

R. L. DRAKE • MODEL

TR-4

SIDEBAND TRANSCEIVER



Drake designs bring the radio amateur "more performance at lower cost, thru engineering."

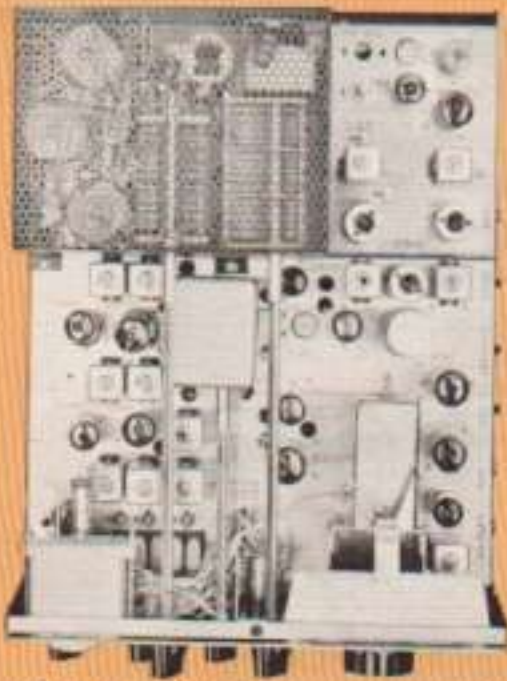
The TR-4 is engineered for optimum performance on upper or lower sideband, AM and CW.

Compact and lightweight, it is ideal for limited space, for mobile, for vacations, and for portable excursions. With 300 watts P.E.P. input it will give a good account "barefoot" and will drive high power "ham" linears. The accessory RV-3 Receiving VFO solves problem of working DX and stations operating on frequencies other than your transmitting frequency.

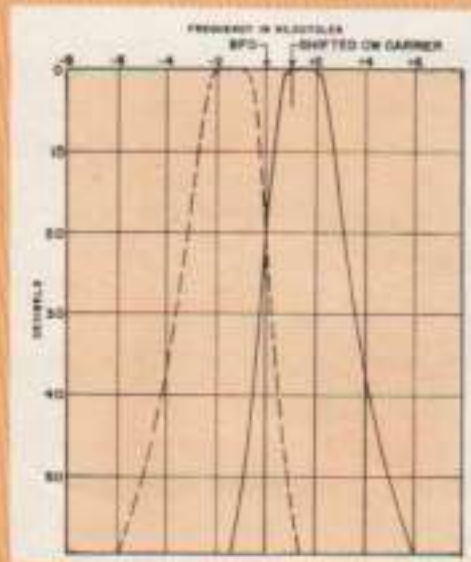
FEATURES:

- Full Frequency Coverage** All amateur bands 10 through 80 meters—additional crystals not required
- Upper and Lower Sideband** on all bands
- VOX or PTT** on AM and SSB
- Automatic Transmit Receive Switching** on CW —sometimes called "semi" break-in
- CW Sidetone Oscillator** built-in
- Diode Detector** for AM reception
- Solid State VFO** with linear permeability tuning for maximum stability
- Output Impedance** adjustable with pi-network
- 300 Watts P.E.P. input on SSB**
- Controlled Carrier Screen Modulator** for AM built-in
- Shifted Carrier CW**, 260 watts input
- Two Special 9 Mc Crystal Filters** for sideband selection
- Separate RF and AF Gain Controls**
- Full AGC** with Drake dual time constant system
- 2.1 KC Passband**
- 100 KC Crystal Calibrator** built-in
- Separate Receiver S-Meter and Transmitter Plate Ammeter**

