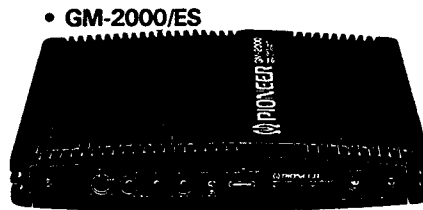


Service Manual

PIONEER
The future of sound and vision.



ORDER NO.
CRT1156

BRIDGEABLE POWER AMPLIFIER

GM-2000

ES EW UC

POWER AMPLIFIER

GM-1000 ES, EW, UC

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SPECIFICATIONS

• GM-2000

Power source 14.4 V DC (10.8–15.6 V allowable)
 Grounding system Negative type
 Max. current consumption 15 A
 Dimensions 265 (W) × 48 (H) × 232 (D) mm
 Weight 3.0 kg (Leads for wiring not included)
 Maximum power output 100 W × 2/200 W × 1
 Continuous power output
 60 W × 2/120 W × 1 (at 4 Ω, 1 kHz, 1% THD)
 50 W × 2 / 100 W × 1
 (at 4 Ω, 20–20,000 Hz, 0.015%/0.03% THD)
 Load impedance 4 Ω (2–8 Ω allowable)
 Frequency response 10–50,000 Hz (+0dB, –1dB)
 Signal-to-noise ratio 102 dB (IEC-A network)
 Distortion 0.005% (at 50 W, 1 kHz)
 Low pass filter cut off frequency 80 Hz
 Low pass filter cut off slope 12dB/octave
 Input level DIN: 70–500 mV/20k Ω
 RCA: 0.2–2 V/7k Ω

• GM-1000

Power source 14.4 V DC (10.8–15.6 V allowable)
 Grounding system Negative type
 Max. current consumption 10 A
 Dimensions 265 (W) × 41 (H) × 225 (D) mm
 Weight 2.7 kg (Cords for wiring not included)
 Maximum power output 60 W × 2
 Continuous power output
 36 W × 2 (at 4 Ω, 1 kHz, 1% THD)
 30 W × 2 (at 4 Ω, 20–20,000 Hz, 0.015% THD)
 Load impedance 4 Ω (4–8 Ω allowable)
 Frequency response 10–50,000 Hz (+0dB, –1dB)
 Signal-to-noise ratio 101 dB (IEC-A network)
 Distortion 0.005% (at 30 W, 1 kHz)
 Input level DIN: 70–500 mV/20k Ω
 RCA: 0.2–2 V/7k Ω

Note:

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

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

• **BFC Switch**

Throw SW5 (BFC switch) when <<BEETO>> is generated during reception of AM broadcast (MW, LW).

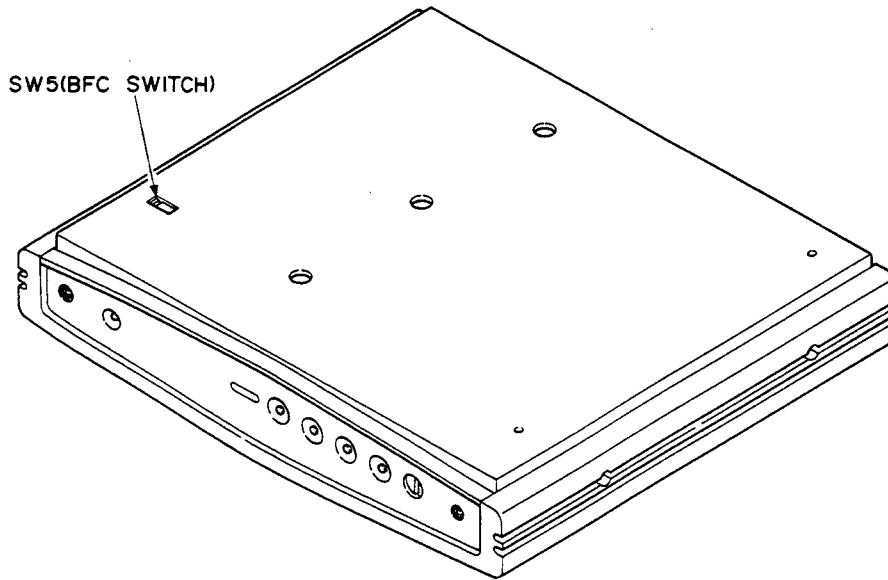
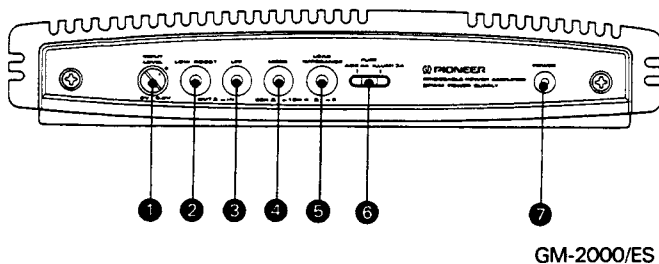


Fig. 1

1. CONTROL AND THEIR USE



GM-2000/ES

1 Input Level Control

Adjust the input level control to suit the output level of the car stereo used with this amplifier. (See "Input Level Adjustment" on page 2.)

2 Low Boost Switch

Press this switch to increase the volume of sounds in the low-frequency range if your car audio system does not reproduce enough bass sounds. This is effective when the amplifier is used to drive a sub-woofer.

- If there are no low-frequency sounds in the music you are listening to, or if you are using relatively small speakers, this switch may not make much difference.

3 Low Pass Filter (LPF) Switch

If this switch is pressed when this amplifier is to be used to drive a sub-woofer, only sounds in the low-frequency range will be output.

4 Mode Select Switch

Press this switch to use the amplifier as a mono amplifier.

- When the amplifier is used in this way, the speaker leads need to be connected accordingly. (See "Connecting Speaker Leads" on page 2.)

5 Load Impedance Select Switch

Press this switch when the impedance of the speaker or speakers connected to this amplifier is less than 4 ohms.

6 Fuse Window

There are a fuse for accessories and a fuse for illumination behind the front grill.

7 Power Indicator

The power indicator lights when the power is switched on.

2. CONNECTION

Connect the components correctly as shown in the diagram.

- Test-connect all components before securing them into place. Test-operate your entire car stereo system to ensure that there are no faulty wiring connections between this unit and the rest of your car stereo system.
- The input selector of this amplifier functions automatically. Therefore, the amplifier may be used with either a Pioneer car stereo with DIN sockets or a car stereo with RCA pin jacks. For information about connecting a stereo, see the section entitled "When combined with a car stereo with DIN sockets" or that entitled "When combined with a car stereo with RCA pin jacks".
- When two channels (stereo) are used, the speakers should have a minimum rating of 100 W or more. When a single channel (mono) is used, the speaker should have a minimum rating of 200 W or more. If a speaker whose rating is below that recommended is used, the speaker may be damaged. The impedance of the speakers should be between 2 and 8 ohms.
- For detailed information concerning connections between different components and this unit consult their respective instruction manuals and follow those recommendations precisely.
- When wiring connecting leads into place secure them with clampers and adhesive electrician's tape. Additionally, to prevent any damage to the insulative coating of the connecting leads, protect them with adhesive electrician's tape wherever they may come into contact with any sharp edges.
- Wire all connecting leads so that they stay well clear of high-temperature areas such as the heater exhaust port.
- To operate the amplifier and car stereo properly, install the continuous power supply lead (orange) and the accessory power lead (red) correctly. If the leads are not installed correctly or are not connected at all, the amplifier and car stereo will not work.
- The supplied speaker lead with green stripes is not used for a single channel (mono) arrangement; keep it in case you need it in future.
- To use a car stereo with DIN sockets, use the optional component extension cable.

Input Level Adjustment

The input level adjustment knob is factory set as shown in Fig. 2. When a car stereo with DIN sockets is connected, adjust the input level as shown in Fig. 3. If the volume is insufficient even when the car stereo volume is increased, adjust the input level adjustment knob as shown in Fig. 3.

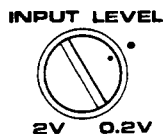


Fig. 2

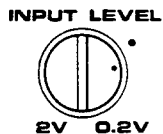


Fig. 3

Connecting Leads (Supplied)

Connecting Speaker Leads

- This amplifier has a mode select switch to select two-channel output (stereo) or one-channel output (mono). The speaker leads must be connected to suit the mode selected. Connect the speaker leads to the output terminals of the amplifier as shown in Fig. 4 and 5, paying attention to the polarities (+ and -) and lead colors.

When two channels (stereo) are used

- Set the mode select switch to the 2CH position.

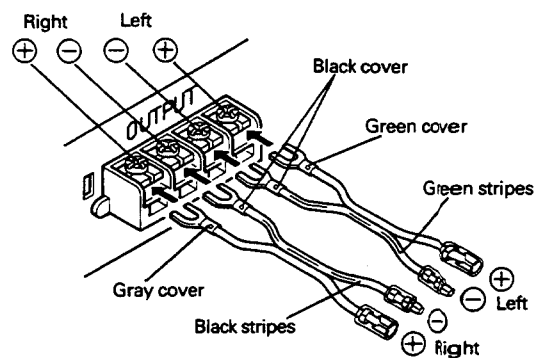


Fig. 4

When one channel (mono) is used

- Set the mode select switch to the 1CH position.
- The speaker lead with green stripes is not used; keep it in case you need it in future.

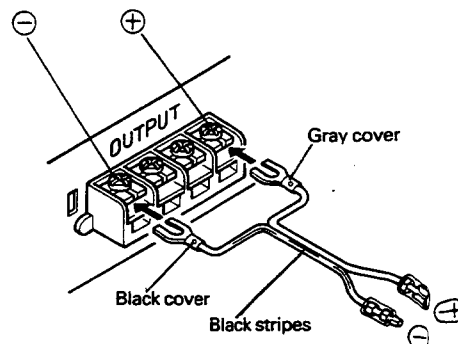


Fig. 5

Connecting the Continuous Power Supply Lead (Orange)

- Route the continuous power supply lead from the engine compartment to the passenger compartment and connect it to the amplifier. To prevent short-circuits, make sure you connect all the other leads first, then connect the end of the continuous power supply lead to the positive (+) terminal of the battery.

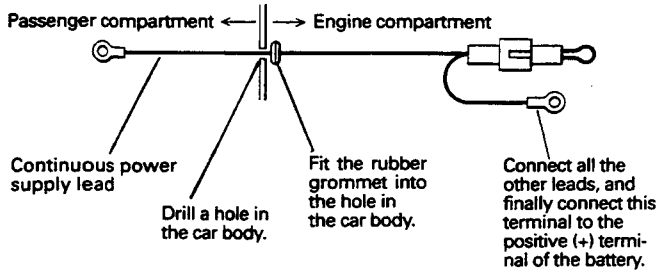


Fig. 6

Procedure for Connecting Speaker Leads

1. Loosen the four output terminal screws at the rear of the amplifier in the middle.
2. Insert each speaker lead terminal into an output terminal according to the selected mode. (Fig. 7)
3. Tighten each output terminal screw.
4. Fit the large terminal cover. (Fig. 8)

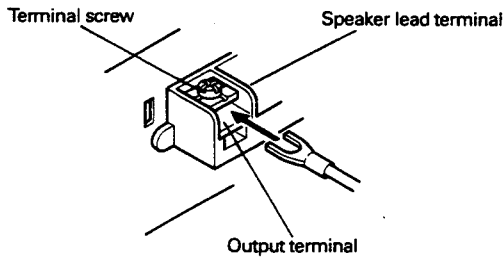


Fig. 7

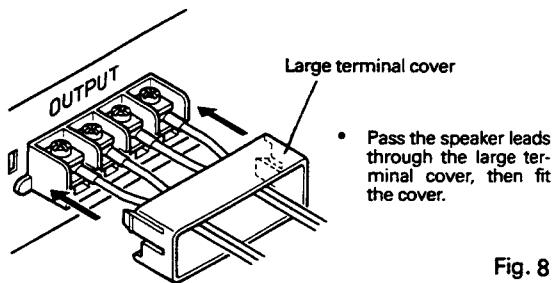


Fig. 8

Procedure for Connecting Continuous Power Supply Lead (Orange) and Grounding Lead (Black)

1. Pass the continuous power supply lead (orange) and the grounding lead (black) through the small terminal cover. (Fig. 9)
2. Remove the screws of the continuous power supply terminal and the grounding terminal at the rear of the amplifier on the left.
3. Replace the screws removed in step 2 in the terminals and tighten them. (Fig. 10)
4. Fit the small terminal cover. (Fig. 11)

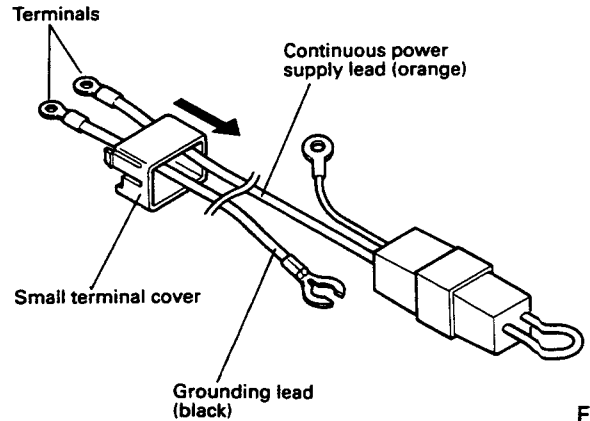


Fig. 9

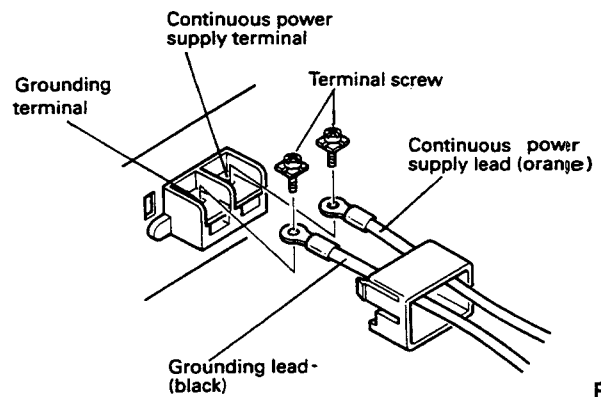


Fig. 10

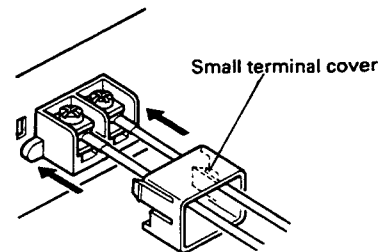


Fig. 11

When Combined with a Car Stereo with RCA Pin Jacks

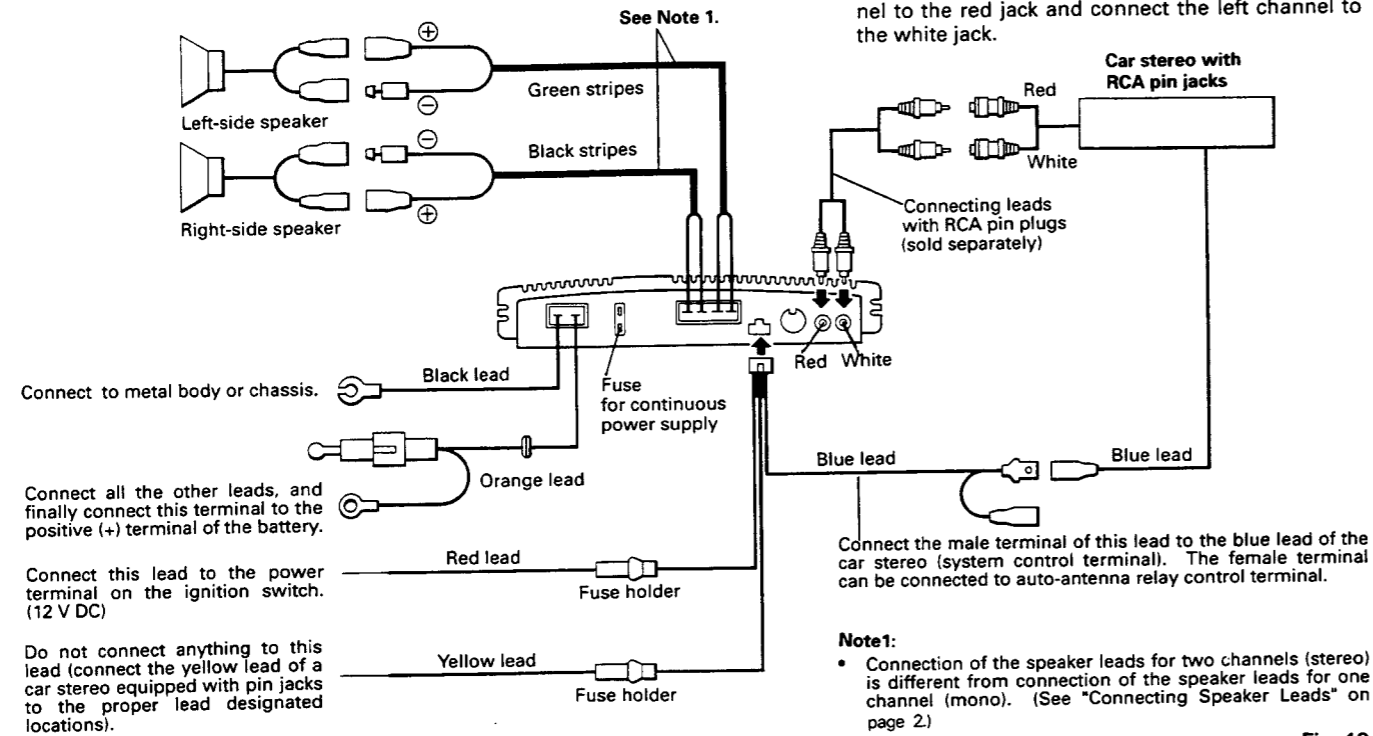


Fig. 12

3. DISASSEMBLY

• Remove the Heat Sink

1. Remove the five screws A and three screws B.
2. Remove the heat sink.

Attention:

Be sure to screw in order of ①, ② and ③ when installing the heat sink.

