DRAKE TR-7

solid state continuous coverage synthesized hf system

In 1963 Drake led the way by producing the first commercially available transceiver that employed the now widely copied 9 MHz i-f frequency. Even today, 15 years later, many major competitive transceivers are still being introduced using i-f's in this range.

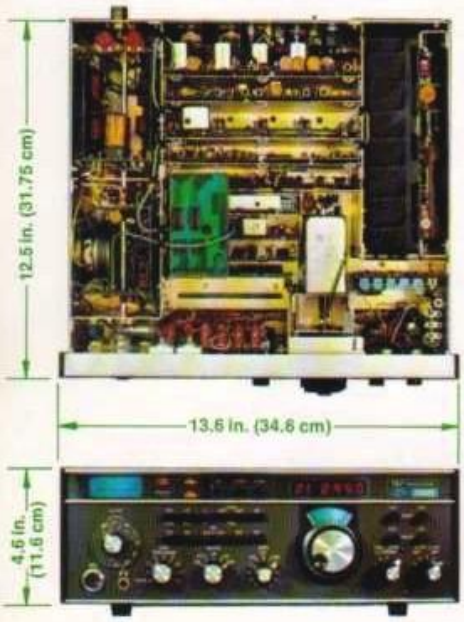
In 1978 Drake leads the way again by developing the first commercially available amateur transceiver that uses a 48 MHz i-f, through the technique of "Up-Conversion." This system greatly improves image and general coverage performance, and will be copied in the years to come. With Drake, you can join the new state of the art today!

The Drake TR-7 significantly advances the technology of world-wide radio communications and unfolds an entirely new state of the art.

The design philosophy behind the new Drake "7 system" has created a most sophisticated system concept, extending from engineering to the visual appearance of the system and each of its parts.

The TR-7 System is the result of one of the most extensive engineering and development programs in the history of the R. L. Drake Company, and provides the user with many innovative design features.

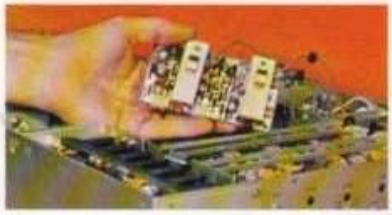
With the excellent design of its front panel and controls, the system is simple and straightforward to operate–makes state of the art performance a pleasure.



Broadband, Solid State Design—100% solid state throughout. All circuits are broadbanded so there is no need for preselection tuning or transmitter adjustments of any kind.

Synthesized/PTO Frequency Control—A Drake exclusive: Special high performance synthesizer, combined with the famous Drake PTO, provides smooth, linear tuning with 1 kHz dial and 100 Hz digital readout. 500 kHz up/down range switching is pushbutton controlled.

Continuous, Wide Range Frequency Coverage—The TR-7/DR-7 provides reception from 1.5 thru 30 MHz—continuously, and **zero** thru **30 MHz** continuously with the optional Aux-7 Range Program Board. The highly advanced Drake Synthesizer makes this possible, and is an industry first. The TR-7/DR-7 provides transmit coverage for all Amateur Bands 160 thru 10 meters. With the optional Aux-7 Range Program Board, diode-programmable out-of-band transmit coverage is available for MARS, Embassy, Government, and future band expansions in the range 1.5 thru 30 MHz.* The Aux-7 Board provides 0 thru 1.5 MHz receive coverage and crystal-controlled fixed channel operation for Government, Amateur, or semi-commercial applications anywhere in the hf range. The TR-7 w/o DR-7 and Aux-7 provides coverage of the Amateur Bands 160 thru 15 meters and the 28.5-29.0 MHz range of 10 meters. The Aux-7 Range Program Board is also useable in the standard TR-7 for extra range coverage as noted.

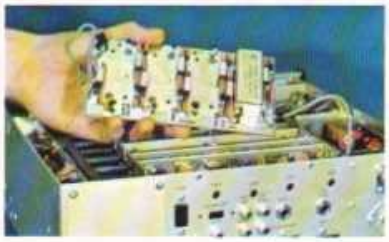


State of the Art Receiver Design—The Drake TR-7 introduces another industry first for amateur transceivers: "Up-Conversion," in combination with a special uhf high level double balanced mixer for superior strong signal handling, spurious and image response performance. The first i-f of 48.05 MHz places images well outside the receiver passband, and provides for true general coverage operation without i-f gaps.

True Passband Tuning—The TR-7 employs the famous Drake Full Passband Tuning instead of the limited range "i-f shift" found in some other units. The Drake System tunes from the top edge of one sideband, through center, to the bottom edge of the other sideband. In fact, the range is even wider to accommodate RTTY. Full passband tuning greatly improves receiving performance in heavy QRM.

*Note: Out-of-band transmitter coverage for MARS, Government, etc. is available only in ranges authorized by the FCC, Military, or other government agency for a specific service. Proof of license for that service must be submitted to the R. L. Drake Company, including the 500 kHz range to be covered. Upon approval, and at the discretion of the R. L. Drake Company, a special range IC will be supplied for use with the Aux-7 Range Program Board. Prices quoted from the factory. See operator's manual for details.

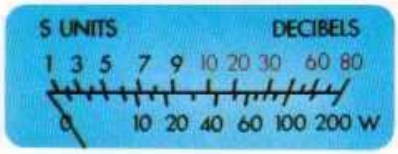
Unique Independent Receive Selectivity—Optional receiving selectivity filters can be installed **internally** and pushbutton-selected from the front panel. These may be selected independently of transmit mode and provide optimum response for various conditions of ssb, cw, RTTY, and a-m. You may also transmit cw while receiving ssb, or vice versa, or even transmit one sideband while receiving the other. The standard filter is 2.3 kHz for ssb. You may choose from optional 300 Hz, 500 Hz, a special 1.8 kHz for crowded ssb, or 6 kHz filter for a-m.



Effective Noise Blanker—This accessory is custom engineered to provide true blanking performance.

Special High Power Solid State PA—A Drake custom-designed diagonal heat sink provides for an internally mounted power amplifier with nothing mounted outboard subject to physical damage. The unique air ducting effect of this amplifier allows an optional rear-mounted fan to provide continuous duty on SSTV/RTTY. Continuous ssb/cw operation is available without the fan, due to the excellent heat sink design. The optional Drake PS-7 Ac Supply is rugged, rated for continuous duty, and will easily handle power requirements. The System is rated 250 watts input—in any of its modes. Fully VSWR protected.

TR-7 Internal Test Facilities—As well as the standard "S" meter function, the TR-7 metering includes a built-in rf Wattmeter/VSWR Bridge. Also, the DR-7 digital counter reads frequencies to **150 MHz** for test purposes. Access to the counter is from the rear panel.



Receiver Incremental Tuning (RIT)—Complete RIT flexibility is provided for **both** the TR-7 and RV-7 remote VFO for maximum convenience. The RV-7 also includes a special "spot" function for easy zero beating.

