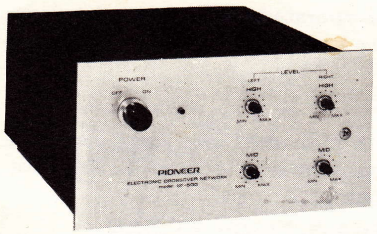
ELECTRONIC CROSSOVER NETWORK

SF-500

FV



INSTALLATION, OPERATION AND SERVICE MANUAL

PIONEER®

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Thank you for buying the SF-500 Electronic Crossover Network. Designed to meet the demands of this multi-amplifier age, the SF-500 is a superb crossover network with which you can build a high-quality multi-amplifier system or, alternatively, convert your conventional stereo system.

FEATURES OF THE SF-500

A CROSSOVER NETWORK WITH EXCELLENT CHARACTERISTICS

The SF-500 incorporates CR-active type filter circuits and emitter dissipated output circuits composed of low-noise transistors and precision parts. No fear of distortion or noise. Output impedance is low, enabling connection of any type of power amplifier.

BOTH 2-WAY AND 3-WAY MULTI-AMPLIFIER SYSTEMS POSSIBLE

Simply set the selector switch to either 2-way or 3-way.
With a 2-way system, crossover frequency can be set at 600Hz or 5kHz.

12dB/STEEP OUT CHARACTERISTICS:

A 12dB/oct. filter is incorporated to reduce crossover distortion and interference to a minimum. Choice of speakers is, also, simplified.

EASY LEVEL SETTINGS

The SF-500 is equipped with individual level controls of the MID and HIGH ranges. Adjust the level control to the most suitable acoustics of your room.

COMPACT, EASY-TO-OPERATE PANEL DESIGN

Panel design and dimensions match Pioneer's famous UA Series of amplifiers and tuners. All controls are located to easy accessibility.

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STEREO SYSTEM USING THE SF-500

1. Typical example using Pioneer UA Series systems.

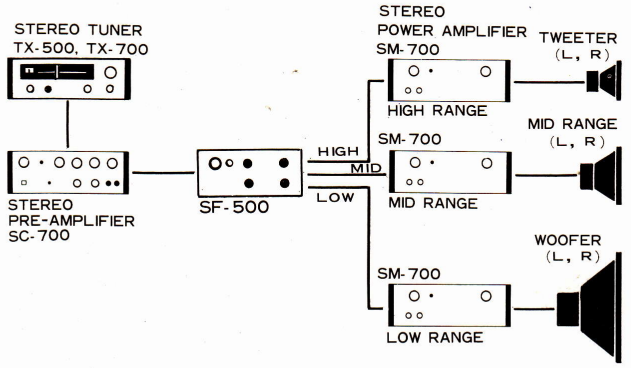

Fig. 1.

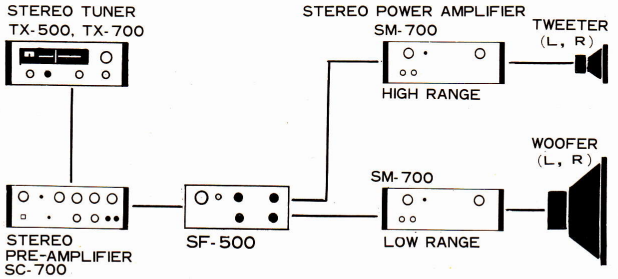

Fig. 2.

2. If you have another manufacturer's pre-amplifier or power amplifiers, construct your system using the models shown in Figs. 1 and 2 above.

3. If you have another manufacturer's stereo amplifier or receiver, construct your system according to the 3-way stereo system.
   a. When using the pre-amplifier and main amplifier sections independently, use the 3-way (for 2-way, omit the MID range).

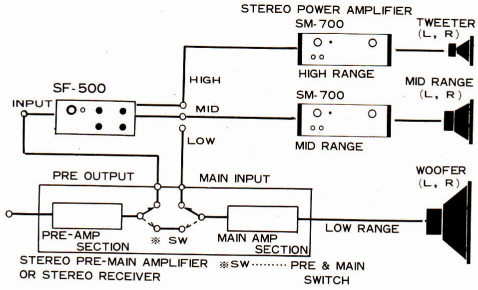

Fig. 3.

   b. When not using the pre-amplifier and main amplifier independently, use the 3-way (for 2-way, omit the MID range).

