JVC

SERVICE MANUAL

FM / MW / LW TUNER

FX-F1GD
FX-F1RGD
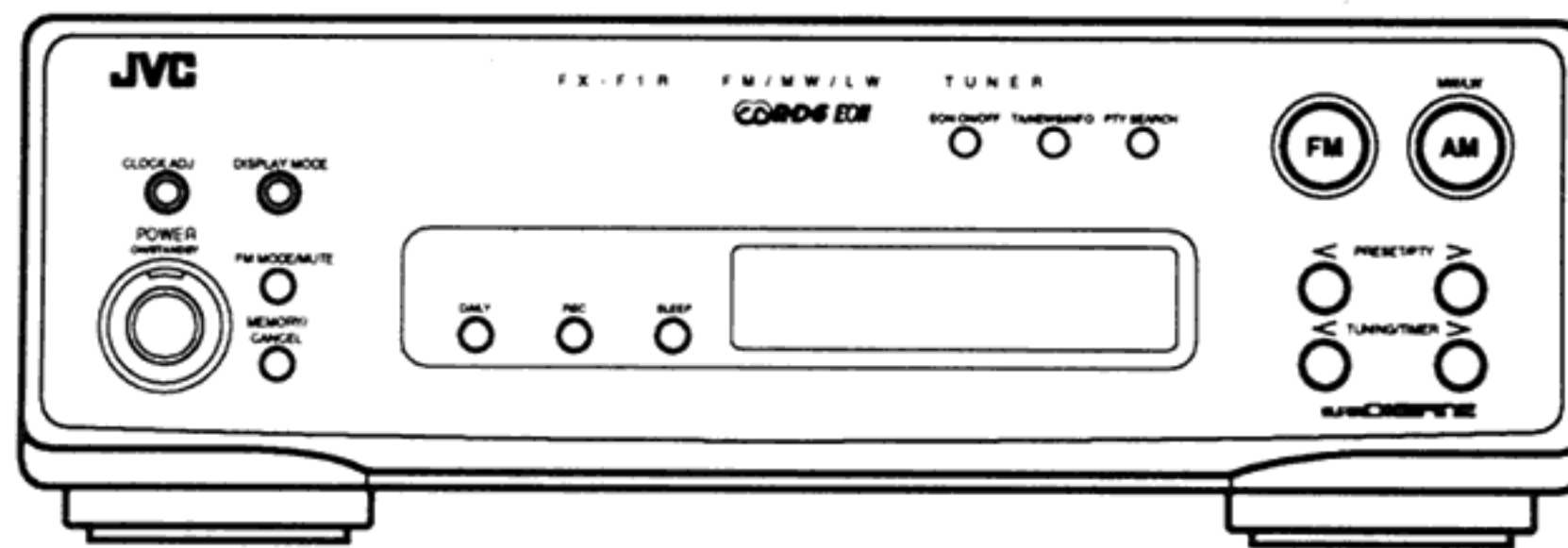
Area Suffix

BS	....	the U.K.
EF	....	Continental Europe Except Germany and Italy
EN	....	Nordic Countris
G	.....	Germany
GI	....	Italy
US	....	Singapore
UT	....	Taiwan
UB	....	Hong Kong
U	.....	Other Area

COMPU LINK
Component

Contents

No.20551
Sep. 1995

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Services should be performed by qualified personnel only.

2. Alterations of the design or circuitry of the product should not be made. Any design alterations of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacture of responsibility for personal injury or property damage resulting therefrom.

3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute repalcement which does not have the same safety characteristics as the recommended replacement parts shown in the Parts List of Service Manual may create shock, fire, or other hazards.

4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.

5. Leakage currnet check (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.

   ● Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal parts of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5mA AC (r.m.s.).

   ● Alternate check method
   Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having, 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500Ω 10 W resistor paralleled by a 0.15 µF AC-type capacitor between an exposed metal part and a known good earth ground.
   Measure the AC voltage across the resistor with the AC voltmeter.
   Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and meausre the AC voltage across the resistor.
   Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).

AC VOLTMETER (Having 1000 ohms/volts, or more sensitivity.)

0.15 µF AC TYPE

1500Ω 10W

Place this probe on each exposed metal part.

Good earth ground
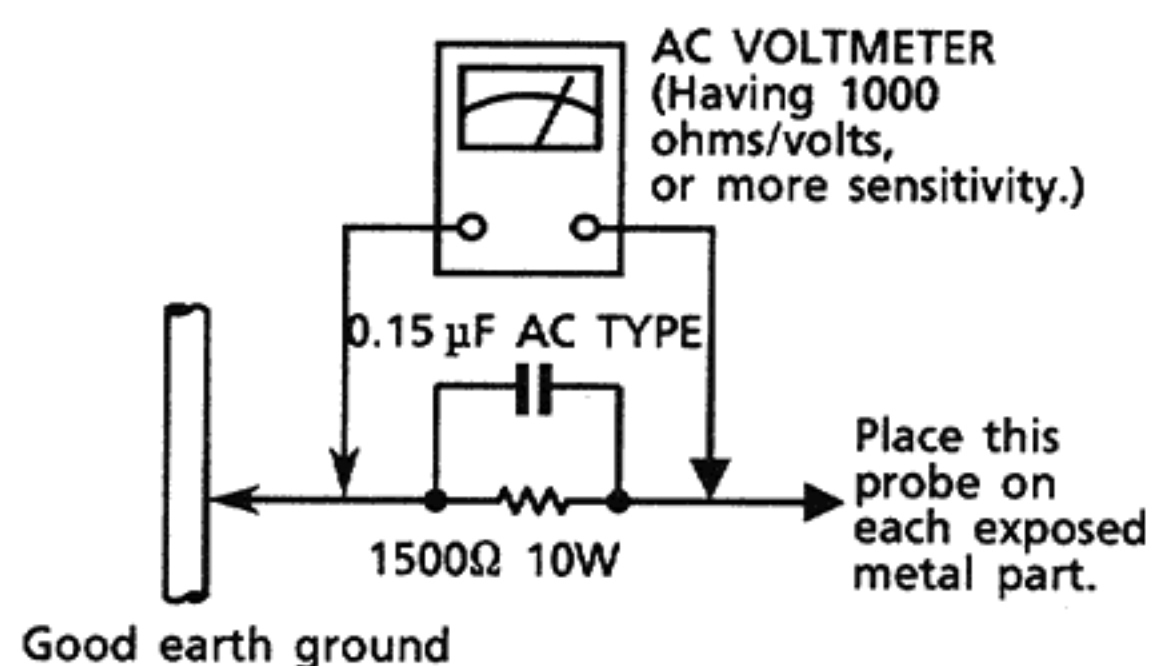
Warning

1. This equipment has been designed and manufactured to meet international safety standards.
2. It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
3. Repairs must be made in accordance with the relevant safety standards.
4. It is essential that safety critical components are replaced by approved parts.
5. If mains voltage selector is provided, check setting for local voltage.

Description of Major LSIs

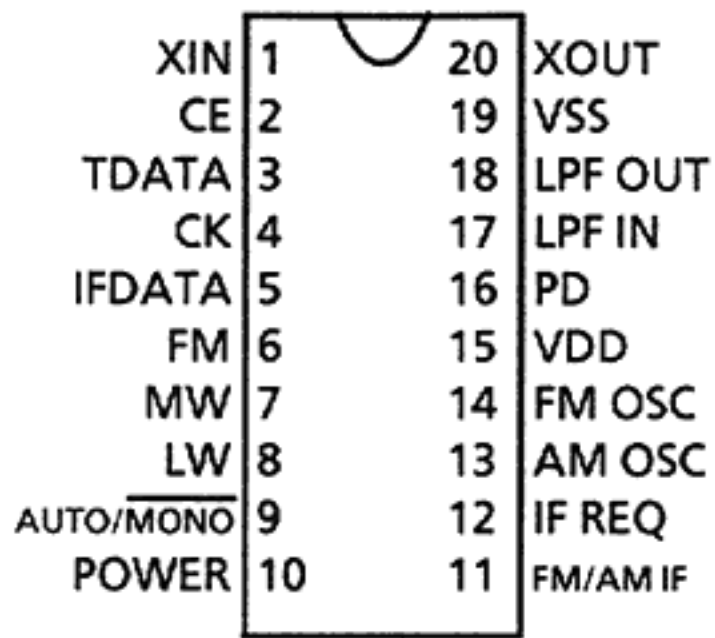■ MN172124J6E (IC201) : SYSTEM CONTROLLER

