

 PIONEER

Service Manual



ORDER NO.
CRT-323-0

COMPONENT CAR STEREO AM/FM ELECTRONIC TUNER

GEX-61

E, SA

COMPONENT CAR STEREO LW/MW/FM ELECTRONIC TUNER

GEX-68

E

NOTE:

The Circuit Description, refer to the model GEX-60/E, 63/E Service Manual (CRT-250-0).

SPECIFICATIONS

General

Power source DC 14.4V (108 ~ 15.6V allowable)
 Grounding system Negative type
 Dimensions 150(W) X 50(H) X 134(D) mm
 (5-7/8(W) X 2(H) X 5-1/4(D) in.)
 Weight 1.1kg (2.4 lbs.)
 Tone controls (bass) ±10dB (100Hz)
 (treble) ±10dB (10kHz)
 Loudness contour +12dB (100Hz), +4dB (10kHz)
 (volume: -30dB)
 Maximum output level 200mV
 Output impedance 1kΩ

FM tuner

Frequency range . . . 87.5 ~ 108MHz (GEX-61/E, SA)
 87.5 ~ 104MHz (GEX-68/E)
 Usable sensitivity 12dBf (1.1μ V/75Ω, mono)
 50dB quieting sensitivity 17dBf (1.9μV / 75Ω, mono)
 Distortion 0.3% (at 65dBf, 1kHz, Stereo)

Frequency response 30 ~ 15,000Hz (±3dB)
 Stereo separation 40dB (at 65dBf, 1kHz)

AM(MW) tuner

Frequency range 520 ~ 1,620 kHz
 Usable sensitivity 18μ V (25dB)(S/N:20dB)
 (GEX-61/E, SA)
 30μ V (29.5dB)(S/N:20dB)(GEX-68/E)
 Selectivity 50dB (±9kHz)

LW tuner (GEX-68/E)

Frequency range 150 ~ 280kHz
 Usable sensitivity 70μ V (37dB)(S/N:20dB)
 Selectivity 50dB (±9kHz)

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

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1. PARTS LOCATION

NOTE

● For your Parts Stock Control, the fast moving items are indicated with the marks ** and *.

** : GENERALLY MOVES FASTER THAN *

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

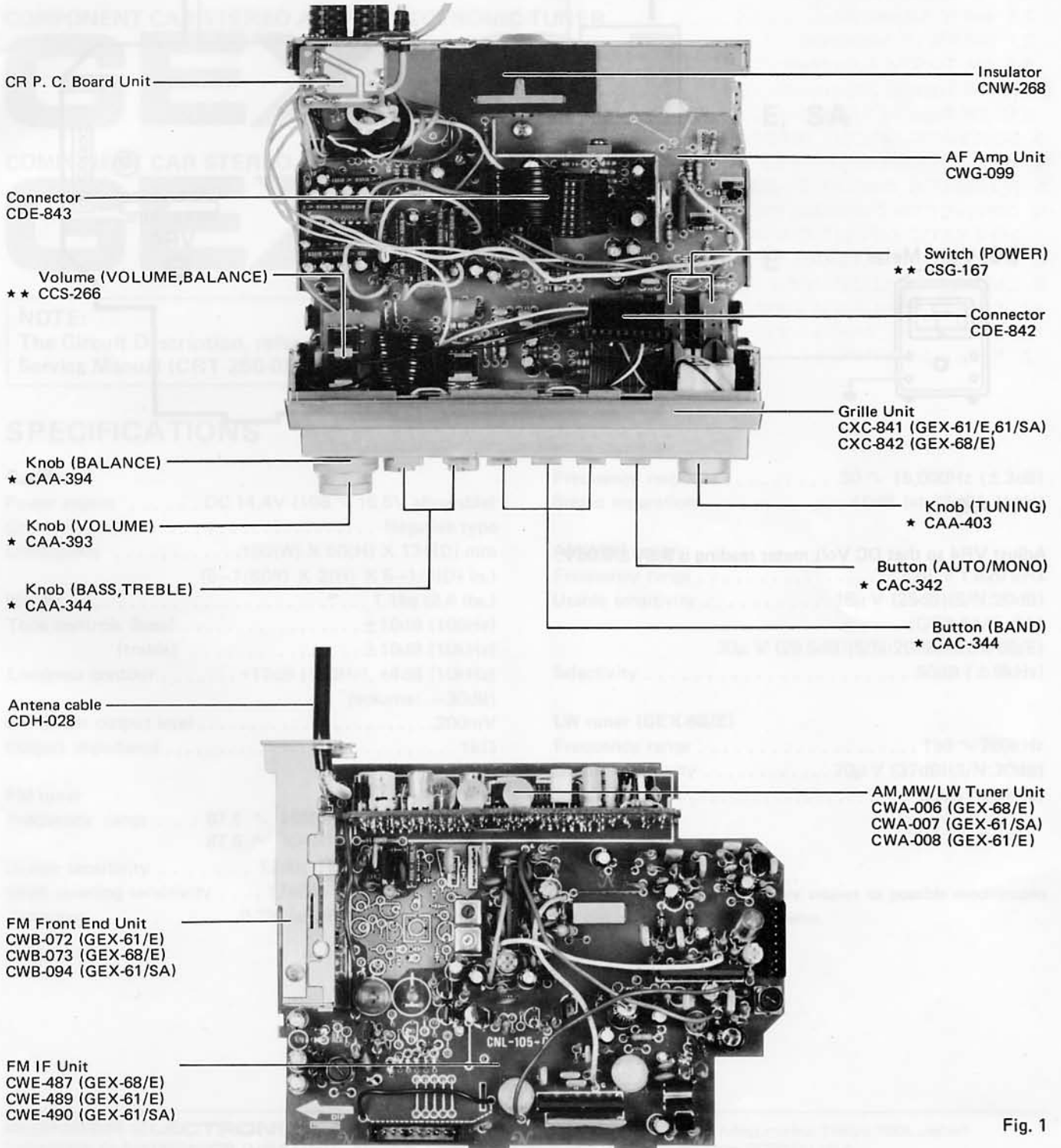


Fig. 1

2. ADJUSTMENT

2.1 TUNING VOLTAGE ADJUSTMENT

- Connection Diagram

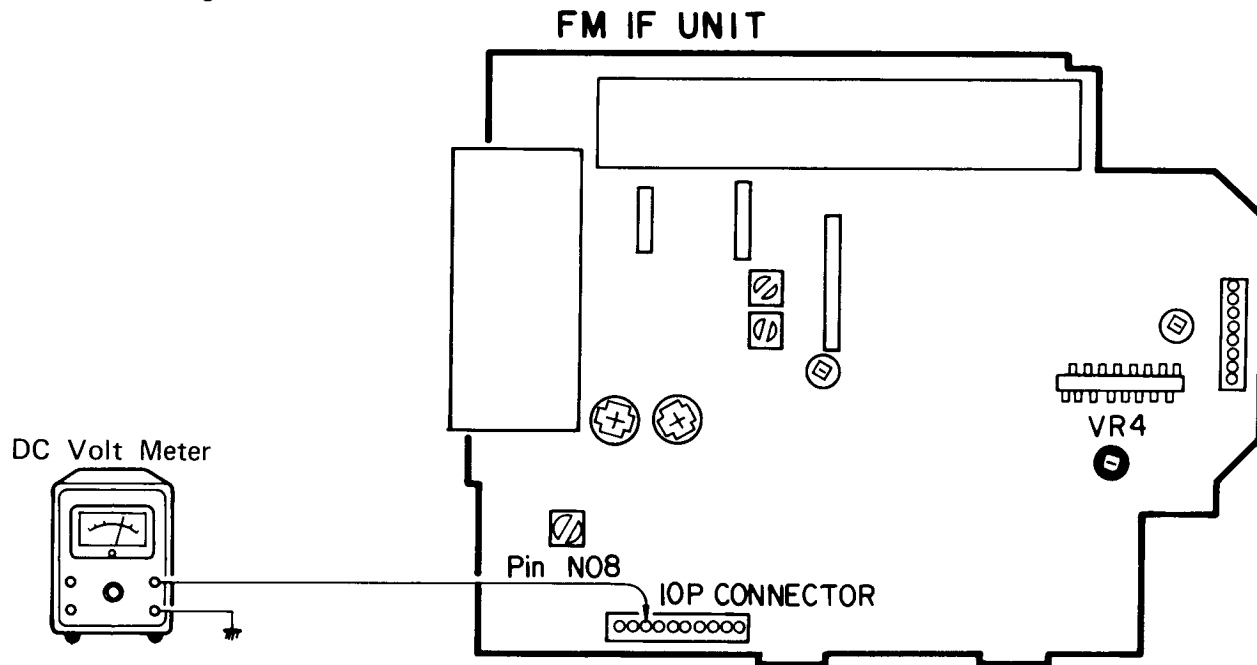


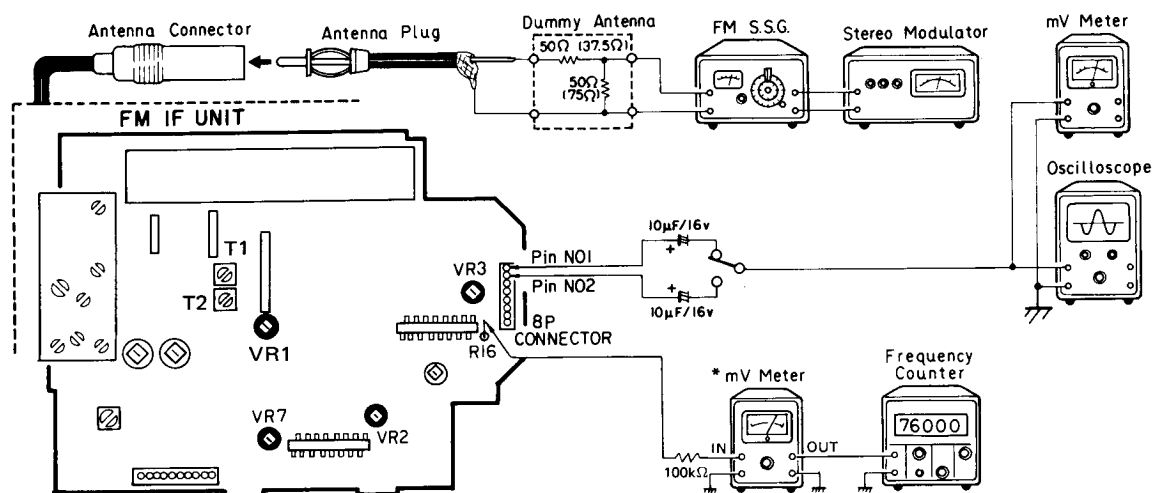
Fig. 2

- To Adjust

Adjust VR4 so that DC Volt meter reading is $8.8V \pm 0.05V$.

2.2 FM IF ADJUSTMENT

• Connection Diagram



* mV Meter
 Input Impedance more than 1M Ω
 Input Capacity less than 100pF

Fig. 3

• To Adjust

1. Turn FM SSG all the way down, and adjust T1 so that the center meter indicates 0 under the no-signal condition.
2. Set the FM SSG modulation to 1kHz mono modulation. Apply a mono signal of 98MHz 60dB (μ V) to the set and check that the center meter reading does not shift. If the reading changes, set the indicator back to the center by tuning in with the FM SSG or the set's tuning knob.
3. Next, adjust T2 so that distortion (see distortion meter) is minimal.
4. Turn FM SSG all the way down again, and check that the center meter reading does not shift from the center. If the reading is off, repeat steps 1 through 3.

2.3 FM MPX ADJUSTMENT

• Connection Diagram (shown in Fig. 3)

• To Adjust

1. Adjust VR3 to make the frequency counter show 76 kHz \pm 120 Hz by applying an unmodulated signal of 98.1 MHz and 60 dB (μ V) from the FM SSG.
2. Adjust VR7 to reduce the oscilloscope wave to the minimum using only the modulation for the pilot signal (10%) and 60 dB (μ V).
3. Adjust VR2 to obtain the best separation by applying a stereo signal (1 kHz, 100% modulation).

2.4 AUTO LEVEL ADJUSTMENT

• Connection Diagram (Shown in Fig. 3)

• To Adjust

1. Apply a 98MHz, 20dB (μ V) stereo signal from the FM SSG, turn the tuning knob and tune is 98MHz.
2. Adjust VR1 so that the separation difference between Lch and Rch will be 5dB (μ V).

2.5 FM TRACKING ADJUSTMENT

• **Connection Diagram**
GEX-61/E, 68/E

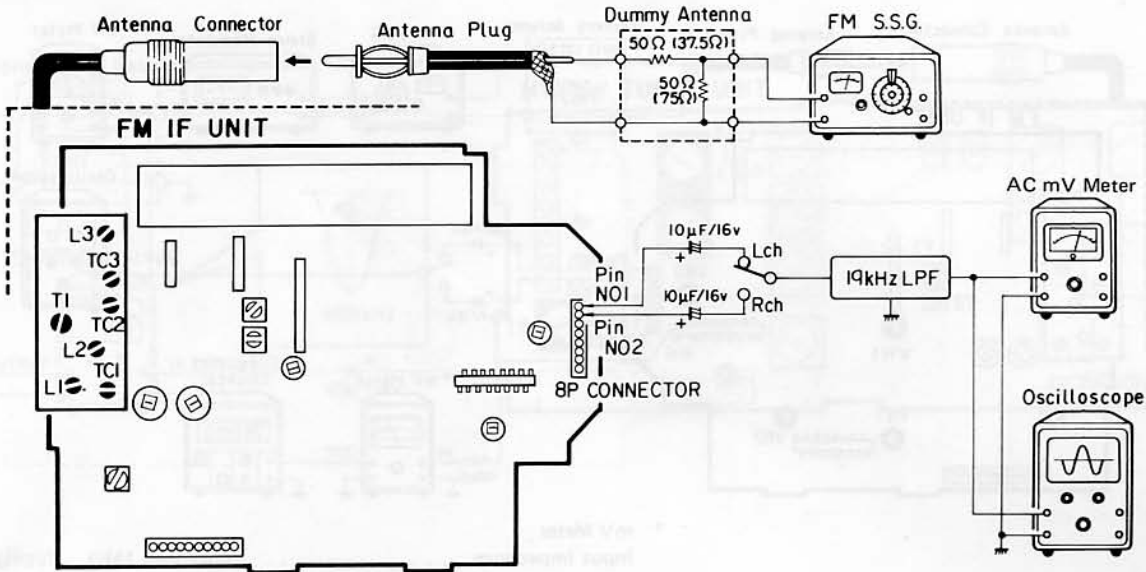


Fig. 4

• **To Adjust**
GEX-61/E, SA

SSG Frequency	Pointer Position	Adjustment Point	Note
1. 87.0 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Minimum	L3	87.0 MHz can be received
2. 108.6 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Maximum	TC3	108.6 MHz can be received
3. Repeat items (1) and (2) alternately so that broadcast can be received at the frequency between 87.0 MHz and 108.6 MHz.			
4. 90 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	L1, L2	Maximum output
5. 106 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	TC1, TC2	Maximum output
6. Repeat items (4) and (5) alternately so that the AC mV meter indicates maximum output.			
7. 98 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Tuned position	T1	Maximum output

GEX-68/E

SSG Frequency	Pointer Position	Adjustment Point	Note
1. 87.0 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Minimum	L3	87.0 MHz can be received
2. 105 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Maximum	TC3	105 MHz can be received
3. Repeat items (1) and (2) alternately so that broadcast can be received at the frequency between 87.0 MHz and 105 MHz.			
4. 90 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	L1, L2	Maximum output
5. 104 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	TC1, TC2	Maximum output
6. Repeat items (4) and (5) alternately so that the AC mV meter indicates maximum output.			
7. 98 MHz (400 Hz, 100% modulation), output level 3 dB (μV)	Tuned position	T1	Maximum output

2.6 AM IF ADJUSTMENT

- Connection Diagram
GEX-61/E GEX-61/SA

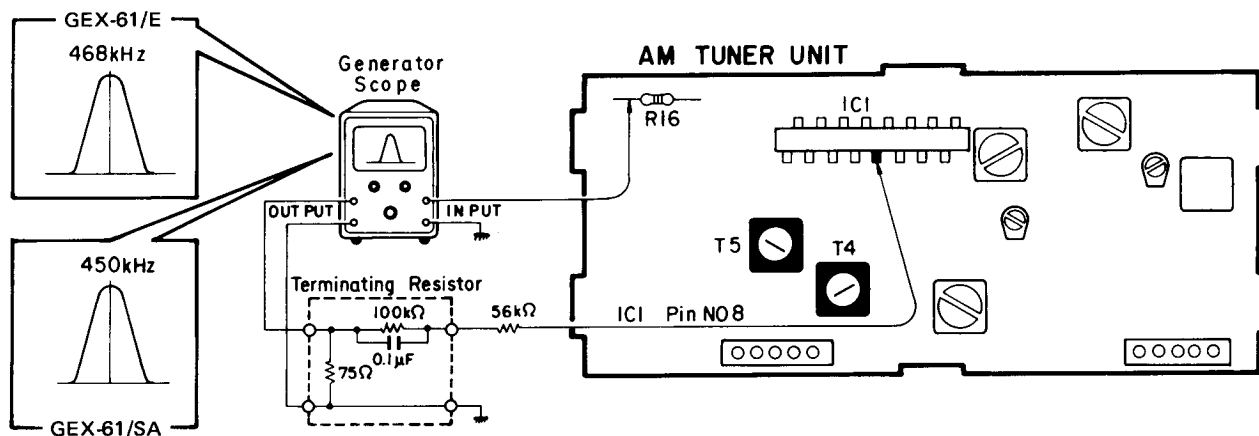


Fig. 5

- To Adjust

1. Set Generator Scope as follows:

Frequency centering on sweep . . . 468kHz (GEX-61/E)
 . . . 450kHz (GEX-61/SA)
 Input level 0.3Vp-p/cm
 Output level 3mV ~ 10mV

2. Tune to a nearby, 1,600kHz station.
3. Tune the cores of T4 and T5, and adjust so that U-curve will be at maximum amplitude and best symmetry.

