

# KENWOOD

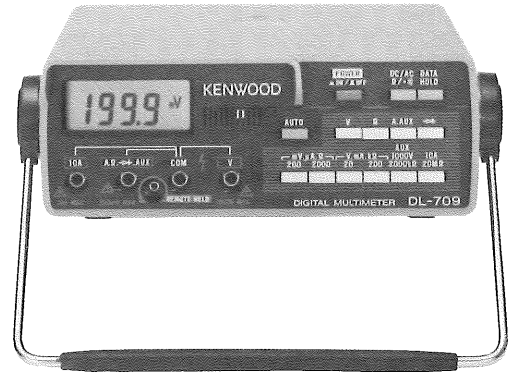
## DIGITAL MULTI-METER

# DL-707

# DL-708

# DL-709

# SERVICE MANUAL



## SPECIFICATIONS

### DC voltage Range automatic/manual

Range	Accuracy (at 23°±5°C, below 80% R.H.)			Resolution	Input impedance
	DL-709	DL-708	DL-707		
200mV	±0.1% of rdg ±2 digits	±0.25% of rdg ±2 digits	±0.5% of rdg ±2 digits	100 μV	1000 Megohms or more
2000mV	±0.1% of rdg ±1 digit	±0.25% of rdg ±1 digit	±0.5% of rdg ±1 digit	1mV	10MΩ ±2%
20 V				10mV	
200 V				100mV	
1000 V				1 V	

rdg : reading

Maximum permissible input 1,100V DC or 850V AC  
 Temperature coefficient 0°~18°C, 28°~40°C  
 DL-709 (±0.02 % of rdg ± 0.1 digit)/°C  
 DL-708 (±0.025% of rdg ± 0.1 digit)/°C  
 DL-707 (±0.03 % of rdg ± 0.1 digit)/°C  
 NMR 40 dB or more (50Hz, 60Hz)  
 CMR 100 dB or more (50Hz, 60Hz) RS=1kΩ

### AC voltage Range automatic/manual Mean value rectification (calibrated to rms value)

Range	Accuracy (at 23°±5°C, below 80% R.H.)			Resolution	Input impedance
	DL-709	DL-708	DL-707		
2000mV	±0.75% of rdg ±3 digits	±1% of rdg ±3 digits	±1% of rdg ±5 digits	1mV	10MΩ ±2%
20 V				10mV	
200 V				100mV	
750 V				1 V	

Maximum permissible input 1,100V DC or 850V AC  
 Frequency range 40~500 Hz  
 Temperature coefficient 0°~18°C, 28°~40°C  
 DL-709  
 DL-708 (±0.05% of rdg ± 0.3 digit)/°C  
 DL-707

### DC current Range manual

Range	Accuracy (at 23°±5°C, below 80% R.H.)			Resolution	Maximum permissible current
	DL-709	DL-708	DL-707		
200 μA	±0.75% of rdg ±1 digit	±0.75% of rdg ±1 digit	±1% of rdg ±1 digit	100 nA	200mA
2000 μA				1 μA	
20mA				10 μA	
200mA				100 μA	
10 A	±1% of rdg ±2 digits	±1% of rdg ±2 digits	±1.2% of rdg ±2 digits	10mA	10A

In the range of 200μA to 200mA, the instrument is protected from input current exceeding 200mA with a fuse.

Temperature coefficient 0°~18°C, 28°~40°C  
 DL-709  
 DL-708 (±0.05% of rdg ± 0.1 digit)/°C  
 DL-707

### AC current Range manual Mean value rectification (calibrated to rms value)

Range	Accuracy (at 23°±5°C, below 80% R.H.)			Resolution	Maximum permissible current
	DL-709	DL-708	DL-707		
200 μA	±1.2% of rdg ±3 digits	±1.2% of rdg ±3 digits	±1.5% of rdg ±5 digits	100 nA	200mA
2000 μA				1 μA	
20mA				10 μA	
200mA				100 μA	
10 A	±3 digits	±3 digits	±5 digits	10mA	10A

Frequency range 40~500 Hz  
 In the ranges of 200μA to 200mA, the instrument is protected from input current exceeding 200mA with a fuse.

Temperature coefficient 0°~18°C, 28°~40°C  
 DL-709  
 DL-708 (±0.1% of rdg ± 0.2 digit)/°C  
 DL-707

# SPECIFICATIONS

## Resistance Range automatic/manual

Range	Accuracy (at 23° ± 5°C, below 80% R.H.)			Resolution	Maximum permissible current
	DL-709	DL-708	DL-707		
200 Ω	±0.2% of rdg ±3 digits	±0.25% of rdg ±3 digits	±0.5% of rdg ±3 digits	100mΩ	0.55mA
2000 Ω	±0.2% of rdg ±1 digit	±0.25% of rdg ±1 digit	±0.5% of rdg ±1 digit	1 Ω	86 <sub>1</sub> μA
20 kΩ				10 Ω	22 <sub>1</sub> μA
200 kΩ				100 Ω	3.7 <sub>1</sub> μA
2000 kΩ	±1% of rdg ±1 digit	±1% of rdg ±1 digit	±1% of rdg ±1 digit	1kΩ	0.4 <sub>1</sub> μA
20MΩ	±2% of rdg ±2 digits	±2% of rdg ±2 digits	±2% of rdg ±2 digits	10kΩ	40nA

### Open terminal voltage

200 ohms range 1.8V or less

2000 ohms—20 megohms range 0.8V or less

Maximum permissible voltage ±250V DC/250Vrms

Temperature coefficient 0°~18°C, 28°~40°C

200 ohms — 200 kilohms range

DL-709 □ (±0.025% of rdg ±0.2 digit)/°C

DL-708 □ (±0.03% of rdg ±0.2 digit)/°C

2000 kilohms range

DL-709 □ (±0.05% of rdg ±0.2 digit)/°C

DL-708 □ (±0.05% of rdg ±0.2 digit)/°C

DL-707 □ (±0.05% of rdg ±0.2 digit)/°C

20 megohms range

DL-709 □ (±0.1% of rdg ±0.2 digit)/°C

DL-708 □ (±0.1% of rdg ±0.2 digit)/°C

DL-707 □ (±0.1% of rdg ±0.2 digit)/°C

### Continuity test

Test range 200 ohms range

Beeping occurs at 20 ± 10 ohms.

Fixed to 200Ω range by "Ω/●)" switch regardless of the range switch setting.

### Diode check

Test current Approx. 1mA ± 5% (when shorted, supply voltage : 6.0V)

Reading accuracy ±5% of rdg ± 1 digit

Open terminal voltage Approx. 2.7V ± 10% (supply voltage : 6.0V)

Display FE-type LCD panel (displaying unit mark)

Maximum reading 1999 or —1999

Operation By integration with drift compensated

Polarity Automatic selection

Overflow indication 1 or —1 appears at MSD position (decimal point and unit displayed)

Range selection Automatic/manual (manual only for AC/DC current)  
Automatic switching  
UP level exceeding 1999  
DOWN level below 179

Sampling time Approx. 500msec/sample

Supply power Dry cells (SUM-2) × 4 or external supply power 4.5~9V, less than 10mA.

Battery service life Approx. 1000 operating hours continuously (with manganese battery) Mark "B" appears on the liquid crystal display when the battery voltage has fallen.

Power consumption Less than 20mW (with buzzer operating)

Withstand voltage ±500V DC (across the COM terminal and ground)

Weight Approx. 610g (batteries included)

Dimensions (162)W × (60)H × (130)D mm

Temperature and humidity ranges for guaranteed accuracy

23° ± 5°C, under 80% R.H.

Operating temperature and humidity ranges

0° to 40°C, under 80% R.H.

Accessories Input leads ... 1 set  
Instruction manual ... 1  
Manganese batteries SUM-2 ... 4  
Fuse ... 1

# BLOCK DIAGRAM/CIRCUIT DESCRIPTION

## BLOCK DIAGRAM

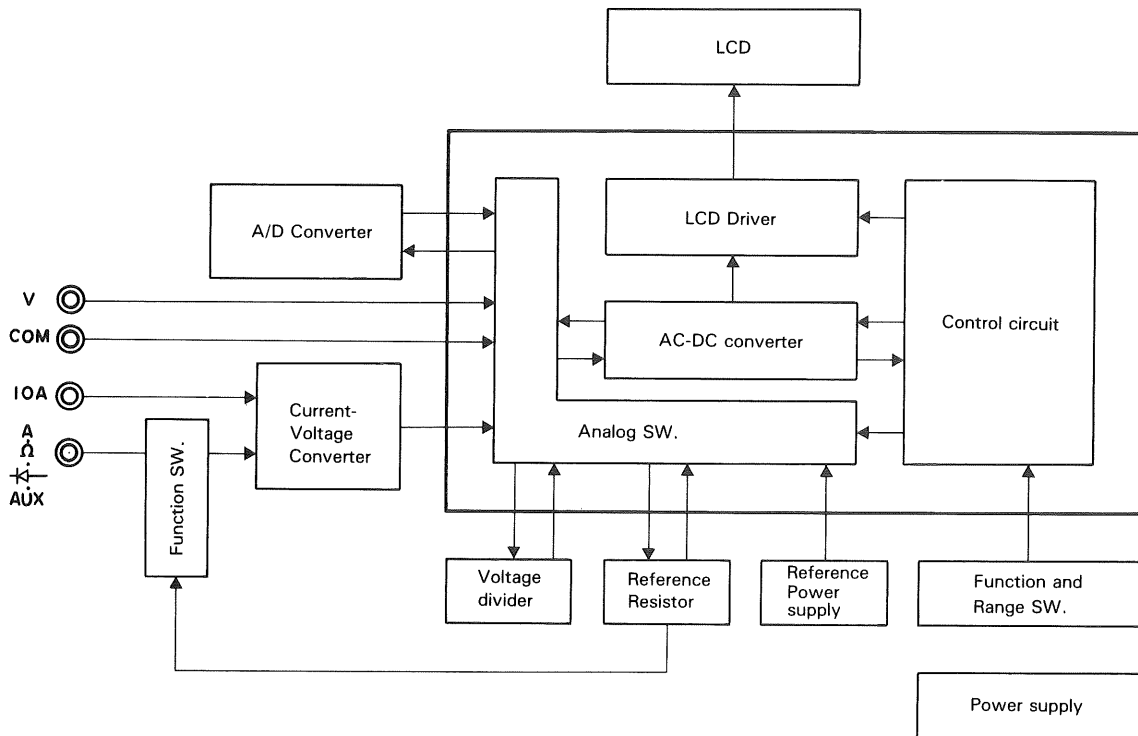


Fig. 1

## CIRCUIT DESCRIPTION

A custom IC A/D converter is used, making the peripheral circuits simple and providing voltage and resistance auto range select function, etc.

### °Voltage measuring circuit

The internal analog switch is turned ON/OFF to select the dividing ratio.

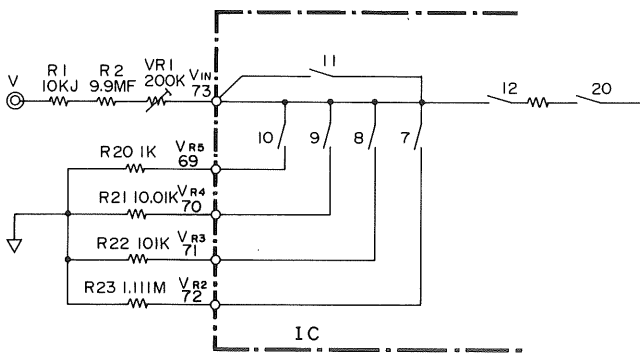


Fig. 2

### °Resistance measuring circuit

The internal analog switch is turned ON/OFF to select the reference resistance. The open voltage for 200  $\Omega$  range is  $V_{DD}$ . For other ranges, the open voltage is  $V_{REF}$  (approx. 0.65 V). R33-R38 are reference resistors for resistance measuring range.