1. Terminal Layout

```
      63  ~  43

64                42

 ⌇                ⌇

84                22

      1   ~  21
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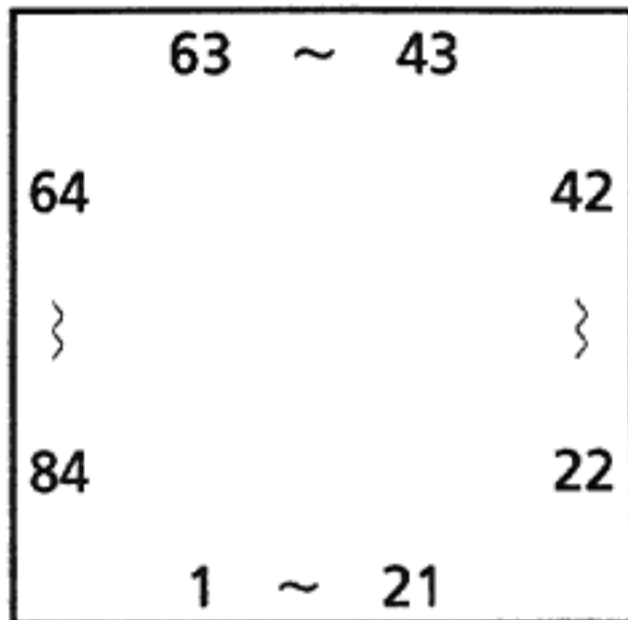
2. Key Matrix

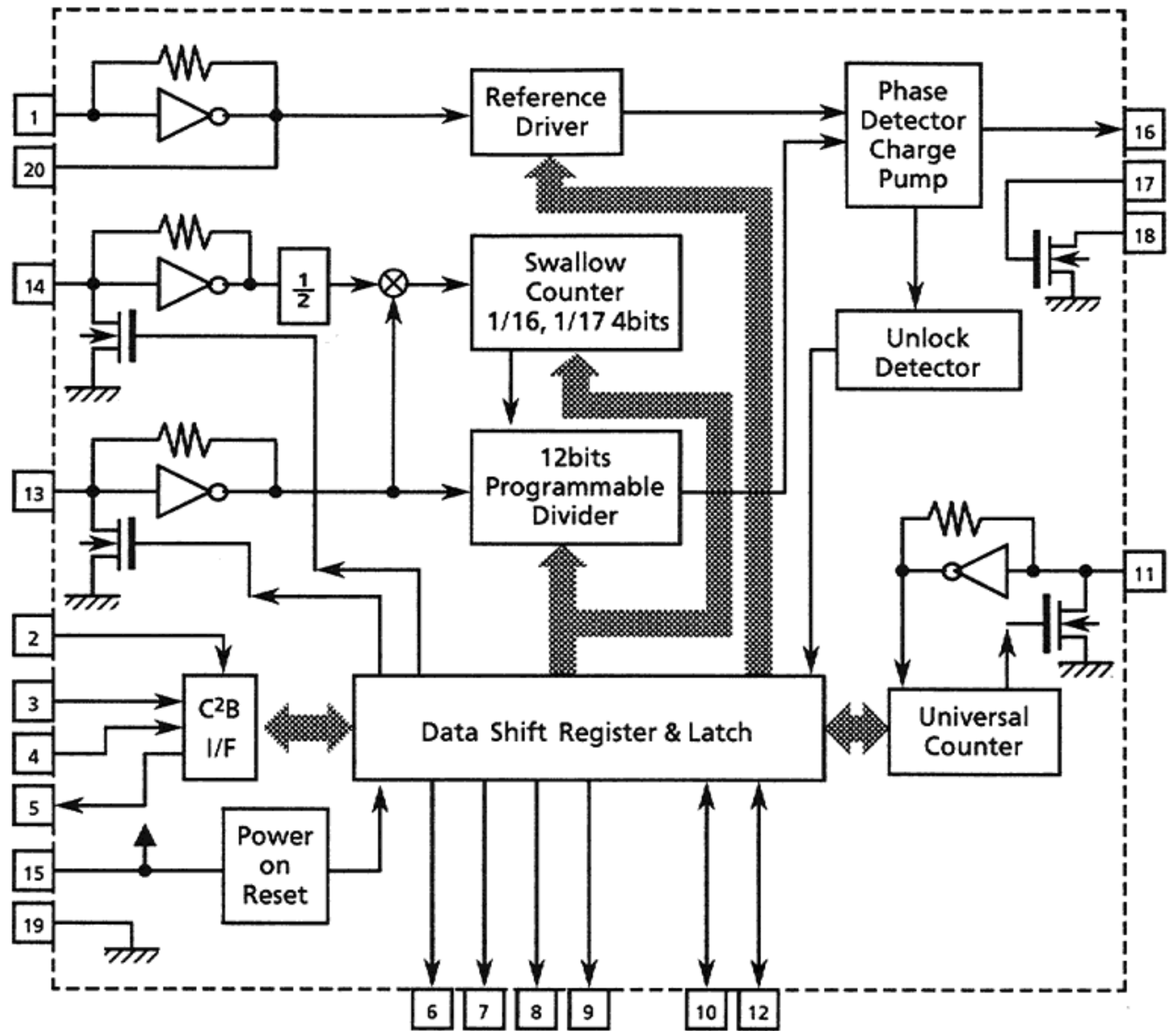|	KEY IN 0 (PIN56)	KEY IN 1 (PIN57)	KEY IN2 (PIN58)	KEY IN3 (PIN59)
KEY OUT 0 (PIN60)	POWER	SLEEP	REC	DAILY
KEY OUT 1 (PIN61)	DISPLAY (AUTO MEMORY)	CLOCK ADJ	FM MODE (MEMORY)	MEMORY (CANCEL)
KEY OUT 2 (PIN62)	DOWN	UP	PRESET DOWN	PRESET UP
KEY OUT 3 (PIN63)	EON ON/OFF (DISPLAY)	EON MODE (FM MODE)	PTY SEARCH (PRESET SCAN)	—
KEY OUT 4 (PIN64)	—	—	FM	AM

3. Description

Pin No.	Symbol	I/O	Description	Pin No.	Symbol	I/O	Description
1	7G	O	FL grid control	43	TUDATA	O	Data for PLL synthesizer
2	6G	O	FL grid control	44	fout	O	Clock frequency
3	5G	O	FL grid control	45	RDS CLK	I	Clock input from IC191
4	4G	O	FL grid control	46	RDS DATA	I	Data signal from IC191
5	3G	O	FL grid control	47	RDS RST	O	Reset signal for IC191
6	2G	O	FL grid control	48	INH	I	Inhibit signal input
7	1G	O	FL grid control	49	RDS D.ST	I	D.Start signal from IC191
8	P1	O	FL anode control	50	TUNED	I	TUNED indication control
9	P2	O	FL anode control	51	STEREO	I	STEREO indication control
10	P3	O	FL anode control	52	MUTE	O	Muting tuner sound
11	P4	O	FL anode control	53	STANDBY	O	STANDBY indication control
12	P5	O	FL anode control	54	DCS OUT	O	Compulink signal output
13	P6	O	FL anode control	55	DCS IN	I	Compulink signal input
14	P7	O	FL anode control	56	KI0	I	Key matrix input
15	P8	O	FL anode control	57	KI1	I	Key matrix input
16	P9	O	FL anode control	58	KI2	I	Key matrix input
17	P10	O	FL anode control	59	KI3	I	Key matrix input
18	P11	O	FL anode control	60	KO0	O	Key matrix output
19	P12	O	FL anode control	61	KO1	O	Key matrix output
20	P13	O	FL anode control	62	KO2	O	Key matrix output
21	P14	O	FL anode control	63	KO3	O	Key matrix output
22	P15	O	FL anode control	64	KO4	O	Key matrix output
23	VP	--	Power supply for FL display	65	KO5	O	Key matrix output
24	P16	O	FL anode control	66	KO6	O	Key matrix output
25	P17	O	FL anode control	67		--	Not used
26	P18	O	FL anode control	68	RST	I	Reset signal input
27	P19	O	FL anode control	69		--	GND
28	P20	O	FL anode control	70		--	Not used
29	P21	O	FL anode control	71		--	GND
30	P22	O	FL anode control	72	OSC2	I/O	Clock oscillation terminal
31	P23	O	FL anode control	73	OSC1	I/O	Clock oscillation terminal
32	P24	O	FL anode control	74	VDD	--	Power supply
33	P25	O	FL anode control	75			
34	P26	O	FL anode control	76		--	GND
35	P27	O	FL anode control	77		--	Not used
36	P28	O	FL anode control	78	P35	O	FL anode control
37	P29	O	FL anode control	79	P34	O	FL anode control
38	P30	O	FL anode control	80	P33	O	FL anode control
39	P36	O	FL anode control	81	P32	O	FL anode control
40	CE	O	Chip enable signal for PLL synthesizer	82	P31	O	FL anode control
41	CLK	O	Clock for PLL synthesizer	83	9G	O	FL grid control
42	IFDATA	I	Data from PLL synthesizer	84	8G	O	FL grid control

FX-F1GD
FX-F1RGD

■ LC72131M (IC121) : PLL Synthesizer

1. Terminal Layout

XIN	1	20	XOUT
CE	2	19	VSS
TDATA	3	18	LPF OUT
CK	4	17	LPF IN
IFDATA	5	16	PD
FM	6	15	VDD
MW	7	14	FM OSC
LW	8	13	AM OSC
AUTO/MONO	9	12	IF REQ
POWER	10	11	FM/AM IF

2. Block Diagram

3. Pin Functions

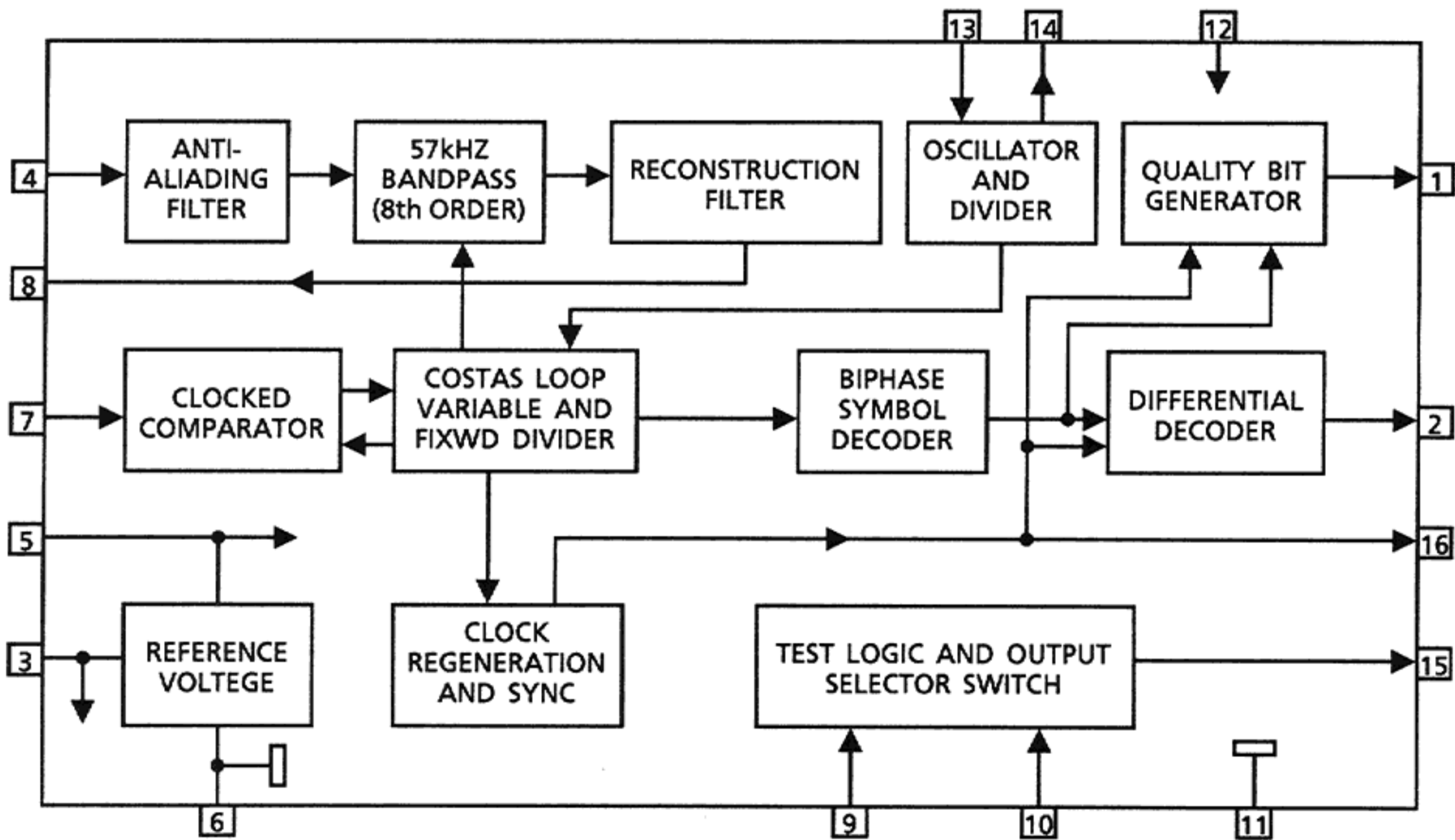| Pin No.	Symbol	I/O	Functions	Pin No.	Symbol	I/O	Functions
1	X in	I	Crystal oscillator (7.2MHz).	11	FM/AM IF	I	Universal counter input
2	CE	I	Fix the chip enable to "H" when inputting (DI) and outputting (DO) the serial data.	12	IF REQ	O	Output the "IF-signal request" to IC102
3	TDATA	I	Receive the control data from the controller (IC201).	13	AM IN	I	Input the local oscillator signal of AM.
4	CK	I	This clock is used to synchronize data when transmitting the data of DI and DO.	14	FM IN	I	Input the local oscillator signal of FM.
5	IFDATA	O	Transmit the data from LC72131M to the controller which is synchronized with CK.	15	VDD	--	This is a terminal of power supply.
6	FM	O	It is "L" on FM mode.	16	PD	O	PLL charge pump output : When the local oscillator signal frequency is higher than the reference frequency high level signals will output. When it is lower than the reference frequency, low level signals will output. When it is same as reference frequency signals, it will be floating.
7	MW	O	It is "L" on MW mode.	17	LPF IN	I	Transistor used for the PLL active low-pass filterr
8	LW	O	It is "L" on LW mode.	18	LPF OUT	O	Transistor used for the PLL active low-pass filterr
9	AUTO/ MONO	O	It is "L" on monaural, "H" on auto.	19	VSS	--	Connected to GND
10	POWER	O	Regulator control singal P ON "H", STANDBY "L"	20	X out	O	Crystal oscillator (7.2MHz).

■ SAA6579T (IC192) : Radio data system demodulator

1. Terminal Layout

QUAL	1		16	RDCL
RDDA	2		15	T57
Vref	3		14	OSCO
MUX	4		13	OSCI
VDDA	5		12	VDD
GND	6		11	GND
CIN	7		10	GND
SCOUT	8		9	GND

2. Pin Function

Pin No.	Symbol	I/O	Function
1	QUAL	—	Non connection
2	RDDA	O	RDS data output
3	Vref	O	Reference voltage output
4	MUX	I	Multiplex signal input
5	VDDA	—	+5V supply voltage for analog part
6	GND	—	Ground for analog part (0V)
7	CIN	I	Subcarrier input to comparator
8	SCOUT	O	Subcarrier output of reconstruction filter
9	GND	—	Ground for digital part (0V)
10	GND	—	Ground for digital part (0V)
11	GND	—	Ground for digital part (0V)
12	VDD	—	+5V supply voltage for digital part
13	OSCI	I	Oscillator input
14	OSCO	O	Oscillator output
15	T57	—	Non connection
16	RDCL	O	RDS clock output

3. Block Diagram

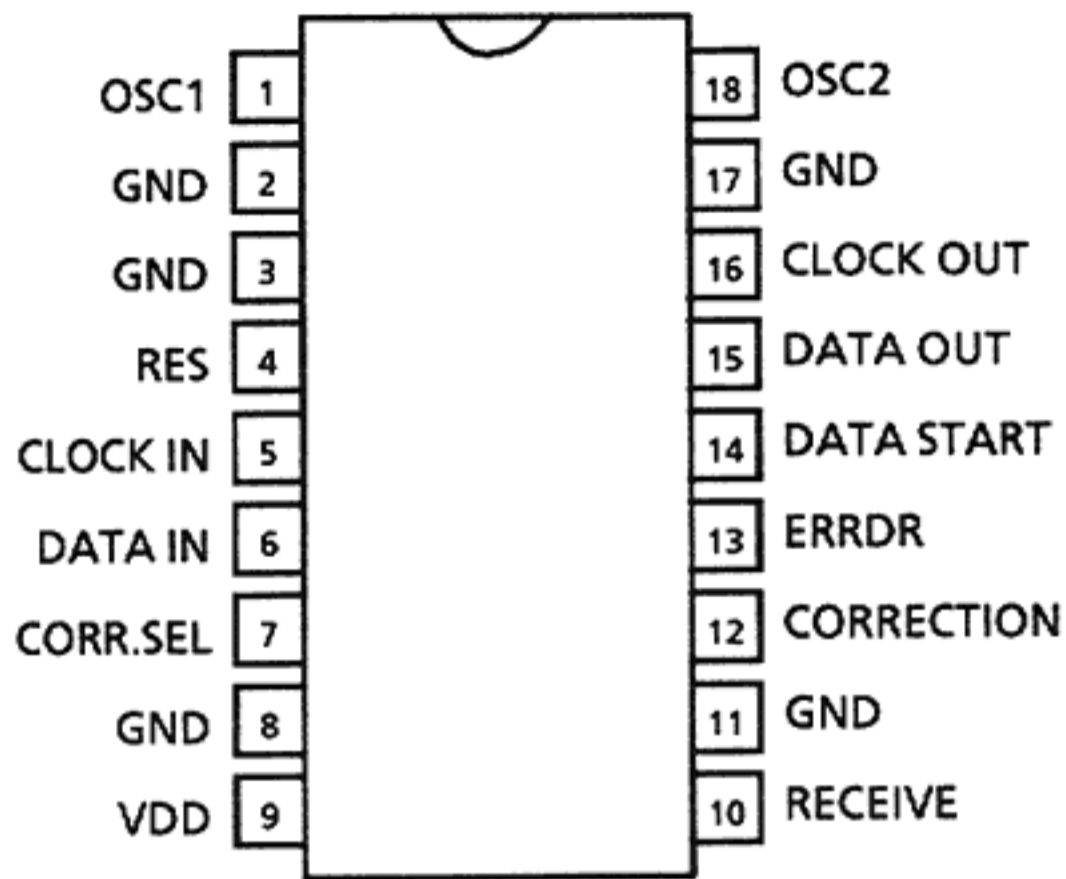■ LA1836M (IC102) : FM AM IF AMP & detector, FM MPX Decorder

1. Terminal Layout