2.7 MW/LW IF ADJUSTMENT

- **Connection Diagram**
GEX-68/E

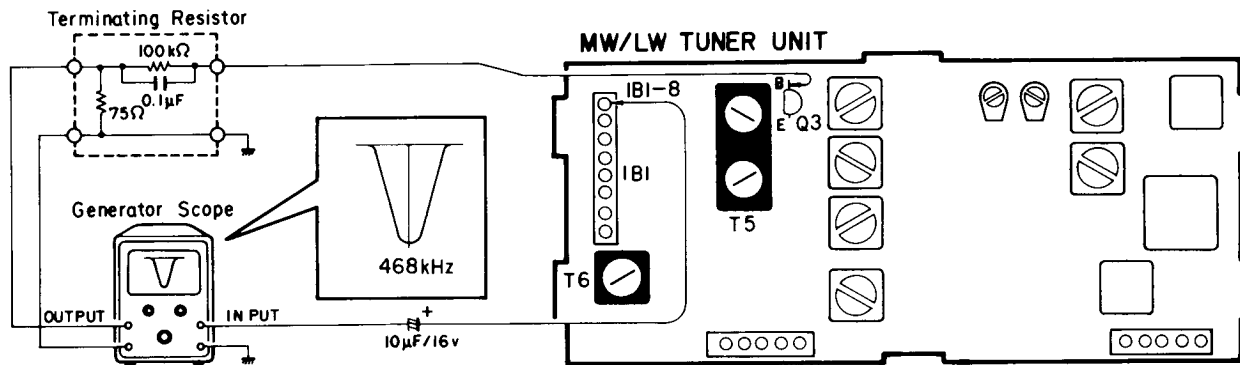


Fig. 6

- **To Adjust**

1. Set Generator Scope as follows:
 Frequency centering on sweep 468kHz
 Input level 0.3Vp-p/cm
 Output level 3mV ~ 10mV
2. Tune to a nearby, 1,600kHz station.
3. Tune the cores of T5 and T6, and adjust so that U-curve will be at maximum amplitude and best symmetry.

2.8 AM TRACKING ADJUSTMENT

- Connection Diagram
GEX-61/E, SA

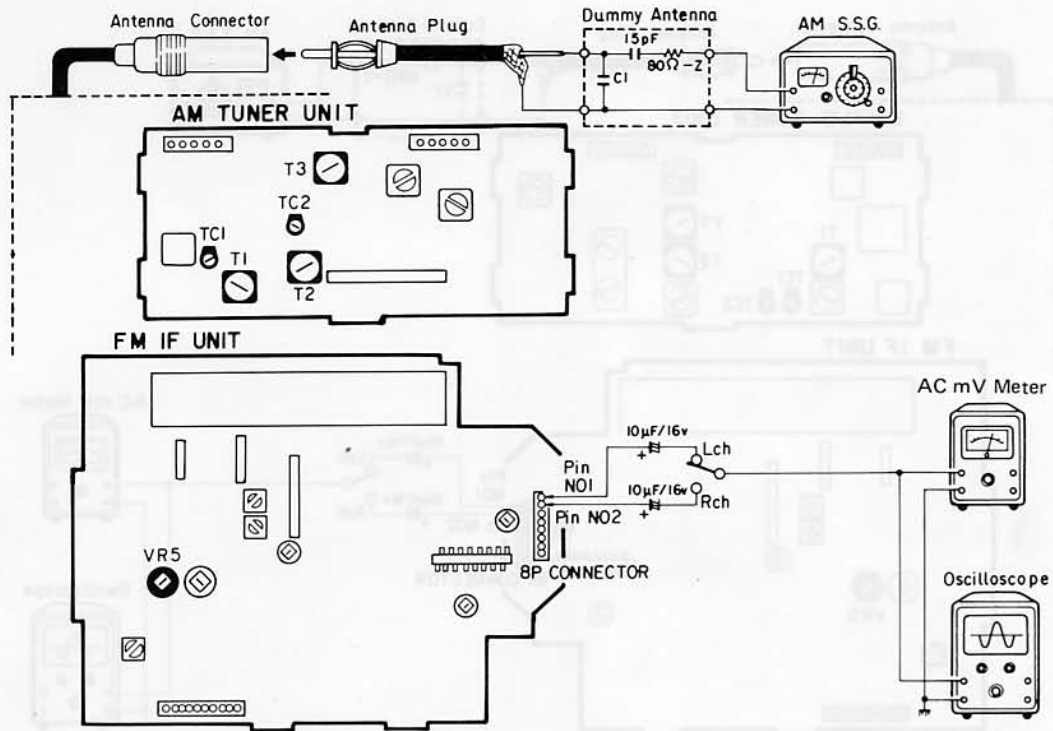


Fig. 7

NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of the S.S.G.

- To Adjust

SSG Frequency	Pointer Position	Adjustment point	Note
1. 1,630 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Maximum	T2	1,630 kHz can be received
2. 515 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Minimum	VR5	515 kHz can be received
3. 600 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 600 kHz	T1, T3	AC mV meter at maximum
4. 1,400 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 1,400 kHz	TC1, TC2	AC mV meter at maximum
5. Repeat items (3) and (4) alternately so that the AC mV meter indicates maximum output.			

2.9 MW TRACKING ADJUSTMENT

**• Connection Diagram
GEX-68/E**

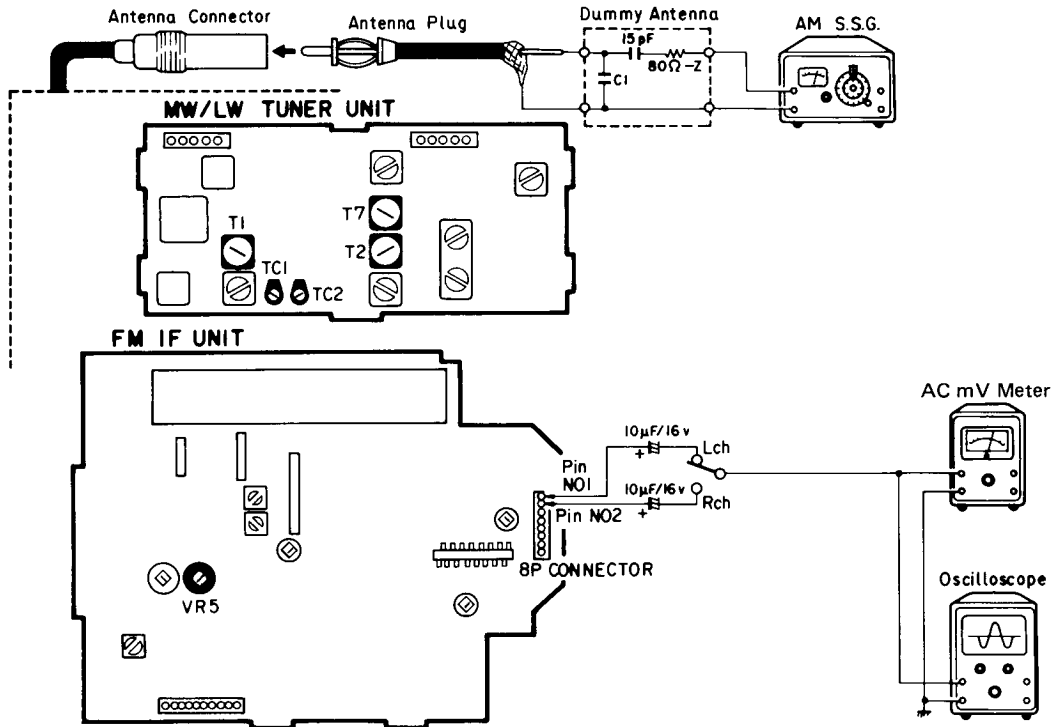


Fig. 8

NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of the S.S.G.

• To Adjust

SSG Frequency	Pointer Position	Adjustment point	Note
1. 1,630 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Maximum	T7	1,630 kHz can be received
2. 515 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Minimum	VR5	515 kHz can be received
3. 600 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 600 kHz	T1, T2	AC mV meter at maximum
4. 1,400 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 1,400 kHz	TC1, TC2	AC mV meter at maximum
5. Repeat items (3) and (4) alternately so that the AC mV meter indicates maximum output.			

2.10 LW TRACKING ADJUSTMENT

• Connection Diagram GEX-68/E

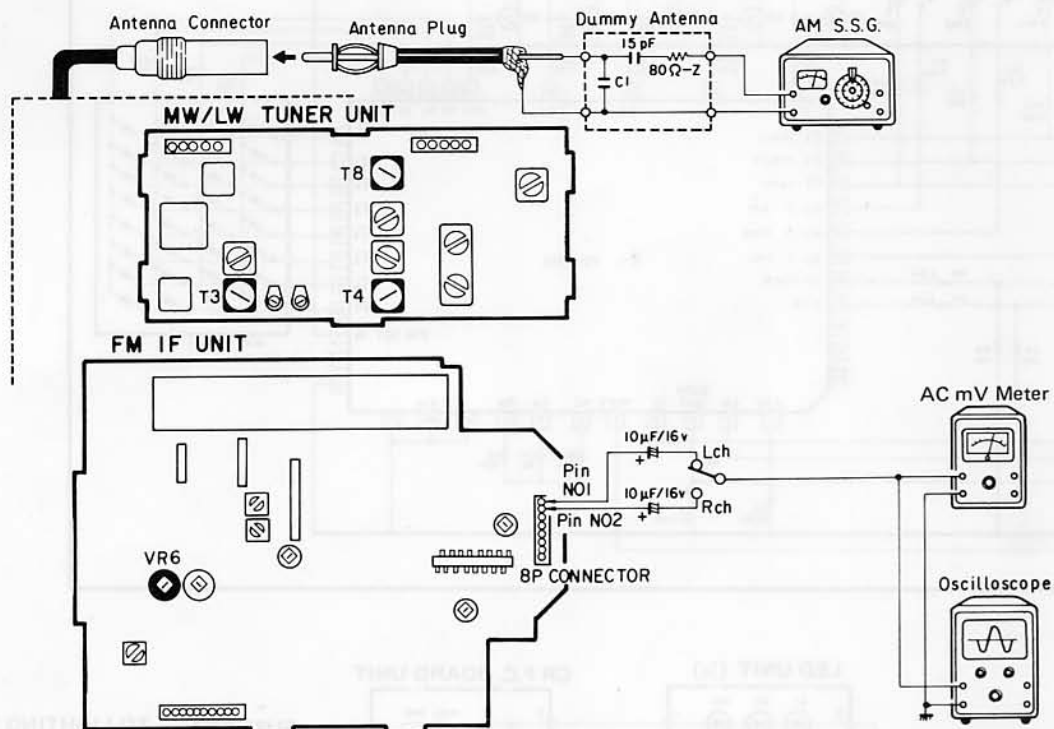


Fig.9

NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of the S.S.G.

• To ADjust

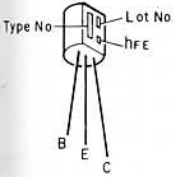
SSG Frequency	Pointer Position	Adjustment Point	Note
1. 145 kHz (400 Hz, 30% modulation), output level 40 dB (μ V)	Minimum	VR6	145 kHz can be received
2. 295 kHz (400 Hz, 30% modulation). output level 40 dB (μ V)	Maximum	T8	295 kHz can be received
3. Repeat (1) and (2) alternately and adjust so that broadcast can be received at the frequency between 145 kHz and 295 kHz.			
4. 215 kHz (400 Hz, 30% modulation), output level 40 dB (μ V)	Tune to 215 kHz	T3, T4	AC mV Meter at maximum

IC's and Transistors

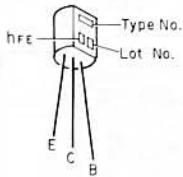
IC's marked by
Be careful in ha
liable to be dan

AF Amp U

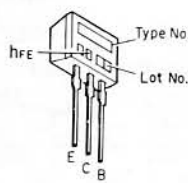
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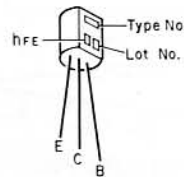
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2SC945
2SC1815
2SA952
2SA1015



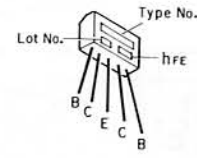
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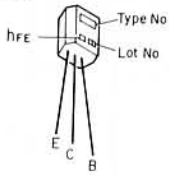
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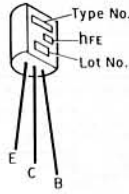
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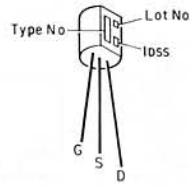
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2SA1048
2SA1150



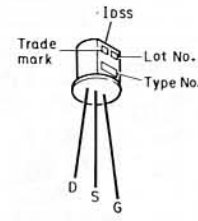
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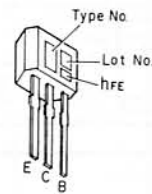
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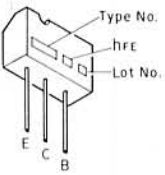
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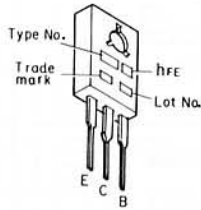
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2SC2839



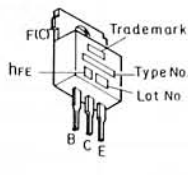
2SC2021
2SA874



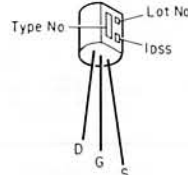
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2SB707



2SK163

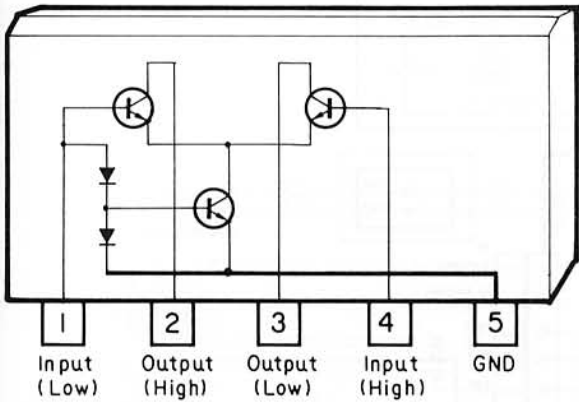


SD306PA
P001

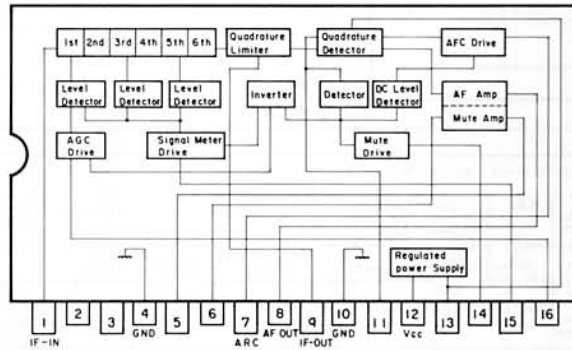


FM IF Unit

IC 1: M5215L

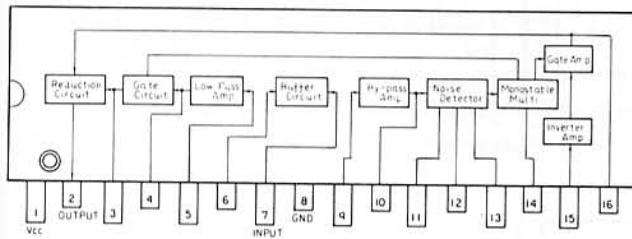


IC 2: LA1140

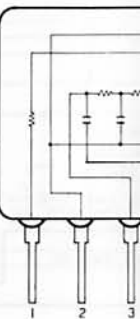
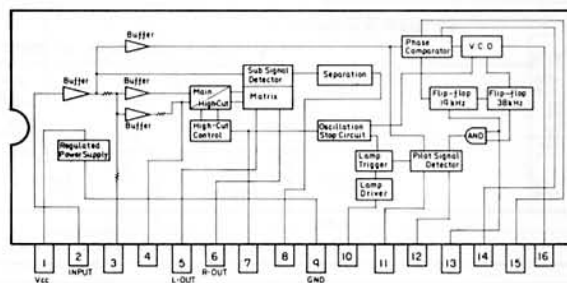


