



wanted information only. This means that long gaps appear on the transmission unless the memory is completely filled.

A modification to the KM4000 to overcome this problem and allow any length of message, however short to be re-circulated is shown in Fig. 11.

CW output from IC11b pin 10 is fed via inverting buffers IC17a, b, to reset the binary counter IC18, whenever CW is being sent. As soon as the CW input stops, a '1' on MR starts the 14 stage binary counter IC18 counting inputs from the address line via buffer IC17c. When stage 06 is reached the positive-going edge triggers mono-stable IC19 producing a negative-going pulse which after buffering/inverting is used to turn off Q1 and reset the KM4000. With SW closed normal operation of the keyer occurs.

If shorter or longer breaks in transmission are required before re-circulation of the memory, different stages of the binary counter output (IC 18) may be used. This may necessitate a change in value of the 2.2 uf mono-stable timing capacitor between pins 1 and 2 of IC19.

## CW DECODING

Owing to the high speeds necessary to take full advantage of short bursts, some means of decoding is required. The most popular method is to use a 4 speed tape or cassette recorder, modified with continuously variable speed. In this way it is possible to decode bursts received during the previous listening period. It is important to ensure that any recording equipment is not prone to RFI as playback is used during the station's transmit period.

A method of overcoming the difficulties encountered when reducing the speed of recorded information is to use an audio frequency up-converter. Audio from the receiver is up-converted to around 8.5Khz and when reduced on playback by a factor of 8 times produces an easily readable output frequency of 1Khz.

A design of this type is described by LA8AK in the September 1982 issue of *Radio Communication*.

## BEAM HEADINGS

For normal forward scatter communication best results will be obtained by directing the antenna towards the other station using great circle bearings. At optimum path times beaming 5 or 6 degrees north during the morning and south by the same amount in the evening im-