Model 1337 Drake TR-7 Transceiver
Model 1530 Drake DR-7 General Coverage/ Digital Readout Board
Model 1336 Drake TR-7/DR-7 General Coverage Digital R/O Transceiver
Model 1338 Drake RV-7 Remote VFO

Model 1502 Drake PS-7 120/240V Ac Supply includes special wide range voltage and frequency capability. Operates from any nominal line voltage (90-132 V/ 180-264 V; 50-60 Hz) ideal for overseas
Model 1536 Drake Aux-7 Range Program Board
Model 1531 Drake MS-7 Matching Speaker
Model 1537 Drake NB-7 Noise Blanker
Model 1529 Drake FA-7 Fan
Model 7021 Drake SL-300 Cw Filter, 300 Hz
Model 7022 Drake SL-500 Cw Filter, 500 Hz
Model 7023 Drake SL-1800 Ssb/RTTY Filter, 1.8 kHz
Model 7024 Drake SL-6000 A-m Filter, 6.0 kHz
Model 1335 Drake MMK-7 Mobile Mounting Kit
Model 1538 Drake MN-7 250 Watt 160-10 Meter Antenna Tuner with Rf Wattmeter and complete switching functions
Model 1514 Drake WH-7 Hf Wattmeter/VSWR Bridge

The Drake State of the Art unfolds an entirely NEW Art of the States!

Specifications

GENERAL

Frequency Coverage
(with DR-7 Digital R/O Gen. Cov. Board)

Receive
- *Without Aux-7* ... 1.5 to 30 MHz, continuous
- *With Aux-7* ..... Same, plus 0 to 1.5 MHz at reduced performance in this range

Transmit
- *Without Aux-7* ... 1.5-2.0, 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-30.0 MHz
- *With Aux-7* * ..... Above ranges, plus any eight 500 kHz segments from 1.5 to 30 MHz

Frequency Coverage
(without DR-7 Digital R/O Gen. Cov. Board)

Receive/Transmit
- *Without Aux-7* ... 1.5-2.0, 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.5-29.0 MHz, plus Receive only on 2.5-3.0 MHz and 5.0-5.5 MHz
- *With Aux-7* * ..... Above ranges, plus any eight 500 kHz segments from 0 to 30 MHz, (0 to 1.5 MHz Receive only)

Modes of Operation ... Usb, Lsb, Cw, RTTY, A-m equiv. (A-3H)

Frequency Stability ... Total drift is less than 100 Hz after warm up. Total frequency change is less than 100 Hz over the 11-16 V-dc input supply range

Frequency Readout Accuracy
- *Analog* ..... Better than ± 1 kHz when calibrated at the nearest marker point
- *Digital* ..... 15 ppm ± 100 Hz

External Counter Mode
- *Maximum Input Frequency* ... 150 MHz
- *Input Level Range* ... 50 mV to 2 V, rms

Power Supply Requirements .... 11-16 V-dc (13.6 V-dc nominal), 3A receive, 25A transmit

Dimensions
- *Depth* ..... 12.5 in. (31.75 cm), excluding knobs and connectors.
- *Width* ..... 13.6 in. (34.6 cm)
- *Height* ..... 4.6 in. (11.6 cm), excluding feet
- *Weight* ..... 17.1 lb. (7.75 kg)

RECEIVER

Sensitivity (1.8-30.0 MHz)
- *Ssb, Cw* ..... Less than 0.5 μV for 10 dB (S+N)÷N
- *A-m (30% Mod.)* ..... Less than 2.0 μV for 10 dB (S+N)÷N

Selectivity ..... 2.3 kHz at −6 dB and 4.1 kHz at −60 dB (1.8:1 shape factor)

Ultimate Selectivity ... Greater than 100 dB

Agc ..... Less than 4 dB output variation for 100 dB input signal change, referenced to agc threshold

Intermodulation ..... Intercept Point, +20 dBm
Two-tone Dynamic Range, 95 dB

I-f Frequency ..... First I-f ..... 48.05 MHz
Second I-f ..... 5.645 MHz

Image and I-f Rejection Greater than 80 dB

Spurious Response ... Greater than 60 dB down

Internally Generated Spurious ..... Less than 1 μV equivalent, except 3 μV equivalent from 5 to 6 MHz

Audio Output ..... 2.0 watts @ less than 10% THD (4 ohm load)

TRANSMITTER

Power Input (Nominal)
- *Ssb* ..... 250 watts PEP
- *Cw* ..... 250 watts
- *A-m equiv.* ..... 80 watts (carrier), plus upper sideband

Load Impedance ..... 50 ohms, nominal

Spurious Output ..... Greater than 50 dB down

Harmonic Output ..... Greater than 45 dB down

Intermodulation Distortion ..... 30 dB below PEP (24 dB below one of two tones)

Duty Cycle
- *Ssb, Cw, A-m* 100%
- *Tune, SSTV, RTTY* .... w/o 1529 FA-7 Fan: 33%, 5 min. transmit, max.
with 1529 FA-7 Fan: 100%

Wattmeter Accuracy ... ±5% @ 100 watts (50 ohm load)

Carrier Suppression ... Greater than 50 dB

Undesired Sideband Suppression ..... Greater than 60 dB @ 1 kHz

Microphone Input ..... High impedance

VSWR Turndown (Nominal)
- @ 1:1 ..... 0%
- @ 2:1 ..... 10%
- @ 3:1 ..... 25%
- @ 4:1 ..... 50%
- @ 5:1 and above 90%

Known 'round the world for world wide radio communications.

R. L. DRAKE COMPANY DRAKE®
540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 • Telex: 288-017
Western Sales and Service Center, 2020 Western Street, Las Vegas, Nevada 89102 • 702/382-9470

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AMATEUR EQUIPMENT PRICE LIST

DRAKE®

Prices Effective: May 14, 1979

R.L. Drake Company, 540 Richard Street, Miamisburg, Ohio 45342
Sales Office Phone: 513-866-2421 Telex: 288-017

