In applications where a matched 50-ohm load is required, a Type 874-G10 or -G20 Pad should be inserted between the mixer rectifier and the signal circuit, since the mixer rectifier does not have a 50-ohm input impedance. The pad also tends to make the local oscillator voltage applied across the crystal (and hence the conversion efficiency) less dependent on the output impedance of the signal circuit at the local-oscillator frequency. Figure 2 shows the standing-wave ratios obtained with various pads.

6. CONNECTIONS. Connect the local oscillator (refer to paragraph 3) to the mixer connector marked L.O.[1], and connect the signal source to the connector marked INPUT[2] at the opposite end. For the best possible shielding, the mixer should be connected directly to the signal source. A length of double-shielded coaxial cable may be used where less than maximum shielding is acceptable.

The connector on the branch end of the mixer is the converter output, and this should be connected to a communications receiver or suitable i-f amplifier (refer to paragraph 4). The patch cord to the receiver input should be kept as short as possible. One length of a Type 874-R22 Patch Cord is satisfactory for use with most receivers. Type 874 Adaptors are available for most other types of connectors.

7. CHOICE OF FREQUENCIES. Set the local-oscillator frequency either above or below the signal frequency by an amount equal to the desired output frequency. At frequencies below about 100 Mc it is suggested that the local oscillator be kept on the high-frequency side of the signal to be detected to secure maximum rejection of the local-oscillator voltage by the output filter.

The second, third, and higher harmonics of the local-oscillator frequency can be used to beat with a signal with a slight reduction in sensitivity. This method of operation makes it possible to extend the frequency range considerably above the upper limit of the local oscillator. Since the harmonics are generated in the crystal mixer, the conversion is not dependent on the harmonic content of the local oscillator. Best results are generally obtained with the lowest or next-to-lowest possible harmonic.

Since it is possible for harmonics of the local oscillator to beat with harmonics of the high-frequency signal, precautions should be taken to avoid setting the local oscillator to beat with a harmonic of the signal rather than with the fundamental. Usually the magnitudes of the harmonics are too small to cause trouble. However, to eliminate possible confusion, the proper local-oscillator frequency, f_o, should be calculated from the equation:

$$f_o = \frac{f_s \pm f_r}{n}$$

[1]Marked R in earlier models.
[2]Marking omitted in earlier models.