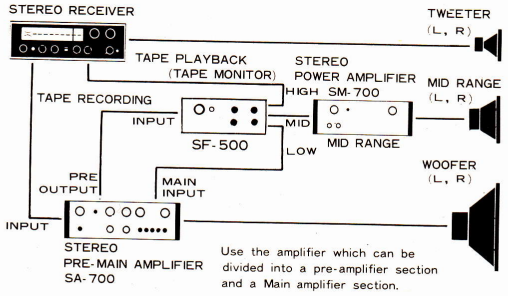

Fig. 4.

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CONNECTION DIAGRAM

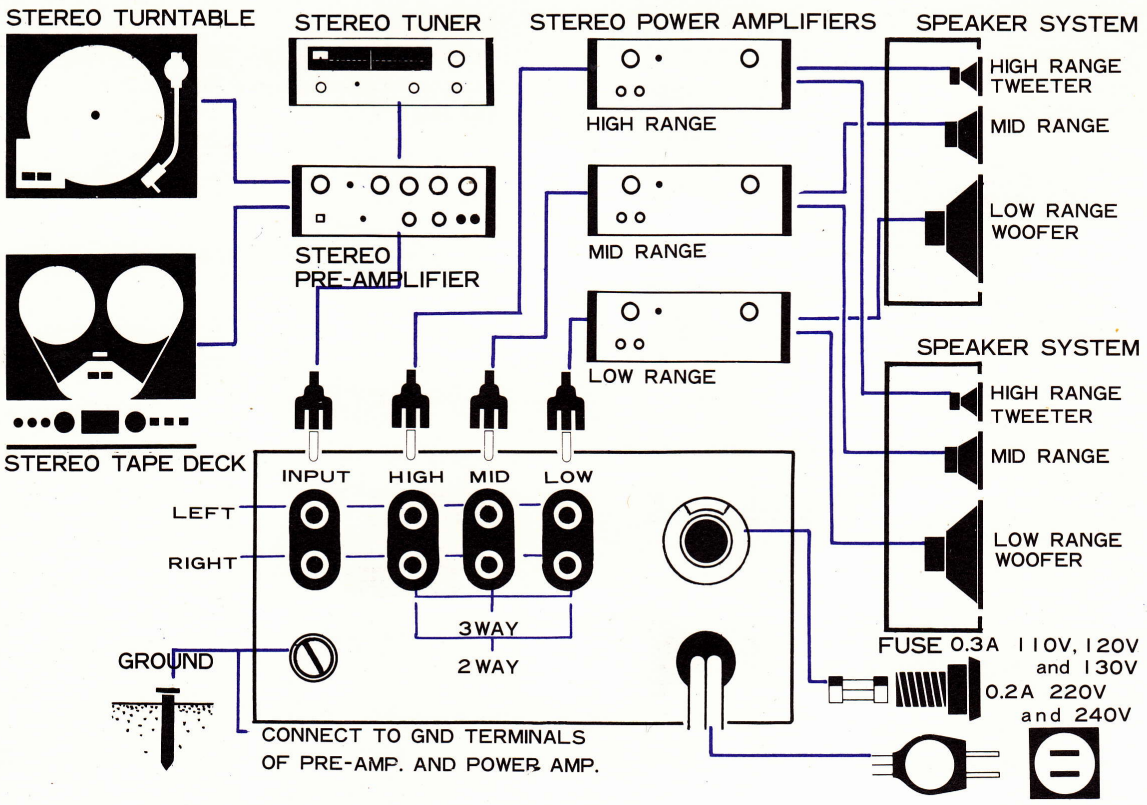

Fig. 5.

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BUILDING THE MULTI-AMP SYSTEM

CONNECTING THE PRE-AMPLIFIER

Connect the INPUT terminals of the SF-500 to the output terminals of the pre-amplifier. With a STEREO amplifier or receiver, connect the SF-500 INPUT terminals to the output terminals of the pre-amplifier section (PRE-AMP OUTPUT). The upper INPUT jack is to the LEFT channel, the lower to the RIGHT channel. Always correctly connect the left cutput to the left input and the right output to the right input of both pre-amplifier and SF-500.