Model Number	Drake Model	Description	Suggested Amateur Net
Receivers (Communications) and Accessories			
1242	DSR-2	Vlf-Hf Digital Synthesized Communications Laboratory Receiver, ssb, a-m, cw, isb, RTTY	$3200.00
1240	R-7/DR-7	0-30 MHz General Coverage, Synthesized Digital Readout Receiver	1295.00
1241	R-7	Amateur Band, Analog Readout Receiver (160-10 meters)	1100.00
1532	NB-7A	Noise Blanker for R-7	90.00
1211	R-4C	Amateur Hf Receiver, 160-10 meters	699.00
1217	4-NB	Noise Blanker for R-4C	74.00
7011	FL250	Accessory I-f Filter	52.00
7013	FL500	Accessory I-f Filter	52.00
7015	FL1500	Accessory I-f Filter	52.00
7017	FL4000	Accessory I-f Filter	52.00
7019	FL6000	Accessory I-f Filter	52.00
Transmitters			
1411	T-4XC	Amateur Hf Transmitter 160-10 meters	699.00
Transceivers and Accessories			
1337	TR-7	Transceiver	1200.00
1530	DR-7	General Coverage/Digital Readout for TR-7/R-7	195.00
1336	TR-7/DR-7	General Coverage Digital R/O Transceiver	1395.00
1338	RV-7	Remote VFO	195.00
1536	Aux-7	Range Program Board for TR-7/R-7	45.00
1537	NB-7	Noise Blanker for TR-7	90.00
1529	FA-7	Fan	25.00
7021	SL-300	Cw Filter, 300 Hz for TR-7/R-7	52.00
7022	SL-500	Cw Filter, 500 Hz for TR-7/R-7	52.00
7023	SL-1800	Ssb/RTTY Filter, 1.8 kHz for TR-7/R-7	52.00
7024	SL-6000	A-m Filter, 6.0 kHz for TR-7/R-7	52.00
7026	SL-4000	A-m Filter, 4.0 kHz for TR-7/R-7	52.00
1335	MMK-7	Mobile Mounting Kit	49.95
1330	UMK-3	Remote Trunk Kit for UV-3	69.95
1340*	UV-3	144 Synthesized Fm Transceiver	595.00
1343*	UV-3	144-220 Synthesized Fm Transceiver	795.00
1344*	UV-3	144-440 Synthesized Fm Transceiver	795.00
1346*	UV-3	144-220-440 Synthesized Fm Transceiver	995.00

**Prices above include factory installed modules for bands as listed.*

Factory installed "add-on" 220 or 440 modules. (Done by Service Dept. only. Modules not sent to field.) These modules expand coverage of models which may have been purchased in single band or two band configurations. Contact Service Dept. for return authorization 200.00

PRICES, AVAILABILITY AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION

Orders of less than $15.00 subject to $1.00 handling charge.

(Continued on back)

Model Number	Drake Model	Description	Suggested Amateur Net
Tranceivers and Accessories (continued)			
1339	1339	Remote Control Head – UV-3	$ 90.00
Power Supplies			
1501	AC-4	120/240 V-ac Power Supply for all Drake 4-line equipment	150.00
1504	PS-3	120/240 V-ac Power Supply for Drake UV-3	89.95
1502	PS-7	120/240 V-ac Power Supply for Drake TR-7	249.00
Major Accessories and Miscellaneous			
1528†	L-7	2 kW Linear Amplifier (160-10 meters*)	1099.00
1538	MN-7	Antenna Matching Network, 160-10 meters, 250 watts	165.00
1539	MN-2700	Matching Network, 160-10 meters, 2 kW	279.00
1510	B-1000	4:1 Balun designed for use with MN-4C/MN-7/MN-2700	24.95
1511	MS-4	Matching Speaker for R-4B, R-4C, SPR-4, SW-4A, TR-4 & TR-6	33.00
1531	MS-7	Matching Speaker for TR-7/R-7	36.00
1514	WH-7	Hf Wattmeter/VSWR Bridge 1.8 to 30 MHz	89.00
1525	1525EM	Drake Push Button Encoding Microphone for UV-3 and TR-33C	49.95
7037	7037	Service/Extender Board Kit for TR-7	50.00
7073	7073	Mobile Microphone with plug for TR-7	19.00
7077	7077	Desk Microphone with plug for TR-7	45.00
1550	DL-300	Dummy load 300 watts, no oil required	19.95
1551	DL-1000	Dummy Load 1000 watts, no oil required	39.95
Crystals			
7020		Crystals for 2-C, R-4B, R-4C, SW-4A, T-4XB, T-4XC, SPR-4, ML-2	7.50
		Crystals for fixed frequency operation of tunable units/2-NT	9.50
		Crystals for TR-22	8.00
		Crystals for TR-72 & TR-33C	8.00
Filters for TV-sets			
1603	TV-300-HP	High Pass Filter, 300 ohms Twin-Lead	10.60
1610	TV-75-HP	High Pass Filter, 75 ohms TV Coax	13.25
Low Pass Filters for Transmitters			
1605	TV-42-LP	For transmitting below 30 MHz, 100 watt continuous, 50 ohms, SO-239 Connectors	14.60
1608	TV-3300-LP	1000 watts continuous to 30 MHz with sharp cutoff above 30 MHz	26.60
1609	TV-5200-LP	1000 watts continuous to 30 MHz 100 watts continuous on 6 meters	26.60
Books			
		All Operators' Manuals except DSR-2	10.00
		DSR-2 Manual	20.00
385-0002		UV-3 Service Manual	25.00
385-0004		TR-7 Service Manual	30.00

† Sale of L-7 subject to FCC Type Acceptance.

* 10 meters on export units only.

PRICES, AVAILABILITY AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION

Orders of less than $15.00 subject to $1.00 handling charge.

The ultimate team... the new Drake "Twins"

The TR7A and R7A offer performance and versatility for those who demand the ultimate!

TR7A Transceiver

• **CONTINUOUS FREQUENCY COVERAGE** — 1.5 to 30 MHz full receive coverage. The optional AUX7 provides 0 to 1.5 MHz receive plus transmit coverage of 1.8 to 30 MHz, for future Amateur bands, MARS, Embassy, Government or Commercial frequencies (proper authorization required).

• **Full Passband Tuning (PBT)** enhances use of high rejection 8-pole crystal filters.

New! **Both 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity are standard,** plus provisions for two additional filters. These 8-pole crystal filters in conjunction with careful mechanical / electrical design result in realizable ultimate rejection in excess of 100 dB.

New! **The very effective NB7 Noise Blanker is now standard.**

New! **Built in lightning protection** avoids damage to solid-state components from lightning induced transients.

New! **Mic audio available** on rear panel to facilitate phone patch connection.

• **State-of-the-art design** combining solid-state PA, up-conversion, high-level double balanced 1st mixer and frequency synthesis provided a no tune-up, broadband, high dynamic range transceiver.

R7A Receiver

• **CONTINUOUS NO COMPROMISE 0 to 30 MHz frequency coverage.**

• **Full passband tuning (PBT).**

New! **NB7A Noise Blanker supplied as standard.**

• **State-of-the-Art features** of the TR7A, plus added flexibility with a low noise 10 dB rf amplifier.

New! **Standard ultimate selectivity choices** include the supplied 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity. Capability for three accessory crystal filters plus the two supplied, including 300 Hz, 1.8 kHz, 4 kHz, and 6 kHz. The 4 kHz filter, when used with the R7A's Synchro-Phase a-m detector, provides a-m reception with greater frequency response within a narrower bandwidth than conventional a-m detection, and sideband selection to minimize interference potential.

• **Front panel pushbutton control** of rf preamp, a-m / ssb detector, speaker ON / OFF switch, i-f notch filter, reference-derived calibrator signal, three agc release times (plus AGC OFF), integral 150 MHz frequency counter / digital readout for external use, and Receiver Incremental Tuning (RIT).