The voltage drop due to the measuring sample resistor is applied to A/D converter via  $R_{Vx}$ . The voltage drop due to the reference resistor is applied to voltage inverter circuit via  $R_{Vs}$ , then applied to A/D converter.

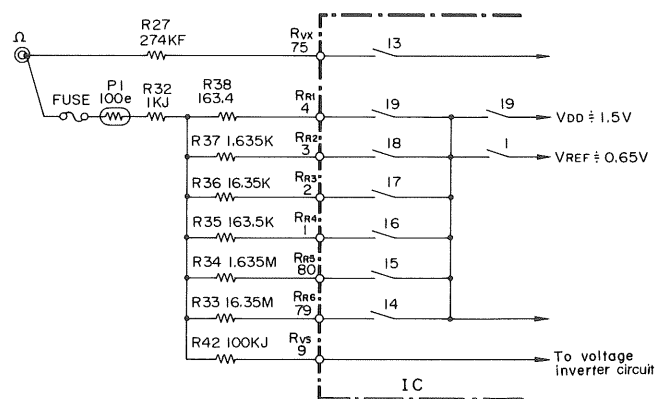


Fig. 3

# CIRCUIT DESCRIPTION

## ° Current measuring circuit (Current-Voltage Converter)

The measuring range can be selected by the external switch. The R4-R8 are resistors for current detection.

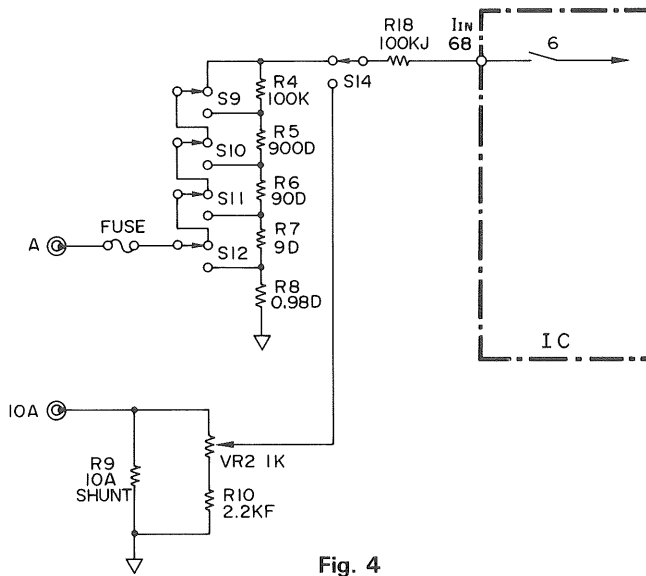


Fig. 4

## ° Reference voltage section (Part of dual-slope integral circuit)

The reference voltage section supplies the positive voltage  $V_{REF}$ . The  $V_{REF}$  is adjusted by VR7 to obtain approx. 0.164 V. Next, the  $V_{REF}$  is about 0.65 V and is used for OHM open voltage (except 200  $\Omega$  range) and Lo BATT detection.

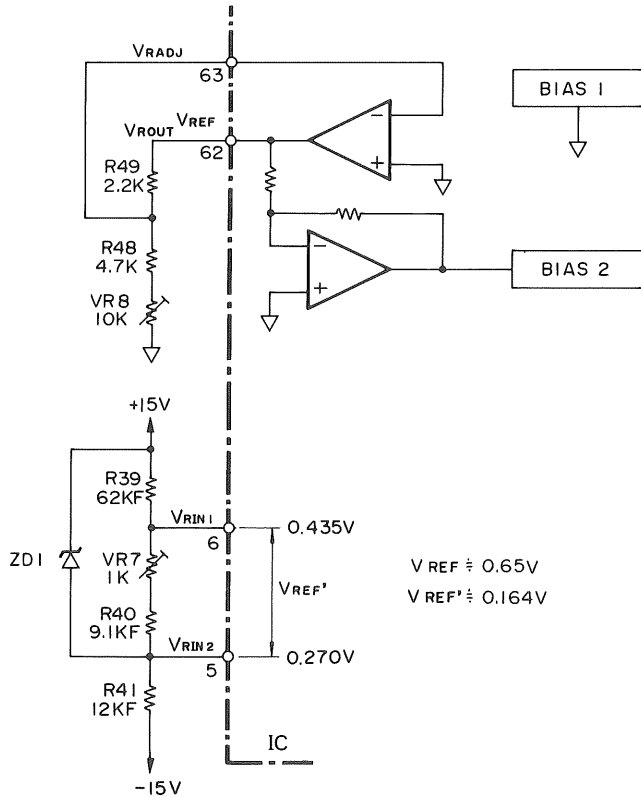


Fig. 5

## ° Voltage inverter (part of dual-slope integral circuit)

In the voltage inverter, the positive reference signal  $V_{REF'}$  is inverted. For resistance measurement, the voltage drop of the reference resistor is inverted.

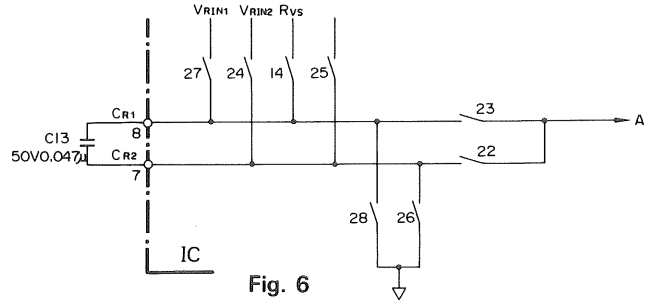


Fig. 6

## ° A/D converter

This A/D converter, referred to as dual slope integral type, converts the analog signal into the digital signal with a timing divided into auto zero, input integral and reverse integral sections.

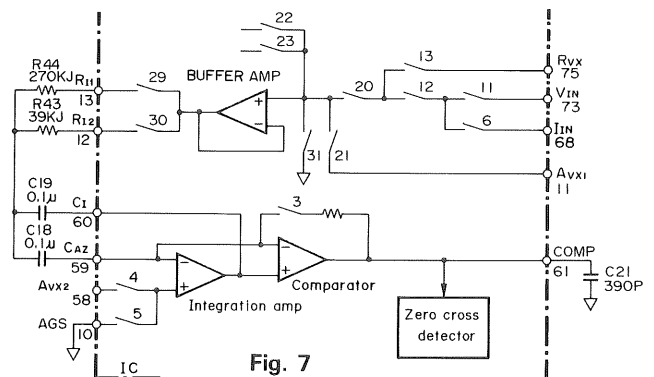


Fig. 7

## ° Rectifier section (AC-DC converter circuit)

In AC function mode, the internal analog switch (33) turns ON.

The signal from voltage and current measuring circuits of the attenuator section is applied to coupling capacitor C9. The negative potential output of the total waveform rectifier circuit is applied to  $A_{VX2}$  and the positive potential output of the total waveform rectifier circuit is applied to  $A_{VX1}$ .

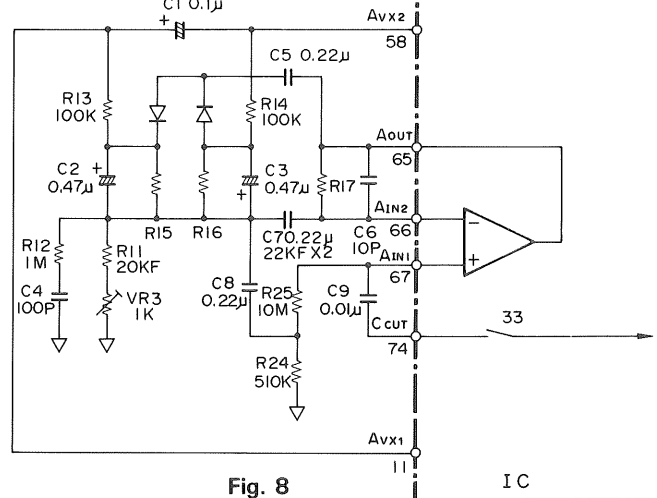


Fig. 8

# CIRCUIT DESCRIPTION

## ° Display converter

The display converter section consists of the sections which generate display drive signals.

The 1/3 duty illumination system is employed to reduce the number of pins.

The relation between the COM and segment pins is as shown in the figure.

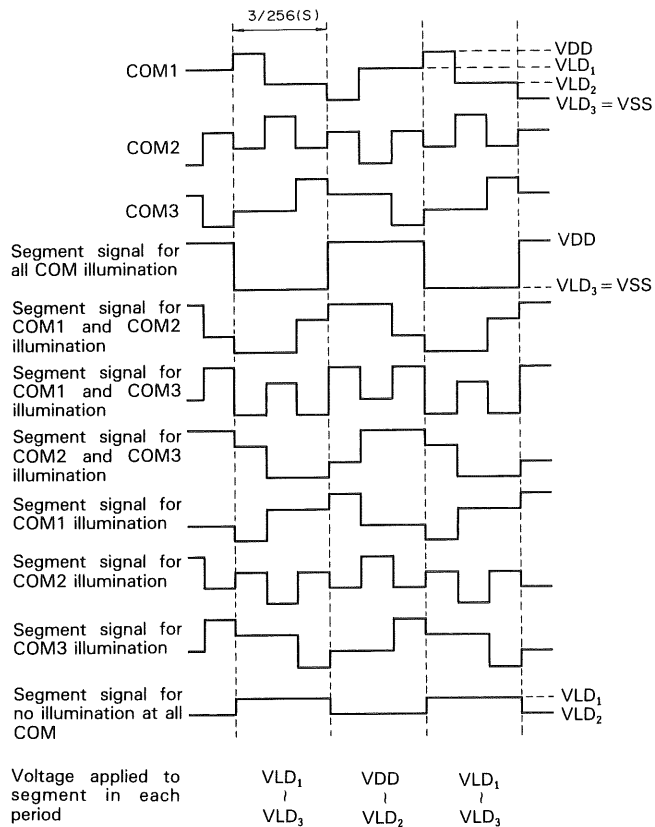


Fig. 9

## ° Low BATT detector

The low battery condition is detected by comparing divided  $V_{DD}$  and  $V_{REF}$  as shown in Fig.

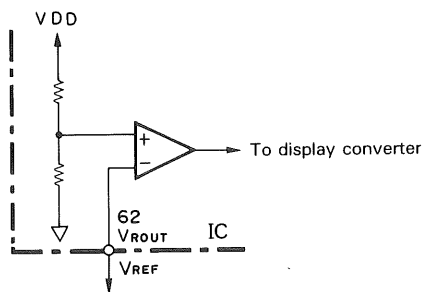


Fig. 10

## ° Booster

The booster supplies the control voltage  $V_{SS2}$  of internal IC analog switch. The circuit is composed of IC and external capacitors C16 and C17.

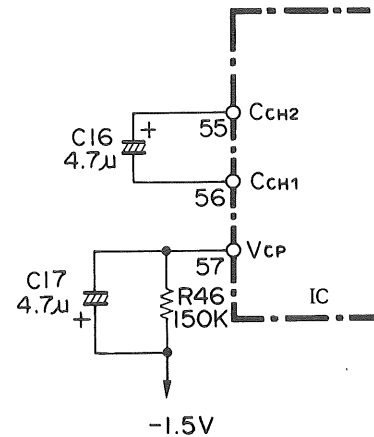


Fig. 11

## ° Buzzer section

The voltage drop due to the sample resistor and the conductive check reference voltage " $V_{CH}$ " are compared in the conductive check comparator and a square waveform of 4069 Hz is output at buzzer output pin.