3-WAY SYSTEM

In assembling a 3-way system, you need 3 power amplifiers (LOW range, MID range and HIGH range) and independent sets of speakers to each range. If a STEREO amplifier or receiver is used, only 2 power amplifiers are necessary.

1. Connect the SF-500 LOW terminals and the input terminals of the LOW range power amplifier. With a STEREO amplifier or receiver, use the input jacks of the main amplifier section.
2. Connect the MID jacks and the input jacks of the MID range power amplifier.
3. Connect the HIGH jacks and the input jacks of the HIGH range power amplifier. The upper jacks on the SF-500 go to the LEFT channel, the lower to the RIGHT channel. Always correctly connect the left and right channels of the power amplifiers.

2-WAY SYSTEM

In assembling a 2-way system, you need 2 power amplifiers (LOW range, HIGH range) and independent sets of speakers to each range.
If a STEREO amplifier or receiver is used, only one power amplifier is necessary.

1. Connect the SF-500 LOW jacks with the input jacks of the LOW range power amplifier.
   With a STEREO amplifier or a receiver, use the input jacks of the main amplifier section.
2. Connect the HIGH jacks and the input jacks of the HIGH range power amplifier.

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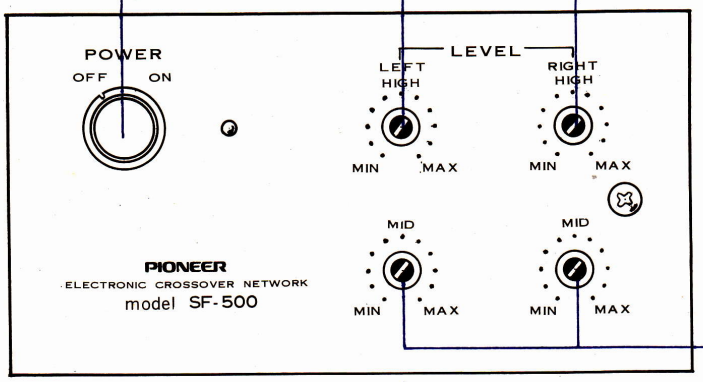
FRONT PANEL FACILITIES

POWER SWITCH

Turn the knob to the right to turn on the power.

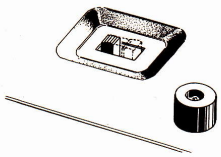


LEVEL HIGH (HIGH RANGE LEVEL CONTROLS)

Turning the knobs to the right increases the output level of the HIGH range, turning them to the left decreases it.
The left-hand knob regulates the left channel, the right-hand knob regulates the right channel.

LEVEL MID (MID RANGE LEVEL CONTROL)

Use these knobs to regulate the output level of the MID range.
Operation is the same to the LEVEL HIGH knobs.



CROSSOVER FREQUENCY SELECTOR SWITCH

3 CH. . . to a 3-way multi-channel system
2 CH.
600Hz. . . to a 2-way system with a crossover frequency of 600Hz.
5kHz. . . to a 2-way system with a crossover frequency of 5kHz.

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OPERATING THE MULTI-AMP SYSTEM

- Multi-amp systems have more controls than conventional systems and require more careful adjustments. Performance varies considerably with the pre-amplifier, power amplifiers and speakers used, as well as with the acoustics of the room, and final adjustments must be made while you are actually listening to the sound.
- Before operating the SF-500, first check all connections correctly. When re-setting the selector switch, first turn off the power amplifiers or turn the volume fully down.

3-WAY SYSTEM

1. Turn the LEVEL MID and LEVEL HIGH knobs fully to the left (i.e. set the levels to the lowest position).
2. Set the crossover frequency selector switch (located on the bottom of the SF-500) to 3 CH.
3. Turn the pre-amplifier output level knob fully down and turn on the power to all amplifiers.
4. Turn up the pre-amplifier output level halfway and, also, the level controls on the SF-500. Play a record or tape.
5. Gradually turn up the pre-amplifier output level until the desired volume is attained.
6. Adjust the level controls on the SF-500 and the volume controls on all amplifiers until the sound quality is ideally suitable to the acoustics of the room.