The "Twins" System

• **FREQUENCY FLEXIBILITY.** The TR7A / R7A combination offers the operator, particularly the DX'er or Contester, frequency control agility not available in any other system. The "Twins" offer the only system capable of no-compromise DSR (Dual Simultaneous Receive). Most transceivers allow some external receiver control, but the "Twins" provide instant transfer of transmit frequency control to the R7A VFO. The operator can listen to either or both receiver's audio, and instantly determine his transmitting frequency by appropriate use of the TR7A's RCT control (Receiver Controlled Transmit). DSR is implemented by mixing the two audio signals in the R7A.

• **ALTERNATE ANTENNA CAPABILITY.** The R7A's Antenna Power Splitter enhances the DSR feature by allowing the use of an additional antenna (ALTERNATE) besides the MAIN antenna connected to the TR7A (the transmitting antenna). All possible splits between the two antennas and the two system receivers are possible.

Specifications, availability and prices subject to change without notice or obligation.

DRAKE

See your Drake dealer or write for additional information.

COMING SOON: **New RV75 Synthesized VFO Compatible with TR5 and 7-Line Xcvrs/Rcvrs**

• Frequency Synthesized for crystal-controlled stability • VRTO (Variable Rate Tuning Oscillator*) adjusts tuning rate as function of tuning speed. • Resolution to 10 Hz • Three programmable fixed frequencies for MARS, etc. • Split or Transceive operation with main transceiver PTO or RV75

R. L. DRAKE COMPANY • 540 Richard Street, Miamisburg, Ohio 45342 • Phone (513) 866-2421 • Telex 288-017

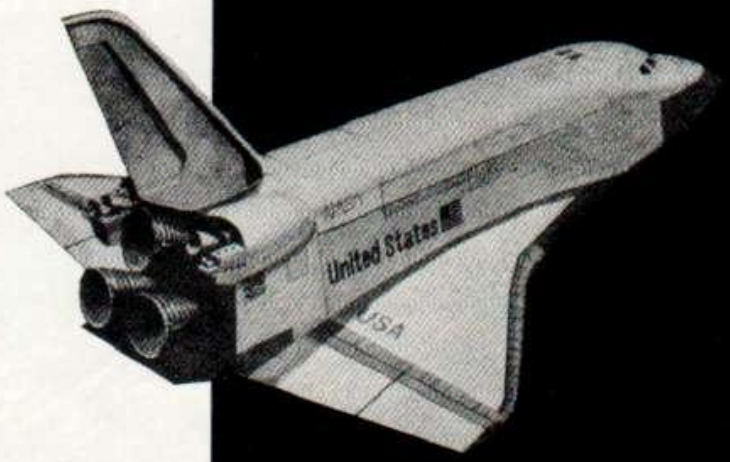
* Patent pending

THE TECHNOLOGY OF OUR TIMES

TR7

by DRAKE

RON WYSONG, K8AY
Director of Engineering



THE "DRAKE TR7 TRANSCEIVER"

THE "TECHNOLOGY OF OUR TIMES"

DRAKE

INTRODUCTION

In the past few years, several amateur transceivers have appeared on the market boasting features and techniques considered to be "state-of-the-art" in regards to communications technology. More often than not, these features and techniques have been incorporated without the initial expense of the development time necessary to assure that the resulting equipment represented an advancement in communications technology with respect to both performance and operator convenience.

The Drake TR7 Transceiver represents a unique blend of proven state-of-the-art techniques culminating in the first truly state-of-the-art transceiver presently available.

A product of the Drake "anything worth doing is worth doing right" philosophy, the TR7's many new techniques and operational features complement each other producing performance and convenience which will remain unexcelled for many years to come.

The following discussion describes the major features of the TR7 and, where applicable, explains why they are required in a modern day amateur transceiver.

UP-CONVERSION

During the evolution of the modern HF communications receiver as we know it today, one of the greatest advances resulted from the availability of relatively high frequency crystal filters at feasible prices. This resulted in a trend back towards single-conversion designs. Prior to this, double and even triple conversion designs were popular. A low frequency IF (e.g., 50 kHz) allowed reasonable selectivity with conventional LC filters, while a higher first IF provided the required image rejection through the use of front-end selectivity. This "PRESELECTOR" or "RF TUNE" provided image rejection performance which necessarily degraded as operating frequency was increased.

Now, with the availability of VHF crystal filters, broadband HF designs are possible which provide a great amount of image rejection which is essentially constant over the entire HF frequency range. Image frequencies, which are removed by twice the IF frequency, can be greatly attenuated by a single 30 MHz low-pass filter. A great amount of IF rejection also results, as well as a low level of local oscillator radiation.

The TR7's 48.05 MHz first IF and its associated four pole crystal filter accomplish the above as well as provide a selectivity window as soon as possible in the receive path, assuring suitable performance in the presence of strong off-tune signals. The width of the 48.05 MHz first IF filter is 8-10 kHz, which is somewhat wider than the widest ultimate selectivity required for any mode. A first IF filter width narrower than this would preclude having effective noise blanker circuitry later in the second IF.

Besides the previously mentioned 30 MHz Master LP filter, a bandswitched LP filter on the transmitter output and a bandswitched HP filter combine to provide a front-end selectivity "window" for each half-octave range between 1.5 and 30 MHz.

As will be seen in the discussion to follow, frequency synthesis, high level double balanced mixers, and a solid state Power Amplifier are all required in conjunction with the technique of Up-Conversion to realize such great advances in both operator convenience and performance.

The convenience of instant "QSY" with no PRESELECTOR, RF TUNE, PLATE, or LOAD control to tune has obvious advantages for serious DX'ers and contest operators, as well as "Rag-Chewers."

