

|                 |              |
|-----------------|--------------|
| R12             | 15           |
| R14             | 4.7k         |
| R15             | 1.5k         |
| C1, C3, C4, C11 | .1 mF 20 V   |
| C5              | 100 pF       |
| C6              | .001 mF 20 V |
| C7              | 100 pF       |
| Q1              | MPF 102      |
| Q2, Q4          | 2N3638A      |
| Q3              | 2N2222       |
| Q5, Q6          | 2N2222       |

IC terminals Molex Soldercon  
Series 90 Mintron Display (6)

Note: Transistors, ICs, terminals and display are available from Digi-Key Corp., P.O. Box 126, Thief River Falls MN 56701.

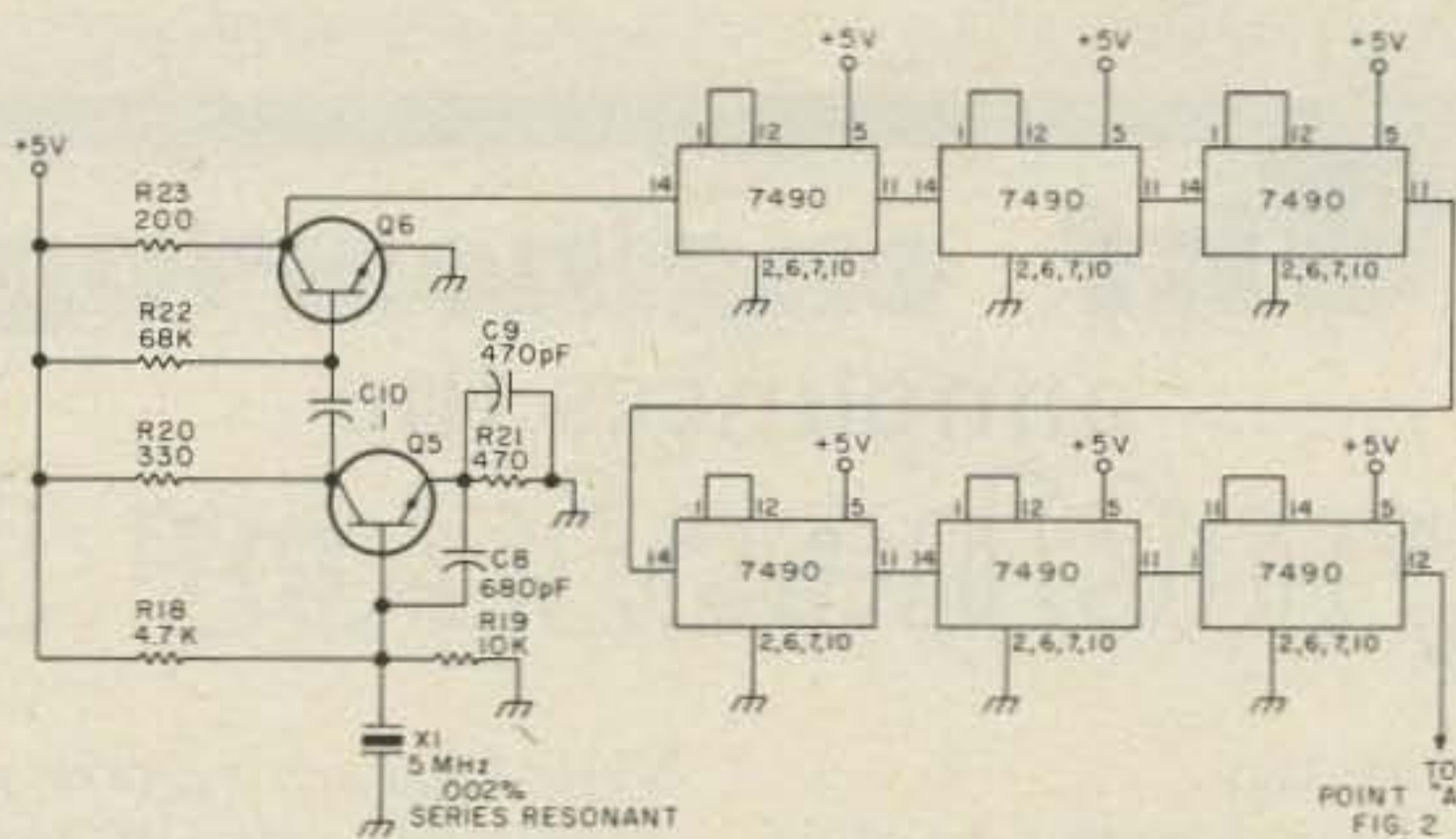


Fig. 7. Crystal controlled timebase.

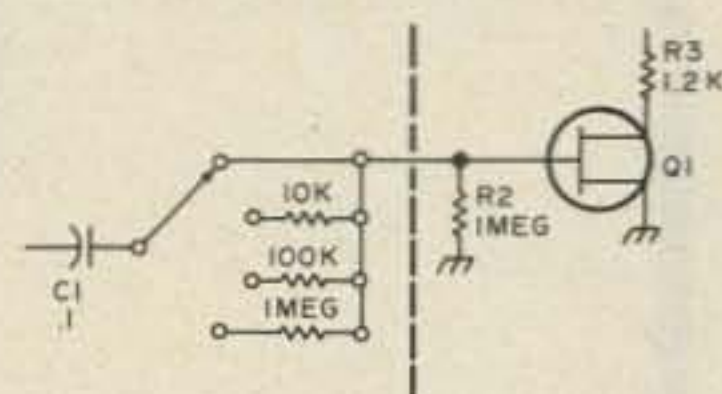


Fig. 8.

