SERVICE MANUAL

F 1030

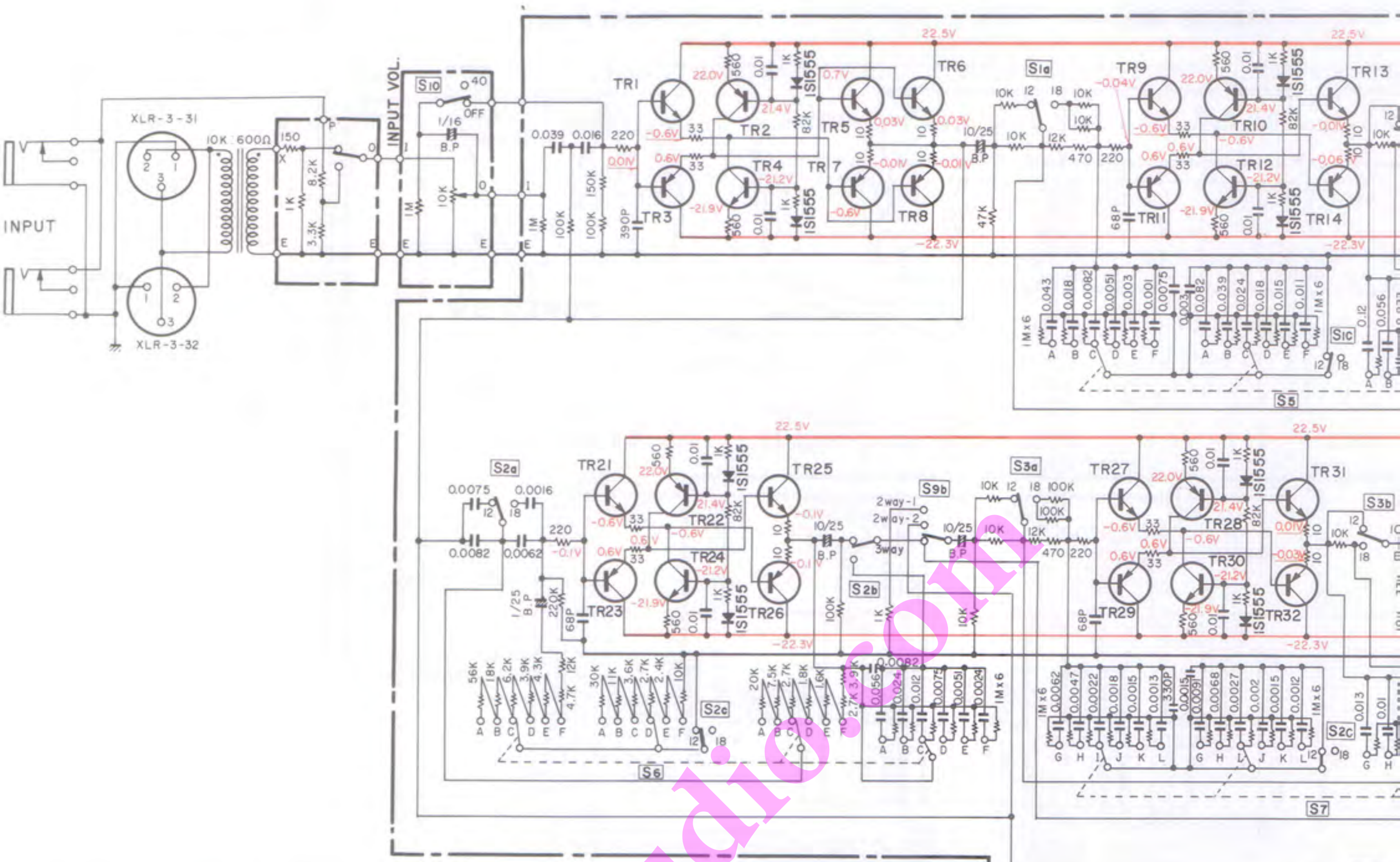
FREQUENCY DIVIDING NETWORK

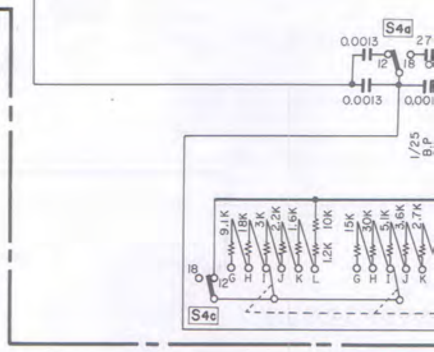
SINCE 1887 YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