Control Unit

IC 3: LA2110



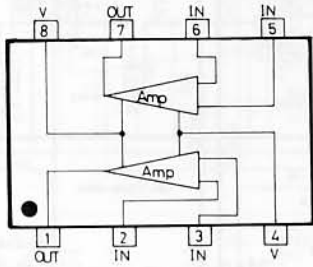
IC 4: LA3375P



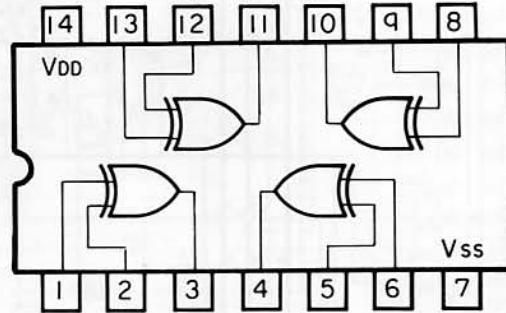
IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

AF Amp Unit

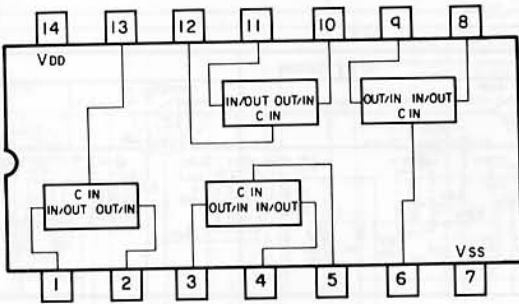
IC 1: NJM4558DD



* IC 3: TC4030BP

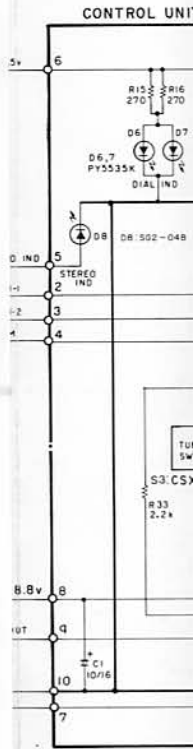
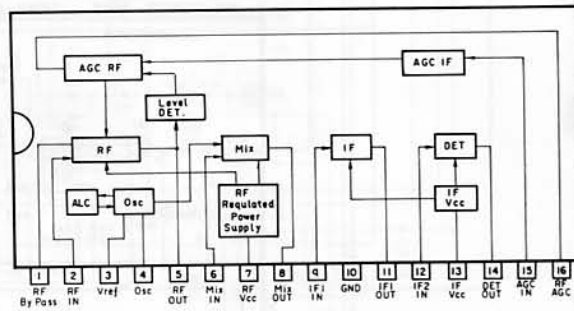


* IC 2: TC4066BP



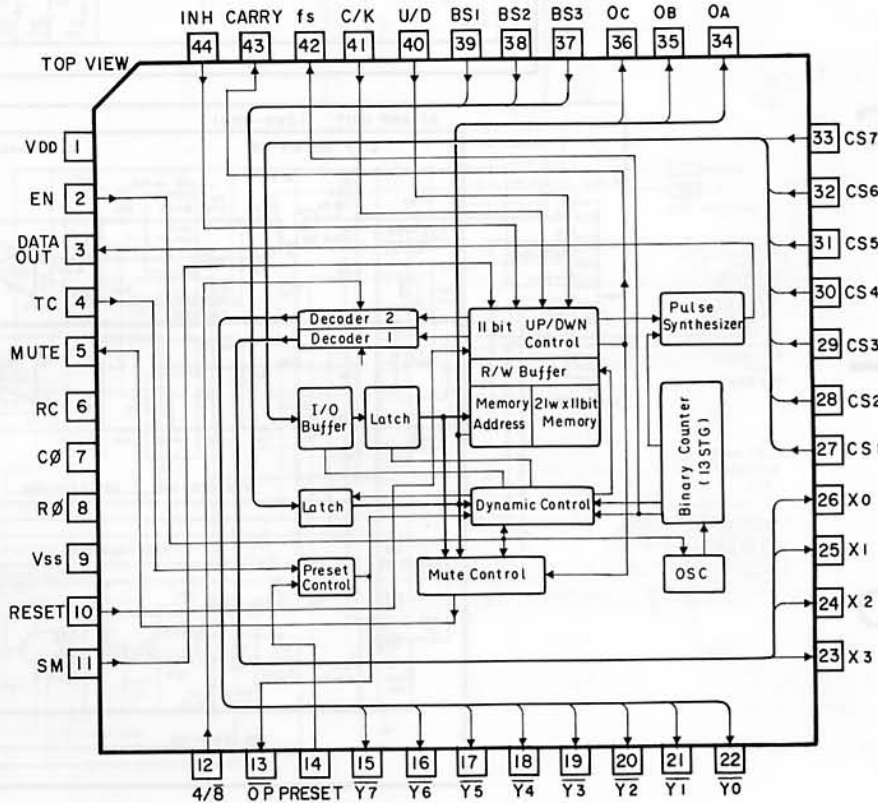
AM Tuner Unit

IC 1: LA1130

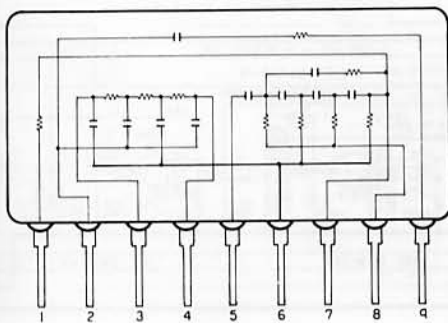


Control Unit

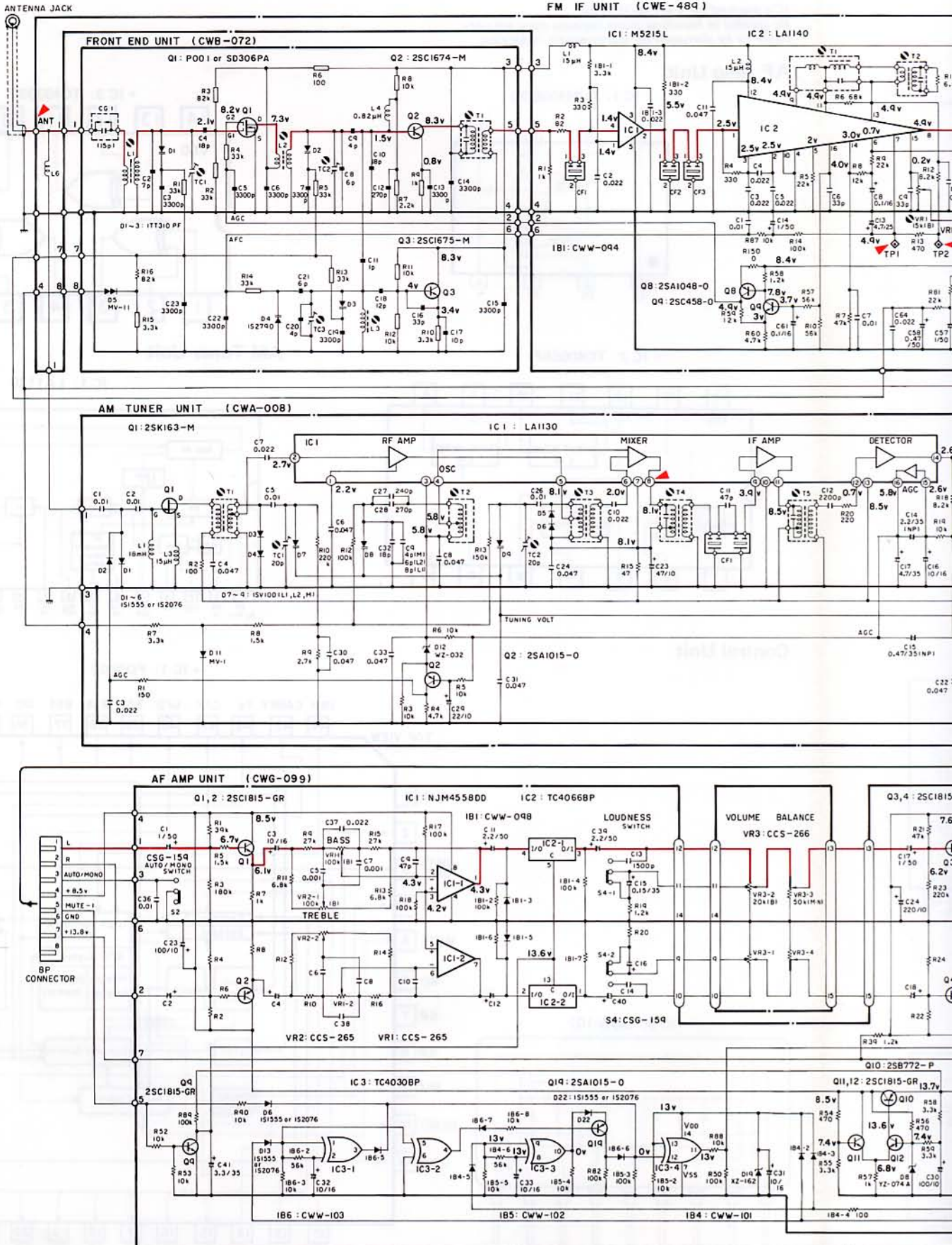
* IC 1: PD0002



IC 5: CWW-107



3. SCHMATIC CIRCUIT DIAGRAM (GEX-61/E)

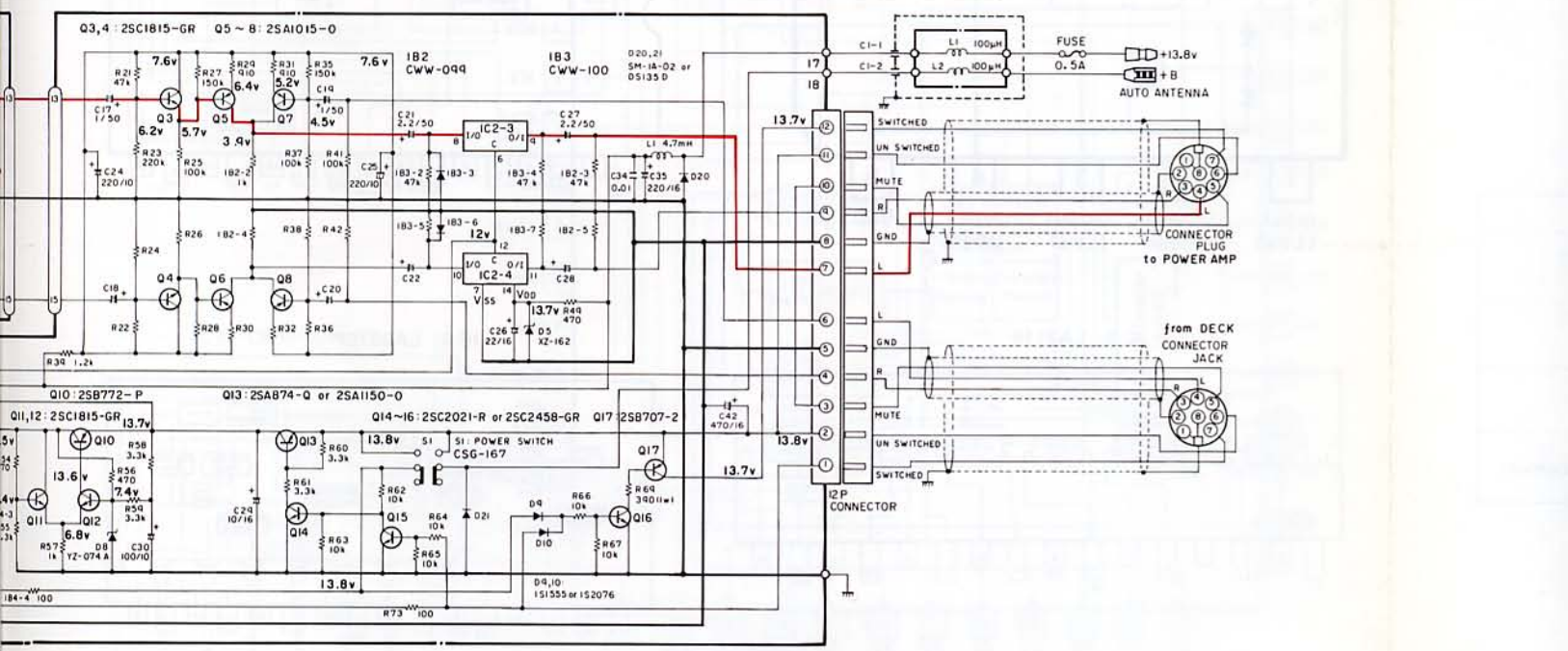
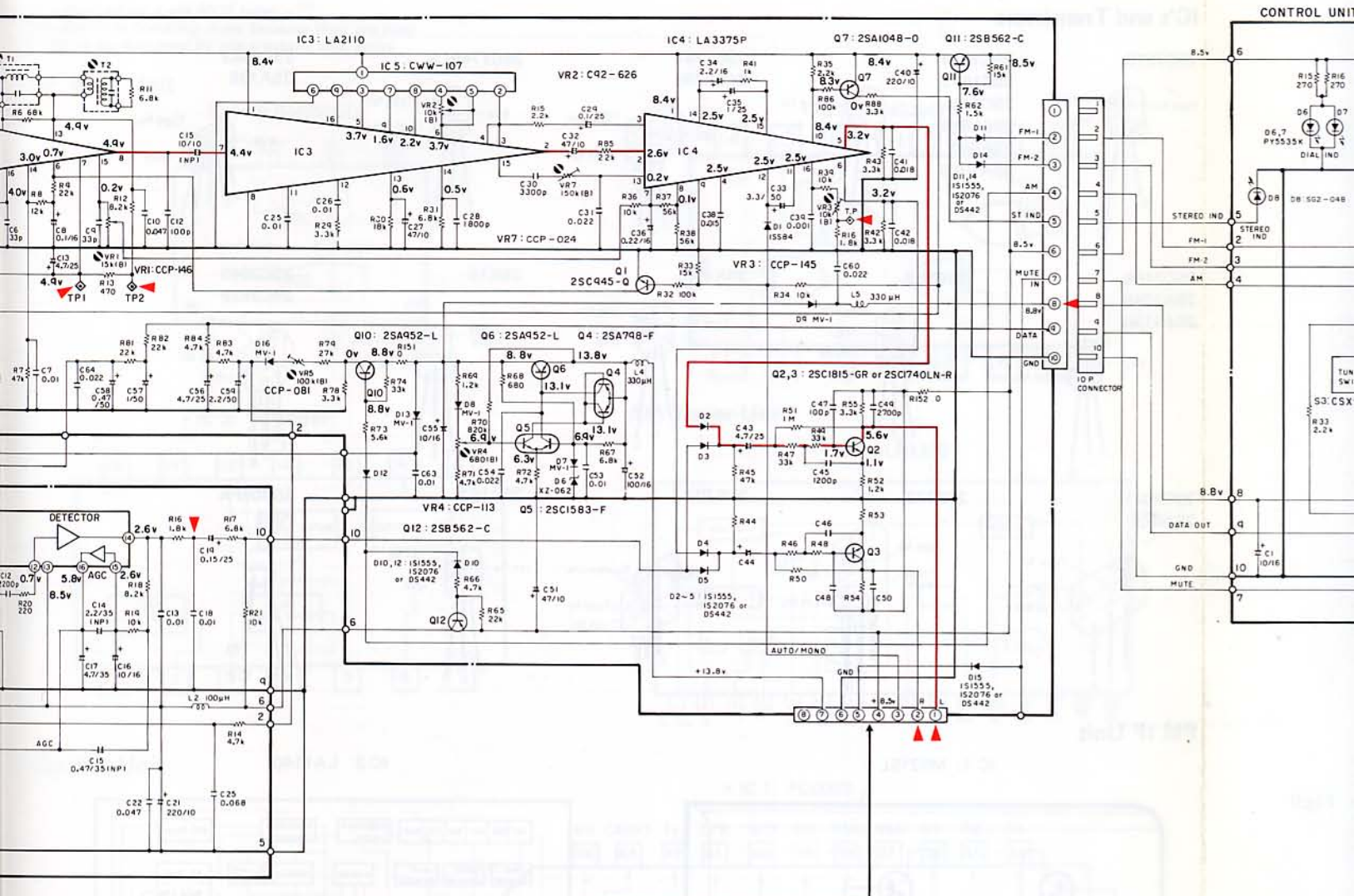