2-WAY SYSTEM

1. Check the crossover frequency best suited to your speakers and set the selector switch on the bottom of the SF-500 to 2 CH.600Hz or 2 CH.5kHz.
   NB. When setting the selector switch to 2 CH.5kHz, first check that nothing is connected to the MID jacks.
   Otherwise the MID range speaker may be damaged.
2. Proceed as explained in steps 3 — 6 for a 3-way system above.

SPEAKER PHASING

- Since the signals in multi-amp systems are separated by 12dB/oct. filters, correct phase adjustment of the speakers results in more natural sound. Where the MID range and HIGH range power amplifiers are fitted with speaker phase selector switches, set these so that the sound is as natural as possible, during actual listening. If there are no switches on the power amplifiers, try changing the connections to the speaker terminals.

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SPECIFICATIONS

SEMICONDUCTORS	Transistors 10
	Diode 1
CHANNELS	
2 channels	LOW Range and HIGH Range
3 channels	LOW Range, MID Range and HIGH Range
Input Impedance	100kΩ at 1kHz
Output Voltage	2V (each channel)
Output Impedance	HIGH: Less than 200Ω at 20kHz
	MID: Less than 1.6kΩ at 1kHz
	LOW: Less than 1.6kΩ at 70Hz
Load Impedance	More than 15kΩ at 1kHz
Harmonic Distortion	Less than 0.3%
Insertion Loss	Less than −4dB
SN ratio	More than 75dB
CROSSOVER FREQUENCY	
For 3 channels	LOW-MID 600Hz
	MID-HIGH 5kHz
For 2 channels	600Hz, 5kHz
Slope	12dB/oct.
MISCELLANEOUS	
Power Requirements	110, 120, 130, 220 and 240 Volts (switchable)
Power Consumption	3VA
Dimensions (over-all)	7-7/8" 200mm (width)
	4-1/2" 115mm (height)
	10" 254mm (depth)
Weight	Without package 5 lb 2.3kg
	With package 6 lb 13 oz 3.1kg

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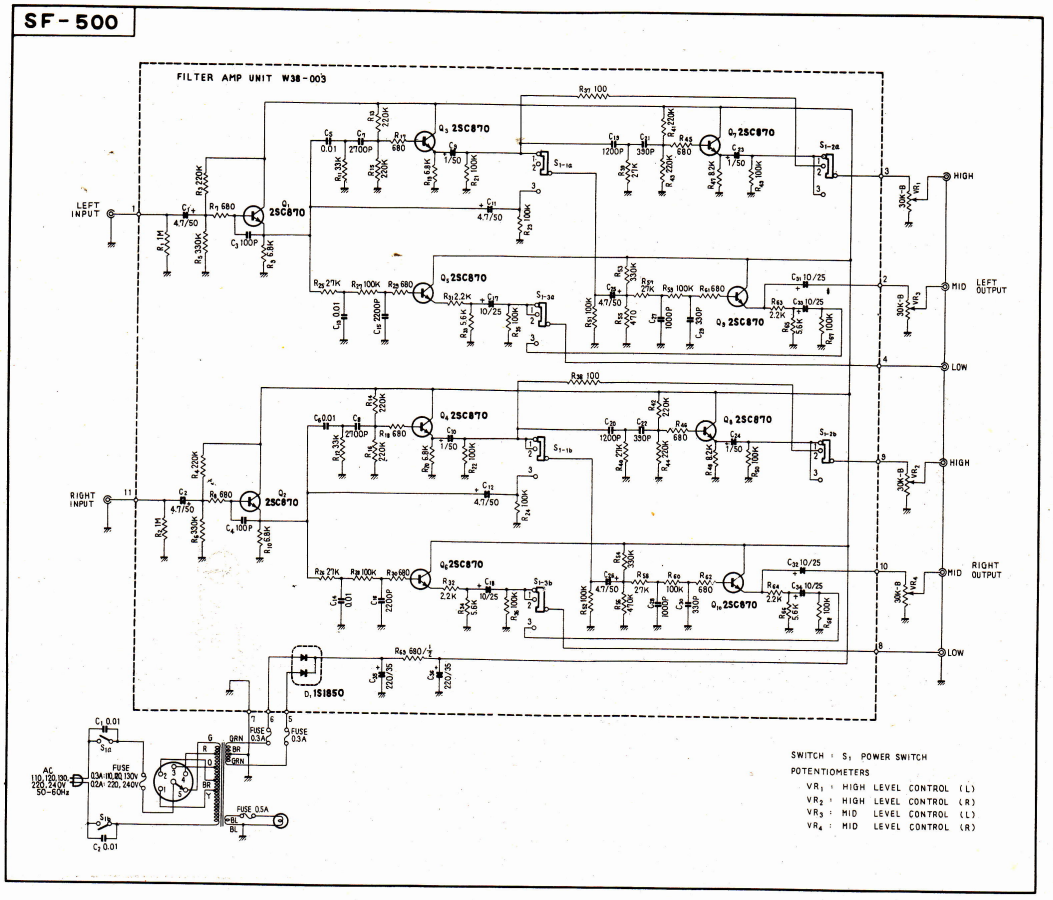
CIRCUIT DIAGRAM