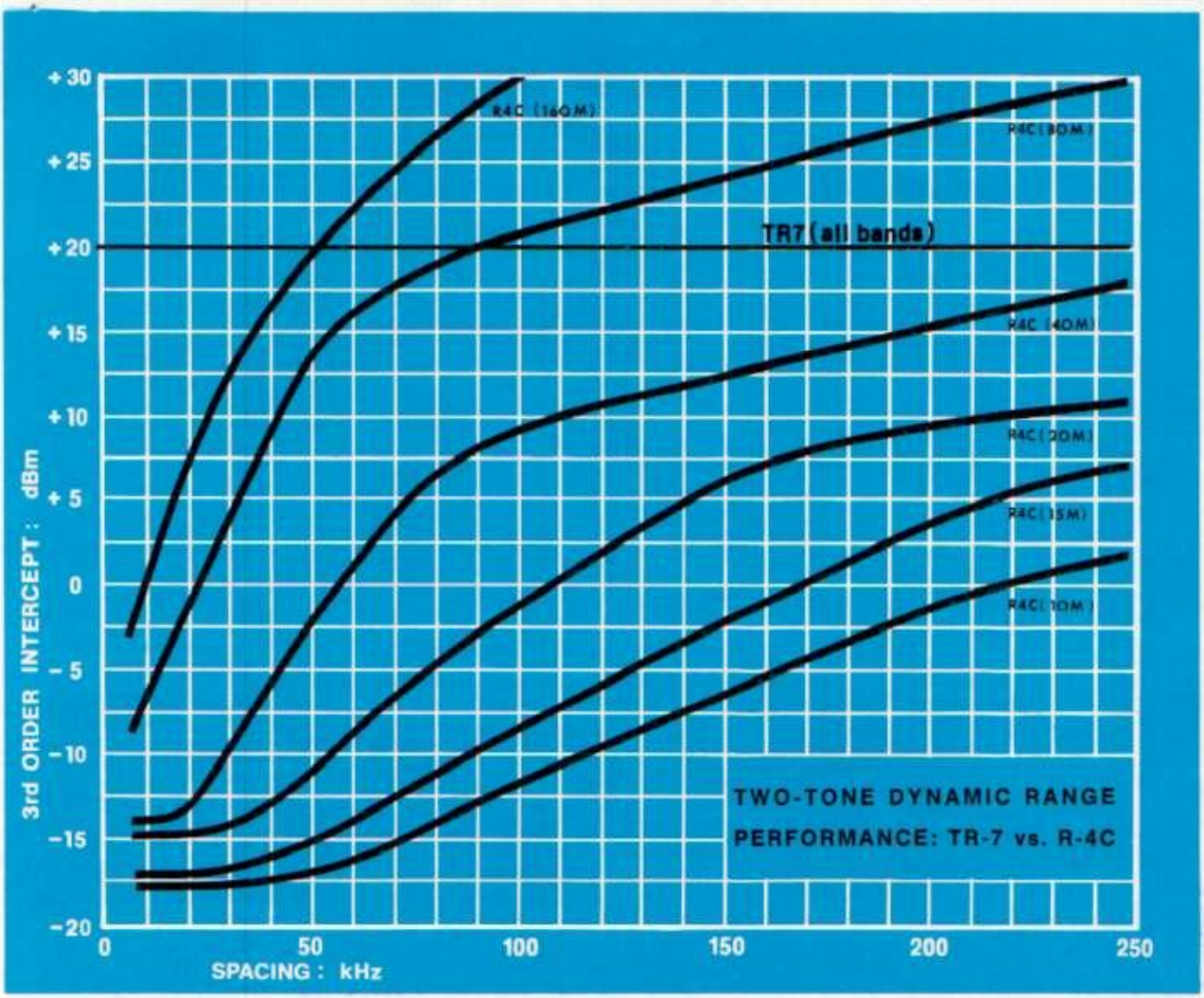
FREQUENCY SYNTHESIS AND FULL COVERAGE RECEIVE CAPABILITY

Frequency synthesizers have made "range" crystals a thing of the past. It is now possible to generate or "synthesize" many discrete frequencies whose frequency and stability are directly related to one system crystal or "reference" oscillator. The frequency synthesizer also acts as a "signal conditioner" supplying a "clean" local oscillator signal free from other frequency components which can cause spurious receiver responses.

This "signal conditioning" property of the synthesizer further complements the broadband Up-Conversion technique previously discussed in that no tuned circuits, previously controlled by the PRESELECTOR or RF TUNE, are required to remove unwanted mixer products present in pre-mixer type injection systems. (Range crystals and VFO mixed to generate required local oscillator injection.)

Another advantage of the TR7 synthesis technique is that it can be easily digitally controlled to provide full coverage receive capability. When installed in a TR7, the DR7 not only provides a digital frequency read-out, but allows pushbutton control of a now full-coverage receiver. Two pushbutton switches provide for incrementing or decrementing the frequency by 500 kHz, each 500 kHz range being tuneable with the VFO.

Using this technique, full coverage receive capability from 1.5 to 30 MHz is possible. By use of the AUX7 auxiliary option (provides fixed frequency and/or additional 500 kHz range coverage without DR7), the receive capability is extended from 1.5 MHz down to 0.



HIGH-LEVEL DOUBLE-BALANCED MIXERS

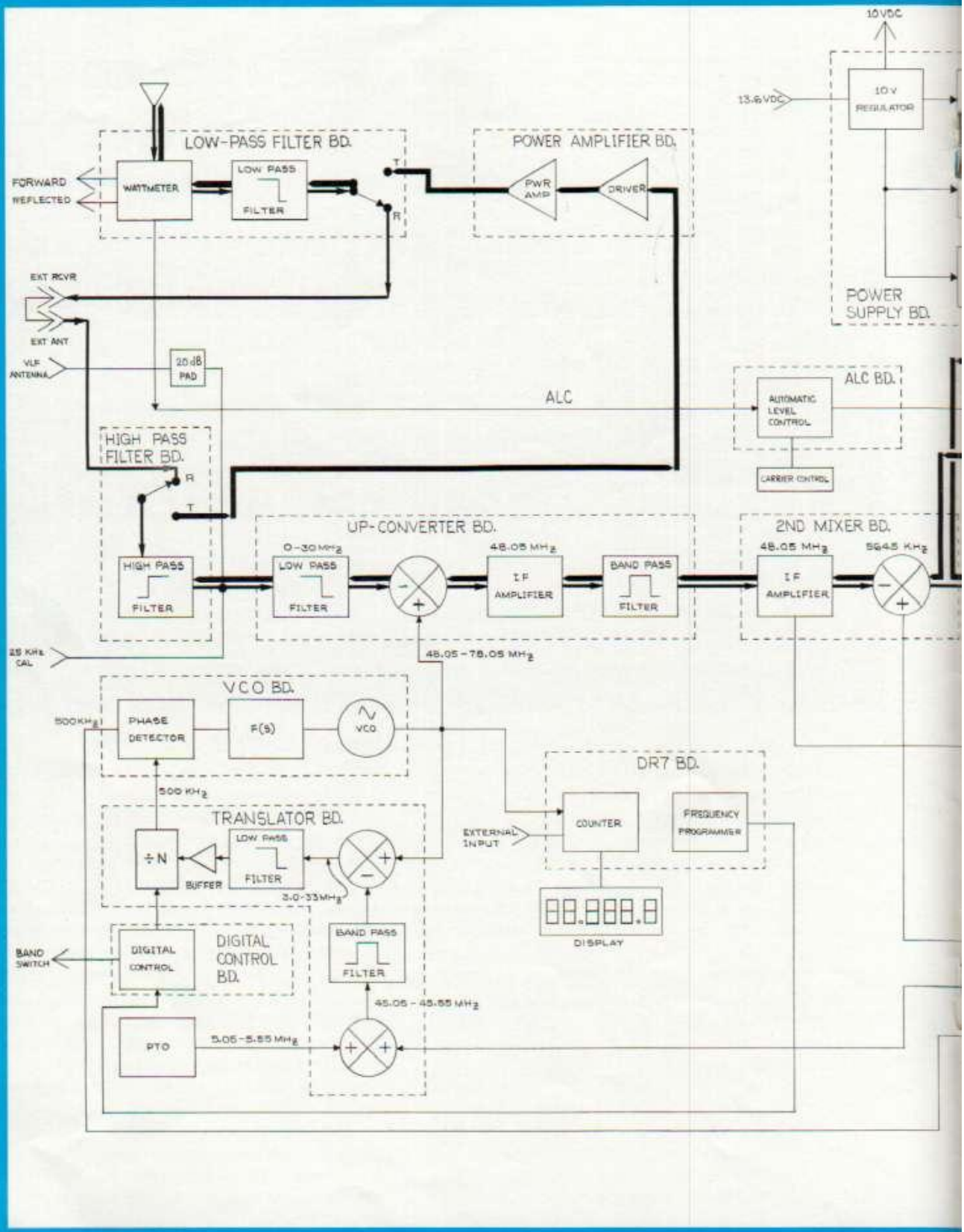
The broadband nature of Up-Conversion means that the first stage can be subjected to a large number of high-level signals falling within the half-octave range in use (within the selectivity "window" previously mentioned). Also, within the crowded amateur bands of today, the probability of large signals existing in the correct frequency relationship to generate interfering intermodulation products is increasing daily. Put another way, the dynamic two-signal performance of modern receivers is extremely important. For instance, it is not unusual for some currently available receivers to be rendered completely useless on the 40 meter band, especially in some European locations.