1500 Printed in Japan

SCHEMATIC CIRCUIT DIAGRAM





● TRANSISTORS

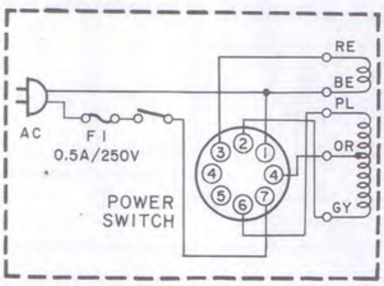
2SC1681(GA)	TR1, 4, 5, 6, 9, 12, 13, 15, 18, 19, 21, 24, 25, 27, 30, 31, 33, 36, 37, 39, 42, 43, 49, 50, 52, 53, 55, 56, 58,
2SC841(GR)	TR2, 3, 7, 8, 10, 11, 14, 16, 17, 20, 22, 23, 26, 28, 29, 32, 34, 35, 38, 40, 41, 44,
2SA561(Y)	TR47, 51, 54, 57, 59,
2SC734(Y)	TR46
2SB596(R)	TR48
2SD526(R)	TR45

● SWITCHES

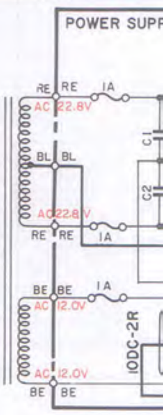
S1 ~ S4	FREQUENCY RESPONSE SELECTOR(−12dB/OCT, −18dB/OCT)
S5 ~ S8	CROSSOVER FREQUENCY SELECTOR A 250Hz B 500Hz C 800Hz D 1KHz E 1.2KHz F 1.5KHz G 2KHz H 2.5KHz I 5KHz J 6KHz K 7KHz L 8KHz
S9	MODE SELECTOR
S10	40Hz HIGH PASS FILTER