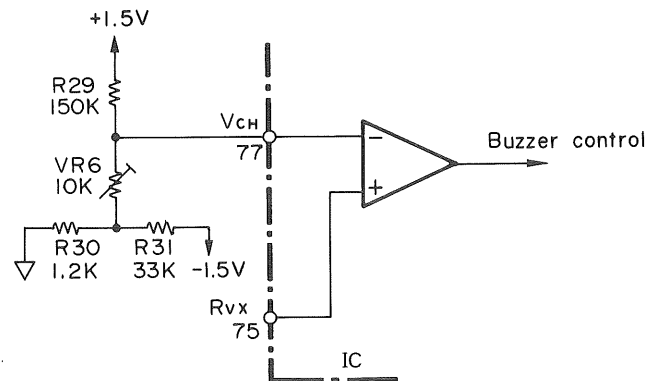


Fig. 12

# ADJUSTMENT

## CALIBRATOR LIST

### DC Calibrator:

Voltage Range: 0.1 mV to 1000 V  
Accuracy:  $\pm 0.01\%$  more than

### Standard Resistor:

Resistor Range: 0.1  $\Omega$  to 20 M $\Omega$   
Accuracy:  $\pm 0.02\%$  more than

### AC Calibrator:

Voltage Range: 1 mV to 750 V RMS  
Accuracy:  $\pm 0.1\%$  more than (40 ~ 500 Hz)

### Digital Multi-Meter (for watch and compare):

4 2/1 class more than (exp. 8600 A: by Fluke)

### DC Current Calibrator:

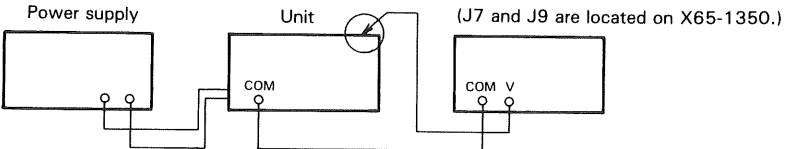
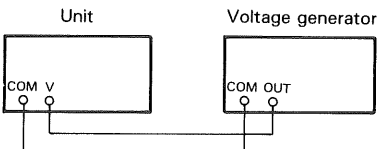
Current Range: 0.1  $\mu$ A to 10 A  
Accuracy:  $\pm 0.1\%$  more than

**Caution:** Be sure to use a signal generator whose accuracy is one-digit higher than the one indicated in the specifications.

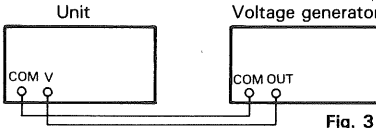
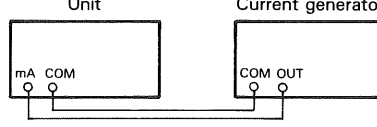
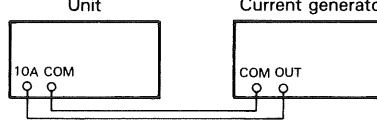
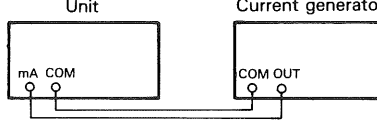
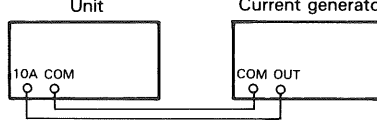
### AC Current Calibrator:

Current Range: 0.1  $\mu$ A to 10 A  
Accuracy:  $\pm 0.1\%$  more than (40 ~ 500 Hz)

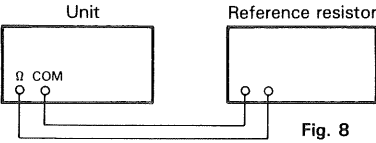
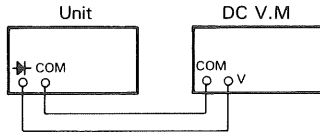
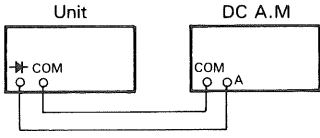
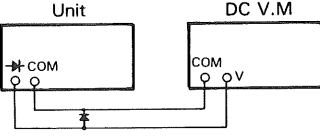
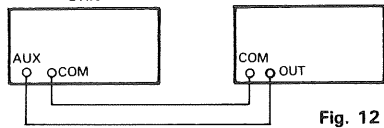
## ADJUSTMENT

Item	Measuring instruments		Connection	Unit				
	Instrument used	Setting		Unit setting	Adjustment	Checking		
1-a Power supply adjustment	1)	DC V M	2 V	Connect a DC voltmeter to COM and J7 of the unit (Fig. 1).	FUNCTION: V	POWER ON	VR9	The DC voltmeter should read 1.5V.
	2)					Connect a DC voltmeter to COM and J9 of the unit (Fig. 1).	—	The DC voltmeter should read -1.4 V ~ -1.6 V.
1-b Lo BATT adjustment	3)	DC regulated power supply	4.45 V (Check with the DC voltmeter.)	Connect the output of the DC regulated power supply to the external power supply jack of the unit.	FUNCTION: V	RANGE: 2000 mV	VR8	Adjust so that the display shows "B".
	4)							4.55 V
	5)	Repeat steps (3) and (4) so that both adjustment is completed.						
When connecting external DC regulated power supply, a power supply of DC 6 V is required.				 <p style="text-align: center;">Fig. 1</p>				
2. DC power voltage adjustment	1)	Voltage generator	—	Connect the output of the voltage generator to V terminal of the unit (Fig. 2)	FUNCTION: V MODE: DC	RANGE: 200 mV INPUT: SHORT	—	0 V
	2)		190.0 mV			RANGE: 200 mV	VR7	190.0 mV
	3)		19.00 V			RANGE: 20 V	VR1	19.00 V
	4)		1900 mV			RANGE: 2000 mV	VR5 (DL-709 only)	1900 mV
	5)		190.0 V			RANGE: 200 V	—	190.0 V
	6)		1000 V			RANGE: 1000 V	VR4 (DL-709 only)	1.000 V
	Indicaion error check with a voltage					 <p style="text-align: center;">Fig. 2</p>		

# ADJUSTMENT

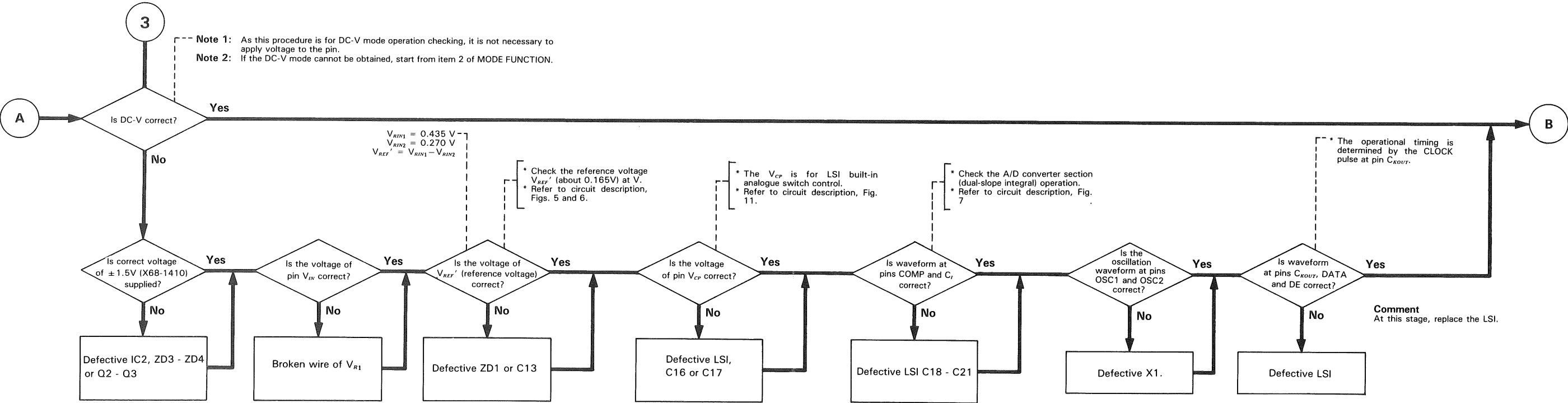
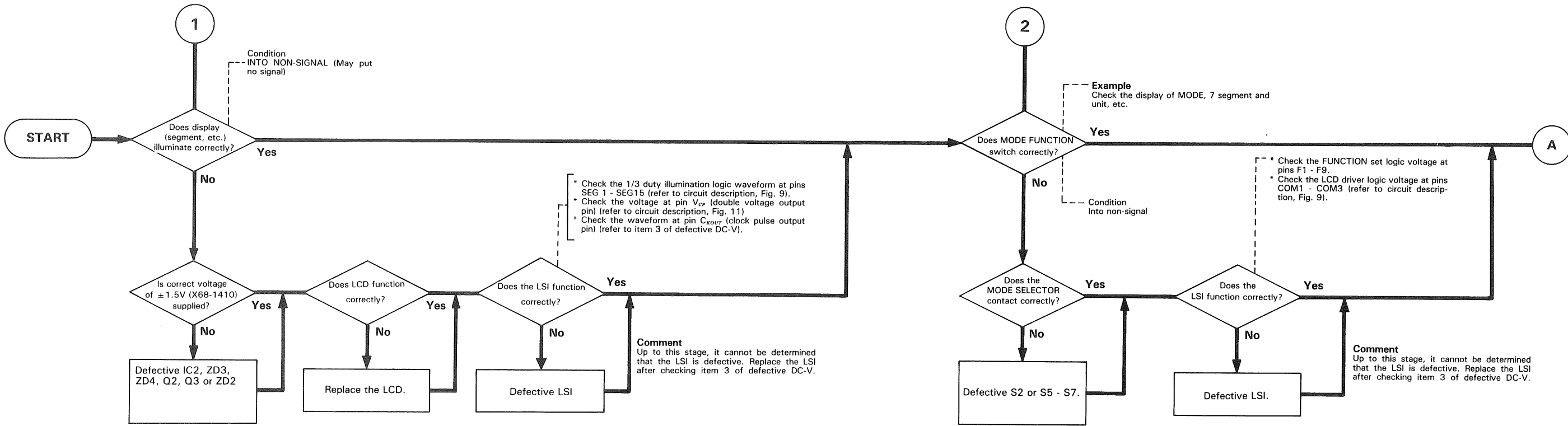
Item	Measuring instruments		Connection	Unit			
	Instrument used	Setting		Unit setting	Adjustment	Checking	
3. AC voltage adjustment	1)	Voltage generator	Connect the output of the voltage generator to V terminal of the unit (Fig. 3)	FUNCTION: V MODE: AC	RANGE: 2000 mV INPUT: SHORT	—	0 V
	2)				RANGE: 2000 mV	VR3	1900 mV
	3)				RANGE: 20 V	—	19.00 V
	4)				RANGE: 200 V	—	190.0 V
	5)				RANGE: 1000 V	—	750 V
	 <p style="text-align: center;">Unit                  Voltage generator</p> <p style="text-align: center;">COM V                  COM OUT</p> <p style="text-align: center;">Fig. 3</p>				Select DC or AC with mode switch. In AC mode, "AC" is displayed.		
4. DC current adjustment	1)	Current generator	Connect the output of the current generator to mA terminal of the unit (Fig. 4).	FUNCTION: A MODE: DC	RANGE: 200 $\mu$ A	—	190.0 $\mu$ A
	2)				RANGE: 2000 $\mu$ A	—	1900 $\mu$ A
	3)				RANGE: 20 mA	—	19.00 mA
	4)				RANGE: 200 mA	—	190.0 mA
	5)	10.00 A	Connect the output of the current generator to 10 A terminal of the unit (Fig. 5).		RANGE: 10 A	VR2	10.00 A
	 <p style="text-align: center;">Unit                  Current generator</p> <p style="text-align: center;">mA COM                  COM OUT</p> <p style="text-align: center;">Fig. 4</p>  <p style="text-align: center;">Unit                  Current generator</p> <p style="text-align: center;">10A COM                  COM OUT</p> <p style="text-align: center;">Fig. 5</p>						
5. AC current adjustment	1)	Current generator	Connect the output of the current generator to mA terminal of the unit (Fig. 6).	FUNCTION: A MODE: AC	RANGE: 200 $\mu$ A	—	190.0 $\mu$ A
	2)				RANGE: 2000 $\mu$ A	—	1900 $\mu$ A
	3)				RANGE: 20 mA	—	19.00 mA
	4)				RANGE: 200 mA	—	190.0 mA
	5)	10.00 A 100 Hz	Connect the output of the current generator to 10 A terminal of the unit (Fig. 7).		RANGE: 10 A	—	10.00 A 100 Hz
	 <p style="text-align: center;">Unit                  Current generator</p> <p style="text-align: center;">mA COM                  COM OUT</p> <p style="text-align: center;">Fig. 6</p>  <p style="text-align: center;">Unit                  Current generator</p> <p style="text-align: center;">10A COM                  COM OUT</p> <p style="text-align: center;">Fig. 7</p>						