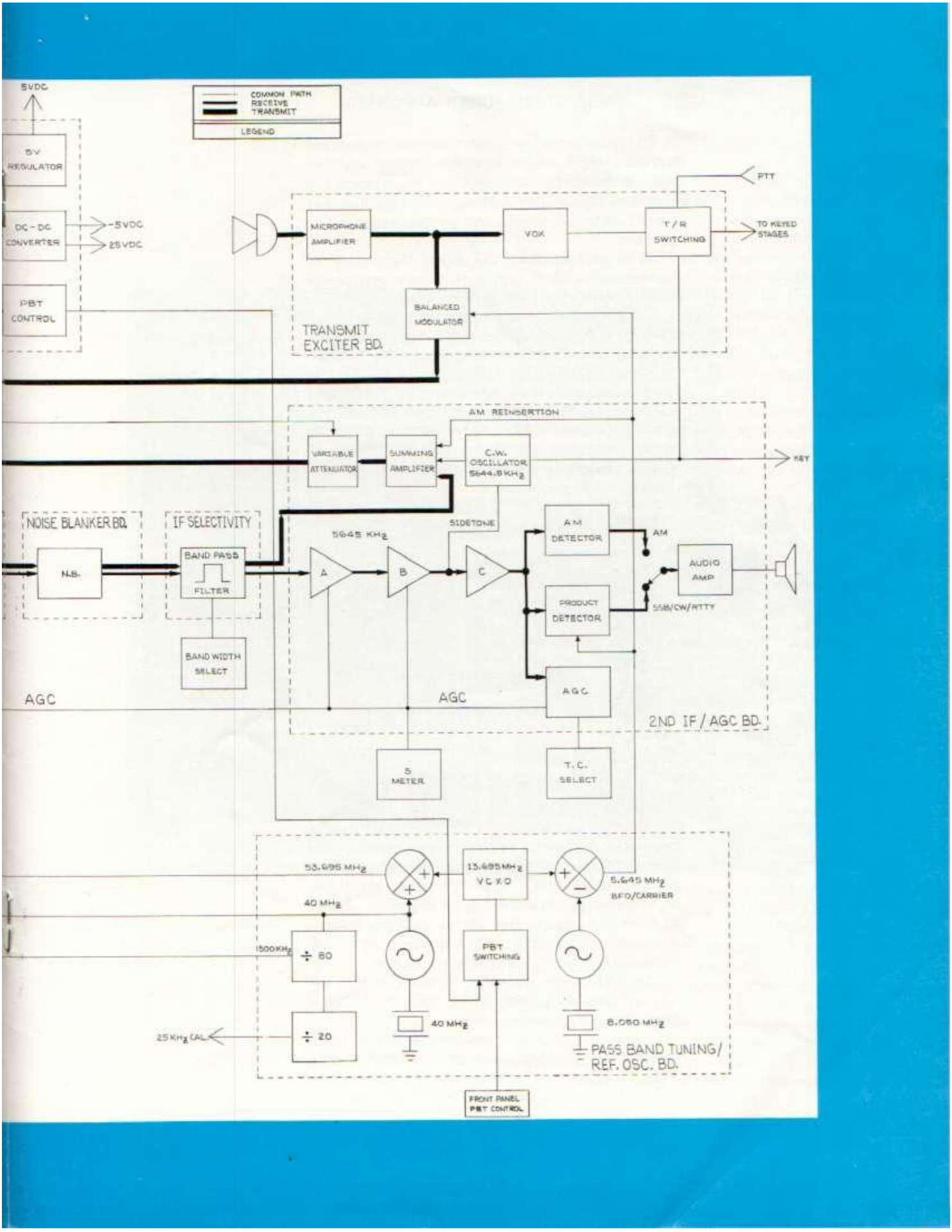
These two basic considerations placed a constraint on system design which could only be overcome by the use of a high-level double-balanced mixer as the first element in the receiver path.

The high-level mixer, composed of computer matched diodes and other carefully selected components, utilizes a high level of local oscillator injection (typically +17 dBm) to yield an extremely high two tone dynamic range. The TR7 is conservatively specified as having a +20 dBm third order intercept point relative to the input. Simply stated, this is a measure of the level required of two interfering signals under a specified set of conditions to produce a specified result. Obviously the higher this number is the better the performance of the receiver. This figure represents dynamic range performance relative to third order intermodulation 30 to 40 dB better than what has been considered good in the past.

Other dynamic performance specifications (i.e. crossmodulation, blocking, reciprocal mixing, etc.) equal or exceed acceptable high performance levels.

The absence of an RF amplifier does not prevent obtaining sufficient sensitivity. Overall noise figure (typically 8 dB) provides maximum usable sensitivity under normal noise conditions on all amateur bands.


