Z50 MkII Instructions – ADDENDUM

The Z.50 has been totally redesigned. It is now known as the Z.50 Mk II.

The Mk II is interchangeable with the earlier model in virtually all applications and the instructions printed in the Project 60 Manual still apply.

It should be noted however that the functions of pins 4 and 7 change somewhat: any resistor fitted to increase the gain is now to be connected between 4 and 7, not 3 and 4. In addition the diode of the anti-switch-on-surge circuit must connect to pin 4 – not pin 7.

The following notes replace the relevant sections of Project 60 Manual.

Technical Description

Tr1 and Tr2 are a long-tailed pair which compare the input signal (on the base of Tr1) with a proportion of the output signal (on the base of Tr2). The input consists of:-

(a) A d.c. voltage set up by R1 and R2. As C3 is non-conducting to d.c. this input signal is compared directly with the voltage on pin 9. So long as there is any difference in these it is amplified and fed to Tr4 which adjusts itself to cancel out the difference. At d.c. therefore the voltage on pin 9 should exactly equal whatever voltage is present on pin 5. Provided that the amplifier is working it cannot do otherwise.

(b) An a.c. signal. This is fed from the preamp or other source to pin 5. Once again Tr1 and 2 form a comparator, but at a.c. C3 is operative and only part of the output signal, defined by R7 and R8, is fed back to the input. The ratio of these two resistors defines the overall voltage gain, which is $\frac{R7 + R8}{R7}$ or, with the values fitted (i.e. *R7 – 2K7, R8 – 100K), exactly 40.

D1 and D2 are used to provide a reference voltage (1.4 volts) to bias Tr3 and Tr6 at the correct level. Tr3 causes the current through Tr1 and Tr2 to be virtually independent of the supply voltage and similarly Tr6 operates as a constant collector current load for Tr4 (ignore for the present Tr5 and Tr7).

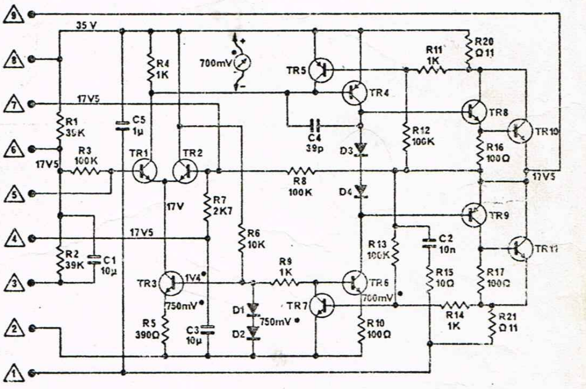
D2 and D3 maintain the correct voltage to drive Tr8 and Tr9 which in turn drive Tr10 and 11.

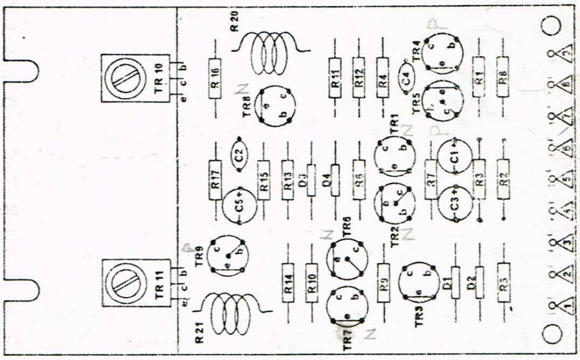
Tr5 and 7 are used to give transient protection to the circuit. If Tr5 conducts too hard it will rob Tr4 of base current, turning it off, thus reducing the amount of current that the circuit can give. Tr7 performs the same function for Tr6.

Tr5 is turned on by two mechanisms – firstly by means of R11 and R12 which detect a proportion of the voltage between h.t. and output (i.e. the voltage across Tr10). It is also turned on by the voltage across R20 which is directly proportional to the current through Tr10. Thus the higher the voltage across Tr10 the less the current it can deliver, which is as it should be if Tr10 is to be used to its full potential.

A similar mechanism detects voltage and current conditions in Tr11 and limits it via Tr7.