# ADJUSTMENT

Item	Measuring instruments		Connection	Unit				
	Instrument used	Setting		Unit setting	Adjustment	Checking		
6-a Resistance adjustment	1)	Reference resistor	Connect the output of the reference resistor to $\Omega$ terminal of the unit (Fig. 8).	FUNCTION: $\Omega$ MODE: $\Omega$	RANGE: 200 $\Omega$ INPUT: SHORT	—	0	
	2)				200 $\Omega$	—	190.0 $\Omega$	
	3)				2000 $\Omega$	—	1900 $\Omega$	
	4)				20 k $\Omega$	—	19.00 k $\Omega$	
	5)				200 k $\Omega$	—	190.0 k $\Omega$	
	6)				2000 k $\Omega$	—	1900 k $\Omega$	
	7)				20 M $\Omega$	—	19.00 M $\Omega$	
6-b Buzzer sound adjustment	8)	10 $\Omega$		FUNCTION: $\Omega$ MODE: $\Omega$	Regardless of the range selector switch setting	VR6	Adjust so that the buzzer sounds.	
	9)	20 $\Omega$			Fixed at 200 $\Omega$ range.	VR6	Adjust so that the buzzer does not sound.	
10) Repeat steps (8) and (9) so that both adjustment is completed.								
				 <p style="text-align: center;">Fig. 8</p>				
				Select $\Omega$ or $\Omega$ with mode switch. In $\Omega$ mode, " $\Omega$ " is displayed.				
7. Diode check	1)	DC V.M	Connect the DC voltmeter to $\rightarrow$ terminal of the unit (Fig. 9).	FUNCTION: $\rightarrow$	INPUT: SHORT	—	0 V	
	2)				20 V			Over indication. Check the DC voltmeter reading (about 2.7 V).
	3)	DC current meter	20 mA		Connect the DC current meter to $\rightarrow$ terminal of the unit (Fig. 10).	—	—	Check the DC voltmeter current (about 1 mA).
	4)	DC V.M	2 V		Connect the DC voltmeter to $\rightarrow$ terminal and connect a diode between the $\rightarrow$ terminal and COM terminal in series (Fig. 11).	—	—	Check that the error between the unit and DC voltmeter reading is $\pm 5\%$ ( $\pm 1$ digit) of the DC voltmeter.
 <p style="text-align: center;">Fig. 9</p>				 <p style="text-align: center;">Fig. 10</p>				
 <p style="text-align: center;">Fig. 11</p>								
8. AUX	1)	DC voltage generator	Connect the DC or AC voltage generator to AUX terminal of the unit (Fig. 12).	FUNCTION: AUX RANGE: AUX	RANGE: DC		190.0	
	2)	AC voltage generator			190.0 mV 100 Hz	MODE: AC	—	190.0
 <p style="text-align: center;">Fig. 12</p>								

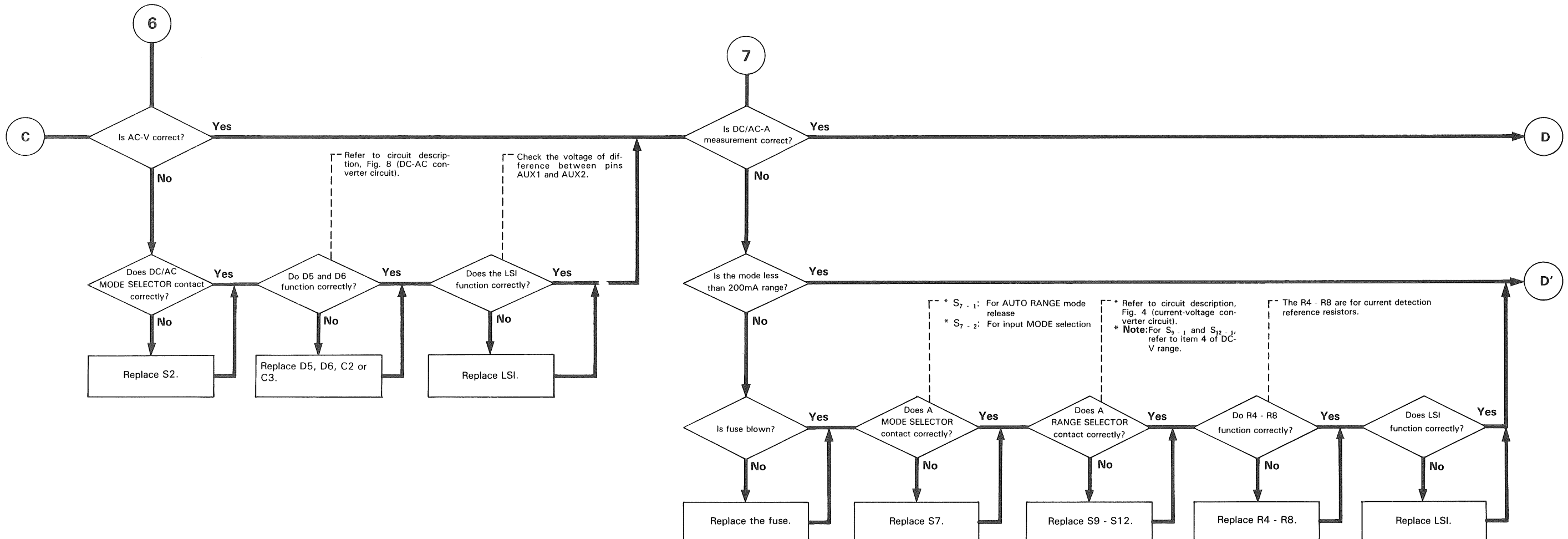
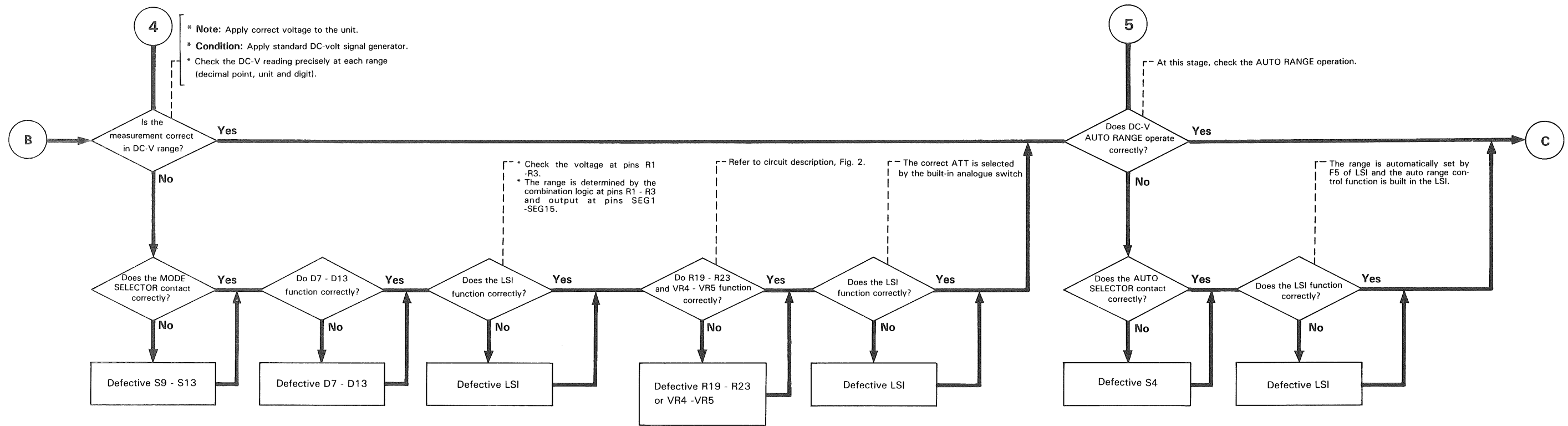


# TROUBLESHOOTING



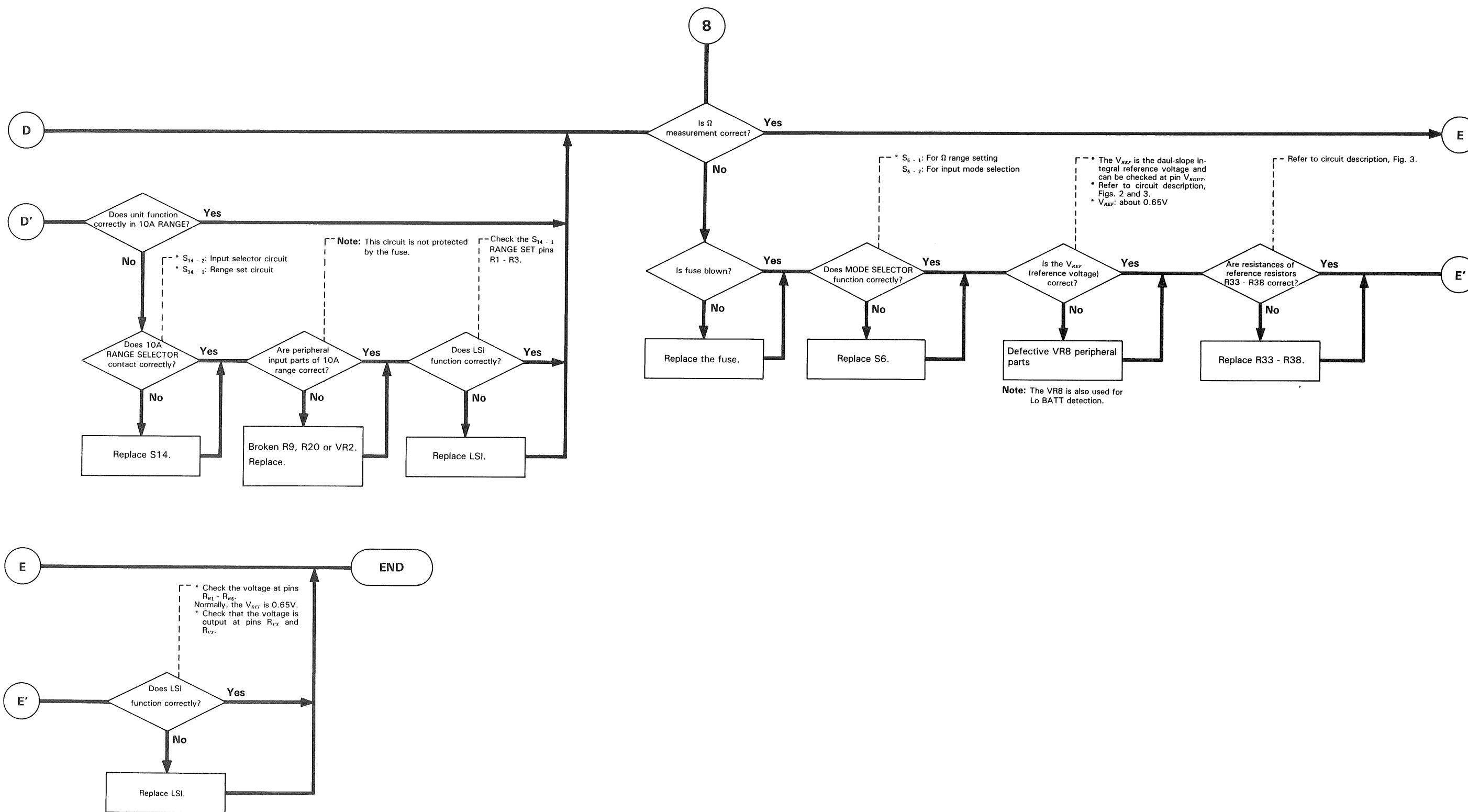
**Note:** SEG 1 - SEG 15, COM 1 - COM 3, V<sub>IN</sub>, V<sub>CP</sub>, COMP, C<sub>I</sub>, OSC 1, OSC 2, C<sub>KOUT</sub>, DATE, DE, etc. stand for the terminal name of the LSI.