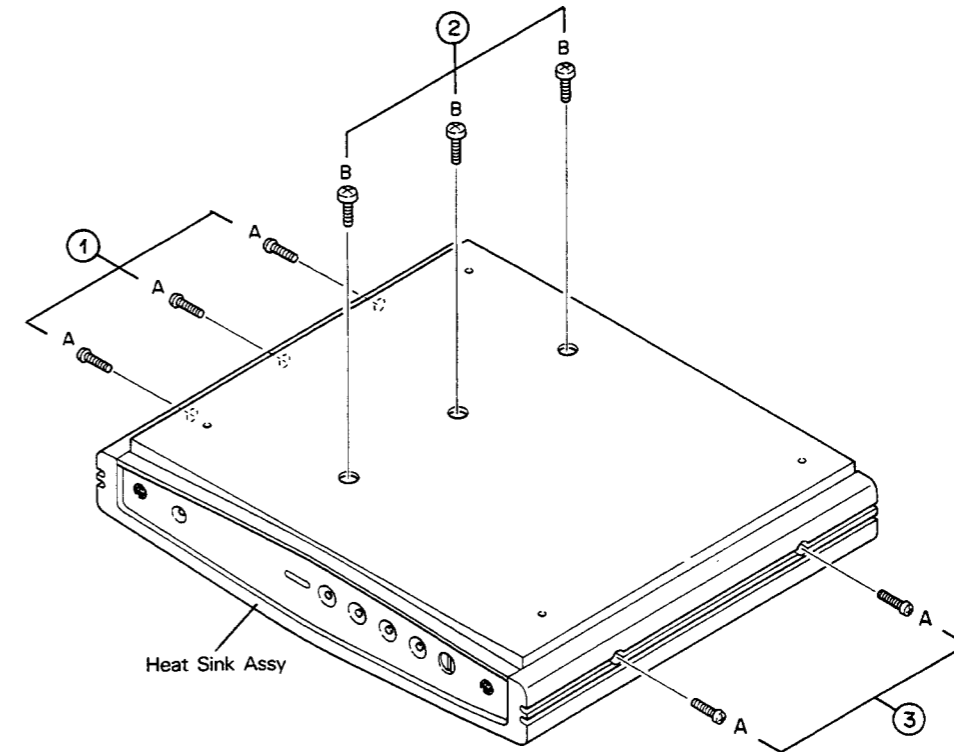


Fig. 14

• Remove the Main Unit

1. Remove the four screws D and four screws E.
2. Remove the knob and four buttons.
3. Remove the main unit.

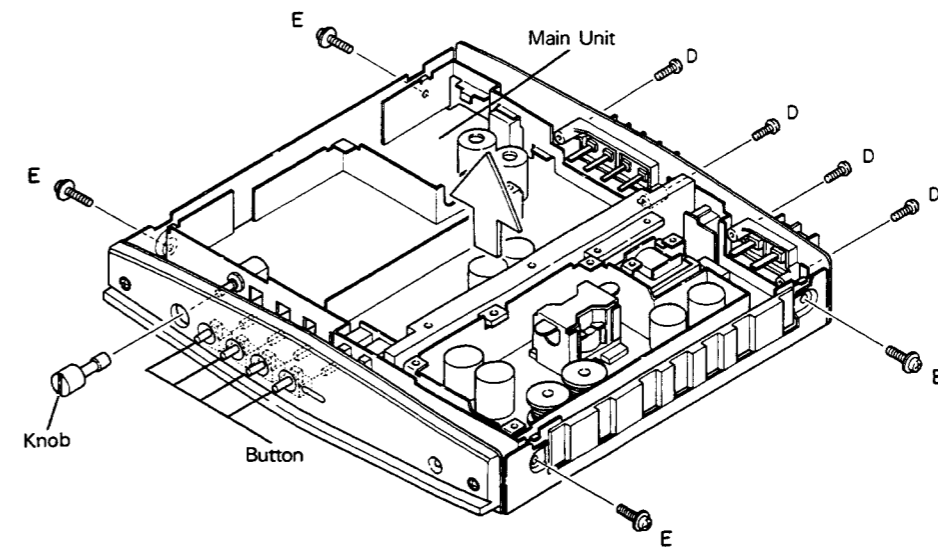


Fig. 15

When Combined with a Car Stereo with DIN sockets

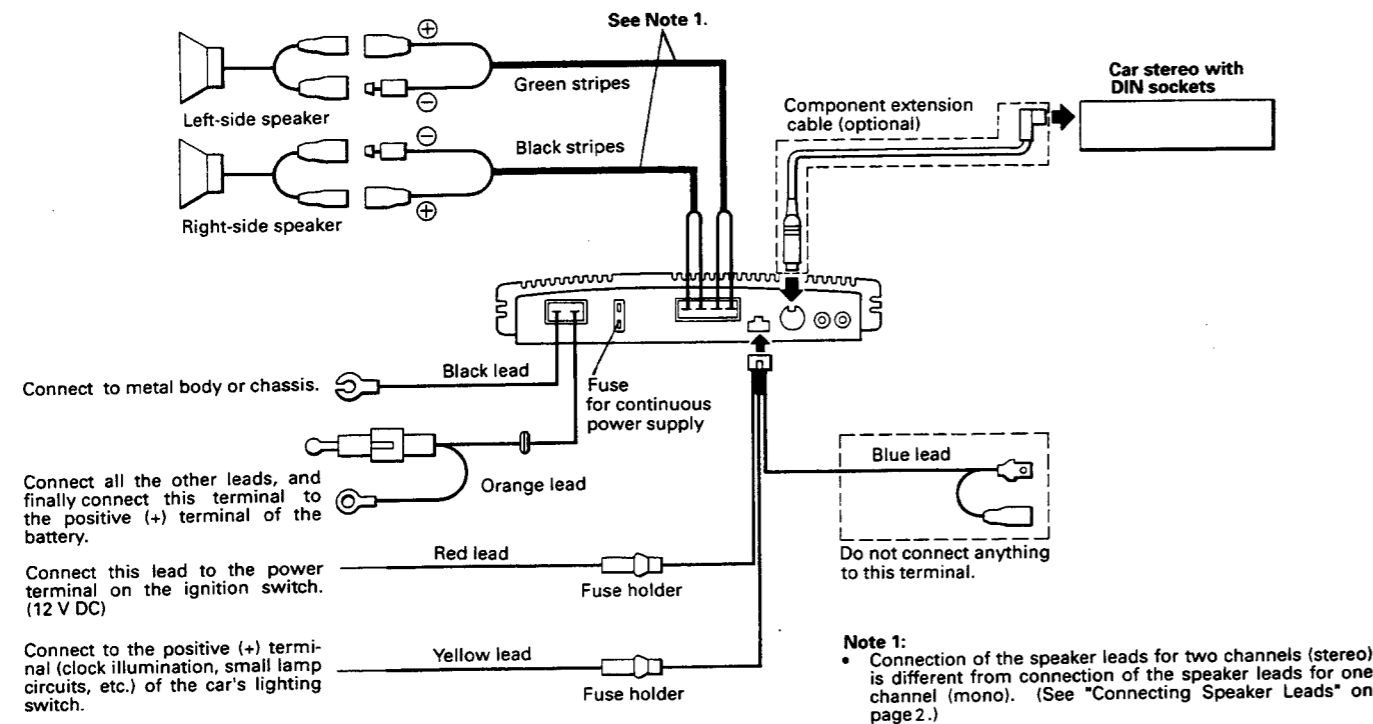
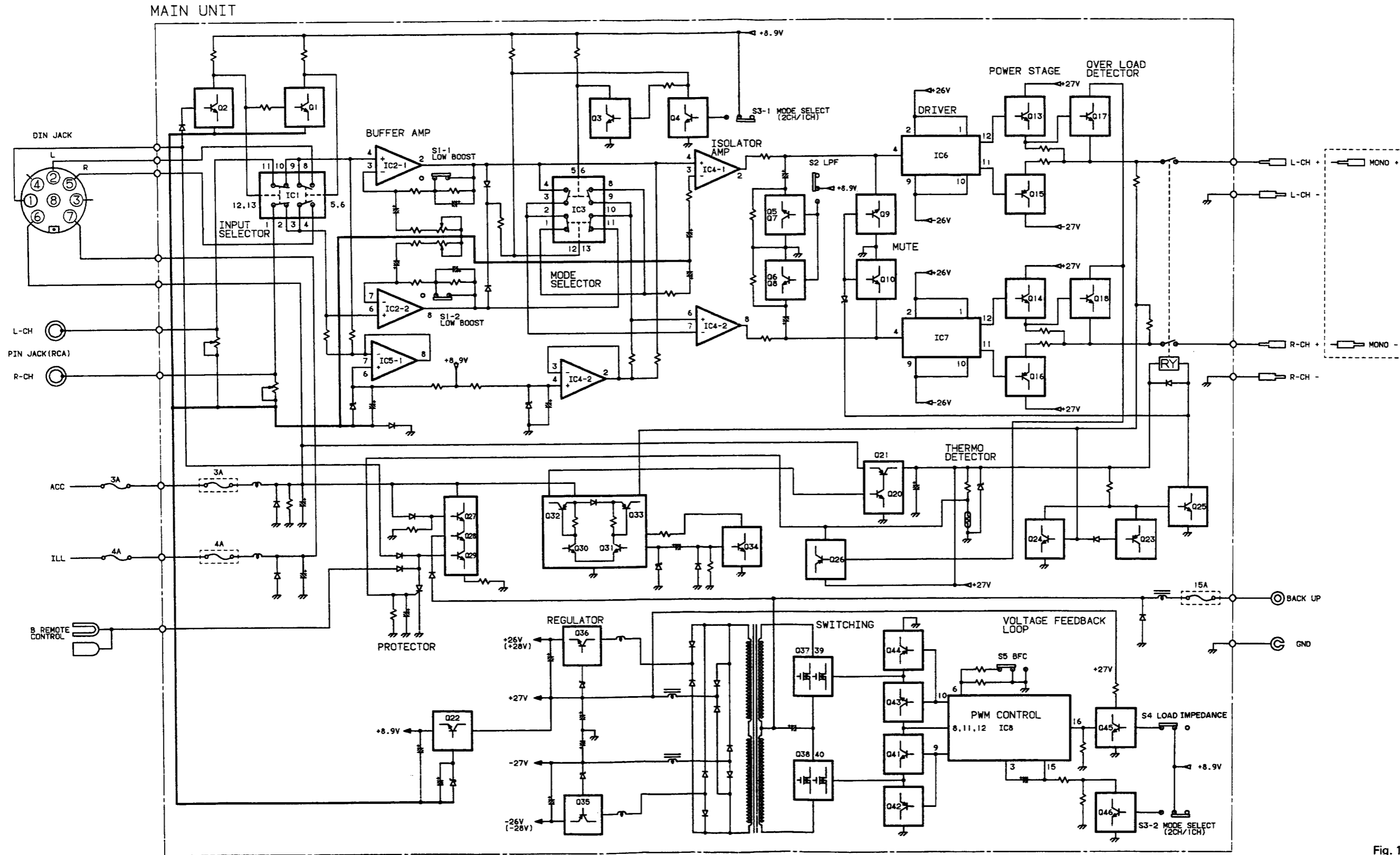


Fig. 13

4. CIRCUIT DESCRIPTION

4.1 BLOCK DIAGRAM (GM-2000/ES)



() WHEN MAXIMUM POWER OUTPUT

Fig. 16

4.2 PWM (Pulse Width Modulation) POWER SUPPLY

The PWM power supply is a circuit that maintains stable secondary voltage in a DC/DC converter, regardless of the voltage fluctuation and load fluctuation of the primary voltage.

In actual operation, the output voltage (V_{out}) expressed by formula (1) is maintained at a stable level. Consequently, when load fluctuation or fluctuation of the primary (battery) voltage occurs, the PWM circuit illustrated in Fig. 17-2 and 17-3 to control the pulse width of the gate voltage at A.

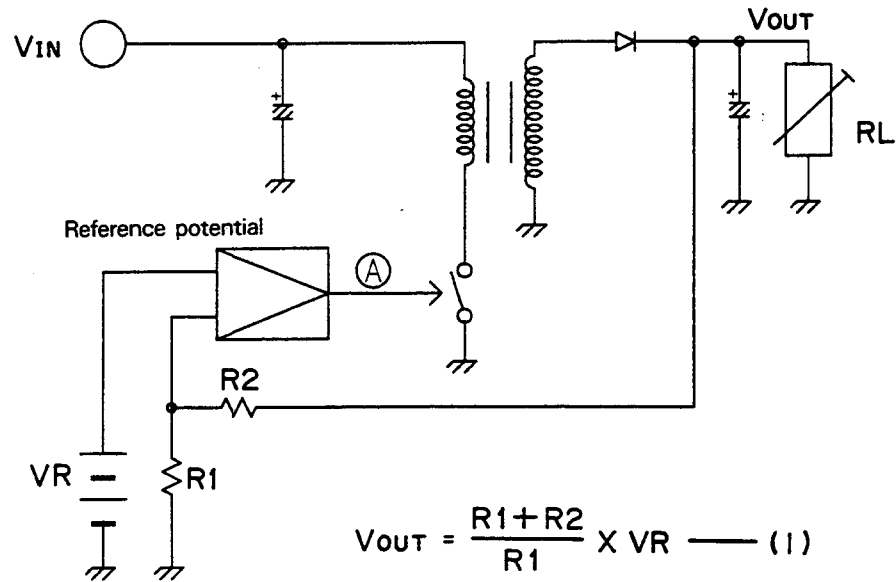


Fig. 17-1

• Waveforms at point A (V: 10V/div, H: 10 μ S/div)

No signal

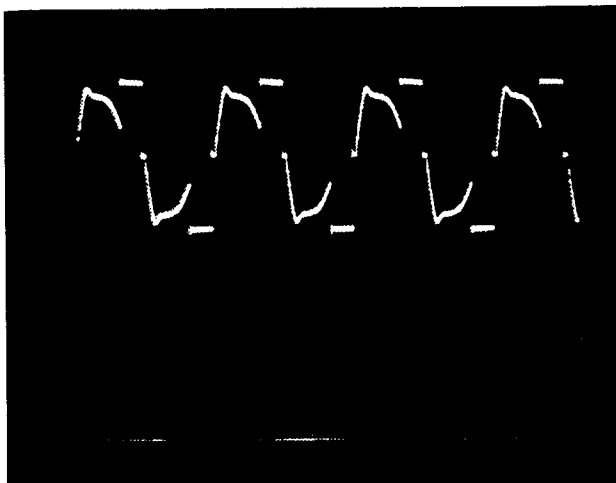


Fig. 17-2

Large output or drop in input voltage (V_{IN})

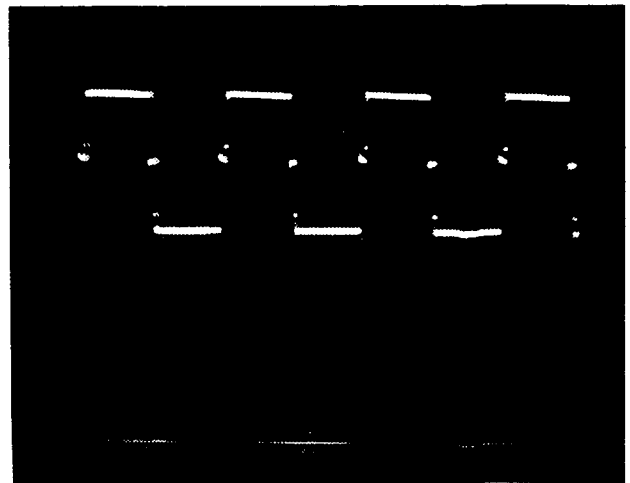


Fig. 17-3

5. ADJUSTMENT

• Connection Diagram

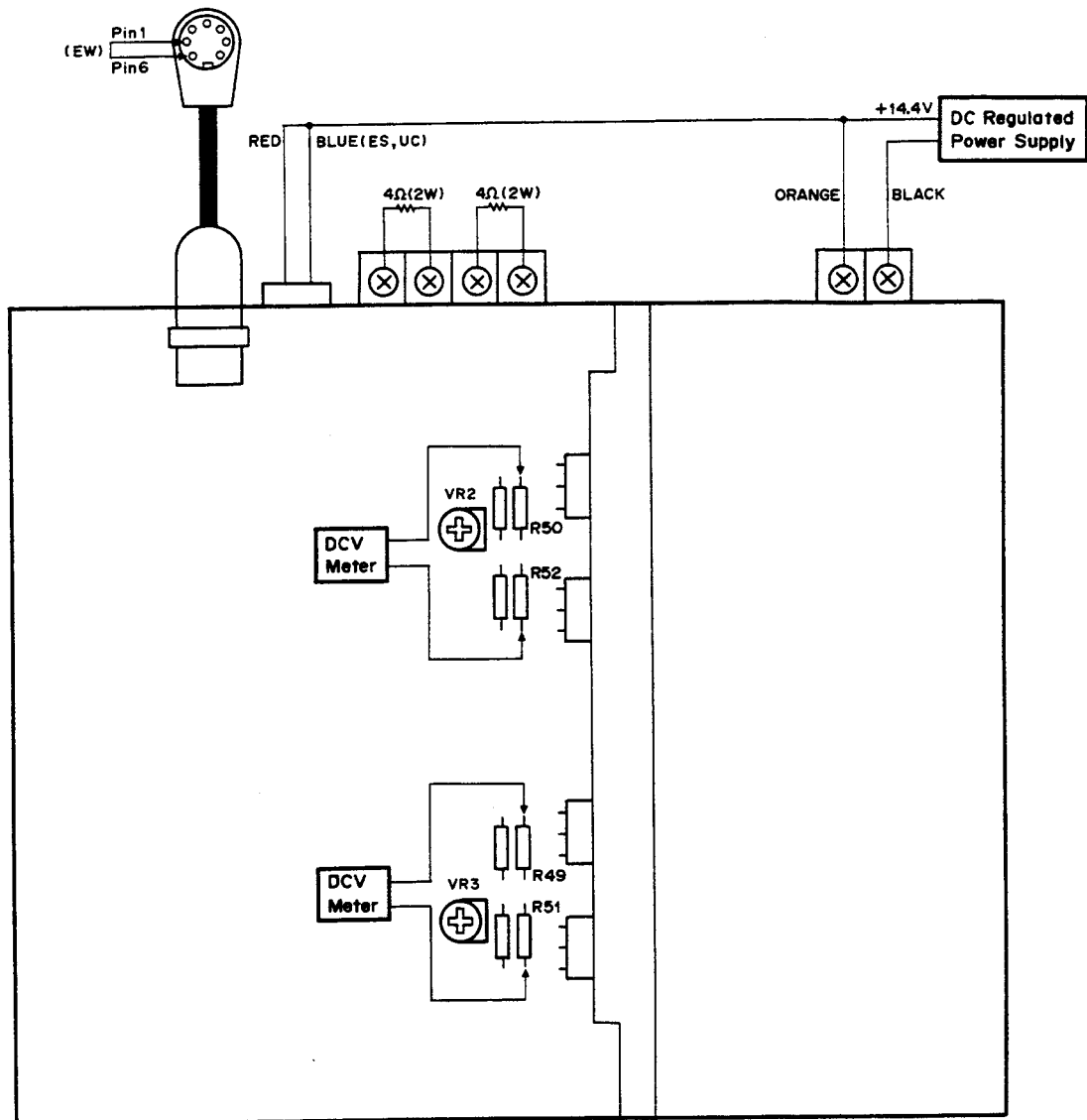


Fig. 18

5.1 IDLE CURRENT ADJUSTMENT

No.	Adjusting Point	Adjustment Method
1		Rotate VR2 and VR3 counterclockwise. Turn the power on, and wait about 30 minutes.
2	VR2,3	DC V Meter: $6.6 \text{ mV} + 1.1 \text{ mV}$ (GM-2000) $- 2.2 \text{ mV}$ DC V Meter: $13.2 \text{ mV} + 2.2 \text{ mV}$ (GM-1000) $- 4.4 \text{ mV}$

• ICs and Transistors

2SA1048
2SC1740S
2SC2458
2SC3113



2SB1240
2SD1862



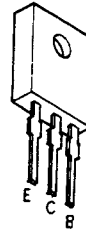
2SA933S
2SD1768S



2SC3623A
2SC2783



2SC1568



2SK817



2SB946
2SD1271



2SB1357
2SD2037



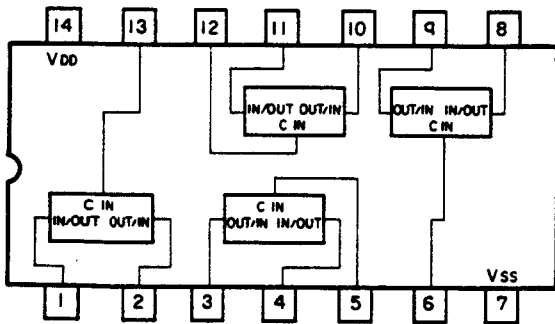
2SB1154
2SD1705



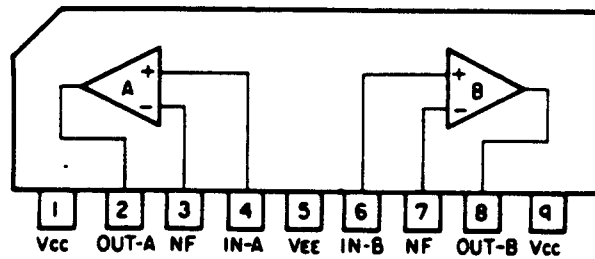
2SA1359
2SC3422



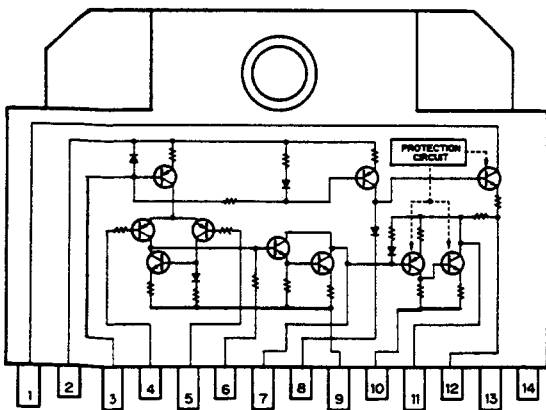
TC4066BP



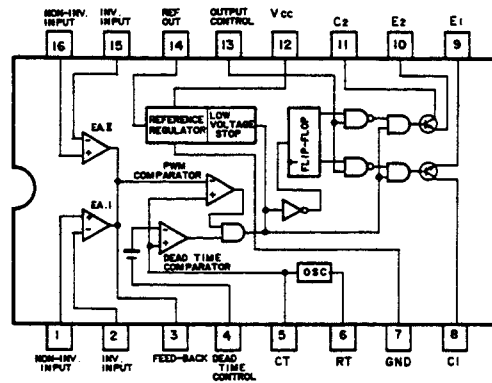
NJM2068S
NJM4558S



μPC1298V



μPC494C



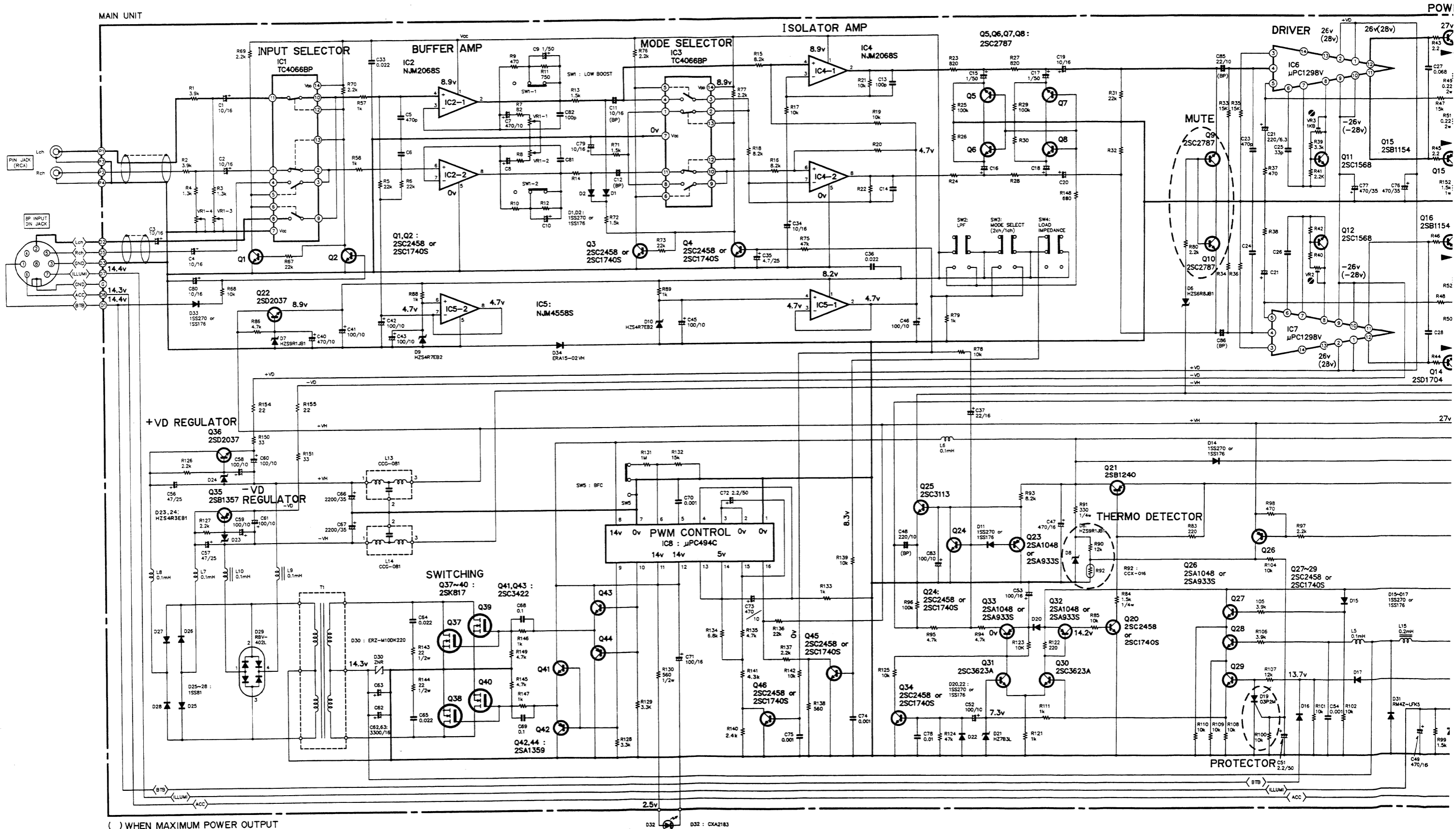
6. SCHEMATIC CIRCUIT DIAGRAM (GM-2000/ES)

A

B

C

D



() WHEN MAXIMUM POWER OUTPUT

4

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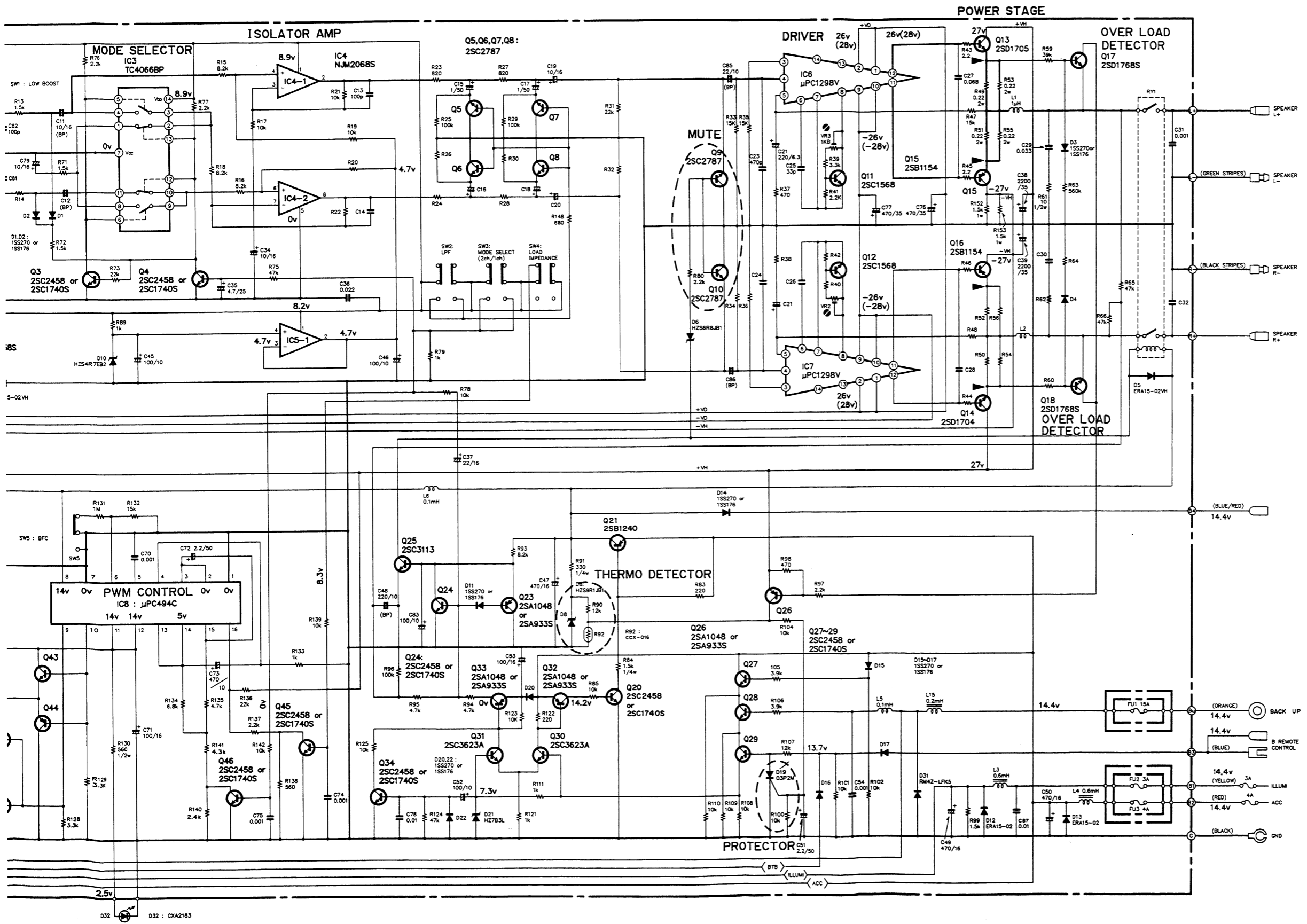
9

A

B

C

D



SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW2: LPF SWITCH ON-OFF
 SW3: MODE SELECT SWITCH 1ch-2ch
 SW4: LOAD IMPEDANCE SWITCH 2Ω-4Ω
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch position.

