



The Drake 2-NT CW Transmitter and 2-C Receiver

When the new Drake 2-NT transmitter and 2-C receiver arrived the other day, I had to rush right home and hook them up to an antenna. I have a base-loaded multiband vertical on 80 and 40, so I didn't know how well I'd be able to work out. After a quick perusal of the excellent instruction books, and connecting them together for semi break-in CW, I was all set to go. A quick three by three call on the 80 meter novice band netted three callers up and down the band; a WN1, a WN3 and a WNØ. I called the WNØ and asked the others to QRX. It turned out that the WNØ was out in Colorado and had never even heard a station from New Hampshire. After exchanging reports we had a nice little rag-chew at about 13 wpm. The 2-NT held up very nicely with 75 watts input—I was running 569 out in WØ land. Next the WN3—nice report from Philadelphia, 589. The WN1 was almost next door, so the 599 report wasn't too surprising. And so it went, nice reports from novices all over the country.

Next I changed the tap on the vertical and tried forty meters. Lots of QRM, but when I found a clear spot, the 2-NT didn't have any trouble at all working out with very nice reports. The excellent sensitivity of the 2-C picked up the weak ones and the selectivity took care of any adjacent rock crushers. Then up to 20, 15 and 10. For these bands I plugged in a VFO so I could move around a bit, connected up the tri-bander and looked

for some DX around 14010. I heard lots of Europeans coming through; a short call to a PAØ in Rotterdam resulted in a 559X report followed by several stations calling from DL, SM and OZ lands. After cleaning up the minor pileup, I moved up to 15—same story in Africa. Some nice reports on the 100 watt signal from ZS6 and 5A3 stations. By this time it was pretty late in the evening so ten meters was pretty well closed down; I didn't hear any stations on CW, and very few on phone. Perhaps some other time.

After using the 2-NT for several hours, a few of the hidden features that aid in operating ease become apparent. Basically this transmitter is no different from many other low power CW transmitters; however these hidden features make all the difference in the world. Essentially, the transmitter is a three tube affair, with a crystal oscillator, driven amplifier and final power amplifier. The driven amplifier output and power amplifier input circuits are broadband tuned circuits that are factory adjusted, so no tuning is required by the operator. The pi-network in the output of the power amplifier is designed for 50 ohm coaxial lines, and the loading of this network is also factory set. All the operator has to do is turn the rig on, tune the plate tuning capacitor for a dip in plate current, adjust the *power set* for the desired power input, hook up the antenna and go on the air. And, if you don't want to tune for meter dip, you can

tune for maximum brilliance of a built-in neon bulb. Operation is simplicity in itself and it takes longer to read about it than to do it. In addition, no external antenna changeover relays or receiver muting switches, no added TVI filters or "harmonikers"; they're all included inside the 2-NT!

The 2-NT transmitter uses grid block keying and extremely clean, crisp CW is obtained by a special pulse and delay circuit. Additional features of this circuit are afforded by the relay which it controls. This relay switches the antenna from transmitter to receiver, mutes the receiver, turns the sidetone off and on in time with your keying and grounds the cathode of your VFO if you use one.

A built-in transistorized 900 Hz phase shift oscillator generates a sidetone which may be used for monitoring your keying. There is a connector on the rear of the 2-C receiver for the sidetone signal; on other receivers it should be connected to the arm of the audio gain control. With these connections, the receiver works normally during receiving, but when it is muted for transmitting, the sidetone comes through the phones. In addition, when the transmitter is placed in the standby position, the 2-NT may be used as a code practice oscillator in conjunction with the receiver. In this mode, the key only controls the sidetone oscillator; none of the other stages are energized.

Another operating aid is the spot switch. With this switch you can spot the frequency that you are operating on without transmitting a signal. It is always good operating practice to listen before transmitting, and the spot switch on the 2-NT allows you to do just that. Only the low power frequency determining stages are energized during spotting, no power is applied to the final stage.

All in all, the 2-NT transmitter is one of the easiest to operate that I have ever used. All the controls have a purpose, and all the set and forget type controls have been adjusted at the factory. In addition, no accessories are necessary to put an outstanding signal on the air. For the novice, the 2-NT appears to be an ideal *starter* transmitter; even many generals will find it to their liking.

The Drake engineers really put their heads together when the 2-C receiver was on the drafting boards. What they have come up with is a neat combination of vacuum tubes and transistors that does a tremendous job. Vacuum tubes are used throughout the amplifier, mixer and *if* stages, but transistors take over in the high frequency oscillator, detector, BFO, AGC and audio stages. A total of five tubes and seven transistors do the bulk of the

job; along with eight diodes for detecting and rectifying duties.

The rf lineup is relatively straightforward; a 12BZ6 rf amplifier, a 12AU6 high frequency mixer, two 12BE6 converters, and a 12BA6 50 kHz *if* amplifier. The two inputs to the high frequency mixer consists of the output of the rf amplifier and the output of the 2N3394 crystal oscillator. The output of the mixer stage is 3.5 to 4.0 MHz. This 80 meter signal is mixed with a 3955 to 4555 kHz VFO in the first 12BE6 for a 455 kHz *if* output. The second 12BE6 converter accepts either a 405 or 505 kHz input to put a 50 kHz upper or lower sideband into the 12BA6 *if* amplifier. A 50 kHz bandpass filter in the 12BA6 input provides an adjustable passband selectivity of

