

QUAD LOW FREQUENCY OSCILLATOR

1. INTRODUCTION

The 80-23 Quad LFO is provided as a low cost complement to the 80-19 Dual VCLFO, and is intended for use in applications that do not require voltage control of LFO frequency or precision modulation signals, merely a cyclically changing control voltage. Four LFOs of identical design have been readily incorporated onto a single PCB. Each LFO output has six switchable waveforms:- square (SQ),

triangle (TR), sawtooth (SA) and pulse (PU) together with inversions of sawtooth and pulse (SA & PU respectively).

2. DESIGN

The circuit diagram for one of the four LFOs is shown in Figure 2. The design is conventional for LFO circuitry and utilises a two op-amp configuration which simultaneously generates square and triangle waveforms. The rate of charge of capacitors C1 and C2 (forming, in effect, a non-polarised electrolytic) is governed by the setting of RV1 and the value of R1. However, using switch S1, diodes D1 and D2 may be switched in circuit to force rapid discharge of an otherwise symmetrical waveform. The direction of D1 or D2 selects either a falling or rising ramp waveform or one of two state mark/space pulse waveforms. The selected output waveform is present at pole A of S1, where each waveform is selectively amplified by 1/4 of IC 3 to bring levels up to about +/-5V P-P, with resistors R5 and R6 providing the necessary scaling factors. The four pulse and sawtooth waveforms are a little below the triangle and square levels due to the diode drop (about 0.6V) caused by either D1 or D2. It was felt that depth controls were not needed on this module as most other modules have an attenuatable control input suitable for an LFO signal.

Different ranges of "rate" may be obtained by adjustment of selected components. Changing the value of R3 will alter the maximum rate attainable, with lower values producing a higher rate. The values of C1 and C2 can be altered such that larger values produce longer sweep times. The value of RV1 on the circuit diagram is 1M Lin, which provides a good range of sweep rates. However, the spread is a little uneven - ideally a 1M reverse Log pot should be used but these seem very difficult to obtain at the present time.