Fig. 19

4

5

6

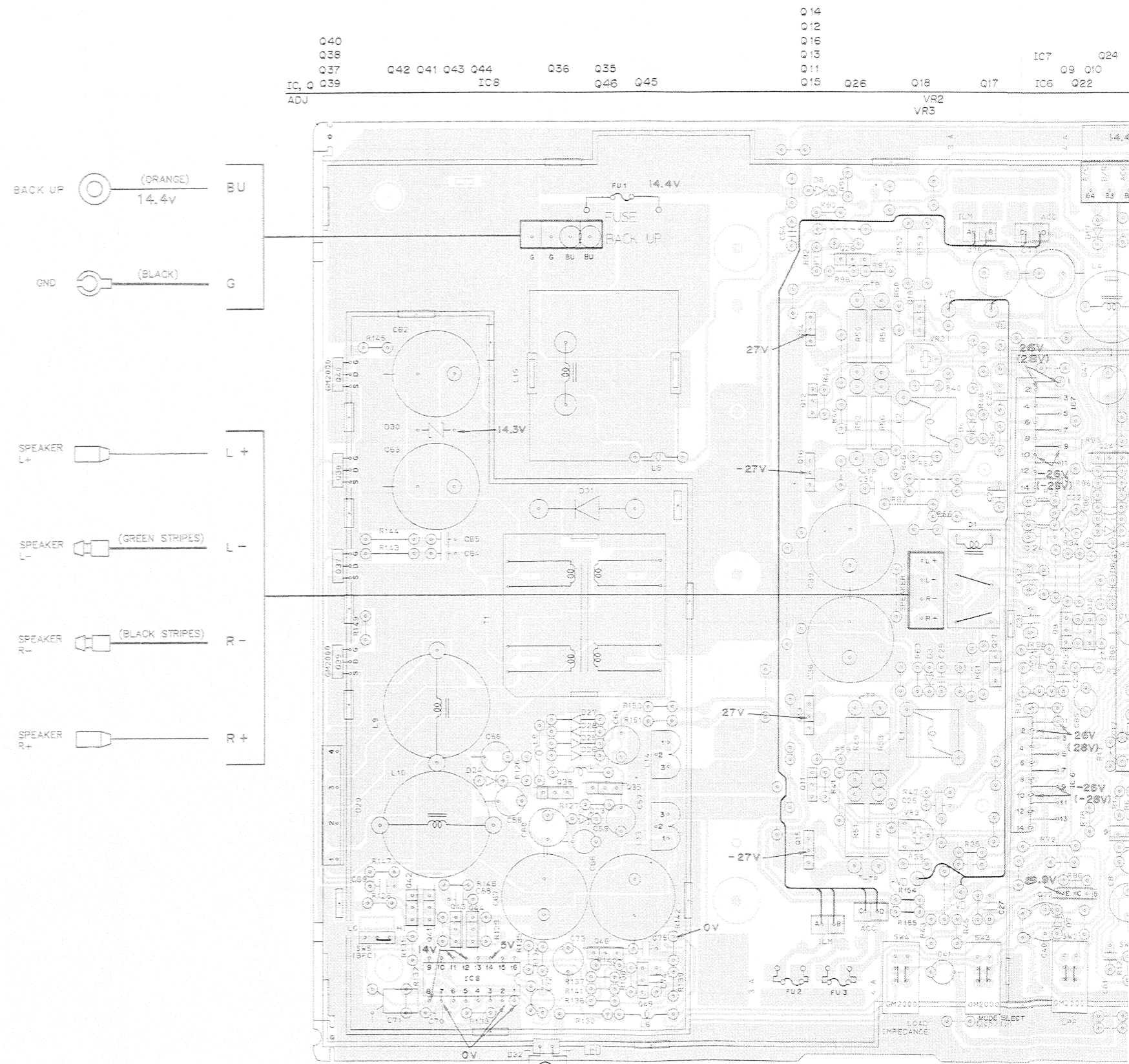
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7. CONNECTION DIAGRAM (GM-2000/ES)

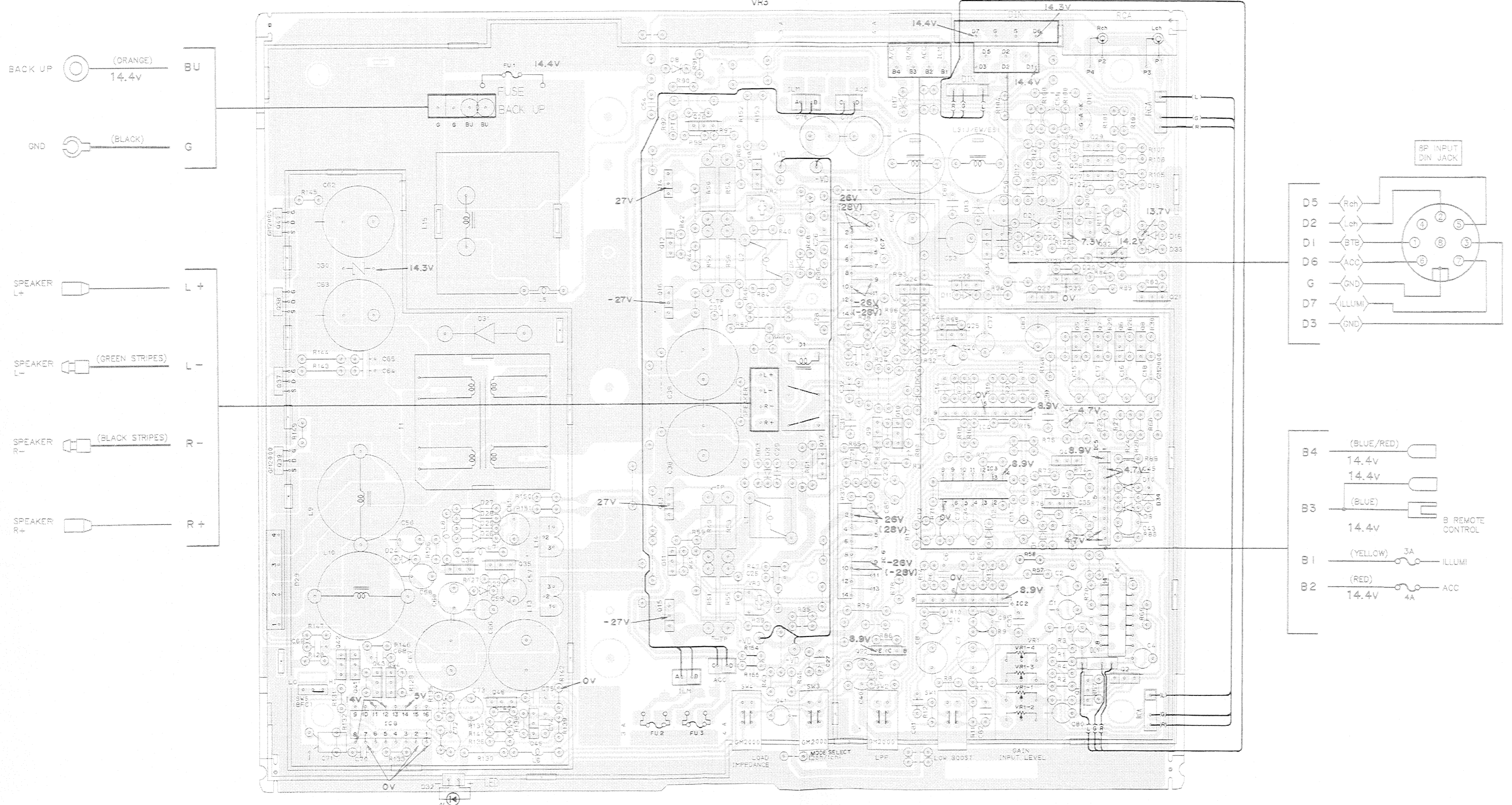
Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square □, then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked ⊕ indicates +.
		Electrolytic capacitor (polarized)	
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

Q40 Q38 Q37 IC, Q 039 ADJ Q42 Q41 Q43 Q44 IC8 Q36 Q35 Q46 Q45 Q14 Q12 Q18 Q13 Q11 Q15 Q26 Q18 Q17 VR2 VR3 Q12 Q16 Q13 Q11 Q15 Q26 Q18 Q17 IC7 Q9 Q10 Q24 Q25 IC3 IC4 IC3 IC2 Q20 Q33 Q31 Q30 Q32 Q5 Q7 Q6 Q8 Q4 IC5 Q3 Q1 IC1 Q29 Q28 Q27



() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

A

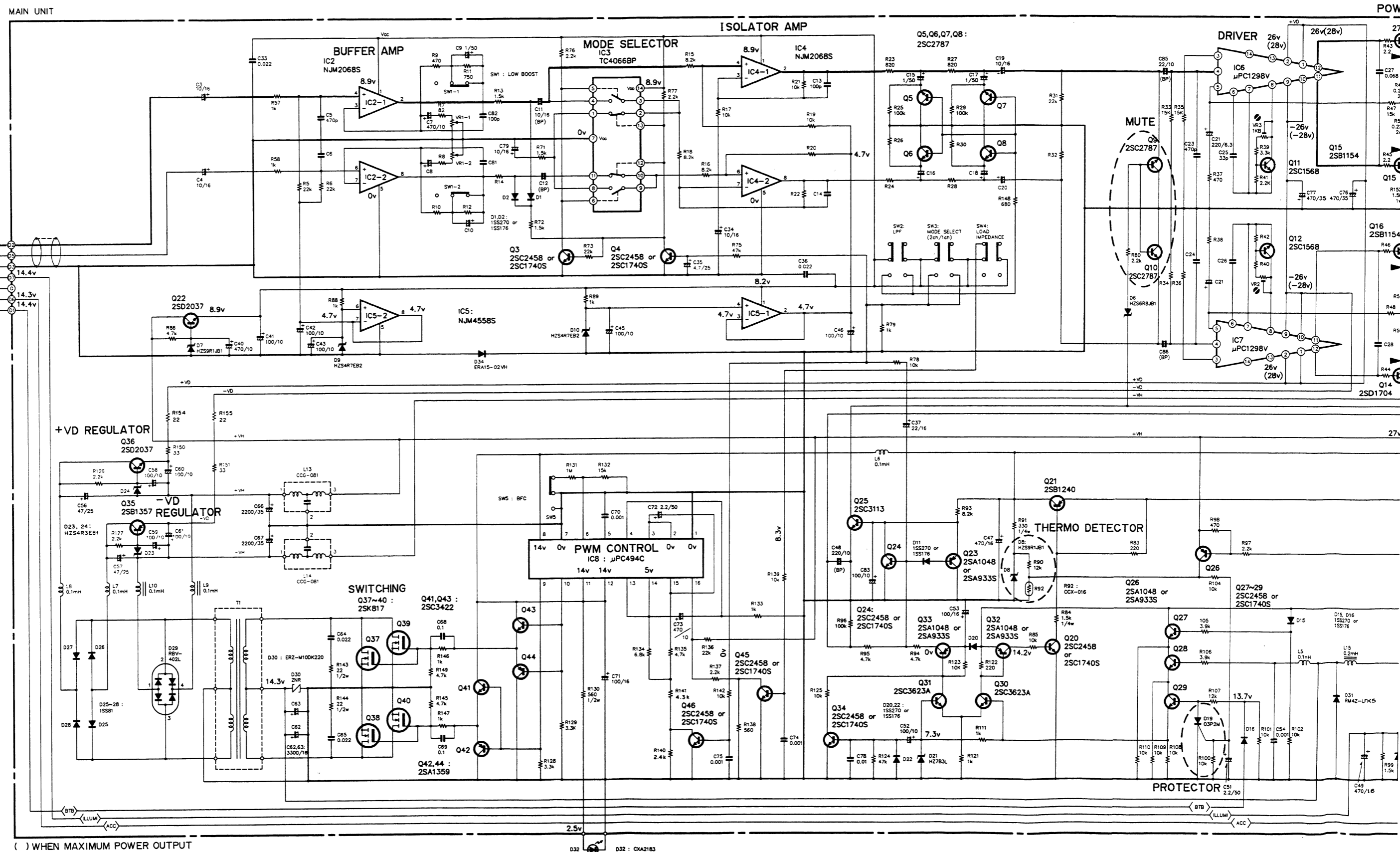
B

C

D

Fig. 20

8. SCHEMATIC CIRCUIT DIAGRAM (GM-2000/EW)



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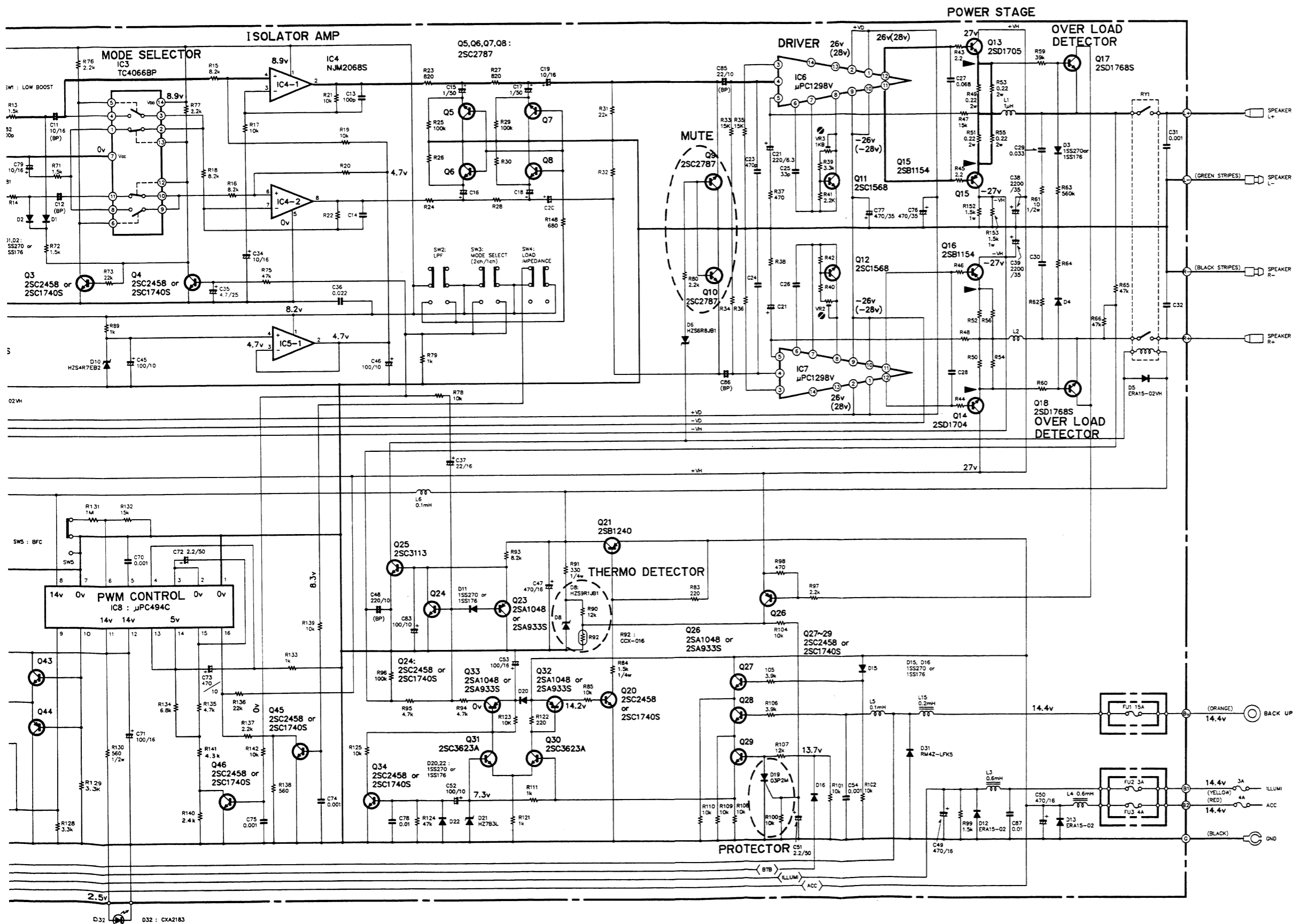
9

A

B

C

D



SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW2: LPF SWITCH ON-OFF
 SW3: MODE SELECT SWITCH 1ch-2ch
 SW4: LOAD IMPEDANCE SWITCH 2Ω-4Ω
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch position.

Fig. 21

4

5

6

7

8

9

9. CONNECTION DIAGRAM (GM-2000/EW)

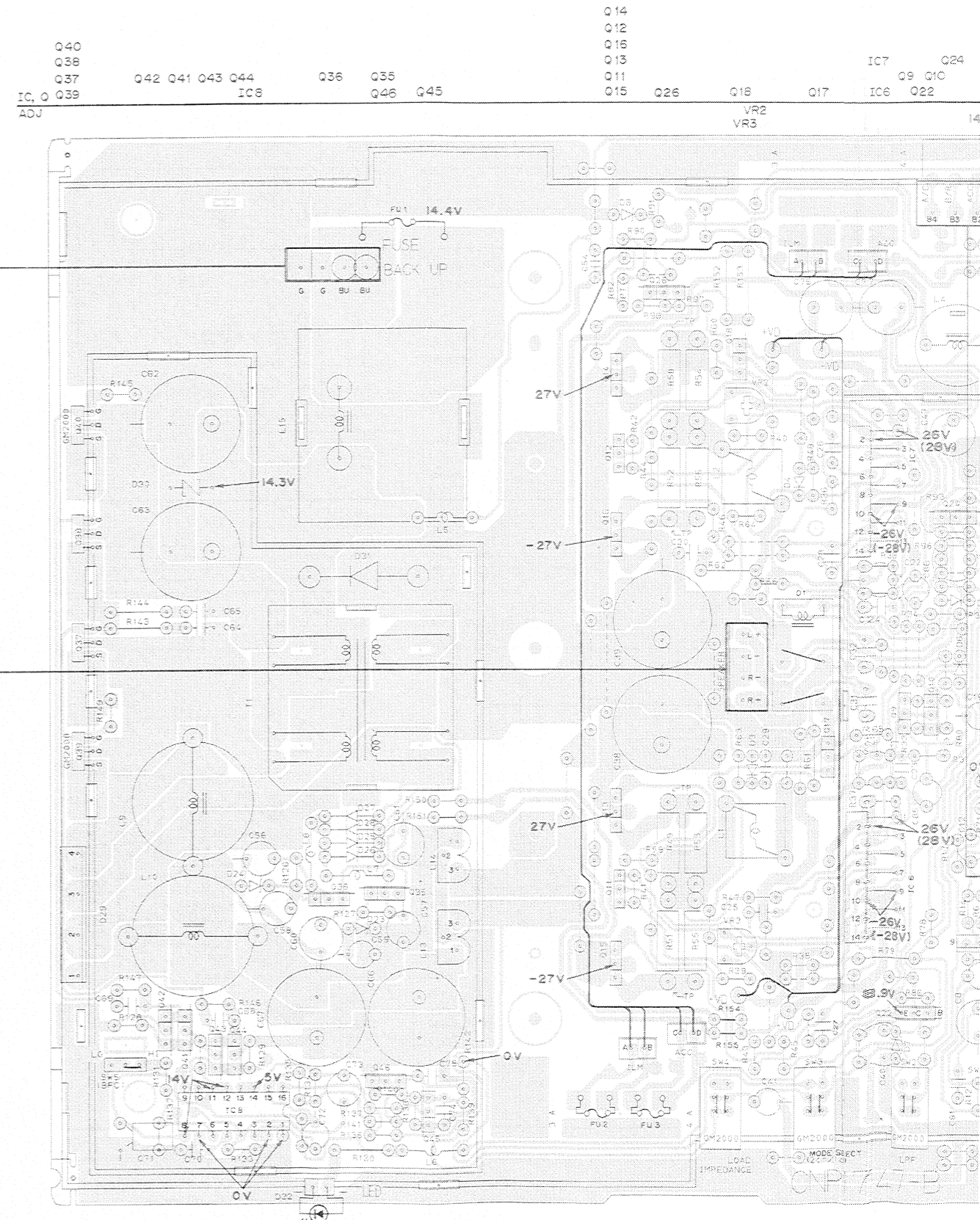
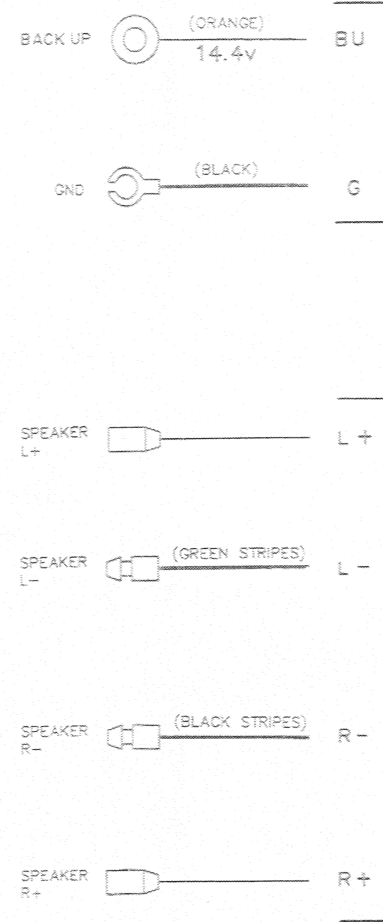
A