A

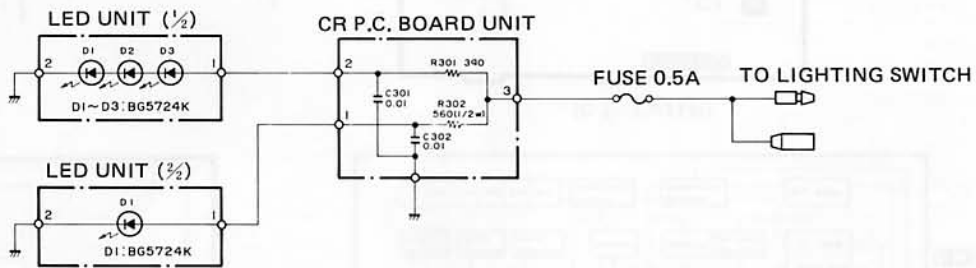
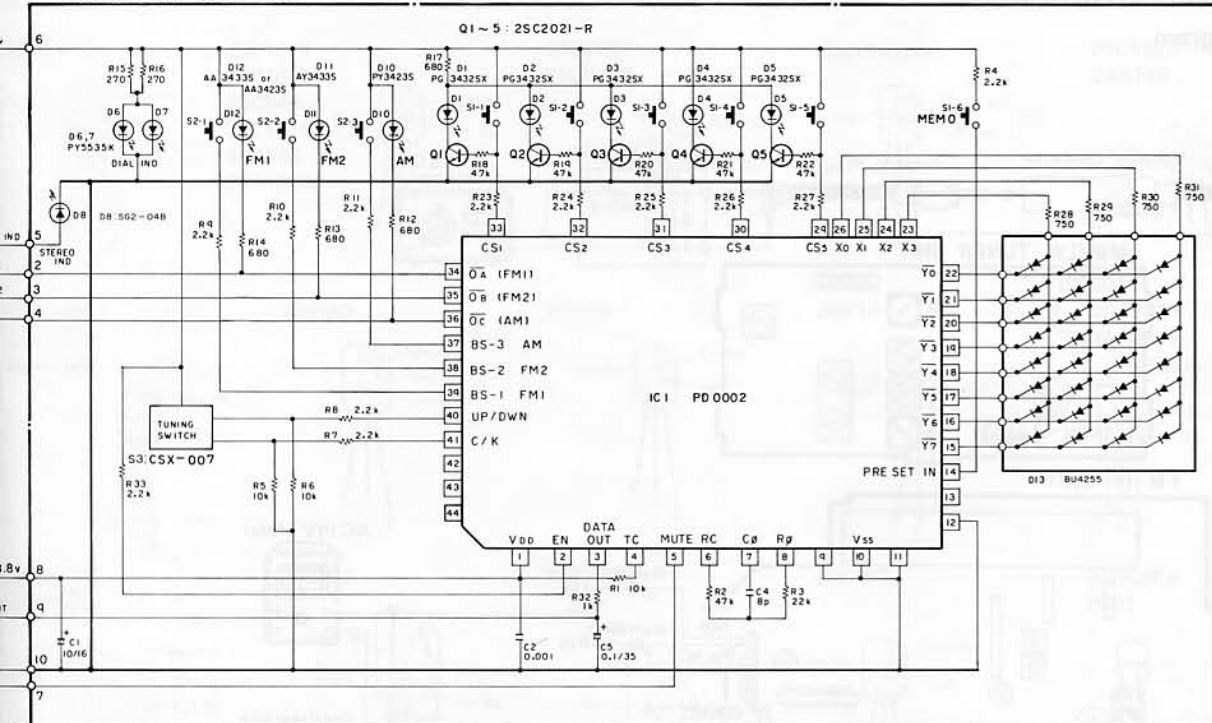
B

C

D



CONTROL UNIT (CWM-168)



SWITCHES :

⊙ AF AMP UNIT

- S1 : POWER SWITCH ----- ON - OFF
- S2 : AUTO/MONO SWITCH ----- AUTO - MONO
- S3 : VACANT
- S4 : LOUDNESS SWITCH ----- ON - OFF

The underlined indicates the switch position.

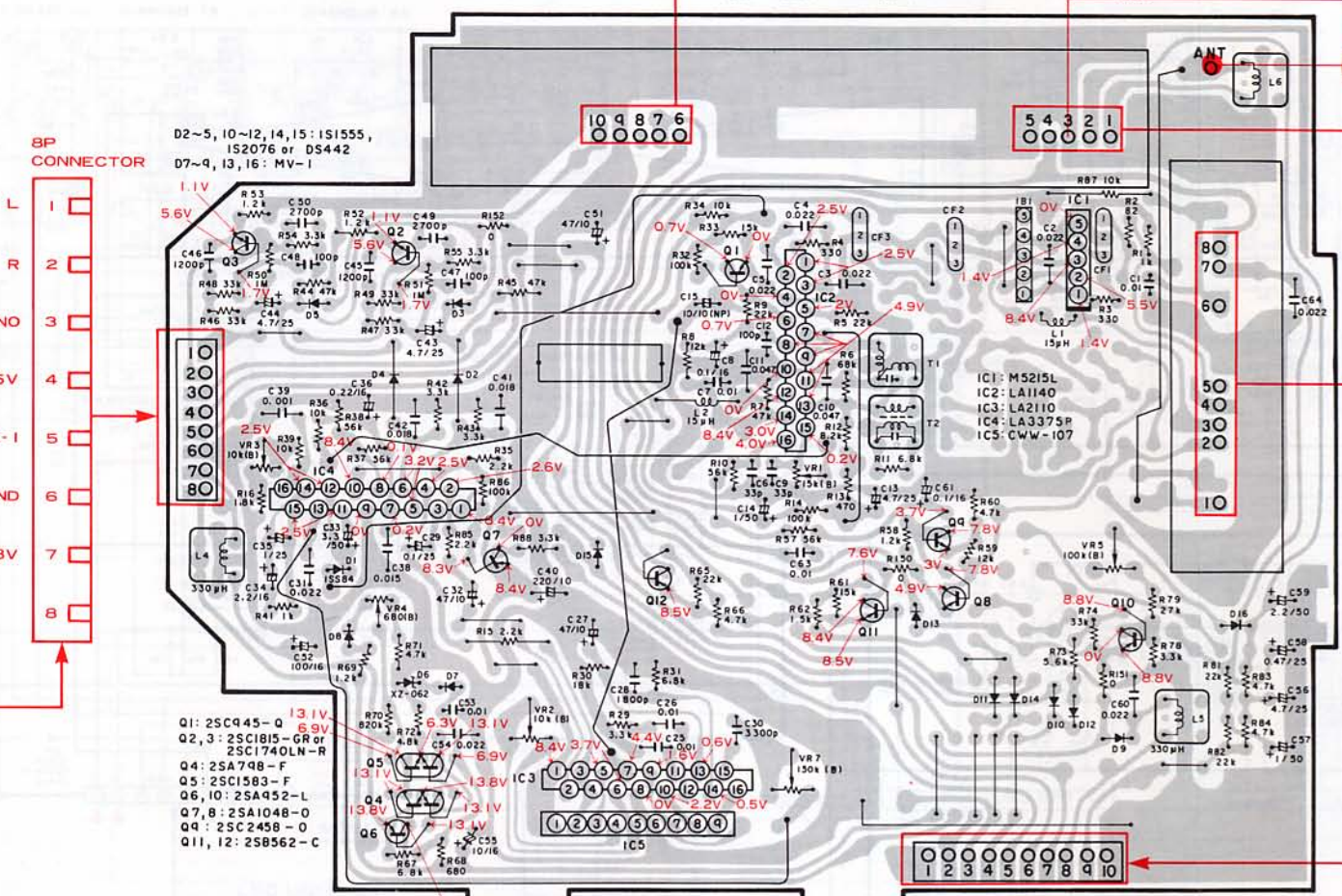
NOTICE:

- Indicates a chip resistor.
- Indicates a chip capacitor.

Fig. 10

FM IF UNIT (CWE-489)

IC, Q Q3 IC4 Q2 Q6 Q5 Q4 Q7 IC5 IC3 Q12 Q1 IC2 Q11 Q9 Q8 IC1 Q10
 ADJ VR3 VR4 VR2 VR7 VRI TI T2 VR5



D2~5, 10~12, 14, 15: IS1555, IS2076 or DS442
 D7~9, 13, 16: MV-1

Q1: 2SC945-0 13.1V
 Q2, 3: 2SC1815-GR or 2SC1740LN-R 6.9V
 Q4: 2SA748-F 13.1V
 Q5: 2SC1583-F 13.8V
 Q6, 10: 2SA452-L 13.1V
 Q7, 8: 2SA1048-0 13.8V
 Q9: 2SC2458-0 13.1V
 Q11, 12: 2SB562-C 13.1V

Q1

G1	2.1V
G2	8.2V
D	7.3V
S	0V

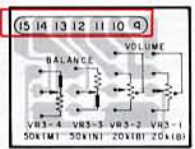
Q2

E	0.8V
C	8.3V
B	1.5V

Q3

E	3.4V
C	8.3V
B	4V

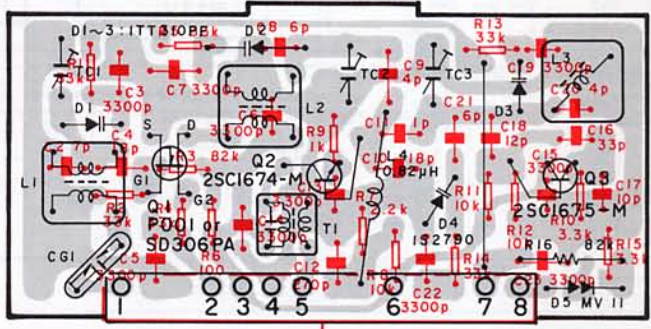
VOLUME UNIT



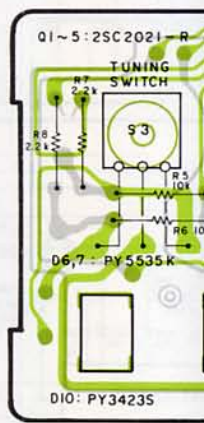
NOTICE:
 [Red rectangle symbol] Indicates a chip resistor.
 [Red square symbol] Indicates a chip capacitor.

FRONT END UNIT (CWB-072)

Q Q1 Q2 Q3
 ADJ LI TCI L2 TI TC2 TC3 L3

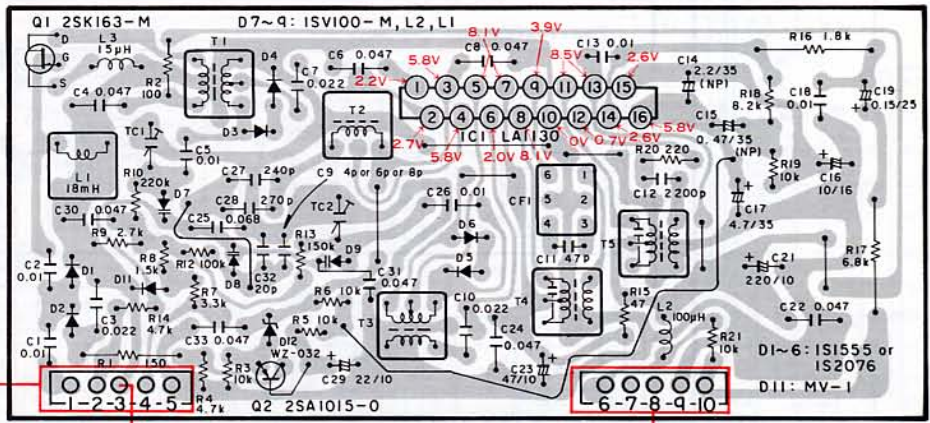


CONTROL UNIT



AM TUNER UNIT (CWA-008)

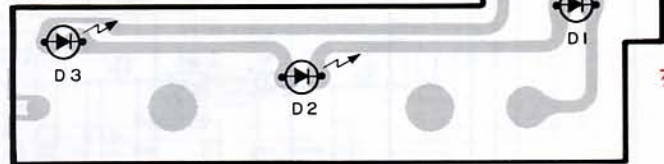
IC,Q	Q1	Q2	IC1
ADJ	TC1	TI	TC2 T2 T3 T4 T5



IOP CONNECTOR

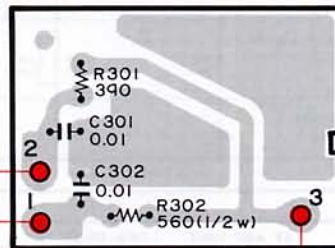
- 1
- 2 FM-1
- 3 FM-2
- 4 AM
- 5 STEREO IND
- 6 8.5V
- 7 MUTE
- 8 8.8V
- 9 DATA OUT
- 10 GND

LED UNIT (1/2)

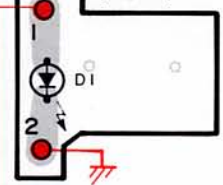


DI~D3 : BG5724K

CR P.C. BOARD UNIT



LED UNIT (2/2)



DI : BG5724K



CONTROL UNIT (CWM-168)

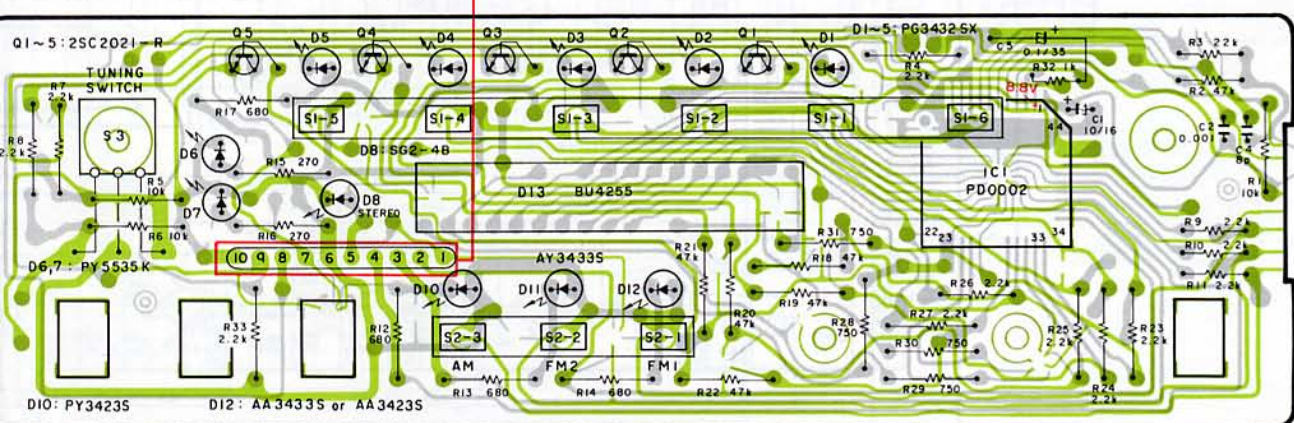
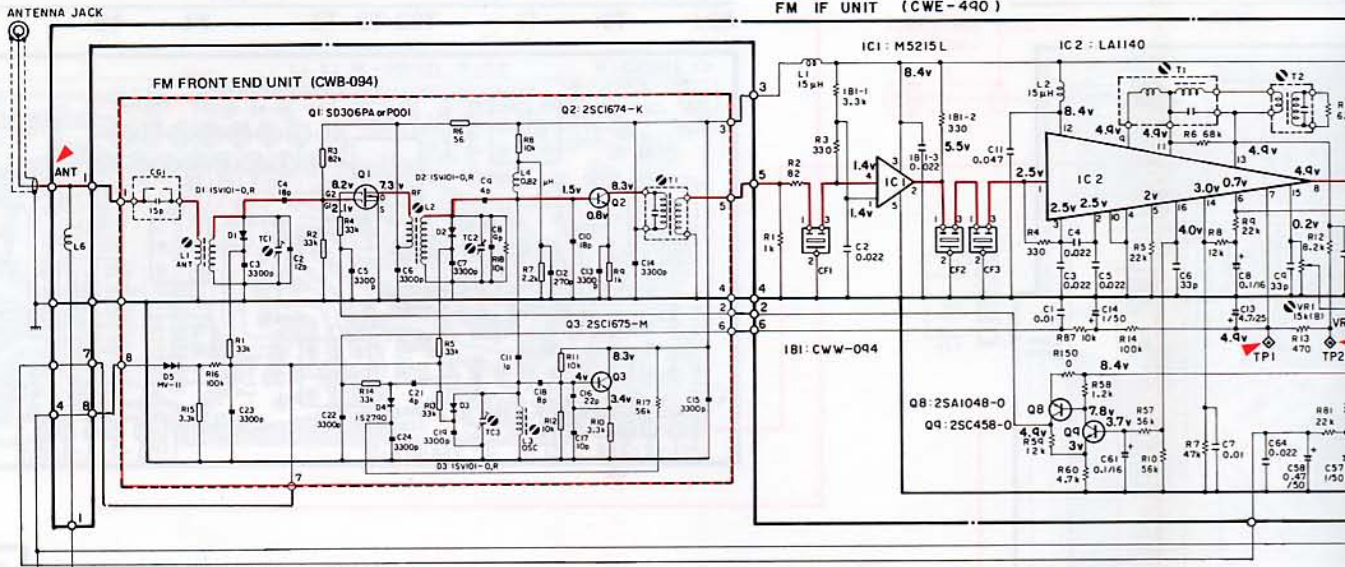