10 VDC
13.6 VDC
10 V REGULATOR
POWER SUPPLY BD.
LOW-PASS FILTER BD.
FORWARD
REFLECTED
WATTMETER
LOW PASS FILTER
T
R
POWER AMPLIFIER BD.
PWR AMP
DRIVER
EXT RCVR
EXT ANT
VLF ANTENNA
20 dB PAD
ALC
ALC BD.
AUTOMATIC LEVEL CONTROL
CARRIER CONTROL
HIGH PASS FILTER BD.
HIGH PASS FILTER
UP-CONVERTER BD.
0-30 MHz
LOW PASS FILTER
48.05 MHz
IF AMPLIFIER
BAND PASS FILTER
2ND MIXER BD.
48.05 MHz
IF AMPLIFIER
5645 KHz
25 KHz CAL
48.05 - 78.05 MHz
VCO BD.
500 KHz
PHASE DETECTOR
F(s)
VCO
500 KHz
TRANSLATOR BD.
÷N
BUFFER
LOW PASS FILTER
3.0-33 MHz
DR7 BD.
EXTERNAL INPUT
COUNTER
FREQUENCY PROGRAMMER
DISPLAY
BAND SWITCH
DIGITAL CONTROL
DIGITAL CONTROL BD.
BAND PASS FILTER
45.05 - 45.55 MHz
PTO
5.05 - 5.55 MHz

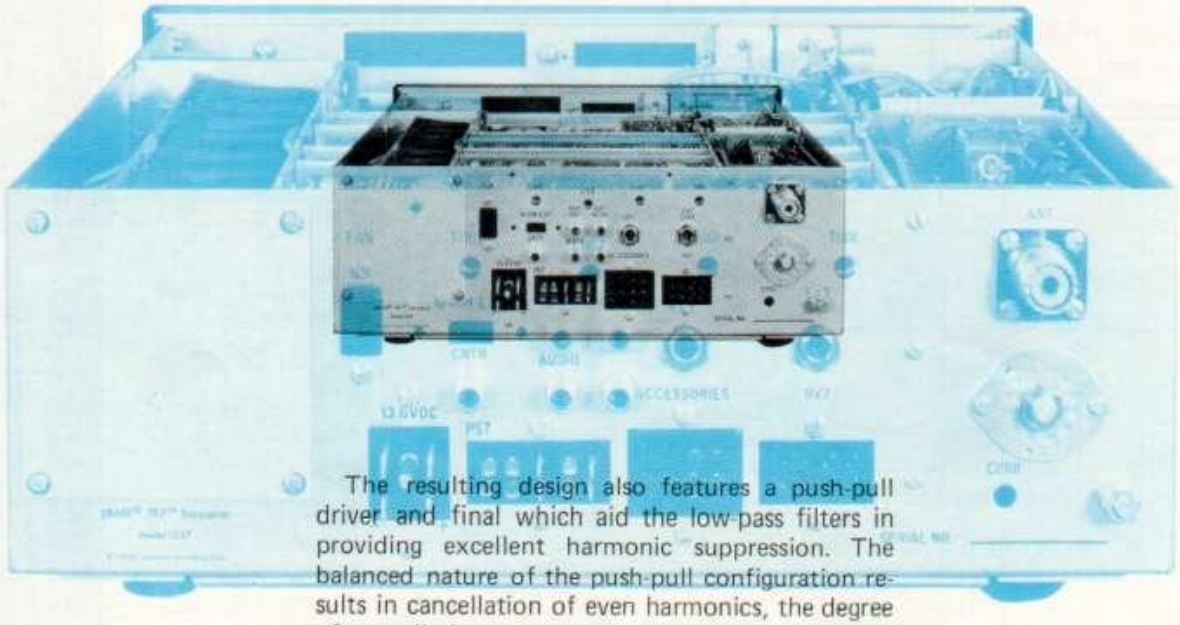

COMMON PATH
RECEIVE
TRANSMIT
LEGEND
5VDC
5V REGULATOR
DC-DC CONVERTER
-5VDC
25VDC
PBT CONTROL
MICROPHONE AMPLIFIER
VOX
T/R SWITCHING
PTT
TO KEYED STAGES
BALANCED MODULATOR
TRANSMIT EXCITER BD.
AM REINSERTION
VARIABLE ATTENUATOR
SUMMING AMPLIFIER
C.W. OSCILLATOR 5644.8 KHz
KEY
NOISE BLANKER BD.
N.B.
IF SELECTIVITY
BAND PASS FILTER
BAND WIDTH SELECT
5645 KHz
A
B
C
SIDETONE
AM DETECTOR
AM
AUDIO AMP
PRODUCT DETECTOR
SSB/CW/RTTY
AGC
AGC
AGC
2ND IF/AGC BD.
S METER
T.C. SELECT
53.695 MHz
40 MHz
500KHz
÷ 80
÷ 20
25 KHz CAL
13.695 MHz VCXO
PBT SWITCHING
40 MHz
5.645 MHz BFO/CARRIER
8.050 MHz
PASS BAND TUNING/ REF. OSC. BD.
FRONT PANEL PBT CONTROL

SOLID STATE POWER AMPLIFIER

To realize complete, uncompromised broadband performance, a rugged solid-state power amplifier was necessary. The extremely low impedances and circuit Q's associated with such an amplifier and its related circuitry make transmitter broadbanding possible.

While accomplishing the above, transmitter intermodulation distortion performance and power output capabilities were not compromised.

The power amplifier's heat sink is an exclusive "angular" design which provides for normal convection cooling, yet an external cooling fan can be easily added to the rear chassis of the TR7 to allow continuous duty operation (e.g. SSTV and RTTY) at full power output. Even without the cooling fan, the TR7 can deliver full output power in any mode for up to five minutes. Complete VSWR protection prevents damage due to mismatched load conditions.

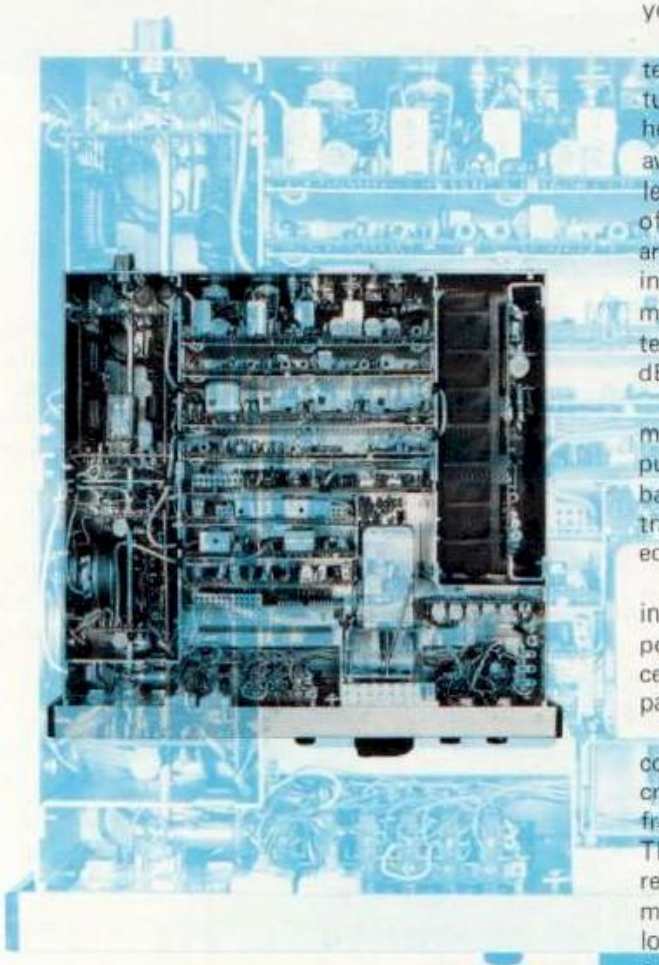


The resulting design also features a push-pull driver and final which aid the low-pass filters in providing excellent harmonic suppression. The balanced nature of the push-pull configuration results in cancellation of even harmonics, the degree of cancellation dependent upon degree of balance in the circuit itself. This assures that the bothersome second harmonic, which is closest to the filter cut-off frequency, is greatly attenuated.