B

C

D

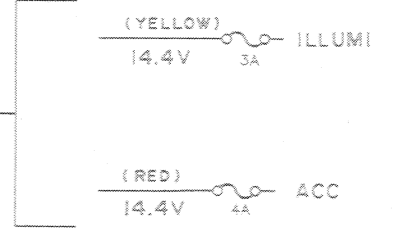
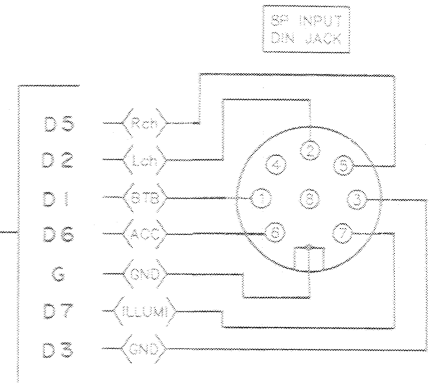
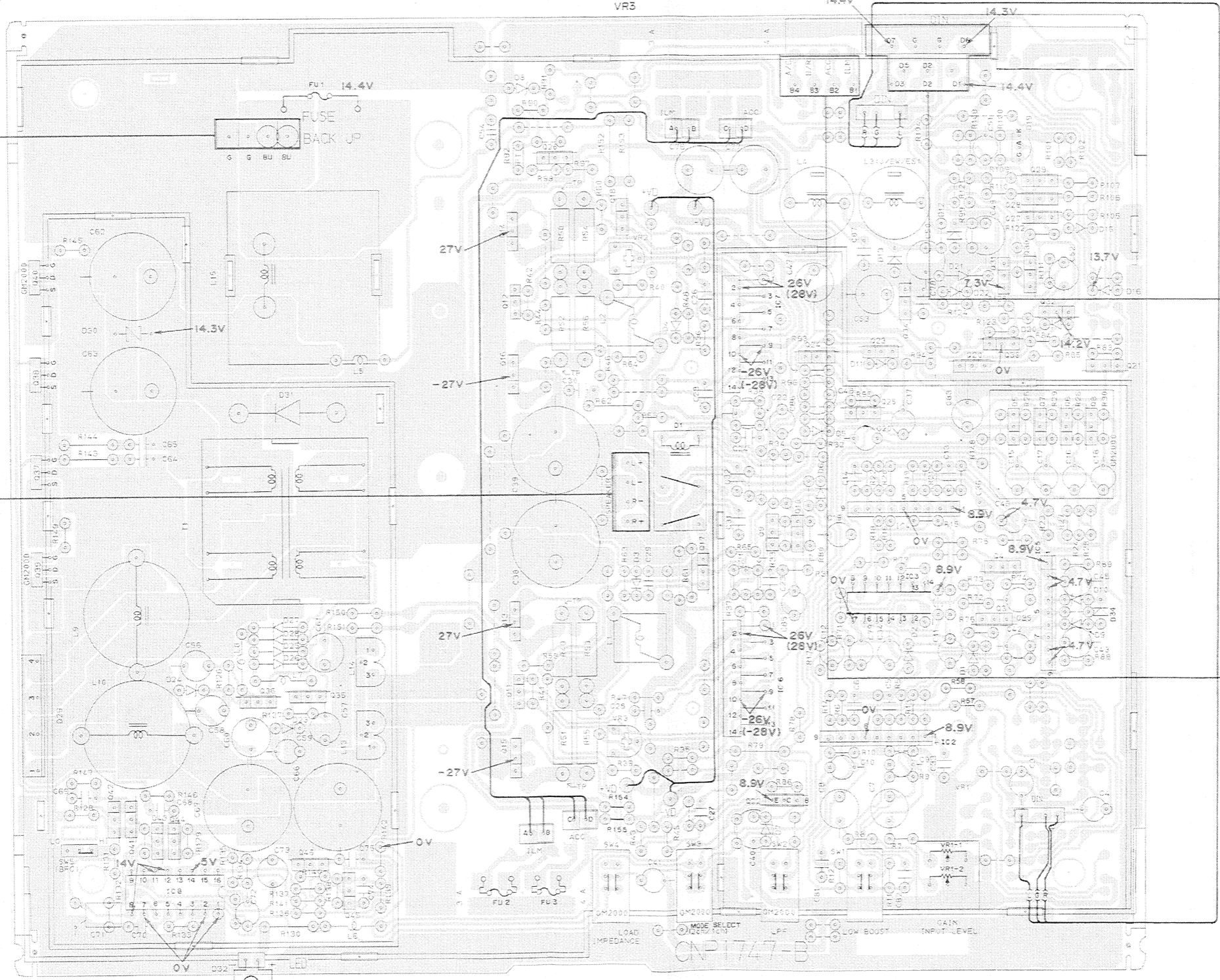
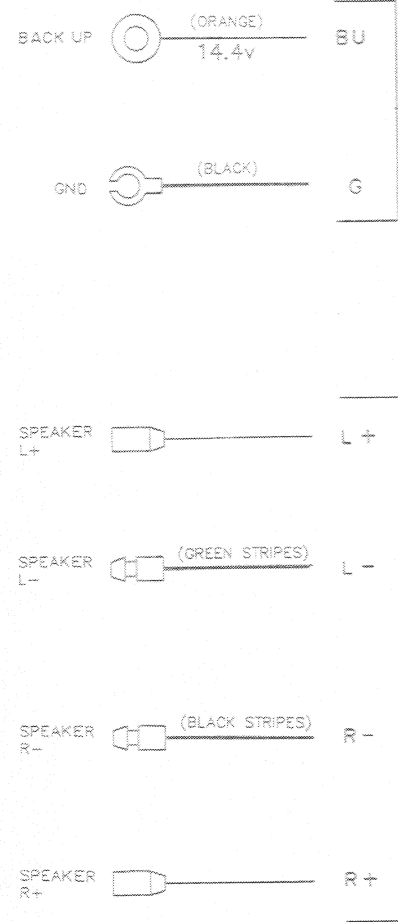
Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square , then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked ⊕ indicates +.
		Electrolytic capacitor (polarized)	
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

Q40 Q38 Q37 Q39 Q42 Q41 Q43 Q44 Q36 Q35 Q46 Q45 Q14 Q12 Q16 Q13 Q11 Q15 Q26 Q18 Q17 Q24 Q25 Q23 Q22 Q21 Q20 Q33 Q34 Q31 Q30 Q32 Q5 Q7 Q6 Q8 Q4 IC5 Q3 IC7 IC9 IC10 IC24 IC3 IC4 IC6 IC2



() WHEN MAXIMUM POWER OUTPUT

A

B

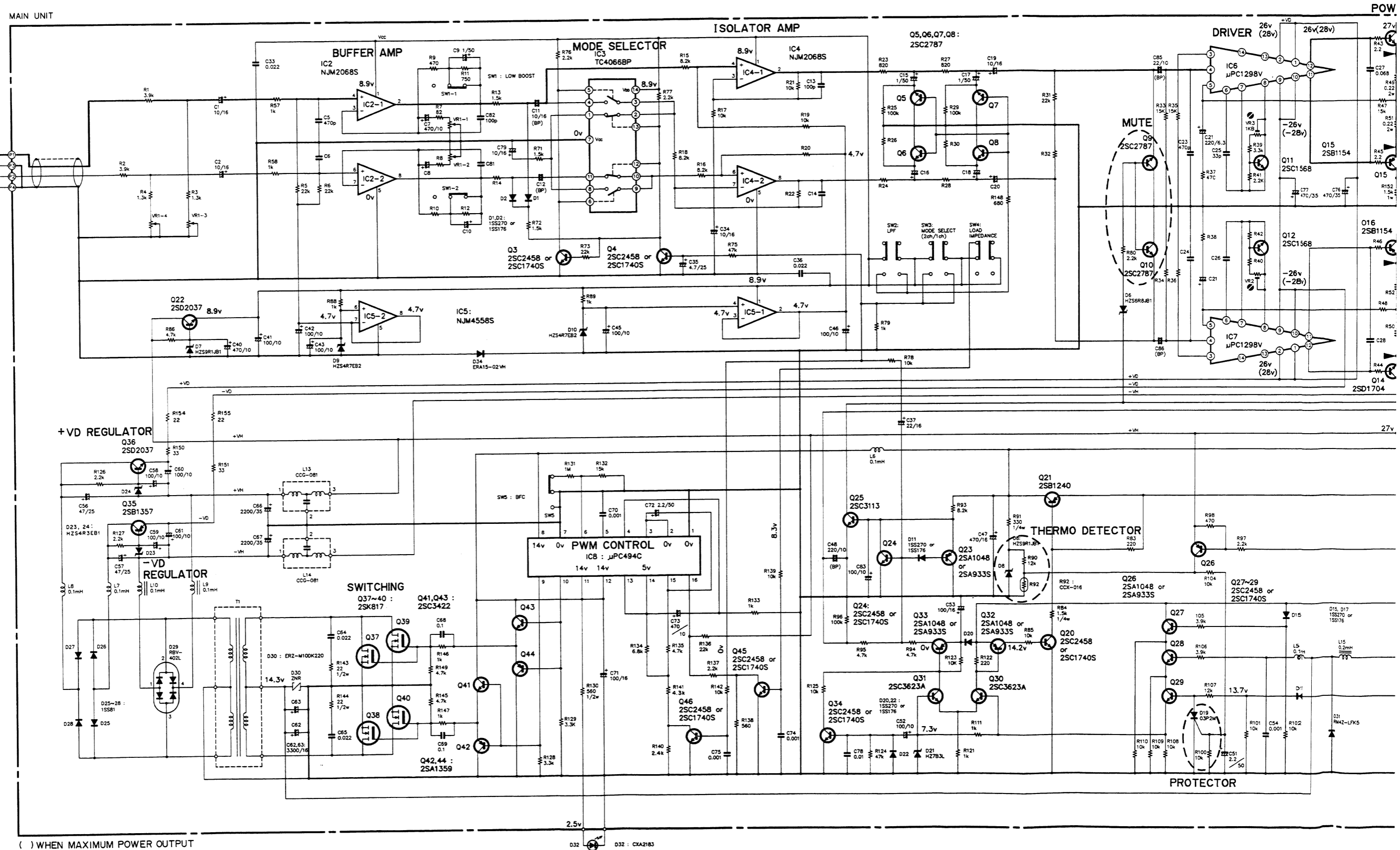
C

D

4 | 5 | 6 | 7 | 8 | 9

Fig. 22

10. SCHEMATIC CIRCUIT DIAGRAM (GM-2000/UC)



() WHEN MAXIMUM POWER OUTPUT

D32 : CXA2183

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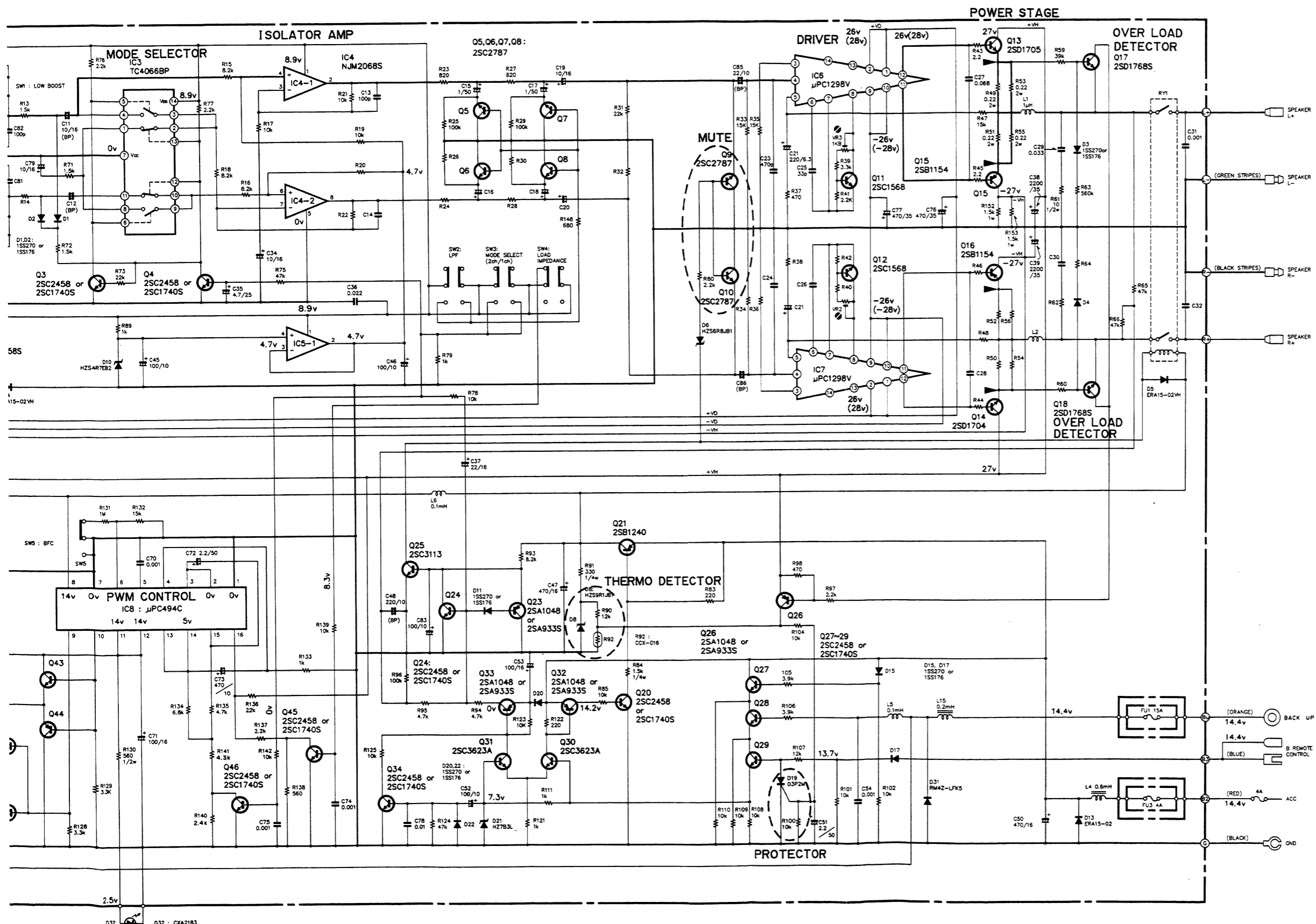
9

A

B

C

D



SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW2: LPF SWITCH ON-OFF
 SW3: MODE SELECT SWITCH 1ch-2ch
 SW4: LOAD IMPEDANCE SWITCH 2Ω-4Ω
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch position.

Fig. 23

4

5

6

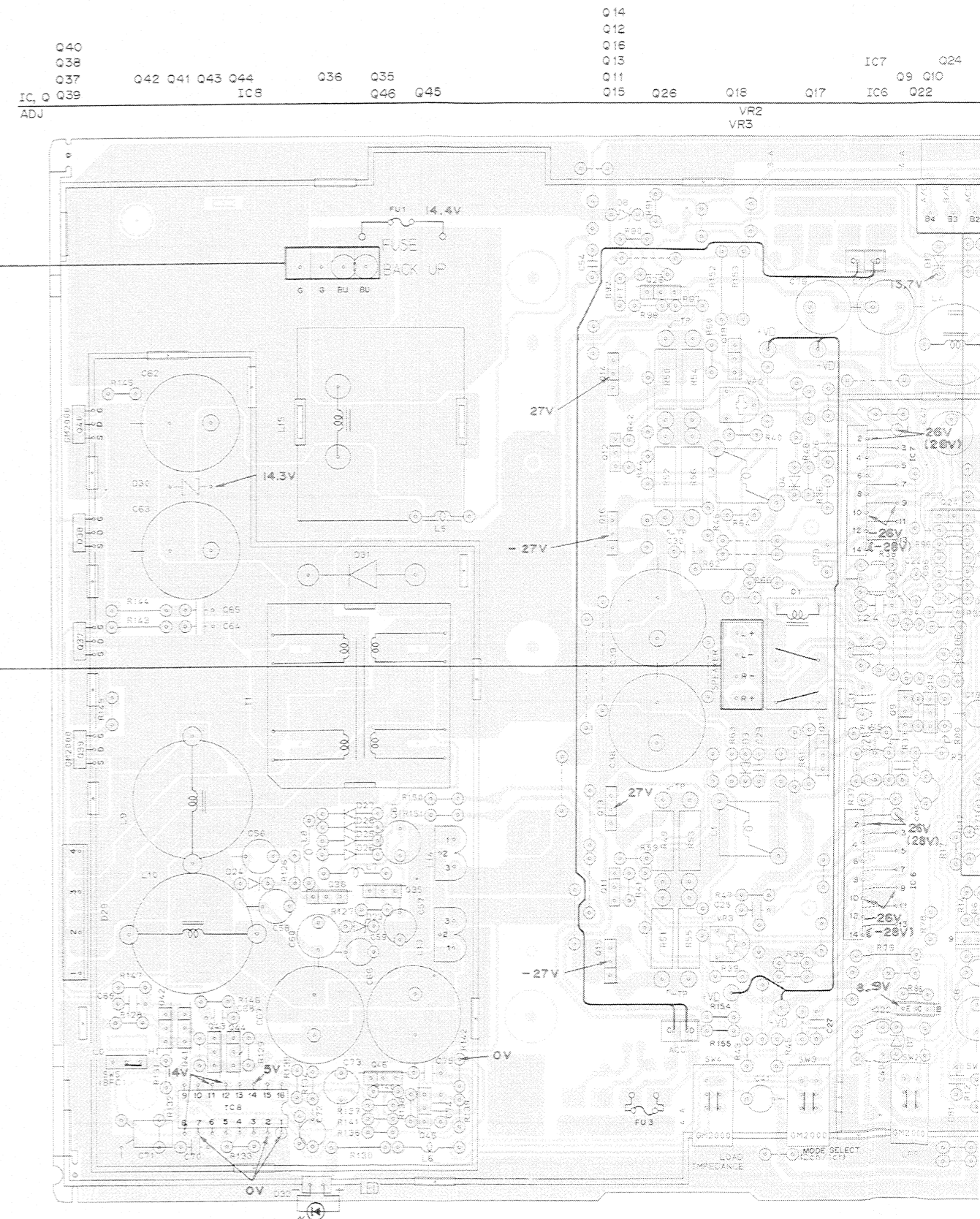
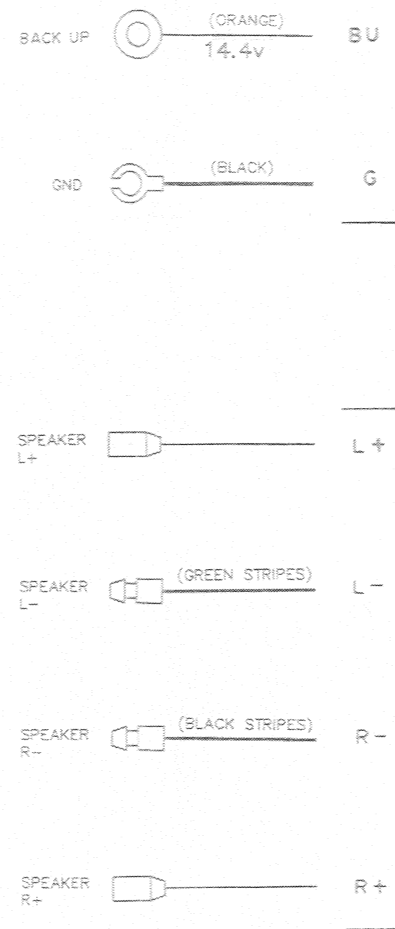
7

8

9

11. CONNECTION DIAGRAM (GM-2000/UC)

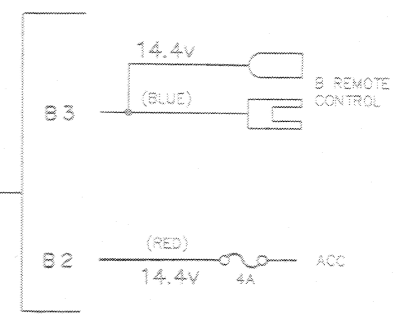
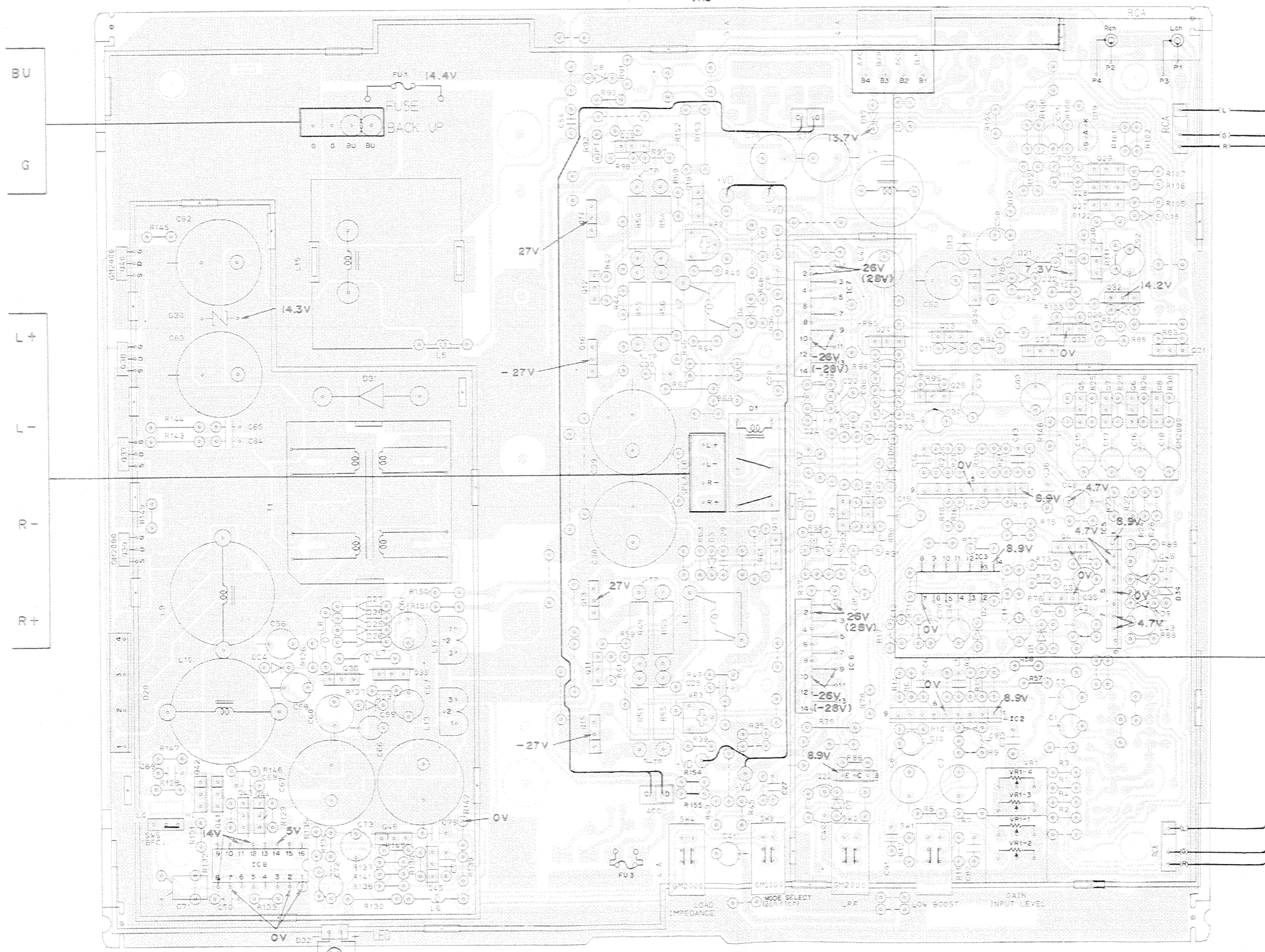
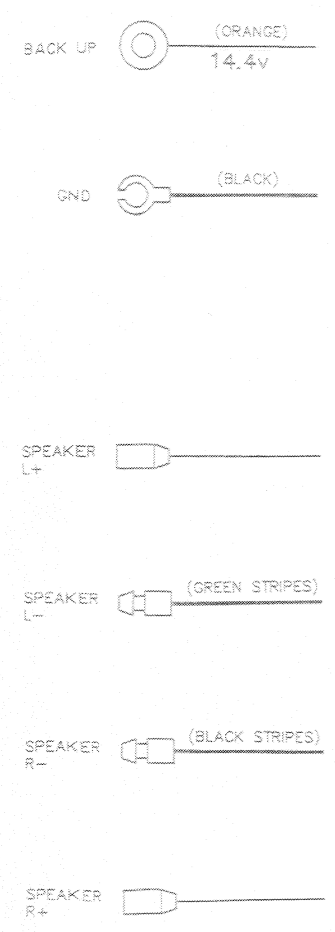
Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square , then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked ⊕ indicates +.
		Electrolytic capacitor (polarized)	
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