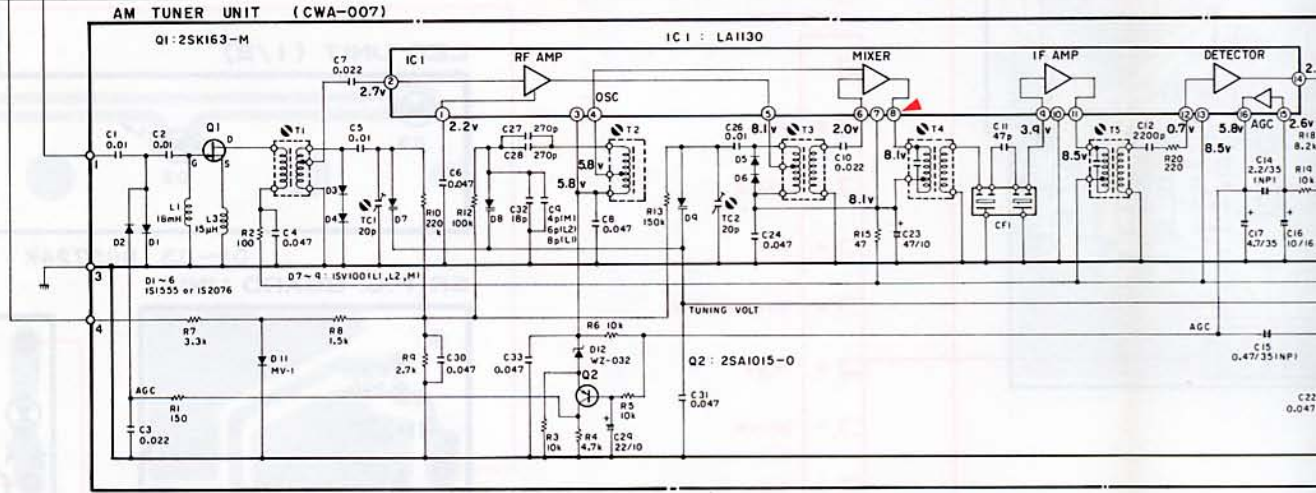
Fig. 11

5. SCHEMATIC CIRCUIT DIAGRAM (GEX-61/SA)

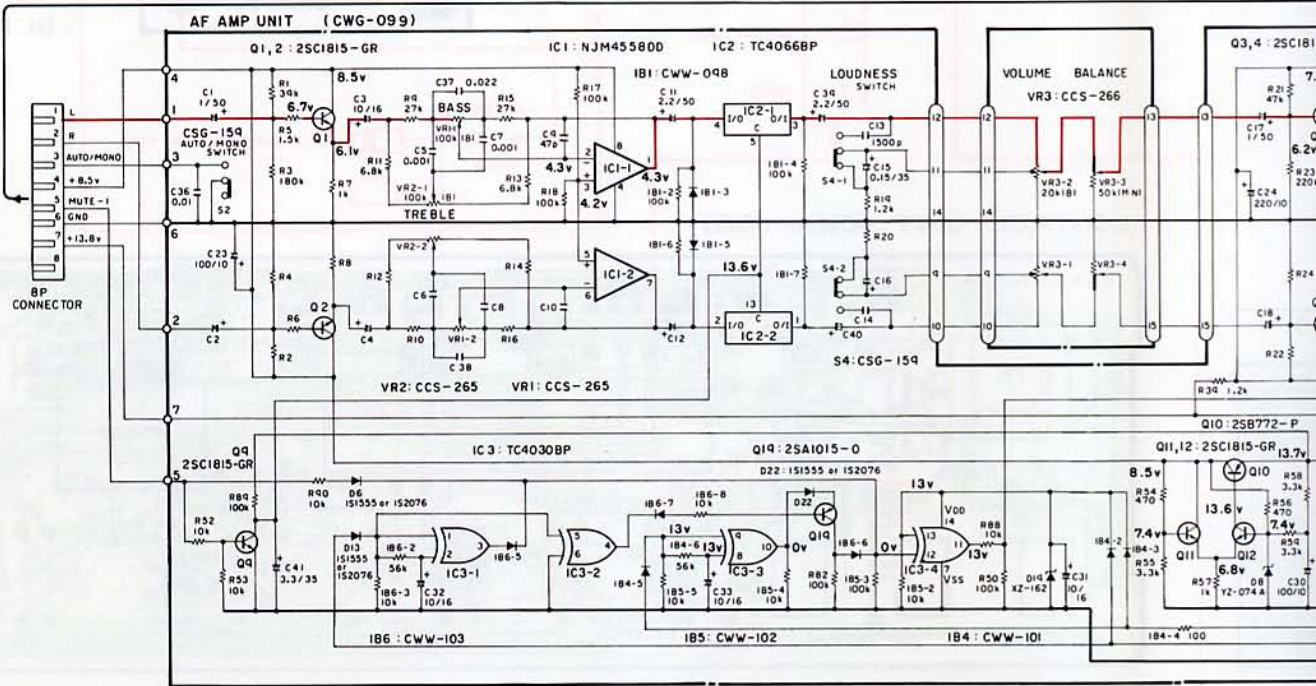
A



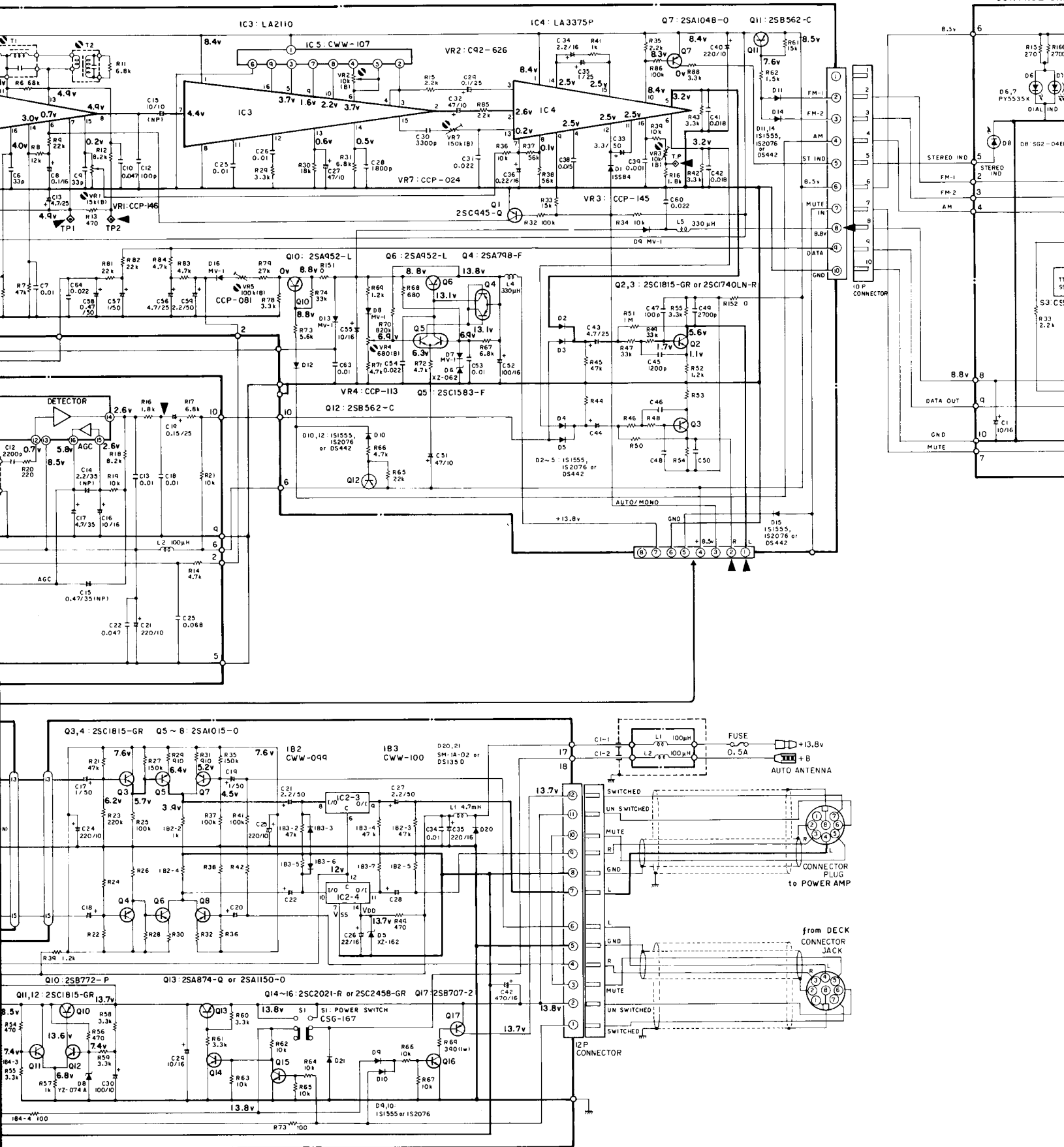
B



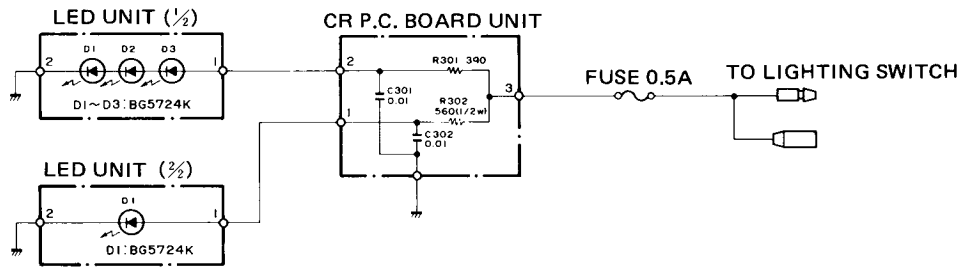
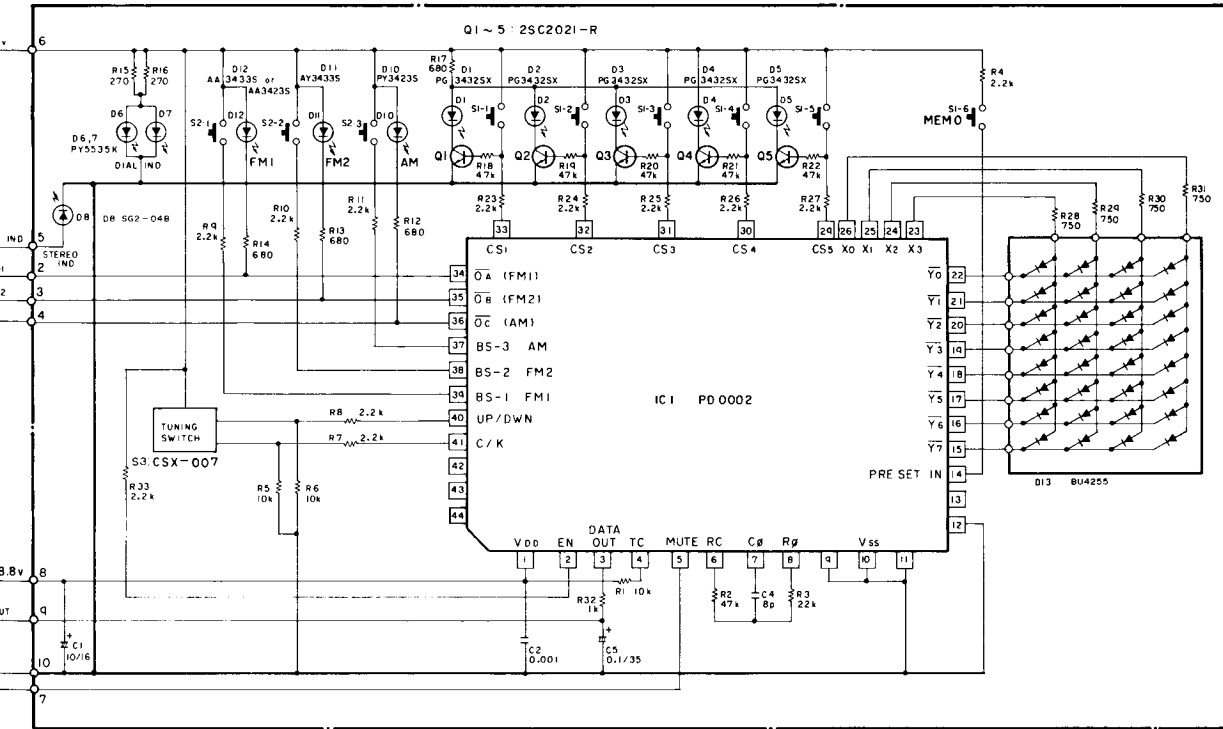
C



D



CONTROL UNIT (CWM-168)



- SWITCHES :
- ⊙ AF AMP UNIT
 - S1 : POWER SWITCH ON - OFF
 - S2 : AUTO/MONO SWITCH AUTO - MONO
 - S3 : VACANT
 - S4 : LOUDNESS SWITCH ON - OFF

The underlined indicates the switch position.

NOTICE:

- Indicates a chip resistor.
- Indicates a chip capacitor.

A

B

C

D

Fig. 12

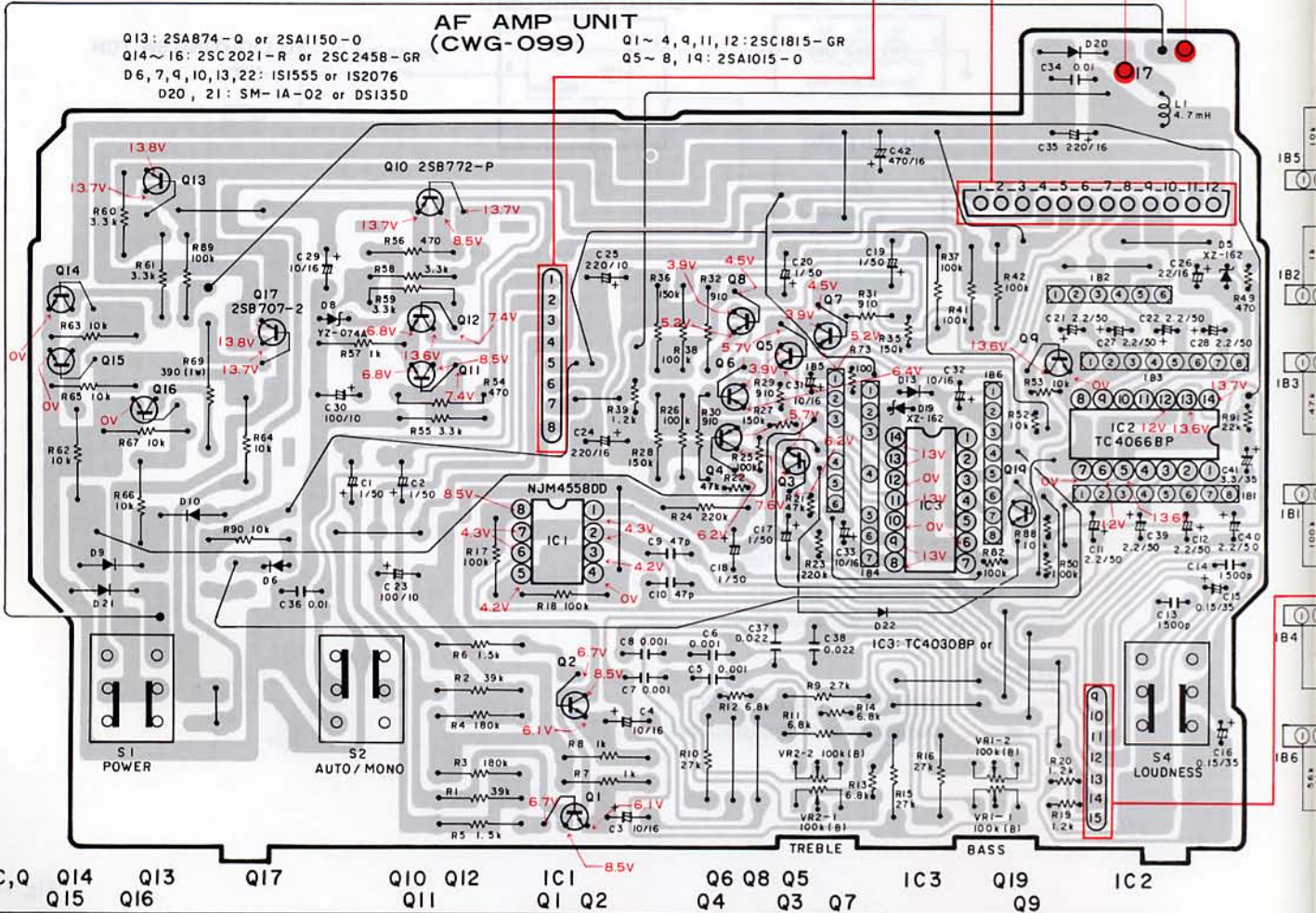
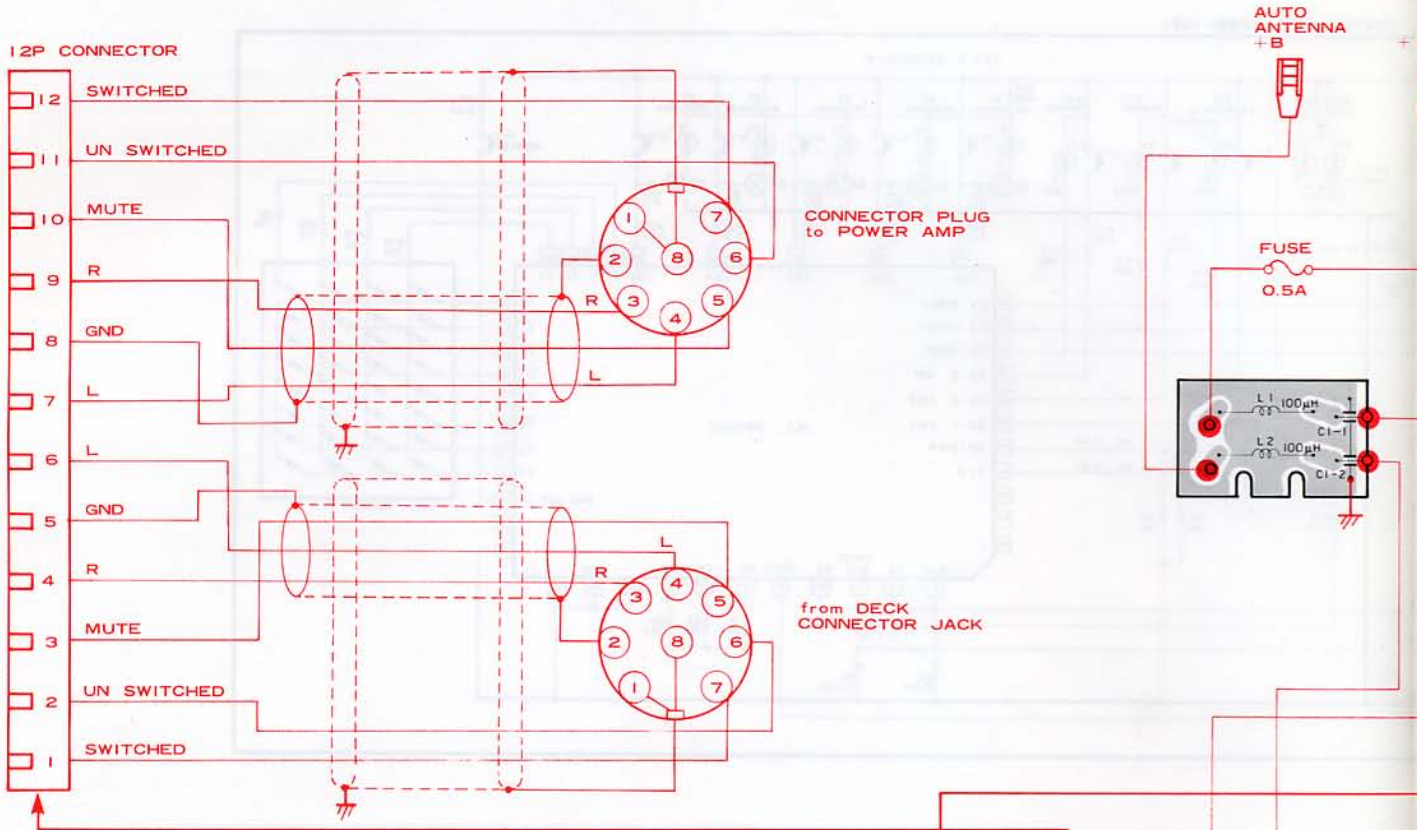
6. CONNECTION DIAGRAM (GEX-61/SA)