# TROUBLESHOOTING

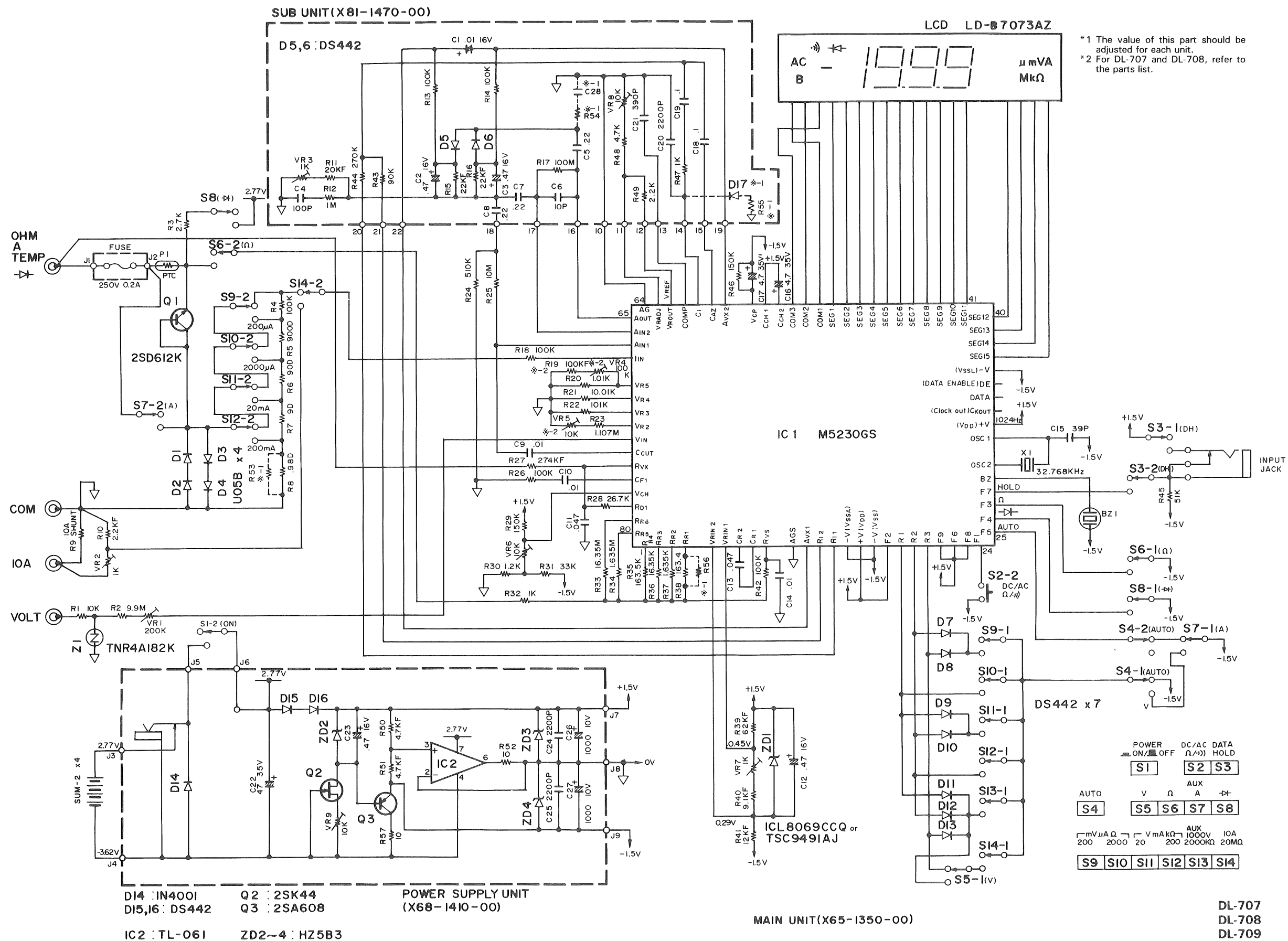


**Note:** Be sure to use a 0.2A (250V) fuse.  
Less than 5 Ω: DC resistance

# TROUBLESHOOTING



# SCHEMATIC DIAGRAM



\*1 The value of this part should be adjusted for each unit.  
\*2 For DL-707 and DL-708, refer to the parts list.

## DC voltage

Range automatic/manual

Range	Accuracy (at 23° ± 5°C, below 80% R.H.)		
	DL-709	DL-708	DL-707
200mV	±0.1% of rdg ± 2 digits	±0.25% of rdg ± 2 digits	±0.5% of rdg ± 2 digits
2000mV			
20 V	±0.1% of rdg	±0.25% of rdg	±0.5% of rdg
200 V	± 1 digit	± 1 digit	± 1 digit
1000 V			

## AC voltage

Range automatic/manual

Mean value rectification (calibrated to rms value)

Range	Accuracy (at 23° ± 5°C, below 80% R.H.)		
	DL-709	DL-708	DL-707
2000mV			
20 V	±0.75% of rdg	± 1% of rdg	± 1% of rdg
200 V	± 3 digits	± 3 digits	± 5 digits
750 V			

## DC current

Range manual

Range	Accuracy (at 23° ± 5°C, below 80% R.H.)		
	DL-709	DL-708	DL-707
200 μA			
2000 μA	±0.75% of rdg	±0.75% of rdg	± 1% of rdg
20mA	± 1 digit	± 1 digit	± 1 digit
200mA			
10 A	± 1% of rdg ± 2 digits	± 1% of rdg ± 2 digits	± 1.2% of rdg ± 2 digits

## AC current

Range manual

Mean value rectification (calibrated to rms value)

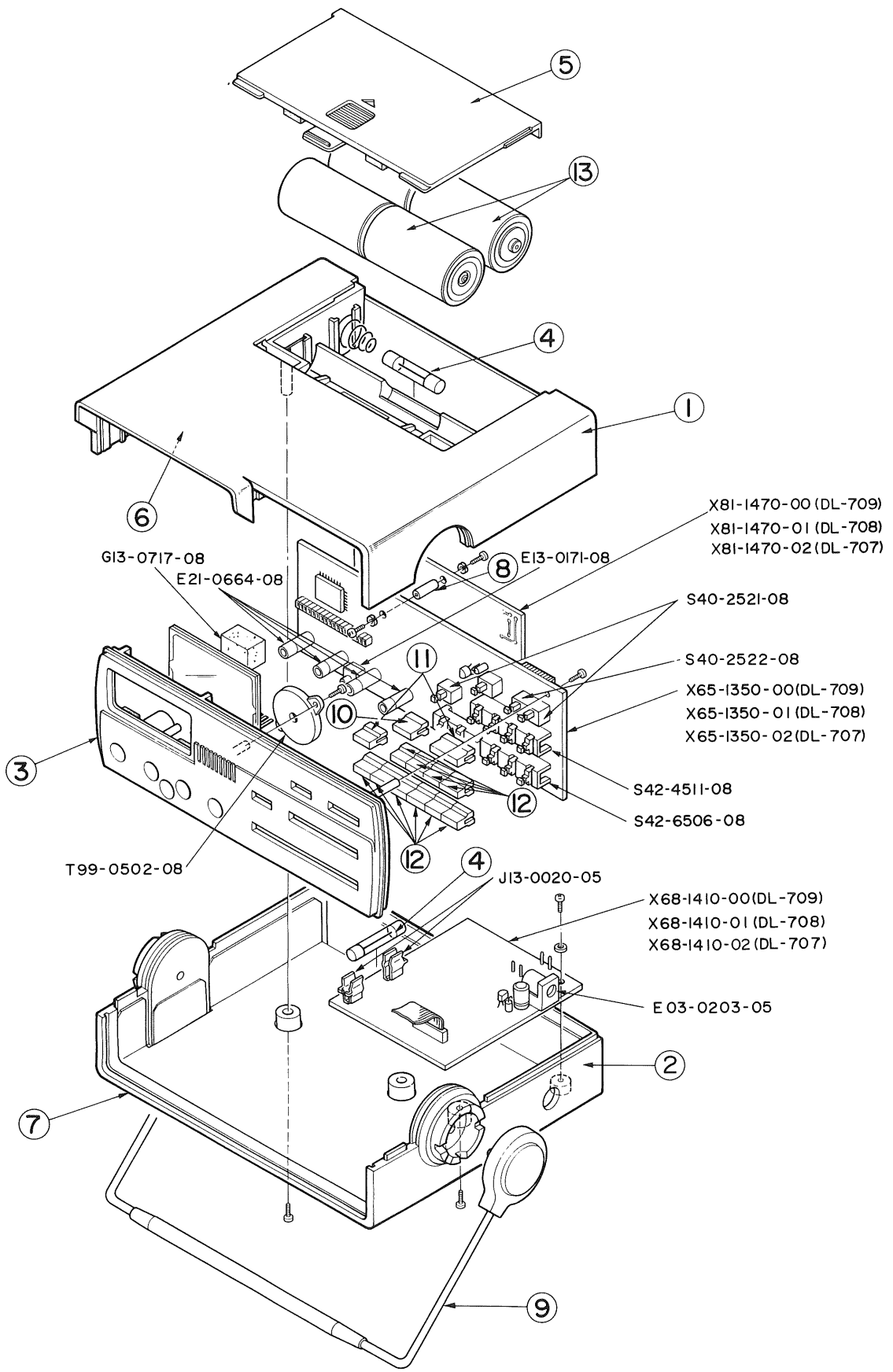
Range	Accuracy (at 23° ± 5°C, below 80% R.H.)		
	DL-709	DL-708	DL-707
200 μA			
2000 μA	± 1% of rdg ± 3 digits	± 1% of rdg ± 3 digits	± 1.2% of rdg ± 5 digits
20mA			
200mA	± 1.2% of rdg	± 1.2% of rdg	± 1.5% of rdg
10 A	± 3 digits	± 3 digits	± 5 digits

## Resistance

Range automatic/manual

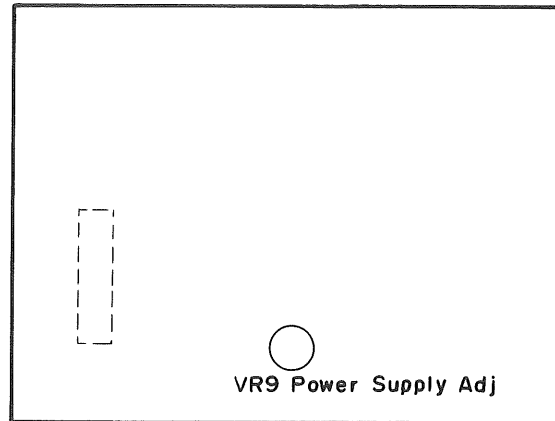
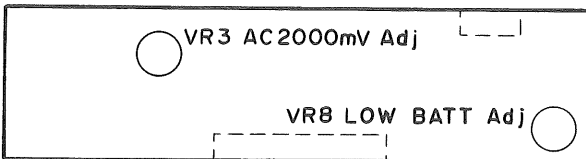
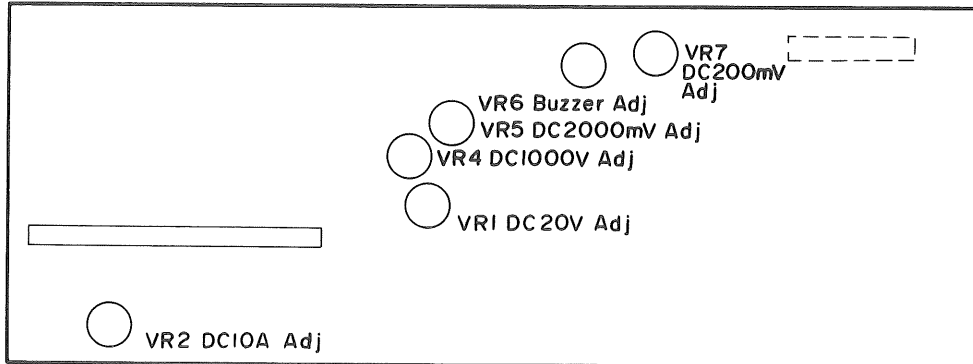
Range	Accuracy (at 23° ± 5°C, below 80% R.H.)		
	DL-709	DL-708	DL-707
200 Ω	±0.2% of rdg ± 3 digits	±0.25% of rdg ± 3 digits	±0.5% of rdg ± 3 digits
2000 Ω			
20 kΩ	±0.2% of rdg	±0.25% of rdg	±0.5% of rdg
200 kΩ	± 1 digit	± 1 digit	± 1 digit
2000 kΩ	± 1% of rdg ± 1 digit	± 1% of rdg ± 1 digit	± 1% of rdg ± 1 digit
20MΩ	± 2% of rdg ± 2 digits	± 2% of rdg ± 2 digits	± 2% of rdg ± 2 digits