```
         ┌───⌣───┐
 FM IN  ─┤1     30├─ OSC BUFFER
 AM MIX ─┤2     29├─ AM OSC
 FM IF  ─┤3     28├─ AFC
 REG    ─┤4     27├─ AM RF
 AM IF  ─┤5     26├─ AM AGC
 GND    ─┤6     25├─ AM DET
 SIG    ─┤7     24├─ DET OUT
 ST/AM IF┤8     23├─ VCO
 FM DET ─┤9     22├─ MPX IN
 VCC    ─┤10    21├─ MPX OUT
 FM/AM IF┤11    20├─ MPX OUT
 V-SM   ─┤12    19├─ R IN
 AM C.F.─┤13    18├─ L IN
 FM/AM  ─┤14    17├─ R OUT
 MONO/ST┤15    16├─ L OUT
         └────────┘
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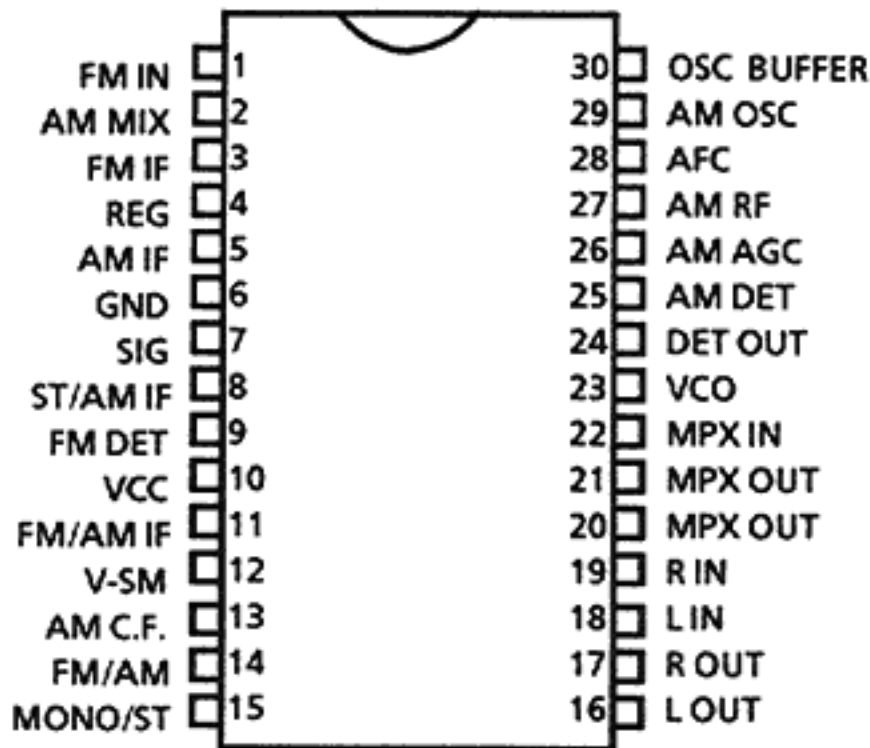
3. Pin Function

