11 - JUNE - 1970

AUDIO MODULATED LIGHT KIT INSTRUCTIONS INCLUDING MIXER/PRE-AMP.

CIRCUIT DESCRIPTION

The function of the translator board is to accept an audio signal and convert it so that it drives the gate of an SCR so that the current through the anode-cathode circuit (and therefore the lamps) varies in step with the input. SCR1 reacts to the high end of the audio spectrum, SCR2 to the mid range and SCR3 to the low. Normally red lamps are wired to the low circuit, green to the mid frequency and blue to the high but these may be varied as desired. In each channel frequency determination is carried out by the capacitors between the input and the integrated circuit. Circuit function is the same for each channel. The input potentiometer is an input signal level control and is used to balance the channels. The transistor is a straightforward amplifier. The integrated circuit is wired as a Schmitt trigger the critical level of which is set by the potentiometer at pin 1. The function of D1 and D2 is to clip the negative peaks and thus give the Schmitt trigger a little extra sensitivity. The output of the trigger is fed into a potential divider and then to the gate of the SCR. No coupling capacitor is used between Q3 and R31 in the low frequency channel. The high pass channel is effective from 2500 hz up to well beyond the audio range. The mid range is from 500 hz to 2500 hz and the low from 20 hz to 500 hz. The roll off points of 500 and 2500 hz are nominal design frequencies and in practice considerable overlapping will be found and is in fact desirable. The purpose of R1 is cut the sensitivity of the high pass channel a little. Although some resistance will probably be found desirable the value may be decreased if required.

GENERAL ADJUSTMENT AND USE

Adjustment can be carried out either with a signal generator or with an ordinary audio input from an amplifier or whatever equipment the translator is to be used with. If the pre-amplifier/mixer is to be used this may be in circuit when making adjustments. To some extent the 2 controls in each channel are inter-active. Set the input controls at centre of rotation so long as approximately 1 volt rms of signal is available. If a higher voltage is present rotate the potentiometers so that the slide contact is closer to ground and vice versa for a lower signal. Note that the high pass channel input potentiometer adjustment is opposite to the other two channels. If a signal generator is available adjust the second trimmer in each channel so that the appropriate light is just lit at the crossover frequencies. If a generator is not available these crossover frequencies must be judged by ear. There is nothing very critical about these adjustments although if a fine crossover point is required it may be necessary to "fiddle" with the controls in each channel. The input (either of the translator or the pre-amp) is connected across the speaker of the main equipment. Adjustment is best carried out with the lowest possible signal, that is with the input control at its least sensitive position compatible with a workable signal.

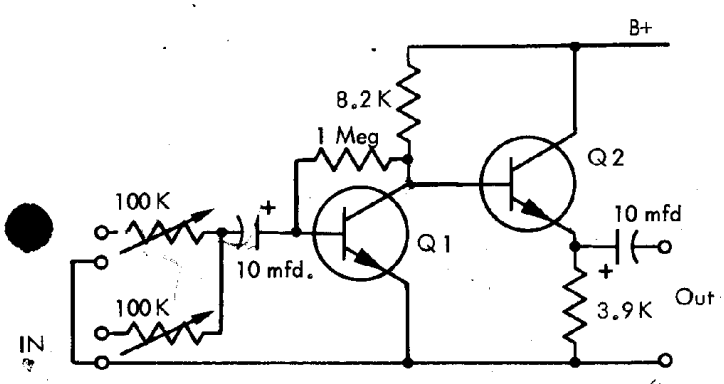
Each channel is capable of 2 amps and approximately 200 watts effective power but do not forget that they are half wave so that in theory lamps rated at 400 watts total may be used per channel.* It is suggested that 300 - 350 watts actually be used - say two 150 watt lamps per channel. Whatever is decided upon the current through each SCR should not be greater than 2 amps maximum. The heat sinks of the SCRs should be spaced off the board a little and probably the easiest method is to pass a screw through the tab of the SCR and the heat sink and secure with a nut under the sink; then pass the screw through the printed circuit board and secure on the copper side with another nut. In this way the first nut will act as a spacer and keep the sink away from the board. Mount the sinks with their fins towards the parts on the board as on no account can one sink be allowed to touch another. The SCRs are bent into an "L" shape so that the maximum amount of tab surface is in contact with the sink. The leads therefore point upwards after mounting. The centre lead is not used as it is in electrical connection with the tab and the anode; this lead should therefore be cut off as close to the plastic body as possible. The lead of the SCR closest to the sloping side of the plastic body is the gate and the lead at the opposite side is the cathode. Short lengths of wire are soldered to each and passed through the board. The leads from the gates are soldered to the individual pads marked "G" and the cathodes are all soldered to the large ground connection. Do not be confused by the fact that this is also marked with a "G" at the side of the board.

The integrated circuits have pin 8 indicated by a flat on the side of the case. The appropriate hole for this pin is shown on the copper side of the board with a little elongation of one pad. The IC pin numbering on the schematic is as viewed from the top of the unit.