# DISASSEMBLY

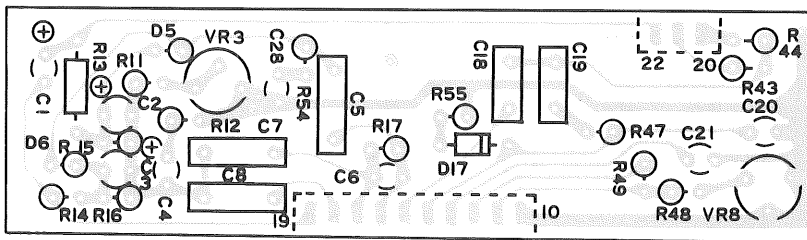


# ADJUSTMENT POINT/PC BOARD

## ADJUSTMENT POINT

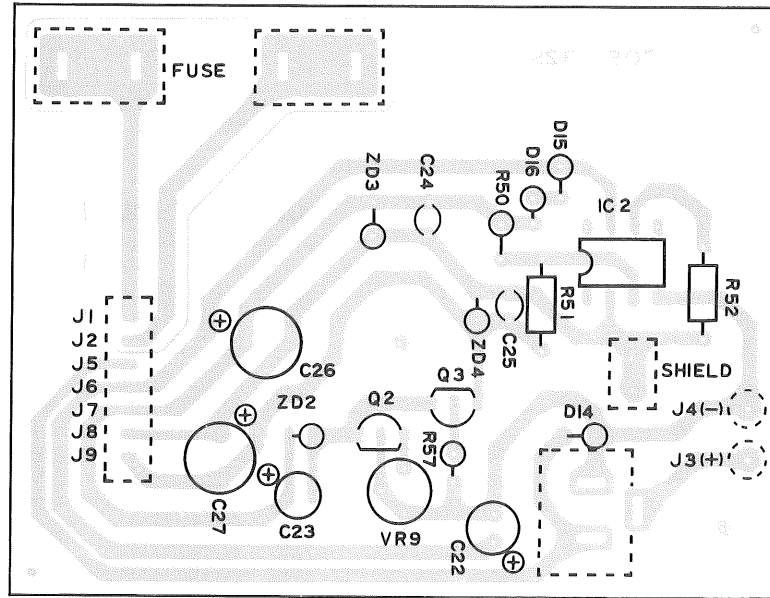


## SUB UNIT (X81-1470-00)

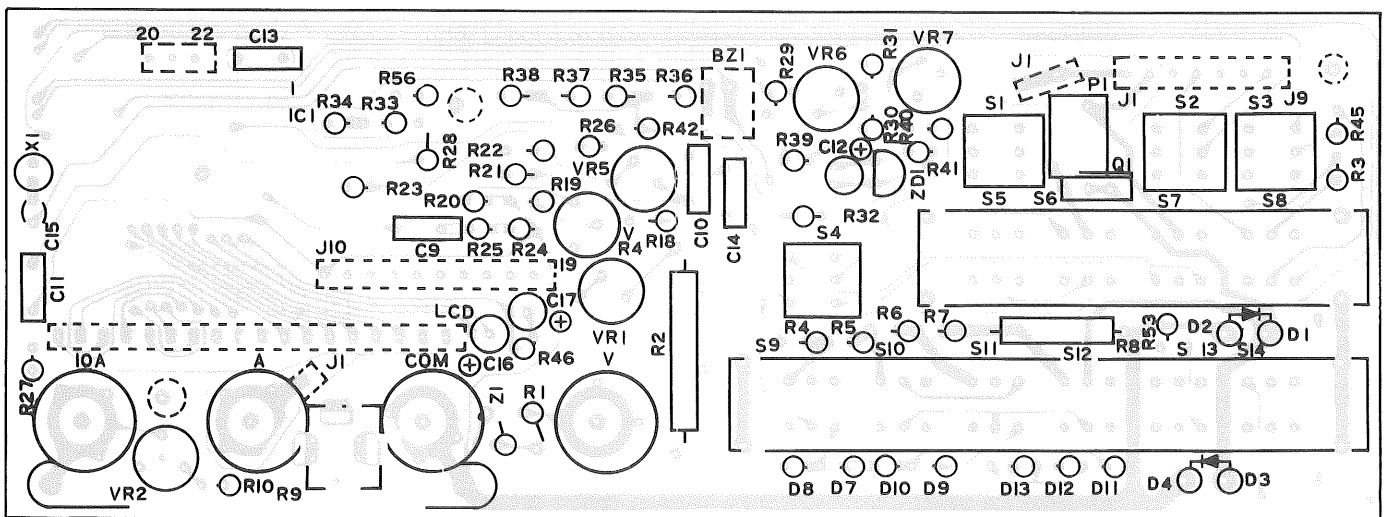


# PC BOARD

## POWER SUPPLY UNIT (X68-1410-00)



## MAIN PCB UNIT (X65-1350-00)



# PARTS LIST

## DL-709 UNIT

Y80-1270-21		
REF. NO	PARTS NO	NAME & DESCRIPTION
1	A02-0513-12	CASE ASS'Y (TOP)
2	A02-0514-02	CASE ASS'Y (BOTTOM)
3	A20-2771-12	PANEL ASS'Y
	B42-1912-04	S/NO. PLATE
	B50-7547-10	INSTRUCTION MANUAL
	E02-0138-08	SEMICONDUCTOR SOCKET
	E30-1863-08	TEST LEAD 1 SET
4	F05-2019-05	FUSE 0.2A
5	F07-0926-03	BATTERY COVER
6	F10-1573-08	SHIELD PLATE (TOP)
7	F10-1574-08	SHIELD PLATE (BOTTOM)
	H01-5730-04	CARTON BOX
	H10-2808-13	FOAMED STYRENE PAD (R)
	H10-2809-03	FOAMED STYRENE PAD (L)
	H19-0505-04	HOLDER FOR BATTERY
	H25-0078-04	VINYL BAG
8	J32-0843-08	METAL FITTINGS
9	K01-0509-03	HANDLE
10	K29-0805-08	KNDB (RED)
11	K29-0806-08	KNDB (GRAY)
12	K29-0807-08	KNDB (WHITE)
	N16-0023-46	SPRING WASHER
	N30-2305-46	SCREW, PAN HD M 2X4
	N50-2005-46	TAPPING SCREW M 2X5
	N50-2305-46	TAPPING SCREW M 2.3X5
	N89-3010-46	SCREW, BINDING TAP TITE
13	UM-2	BATTERY
	X65-1350-00	MAIN UNIT
	X68-1410-00	POWER SUPPLY UNIT
	X81-1470-00	SUB UNIT

## DL-708 UNIT

Y80-1260-21		
REF. NO	PARTS NO	NAME & DESCRIPTION
1	A02-0513-12	CASE ASS'Y (TOP)
2	A02-0514-02	CASE ASS'Y (BOTTOM)
3	A20-2770-12	PANEL ASS'Y
	B42-1912-04	S/NO. PLATE
	B50-7547-10	INSTRUCTION MANUAL
	E02-0138-08	SEMICONDUCTOR SOCKET
	E30-1863-08	TEST LEAD 1 SET
4	F05-2019-05	FUSE 0.2A
5	F07-0926-03	BATTERY COVER
6	F10-1573-08	SHIELD PLATE (TOP)
7	F10-1574-08	SHIELD PLATE (BOTTOM)
	H01-5729-04	CARTON BOX
	H10-2808-13	FOAMED STYRENE PAD (R)
	H10-2809-03	FOAMED STYRENE PAD (L)
	H19-0505-04	HOLDER FOR BATTERY
	H25-0078-04	VINYL BAG
8	J32-0843-08	METAL FITTINGS
9	K01-0509-03	HANDLE
10	K29-0805-08	KNDB (RED)
11	K29-0806-08	KNDB (GRAY)
12	K29-0807-08	KNDB (WHITE)
	N16-0023-46	SPRING WASHER
	N30-2305-46	SCREW, PAN HD M 2X4
	N50-2005-46	TAPPING SCREW M 2X5
	N50-2305-46	TAPPING SCREW M 2.3X5
	N89-3010-46	SCREW, BINDING TAP TITE
13	UM-2	BATTERY
	X65-1350-01	MAIN UNIT
	X68-1410-01	POWER SUPPLY UNIT
	X81-1470-00	SUB UNIT

## DL-707 UNIT

Y80-1250-21		
REF. NO	PARTS NO	NAME & DESCRIPTION
1	A02-0513-12	CASE ASS'Y (TOP)
2	A02-0514-02	CASE ASS'Y (BOTTOM)
3	A20-2769-12	PANEL ASS'Y
	B42-1912-04	S/NO. PLATE
	B50-7547-10	INSTRUCTION MANUAL
	E02-0138-08	SEMICONDUCTOR SOCKET
	E30-1863-08	TEST LEAD 1 SET
4	F05-2019-05	FUSE 0.2A
5	F07-0926-03	BATTERY COVER
6	F10-1573-08	SHIELD PLATE (TOP)
7	F10-1574-08	SHIELD PLATE (BOTTOM)
	H01-5728-04	CARTON BOX
	H10-2808-13	FOAMED STYRENE PAD (R)
	H10-2809-03	FOAMED STYRENE PAD (L)
	H19-0505-04	HOLDER FOR BATTERY
	H25-0078-04	VINYL BAG
8	J32-0843-08	METAL FITTINGS

REF. NO	PARTS NO	NAME & DESCRIPTION
9	K01-0509-03	HANDLE
10	K29-0805-08	KNDB (RED)
11	K29-0806-08	KNDB (GRAY)
12	K29-0807-08	KNDB (WHITE)
	N16-0023-46	SPRING WASHER
	N30-2305-46	SCREW, PAN HD M 2X4
	N50-2005-46	TAPPING SCREW M 2X5
	N50-2305-46	TAPPING SCREW M 2.3X5
	N89-3010-46	SCREW, BINDING TAP TITE
13	UM-2	BATTERY
	X65-1350-02	MAIN UNIT
	X68-1410-02	POWER SUPPLY UNIT
	X81-1470-00	SUB UNIT