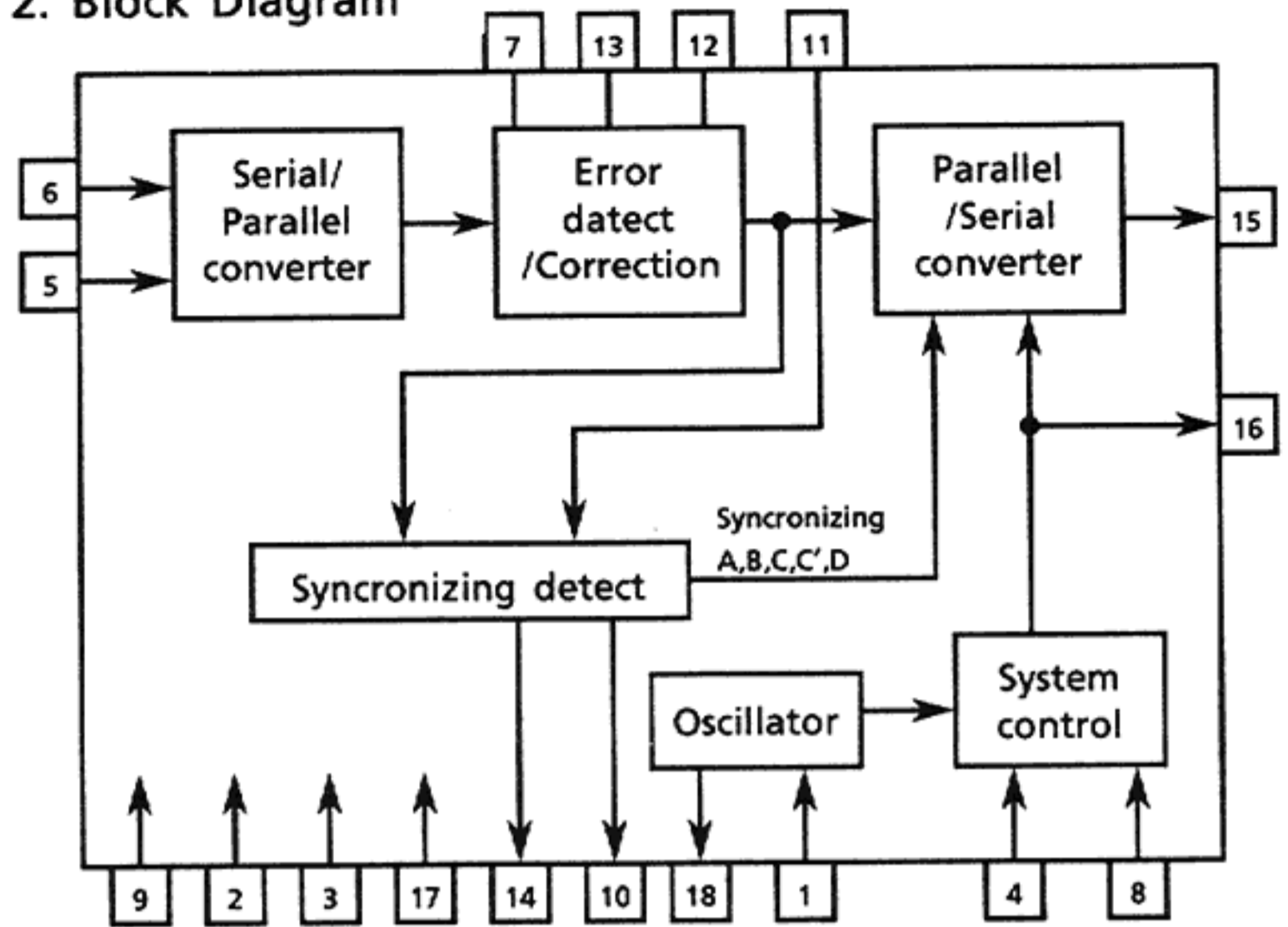| Pin No.	Symbol	I/O	Function
1	FM IN	I	This is an input terminal of FM IF Signal.
2	AM MIX	O	This is an output terminal for AM mixer.
3	FM IF	I	Bypass of FM IF
4	REG	—	Register value between pin4 and pin28 desides the frequency width of the input signal.
5	AM IF	I	Input of AM IF Signal.
6	GND	—	This is the device ground terminal.
7	SIG	O	When the set is tunning , this terminal becomes "L".
8	ST/AM IF	O	Stereo indicator output. Stereo : "L", Mono : "H"
9	FM DET	—	FM detect transformer.
10	VCC	—	This is the power supply terminal.
11	FM/AM IF //MUTE	O/I	When the signal of IF REQ of IC121(LC72131M) appear, the signal of FM/AM IF output. //Muting control input.
12	VSM	O	S Meter output and adjust AM SD sensitivity.
13	AM C.F.	O	This is a terminal of AM ceramic filter.
14	FM/AM	I	Change over the FM/AM input. "H" : FM, "L" : AM
15	MONO/ST	O	Stereo : "H", Mono : "L"
16	L OUT	O	Left channel signal output.
17	R OUT	O	Right channel signal output
18	L IN	I	Input terminal of the Left channel post AMP.
19	R IN	I	Input terminal of the Right channel post AMP.
20	MPX L OUT	O	Mpx Left channel signal output.
21	MPX R OUT	O	Mpx Right channel signal output.
22	MPX IN	I	Mpx input terminal.
23	VCO	I	Voltage controlled oscillator terminal.
24	DET OUT	O	AM/FM detection output.
25	AM DET	—	AM low cut adjustment.
26	AM AGC	I	This is an AGC voltage input terminal for AM.
27	AM RF	I	This is an input terminal for AM RF signal.
28	AFC	—	This is an output terminal of voltage for FM-AFC.
29	AM OSC	—	This is a terminal of AM Local oscillation circuit.
30	OSC BUFFER	O	AM Local oscillation signal output.