A

B

C

D



1

2

3

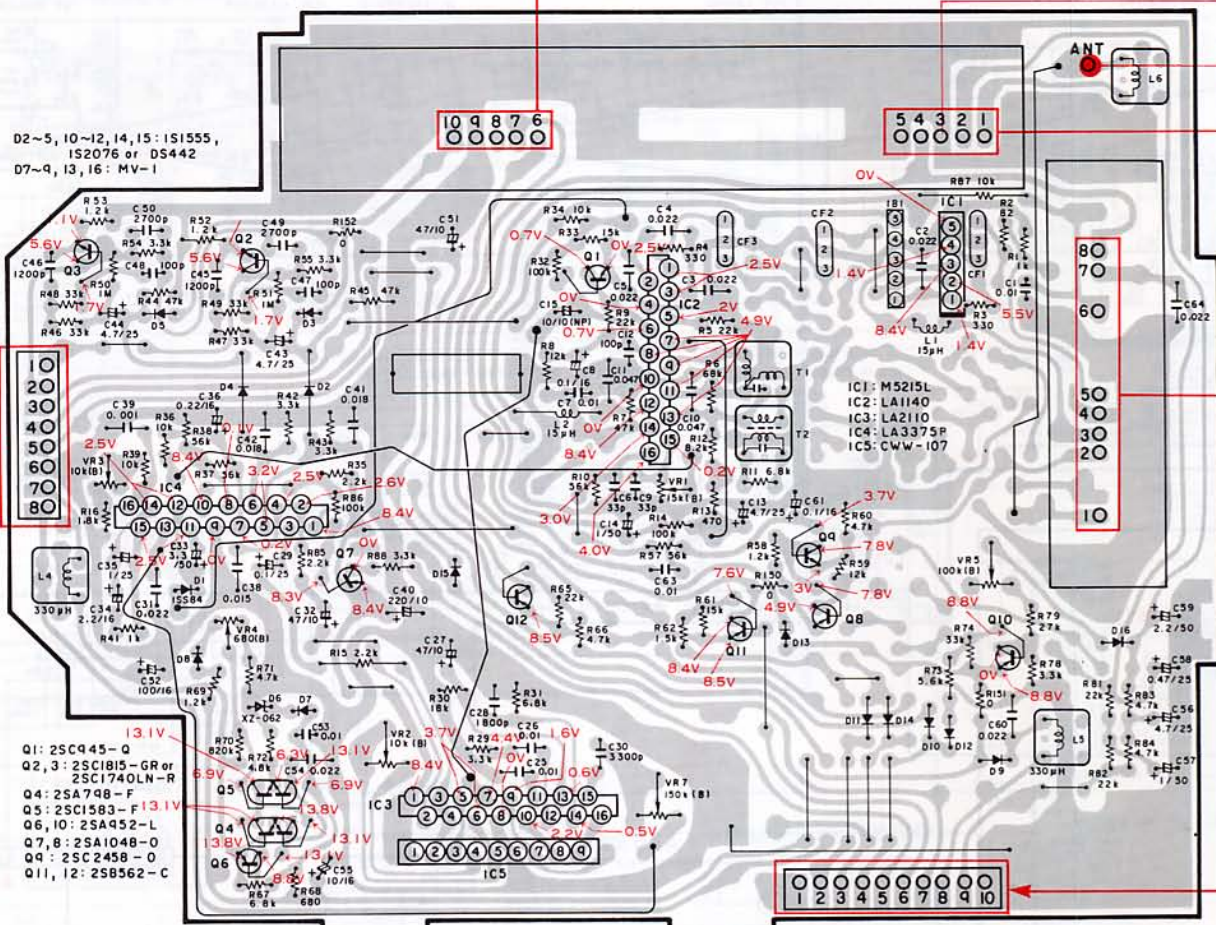
FM IF UNIT (CWE-490)

IC, Q Q3 IC4 Q2 Q6 Q5 Q4 Q7 IC5 IC3 Q12 Q1 IC2 Q11 Q9 Q8 IC1 Q10
 ADJ VR3 VR4 VR2 VR7 VRI T1 T2 VR5

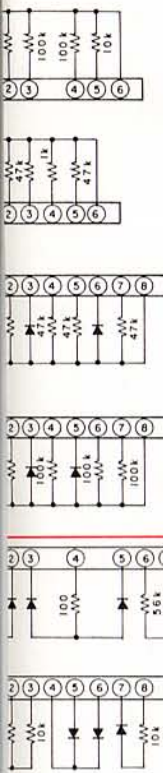
3.8V

8P CONNECTOR

D2-5, 10-12, 14, 15: IS1555, IS2076 or DS442
 D7-9, 13, 16: MV-1



Q1: 25C945-Q
 Q2, 3: 25C1815-GR or 25C1740LN-R
 Q4: 25A798-F
 Q5: 25C1583-F
 Q6, 10: 25A952-L
 Q7, 8: 25A1048-0
 Q9: 25C2458-0
 Q11, 12: 25B562-C

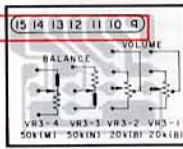


Q1	G1	2.1V
	G2	8.2V
	D	7.3V
	S	0V

Q2	E	0.8V
	C	8.3V
	B	1.5V

Q3	E	3.4V
	C	8.3V
	B	4V

VOLUME UNIT

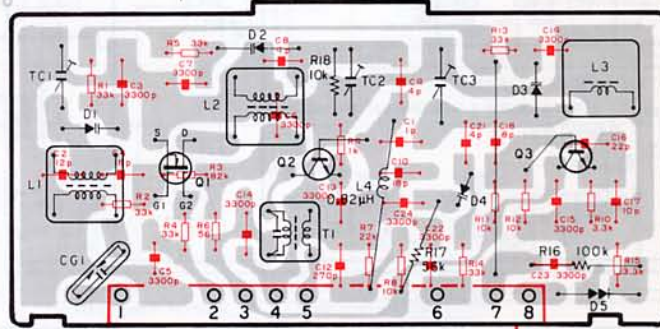


NOTICE:

- Indicates a chip resistor.
- Indicates a chip capacitor.

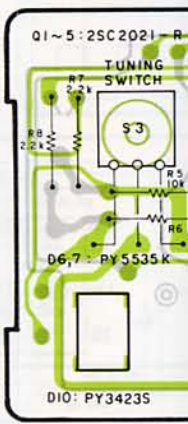
FRONT END UNIT (CWB-094)

Q Q1 Q2 Q3
 ADJ TCI LI L2 T1 TC2 TC3 L3



Q1: SD306PA or P001 Q2: 25C1674-K Q3: 25C1675-M
 D1-3: ISV101-0, R D4: IS2740 D5: MV-11

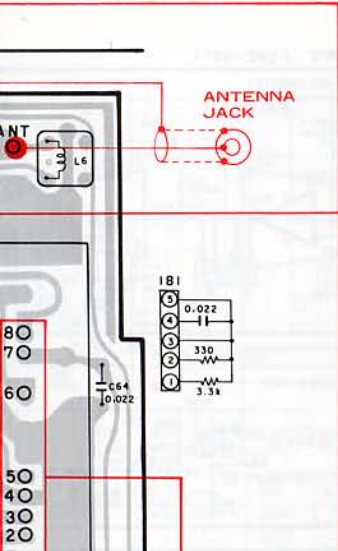
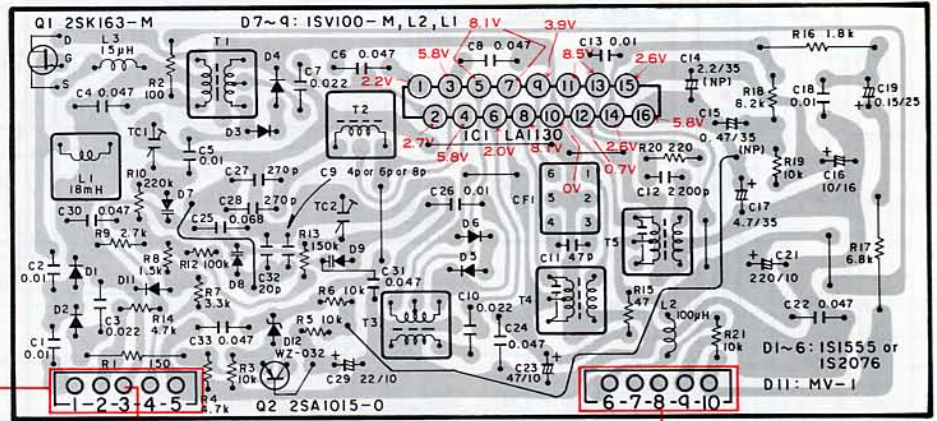
CONTROL UNIT



D10: PY34235

AM TUNER UNIT (CWA-007)

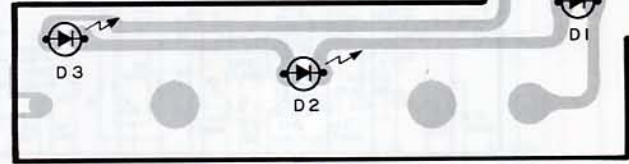
IC, Q Q1 Q2 IC1
ADJ TCI TI TC2 T2 T3 T4 T5



I OP CONNECTOR

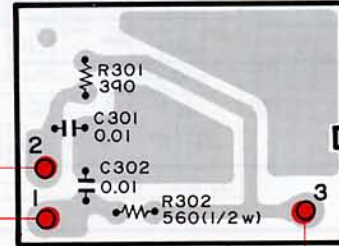
- 1
- 2 FM-1
- 3 FM-2
- 4 AM
- 5 STEREO IND
- 6 8.5V
- 7 MUTE
- 8 8.8V
- 9 DATA OUT
- 10 GND

LED UNIT (1/2)

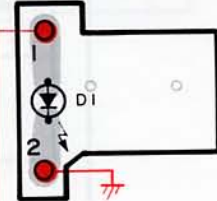


D1~D3 : BG5724K

CR P.C. BOARD UNIT



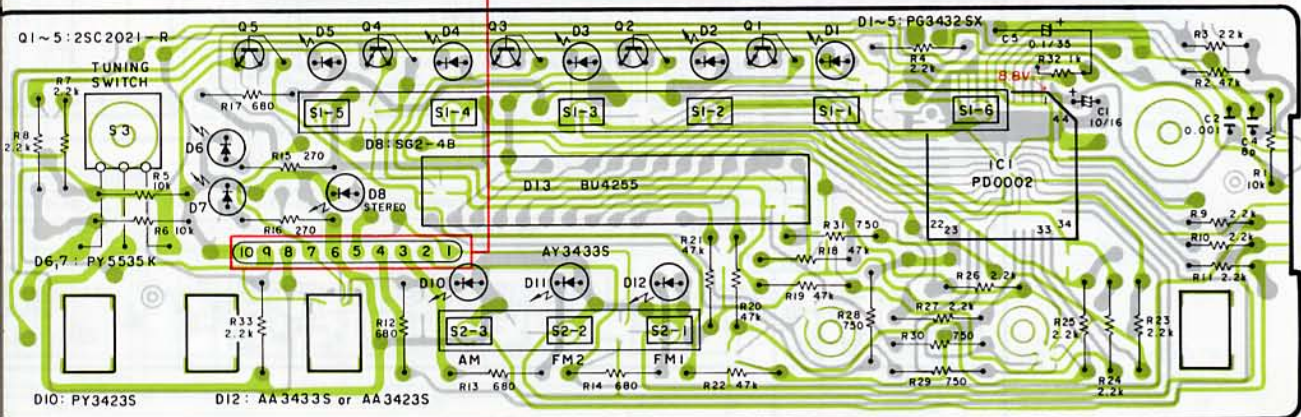
LED UNIT (2/2)



D1 : BG5724K



CONTROL UNIT (CWM-168)