DRAKE MODEL *TR-4*

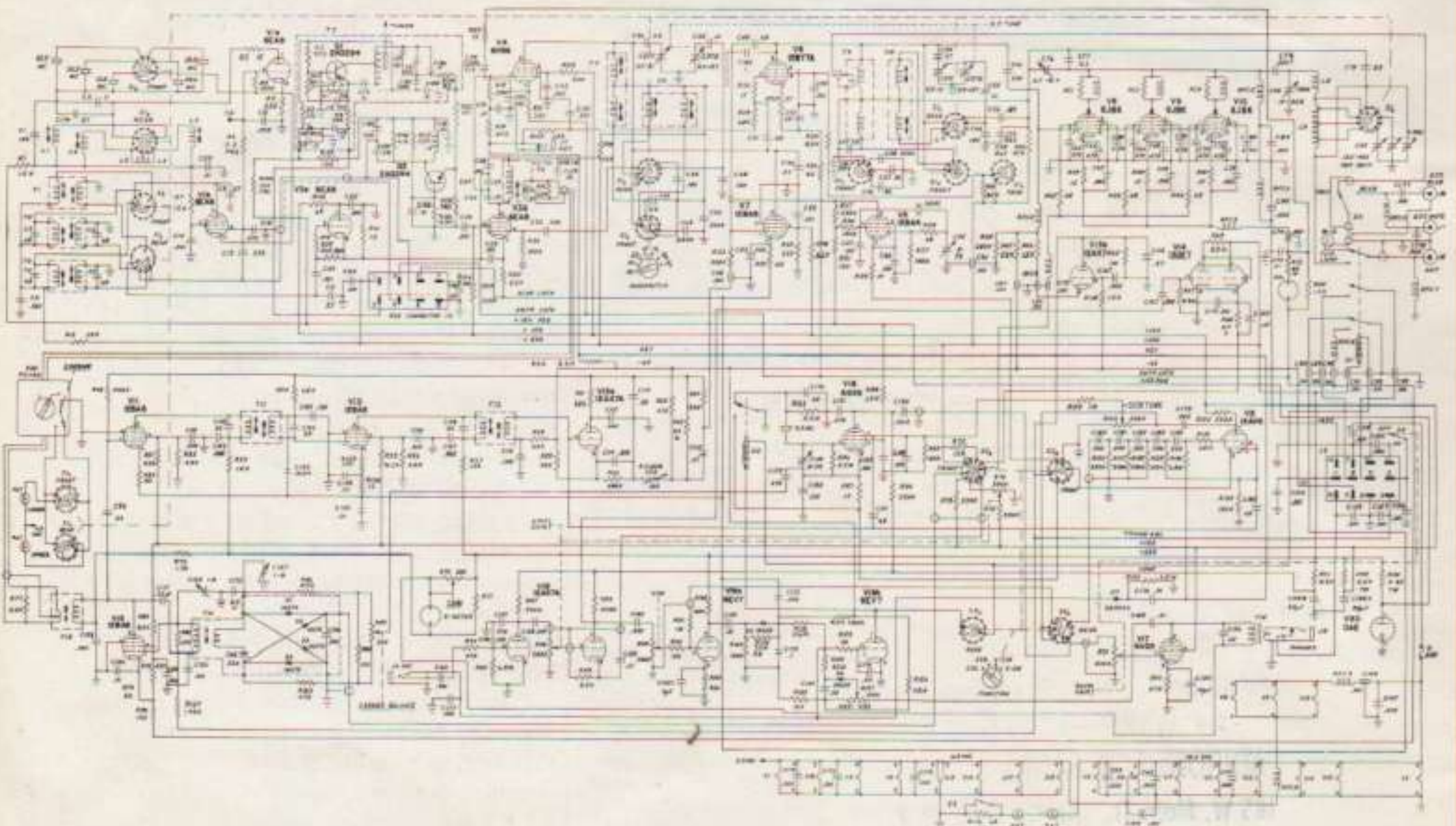


Top view, TR-4 with cover removed.



Selectivity curve, 9 Mc Crystal Filters.

\$58500
AMATEUR NET



SCHEMATIC DIAGRAM
Model TR-4 Sideband Transceiver

NOTE: Switch control from front panel.
 500K resistor unless otherwise noted.
 100K resistor unless otherwise noted.
 10K resistor unless otherwise noted.
 100Ω resistor unless otherwise noted.
 10Ω resistor unless otherwise noted.
 1Ω resistor unless otherwise noted.
 0.1μF capacitor unless otherwise noted.
 0.01μF capacitor unless otherwise noted.
 0.001μF capacitor unless otherwise noted.

SIDEBAND TRANSCEIVER

GENERAL SPECIFICATIONS:

FREQUENCY COVERAGE: Full coverage on all amateur bands 10 thru 80 meters, in seven 600 kc ranges: 3.5 to 4.1 mc, 7.0 to 7.6 mc, 13.9 to 14.5 mc, 21 to 21.6 mc, 28 to 28.6 mc, 28.5 to 29.1 mc, 29.1 to 29.7 mc.