2. Block Diagram
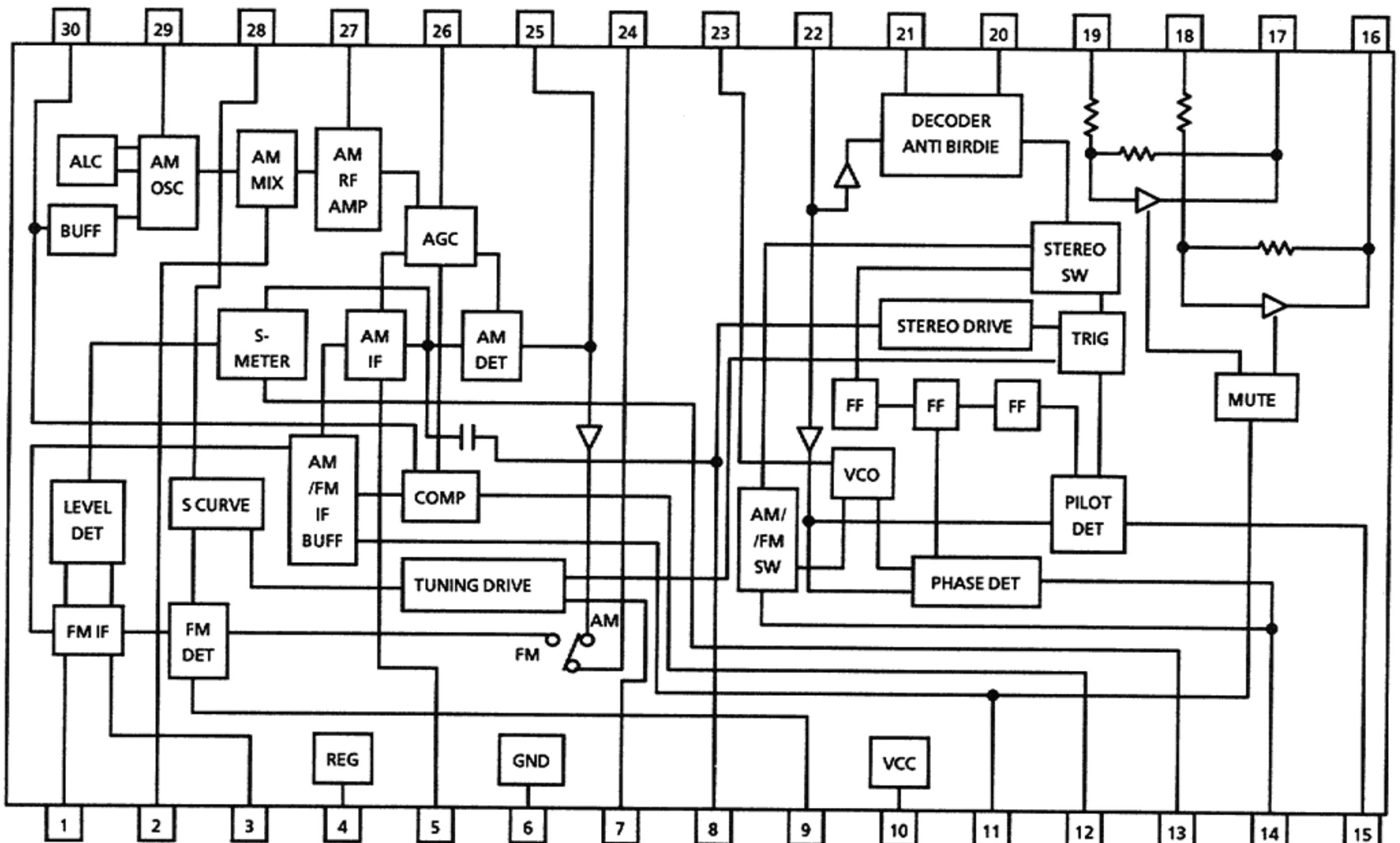
■ LC7073M (IC191) : Radio Data System

1. Terminal Layout

```
OSC1      1 |        | 18   OSC2
GND       2 |        | 17   GND
GND       3 |        | 16   CLOCK OUT
RES       4 |        | 15   DATA OUT
CLOCK IN  5 |        | 14   DATA START
DATA IN   6 |        | 13   ERRDR
CORR.SEL  7 |        | 12   CORRECTION
GND       8 |        | 11   GND
VDD       9 |        | 10   RECEIVE
```

2. Block Diagram

3. Pin Functions

| Pin No.	Symbol	I/O	Function	Pin No.	Symbol	I/O	Function
1	OSC1	I	Oscillation terminal	10	RECEIVE	—	Non connection
2	GND	—	GND	11	GND	—	GND
3	GND	—	GND	12	CORRECTION	—	Non connection
4	RES	I	Reset input	13	ERRDR	—	Non connection
5	CLOCK IN	I	RDS clock input	14	DATA START	O	Data start signal for block data to output serial data
6	DATA IN	I	RDS data input	15	DATA OUT	O	Serial data output
7	CORR.SEL	I	Non connection	16	CLOCK OUT	O	Data output of serial data output
8	GND	—	GND	17	GND	—	GND
9	VDD	—	Power supply	18	OSC2	O	Oscillation terminal

■ PST9140T (IC561) : Reset IC
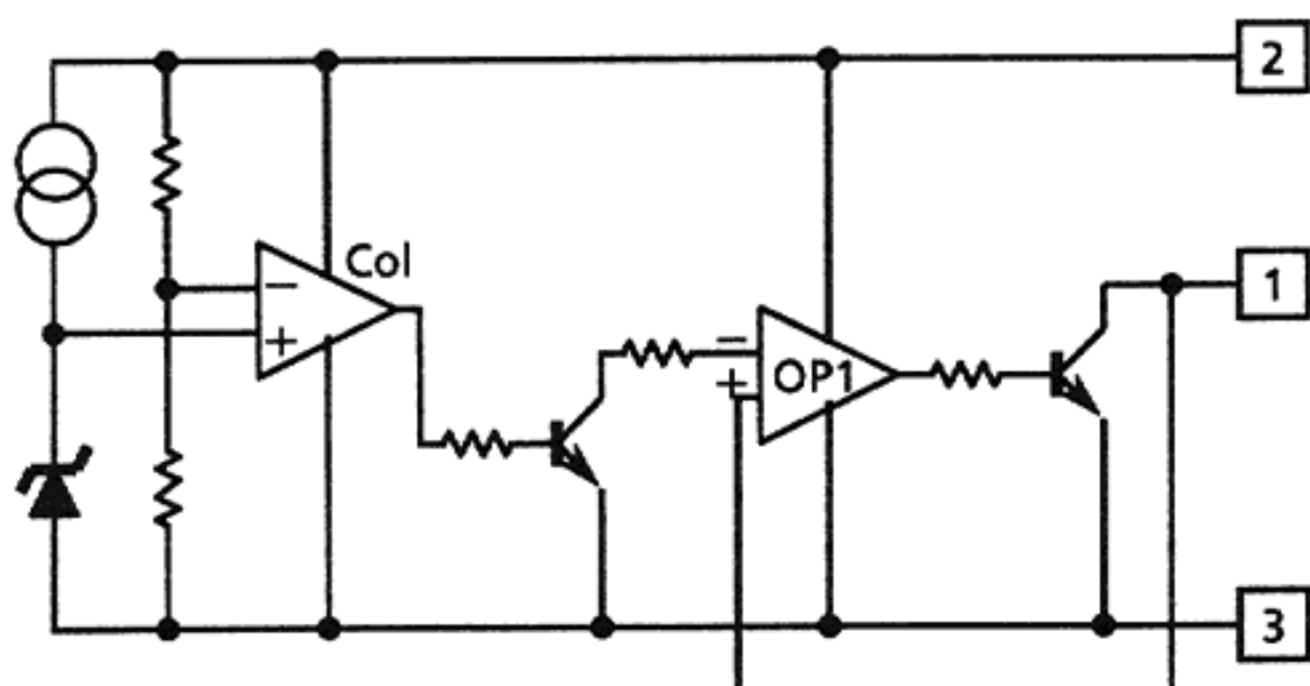
Internal Connections of the FL Display

■ ELU0001-205 : (DI201)

1. Grid Assignment

9G	8G	7G	6G	5G	4G	3G	2G	1G
RDS	EON	TA	NEWS	INFO	ST	TUNED	REC	DAILY SLEEP kHZ AM MHz PM
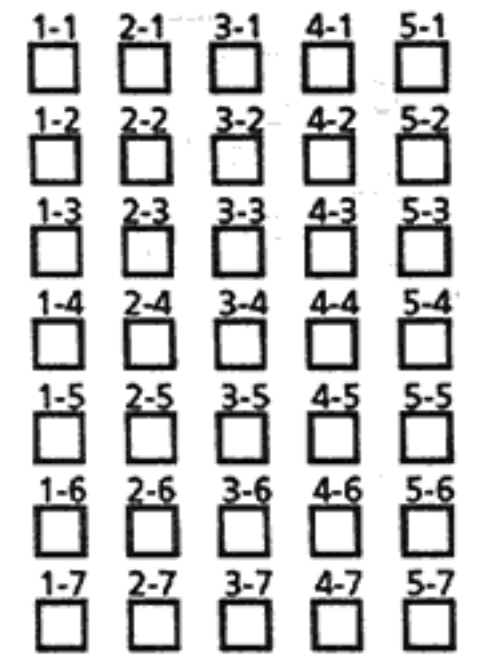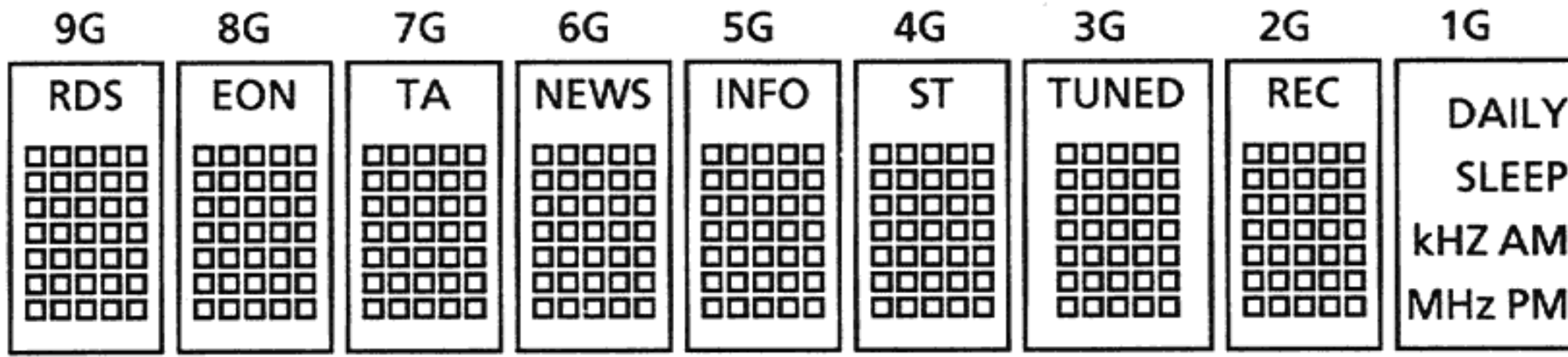
(9G~2G)