Note: For a more versatile counter, and to prevent overloading the front end, the input circuitry shown in Fig. 8 should be added.

## NEW PRODUCTS

### ICOM's IC-202

What has two meters, three Watts, and a swinging VXO wrapped up in a \$280 package? The IC-202, of course!

A few months ago, Jay W6BWB, took his Japanese-born wife Kiyo to visit relatives in Japan. A trip to Akihabara, Tokyo's Electronics District, was also on the agenda. It was a fortunate bit of timing that ICOM had just introduced six meter and two meter walkie-talkies in Japan since Jay was "hot to trot" to get on two meter sideband after monitoring the activity for some months. It was also fortunate because the price was very reasonable when compared to other units available.

So he bought the rigs (for six and two). Listening on six or two in Tokyo was an eye-opener. I suppose it was because of their code-free license (held by many very technically competent engineers, by the way), but the bands were filled with activity day and night. Even from 60 miles outside of Tokyo, Jay found high activity.

Back in the states, the rig proved quite adequate for local QSOs out to 60 miles or so. The surprise came when he was able to work Los Angeles and San Diego some 320 and 420 miles down the mountainous coast of California! Jay's QTH is one of the better ones in Santa Cruz, but even with his KLM 16 element beam and 70 foot tower his total height above sea level is less than 125 feet. No matter how you slice it, 420 miles on 3.2 W PEP is nothing to sneeze at!

I've been able to check out two IC-202's at SBE's engineering facility. Both showed good results. Both had less than 0.125 uV sensitivity for 10 dB S+N/N ratio. Both gave better than 70 dB intermodulation rejection (+10 and +20 kHz signals required to equal the level of the desired signal). The AGC is reasonable... 15 dB audio change for over 70 dB rf change (0.3 uV-1,000 uV). Audio output is adequate for a portable package but may be marginal in noisy vehicles in mobile service... about 1 W.

The transmitter shows good design with spurious and harmonic content below the 70 dB range of the Spectrum Analyzer. Distortion products at the 3.2 W level allowed by the ALC are better than 30 dB below each tone (-36 dB by ARRL stan-

dards). Some have been able to increase the output to over 4 W PEP by backing off the ALC, but the 1.5 dB gained by doing this is probably not worth the 5-6 dB of additional "garbage" it causes.

The unit's size makes it a natural for trips, mountain-topping, battery operation, "natural power," and emergency use. It is roughly the size of the popular TR-22 FM transceiver (2 1/4 x 6 1/2 x 7 1/2). It features built-in batteries (nine "C" cells), internal whip antenna, external power jack, external antenna jack (SO-239), and external speaker jack.

The VXO covers two ranges as it comes from the factory, 144.00-144.20 and 144.20-144.40. Two additional ranges are available or an external VFO can be used. The VXO is calibrated in 5 & 10 kHz steps and can be set within about 1 kHz of a desired frequency. While this is not as accurate as rigs like the Echo II (which can be set within 100 Hz), it is good enough so that you can tell that a station is there.

The rig sports Receiver Incremental Tuning (RIT) so that the receiver can be tuned independently from the transmitter. The RIT has a center-off detent.

CW is accomplished by throwing a front panel switch each time CW is desired. This sets up a carrier shift of about 1 kHz for automatic offset. Some may find that the switch is inconvenient as it must be turned off again in order to receive. However, this is a minor inconvenience. CW output is about 4 W.

The "S" meter is of the "hang" variety making signal levels easy to read. Since it works off the AGC line it does not read below 0.5 uV, however, even though this is well into the "Q-5" area. The "S" meter doubles as an rf output indicator.

There is no squelch on the IC-202. While this is not considered a problem by many sideband operators, I like to have it on my rigs. I find it convenient.

Of the seven or eight IC-202 owners in the San Francisco Bay area, I don't know of any who have been dis-

appointed with their units. Some have had some drift problems because of temperature variations in mobile service, but part of this seems to be traceable to using cheaper grades of American crystals not specifically cut for VXO service. ICOM has not published full specifications for the crystals and so far only includes 144.0-144.4 crystals. Since operations in many parts of the country center around 145.010 in keeping with the .010, .110 tradition on other VHF bands (6m, 2m, 220, 432, 1296), ICOM might do well to include the 145.0-145.2 MHz range at least as an option. This might eliminate the spec problem.

Speaking of frequencies, due to the very rapid growth of SSB in the San Francisco Bay area we have frequent QRM problems when QSOs get going in several communities independently. Since cross-town signals are quite loud, signals from other areas often aren't noticed. However, the poor guy located in between two such QSOs ends up with a real problem!

Perhaps a lesson from the 11 meter bunch would be in order. We've already made a gentlemen's agreement to use 145.005 for "DX" with 145.010 for monitoring and calling. Then "private" QSOs move up 20 or 30 kHz to get out of the way. CBers go one step further in that each community has its "channel" so that when they QSY off the calling channel they don't end up on distant QSOs. While something this formal might not be desired, it has the advantage that one can find someone in a specific area by calling on that frequency. I figure if "Red Rover" can handle it, hams ought to be able to do it!

One last comment. Bob WA6MUG took his 202 up to Lick Observatory on Mt. Hamilton (3500 feet). He worked many Bay area stations plus several hams down at Webster Radio in Fresno... some 120 miles. Signals were very good all the way around. The clincher is that Bob was using battery power and the internal whip antenna! The IC-202 promises to be a fun radio.

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