SOLID STATE VFO: Has linear permeability tuning. Tunes 4.9 to 5.5 mc for all ranges. 9 mc I.F. minus VFO range covers 80 meters, 9 mc I.F. plus VFO range covers 20 meters, VFO and crystal oscillator heterodyned in pre-mixer for 40, 15, and three 10 meter ranges.

DIAL CALIBRATION: 10 kc divisions on main tuning dial and 1 kc divisions on the tuning knob skirt. Effective length of circular dial scale is over 14 inches.

FREQUENCY STABILITY: High stability solid state VFO tunes same range on all bands. Drift is less than 100 cycles after warm-up, and less than 100 cycles for plus or minus 10% line voltage change.

MODES OF OPERATION: SSB Upper and Lower Sideband, CW and AM.

FRONT PANEL CONTROLS:

"Main Tuning" has fluted knob with adjustable 25 division skirt. Tunes VFO and rotates main dial.

"RF Tune" tunes the RF circuits common to receiver RF amplifier and transmitter driver stages. 0-10 scale.

"Plate and "Load" tuning adjust pi-network capacitors in transmitter for proper resonance and loading on each band.

"Band" switch selects desired ham band (see frequency coverage).

"Function" switch has four positions "CAL, SSB, CW, AM." "CAL" operates built-in 100 kc crystal calibrator for accurate setting of main tuning hair line indicator and knob skirt. "SSB" provides SSB operation, either VOX or PTT. "CW" provides for CW operation with automatic transmit receive switching and CW sidetone, and is used for tune up. "AM" provides for AM operation with VOX or PTT, and with diode detector for receiving.

"Xmtr Gain" functions as mike audio gain on SSB and AM, and as carrier injection control on CW for tune and CW.

"Rcvr Gain" knob controls receiver AF gain and power ON-OFF switch. Lever behind knob controls setting of RF gain.

"Sideband" switch in conjunction with indicator lights marked "Upper" and "Lower" selects desired sideband by connecting into the circuit either the upper or lower sideband filter.

RIGHT SIDE SCREWDRIVER ADJUST CONTROLS: Vox Gain, Anti-Vox Gain, S-Meter Zero.

RIGHT SIDE JACKS: Headphone (disconnects speaker circuit), Microphone (3-circuit for PTT), Key (normally closed).

REAR CONTROLS: Sidetone gain, Dial light dimmer.

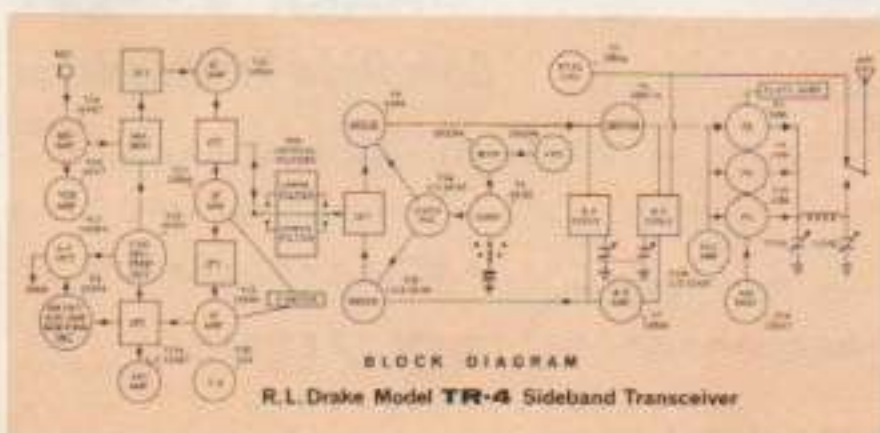
REAR JACKS: Power (connects TR-4 to power supply and speaker), MUTE (for muting an external receiver), EXT RCV (for connecting an external receiver to the antenna), Antenna (for connecting the TR-4 to the antenna).

LEFT SIDE CONTROLS—Transceiver/External receive switch (for selecting between the use of the TR-4 or an external receiver.)

INSIDE CONTROLS: Carrier balance.

METERS: Separate receiver S-meter and transmitter plate ammeter.