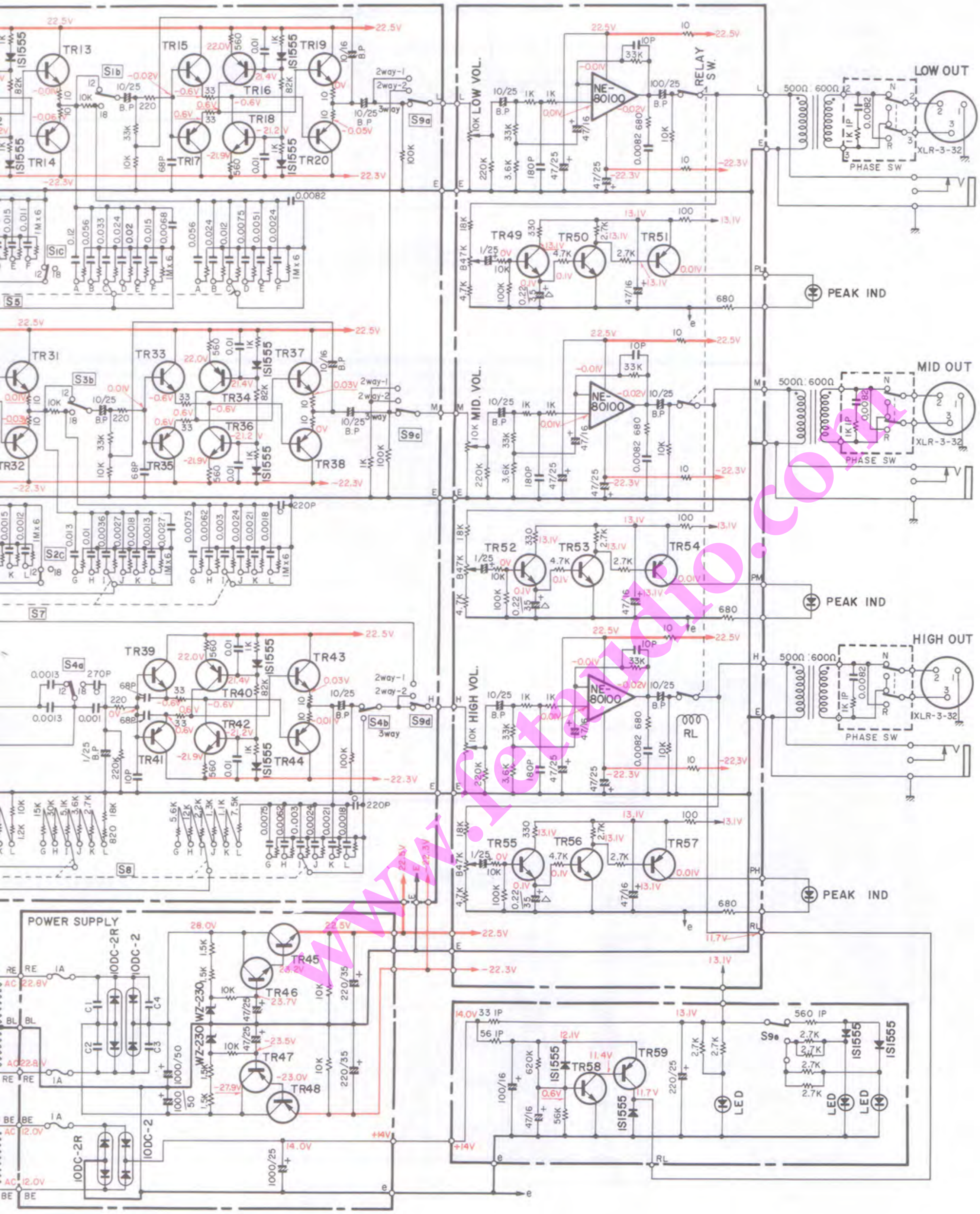
● CAPACITORS

C1 ~ C4	0.0047μF/500V(CERAMIC)
△	TANTALUM CAPACITOR
○	STYROL CAPACITOR
NO MARK	MYLOR or CERAMIC CAPACITOR



GENERAL EXPORT MODEL




LOW OUT
MID OUT
HIGH OUT
LOW VOL.
MID VOL.
HIGH VOL.
RELAY SW.
PHASE SW
XLR-3-32
500Ω : 600Ω
PEAK IND
POWER SUPPLY
NE-80100
TR13
TR14
TR15
TR16
TR17
TR18
TR19
TR20
TR31
TR32
TR33
TR34
TR35
TR36
TR37
TR38
TR39
TR40
TR41
TR42
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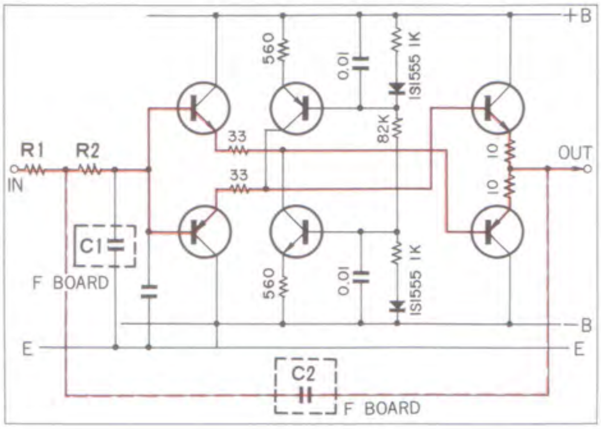
TR44
TR45
TR46
TR47
TR48
TR49
TR50
TR51
TR52
TR53
TR54
TR55
TR56
TR57
TR58
TR59
S1b
S1c
S2c
S3b
S4a
S4b
S5
S7
S8
S9a
S9c
S9d
S9e
2way-1
2way-2
3way
10DC-2R
10DC-2
WZ-230
IS1555
LED
RL
22.5V
-22.3V
13.1V
28.0V
14.0V
+14V
11.7V

CR elements, and also −6dB/oct. attenuation characteristics obtained by means of NF.



