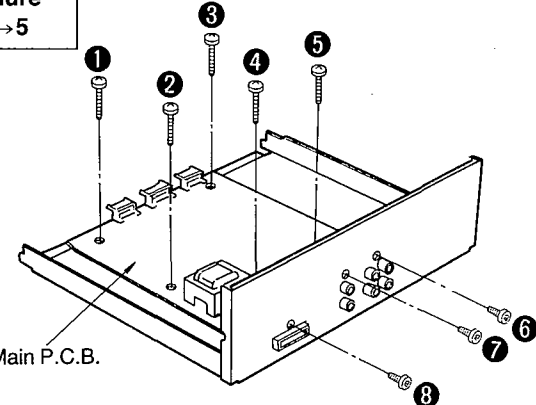
- ④ **Display mode select button (DISPLAY, -SPECTRUM, -MODE)**
Use to select one of 5 spectrum modes.
Press and hold to extinguish the equalization curve.
- ⑤ **Sound effect adjustment control (EFFECT)**
Use to adjust the level of SPACE mode sounds (simulated listening environments), and equalizer level.
- ⑥ **Preset/User mode button (PRESET/USER)**
Press to select either PRESET mode or USER mode.
- ⑦ **Equalizer/SPACE mode ON/FLAT button (ON/FLAT)**
Press to switch the equalizer or SPACE mode on or flat.
- ⑧ **SPACE mode button (SPACE MODE)**
Press to select the SPACE mode.
- ⑨ **Equalizer mode button (EQ MODE)**
Press to select the equalizer mode.
- ⑩ **CAR/H.P mode button (CAR/H.P)**
Press to select the equalizer mode especially programmed for the car audio or headphones stereo use.
- ⑪ **Microphone volume control (MIC VOLUME)**
Use to adjust the microphone volume level.
- ⑫ **Microphone jack (MIC) (∅6, 12 kΩ)**
Plug microphone cord into this jack.

- ⑭ **SPACE mode indicator (SPACE)**
Lights when you select the SPACE mode (DISCO, LIVE, HALL).
- ⑮ **Equalizer mode indicator (EQ)**
Lights when you select the equalizer mode (HEAVY, CLEAR, SOFT).
- ⑯ **Preset mode indicator (PRESET)**
Lights when you select the preset mode.
- ⑰ **USER mode indicator (USER)**
Lights when you adjust the level of SPACE mode or equalizer level.
- ⑱ **Sound mode display**
Shows the selected mode of equalization curve or SPACE mode sound.

DISASSEMBLY INSTRUCTIONS

"ATTENTION SERVICER"

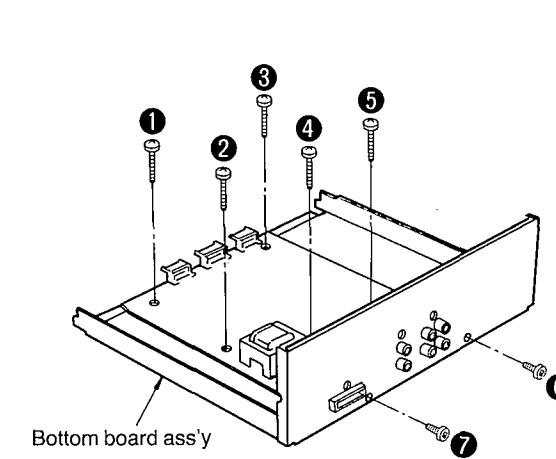
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 1	Removal of the Cabinet	Ref. No. 2	Removal of the Front Panel Ass'y
Procedure 1	 <ol style="list-style-type: none"> Remove the 5 screws (1~5). Remove the cabinet in the direction of arrow. 	Procedure 1→2	 <ol style="list-style-type: none"> Remove the 2 screws (1, 2). Remove the front panel ass'y in the direction of arrow.
Ref. No. 3	Removal of the Operation P.C.B.		
Procedure 1→2→3	<p>*Removal of the microphone volume knob. •Wind cellophane tape around the knob and put it the direction of arrow.</p>  <ol style="list-style-type: none"> Pull out the microphone volume knob. Pull out the jog knob. Remove the nut. 	Ref. No. 4	Removal of the Main P.C.B.
Ref. No. 4	Removal of the Microphone Jack P.C.B.	Ref. No. 5	Removal of the Main P.C.B.
Procedure 1→2→3→4	 <p>•Remove the microphone jack P.C.B. in the direction of arrow.</p>	Procedure 1→2→5	 <p>•Remove the 8 screws (1~8).</p>