MISC: 20 tubes including voltage regulator; two transistors; 8 diodes; 100 kc crystal calibrator built in; Dimensions: 5½" high, 10¾" wide, 14¾" deep. Weight: 16 lbs.



TRANSMITTER SPECIFICATIONS:

SINGLE SIDEBAND: 300 watts P.E.P. input power, VOX or PTT. Two special 9 mc crystal filters provide upper or lower sideband selection on any band, without the necessity of shifting oscillators. The 9 mc filters are asymmetrical, that is, steeper on the carrier side (see filter selectivity charts) making possible unwanted sideband suppression of more than 40 db and carrier suppression of 50 db. Overall audio frequency response 400 to 2500 cycles at 6 db down. Distortion products 30 db down at maximum output. Amplified AGC.

CW: Power input 260 watts. Carrier is shifted approximately 1000 cycles into one sideband, and mixer and driver are keyed. Grid block keying is free from chirps and clicks. Automatic transmit/receive switching when key is operated. CW sidetone oscillator for monitoring.

AM: Controlled carrier AM screen modulator is built-in. 260 watts P.E.P. input. Low carrier power increases 6 times to 50 watts output at maximum modulation. This system is compatible with SSB linears. VOX or PTT. Diode detector used for receiving on this mode. Product Detector can be used by switching manually.

OUTPUT IMPEDANCE: Nominal 50 ohms, adjustable with pi-network.

MICROPHONE INPUT: High-impedance.

RECEIVER SPECIFICATIONS:

SENSITIVITY: Less than ½ microvolt for 10 db S/N.

I. F. SELECTIVITY: 2.1 kc at 6 db, 7.5 kc at 60 db.

AGC: FULL AGC on received modes—audio output varies less than 3 db for 60 db change in signal level. Any amount of AGC from zero to full can be had by adjustment of RF gain control. Time proven Drake AGC system provides fast attack and slow release with noise pulse suppression, no pumping or popping evident.

ANTENNA INPUT: Nominal 50 ohms.

AUDIO RESPONSE: 400 to 2500 cycles at 6 db.

AUDIO OUTPUT POWER: 2 watts.

AUDIO OUTPUT IMPEDANCE: 4 ohms.

POWER SUPPLY REQUIREMENTS: Due to the 300 watt P.E.P. input rating, the TR-4 will require a power supply capable of low voltage at high current with very good dynamic regulation. The voltage and current requirements are as follows:

- 650 volts at 300 ma average and 500 ma maximum with 10% regulation from 100 ma to 500 ma and maximum ripple of less than 1%.
- 250 volts at 175 ma with 10% regulation from 150 ma to 180 ma. This includes the effect of the 650 volt supply change if both voltages are obtained from the same transformer. Maximum ripple must be less than ¼%.
- 45 to -65 VDC adjustable filtered bias into 33K ohm load.
- 12.6 Volt AC or DC at 5.5 amps.

| TUBE or TRANSISTOR | FUNCTION | |
|--------------------|---------------------|-----------------------|
| | Transmitter | Receiver |
| 12AX7 | Mike Amp. | — |
| 6EV7 | Vox Amp./Relay | — |
| 6GX6 | 9 MC Xtal Osc. | BFO/Prod. Det. |
| 12BA6 | I. F. Amp. | — |
| 12BA6 | — | I. F. Amp. |
| 12BA6 | — | I. F. Amp. |
| 12AX7 | AGC | AGC |
| 6AQ5A | Anti-Vox | Audio Output |
| 6HS6 | Mixer | — |
| 6EA8 | Cathode Fol. | Mixer/Cath. Fol. |
| 6EA8 | Pre-Mixer/Xtal Osc. | Pre-Mixer/Xtal Osc. |
| 12AV6 | Sidetone Osc. | Diode det/1st AF amp. |
| 13DE7 | AM Screen Mod. | — |
| 12BA6 | — | R. F. Amp. |
| 12BA6 | — | Crystal Calib. |
| 12BY7A | Driver | — |
| (3) 6JB6 | Power Amps | — |
| 0A2 | Voltage Reg. | Voltage Reg. |
| 2N3394 | VFO | VFO |
| 2N3394 | VFO Buffer | VFO Buffer |



REMOTE VFO

Model RV-3 . . . \$79.95

Consists of same VFO and calibrated dial as TR-3, cathode follower, voltage regulator, and required control circuitry to permit reception, transmission, or transceiver operation on a separate frequency in the same band to which the TR-4 is tuned. All these functions performed without retuning TR-4 VFO. Includes 5-inch speaker, 3-foot interconnecting cable, and space for AC Power Supply.