2. Pin Connection

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Connection	F1	F1	F1	NP	NP	NC	P31	P30	P29	P28	P27	P26	P25	P24	P23	P22	P21	P20	P19	P18	P17	P16	P15	P14

Pin No.	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Connection	P13	P12	P11	P10	9P	P8	P7	NP	NP	F2	F2	F2	F2	F2	F2	NP	NP	IC	P6	P5	P4	P3	P2	P1

Pin No.	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Connection	NC	NC	NC	NC	NC	1G	2G	3G	4G	5G	6G	7G	8G	9G	P36	P35	P34	P33	P32	NP	NP	F1	F1	F1

NOTE)   F1,F2 : Filament,   NP : No pin,   NC : No connection,   1G~9G : Grid,   P : Anode   IC : Internal connection,

3. Anode Connection

	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	1-1	1-1	1-1	1-1	1-1	1-1	1-1	1-1	DAILY
P2	2-1	2-1	2-1	2-1	2-1	2-1	2-1	2-1	SLEEP
P3	3-1	3-1	3-1	3-1	3-1	3-1	3-1	3-1	AM
P4	4-1	4-1	4-1	4-1	4-1	4-1	4-1	4-1	PM
P5	5-1	5-1	5-1	5-1	5-1	5-1	5-1	5-1	MHz
P6	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	kHz
P7	2-2	2-2	2-2	2-2	2-2	2-2	2-2	2-2	—
P8	3-2	3-2	3-2	3-2	3-2	3-2	3-2	3-2	—
P9	4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2	—
P10	5-2	5-2	5-2	5-2	5-2	5-2	5-2	5-2	—
P11	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	—
P12	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	—
P13	3-3	3-3	3-3	3-3	3-3	3-3	3-3	3-3	—
P14	4-3	4-3	4-3	4-3	4-3	4-3	4-3	4-3	—
P15	5-3	5-3	5-3	5-3	5-3	5-3	5-3	5-3	—
P16	1-4	1-4	1-4	1-4	1-4	1-4	1-4	1-4	—
P17	2-4	2-4	2-4	2-4	2-4	2-4	2-4	2-4	—
P18	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	—

|	9G	8G	7G	6G	5G	4G	3G	2G	1G
P19	4-4	4-4	4-4	4-4	4-4	4-4	4-4	4-4	—
P20	5-4	5-4	5-4	5-4	5-4	5-4	5-4	5-4	—
P21	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	—
P22	2-5	2-5	2-5	2-5	2-5	2-5	2-5	2-5	—
P23	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	—
P24	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	—
P25	5-5	5-5	5-5	5-5	5-5	5-5	5-5	5-5	—
P26	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	—
P27	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6	—
P28	3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-6	—
P29	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	—
P30	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	—
P31	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	—
P32	2-7	2-7	2-7	2-7	2-7	2-7	2-7	2-7	—
P33	3-7	3-7	3-7	3-7	3-7	3-7	3-7	3-7	—
P34	4-7	4-7	4-7	4-7	4-7	4-7	4-7	4-7	—
P35	5-7	5-7	5-7	5-7	5-7	5-7	5-7	5-7	—
P36	RDS	EON	TA	NEWS	INFO	ST	TUNED	REC	—

Disassembly Procedures

(1) Removing the top cover
1. Remove 2 screws Ⓐ fastening both sides of top cover, and 4 screws Ⓑ fastening the rear side.
2. Remove the top cover.

FRONT

Ⓐ×2   Ⓑ×4
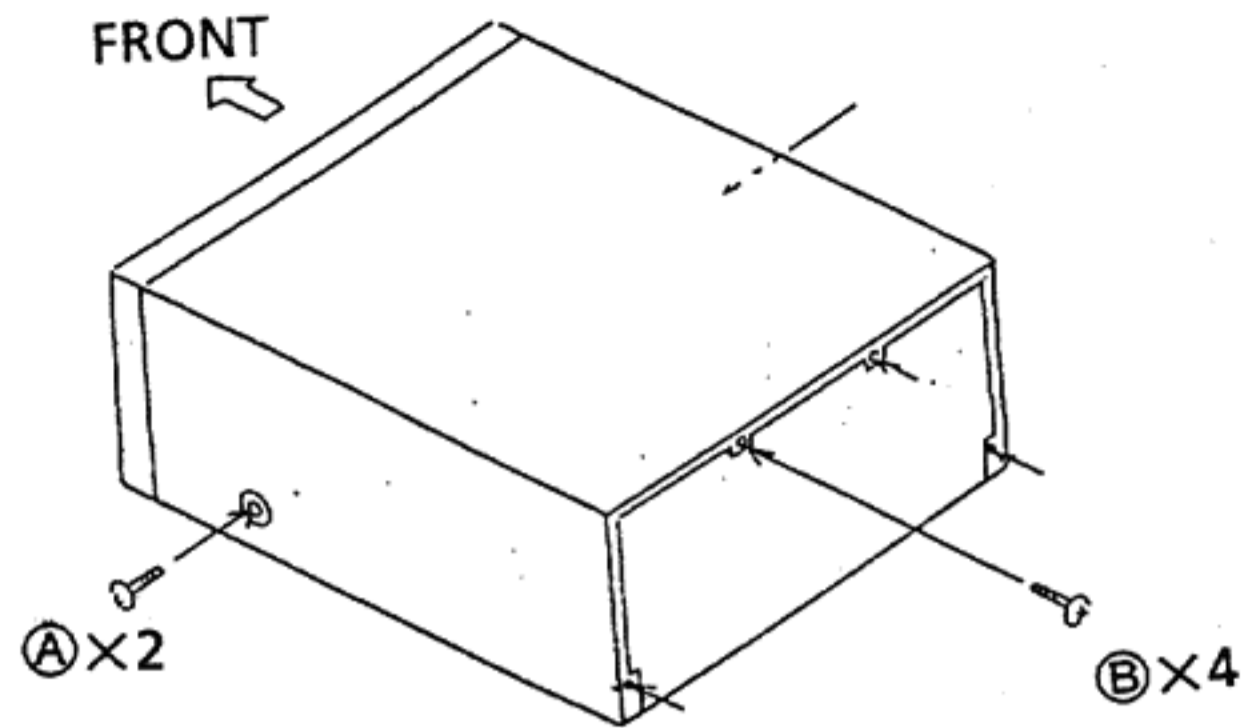
(2) Removing the Front Panel Assembly
1. Remove the top cover.
2. Disconnect the connectors. (CN101,CN102)
3. Remove 3 screws Ⓐ fastening bottom of the front panel assembly.
4. Remove screw Ⓒ.
5. Remove 3 hooks ①.
6. Remove the front panel assembly.