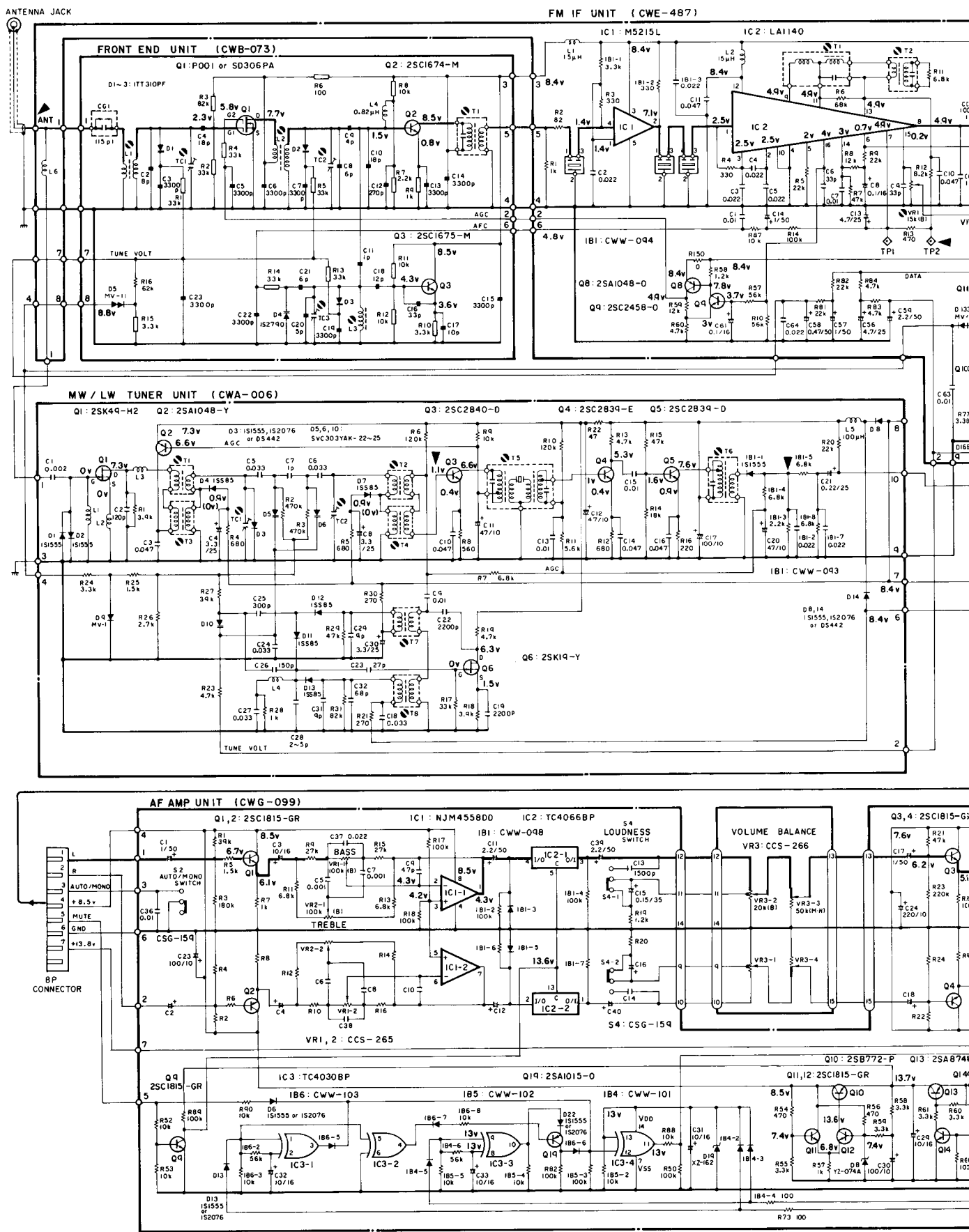
A

B

C

D

7. SCHEMATIC CIRCUIT DIAGRAM (GEX-68/E)

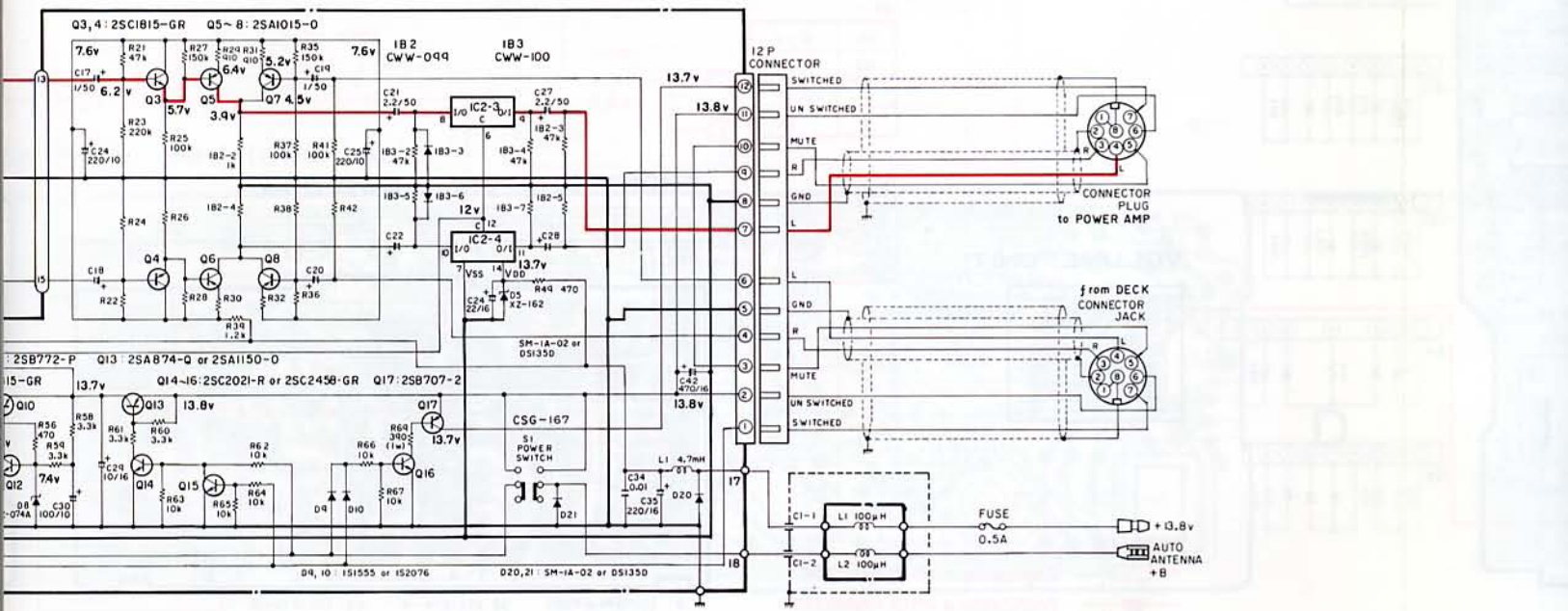
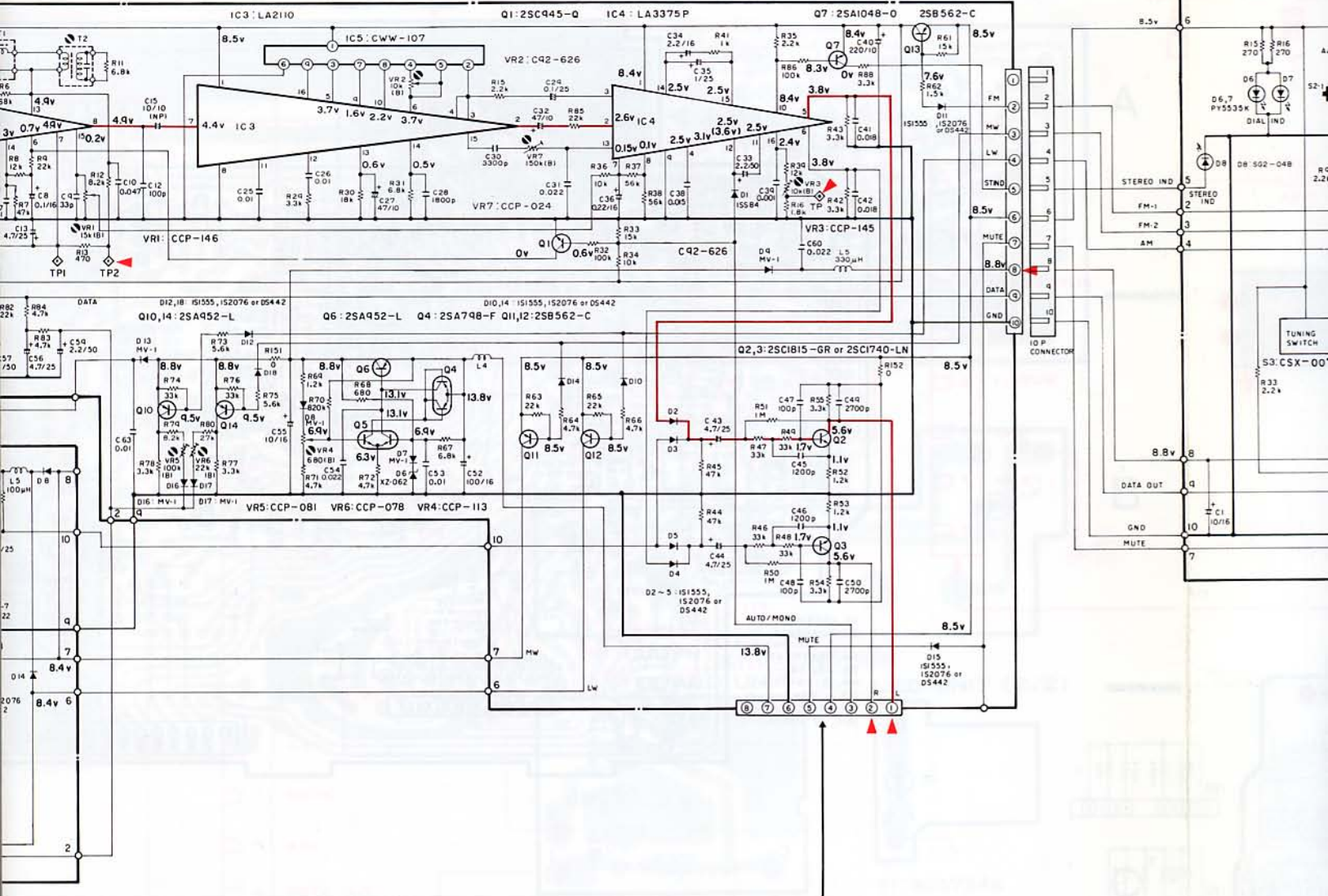


A

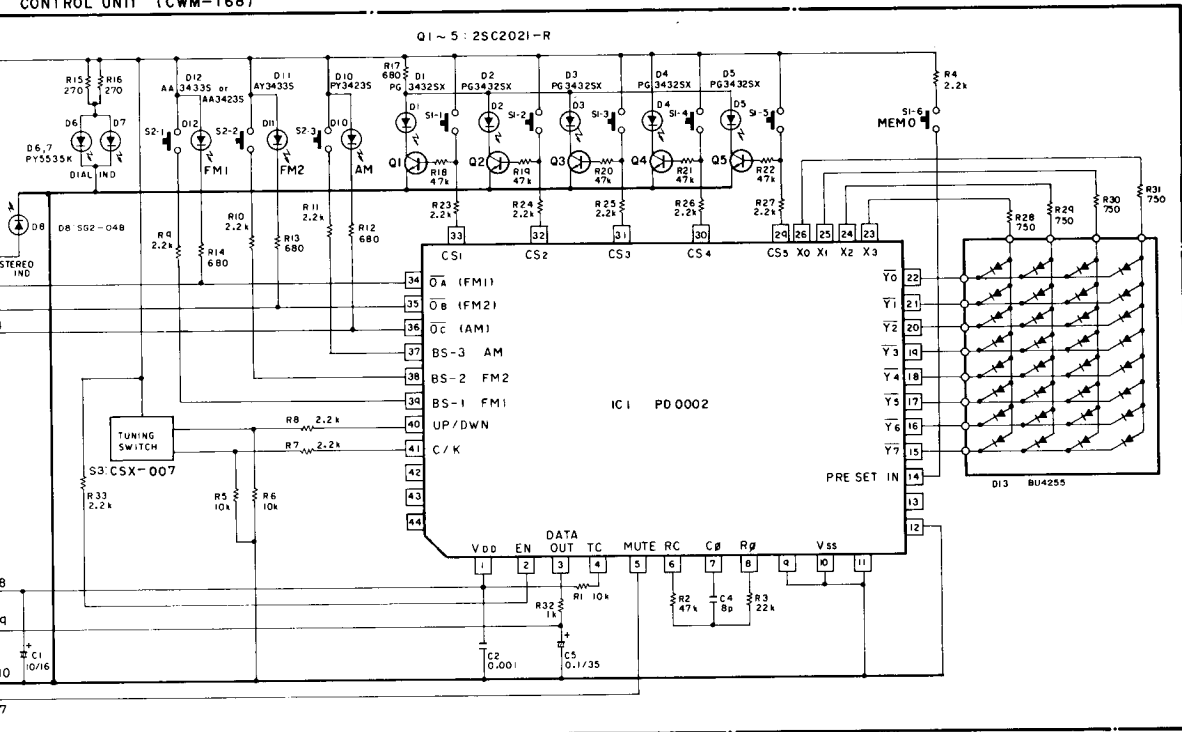
B

C

D

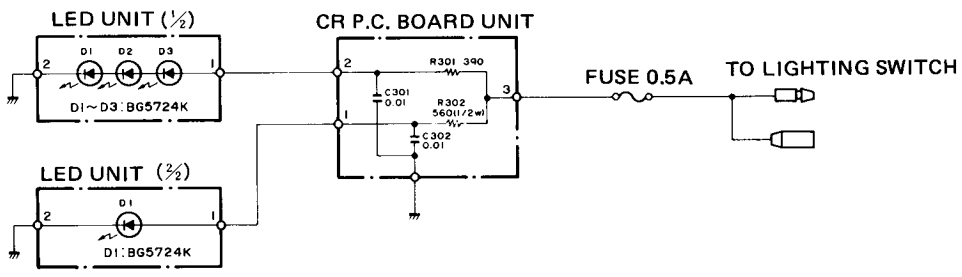


CONTROL UNIT (CWM-168)



A

B



- SWITCHES :
- ⊙ AF AMP UNIT
 - S1 : POWER SWITCH ON - OFF
 - S2 : AUTO/MONO SWITCH AUTO - MONO
 - S3 : VACANT
 - S4 : LOUDNESS SWITCH ON - OFF

The underlined indicates the switch position.

NOTICE:

—■— Indicates a chip resistor.

—■— Indicates a chip capacitor.

C

D

Fig. 14

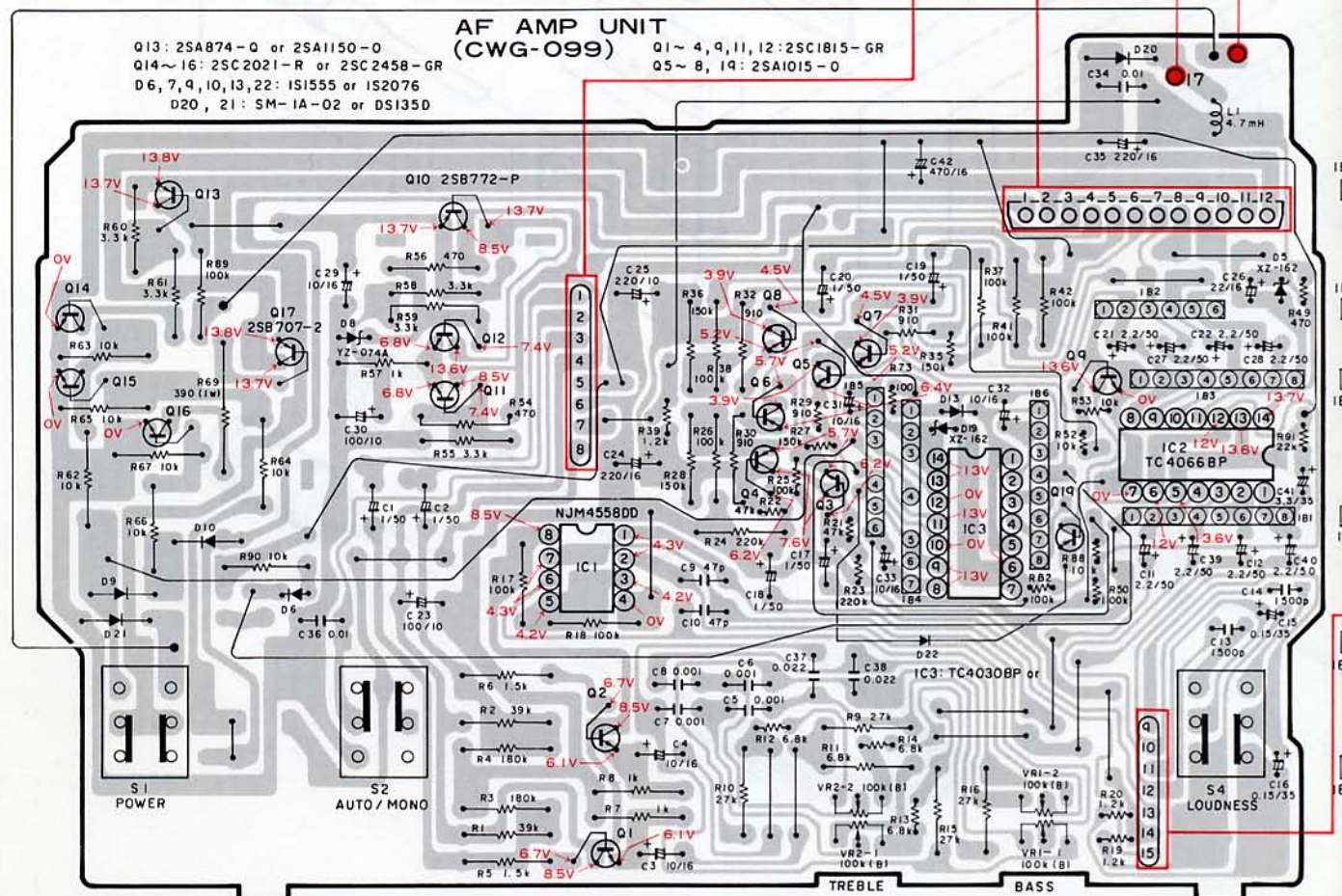
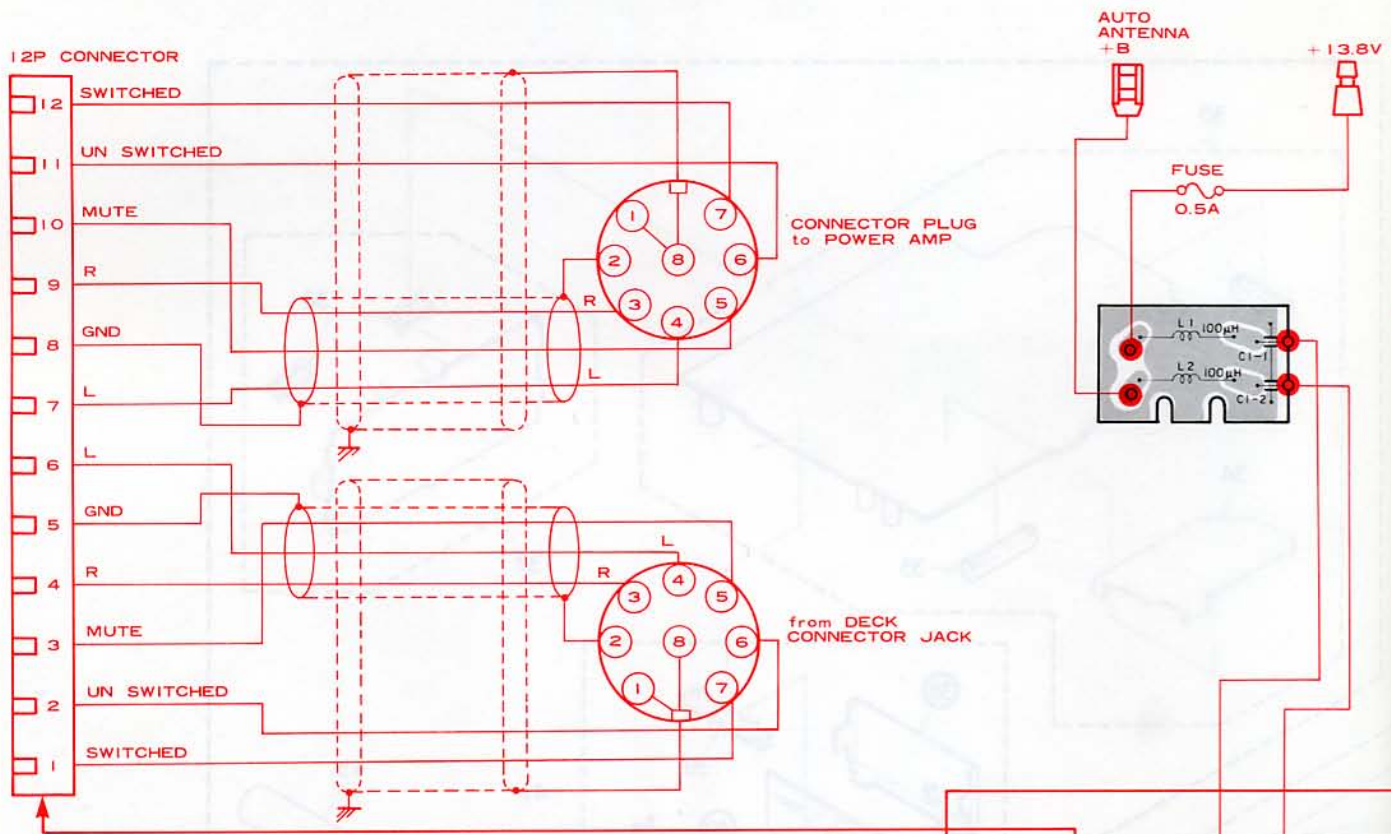
8. CONNECTION DIAGRAM (GEX-68/E)

