Terry L. Dobler WA7ZGP
1205 Howard
Boise ID 83706

CB to 10

— part XXXI: simplified offsets

With the growing number of CB-to-10-conversion articles, an urge to do my part and liberate one from 11 meters finally got the best of me. I obtained a Realistic TRC-452 and was then faced with the problem of which of the many band plans to use. A listen on 10 with the FT-101 only served to compound the problem. Then along came the January, 1980, 73 with a CB-to-10 FM conversion, and I was sold!

A Sams for the 452 was obtained and studied at great length. The TRC-452 uses a uDP-585 chip as the heart of the synthesizer. This chip has a BCD programmable divider, so it was decided to use thumbwheel switches for channel selection.

The unit was then placed on 10 FM using the January, 1980, and November, 1978, 73s as a guide. The coverage using the thumbwheel switches is 29.000 to 29.990 MHz, so care must be used to ensure that all transmissions are in the amateur bands, but no trouble has been experienced with this. If you are nervous, an additional circuit could be added to prevent out-of-band transmission, but that's another project.

The only thing left to do was to find a *simple* circuit to obtain the 100-kHz offset used by repeaters on 10. Another search through back issues of 73 yielded the 600-kHz offset for 2m which became the inspiration for the circuit in the accompanying diagram.

The offset circuit consists of two main portions: the subtraction logic and the switching logic. It is placed between the 100-kHz BCD switch and the programmable divider inputs. Four exclusive NOR gates are used to achieve subtraction in conjunction with two NAND gates used as inverters and four 1N914 diodes wired as OR gates. The 74LS266 was chosen, as were all of the parts used, because it is readily available. Since it uses open collector outputs, resistors R7 through R10 must be used, but if a 74135 exclusive NOR gate package can be located, the four collector resistors can be eliminated, further simplifying construction. Resistors R1 through R6 are all pull-down resistors to ensure

that the gates see the correct logic levels.

The 74157 is a quad 2-line-to-1 data selector. A pair of 7400 NAND gates and a 7805 regulator to interface the offset circuit to the radio make up the switching logic. The TRC-452 uses an 8-volt line which goes low on transmit to switch the radio between receive and transmit. This line is brought down to the 5 volts required by the TTL logic by the 7805. A switch on the front panel is used to remove the 8-volt transmit line when no transmit offset is desired.

If you sit down and work out the innards of the subtraction logic, it will become obvious that it is a binary rather than a true BCD subtraction, but this is really only a problem using BCD switches when 1 is subtracted from zero. The answer is 15 instead of the 9 we would get with a BCD subtraction. Rather than add more circuitry to gloss this over, I decided to use a NAND gate left over to sense this invalid code and inhibit the offset. This is the function of U3C and conforms with the main design goal of a simple, easy-to-build circuit.

Hopefully, this 100-kHz offset will be of use to others who are converting this or similar CB units for use on 10-meter FM. Pick up your soldering iron and have at it! I'll see you on 10 FM. ■
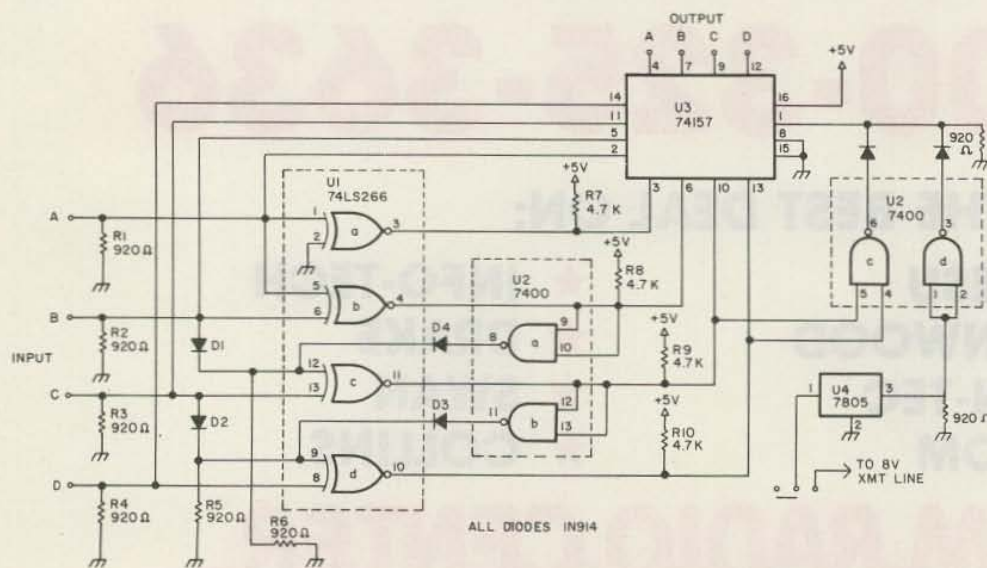

Fig. 1.