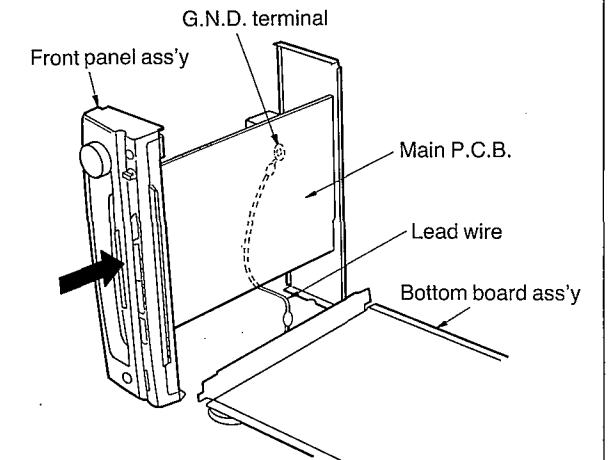
Ref. No.
6

How to check the Main P.C.B.
Procedure
1→2→6

•When checking the soldered surfaces of main P.C.B. and replacing the parts, do as shown below.



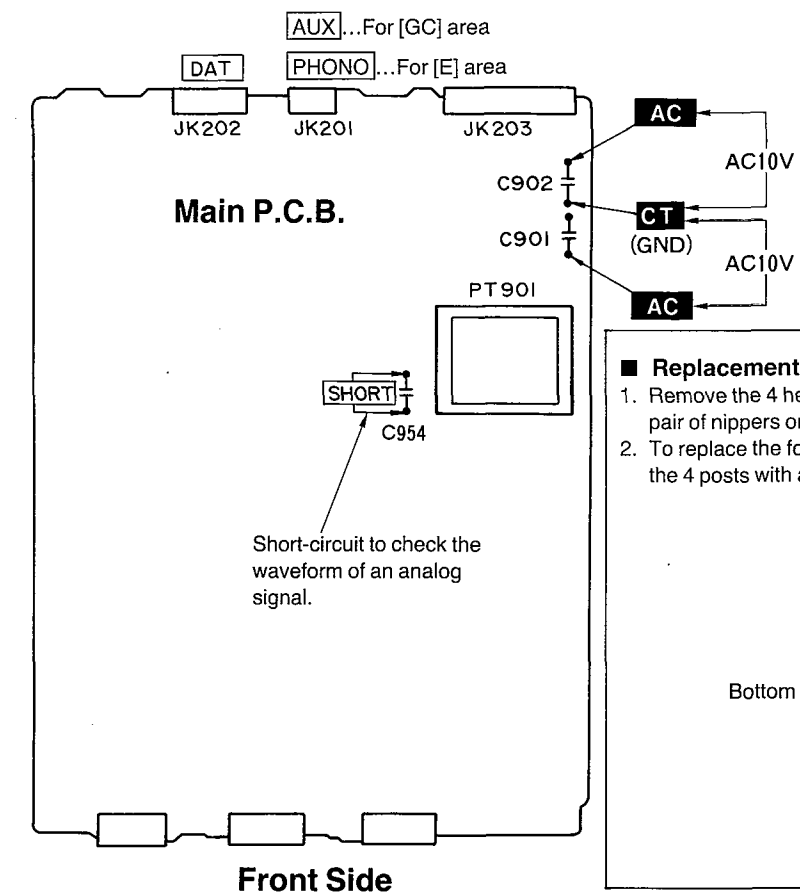
- Remove the 7 screws (1~7).
- Remove the bottom board ass'y.



- Reinstall the front panel ass'y to the main P.C.B.
- Connect the G.N.D. terminal to the bottom board ass'y using the lead wire.