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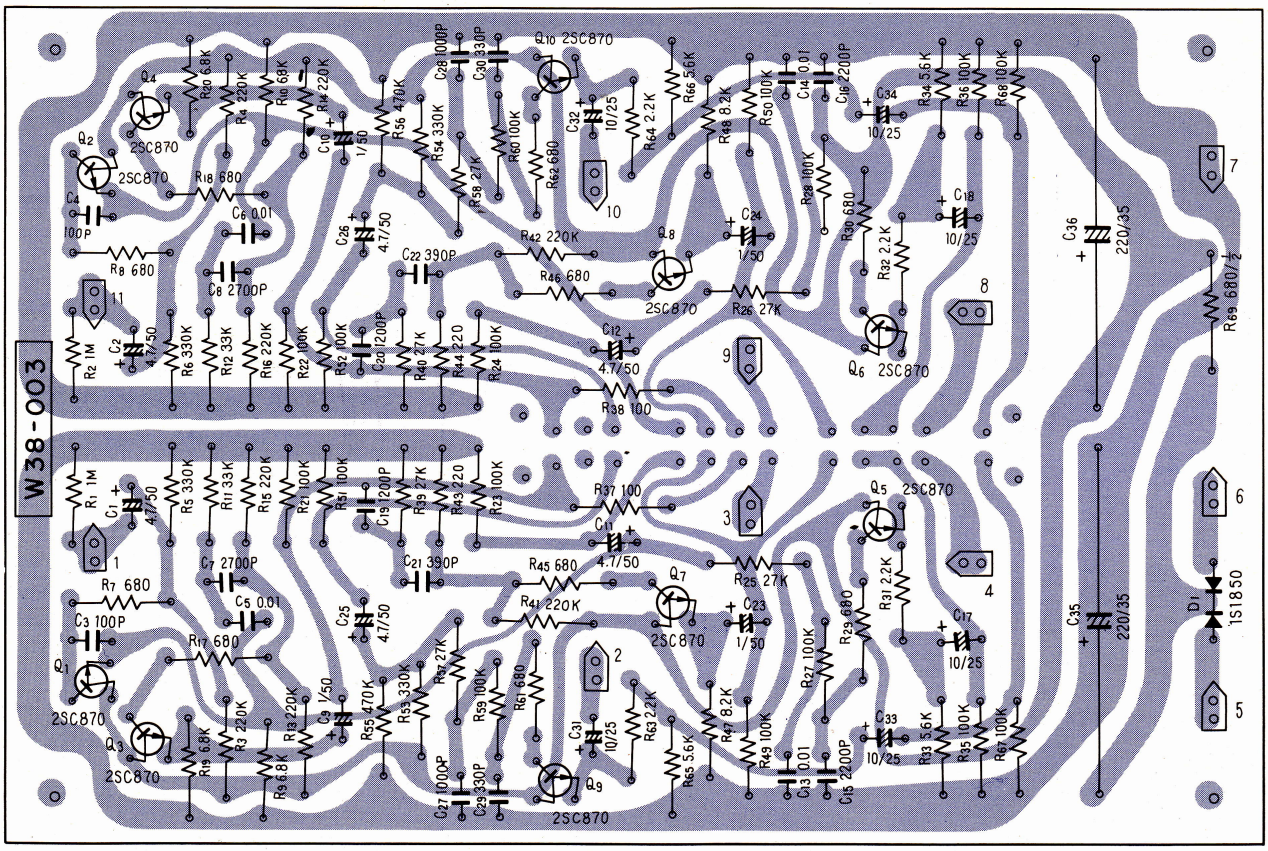
PRINTED CIRCUIT BOARD