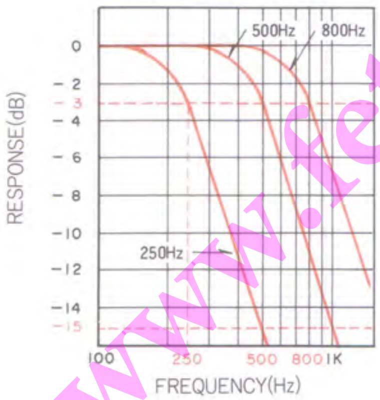
Cutoff frequency fc can be calculated by the following equation:

$$fc = \frac{1}{2\pi \cdot C1 \cdot R2} = \frac{1}{2\pi \cdot C2 \cdot R1}$$

where,
C1, C2: Farad (F)
R, R2: Ohm (Ω)

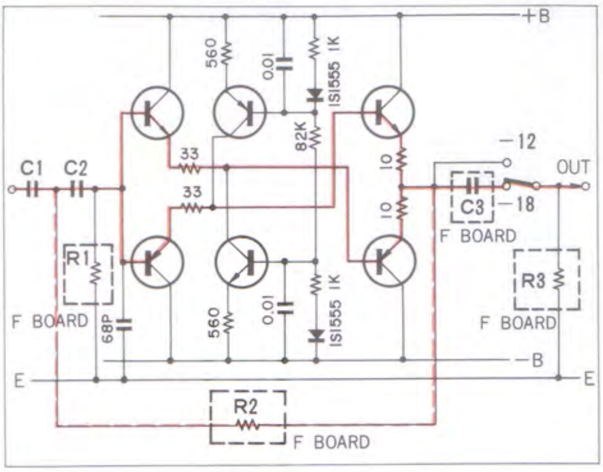
C1 and C2 are combined capacity value in F board (filter element board).

−12dB/OCT LOW-PASS

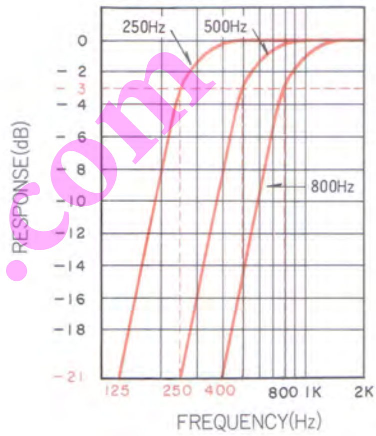


−18dB/oct.

Both high-pass and low-pass filters obtain a characteristic of −18dB/oct. by connecting one stage of CR filter to the output section of the buffer. The high-pass filter of HIGH channel is directly connected to the line amp without using butter at the next stage. As a result, anothe rstage of CR filter is composed of the capacitor at F board and the input volume (10kΩ) at the line amp.



−18dB/OCT HIGH-PASS

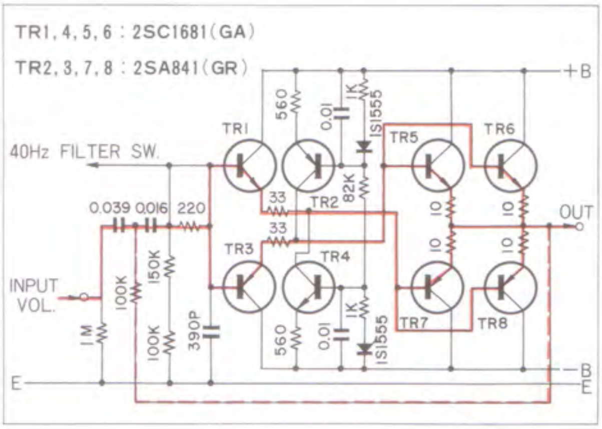


Gain at Crossover Frequency Points

At −12dB/oct., gain at crossover point (cutoff point) is −3dB at both low-pass and high-pass. This value shows voltage ratio when $\zeta = \sqrt{2/2}$. When converted into output ratio (power ratio), this value becomes 1/2. Accordingly, the total value of both high-pass and low-pass at crossover point becomes 1. Then, when $\zeta = 1$, the total voltage becomes 1, and the total output (power) becomes 0.5. The difference between the total voltage and total output appears as auditory difference. (ζ: attenuation coefficient)
In case of −18dB/oct., both the total voltage and total output become 1 respectively.