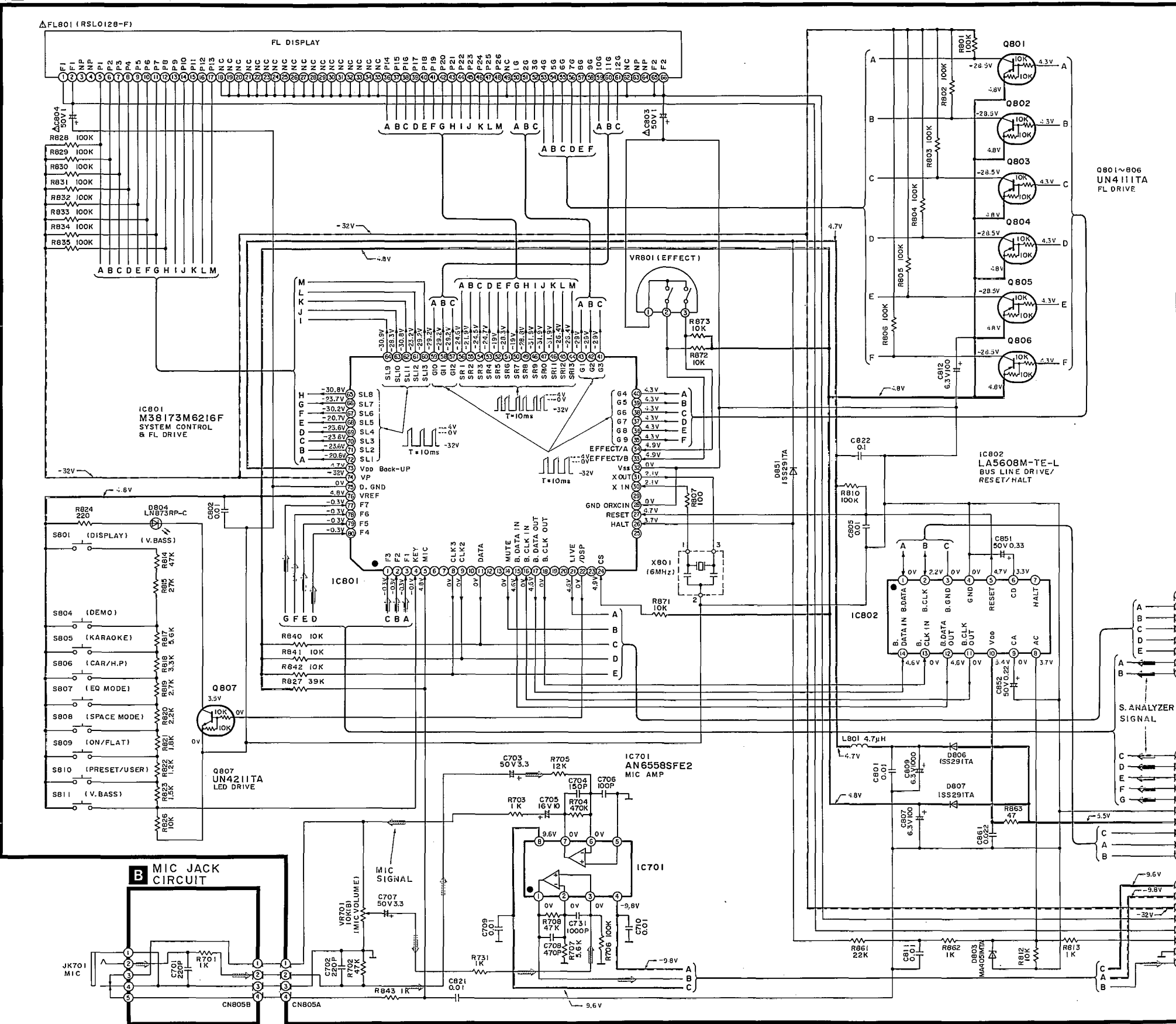
■ This unit (SH-CH650) is actuated by power supply from the tuner amplifier SA-CH650. If you wish to actuate this unit without using the tuner amplifier SA-CH650 for checking or repairing, follow the below procedures.

- Short-circuit the terminal of the capacitor (C954).
- Apply AC 10 V between AC (C901) - CT (C901, C902) - AC (C902).



SCHEMATIC DIAGRAM • OPERATION/MIC JACK CIRCUIT (Parts list on pages 18, 19, 21, 22.)

A OPERATION CIRCUIT



Notes:

- S801 : Display mode select switch (DISPLAY, -SPECTRUM, -MODE)
- S804 : Demonstration switch (DEMO)
- S805 : Voice mute switch (KARAOKE)
- S806 : CAR/H.P mode switch (CAR/H.P)
- S807 : Equalizer mode switch (EQ MODE)
- S808 : Space mode switch (SPACE MODE)
- S809 : Equalizer/Space mode ON/FLAT switch (ON/FLAT)
- S810 : Preset/User mode switch (PRESET/USER)
- S811 : V. Bass switch (V. Bass)

•Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

•Important safety notice:

Components identified by Δ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

•This schematic diagram may be modified at any time with the development of new technology.