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PARTS LIST

CAPACITORS

Symbol	Description			Part No.
C_1	Ceramic	0.01	D.C. 1.4kV	C43-003-0
C_2	Ceramic	0.01	D.C 1.4kV	C43-003-0

SWITCH

Symbol	Description	Part No.
S_1	Power switch	S11-016-A

POTENTIOMETERS

Symbol	Description	Part No.
VR_1	HIGH Level control (Left)	C92-062-0
VR_2	HIGH Level control (Right)	C92-062-0
VR_3	MID Level control (Left)	C92-062-0
VR_4	MID Level control (Right)	C92-062-0

TRANSFORMER

Symbol	Description	Part No.
	Power Transformer	T52-207-0

MISCELLANEOUS

Symbol	Description	Part No.
	Filter Amp Unit	W38-003-0
	Front Panel	M21-417-0
	Metal Cover	M33-125-0
	Knob for Power Switch	A12-144-D
	Lense for Pilot Lamp	A62-045-0
	Pilot Lamp Socket	K42-003-A
	Pilot Lamp	E22-006-0
	Line Voltage Selector	S11-018-0
	2P Input Terminal	K21-009-D
	6P Input Terminal	K22-013-D
	4P Terminal	K13-042-A
	Fuse 0.2A	E21-009-0
	Fuse 0.3A	E21-032-0
	Fuse 0.5A	E21-019-A
	Foot	M61-017-0
	AC Power Cord	D11-003-E
	Screw for GND	B11-012-A
	Instruction Manual	R12-088-0
	Accessory Parts Bag (A-5)	E11-060-0
	Accessory Parts Bag (B-36)	E11-121-0
	Packing Case	H15-143-0
	Protector	H11-074-0
	Vinyl Bag	H14-049-A

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FILTER AMP UNIT (W38-003)

CAPACITORS

IN μF UNLESS OTHERWISE NOTED.
p: μμF

Symbol	Description			Part No.
C_1	Electrolytic	4.7	50V	CEMX 4R7MF 50V
C_2	Electrolytic	4.7	50V	CEMX 4R7MF 50V
C_3	Ceramic	100p	50V	CCDSL 101K 50
C_4	Ceramic	100p	50V	CCDSL 101K 50
C_5	Mylar	0.01	50V	CQMA 103K 50
C_6	Mylar	0.01	50V	CQMA 103K 50
C_7	Styrol	2700p	50V	CQSA 272J 50
C_8	Styrol	2700p	50V	CQSA 272J 50
C_9	Electrolytic	1	50V	CEMX 1MF 50V
C_{10}	Electrolytic	1	50V	CEMX 1MF 50V
C_{11}	Electrolytic	4.7	50V	CEMX 4R7MF 50V
C_{12}	Electrolytic	4.7	50V	CEMX 4R7MF 50V
C_{13}	Mylar	0.01	50V	CQMA 103K 50
C_{14}	Mylar	0.01	50V	CQMA 103K 50
C_{15}	Styrol	2200p	50V	CQSA 222J 50
C_{16}	Styrol	2200p	50V	CQSA 222J 50
C_{17}	Electrolytic	10	25V	CEMX 10MF 25V
C_{18}	Electrolytic	10	25V	CEMX 10MF 25V
C_{19}	Styrol	1200p	50V	CQSA 122J 50
C_{20}	Styrol	1200p	50V	CQSA 122J 50
C_{21}	Styrol	390p	50V	CQSA 391J 50
C_{22}	Styrol	390p	50V	CQSA 391J 50
C_{23}	Electrolytic	1	50V	CEMX 1MF 50V
C_{24}	Electrolytic	1	50V	CEMX 1MF 50V
C_{25}	Electrolytic	4.7	50V	CEMX 4R7MF 50V
C_{26}	Electrolytic	4.7MF	50V	CEMX 4R7MF 50V
C_{27}	Styrol	1000p	50V	CQSA 102J 50
C_{28}	Styrol	1000p	50V	CQSA 102J 50
C_{29}	Styrol	330p	50V	CQSA 331J 50
C_{30}	Styrol	330p	50V	CQSA 331J 50
C_{31}	Electrolytic	10	25V	CEMX 10MF 25V
C_{32}	Electrolytic	10	25V	CEMX 10MF 25V
C_{33}	Electrolytic	10	25V	CEMX 10MF 25V
C_{34}	Electrolytic	10	25V	CEMX 10MF 25V
C_{35}	Electrolytic	220	35V	CETG 220MF 35V
C_{36}	Electrolytic	220	35V	CETG 220MF 35V