The circuits comprise a buffer amp circuit for active filter, three line amp circuits, three peak indicator amp circuits, relay-driving circuit and power supply circuit.

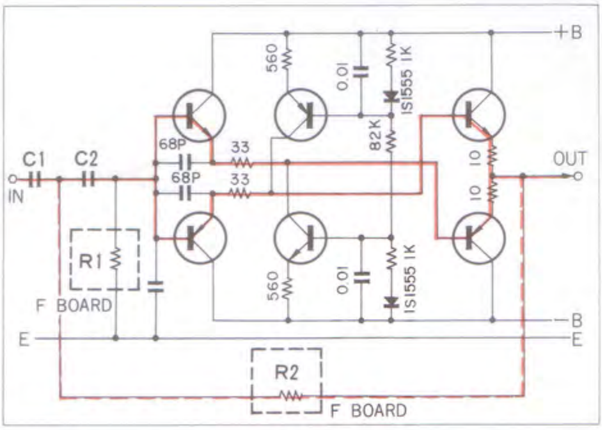
Input Buffer Amp



TR1 and TR3 respectively constitute emitter followers for TR2 and TR4 which are constant-current circuits servicing as emitter resistances. TR1 and TR3 also function as buffer amps having high input impedance. TR5, TR6, TR7 and TR8 are parallel push-pull SEPP circuits which feature great dynamic range and low output impedance. The SEPP circuits are driven by TR1 and TR3. The above-mentioned circuit system is similar to that employed in other filter amps. More specifically, the input amp further reduces output impedance, thus supplying enough power to three LOW, MID and HIGH systems.
In these high impedance input and low impedance output amp systems, CR value is easily established because CR effect on time-constant element is minimized.
In other words, when affected by input and output impedance, CR value becomes complicated and cannot be easily established by calculation.

High-Pass Filter

HIGH channel and MID channel each are provided with one high-pass filter circuit.
The high-pass filter consists of the SEPP buffer and feeds low impedance signal with less distortion to the next stage.
Actuation of each transistor in the buffer is basically similar to that of the input buffer. Like other buffer filters, there are two functions — parallel operation and single operation of the SEPP.
Hereinafter, circuit operation at −12dB/oct. will be described.



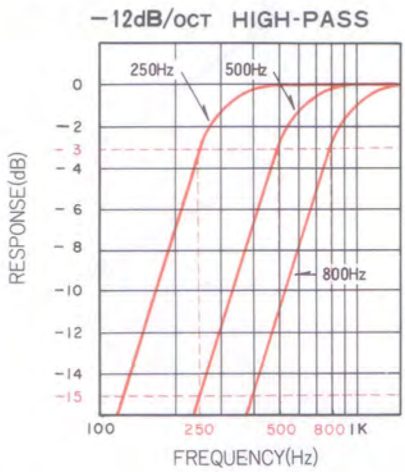
When the signal enters the buffer, low cutting of the signal is conducted at −6dB/oct. by means of C2 and R1. Cutoff frequency (fc) can be computed as follows:

$$fc = \frac{1}{2\pi \cdot C2 \cdot R1}$$ where, C2: Farad (F), R1: Ohm (Ω)

C2 includes floating capacity. R1 is combined resistance value in F board (filter element board).
Signals emitted from the buffer are fed back through R2. At this time, the signals are attenuated at −6dB/oct. by means of R2 and C1. Now, cutoff frequency fc is:

$$fc = \frac{1}{2\pi \cdot C1 \cdot R2}$$ where, C1: Farad (F), R2: Ohm (Ω)

As descrbied above, filter characteristics of −12dB/oct. is achieved from −6dB/oct. attenuation by means of CR passive elements and from −6dB/oct. attenuation by means of NF.



Low-Pass Filter

At the input section of the buffer, −6dB/oct. attenuation characteristics can be obtained by means of