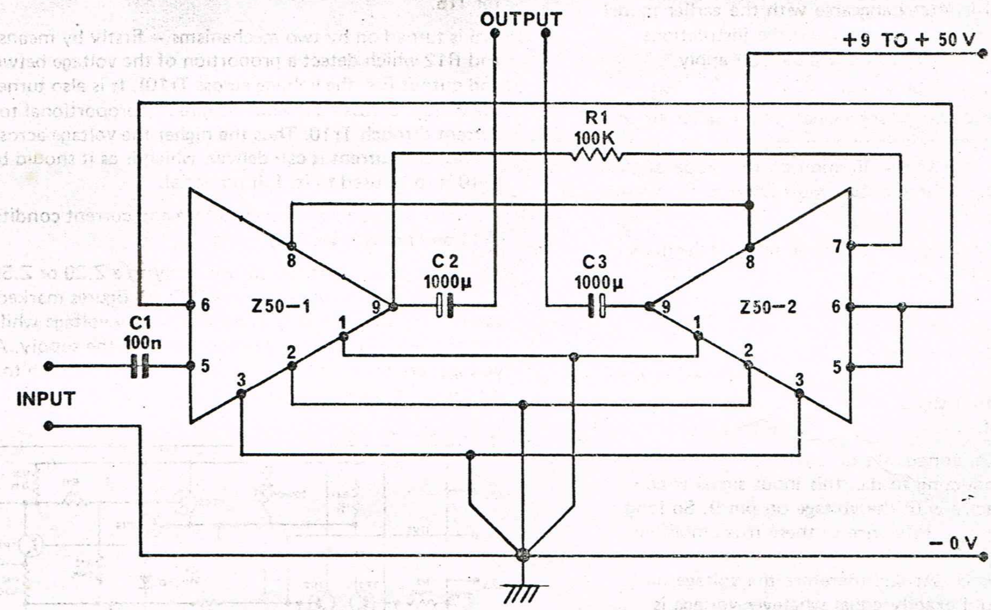
The voltages and currents shown apply to a Z.30 or Z.50 operated with a 35v power supply rail. Those figures marked with an asterisk (*) will vary very little with supply voltage whilst those not so marked are directly proportional to the supply. All voltages are taken with respect to the earth rail, with the exception of the voltage across R4.

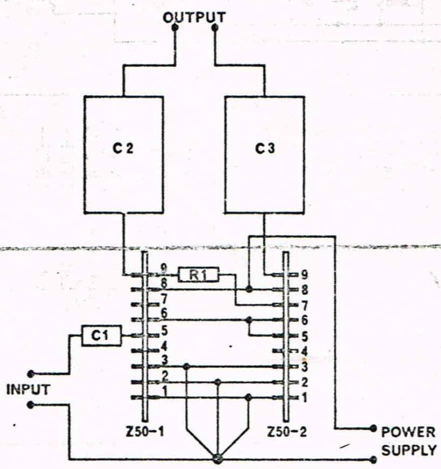




Z.50 Mk II Transistor Types

			Vce/min.		In Use: May 1972
Tr1 & 2	Small Signal	NPN	25)	ME4101, 2, 3, BC107, 8, 9, 148, 9.	E5368
Tr3	Small Signal	NPN	25	ME4101, 2, 3 BC107, 8, 9, 148, 9.	E5368
Tr4	High Voltage	PNP	50	ME0411, 2, 3 BC157, Z132. BC 212	BC212
Tr5	Low Voltage	PNP	5	Almost Any e.g. BC158, 9, 186, 7.	E5369, 5371
Tr6	High Voltage	NPN	50	ME4101, 2, 3, BC107, 147, Z131. BC 182	BC182
Tr7	Low Voltage	NPN	5	Almost Any e.g. BC107, 8, 9.	E5368, 5370
Tr8	Driver Type	NPN	50	ME6101, 2 BC107, 147, Z131. BC 182	BC182
Tr9	Driver Type	PNP	50	ME0401, 2 BC157, Z132. BC 212	BC212
Tr10 & 11	Power	NPN	50	BD155 BIP 19	BD187





The preceding circuit shows a modification to the circuit shown in Fig 4.16.2. of the Project 60 Manual. Fig B is showing a physical representation of it. Note that pins 6 are linked to give common d.c. biasing. Note also (Fig B) that the two amplifiers are mounted parallel, about ½" to 1" apart (one of the heatsink blocks shown in the Project 60 Manual is ideal) and that wires join pins 1-1, 2-2, 3-3, 6-6 and 8-8. The use of the output capacitors is recommended for two reasons: firstly they will protect the loudspeaker in the event of amplifier failure. Secondly d.c. balancing is now unnecessary.

It is important that the wiring be kept as shown, and in particular wires from 1-1, 2-2 and 3-3 connections to the earth point must be short (2-3"). This means that where more than one bridge is used on a common supply the bridges must be close together.

Heatsinking is of prime importance on the bridge. It will give 60w into 8Ω operating from 38v supply, but may have to dissipate under these conditions, up to 30w itself. Not only must a large area of thick (1/8" or so) aluminium be used but contact around the bridges must be good. All surfaces must be flat and all holes must be deburred. Silicone grease must also be used on the contact surfaces.

Used with a suitable transformer (40v, 3a) one PZ8 set to around 38v, will drive two bridges into 8Ω loads at 60 + 60w.

sinclair