RESISTORS

In Ω, ¼W UNLESS OTHERWISE NOTED.
k: kΩ, M: MΩ

Symbol	Description		Part No.
R_1	Carbon film	1M	RF¼PS 1M-K
R_2	Carbon film	1M	RF¼PS 1M-K
R_3	Carbon film	220K	RF¼PS 220K-K
R_4	Carbon film	220K	RF¼PS 220K-K
R_5	Carbon film	330K	RF¼PS 330K-K
R_6	Carbon film	330K	RF¼PS 330K-K
R_7	Carbon film	680	RF¼PS 680-K
R_8	Carbon film	680	RF¼PS 680-K
R_9	Carbon film	6.8K	RF¼PS 6R8K-K
R_{10}	Carbon film	6.8K	RF¼PS 6R8K-K
R_{11}	Carbon film	33K	RF¼PS 33K-J
R_{12}	Carbon film	33K	RF¼PS 33K-J

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R_{13}	Carbon film	220K	RF¼PS 220K-J
R_{14}	Carbon film	220K	RF¼PS 220K-J
R_{15}	Carbon film	220K	RF¼PS 220K-J
R_{16}	Carbon film	220K	RF¼PS 220K-J
R_{17}	Carbon film	680	RF¼PS 680-K
R_{18}	Carbon film	680	RF¼PS 680-K
R_{19}	Carbon film	6.8K	RF¼PS 6R8K-K
R_{20}	Carbon film	6.8K	RF¼PS 6R8K-K
R_{21}	Carbon film	100K	RF¼PS 100K-K
R_{22}	Carbon film	100K	RF¼PS 100K-K
R_{23}	Carbon film	100K	RF¼PS 100K-K
R_{24}	Carbon film	100K	RF¼PS 100K-K
R_{25}	Carbon film	27K	RF¼PS 27K-J
R_{26}	Carbon film	27K	RF¼PS 27K-J
R_{27}	Carbon film	100K	RF¼PS 100K-J
R_{28}	Carbon film	100K	RF¼PS 100K-J
R_{29}	Carbon film	680	RF¼PS 680-K
R_{30}	Carbon film	680	RF¼PS 680-K
R_{31}	Carbon film	2.2K	RF¼PS 2R2K-K
R_{32}	Carbon film	2.2K	RF¼PS 2R2K-K
R_{33}	Carbon film	5.6K	RF¼PS 5R6K-K
R_{34}	Carbon film	5.6K	RF¼PS 5R6K-K
R_{35}	Carbon film	100K	RF¼PS 100K-K
R_{36}	Carbon film	100K	RF¼PS 100K-K
R_{37}	Carbon film	100	RF¼PS 100-K
R_{38}	Carbon film	100	RF¼PS 100-K
R_{39}	Carbon film	27K	RF¼PS 27K-J
R_{40}	Carbon film	27K	RF¼PS 27K-J
R_{41}	Carbon film	220K	RF¼PS 220K-J