Resistors R35 and R36 will run hot. The voltage across D3 should be 3.6 volts and across C9 should be 18 volts. Current consumption for the translator board is 70 ma. Mount R36 3/8" off the board to provide heat convection.

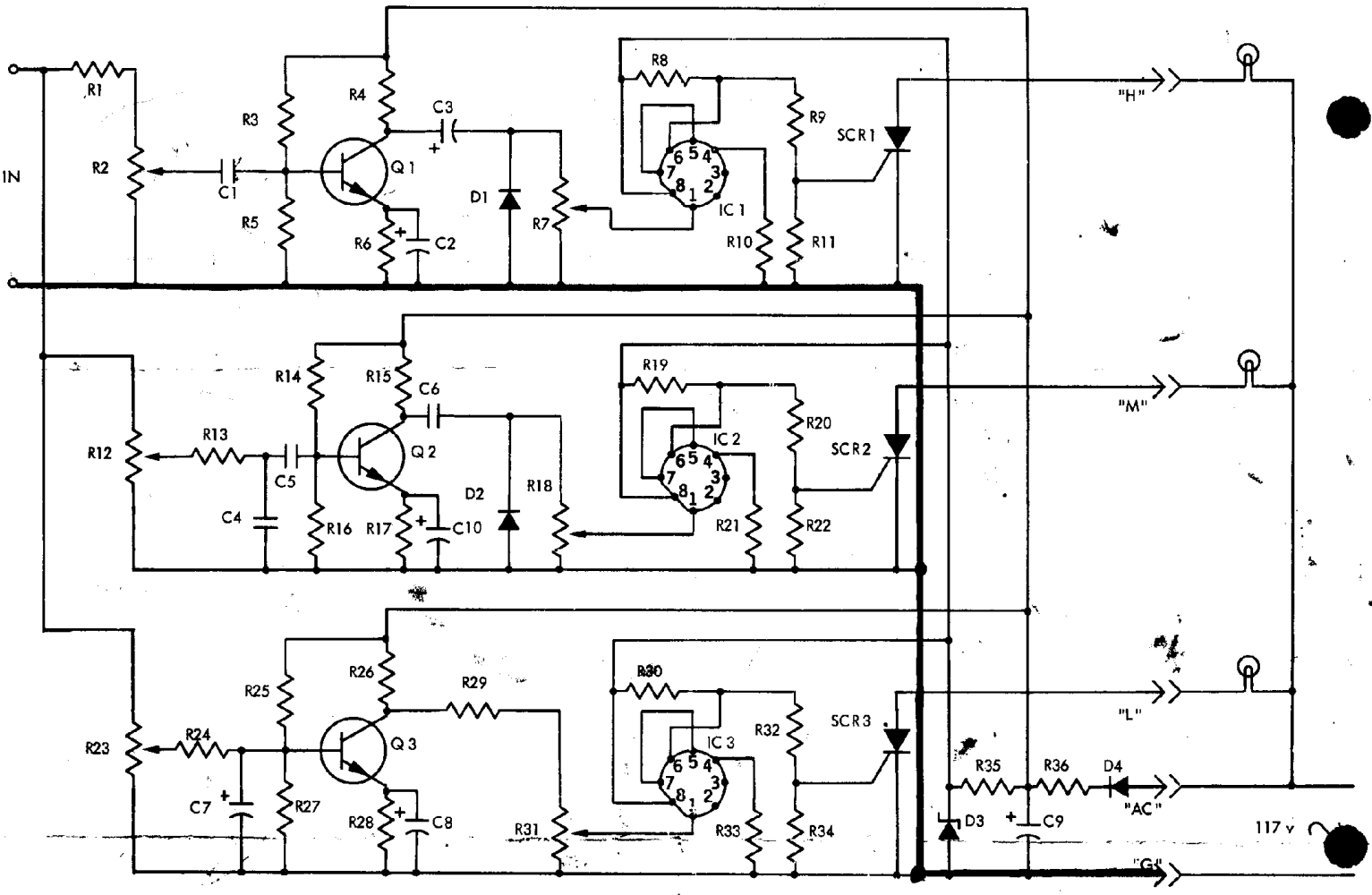
VERY IMPORTANT! This unit is operated direct from the line and some parts are therefore in electrical contact with one side of 117 volts AC. Care must therefore be taken when handling the board, lamps etc. In particular the heat sinks, cathodes, D4 and one end of R36 should be treated with the utmost caution as must the leads to the lamps. Also if test equipment is used crossed AC "grounds" must be watched for. Finally all ground connections are common to one side of the line voltage and if the unit is mounted in a metal box, insulated receptacles must be used and the ground kept insulated from the box.