•Caution!

IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair. Cover the parts boxes made of plastics with aluminum foil. Ground the soldering iron. Put a conductive mat on the work table. Do not touch the legs of IC or LSI with the fingers directly.

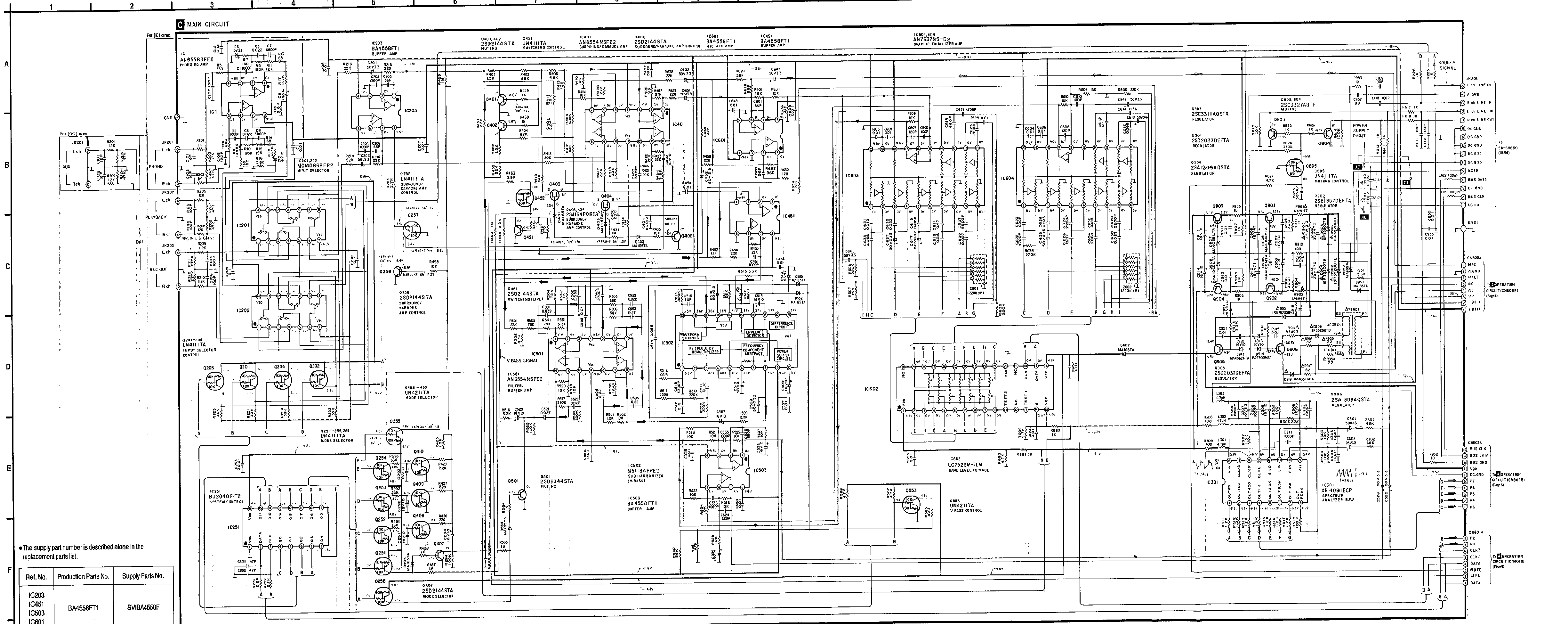
- : Source signal line
- : Rec out signal line
- : V. Bass signal line
- : Spectrum analyzer signal line
- : Mic signal line
- : Positive voltage line
- : Negative voltage line

To MAIN CIRCUIT (CN801A) (Page 10)

To MAIN CIRCUIT (CN802A) (Page 10)

To MAIN CIRCUIT (CN803A) (Page 10)