A

B

C

D



- IC, Q Q14 Q13 Q17 Q10 Q12 IC1 Q6 Q8 Q5 IC3 Q19 IC2
- Q15 Q16 Q11 Q1 Q2 Q4 Q3 Q7 Q9

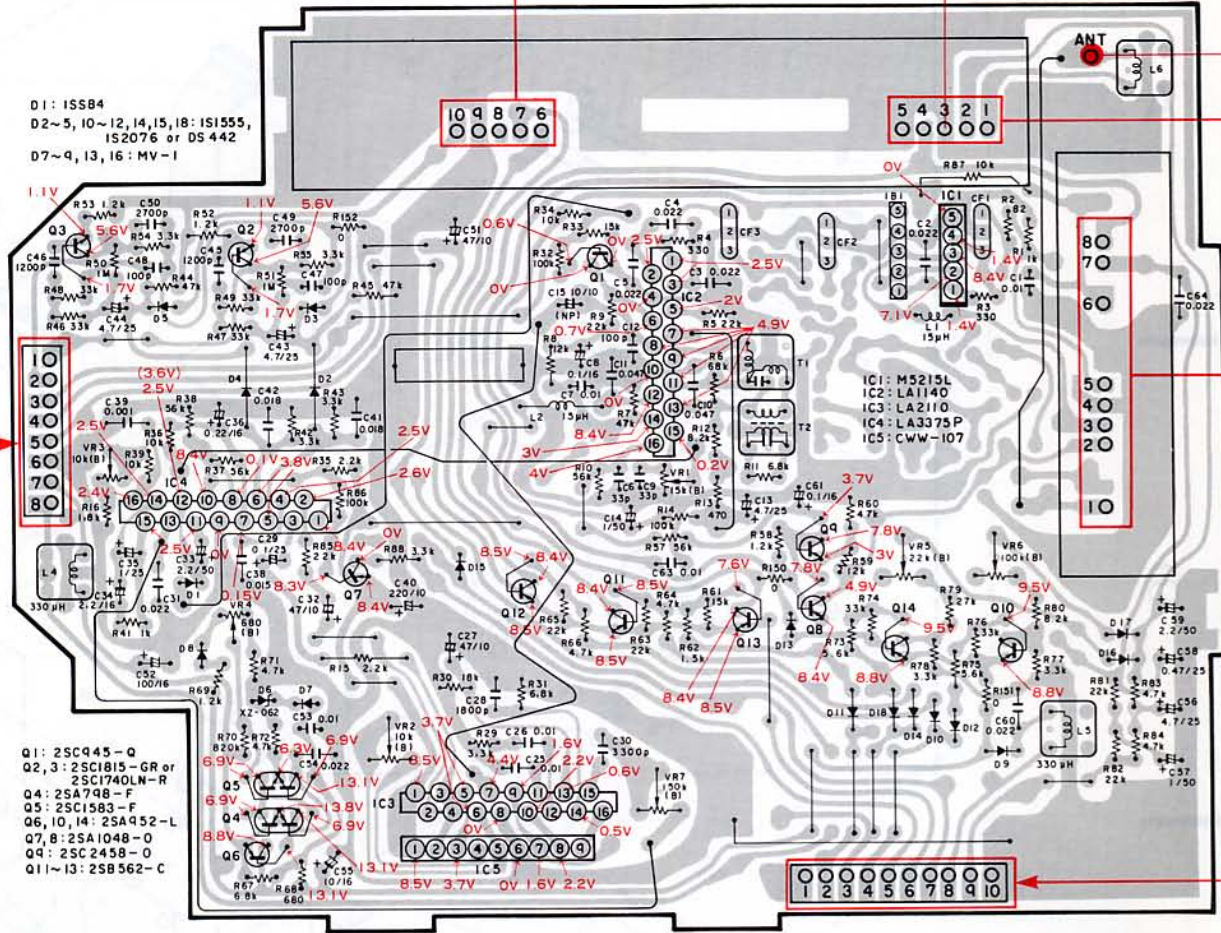
1

2

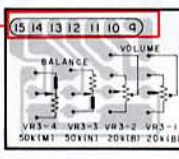
3

FM IF UNIT (CWE-487)

IC, Q	Q3	IC4	Q2	Q6	Q5	Q4	Q7	IC5	IC3	Q12	Q1	Q11	IC2	Q13	Q9	Q8	Q14	IC1	Q10
ADJ	VR3	VR4					VR2				VR7	VR1	T1	T2			VR5		VR6



VOLUME UNIT

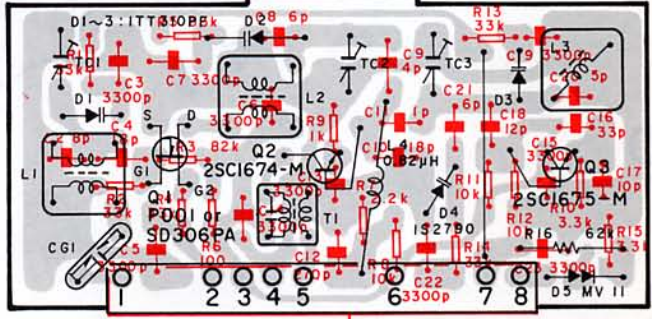


NOTICE:

- Indicates a chip resistor.
- Indicates a chip capacitor.

FRONT END UNIT (CWB-O73)

Q	Q1	Q2	Q3
ADJ	L1	TC1	L3



I OP CONNECTOR

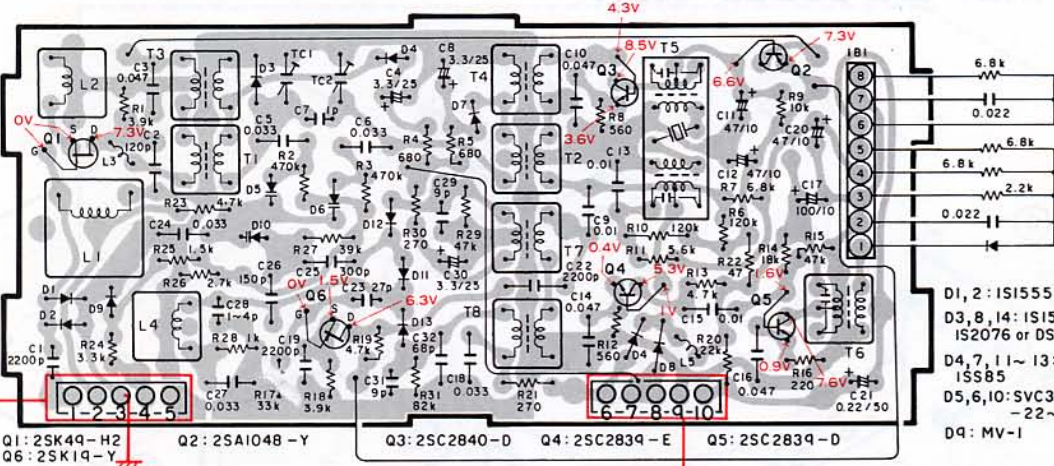


CONTROL

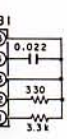


MW/LW TUNER UNIT (CWA-006)

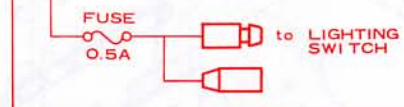
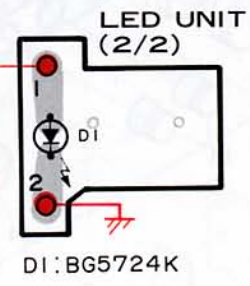
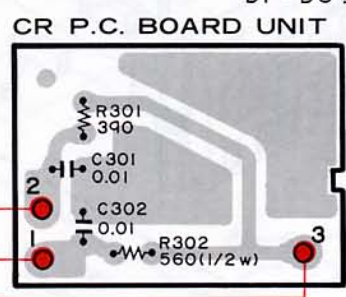
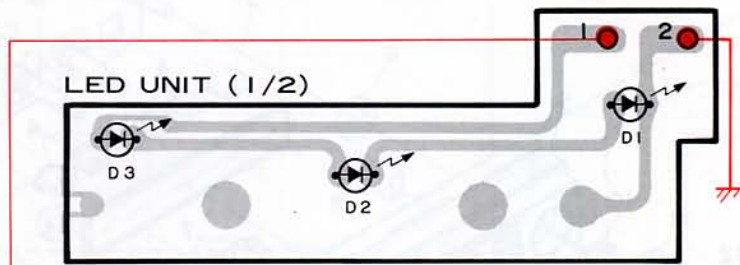
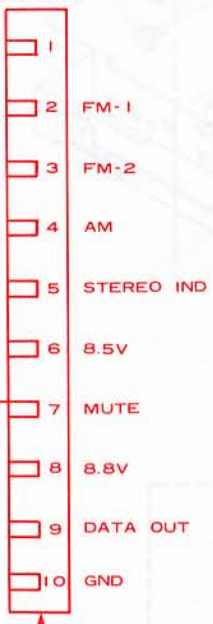
Q Q1 Q6 Q3 Q4 Q2 Q5



ANTENNA JACK



IOP CONNECTOR



CONTROL UNIT (CWM-168)

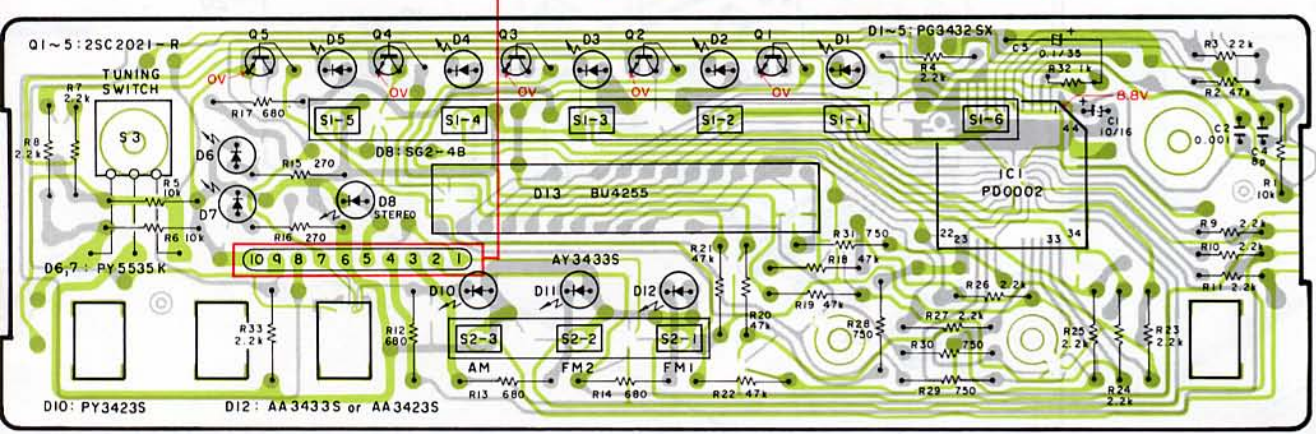


Fig. 15

12. PACKING METHOD

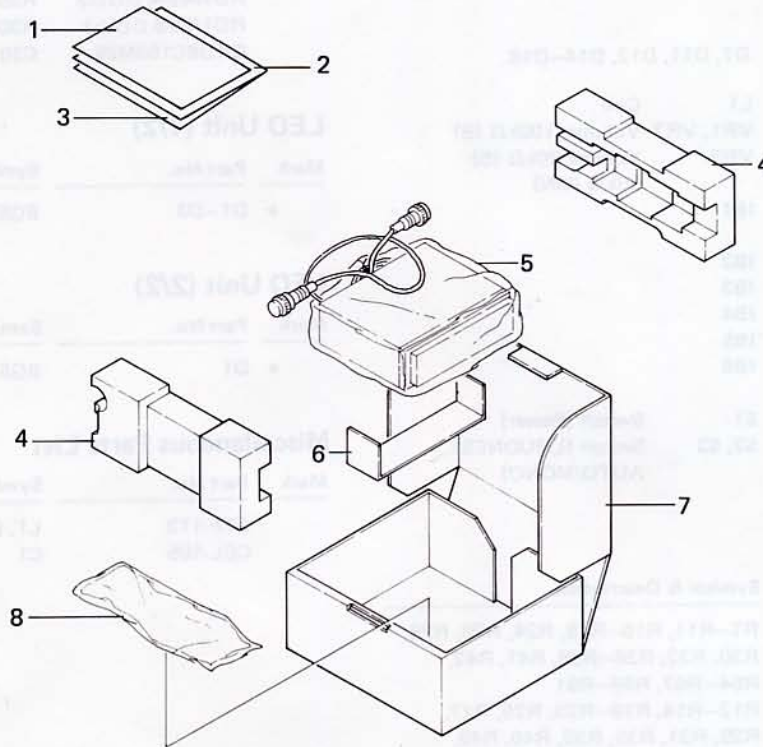


Fig. 18

Parts List

NOTE

● Parts whose parts numbers are omitted are subject to being not supplied.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CRD-231	Mounting Manual (GEX-61/E)		8.	CEA-466	Accessory Kit
	2.	CRD-313	Owner's Manual (GEX-61/E, SA) (English, French, German, Spanish)		8-1.	CNF-111	Strap
		CRD-314	Owner's Manual (GEX-68/E) (English, French, German, Spanish)		8-2.	CDE-437	Cord
	3.	CRD-315	Owner's manual (GEX-68/E) (Swedish, Norwegian, Dutch, Italian)		8-3.	CBA-028-A	Screw for Strap
	4.	CHC-540	Styrofoam (1 set pair)		8-4.	CBA-101-0	Screw, M4 x 6
	5.	CEG-157	Cover		8-5.	CBA-102-0	Screw, M5 x 16
	6.	CNB-198	Mounting Bracket		8-6.	B70-055-A	WN4φ x 4.5t
	7.	CHC-745	Carton (GEX-61/E, 61/SA)		8-7.	B70-056-A	WN5φ x 5.3t
		CHC-747	Carton (GEX-68/E)		8-8.	B20-013-A	SW4φ x 1t