R_{42}	Carbon film	220K		RF¼PS 220K-J
R_{43}	Carbon film	220K		RF¼PS 220K-J
R_{44}	Carbon film	220K		RF¼PS 220K-J
R_{45}	Carbon film	680		RF¼PS 680-K
R_{46}	Carbon film	680		RF¼PS 680-K
R_{47}	Carbon film	8.2K		RF¼PS 8R2K-K
R_{48}	Carbon film	8.2K		RF¼PS 8R2K-K
R_{49}	Carbon film	100K		RF¼PS 100K-K
R_{50}	Carbon film	100K		RF¼PS 100K-K
R_{51}	Carbon film	100K		RF¼PS 100K-K
R_{52}	Carbon film	100K		RF¼PS 100K-K
R_{53}	Carbon film	330K		RF¼PS 330K-K
R_{54}	Carbon film	330K		RF¼PS 330K-K
R_{55}	Carbon film	470K		RF¼PS 470K-K
R_{56}	Carbon film	470K		RF¼PS 470K-K
R_{57}	Carbon film	27K		RF¼PS 27K-J
R_{58}	Carbon film	27K		RF¼PS 27K-J
R_{59}	Carbon film	100K		RF¼PS 100K-J
R_{60}	Carbon film	100K		RF¼PS 100K-J
R_{61}	Carbon film	680		RF¼PS 680-K
R_{62}	Carbon film	680		RF¼PS 680-K
R_{63}	Carbon film	2.2K		RF¼PS 2R2K-K
R_{64}	Carbon film	2.2K		RF¼PS 2R2K-K
R_{65}	Carbon film	5.6K		RF¼PS 5R6K-K
R_{66}	Carbon film	5.6K		RF¼PS 5R6K-K
R_{67}	Carbon film	100K		RF¼PS 100K-K
R_{68}	Carbon film	100K		RF¼PS 100K-K
R_{69}	Carbon film	680	½W	RF½PS 680-K

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SEMICONDUCTORS

Symbol	Description	Part No.
D_1	1S1850 Diode	
Q_1	2SC870 E or F Transistor	
Q_2	2SC870 E or F Transistor	
Q_3	2SC870 E or F Transistor	
Q_4	2SC870 E or F Transistor	
Q_5	2SC870 E or F Transistor	
Q_6	2SC870 E or F Transistor	
Q_7	2SC870 E or F Transistor	
Q_8	2SC870 E or F Transistor	
Q_9	2SC870 E or F Transistor	
Q_{10}	2SC870 E or F Transistor	

SWITCH

Symbol	Description	Part No.
S_1	2 channel – 3 channel selector switch	S41-027-0

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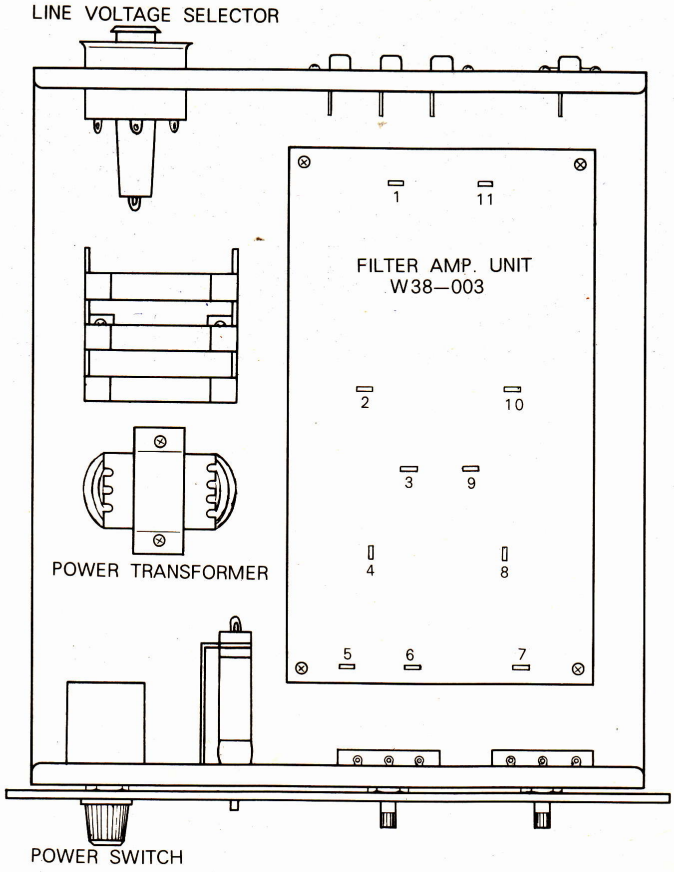
PARTS LAYOUT

TOP VIEW



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