Ⓒ

Ⓐ×3
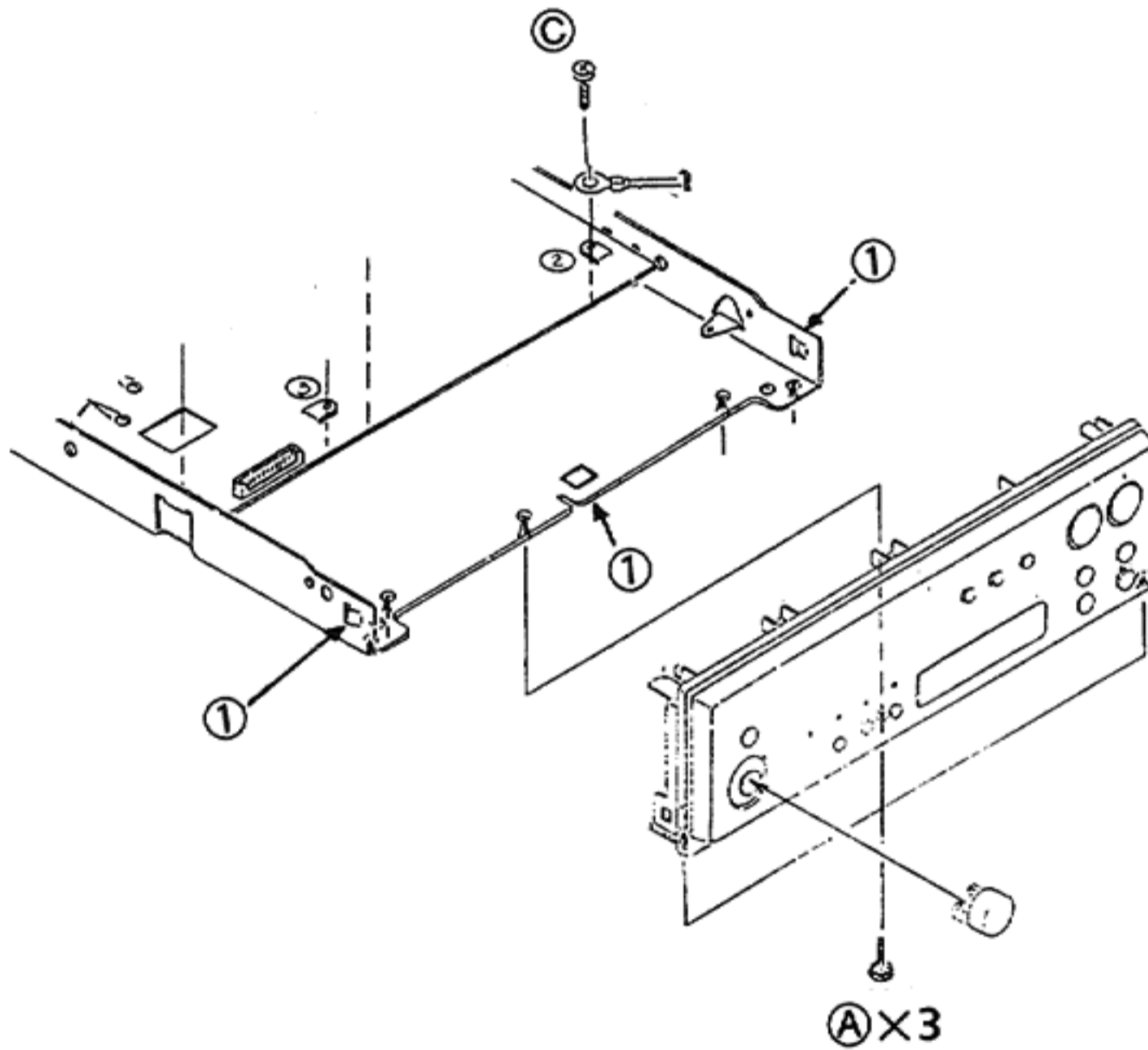
(3) Removing the Control PCB (ENA-166-2)
1. Remove the top cover.
2. Remove the front panel assembly.
3. Remove 7 screws Ⓓ fastening the control PCB to remove it.

Ⓓ×7
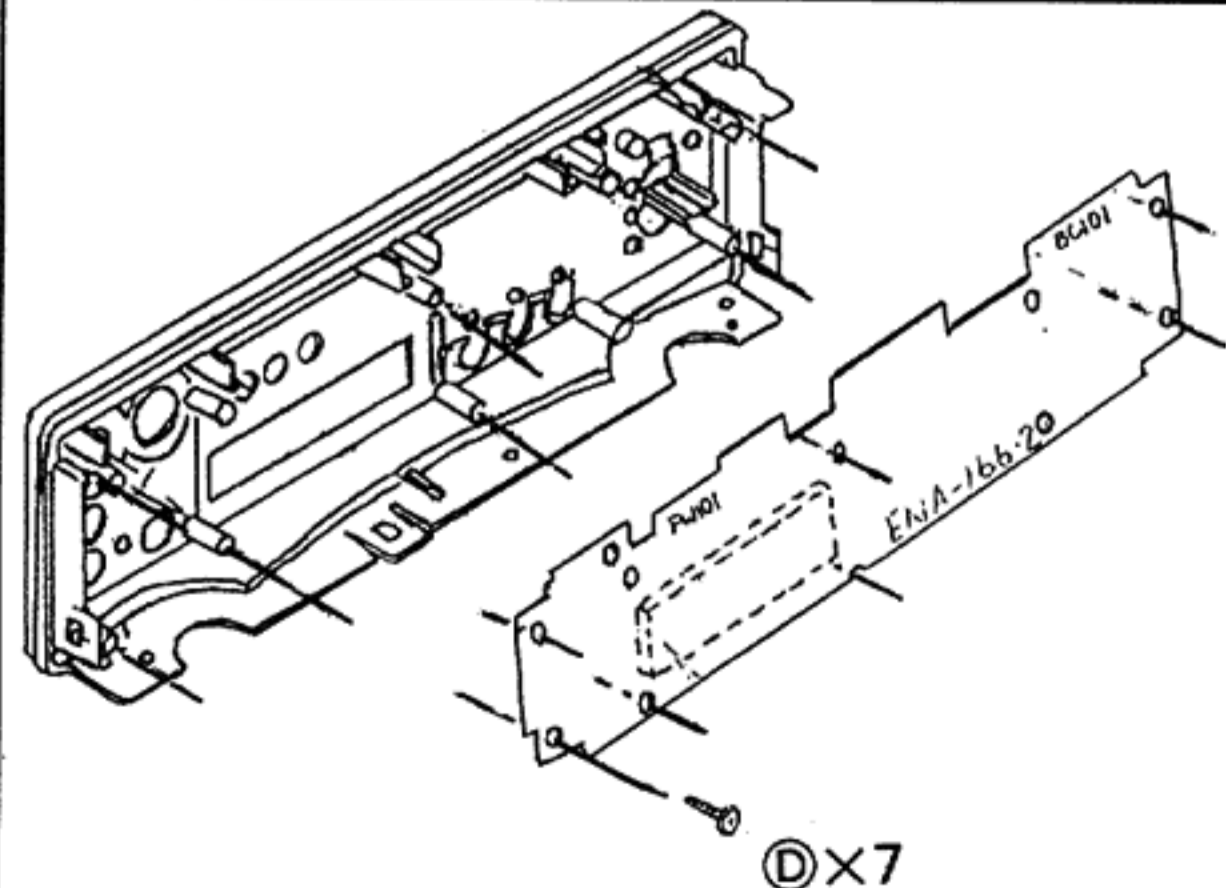
Ⓐ .. SDSG3008N	Ⓑ ... GBSG3008CC	Ⓒ ... SBSG3006CC	Ⓓ ... SDSF2608Z

(4) Removing the Main PCB (ENA-166-1)
1. Remove the top cover.
2. Remove *6 screws Ⓔ fastening the rear of the main PCB.
   (* U,UB,US,UT version. Remove 2 screws Ⓕ)
3. Remove the rear panel.
4. Remove 2 screws Ⓖ fastening the power trans.
5. Remove 3 screws Ⓒ fastening the main PCB to remove it.

Ⓖ×2

Ⓒ×3

Ⓔ×6

Ⓕ×2
(U,UB,US,UT)
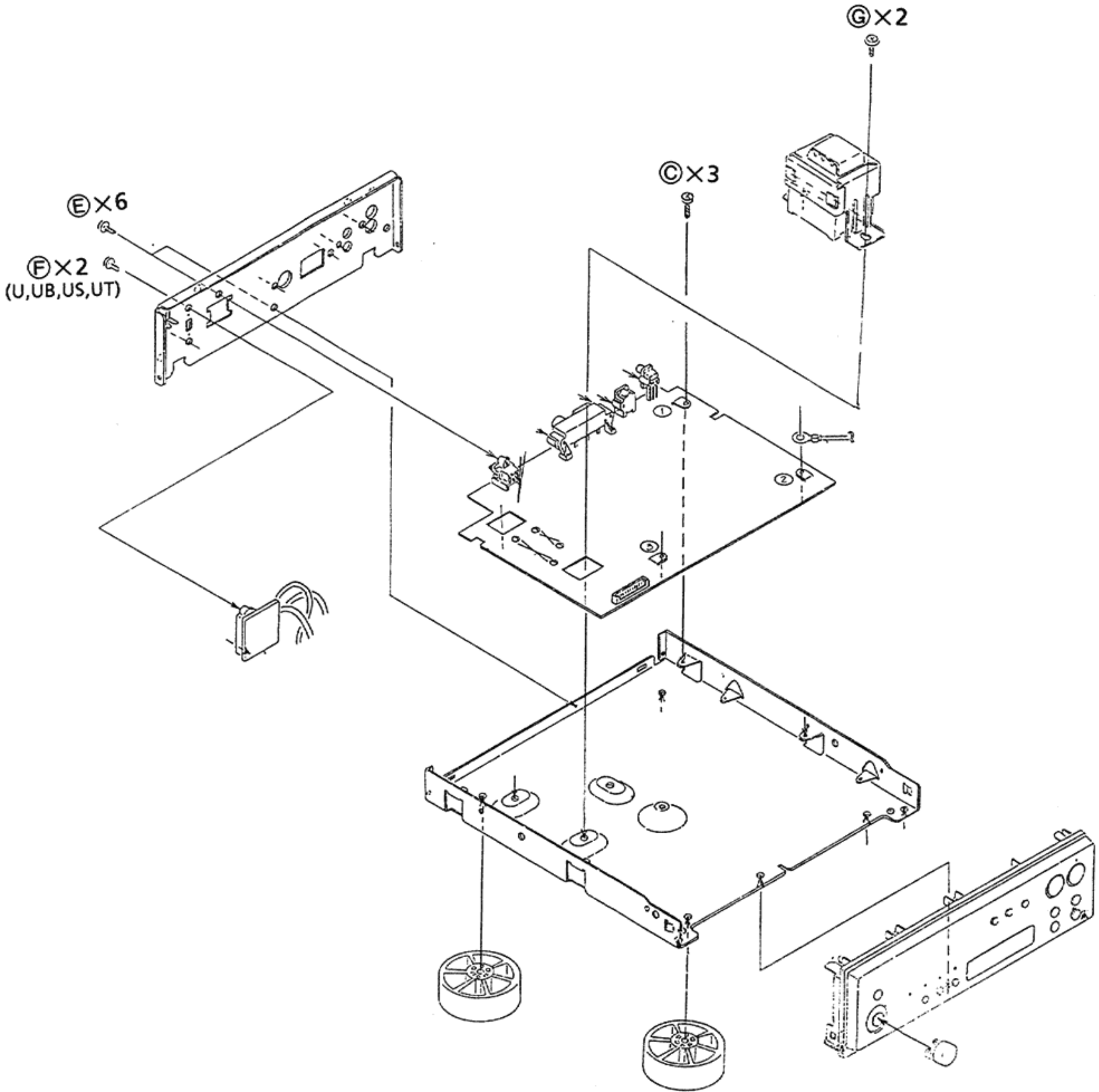
Ⓔ .. E73273-003	Ⓕ ... SBSF2608CC	Ⓖ ... E61661-003