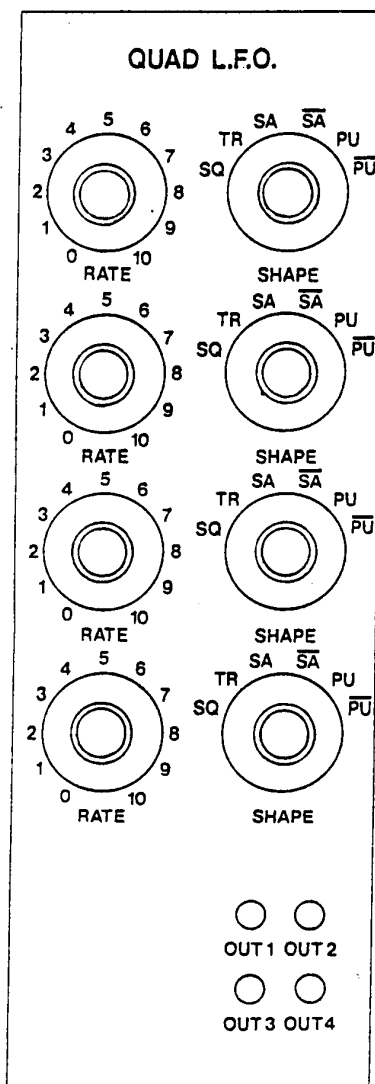


FIGURE 1. 80-23 PANEL LAY-OUT

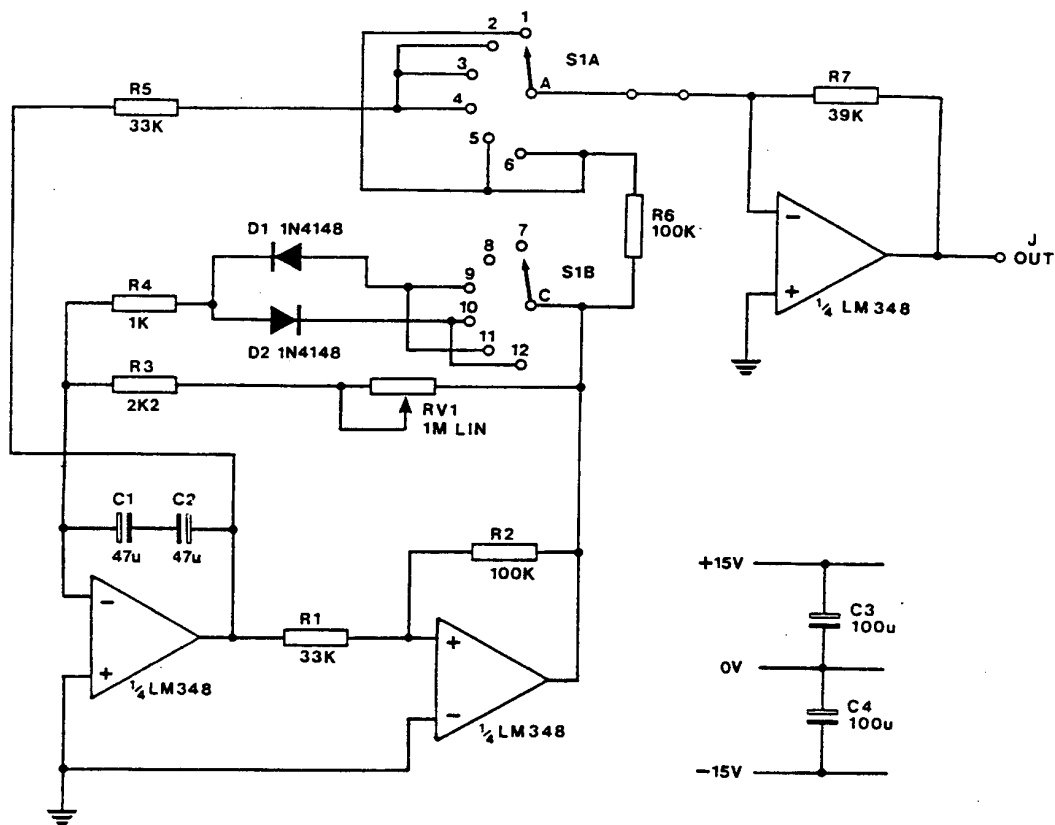


FIGURE 2. 80-23 QUAD LFO CIRCUIT DIAGRAM

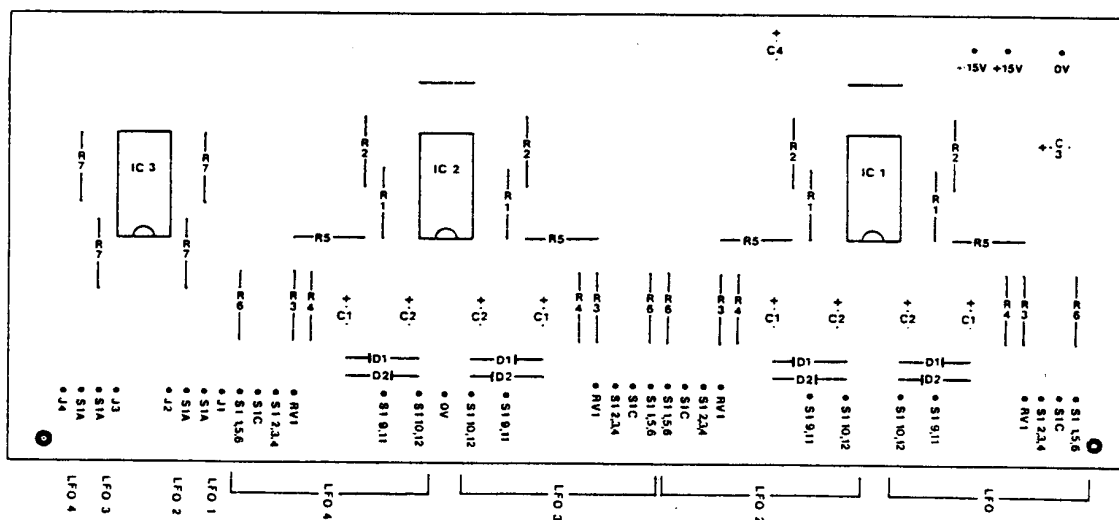
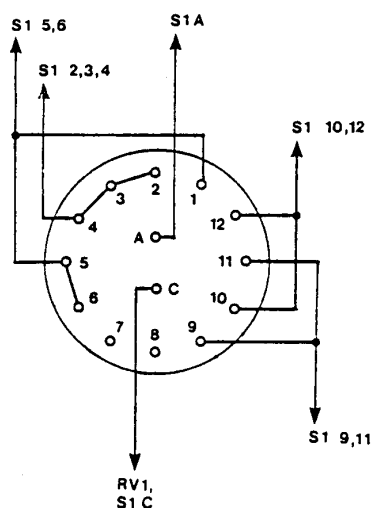
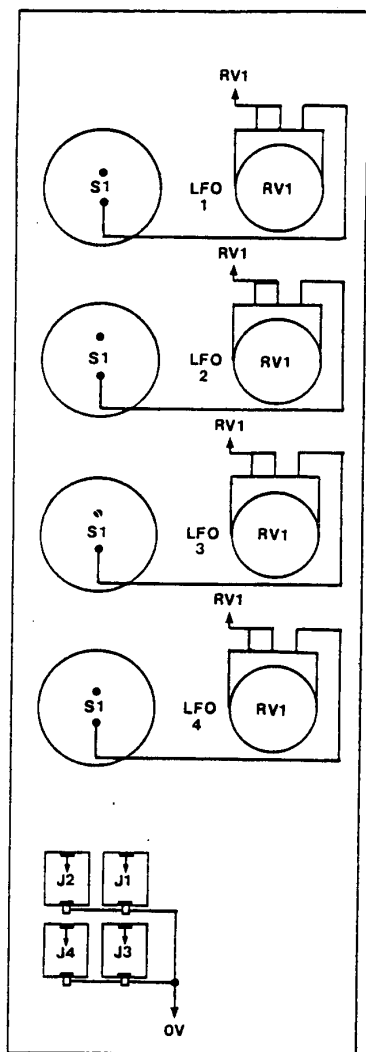


FIGURE 3. 80-23 PCB COMPONENT LAY-OUT



3. CONSTRUCTION

The PCB component layout is shown in Figure 3. Construction is very straightforward and should begin with the circuit board assembly in the normal manner. The potentiometers, rotary switches and output sockets may be mounted on a front panel as shown in Figure 1. The connections to be made between the front panel and the PCB are shown in Figure 4.

4. IN USE

The uses of an LFO within a modular synthesiser are many and varied. For instance, the four LFOs provided by this module may be connected to four different parameter inputs to produce a constantly varying sound. Where more than one input per parameter is provided, waveforms may be combined producing a less predictable source of modulation. Alternatively, a number of LFOs may be mixed (in a VCM) and their composite output used as a complex modulation signal. It should be noted that although the outputs are set at about $\pm 5V$ as opposed to 0V to +10V, most synthesiser functions can still be affected. Where both a control potentiometer and a CV input socket exist for one function, the former may be used as an adjustable bias control.

5. COMPONENTS

RESISTORS, 5%, 1/4w carbon film

R1,5 (x4)	33k
R2,6 (x4)	100k
R3 (x4)	2k2
R4 (x4)	1k
R7 (x4)	39k

POTENTIOMETERS, SWITCHES

RV1 (x4)	1M lin. rotary
S1 (x4)	2P6W rotary

CAPACITORS

C1,2 (x4)	47u PCB electrolytic
C3,4	100u PCB electrolytic

SEMICONDUCTORS

IC1,2,3	LM 348
DI,2 (x4)	1N 4148

FIGURE 4. 80-23 PANEL/SWITCH WIRING