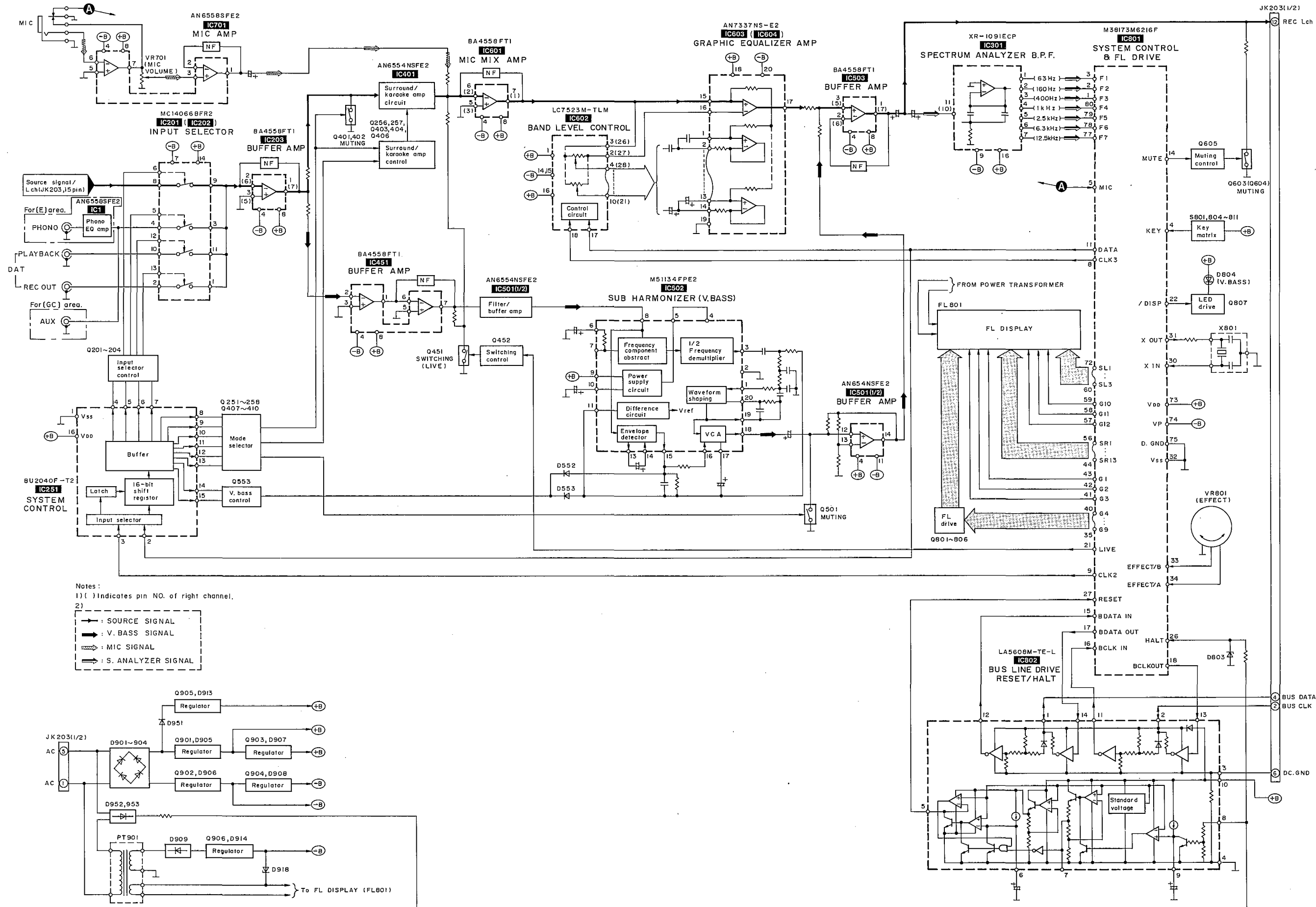
SCHEMATIC DIAGRAM • MAIN CIRCUIT (Parts list on pages 18, 19, 21, 22.)



•The supply part number is described alone in the replacement parts list.

Ref. No.	Production Parts No.	Supply Parts No.
IC203		
IC451	BA4558FT1	SVIBA4558F
IC503		
IC601		

BLOCK DIAGRAM



FUNCTION OF IC TERMINALS

●IC801 (M38173M6216F)