Dim.: 5 $\frac{3}{8}$ " h, 10 $\frac{3}{4}$ " w, 11 $\frac{1}{8}$ " d.
Weight 8 $\frac{1}{2}$ lbs.

MOBILE MOUNTING KIT Model MMK-3 \$6.95

Contains brackets and hardware for under-dash or hump mounting TR-4 in practically all cars. Weight 1 lb.

ACCESSORIES

All Accessories can be used with either TR-4 or TR-3



MATCHING SPEAKER

Model MS-4 . . . \$19.95

Contains a 5 x 7 inch heavy magnet speaker and connecting cable. Styled to match TR-4 Transceiver. Space for mounting AC power supply in rear.

Dim.: 5 $\frac{3}{8}$ " h, 10 $\frac{3}{4}$ " w, 11 $\frac{1}{8}$ " d.
Weight: 6 lbs.

POWER SUPPLIES

AC Power Supply Model AC-3 \$79.95

Designed to supply all voltage and current requirements for the TR-4. Seven silicon diode rectifiers. 120 volt 50/60 cycle. Has 5 ft. interconnecting cable with 12-prong connector and speaker connector. Will mount in rear of MS-4 and RV-3 cabinets.

Dimensions: 5" x 5" x 10 $\frac{1}{4}$ ".
Weight: 15 lbs.

DC Power Supply Model DC-3 \$129.95

Transistorized. Operates from 12 VDC. Supplies all voltage and current requirements for the TR-4. Has 5 ft. interconnecting cable and speaker connector.

Dimensions: 3 $\frac{3}{8}$ " h, 4 $\frac{3}{8}$ " w, 8" d.
Weight: 7 $\frac{1}{2}$ lbs.

DRAKE TR-4 Operating and Instruction MANUAL Price \$2.00 Postpaid in U.S.A.

OTHER DRAKE PRODUCTS

TVI Filters

| | |
|----------------------------------|---------|
| TV-300-HP High Pass Filter . . . | \$ 3.97 |
| TV-1000-LP Low Pass Filter . . . | 16.95 |
| TV-100-LP Low Pass Filter . . . | 5.95 |
| TV-CB-LP Citizen Band Low Pass | 6.95 |
| TV-300-FMT FM Band Rejection | 2.55 |



T-4 RECITER

Transceives with R-4 Receiver.

Model T-4 \$269⁹⁵ Amateur Net

Covers all Ham Bands 160 thru 10 meters.
Covers MARS and Other Frequencies between ham bands.
Upper and Lower Sideband on all frequencies.
Automatic Transmit Receive Switching on CW (semi break-in).
Controlled Carrier Modulation for AM is completely compatible with SSB linear amplifiers.
VOX or PTT on SSB and AM built-in.
Adjustable PI-Network Output.
Two Crystal Lattice Filters for sideband selection, 2.4 Kc bandwidth.
Transmitting AGC prevents flat topping.
Shaped Grid Block Keying with side tone output.
200 Watts PEP Input on SSB—180 watts input CW.
Meter indicates plate current and relative output.

R-4 RECEIVER

Model R-4 \$379⁹⁵ Amateur Net

Linear permeability tuned VFO with 1 Kc dial divisions. VFO and crystal frequencies pre-mixed for all-band stability.

Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished.

Any ten 500 Kc ranges between 1.5 and 30 Mc can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 Mc not recommended).

Four bandwidths of selectivity, 0.4 Kc, 1.2 Kc, 2.4 Kc and 4.8 Kc.

Passband tuning gives sideband selection, without retuning.

Noise blanker that works on CW, SSB, and AM is built-in.

Notch filter is built-in.

100 Kc crystal calibrator is built-in.

Product detector for SSB/CW, diode detector for AM.

Crystal Lattice Filter gives superior cross modulation and overload characteristics.



DRAKE T-4X Complete Transmitter

All T-4 features plus
• Solid State VFO and
• XTAL Oscillators . . .

\$379⁹⁵ Amateur Net

All prices are amateur net.
See your distributor or write:

R. L. DRAKE COMPANY MIAMISBURG, OHIO 45342