- Q40
- Q36
- Q37
- Q39
- Q42
- Q41
- Q43
- Q44
- IC8
- Q36
- Q35
- Q46
- Q45
- Q14
- Q12
- Q16
- Q13
- Q11
- Q15
- Q26
- Q18
- Q17
- IC6
- Q22
- VR2
- VR3
- IC7
- Q9
- Q10
- Q24
- Q25
- IC3
- IC2
- Q34
- Q23
- Q25
- IC4
- Q3
- Q20
- Q33
- Q31
- Q30
- Q32
- Q21
- Q5
- Q7
- Q6
- Q8
- Q4
- IC5



() WHEN MAXIMUM POWER OUTPUT

A
B
C
D

4 | 5 | 6 | 7 | 8 | 9

Fig. 24

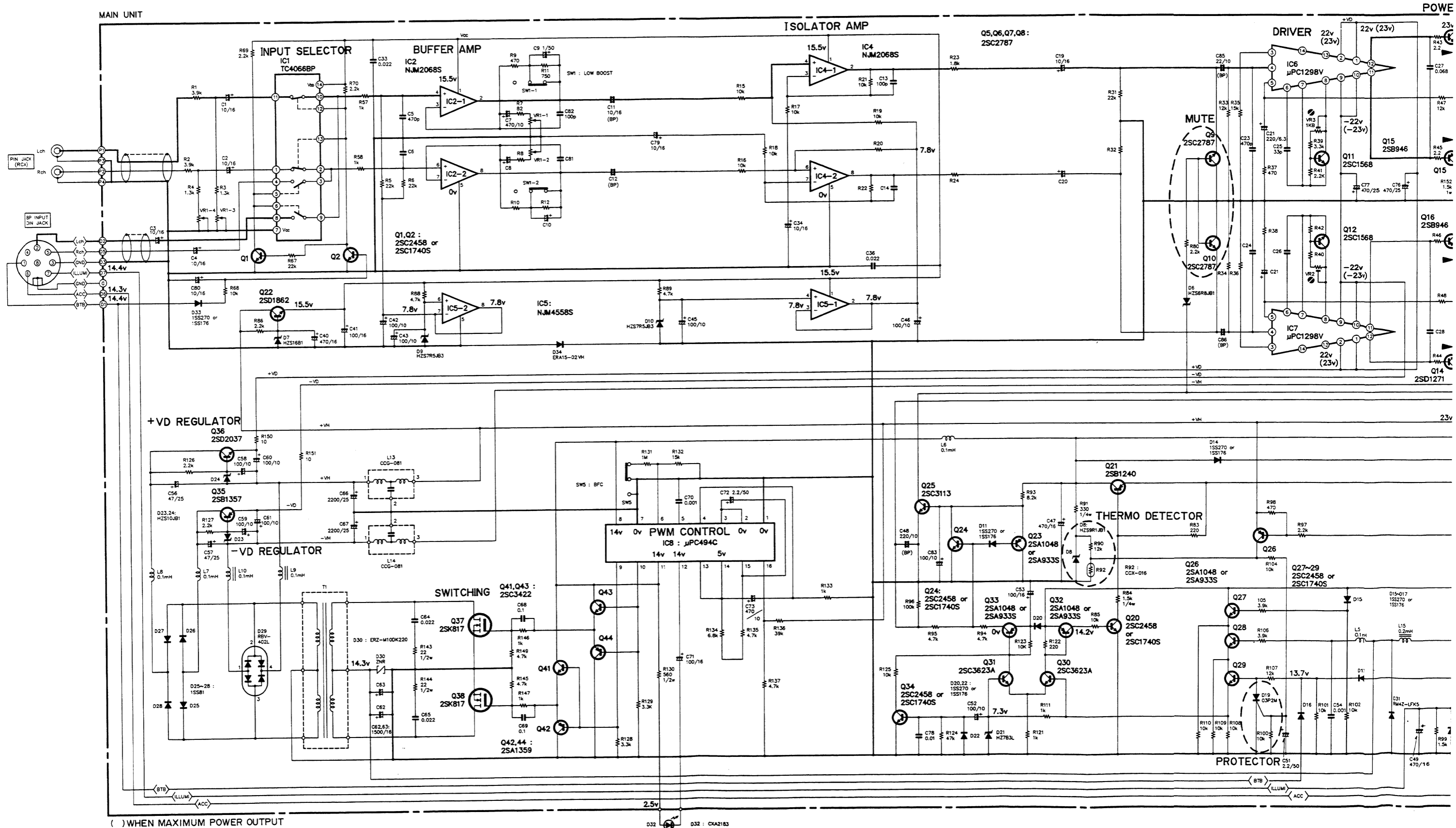
12. SCHEMATIC CIRCUIT DIAGRAM (GM-1000/ES)

A

B

C

D



() WHEN MAXIMUM POWER OUTPUT

4

5

6

7

8

9

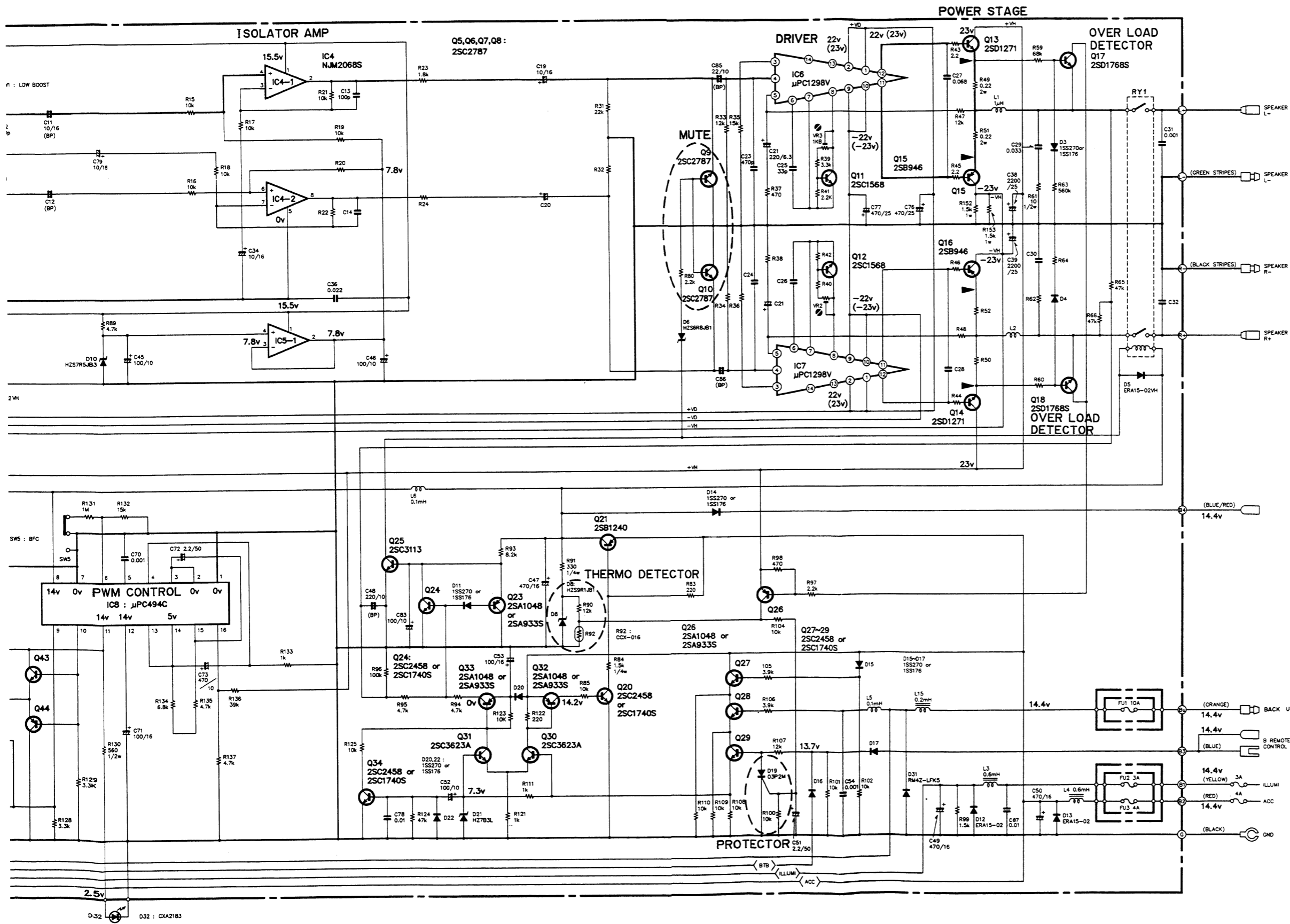
L

A

B

C

D



SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch positon.

Fig. 25

4

5

6

7

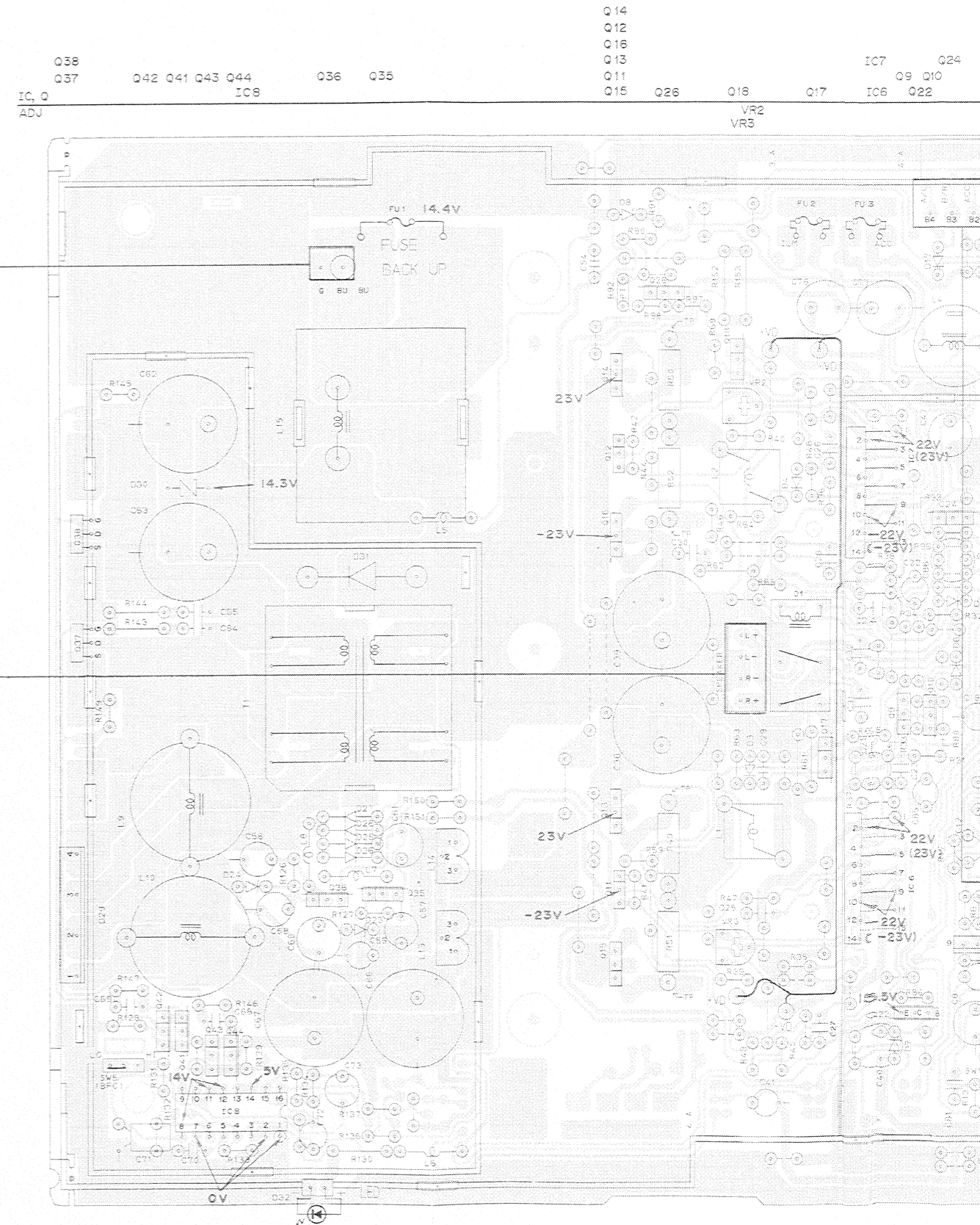
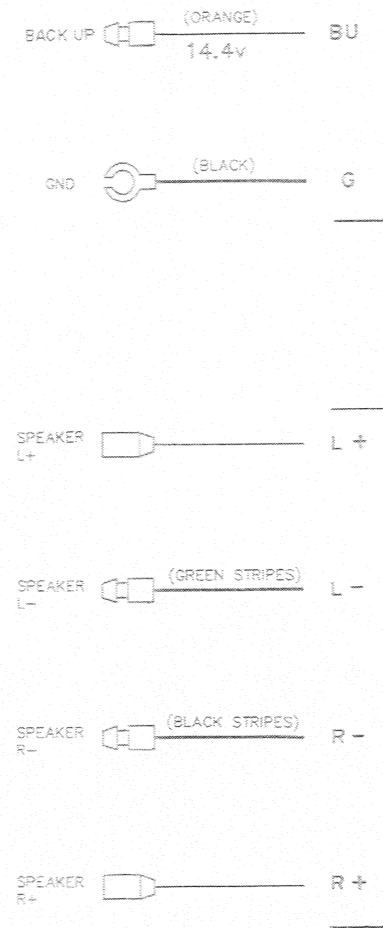
8

9

L

13. CONNECTION DIAGRAM (GM-1000/ES)

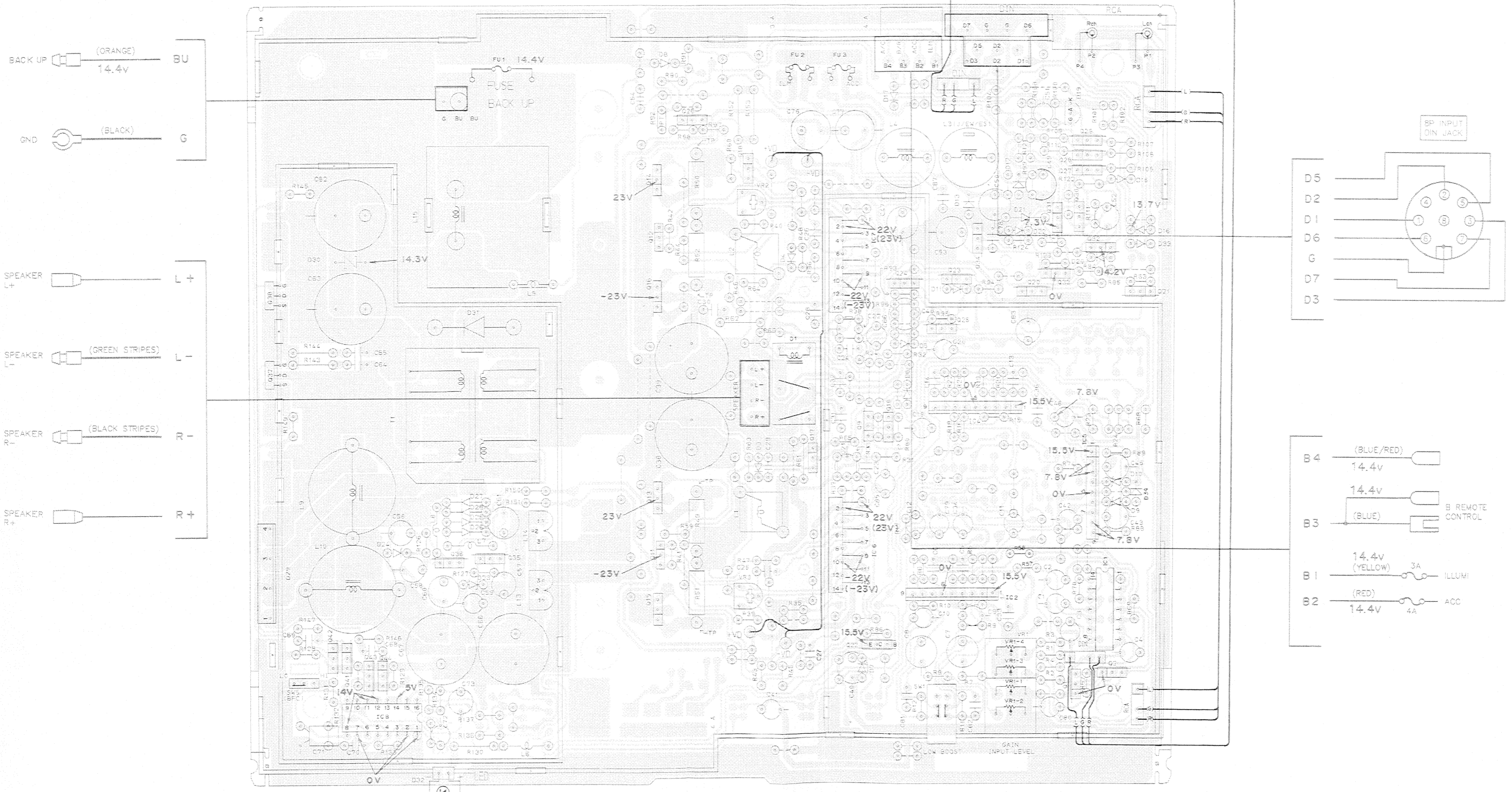
Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square , then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked ⊕ indicates +.
		Electrolytic capacitor (nonpolarized)	
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

Q38 Q37 Q42 Q41 Q43 Q44 IC8 Q36 Q35
 IC 0 ADJ
 Q14 Q12 Q16 Q13 Q11 Q15 Q26 Q18 Q17 IC7 Q9 Q10 IC6 Q22 IC2 Q34 Q23 Q25 IC4 Q20 Q33 Q31 Q30 Q32 Q21
 VR2 VR3