Pin No.	Signal Name	I/O	Description	Pin No.	Signal Name	I/O	Description
1 2 3	F3 F1	I	Spectrum analyzer input	25	—	—	No use (normally at "L")
4	KEY	I	Key input	26	HALT	I	Power failure detection input (AC 50 Hz or 60 Hz)
5	MIC	I	MIC connection detection input (MIC IN="L")	27	RESET	I	RESET input
6	—	—	Strobing input for TC916 4N (normally at "L") (No use)	28	GND OR XCIN	I	Pulls up to +10 V
7	—	—	No use (normally at "L") (No use)	29	—	—	No use (free terminal)
8	CLK3	O	Clock output for M50253, switching output video (normally at "L")	30	XIN	I	Ceramic oscillator connection for system clock generation (6 MHz)
9	CLK2	O	Clock output for LC7523 (normally at "L")	31	XOUT	O	
10	—	—	Clock output for TC9164 (normally at "L") (No use)	32	V _{SS}	—	GND connection
11	DATA	O	Data output for TC9164, BU2040, AND LC7523	33	EEFFECT/B	I	JOG input
12 13	—	—	No use (normally at "L")	34	EEFFECT/A	I	
14	MUTE	O	Muting signal output (normally at "L")	35 36 40	G9 G4	O	Grid output for fluorescent character display tube
15	B.DATA IN	I	Bus data input	41 42 43	G3 G1	O	Grid output for fluorescent character display tube
16	B.CLK IN	I	Bus clock input	44 45 56	SR13 SR1	O	Segment output for fluorescent character display tube
17	B.DATA OUT	O	Bus data output (normally at "L")	57 58 59	G12 G10	O	Grid output for fluorescent character display tube
18	B.CLK OUT	O	Bus clock output (normally at "L")	60 61 72	SL13 SL1	O	Segment output for fluorescent character display tube
19	—	—	Video switching output (No use)	73	V _{DD} Back-up	—	+5 V connection
20	—	—					
21	LIVE	O	At "L" when SPACE control mode is LIVE	74	VP	—	VP connection for fluorescent character display tube
22	/DSP	O	At "H" during BASS SYNTHESIZER ON	75	D.GND	—	GND connection
23	—	—	No use (normally at "L")	76	VREF	—	Reference voltage for A/D converter (connected to V _{CC})
24	CS	—	Chip selection (No use) H: with JOG L: without JOG	77 78 80	F7 F4	I	Spectrum analyzer input

REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by Δ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		D401-404	MA165	DIODE	
				D552-554	MA165	DIODE	
				D602	MA165	DIODE	
IC1	AN6558SFE2	I. C, PHONO EQ. AMP.	(E)	D803	MA4051MTA	DIODE	
IC201, 202	MC14066BFR2	I. C, INPUT SELECTOR		D804	LN873RP-C	DIODE (L. E. D.)	
IC203	SVIBA4558F	I. C, BUFFER AMP.		D806, 807	1SS291TA	DIODE	
IC251	BU2040F-T2	I. C, SYSTEM CONTROL		D851	1SS291TA	DIODE	
IC301	XR-1091ECP	I. C, SPECTRUM ANALYZER		D901-904	1SR35200TB	DIODE	Δ
IC401	AN6554NSFE2	I. C, SURROUND AMP.		D905, 906	MA4100MTA	DIODE	
IC451	SVIBA4558F	I. C, BUFFER AMP.		D907, 908	MA4068L	DIODE	
IC501	AN6554NSFE2	I. C, FILTER/BUFFER AMP.		D909	1SR35200TB	DIODE	Δ
IC502	MS1134PPE2	I. C, SUB HARMONIZER		D913	MA4062-H	DIODE	
IC503	SVIBA4558F	I. C, BUFFER AMP.		D914	MA4300M	DIODE	
IC601	SVIBA4558F	I. C, MIC MIX AMP.		D918	MA4051MTA	DIODE	Δ
IC602	LC7523M-TLM	I. C, BAND LEVEL CONTROL		D951	1SR35200TB	DIODE	Δ
IC603, 604	AN7337NS-E2	I. C, GRAPHIC EQUALIZER AMP.		D952, 953	MA185TA	DIODE	
IC701	AN6558SFE2	I. C, MIC AMP.				VARIABLE RESISTOR(S)	
IC801	M38173M6216F	I. C, FL. DRIVE/SYSTEM CONT.		VR701	EVJ02BF01B14	V. R, MIC VOLUME	
IC802	LA5608M-TE-L	I. C, BUS LINE DRIVE/RESET		VR801	EVQMPWF1512B	V. R, JOG CONTROL	
		TRANSISTOR(S)				COMPONENT COMBINATION(S)	
Q201-204	UN4111	TRANSISTOR				COMPONENT COMBINATION	
Q251-255	UN4111	TRANSISTOR				COIL(S)	
Q256	2SD2144S	TRANSISTOR		Z601, 602	EXBF7E224JYV	COMPONENT COMBINATION	
Q257, 258	UN4111	TRANSISTOR					
Q401, 402	2SD2144S	TRANSISTOR		L101, 102	ELEXT101KA9	COIL	
Q403, 404	2SJ164PQRTA	TRANSISTOR		L301-303	ELEPK4R7KA	COIL	
Q406, 407	2SD2144S	TRANSISTOR		L801	ELEXT4R7KA9	COIL	
Q408-410	UN4211	TRANSISTOR				OSCILLATOR(S)	
Q451	2SD2144S	TRANSISTOR					
Q452	UN4111	TRANSISTOR					
Q501	2SD2144S	TRANSISTOR					
Q553	UN4211	TRANSISTOR					
Q603, 604	2SC3327-A	TRANSISTOR		X801	RSXY6M00M01T	OSCILLATOR (6MHz)	
Q605	UN4111	TRANSISTOR					
Q801-806	UN4111	TRANSISTOR				DISPLAY(S)	
Q807	UN4211	TRANSISTOR					
Q901	2SD2037DEFTA	TRANSISTOR		FL801	RSLO128-F	FL DISPLAY	Δ
Q902	2SB1357DEFTA	TRANSISTOR					
Q903	2SC3311A-Q	TRANSISTOR				SWITCH(ES)	
Q904	2SA1309A-R	TRANSISTOR					
Q905	2SD2037DEFTA	TRANSISTOR		S801	EVQ21405R	SW, DISPLAY	
Q906	2SA1309A-R	TRANSISTOR		S804	EVQ21405R	SW, DEMO	
		DIODE(S)		S805	EVQ21405R	SW, KARAOKE	
				S806	EVQ21405R	SW, CAR/H. P.	
				S807	EVQ21405R	SW, EQ. MODE	