Adjustment Procedures

Tuning range

Area	Range		
	LW (kHz)	MW (kHz)	FM (MHz)
Continental Europe, the U.K	144~288	522~1629	
Universal type (AM Channel space 9kHz)	—	531~1602	87.5MHz~108MHz
Universal type (AM Channel space 10kHz)	—	530~1600	

(1) Tuning voltage
Confirm the voltages in the table below at TP101.

FM Tuning voltage (Unit : V)

Area	Frequency	
	87.5MHz	108MHz
the U.K., Continental Europe, Universal	1.3 <1.6	9.0> 8.0

AM Tuning voltage (Unit : V)

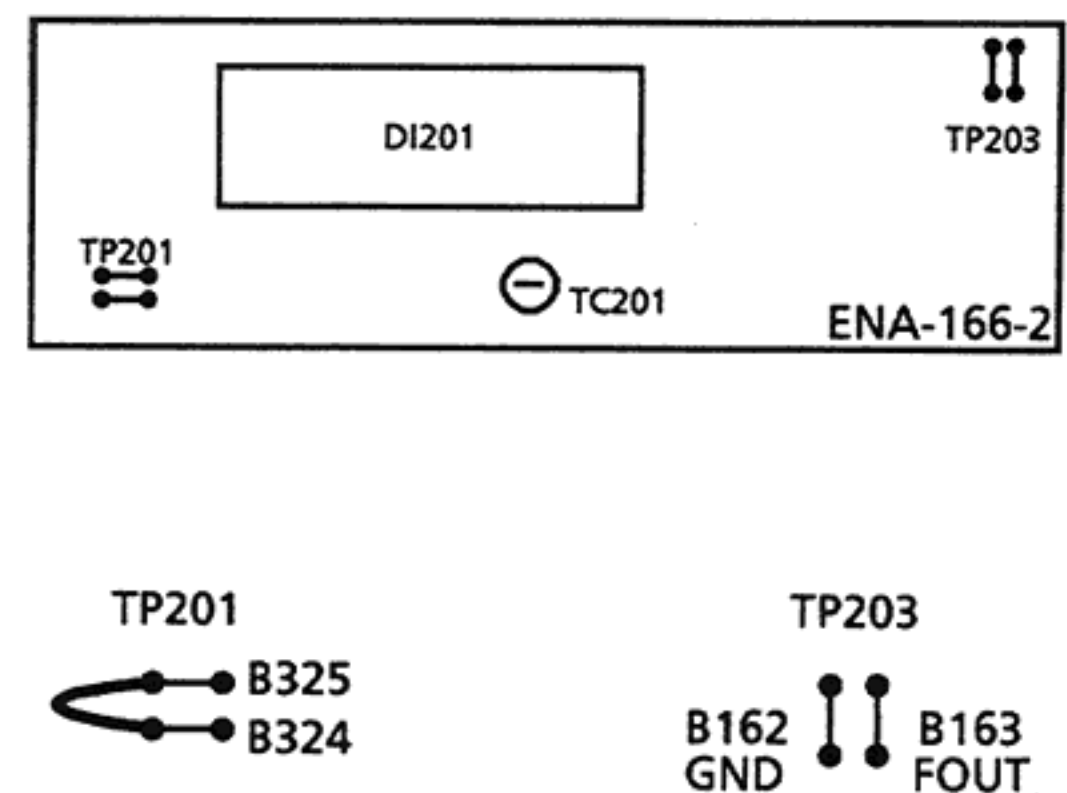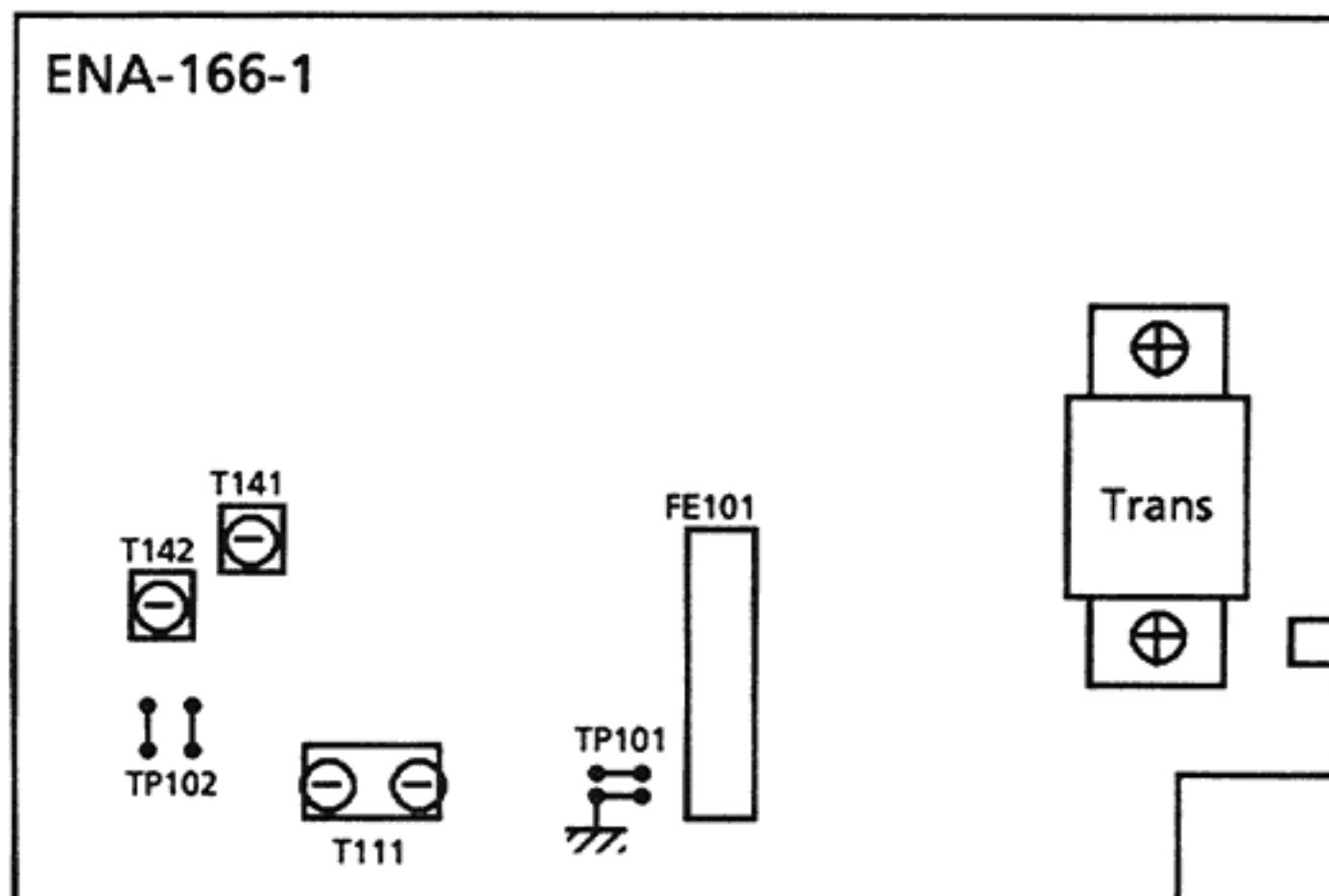| Area	Frequency (MW)						Frequency (LW)	
	522KHz	530KHz	531KHz	1600KHz	1602KHz	1629KHz	144kHz	288kHz
the U.K., Continental Europe	0.8 <1.0	—	—	—	—	8.0 <9.0	0.8 <1.0	6.5 <9.0
Universal (Chanel space9kHz)	—	—	0.8 <1.0	—	8.0 <9.0	—	—	—
Universal (Chanel space10kHz)	—	0.8 <1.0	—	8.0 <9.0	—	—	—	—

(2) FM center meter
Receive a broadcast by using the function of 'AUTO STOP'.
Adjust T141 (detector coil) so that the voltage at TP102 becomes 0 ± 1.5mV.

(3) Clock Adjustment
1. After connecting B324 and B325 with some wire as shown in figure below, connect the AC power cord into an AC outlet.
2. Confirm that the display is off and remove the wire.
3. Connect a frequency counter to B162 and B163.
4. Adjust TC201 so that the frequency becomes 50000.00 ± 0.38Hz.

FX-F1GD
FX-F1RGD

Block Diagram