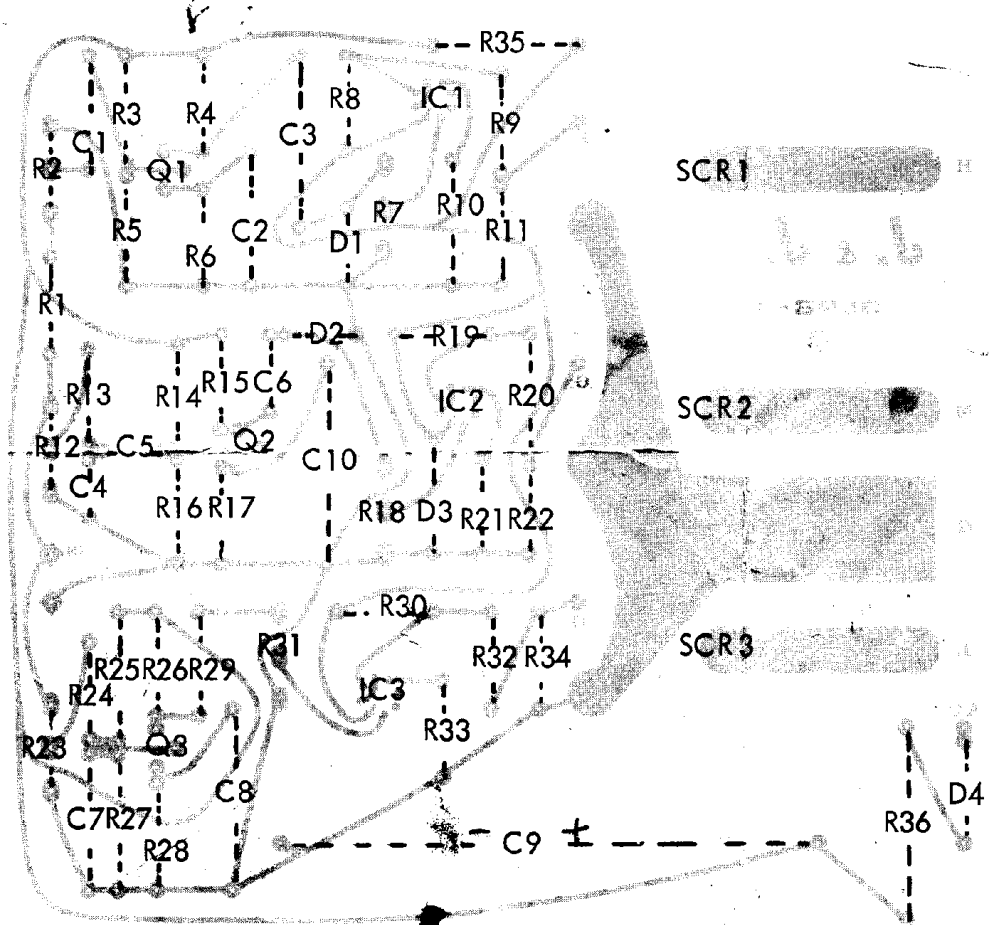
* When two or more lamps are used in each channel they should be wired in parallel - not in series with each other.



PRE-AMPLIFIER/MIXER

This is for use with stereo or where a signal lesser than 1 volt rms is expected. Minimum signal is 100 mv. The 2 trimmer potentiometers are used as gain controls and to balance any channel differencies. Wiring is on a piece of Veroboard. The B+ can be taken from the + end of C9 on the translator board (18 volts) and the ground must be common to the translator ground - refer to the Very Important comments above. Each input is taken to the speakers of the equipment, where mono is used just ignore the other input. The output goes to the input of the translator. It is highly unlikely that any amplifier has a ground common to the line AC but if it has watch for the crossed AC "grounds" mentioned above.





~~R1, R3, R7, R23~~	= 1K
R2, R12, ~~R23~~	= 1K trimmer potentiometers
~~R3, R14, R25, R13~~	= 15K
~~R5~~, R15, ~~R27~~	= 1.5K
~~R4~~, R15, ~~R26~~	= 8.2K
~~R7~~, R16, ~~R31~~	= 4.7K trimmer potentiometers
~~R8~~, R19, ~~R30~~	= 820 ohms
~~R9~~, ~~R20~~, ~~R32~~	= 62K
~~R11~~, ~~R22~~, ~~R34~~	= 120K
~~R10~~, ~~R21~~, ~~R33~~	= 47 ohms
~~R24~~, R29	= 4.7K
(R35)	= 240 ohms 1 watt 5%
(R36)	= 600 ohms 5 watt
C1,	= .01 mfd
~~C3~~, C7	= ~~1 mfd~~ 1.25
~~C8~~, C8	= ~~22 mfd~~ 20
~~C4~~, C5	= .033 mfd
C6	= .1 mfd
~~C9~~	= 1000 mfd
~~C10~~	= 50 mfd
D1, D2	= FDH series
D3	= 3.6 volt zener diode
~~D4~~	= 1N4005
SCR1, 2, 3	= C106B
Q1, 2, 3	= AR202 or equivalent
IC1, 2, 3	= uL914

Miscellaneous, 3 heat sinks and printed circuit board. Instructions.

Any differences from the above will be clearly marked except for small capacitor variations.