■ CABINET PARTS LOCATION

Ref. No.	Part No.	Part Name & Description	Remarks
S808	EVQ21405R	SW, SPACE MODE	
S809	EVQ21405R	SW, ON/FLAT	
S810	EVQ21405R	SW, PRESET/USER	
S811	EVQ21405R	SW, V. BASS	
		CONNECTOR (S)	
CN801A	RJU003K008M1	SOCKET (8P)	
CN802A	RJU003K010M1	SOCKET (10P)	
CN803A	RJU003K008M1	SOCKET (8P)	
CN805A	RJT057W004-1	CONNECTOR (4P)	
CN801B	RJT003K008-1	CONNECTOR (8P)	
CN802B	RJT003K010-1	CONNECTOR (10P)	
CN803B	RJT003K008-1	CONNECTOR (8P)	
CN805B	RJU057W004	SOCKET (4P)	
		EARTH TERMINAL (S)	
E901	SNE1004-1	GND PLATE	
		TRANSFORMER (S)	
PT901	RTP114G003	POWER TRANSFORMER	△
		JACK (S)	
JK201	SJF3068N	PHONO TERMINAL	
JK202	SJF3069-5N	DAT TERMINAL	
JK203	RJT065K15	CONNECTOR (15P)	
JK701	RJJ65MA02	MIC JACK	

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RHD30007	SCREW	
2	RKMD203-1K	CABINET	
3	XTB3+8JFZ	SCREW	
4	RGRO146B-H	REAR PANEL	(E)
4	RGRO146B-J	REAR PANEL	(GC)
5	RGW0048-K	KNOB, MIC VOLUME	
6	RFKJHCH550PP	BOTTOM BOARD ASS'Y	
6-1	RKA0055-N	FOOT	
7	FMN0184-1	HOLDER	
8	RGL0169-Q	LENS	
9	RFKGGHCH650EK	FRONT PANEL ASS'Y	
9-1	RKW0251-K	FL PANEL	
10	RGU0770-K	BUTTON, EQ.	
11	RGU0832-K	BUTTON, V. BASS	
12	XTBS26+8J	SCREW	
13	XTWS3+10T	SCREW	
14	SHE185-2	P. C. B. SPACER	
15	XTBS3+8JFZ1	SCREW	
16	XTB3+16JFZ	SCREW	
17	RGW0113-2K2	KNOB, JOG CONTROL	
18	SNE4021-1	NUT	
19	SNE2123	GND SCREW	(E)