A

B

C

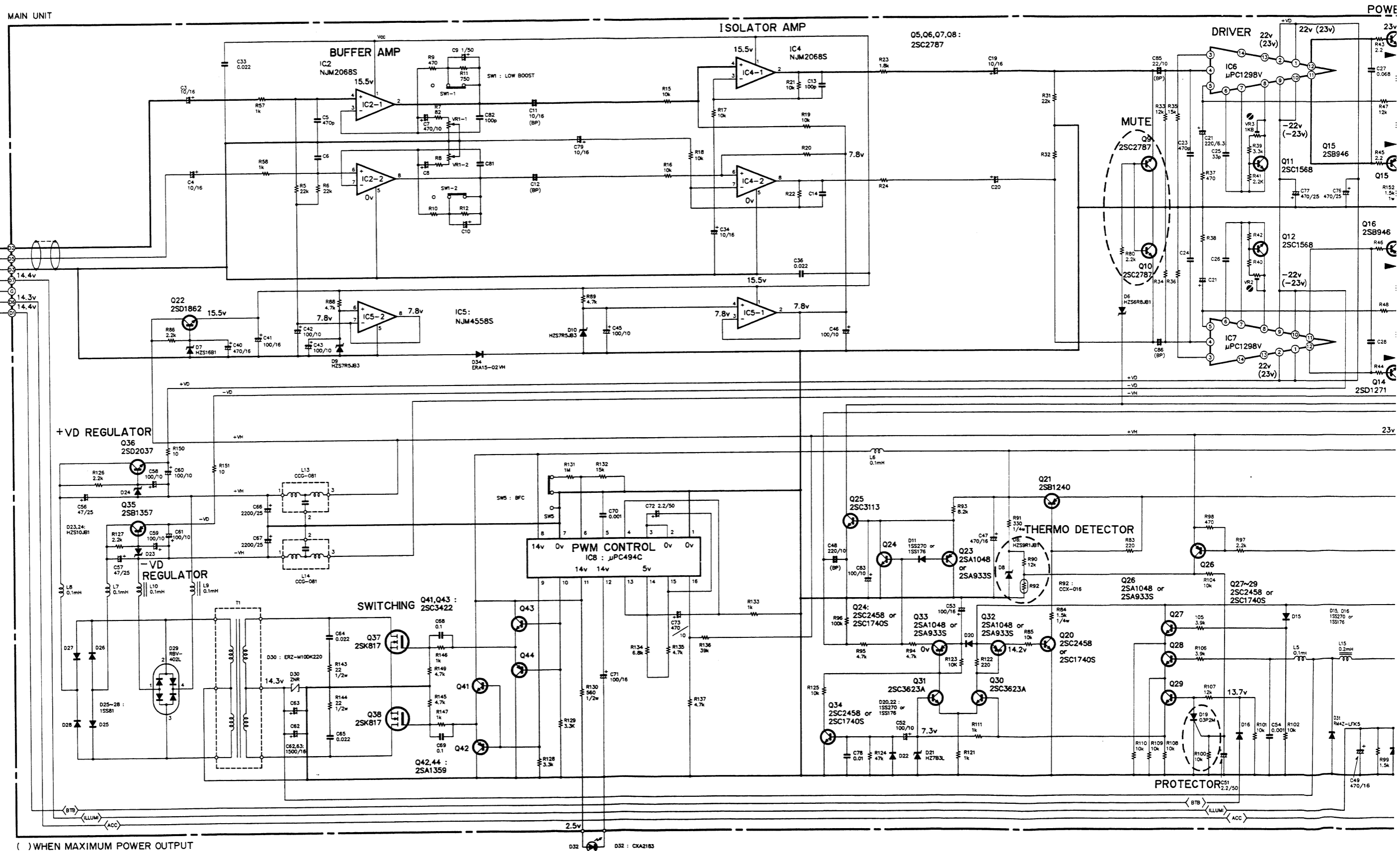
D

() WHEN MAXIMUM POWER OUTPUT

Fig. 16

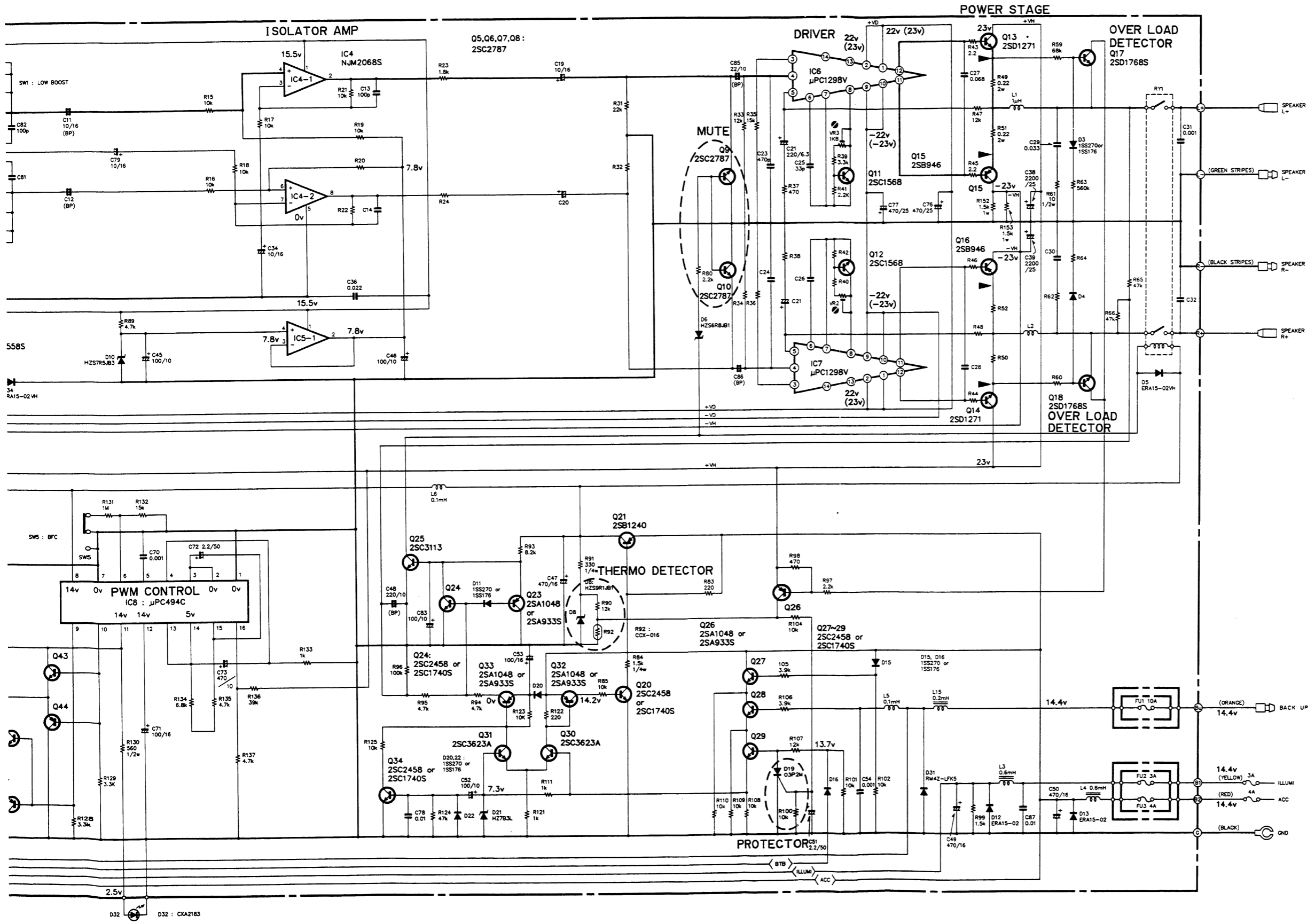
4 | 5 | 6 | 7 | 8 | 9

14. SCHEMATIC CIRCUIT DIAGRAM (GM-1000/EW)



() WHEN MAXIMUM POWER OUTPUT

D32 : CXA2183

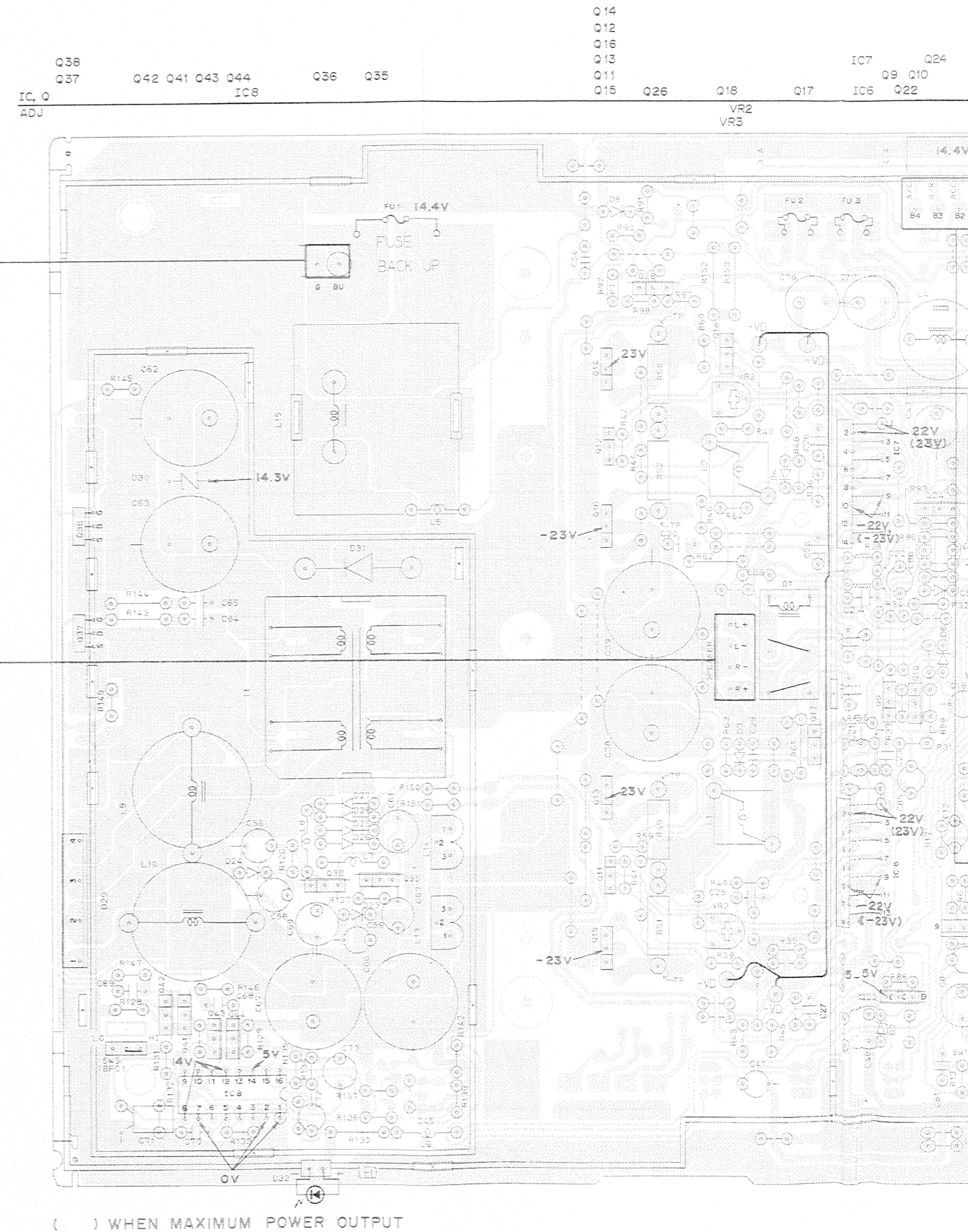
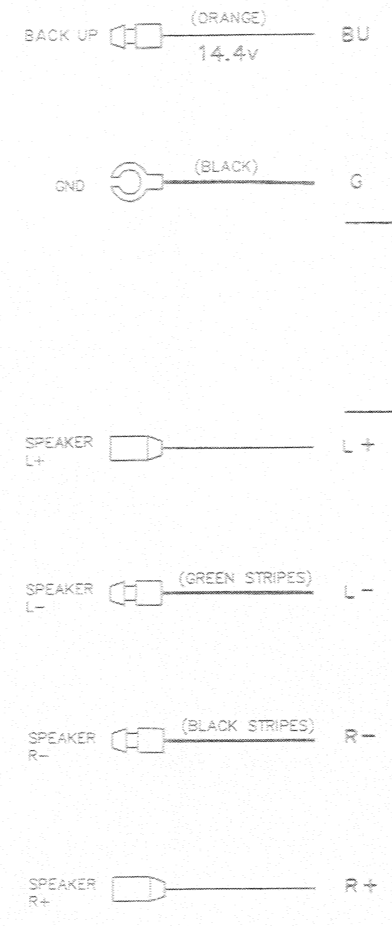


SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch position.

Fig. 27

15. CONNECTION DIAGRAM (GM-1000/EW)

Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square \square , then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked \oplus indicates +.
		Electrolytic capacitor (polarized)	
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



4 | 5 | 6 | 7 | 8 | 9

Q38 Q37 Q42 Q41 Q43 Q44 Q36 Q35
 IC, Q ADJ ICB

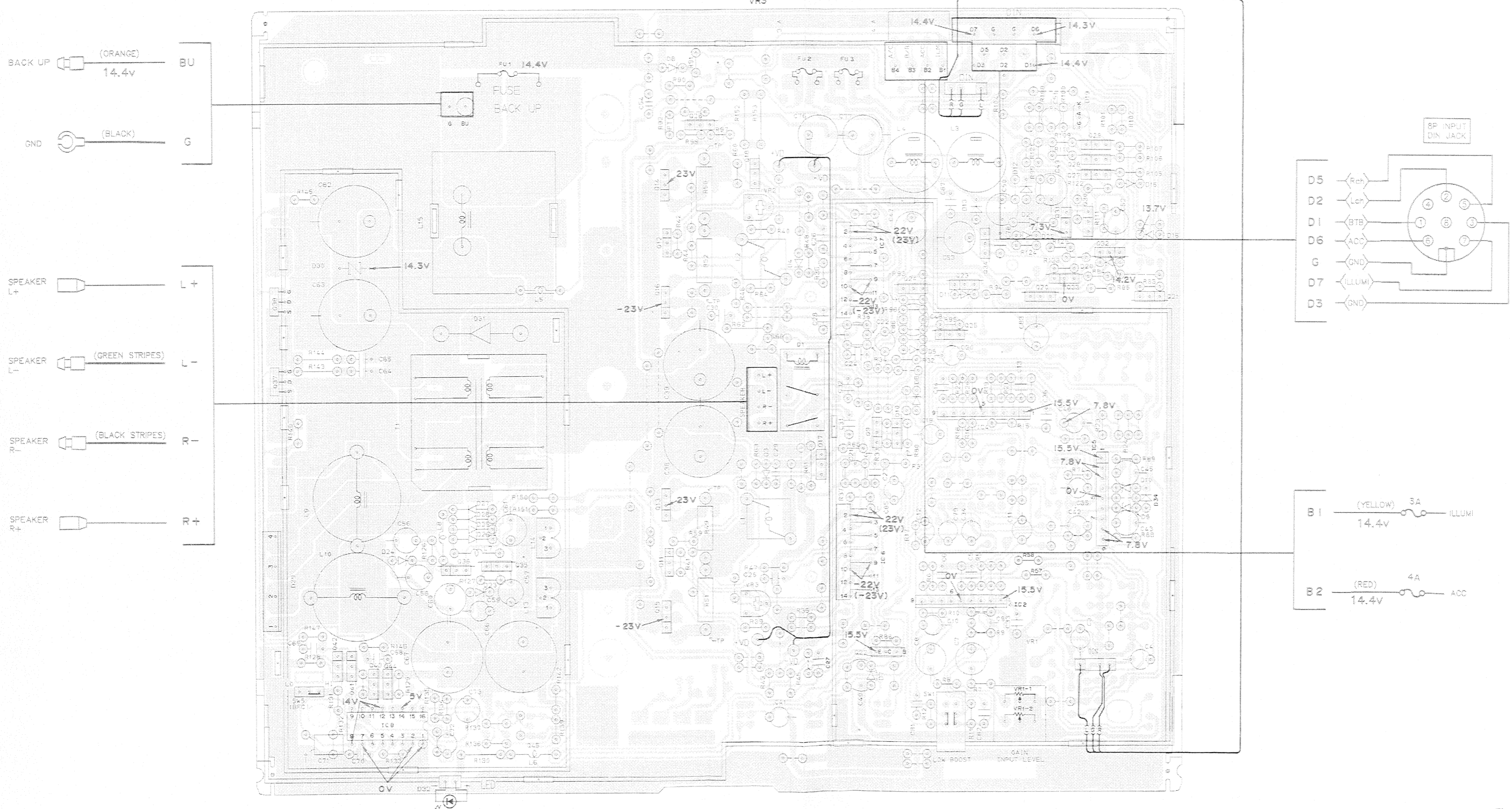
Q14 Q12 Q16 Q13 Q11 Q15 Q26 Q18 Q17 Q10 Q09 Q24 Q25 Q23 Q22 Q21

Q29 Q28 Q27 Q31 Q30 Q32 Q20 Q33

Q34 Q20 Q33 Q21

IC7 IC4 IC5

VR2 VR3



A

B

C

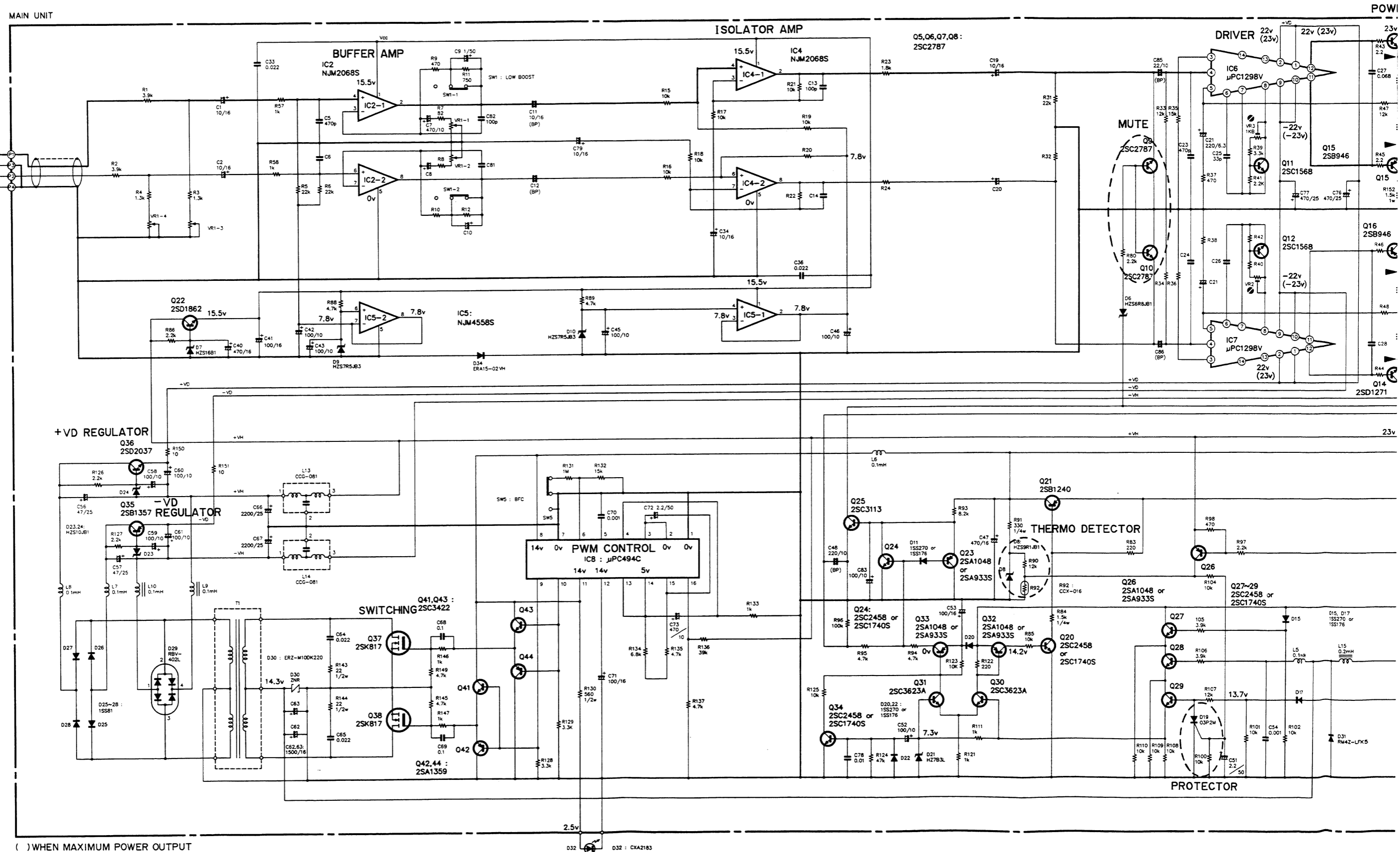
D

() WHEN MAXIMUM POWER OUTPUT

4 | 5 | 6 | 7 | 8 | 9

Fig. 28

16. SCHEMATIC CIRCUIT DIAGRAM (GM-1000/UC)



() WHEN MAXIMUM POWER OUTPUT

D32 : CXA2183

4

5

6

7

8

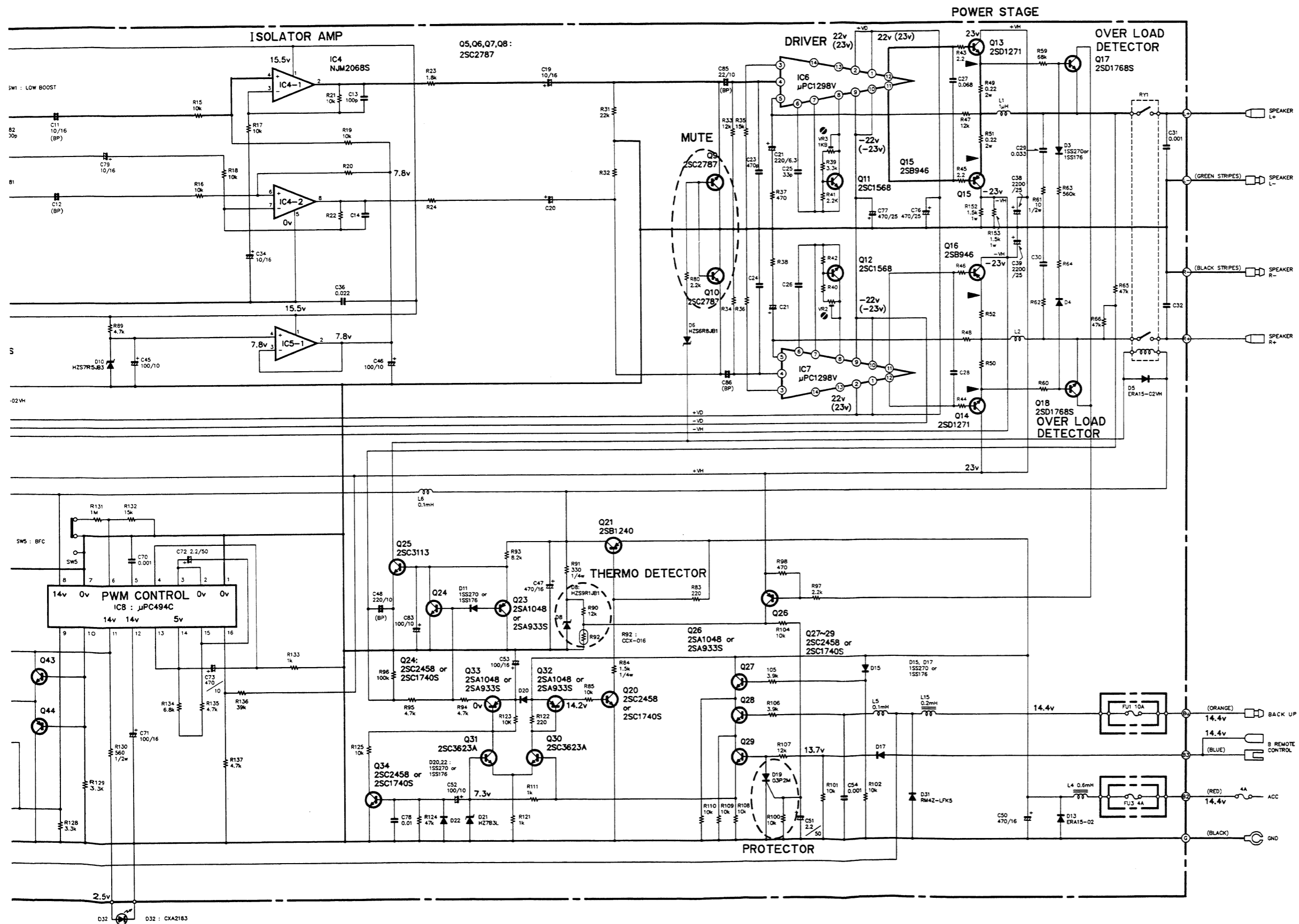
9

A

B

C

D



SWITCHES
 SW1: LOW BOOST SWITCH ON-OFF
 SW5: BFC SWITCH LOW-HIGH
 The underlined indicates the switch position.