Drake 2-C Specifications

Frequency coverage:	3.5-4.0 MHz, 7.0-7.5 MHz, 14.0-14.5 MHz, 21.0-21.5 MHz and 28.5-29 MHz with the crystals provided. Accessory crystals will cover any 500 kHz segment between 3.0 and 30 MHz.
Modes:	SSB, CW, AM, RTTY
Selectivity:	Selectable passband filter provides: 0.4 KHz at 6 dB down and 2.7 KHz at 60 dB down. 2.4 KHz at 6 dB down and 9.0 KHz at 60 dB down. 4.8 KHz at 6 dB down and 16.8 KHz at 60 dB down.
Stability:	Less than 100 Hz after warm up or for 10% line voltage change.
Sensitivity:	Less than 0.5 μ V for 10 dB signal plus noise to noise on all amateur bands.
Calibration:	Main dial calibrated 0 to 500 KHz in 10 KHz divisions; vernier dial calibrated in approximately 1 KHz divisions. Both the main dial and vernier are adjustable for calibration purposes.
AVC:	Amplified AVC system has slow or fast discharge and less than 100 microsecond charge. Less than 6 dB audio change for 100 dB rf input change.
Audio:	4 ohms output impedance. 1.8 watts with less than 5% distortion.
Antenna input:	50 ohms nominal.
Spurious responses:	Image rejection greater than 60 dB; <i>if</i> rejection greater than 60 dB on amateur bands. Internal spurious signals less than the equivalent 1 μ V signal on the antenna.
Lineup:	5 tubes, 7 transistors and 8 diodes.
Accessories available:	2-AC 100 KHz calibrator, 2-LF low frequency converter, 2-CQ speaker/Q-multiplier and notch filter, and 2-NB noise blanker.
Power requirements:	120 volts, 50 to 60 Hz, 30 watts.
Size and weight:	11-5/16 x 6-9/32 x 9-3/32 inches. 13 1/2 pounds.

Drake 2-NT Specifications

Frequency coverage:	CW portions of the amateur bands from 80 through 10.
Input power:	Variable to 100 watts. Plate current meter redlined for 75 watts novice limitation.
Modes:	Break-in CW, semi break-in CW or manual CW.
Features:	Automatic transmit switching, built-in antenna changeover relay, side-tone oscillator, frequency spotting, built-in low pass filter and simplified tuning.
Antenna output impedance:	50 ohms nominal.
Lineup:	3 tubes, 1 transistor and 5 diodes.
Accessories available:	Antenna matching network, VFO, crystals.
Power requirements:	120 volts, 50 to 60 Hz at 2.8 amperes.
Size and weight:	9 $\frac{7}{8}$ x 6-9/32 x 9-9/32 inches, 12 $\frac{1}{2}$ pounds.

either 400 Hz, 2.4 kHz or 4.8 kHz at the 6 dB points.

The sensitivity and selectivity of this lineup is really tremendous. The 0.5 μ V sensitivity for 10 dB signal plus noise to noise on all bands from 80 through 10 really pulls in the weak ones. Like the old adage says, if you can't hear 'em, you can't work 'em. And after a few minutes warm up, the drift is not detectable; even with a 10 volt change in line voltage the drift is only barely perceptible. When a strong local comes on the 2-C performs admirably. The 12BZ6 contributes a great deal to this because of its low intermod-

ulation characteristics, but the variable pass-band filter does most of the work. When the going really gets rough, you can turn it down to the 0.4 mark; in this position the bandpass is still only 2.7 kHz wide 60 dB down.

The amplified AVC systems works extremely well. When the stations are weak, there is almost no AVC voltage applied to the rf and if stages, but let a strong signal come on and immediately it is at a comfortable listening level. In fact, there is less than 6 dB audio change for a 100 dB change in rf level. To give you an idea what this means, 6dB is about the difference between programming and commercials on TV; 100 dB is the same as comparing a 1 watt transmitter to a ten trillion watt transmitter; for different types of operation, the operator may choose slow or fast AVC release times, or he may turn the AVC off.

The 2-NT transmitter and 2-C receiver, working singly or as a pair provide an extremely convenient and economical starter station for the novice. And when the novice advances to the general ticket, many will find that this equipment is still ideally suited to their needs. For ssb and RTTY operation, the 2-C stands up right along with many of its more expensive cousins, so when the general ticket arrives there is no need to go out and buy another receiver. For portable or field day operation the pair is ideal. They are compact, easy to tune, require a minimum of outside accessories and require a minimum amount of power; perfect for low power gasoline generators. . . . W1DTY

Space Age Soldering

I read K4CPR's article in the March 73 and it inspired me to look up the methods for space vehicle soldering. When you are putting equipment into orbit every solder joint must be perfect. This is how it is done.

Given—a cruddy old resistor to solder into the circuit.

1. The part to be soldered is never handled with the bare fingers. This puts oil where you want the solder. You use a pair of gloves or nylon finger cots when touching the leads.

2. Choose a soldering iron:

Wire gage 20 and smaller	35 watts
Wire gage 20, 16, 14, 12	50 watts
Wire gage 12, 10, 8, 6	100 watts
Wire gage 6 and larger	200 watts

3. Take a pink pearl eraser and shine the area to be soldered.

4. Dip a brush in trichloroethane, or equivalent, and wash the area to be soldered.

5. Take another brush and coat the area to

be soldered with liquid rosin base solder, MIL F 4995.

6. Heat the iron, dip the tip in liquid rosin flux, apply solder to the tip of the iron, and wipe it clean on a damp cellulose sponge.

7. Tin the lead to be soldered by putting a heat sink next to the body of the resistor, apply rosin core solder to the iron tip, and within six seconds apply the solder to the wire for five seconds only. If you are not able to apply the solder within six seconds, wipe the iron clean and start with fresh solder.

8. After tinning the lead solder the part within an hour. If this is not possible wash off the flux with trichloroethane and reflux when you are ready to solder. After soldering the connections wash off the flux with a brush and trichloroethane.

If you follow the directions you'll find they work just fine but I find a good sprinkling of profanity to be of great service.

. . . Del Wininger WB6JNI