## MAIN UNIT (DL-709)

X65-1350-00				
REF. NO	PARTS NO	NAME & DESCRIPTION		
	E13-0171-08	PIN JACK (MIDGET)		
	E21-0664-08	INPUT CONECTOR		
	E40-7013-08	SOCKET	7 P	
	J25-5064-08	PCB (UNMOUNTED)		
	LD-B7073AZ	LCD		
BZ001	T99-0502-08	BEEPER		
C009	CF92V1H103J	CAP. POLYESTER	0.01 5%	50V
C010	CF92V1H103J	CAP. POLYESTER	0.01 5%	50V
C011	CF92V1H473J	CAP. POLYESTER	0.047 5%	50V
C012	CS15E1CR47M	CAP. TANTALUM	0.47 20%	16V
C013	CF92V1H473J	CAP. POLYESTER	0.047 5%	50V
C014	CF92V1H103J	CAP. POLYESTER	0.01 5%	50V
C015	CC45SL1H390J	CAP. CERAMIC	39P 5%	50V
C016	CE04CW1V4R7M	CAP. ELECTRO	4.7 20%	35V
C017	CE04CW1V4R7M	CAP. ELECTRO	4.7 20%	35V

D001	U05B	DIODE		
D002	U05B	DIODE		
D003	U05B	DIODE		
D004	U05B	DIODE		
D007	DS442	DIODE, SILICON	SWITCHING	
D008	DS442	DIODE, SILICON	SWITCHING	
D009	DS442	DIODE, SILICON	SWITCHING	
D010	DS442	DIODE, SILICON	SWITCHING	
D011	DS442	DIODE, SILICON	SWITCHING	
D012	DS442	DIODE, SILICON	SWITCHING	
D013	DS442	DIODE, SILICON	SWITCHING	
IC001	M5230GS	A/D CONVERTER		
P001	911P97E101YU10	THERMISTOR	500 OHM	
Q001	2SD612K	TR, SI, NPN		
R001	RN14BK2H1002F	RES. METAL FILM	10K 1%	1/2W
R002	R92-1082-08	RES. METAL FILM	9.9M 1%	
R003	RD14BB2B272J	RES. CARBON	2.7K 5%	1/8W
R004	RD14BB2B104J	RES. CARBON	100K 5%	1/8W
R005	R92-1083-08	RES. METAL FILM	900 0.5%	1/4W
R006	R92-1084-08	RES. METAL FILM	90 0.5%	1/4W
R007	R92-1085-08	RES. METAL FILM	9 0.5%	1/4W
R008	R92-1086-08	RES. METAL FILM	0.98 0.5%	1/2W
R009	R92-1089-08	RES. METAL FILM	101K 0.05%	
R010	RN14BK2E2201F	RES. METAL FILM	2.2K 1%	1/4W
R018	RD14BB2B104J	RES. CARBON	100K 5%	1/8W
R019	NO USE			
R020	R92-1105-08	RES. METAL FILM	1K 0.25%	
R021	R92-1106-08	RES. METAL FILM	10.01K 0.1%	
R022	R92-1107-08	RES. METAL FILM	101K 0.1%	
R023	R92-1108-08	RES. METAL FILM	1.111M 0.25%	1/
R024	RD14BB2B514J	RES. CARBON	510K 5%	1/8W
R025	R92-1097-08	RES. CARBON	10M 5%	1/8W
R026	RD14BB2B104J	RES. CARBON	100K 5%	1/8W
R027	RN14BK2E2743F	RES. METAL FILM	274K 1%	1/4W
R028	RN14BK2E2672F	RES. METAL FILM	26.7K 1%	1/4W
R029	RD14BB2B154J	RES. CARBON	150K 5%	1/8W

R030	RD14BB2B122J	RES. CARBON	1.2K 5%	1/8W
R031	RD14BB2B333J	RES. CARBON	33K 5%	1/8W
R032	RD14BB2B102J	RES. CARBON	1K 5%	1/8W
R033	R92-1091-08	RES. METAL FILM	16.35M 1%	1/4W
R034	R92-1092-08	RES. METAL FILM	163.5M 0.25%	1/
R035	R92-1101-08	RES. METAL FILM	163.5K 0.25%	
R036	R92-1102-08	RES. METAL FILM	16.35K 0.25%	
R037	R92-1103-08	RES. METAL FILM	1.635K 0.25%	
R038	R92-1104-08	RES. METAL FILM	163.4 0.25%	
R039	RN14BK2E6202F	RES. METAL FILM	62K 1%	1/4W
R040	RN14BK2E9101F	RES. METAL FILM	9.1K 1%	1/4W
R041	RN14BK2E1202F	RES. METAL FILM	12K 1%	1/4W
R042	RD14BB2B104J	RES. CARBON	100K 5%	1/8W
R045	RD14BB2B513J	RES. CARBON	51K 5%	1/8W
R046	RD14BB2B154J	RES. CARBON	150K 5%	1/8W
R053	RD14BB2B151J	RES. CARBON	150 5%	1/8W



# PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION	REF. NO	PARTS NO	NAME & DESCRIPTION
S001	S40-2521-08	PUSH SWITCH	R037	R92-1095-08	RES. METAL FILM 1.635K 0.1%
S002	S40-2522-08	PUSH SWITCH	R038	R92-1096-08	RES. METAL FILM 163.4 0.1%
S003	S40-2521-08	PUSH SWITCH	R039	RN14BK2E6202F	RES. METAL FILM 62K 1% 1/4W
S004	S40-2521-08	PUSH SWITCH	R040	RN14BK2E9101F	RES. METAL FILM 9.1K 1% 1/4W
S005	S42-4511-08	TACTIL SWITCH	R041	RN14BK2E1202F	RES. METAL FILM 12K 1% 1/4W
S006	S42-4511-08	TACTIL SWITCH	R042	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
S007	S42-4511-08	TACTIL SWITCH			
S008	S42-4511-08	TACTIL SWITCH	R045	RD14BB2B513J	RES. CARBON 51K 5% 1/8W
S009	S42-6506-08	TACTIL SWITCH	R046	RD14BB2B154J	RES. CARBON 150K 5% 1/8W
S010	S42-6506-08	TACTIL SWITCH			
S011	S42-6506-08	TACTIL SWITCH	R053	RD14BB2B151J	RES. CARBON 150 5% 1/8W
S012	S42-6506-08	TACTIL SWITCH			
S013	S42-6506-08	TACTIL SWITCH			
S014	S42-6506-08	TACTIL SWITCH			
VR001	R12-5505-05	RES. SEMI FIXED 200K B			
VR002	R12-1514-05	RES. SEMI FIXED 1K B			
VR006	R12-3518-05	RES. SEMI FIXED 10K B			
VR007	R12-1514-05	RES. SEMI FIXED 1K B			
X001	L77-1015-08	CRYSTAL RESONATOR			
Z001	TNR4A182K	VARIATOR			
ZD001	ICL8069DCQ	DIODE ZENER			

## MAIN UNIT (DL-708)

### X65-1350-01

REF. NO	PARTS NO	NAME & DESCRIPTION
E13-0171-08		PIN JACK (MIDGET)
E21-0664-08		INPUT CONECTOR
E40-7013-08		SOCKET 7 P
J25-5064-08		PCB (UNMOUNTED)
LD-B7073AZ		LCD
T99-0502-08		BEEPER
BZ001		
C009	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C010	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C011	CF92V1H473J	CAP. POLYESTER 0.047 5% 50V
C012	CS15E1CR47M	CAP. TUNTALUM 0.47 20% 16V
C013	CF92V1H473J	CAP. POLYESTER 0.047 5% 50V
C014	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C015	CC45SL1H390J	CAP. CERAMIC 39P 5% 50V
C016	CE04CW1V4R7M	CAP. ELECTRO 4.7 20% 35V
C017	CE04CW1V4R7M	CAP. ELECTRO 4.7 20% 35V
D001	U05B	DIODE
D002	U05B	DIODE
D003	U05B	DIODE
D004	U05B	DIODE
D007	DS442	DIODE, SILICON SWITCHING
D008	DS442	DIODE, SILICON SWITCHING
D009	DS442	DIODE, SILICON SWITCHING
D010	DS442	DIODE, SILICON SWITCHING
D011	DS442	DIODE, SILICON SWITCHING
D012	DS442	DIODE, SILICON SWITCHING
D013	DS442	DIODE, SILICON SWITCHING
IC001	M52306S	A/D CONVERTER
P001	911P97E101YU10	THERMISTER 500 OHM
Q001	2SD612K	TR, SI, NPN
R001	RN14BK2H1002F	RES. METAL FILM 10K 1% 1/2W
R002	R92-1082-08	RES. METAL FILM 9.9M 1%
R003	RD14BB2B272J	RES. CARBON 2.7K 5% 1/8W
R004	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R005	R92-1083-08	RES. METAL FILM 900 0.5% 1/4W
R006	R92-1084-08	RES. METAL FILM 90 0.5% 1/4W
R007	R92-1085-08	RES. METAL FILM 9 0.5% 1/4W
R008	R92-1086-08	RES. METAL FILM 0.98 0/5% 1/2W
R009	R92-1089-08	RES. METAL FILM 101K 0.05%
R010	RN14BK2E2201F	RES. METAL FILM 2.2K 1% 1/4W
R018	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R019	RN14BK2E1003F	RES. METAL FILM 100K 1% 1/4W
R020	R92-1087-08	RES. METAL FILM 1.01K 0.25% 1/4
R021	R92-1088-08	RES. METAL FILM 10.01K 0.05%
R022	R92-1089-08	RES. METAL FILM 101K 0.05%
R023	R92-1090-08	RES. METAL FILM 1.107M 0.25% 1/
R024	RD14BB2B514J	RES. CARBON 510K 5% 1/8W
R025	R92-1097-08	RES. CARBON 10M 5% 1/8W
R026	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R027	RN14BK2E2743F	RES. METAL FILM 274K 1% 1/4W
R028	RN14BK2E2672F	RES. METAL FILM 26.7K 1% 1/4W
R029	RD14BB2B154J	RES. CARBON 150K 5% 1/8W
R030	RD14BB2B122J	RES. CARBON 1.2K 5% 1/8W
R031	RD14BB2B333J	RES. CARBON 33K 5% 1/8W
R032	RD14BB2B102J	RES. CARBON 1K 5% 1/8W
R033	R92-1091-08	RES. METAL FILM 16.35M 1% 1/4W
R034	R92-1092-08	RES. METAL FILM 163.5M 0.25% 1/
R035	R92-1093-08	RES. METAL FILM 163.5K 0.1%
R036	R92-1094-08	RES. METAL FILM 16.35K 0.1%

## MAIN UNIT (DL-707)

### X65-1350-02

REF. NO	PARTS NO	NAME & DESCRIPTION
E13-0171-08		PIN JACK (MIDGET)
E21-0664-08		INPUT CONECTOR
E40-7013-08		SOCKET 7 P
J25-5064-08		PCB (UNMOUNTED)
LD-B7073AZ		LCD
T99-0502-08		BEEPER
BZ001		
C009	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C010	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C011	CF92V1H473J	CAP. POLYESTER 0.047 5% 50V
C012	CS15E1CR47M	CAP. TUNTALUM 0.47 20% 16V
C013	CF92V1H473J	CAP. POLYESTER 0.047 5% 50V
C014	CF92V1H103J	CAP. POLYESTER 0.01 5% 50V
C015	CC45SL1H390J	CAP. CERAMIC 39P 5% 50V
C016	CE04CW1V4R7M	CAP. ELECTRO 4.7 20% 35V
C017	CE04CW1V4R7M	CAP. ELECTRO 4.7 20% 35V
D001	U05B	DIODE
D002	U05B	DIODE
D003	U05B	DIODE
D004	U05B	DIODE
D007	DS442	DIODE, SILICON SWITCHING
D008	DS442	DIODE, SILICON SWITCHING
D009	DS442	DIODE, SILICON SWITCHING
D010	DS442	DIODE, SILICON SWITCHING
D011	DS442	DIODE, SILICON SWITCHING
D012	DS442	DIODE, SILICON SWITCHING
D013	DS442	DIODE, SILICON SWITCHING
IC001	M52306S	A/D CONVERTER
P001	911P97E101YU10	THERMISTER 500 OHM
Q001	2SD612K	TR, SI, NPN
R001	RN14BK2H1002F	RES. METAL FILM 10K 1% 1/2W
R002	R92-1082-08	RES. METAL FILM 9.9M 1%
R003	RD14BB2B272J	RES. CARBON 2.7K 5% 1/8W
R004	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R005	R92-1083-08	RES. METAL FILM 900 0.5% 1/4W
R006	R92-1084-08	RES. METAL FILM 90 0.5% 1/4W
R007	R92-1085-08	RES. METAL FILM 9 0.5% 1/4W
R008	R92-1086-08	RES. METAL FILM 0.98 0/5% 1/2W
R009	R92-1089-08	RES. METAL FILM 101K 0.05%
R010	RN14BK2E2201F	RES. METAL FILM 2.2K 1% 1/4W
R018	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R019	NO USE	
R020	R92-1105-08	RES. METAL FILM 1K 0.25%
R021	R92-1109-08	RES. METAL FILM 10.01K 0.25%
R022	R92-1110-08	RES. METAL FILM 101K 0.25%
R023	R92-1108-08	RES. METAL FILM 1.111M 0.25% 1/
R024	RD14BB2B514J	RES. CARBON 510K 5% 1/8W

# PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
R025	R92-1097-08	RES. CARBON 10M 5% 1/8W
R026	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R027	RN14BK2E2743F	RES. METAL FILM 274K 1% 1/4W
R028	RN14BK2E2672F	RES. METAL FILM 26.7K 1% 1/4W
R029	RD14BB2B154J	RES. CARBON 150K 5% 1/8W
R030	RD14BB2B122J	RES. CARBON 1.2K 5% 1/8W
R031	RD14BB2B333J	RES. CARBON 33K 5% 1/8W
R032	RD14BB2B102J	RES. CARBON 1K 5% 1/8W
R033	R92-1091-08	RES. METAL FILM 16.35M 1% 1/4W
R034	R92-1092-08	RES. METAL FILM 163.5M 0.25% 1/4W
R035	R92-1093-08	RES. METAL FILM 163.5K 0.1%
R036	R92-1094-08	RES. METAL FILM 16.35K 0.1%
R037	R92-1095-08	RES. METAL FILM 1.635K 0.1%
R038	R92-1096-08	RES. METAL FILM 163.4 0.1%
R039	RN14BK2E6202F	RES. METAL FILM 62K 1% 1/4W
R040	RN14BK2E9101F	RES. METAL FILM 9.1K 1% 1/4W
R041	RN14BK2E1202F	RES. METAL FILM 12K 1% 1/4W
R042	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R045	RD14BB2B513J	RES. CARBON 51K 5% 1/8W
R046	RD14BB2B154J	RES. CARBON 150K 5% 1/8W
R053	RD14BB2B151J	RES. CARBON 150 5% 1/8W
S001	S40-2521-08	PUSH SWITCH
S002	S40-2522-08	PUSH SWITCH
S003	S40-2521-08	PUSH SWITCH
S004	S40-2521-08	PUSH SWITCH
S005	S42-4511-08	TACTIL SWITCH
S006	S42-4511-08	TACTIL SWITCH
S007	S42-4511-08	TACTIL SWITCH
S008	S42-4511-08	TACTIL SWITCH
S009	S42-6506-08	TACTIL SWITCH
S010	S42-6506-08	TACTIL SWITCH
S011	S42-6506-08	TACTIL SWITCH
S012	S42-6506-08	TACTIL SWITCH
S013	S42-6506-08	TACTIL SWITCH
S014	S42-6506-08	TACTIL SWITCH
VR001	R12-5508-05	RES. SEMI FIXED 200K B
VR002	R12-1514-05	RES. SEMI FIXED 1K B
VR006	R12-3518-05	RES. SEMI FIXED 10K B
VR007	R12-1514-05	RES. SEMI FIXED 1K B
X001	L77-1015-08	CRYSTAL RESONATOR
Z001	TNR4A182K	VARISTOR
ZD001	ICL8069DCQ	DIODE ZENER

## POWER SUPPLY UNIT (DL-709)

### X68-1410-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	E03-0203-05	POWER CONNECTOR
	E40-7013-08	SOCKET 7 P
	F05-2012-05	FUSE
	J13-0020-05	FUSE HOLDER
	J25-5065-08	PCB (UNMOUNTED)
	N16-0030-46	SPRING WASHER
	N30-3005-46	SCREW, PAN HD M 3X5
C022	CE04W1V470M	CAP. ELECTRO 47 20% 35V
C023	CS15E1CR47M	CAP. TANTALUM 0.47 20% 16V
C024	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C025	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C026	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
C027	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
D014	1N4001	DIODE
D015	DS442	DIODE, SILICON SWITCHING
D016	DS442	DIODE, SILICON SWITCHING
IC002	TL-061	IC, JFET-INPUT OP-AMP
Q002	2SK44	FET, N-CHANNEL
Q003	2SA608(F)	TR. SI, PNP
R050	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R051	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R052	RD14BB2B100J	RES. CARBON 10 5% 1/8W
R057	RD14BB2B100J	RES. CARBON 10 5% 1/8W
VR009	R12-3531-05	RES. SEMI FIXED 10K B
ZD002	HZ5B3	DIODE ZENER
ZD003	HZ5B3	DIODE ZENER
ZD004	HZ5B3	DIODE ZENER

## POWER SUPPLY UNIT (DL-708)

### X68-1410-01

REF. NO	PARTS NO	NAME & DESCRIPTION
	E03-0203-05	POWER CONNECTOR
	E40-7013-08	SOCKET 7 P
	F05-2012-05	FUSE
	J13-0020-05	FUSE HOLDER
	J25-5065-08	PCB (UNMOUNTED)
	N16-0030-46	SPRING WASHER
	N30-3005-46	SCREW, PAN HD M 3X5
C022	CE04W1V470M	CAP. ELECTRO 47 20% 35V
C023	CS15E1CR47M	CAP. TANTALUM 0.47 20% 16V
C024	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C025	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C026	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
C027	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
D014	1N4001	DIODE
D015	DS442	DIODE, SILICON SWITCHING
D016	DS442	DIODE, SILICON SWITCHING
IC002	TL-061	IC, JFET-INPUT OP-AMP
Q002	2SK44	FET, N-CHANNEL
Q003	2SA608(F)	TR. SI, PNP
R050	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R051	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R052	RD14BB2B100J	RES. CARBON 10 5% 1/8W
R057	RD14BB2B100J	RES. CARBON 10 5% 1/8W
VR009	R12-3518-05	RES. SEMI FIXED 10K B
ZD002	HZ5B3	DIODE ZENER
ZD003	HZ5B3	DIODE ZENER
ZD004	HZ5B3	DIODE ZENER

# PARTS LIST/SEMI CONDUCTOR

## POWER SUPPLY UNIT (DL-707)

### X88-1410-02

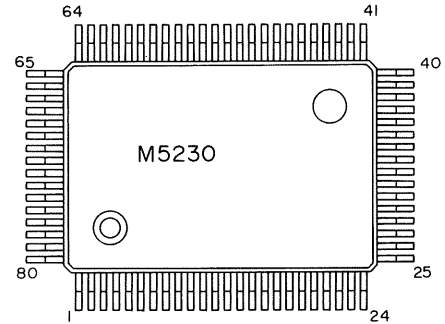
REF. NO	PARTS NO	NAME & DESCRIPTION
	E03-0203-05	POWER CONNECTOR
	E40-7013-08	SOCKET 7 P
	F05-2012-05	FUSE
	J13-0020-05	FUSE HOLDER
	J25-5065-08	PCB (UNMOUNTED)
	N16-0030-46	SPRING WASHER
	N30-3005-46	SCREW, PAN HD M 3X5
C022	CE04W1V470M	CAP. ELECTRO 47 20% 35V
C023	CS15E1CR47M	CAP. TUNTALUM 0.47 20% 16V
C024	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C025	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C026	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
C027	CE04W1A102M	CAP. ELECTRO 1000 20% 10V
D014	1N4001	DIODE
D015	DS442	DIODE, SILICON SWITCHING
D016	DS442	DIODE, SILICON SWITCHING
IC002	TL-061	IC, JFET-INPUT OP-AMP
Q002	2SK44	FET, N-CHANNEL
Q003	2SA608(F)	TR. SI, PNP
R050	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R051	RN14BK2E4701F	RES. METAL FILM 4.7K 1% 1/4W
R052	RD14BB2B100J	RES. CARBON 10 5% 1/8W
R057	RD14BB2B100J	RES. CARBON 10 5% 1/8W
VR009	R12-3518-05	RES. SEMI FIXED 10K B
ZD002	HZ5B3	DIODE ZENER
ZD003	HZ5B3	DIODE ZENER
ZD004	HZ5B3	DIODE ZENER

## SUB UNIT (DL-709, 708, 707)

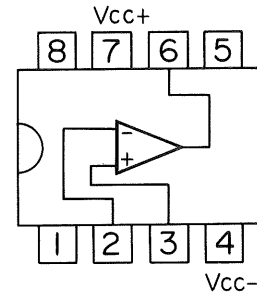
### X81-1470-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	E29-0539-08	PIN CONNECTOR
	J25-5066-08	PCB (UNMOUNTED)
	N16-0023-46	SPRING WASHER
	N30-2305-46	SCREW, PAN HD M 2X4
C001	CS15E1CR10M	CAP. TUNTALUM 0.1 20% 16V
C002	CS15E1CR47M	CAP. TUNTALUM 0.47 20% 16V
C003	CS15E1CR47M	CAP. TUNTALUM 0.47 20% 16V
C004	CC45SL1H101J	CAP. CERAMIC 100P 5% 50V
C005	CF92V1H224J	CAP. POLYESTER 0.22 5% 50V
C006	CC45SL1H100J	CAP. CERAMIC 10P 5% 50V
C007	CF92V1H224J	CAP. POLYESTER 0.22 5% 50V
C008	CF92V1H224J	CAP. POLYESTER 0.22 5% 50V
C018	CF92V1H104J	CAP. POLYESTER 0.1 5% 50V
C019	CF92V1H104J	CAP. POLYESTER 0.1 5% 50V
C020	CK45D1H222M	CAP. CERAMIC 2200P 20% 50V
C021	CK45D1H391M	CAP. CERAMIC 390P 20% 50V
D005	DS442	DIODE, SILICON SWITCHING
D006	DS442	DIODE, SILICON SWITCHING
D017	DS442	DIODE, SILICON SWITCHING
R011	RN14BK2E2002F	RES. METAL FILM 20K 1% 1/4W
R012	RD14BB2B105J	RES. CARBON 1M 5% 1/8W
R013	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R014	RD14BB2B104J	RES. CARBON 100K 5% 1/8W
R015	RN14BK2E2202F	RES. METAL FILM 22K 1% 1/4W
R016	RN14BK2E2202F	RES. METAL FILM 22K 1% 1/4W
R017	R92-1115-08	RES. METAL FILM 100M 10% 1/4W
R043	RD14BB2B394J	RES. CARBON 390K 5% 1/8W
R044	RD14BB2B274J	RES. CARBON 270K 5% 1/8W
R047	RD14BB2B102J	RES. CARBON 1K 5% 1/8W
R048	RD14BB2B472J	RES. CARBON 4.7K 5% 1/8W
R049	RD14BB2B222J	RES. CARBON 2.2K 5% 1/8W
R055	RD14BB2B124J	RES. CARBON 120K 5% 1/8W
VR003	R12-1514-05	RES. SEMI FIXED 1K B
VR008	R12-3518-05	RES. SEMI FIXED 10K B

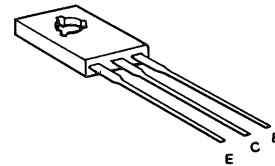
## M5230GS



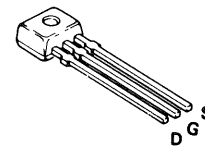
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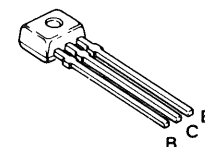
## 2SD612K



## 2SK44



## 2SA608-F



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