Fig. 29

4

5

6

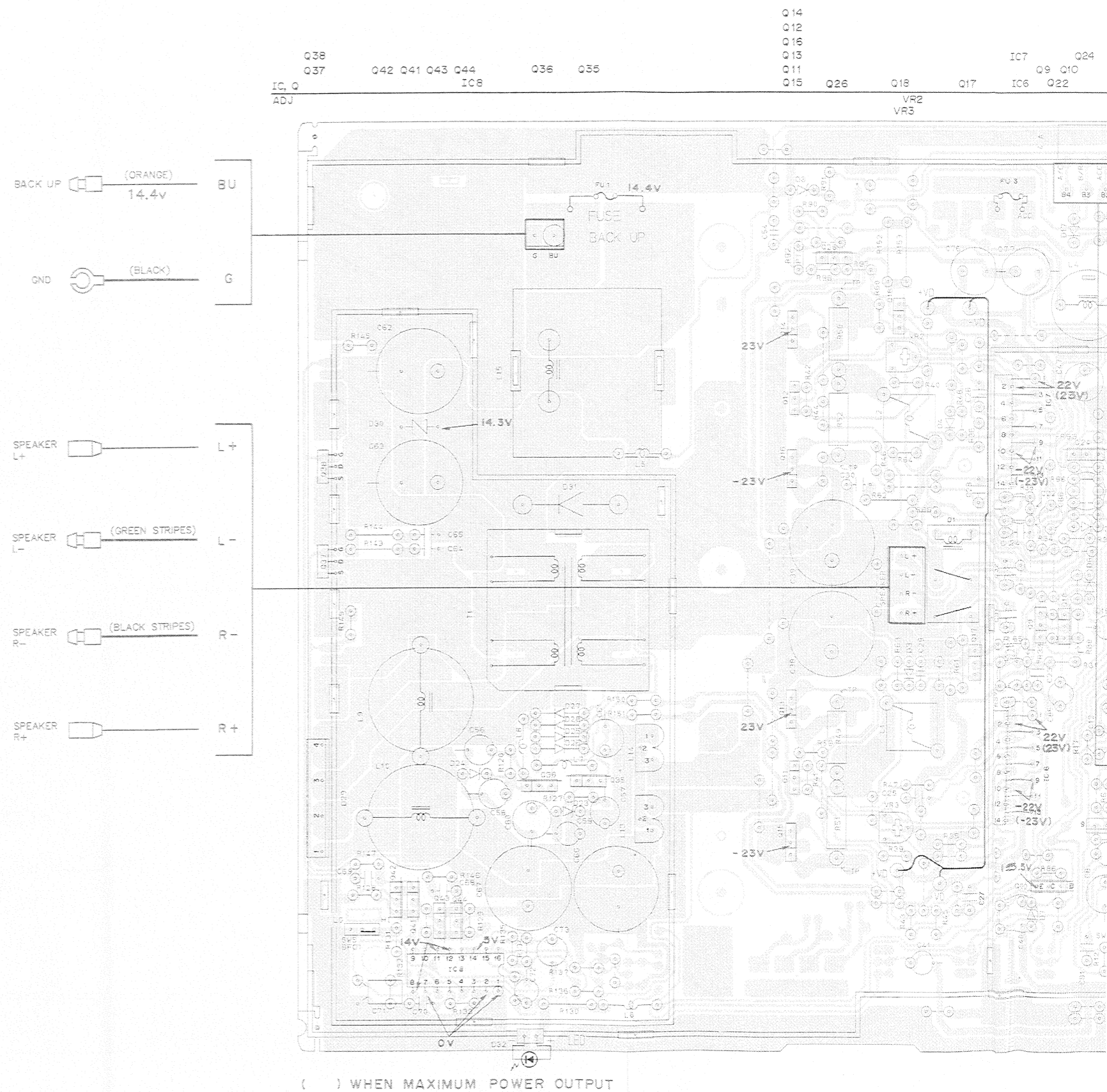
7

8

9

17. CONNECTION DIAGRAM (GM-1000/UC)

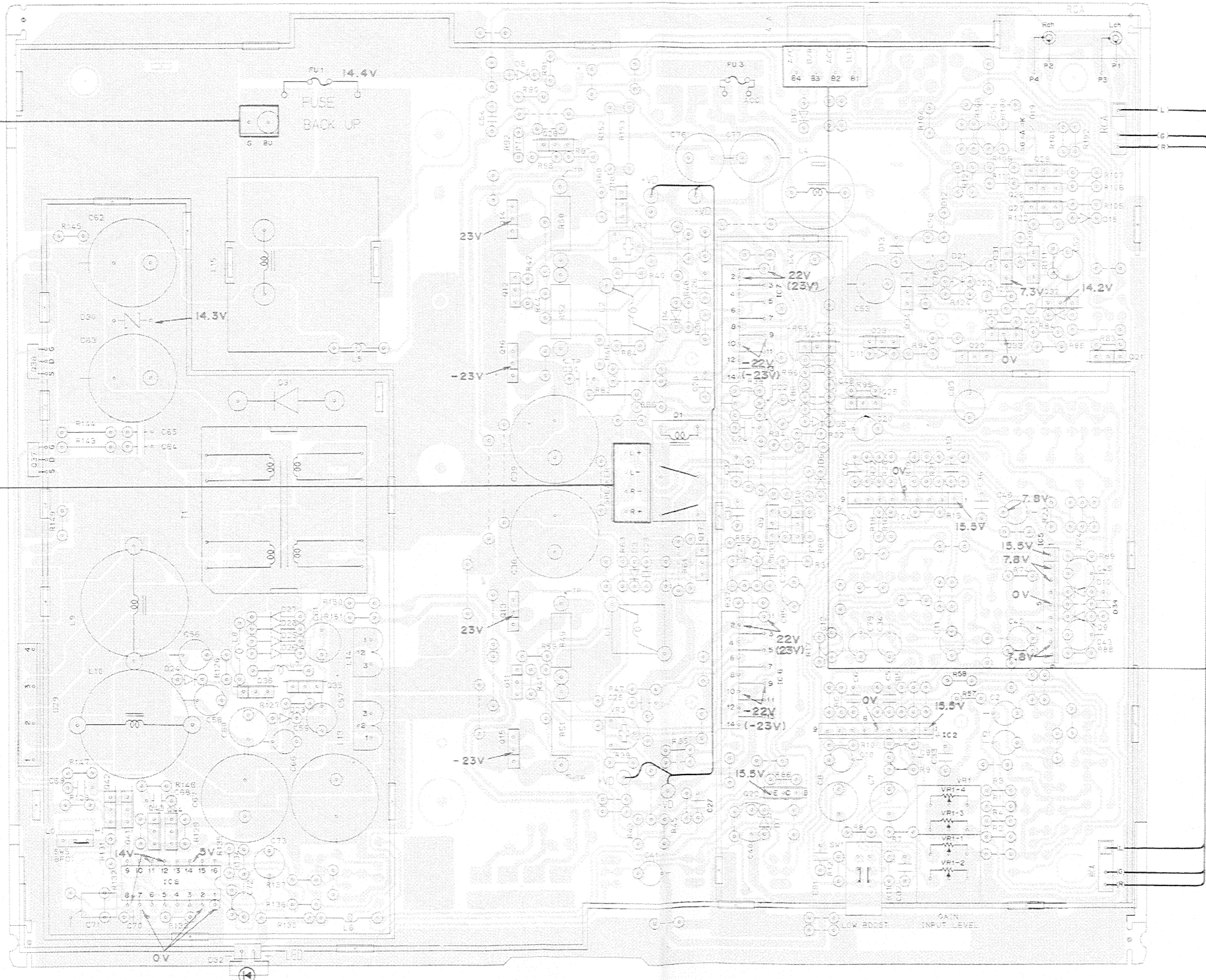
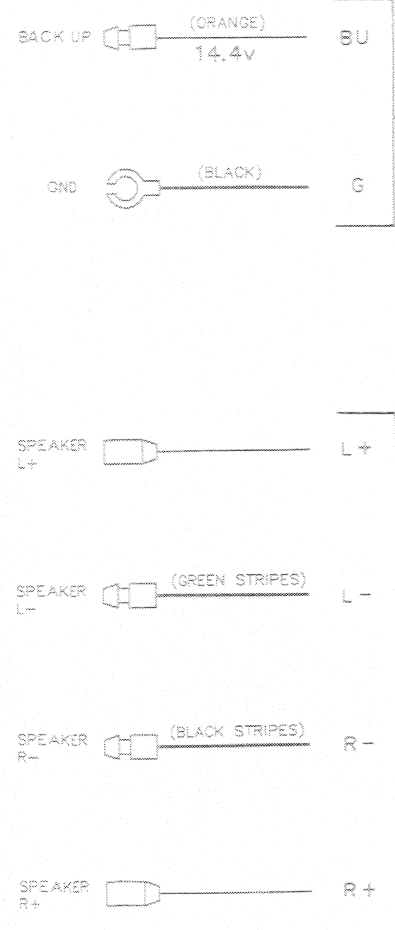
Pattern symbol	Schematic symbol	Representation	Remarks
		Transistor	Transistor E comes in square \square , then to left C and B follow unless otherwise indicated.
		FET	
		Thyristor	
		Posistor	
		Electrolytic capacitor (polarized)	In case of polarized electrolytic capacitor, terminal marked \oplus indicates +.
		Electrolytic capacitor (nonpolarized)	
		Capacitor	
		Resistor	
		Filter	
		Semi-fixed resistor	
		Jumper	



4 | 5 | 6 | 7 | 8 | 9

Q14 Q29
 Q12 Q28
 Q16 Q27
 Q13 Q31 Q30 Q32
 Q11 Q20 Q33 Q21
 Q15 Q26 Q18 Q17 Q24 Q25 IC4 IC5
 IC7 Q9 Q10
 IC6 Q22 IC 2
 VR2
 VR3

Q38
 Q37 Q42 Q41 Q43 Q44 Q36 Q35
 IC8 IC8
 IC 0
 ADJ



() WHEN MAXIMUM POWER OUTPUT

A

B

C

D

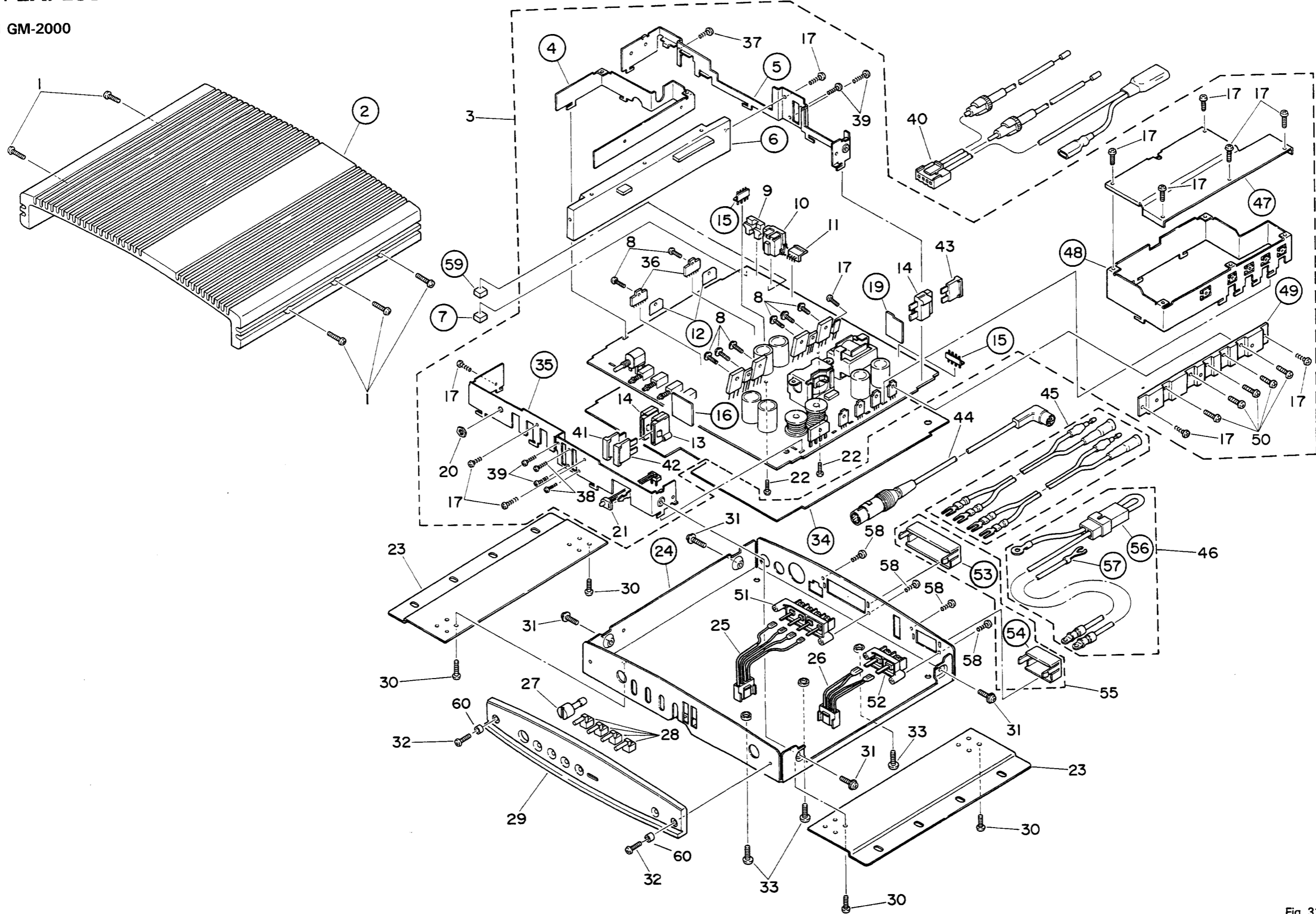
Fig. 30

4 | 5 | 6 | 7 | 8 | 9

18. EXPLODED VIEW

18.1 GM-2000

A
B
C
D



NOTE:

- For your Parts S
- ★★ and ★.
- ★★: GENERA.
- This classificatio
- number, temper.
- Parts whose par
- Parts marked by
- longer than usu

•Parts List

Mark	No.	Pa
	1	AM
	2	
●	3	CW
●	3	CW
●	3	CW
	4	
	5	
	6	
	7	
	8	PM
	9	CK
	10	CK
	11	CK
	12	CK
	13	CK
	14	CK
	15	
	16	
	17	BM
	18	..
	19	
	20	CB
★	21	CX
	22	BM
	23	CN
	24	
	25	CE
★	26	CE
★	27	CA
★	28	CA
	29	CX
	29	CX

Fig. 31

1 | 2 | 3 | 4 | 5 | 6

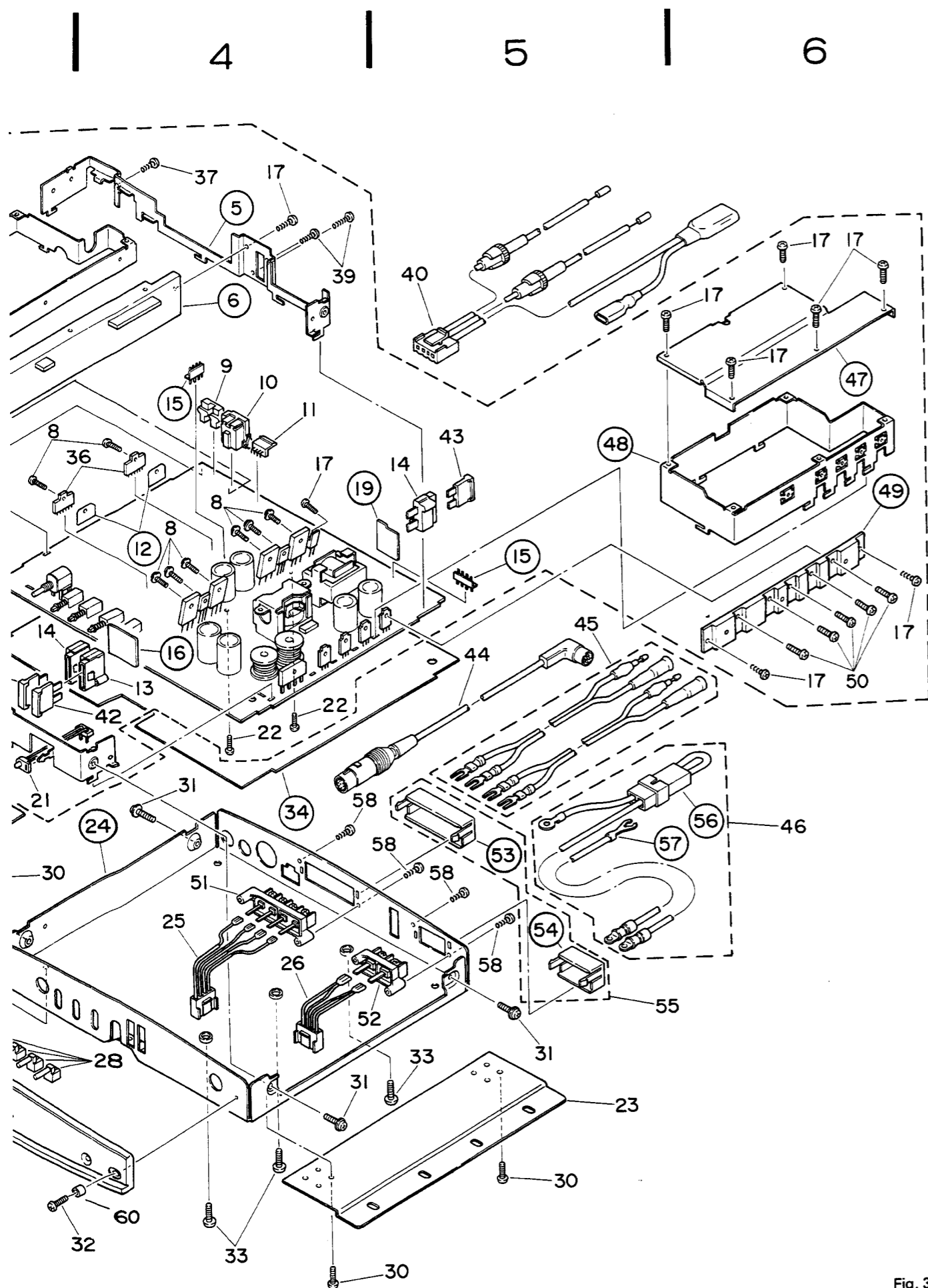


Fig. 31

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.
- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

• Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AMZ30P080FZK	Screw			CXA2415	Grille Assy (EW)
	2		Heat Sink Assy (ES, EW)		30	BMZ50P060FZK	Screw
			Heat Sink Assy (UC)		31	BMZ30P050FMC	Screw
●	3	CWM1640	Main Unit (ES)		32	BMZ30P080FZK	Screw
●		CWM1639	Main Unit (UC)		33	BMZ40P080FMC	Screw
●		CWM1641	Main Unit (EW)		34		Insulator
	4		Shield		35		Bracket
	5		Bracket	★★	36	μ PC1298V	IC
	6		Heat Sink		37	BMZ20P080FMC	Screw (ES, EW)
	7		Cushion		38	PTZ20P080FMC	Screw (ES, EW)
	8	PMF30P100FMC	Screw		39	PTZ20P080FMC	Screw
	9	CKS1466	Pin Jack (ES, UC)	★	40	CDE2106	Cord Assy (ES)
	10	CKS1156	Connector (ES, EW)	★		CDE2107	Cord Assy (UC)
	11	CKS1340	Connector (4P)	★		CDE2105	Cord Assy (EW)
	12		Rubber	★★	41	CEK1001	Fuse (4A)
	13	CKR1001	Fuse Holder (ES, EW)	★★	42	CEK1134	Fuse (3A) (ES, EW)
	14	CKR1001	Fuse Holder	★★	43	CEK1137	Fuse (15A)
	15		Plug (4P)		44	CDE1846	DIN Connector (EW)
	16		P.C. Board		45	CDE2018	Cord
	17	BMZ30P050FMC	Screw	★	46	CDE1997	Cord Assy (ES, UC, EW)
	18			47		Shield
	19		P.C. Board		48		Shield
	20	CBN-032	Nut		49		Heat Sink
★	21	CXA2183	LED Assy		50	BMZ26P080FZK	Screw
	22	BMZ30P060FMC	Screw		51	CKE1004	4P Terminal
	23	CNC2099	Bracket		52	CKE1007	2P Terminal
	24		Case (ES)		53		Cover
			Case (UC)		54		Cover
			Case (EW)		55	CEA1345	Cover Assy
	25	CDE2028	Cord (4P)		56		Cord
★	26	CDE2030	Cord (4P)		57		Cord
★	27	CAA1135	Knob		58	BTZ30P080FZK	Screw
★	28	CAC1701	Button		59		Cushion
	29	CXA2378	Grille Assy (ES)		60	CNC2375	Collar
		CXA2423	Grille Assy (UC)				

18.2 GM-1000

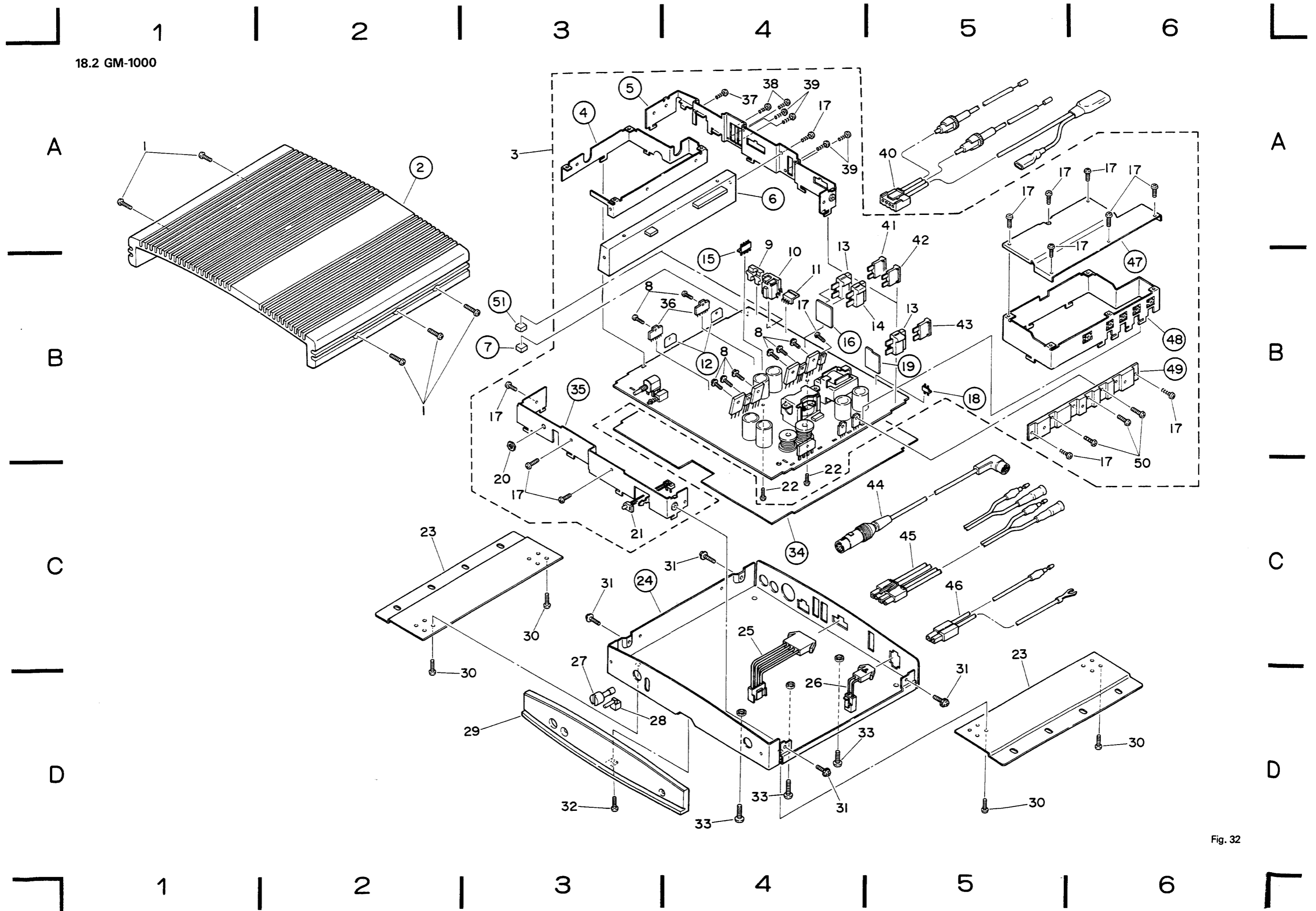


Fig. 32

●Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AMZ30P120FZK	Screw	★	26	CDE1885	Cord(4P)
	2		Heat Sink Assy(ES,EW)	★	27	CAA1135	Knob
			Heat Sink Assy(UC)	★	28	CAC1701	Button
◎	3	CWM1644	Main Unit(ES)		29	CXA2379	Grille Assy(ES,UC)
◎		CWM1643	Main Unit(UC)			CXA2417	Grille Assy(UC)
◎		CWM1645	Main Unit(EW)		30	BMZ50P060FZK	Screw
	4		Shield		31	BMZ30P050FMC	Screw
	5		Bracket		32	BMZ30P050FZK	Screw
	6		Heat Sink		33	BMZ40P080FMC	Screw
	7		Cushion		34		Insulator
	8	PMF30P080FMC	Screw		35		Bracket
	9	CKS1466	Pin Jack(ES,UC)	★★	36	μ PC1298V	IC
	10	CKS1156	Connector(ES,EW)		37	BMZ20P080FMC	Screw(ES,EW)
	11	CKS1340	Connector(4P)		38	PTZ20P080FMC	Screw(ES,EW)
	12		Rubber		39	PTZ20P080FMC	Screw
	13	CKR1001	Fuse Holder	★	40	CDE2110	Cord Assy(ES)
	14	CKR1001	Fuse Holder(ES,EW)			CDE2111	Cord Assy(UC)
	15		Plug(4P)			CDE2109	Cord Assy(EW)
	16		P.C.Board	★★	41	CEK1001	Fuse(4A)
	17	BMZ30P050FMC	Screw	★★	42	CEK1134	Fuse(3A)(ES,EW)
	18		Plug(2P)	★★	43	CEK1136	Fuse(10A)
	19		P.C.Board		44	CDE1847	DIN Connector(EW)
	20	CBN-032	Nut		45	CDE1836	Cord
★	21	CXA2183	LED Assy	★	46	CDE1840	Cord Assy(ES,UC,EW)
	22	BMZ30P060FMC	Screw		47		Shield
	23	CNC2099	Bracket		48		Shield
	24		Case(ES)		49		Heat Sink
			Case(UC)		50	BMZ26P080FMC	Screw
			Case(EW)		51		Cushion
	25	CDE1839	Cord(4P)				

19. ELECTRICAL PARTS LIST

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.
- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S □□□J

Chip Capacitor (except for CQS.)

