

# AN IMPROVED 7360 CONVERTER FOR 14 AND 21 MC

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**D**ESCRIBED below is a compact two-band converter for 14 and 21 mc. The converter features a toroidal antenna coil, a Q multiplier and a monitoring arrangement that really works. Power is borrowed from the communication receiver, and the power consumption is kept at a minimum by using just three tubes—a 7360 as the mixer, an ECC81/12AT7 as Q-Multiplier, and a 0A2 as the voltage regulator.

The article on a 7360 mixer that appeared in the *CQ*, October 1966, issue provided the starting point for the writer's experiments.<sup>1</sup> It was found that a toroidal input coil will provide quite sharp selectivity without the necessity of making the coupling to the mixer light and thus sacrificing signal strength. The toroidal coil also ensures freedom from stray pickup which can impair the performance of the 7360. The toroid used is a small ferrite ring of 1/2" diameter, suitable for use up to 30 mc. The proper turns required for the primary, secondary and the feedback winding were arrived at by trial and error so as to optimize the performance.

Additional selectivity is obtained by the use of a Q multiplier which enables the signal to be boosted up to 20 db by regeneration. Near the point of oscillation, the antenna circuit becomes highly selective and the input tuning becomes quite critical. Image rejection is excellent, even with a multiband antenna.

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<sup>1</sup>Schuler, C., "An All-Band 7360 Converter," *CQ*, October 1966, p. 57.

Going through several articles on 7360 mixers, the writer found that one important point has been overlooked by all writers, a good way of monitoring the transmitted signal on c.w., a.m. and s.s.b. Even with the writer's 150-watt transmitter, the 7360 was getting overloaded, in spite of the antenna terminals being shorted in the transmit position. The effect was not very noticeable on c.w., but gave rise to distorted audio on phone.

The writer tried cutting off the screen supply, but that did not work. Then the writer tried strapping the cathode line to the monitoring level control which is inserted in the cathode line of the gain-controlled stages of the receiver. The result was that the 7360 was getting completely blocked by the high cathode bias of 30 to 50 volts required by the receiver. If the monitor control was advanced too far, the result was again distorted output due to the 7360 working too near cutoff and the receiver getting under-biased!

Finally the writer solved the problem by clamping the cathode bias of the 7360 in the monitoring position at 6.2 volts by a 6.2 volt one watt zener diode. With a well-shielded transmitter and T/R switch, a 4.7-volt zener may be used. When it conducts, the zener may introduce some noise which, however, is of no consequence in monitoring. Also the Q multiplier is biased to cutoff in the transmit position. Now there is no overloading of the 7360 and distortion-free monitoring of phone signals is possible.

The writer has wired the converter on a