CKS., CCS.

Model Number : GM-2000/ES UC EW

Unit Number :

Unit Name : Main unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
**	IC 1	(ES)	TC4066BP	*	D 9 10		HZS4R7EB2 (RD4R5ESB2)
**	IC 2 4		NJM2068S				ERA15-02VH
**	IC 3		TC4066BP	*	D 12	(ES EW)	1SS176
**	IC 5		NJM4558S	*	D 16	(EW)	(US1040M)
**	IC 6 7		μPC1298V				
**	IC 8		μPC494C				(1SS270)
**	Q 1 2	(ES)	2SC2458	*	D 16 17 33	(ES)	1SS176
			(2SC1740S)				(US1040M)
**	Q 3 4 20 24 27 28 29 34 45 46		2SC2458	*	D 17	(UC)	(1SS270)
			(2SC1740S)				1SS176
**	Q 5 6 7 8 9 10		2SC2787				(US1040M)
**	Q 11 12		2SC1568				(1SS270)
**	Q 13 14		2SD1704	*	D 19	Thyristor	03P2M
**	Q 15 16		2SB1154	*	D 21		HZ7B3L
**	Q 17 18		2SD1768S	*	D 23 24		HZS4R3EB1
**	Q 23 26 32 33		2SA1048				(RD4R3ESB1)
			(2SA933S)	*	D 25 26 27 28		1SS81
**	Q 21		2SB1240	*	D 29		RBV-402L
**	Q 22		2SD2037	*	D 30	Serge Absorber	ERZ-M10DK220
**	Q 25		2SC3113	*	D 31		RM4Z-LFK5
**	Q 30 31		2SC3623A	*	D 32	LED Assy	CXA2183
**	Q 35		2SB1357	L	1 2	Coil	CTH1028
**	Q 36		2SD2037	L	3	Choke Coil(ES EW)	CTH1048
**	Q 37 38 39 40		2SK817	L	4	Choke Coil	CTH1048
**	Q 41 43		2SC3422	L	5	Ferri-Inductor	CTF-157
**	Q 42 44		2SA1359	L	6 7 8	Coil 100μH	CTF-113
*	D 1 2 3 4 11 15 20 22		1SS176	L	9 10	Choke Coil	CTH1036
			(US1040M)	L	13 14		CCG-081
			(1SS270)	L	15	Choke Coil	CTH1031
*	D 5 13 34		ERA15-02VH	**	SW 1 2 3 4	Switch	CSG1023
*	D 6		HZS6R8JB1	**	SW 5	Switch	HSW-156
			(RD6R8JSB1)	**	VR 1	Volume 2kΩ(C)×2, 3kΩ(A)×2 (ES UC)	CCS1095
*	D 7		HZS9R1JB1				
			(RD9R1JSB1)	**	VR 1	Volume 2kΩ(C)×2 (EV)	CCS1103
*	D 8		HZS9R1JB1	**	VR 2 3	Semi-fixed	VRTB6VS102
			(RD9R1JSB1)				

Mark	===== Circuit Symbol & No.	==== Part Name	Part No.	Mark	===== Circuit Symbol & No.	==== Part Name	Part No.
	RY 1	Relay	CSR1010	R 134			RD1/4PS682JL
	T 1	Transformer	CTT1004	R 136			RD1/4PS223JL
**	FU 1	Fuse 15A	CEK1137	R 137			RD1/4PS222JL
**	FU 2	Fuse 3A (ES EW)	CEK1134	R 138			RD1/4PS561JL
**	FU 3	Fuse 4A	CEK1001	R 140			RD1/4PS242JL

RESISTORS

Mark	===== Circuit Symbol & No.	==== Part Name	Part No.
R	1 2	(ES UC)	RD1/4PS392JL
R	3 4	(ES UC)	RD1/4PS132JL
R	5 6 31 32		RD1/4PS223JL
R	7 8		RD1/4PS820JL
R	9 10 37 38 98		RD1/4PS471JL
R	11 12		RD1/4PS751JL
R	13 14 71 72		RD1/4PS152JL
R	15 16 18 93		RD1/4PS822JL
R	17 19 20 21 22		RD1/4PS103JL
R	23 24 27 28		RD1/4PS821JL
R	25 26 29 30		RD1/4PS104JL
R	33 34 47 48		RD1/4PS153JL
R	35 36		RD1/4PS153JL
R	39 40		RD1/4PS332JL
R	41 42 97 126 127		RD1/4PS222JL
R	43 44 45 46		RD1/4PS2R2JL
R	49 50 51 52	0.22Ω/2W	CCN1013
R	53 54 55 56 61 62		RS1/2P100JL
R	57 58 111 121 133 146 147		RD1/4PS102JL
R	59 60 136		RD1/4PS393JL
R	63 64		RD1/4PS564JL
R	65 66		RD1/4PS473JL
R	67	(ES)	RD1/4PS223JL
R	68	(ES)	RD1/4PS103JL
R	69 70	(ES)	RD1/4PS222JL
R	73		RD1/4PS223JL
R	75		RD1/4PS473JL
R	76 77		RD1/4PS222JL
R	78 139 142		RD1/4PS103JL
R	79		RD1/4PM102J
R	80		RD1/4PS222JL
R	83 122		RD1/4PS221JL
R	84		RD1/4PS152JL
R	85 100 101 102 104 108		RD1/4PS103JL
R	86		RD1/4PS472JL
R	88 89		RD1/4PS102JL
R	90		RD1/4PS123JL
R	91		RD1/4PS331JL
R	92	Posister	CCX-016
R	94 95 135 145 149		RD1/4PS472JL
R	96		RD1/4PS104JL
R	99	(ES EW)	RD1/4PS152JL
R	105 106		RD1/4PS392JL
R	107		RD1/4PS123JL
R	109 110 123 125		RD1/4PS103JL
R	124		RD1/4PS473JL
R	128 129		RD1/4PS332JL
R	130		RS1/2P561JL
R	131		RN1/4PC1004D
R	132		RN1/4PC1502D

R 141			RD1/4PS432JL
R 143 144			RS1/2P220JL
R 148			RD1/4PS681JL
R 150 151			RD1/4PS330JL
R 152 153			RS1P152JL
R 154 155			RD1/4PS220JL

CAPACITORS

Mark	===== Circuit Symbol & No.	==== Part Name	Part No.
C	1 2	(ES UC)	CEKA100M16
C	3 4	(ES EW)	CEKA100M16
C	5 6 23 24		CKCYB471K50
C	7 8		CEA471M10L2
C	9 10 15 16 17 18		CEA010M50I.2
C	11 12	10 μF/16V	CCCH1034
C	13 14		CCCH101J50
C	19 20		CEKA100M16
C	21 22		CEA221M6R3I.2
C	25 26		CCCH330J50
C	27 28		QMA683K50
C	29 30		QMA333K50
C	31 32 74 75		QMA102K50
C	33 36 64 65		QMA223K50
C	34 79		CEA100M16I.2
C	35		CEA4R7M25I.2
C	37		CEA220M16I.2
C	38 39	2200 μF/35V	CH1028
C	40		CEA471M10I.2
C	41		CEA101M10L2
C	42 43 45 46		CEA101M10I.2
C	47 50	470 μF/16V	CH-114
C	48		CEA221M10NPI.1
C	49	470 μF/16V(ES EW)	CH-114
C	51		CEA2R2M50L2
C	52		CEA101M10I.2
C	53		CEA101M16L2
C	54		CKPYB102K50L
C	56 57		CEAUH470M25
C	58 59 60 61		CEAUH101M10
C	62 63	3300 μF/16V	CH1023
C	66 67	2200 μF/35V	CH1024
C	68 69		QMA104K50
C	70		QPA102J2A
C	71		CEAUH101M16
C	72		CEAUH2R2M50
C	73		CEHAQ471M10
C	80	(ES)	CEA100M16I.2
C	76 77		CEA471M35L2
C	78		QMA103K50
C	81 82		CCCH101J50
C	83		CEA101M10L2
C	85 86	22 μF/10V	CH1035
C	87	(ES EW)	QMA103K50

Model Number : GM-1000/ES UC EW

Unit Number :

Unit Name : Main unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
** IC	1	(ES)	TC4066BP	* D	30	Serge Absorber	FR7-M10DK220
** IC	2 4		NJM2068S	* D	31		RM47-1FK5
** IC	5		NJM4558S	* D	32	LED Assy	CXA2183
** IC	6 7		μ PC1298V	L	1 2	Coil	CTH1028
** IC	8		μ PC494C	L	3	Choke Coil(ES EW)	CTH1048
** Q	1 2	(ES)	2SC2458	L	4	Choke Coil	CTH1048
			(2SC1740S)	L	5	Ferri-Inductor	CTF-157
** Q	9 10		2SC2787	L	6 7 8	Coil 100 μ H	CTF-113
** Q	11 12		2SC1568	L	9 10	Choke Coil	CTH1034
** Q	13 14		2SD1271	L	13 14		CCG-081
** Q	15 16		2SB946	L	15	Choke Coil	CTH1033
** Q	17 18		2SD1768S	** SW	1	Switch	CSG1023
** Q	23 26 32 33		2SA1048	** SW	5	Switch	HSH-156
			(2SA933S)	** VR	1	Volume 2k Ω (C) \times 2, 3k Ω (A) \times 2 (ES UC)	CCS1095
** Q	20 24 27 28 29 34		2SC2458				
			(2SC1740S)	** VR	1	Volume 2k Ω (C) \times 2 (EW)	CCS1103
** Q	21		2SB1240	** VR	2 3	Semi-fixed	VRTB6VS102
** Q	22		2SD1862	RY	1	Relay	CSR1010
** Q	25		2SC3113	T	1	Transformer	CTT1005
** Q	30 31		2SC3623A	** FU	1	Fuse 10A	CEK1136
** Q	35		2SB1357	** FU	2	Fuse 3A (ES EW)	CEK1134
** Q	36		2SD2037	** FU	3	Fuse 4A	CEK1001
** Q	37 38		2SK817				
** Q	41 43		2SC3422				
** Q	42 44		2SA1359				
* D	3 4 11 15 20 22		1SS176				
			(US1040M)	R	1 2	(ES UC)	RD1/4PS392JL
			(1SS270)	R	3 4	(ES UC)	RD1/4PS132JL
* D	5 13 34		ERA15-02VH	R	5 6 31 32		RD1/4PS223JL
* D	6		HZS6R8J1B1	R	7 8		RD1/4PS820JL
			(RD6R8JSB1)	R	9 10 37 38 98		RD1/4PS471JL
* D	7		HZS16J1B1	R	11 12		RD1/4PS751JL
			(RD16JSB1)	R	15 16 17 18 19 20 21 22		RD1/4PS103JL
* D	8		HZS9R1J1B1	R	23 24		RD1/4PS182JL
			(RD9R1JSB1)	R	33 34 47 48 107		RD1/4PS123JL
				R	35 36		RD1/4PS153JL
* D	9 10		HZS7R5J1B3				
			(RD7R5JSB3)	R	39 40 128 129		RD1/4PS332JL
* D	12	(ES EW)	ERA15-02VH	R	41 42 97 126 127		RD1/4PS222JL
* D	16	(EW)	1SS176	R	43 44 45 46		RD1/4PS2R2JL
			(US1040M)	R	49 50 51 52	0.22 Ω /2W	CCN1013
			(1SS270)	R	57 58 111 121 133 146 147		RD1/4PS102JL
* D	16 17 33	(ES)	1SS176	R	59 60		RD1/4PS683JL
			(US1040M)	R	61 62		RD1/4PM100J
				R	63 64		RD1/4PS564JL
			(1SS270)	R	65 66		RD1/4PS473JL
* D	17	(UC)	1SS176	R	67	(ES)	RD1/4PS223JL
			(US1040M)				
			(1SS270)	R	68	(ES)	RD1/4PS103JL
* D	19	Thyristor	03P2M	R	69 70	(ES)	RD1/4PS222JL
				R	80		RD1/4PS222JL
* D	21		HZ7B3L	R	83 122		RD1/4PS221JL
* D	23 24		HZS10J1B1	R	84		RD1/4PS152JL
			(RD10JSB1)				
* D	25 26 27 28		1SS81				
* D	29		RBV-402L				

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
R	1 2	(ES UC)	RD1/4PS392JL
R	3 4	(ES UC)	RD1/4PS132JL
R	5 6 31 32		RD1/4PS223JL
R	7 8		RD1/4PS820JL
R	9 10 37 38 98		RD1/4PS471JL
R	11 12		RD1/4PS751JL
R	15 16 17 18 19 20 21 22		RD1/4PS103JL
R	23 24		RD1/4PS182JL
R	33 34 47 48 107		RD1/4PS123JL
R	35 36		RD1/4PS153JL
R	39 40 128 129		RD1/4PS332JL
R	41 42 97 126 127		RD1/4PS222JL
R	43 44 45 46		RD1/4PS2R2JL
R	49 50 51 52	0.22 Ω /2W	CCN1013
R	57 58 111 121 133 146 147		RD1/4PS102JL
R	59 60		RD1/4PS683JL
R	61 62		RD1/4PM100J
R	63 64		RD1/4PS564JL
R	65 66		RD1/4PS473JL
R	67	(ES)	RD1/4PS223JL
R	68	(ES)	RD1/4PS103JL
R	69 70	(ES)	RD1/4PS222JL
R	80		RD1/4PS222JL
R	83 122		RD1/4PS221JL
R	84		RD1/4PS152JL

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
R	85 100 101 102 104 108		RD1/4PS103JL	C	62 63	1500 μ F/16V	CCH1021
R	86		RD1/4PS222JL	C	66 67	2200 μ F/25V	CCH1022
R	88 89		RD1/4PS472JL	C	68 69		CQMA104K50
R	90		RD1/4PS123JL	C	70		CQPA102J2A
R	91 150		RD1/4PS331JL	C	71		CEAUH101M16
R	92	Posister	CCX-016	C	72		CEAUH2R2M50
R	93		RD1/4PS822JL	C	73		CEHAQ471M10
R	94 95 135 137 145 149		RD1/4PS472JL	C	76 77		CEA471M25L2
R	96		RD1/4PS104JL	C	78		CQMA103K50
R	99	(ES EW)	RD1/4PS152JL	C	80	(ES)	CEA100M16L2
R	105 106		RD1/4PS392JL	C	81 82		CCCCH101J50
R	109 110 123 125		RD1/4PS103JL	C	83		CEA101M10L2
R	124		RD1/4PS473JL	C	85 86	22 μ F/10V	CCH1035
R	130		RS1/2P561JL	C	87	(ES EW)	CQMA103K50
R	131		RN1/4PC1004D				
R	132		RN1/4PC1502D				
R	134		RD1/4PS682JL				
R	136		RD1/4PS393JL				
R	143 144		RS1/2P220JL				
R	150		RD1/4PS100JL				
R	151		RD1/4PS100JL				
R	152 153		RS1P152JL				

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
C	1 2	(ES UC)	CEKA100M16
C	3 4	(ES EW)	CEKA100M16
C	5 6 23 24		CKCYB471K50
C	7 8		CEA471M10L2
C	9 10		CEA010M50L2
C	11 12 19 20		CEKA100M16
C	13 14		CCCCH101J50
C	21 22		CEA221M6R3L2
C	25 26		CCCCH330J50
C	27 28		CQMA683K50
C	29 30		CQMA333K50
C	31 32		CQMA102K50
C	33 36 64 65		CQMA223K50
C	34 79		CEA100M16L2
C	38 39	2200 μ F/25V	CCH1027
C	40 47 50	470 μ F/16V	CCH-114
C	41 53		CEA101M16L2
C	42 43 45 46		CEA101M10L2
C	48		CEA221M10NPLL
C	49	470 μ F/16V(ES EW)	CCH-114
C	51		CEA2R2M50L2
C	52		CEA101M10L2
C	54		CKPYB102K50L
C	56 57		CEAUH470M25
C	58 59 60 61		CEAUH101M10

20. PACKING METHOD

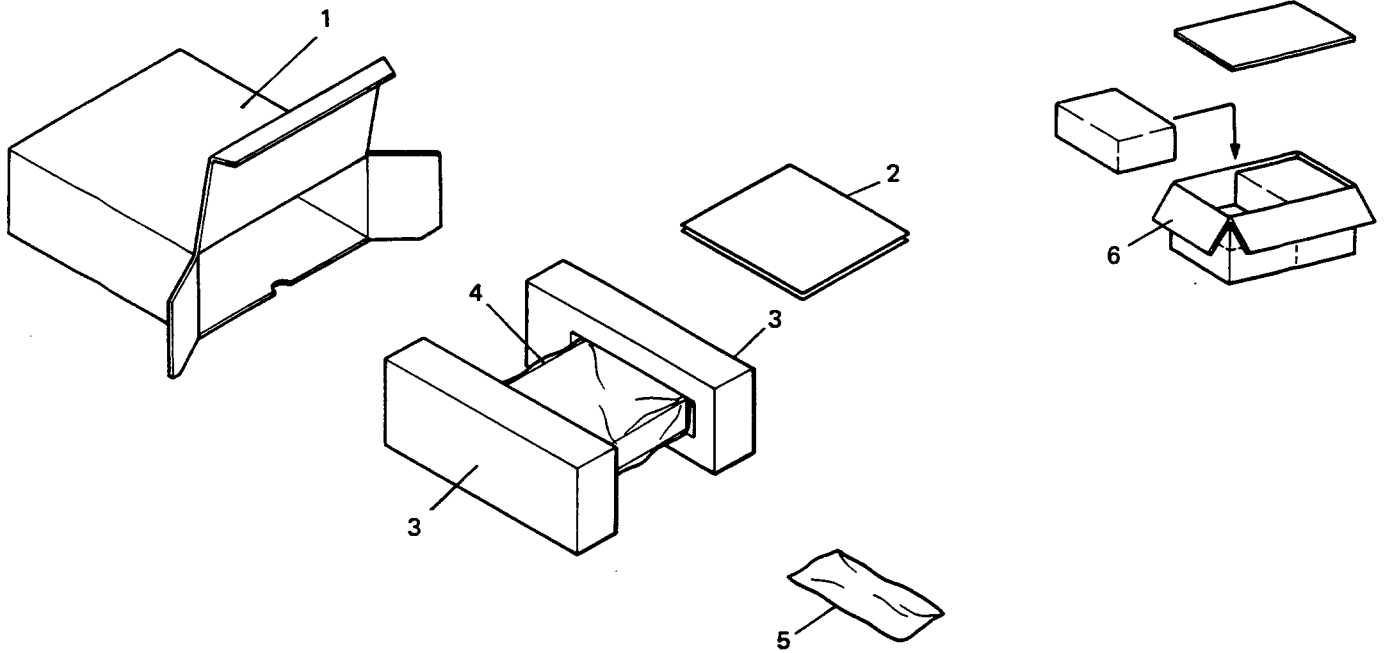


Fig. 33

●Parts List

Mark No.	Part No.	Description	Mark No.	Part No.	Description
1	CHG1469	Carton (GM-2000/ES)	5-1	CDE2106	Cord (GM-2000/ES)
	CHG1467	Carton (GM-2000/EV)		CDE2105	Cord (GM-2000/EV)
	CHG1468	Carton (GM-2000/UC)		CDE2107	Cord (GM-2000/UC)
	CHG1466	Carton (GM-1000/ES)		CDE2110	Cord (GM-1000/ES)
	CHG1464	Carton (GM-1000/EV)		CDE2109	Cord (GM-1000/EV)
	CHG1465	Carton (GM-1000/UC)		CDE2111	Cord (GM-1000/UC)
2	CRD1203	Owner's Manual (GM-2000/ES)	5-2	CDE1997	Cord Assy (GM-2000)
	CRD1200	Owner's Manual (GM-1000/ES)		CDE1840	Cord Assy (GM-1000)
		(English, French, Spanish, Arabic)	5-2-1		Cord (GM-2000)
	CRD1201	Owner's Manual (GM-2000/EV)	5-2-2		Cord (GM-2000)
	CRD1198	Owner's Manual (GM-1000/EV)	5-3	CDE2018	Cord (GM-2000)
		(English, French, German, Spanish, Swedish, Norwegian, Dutch, Italian)		CDE1836	Cord (GM-1000)
	CRD1202	Owner's Manual (GM-2000/UC)	5-4	CDE1846	DIN Connector (GM-2000/EV)
	CRD1199	Owner's Manual (GM-1000/UC)		CDE1847	DIN Connector (GM-1000/EV)
		(English, French)	5-5		Screw Kit
3	CHP1138	Styrofoam (GM-2000)	5-5-1	BMZ50P060FZK	Screw (X4)
	CHP1137	Styrofoam (GM-1000)	5-5-2	BTZ50P160FZK	Screw (X8)
4	CEG1042	Polyethylene Bag	5-6	CEA1345	Cover Assy (GM-2000)
5	CEA1336	Accessory Assy (GM-2000ES)	5-6-1		Cover (GM-2000)
	CEA1338	Accessory Assy (GM-2000EV)	5-6-2		Cover (GM-2000)
	CEA1339	Accessory Assy (GM-2000UC)	5-7	CNC2099	Bracket(X2)
	CEA1340	Accessory Assy (GM-1000ES)	6	CHL1468	Contain Box (GM-2000/UC)
	CEA1342	Accessory Assy (GM-1000EV)		CHL1465	Contain Box (GM-1000/UC)
	CEA1343	Accessory Assy (GM-1000UC)			