The TR7 Power Amplifier is housed within the cabinet instead of being an "outboard" design as many presently available units.

In contrast to many presently available solid-state power amplifiers, most of which deliver only one-half the output power of the TR7 power amplifier, the unit is extremely stable and spurious free.

OTHER FEATURES AND OPERATING CONVENIENCES



The TR7 is the first transceiver to incorporate full passband tuning. This is not to be confused with limited passband tuning, sometimes referred to as "IF shift." The importance of passband tuning for QRM reduction has been proven over the years by the Drake R4 series of receivers.

A 1.8 kHz accessory crystal filter (standard filter is 2.3 kHz) in conjunction with the passband tuning provide the ultimate weapons for fighting heavy QRM. 300 Hz and 500 Hz CW filters are also available, as well as a 6 kHz AM filter. The IF Selectivity module in the TR7 will accept any three of these accessory filters in addition to the standard 2.3 kHz filter supplied. The filters are easily installed, but not at the expense of degrading ultimate rejection due to leakage paths around the filters. Ultimate rejection is maintained near the 100 dB level.

Any of the four IF bandwidths which can be made available are selected by means of front panel pushbuttons. This provides selection of a receive IF bandwidth independent of the filter used during transmit (the 2.3 kHz filter is automatically selected during transmit).

As previously outlined, the PBT (Passband Tuning) control has the net effect of controlling the position of the selected filter relative to the received signal. When the PBT is disabled, the IF passband position is dictated by the MODE switch.

This "electronic" type passband tuning is accomplished by use of a VCXO (voltage controlled crystal oscillator) whose frequency controls the frequency of the second LO as well as the BFO. The result is a movement of the received signal relative to the selected filter. This is in contrast to moving the filter relative to the signal as in older low frequency IF designs using LC filters to develop the ultimate receiver selectivity.

The previously mentioned features combined with many others, such as RIT, front panel VOX controls including a separate CW Delay control, built-in wattmeter, pushbutton VOX enable/disable, Fast/Slow AGC select, 25 kHz calibrator, and fixed frequency receive, transmit or transceive operation result in a transceiver whose performance and convenience were obtainable prior to now only by use of separate receiver/transmitter combinations.

The modern plug in module approach to construction assures quick isolation of problems for fast servicing. This approach also aids in field servicing.

In conclusion, the TR7 is by far the most modern no-compromise transceiver available today, and will be for years to come. Its design went far beyond the old four "S" concept of good receiver design (sensitivity, selectivity, setability, and stability) to generate a receiver whose performance will stand up to today's stringent requirements. The transmitter section finally bridges the gap between an all solid state design and popular hybrid designs or all solid state designs whose performance is barely acceptable.

SPECIFICATIONS

GENERAL

Frequency Coverage: (With DR-7 Digital Readout/General Coverage Board)

Receive:

Without AUX-7:	1.5 to 30 MHz, continuous.
With AUX-7:	Same, plus 0 to 1.5 MHz at reduced performance.

Transmit:

Without AUX-7:	1.5-2.0, 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-30.0 MHz.
With AUX-7:	Above ranges, plus any eight 500 kHz segments between 1.5 and 30 MHz.
Without DR-7 Digital Readout/ General Coverage Board	1.5-2.0, 2.5-3.0 (Receive only), 3.5-4.0, 5.0-5.5 (Receive only), 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.5-29.0 MHz plus 8 additional 500 kHz ranges with AUX-7.*

(0 to 1.5 MHz Receive only)

*AUX-7 requires use of appropriate Range Modules.

NOTE

Proof of license or other F.C.C. authorization must be submitted in order to obtain range modules which allow transceive operation outside an amateur band.

Modes of Operation:	USB, LSB, CW, RTTY, AME (A-3H).
Frequency Stability:	Total drift is less than 100 Hz after warm-up. Total frequency change is less than 100 Hz over the 11-16 VDC input supply range.
Frequency Readout Accuracy:	
Analog:	Better than ±1 kHz when calibrated at the nearest marker point.
Digital:	15 ppm ±100 Hz.
External Counter Mode:	
Maximum Input Frequency:	150 MHz.
Input Level Range:	50 mV to 2V., rms.
Power Supply Requirements:	11-16 VDC (13.6 VDC nominal), 3A receive, 25A transmit.
Dimensions:	
Depth:	12.5 in. (31.75 cm), excluding knobs and connectors.
Width:	13.6 in. (34.6 cm).
Height:	4.6 in. (11.6 cm), excluding feet.
Weight:	17.1 lb. (7.75 kg.).

RECEIVER

Sensitivity (1.8-30 MHz):	
SSB, CW: *(Typically .25μV on 15m & 10m bands)*	Less than 0.5 uV for 10 dB $\frac{S+N}{N}$
AM (30% Mod.):	Less than 2.0 uV for 10 dB $\frac{S+N}{N}$
AGC:	Less than 4 dB output variation for 100 dB input signal change, referenced to AGC threshold.
Selectivity:	2.3 kHz at -6 dB and 4.1 kHz at -60 dB. (1.8:1 shape factor).
Ultimate Selectivity:	Greater than 100 dB.

**60 dB 1st. IF rejection from 22-30 MHz.*

Intermodulation:	
Intercept Point:	+20 dBm.
Two-tone Dynamic Range:	95 dB.
IF Frequency:	
First IF:	48.05 MHz.
Second IF:	5.645 MHz.
Image and IF Rejection:	Greater than 80 dB.*
Spurious Response:	Greater than 60 dB down.
Internally Generated Spurious:	Less than 1 uV equivalent, except 3 uV equivalent from 5 to 6 MHz.
Audio Output:	2.0 watts @ less than 10% THD (4 ohm load).

TRANSMITTER

Power Input (Nominal):	
SSB:	250 watts PEP.
CW:	250 watts.
AME (A-3H)	80 watts (carrier), plus upper sideband.
Load Impedance:	50 ohms, nominal.
Spurious Output:	Greater than 50 dB down.
Harmonic Output:	Greater than 45 dB down.
Intermodulation Distortion:	30 dB below PEP. (24 dB below one of two tones.)
Duty Cycle:	
SSB, CW, AM:	100%.
Tune, SSTV, RTTY: w/o FA-7 Fan:	33%, 5 minutes transmit, maximum.
with FA-7 Fan:	100%.

Wattmeter Accuracy:	±5% @ 100 watts (50 ohm load).
Carrier Suppression:	Greater than 60dB.
Undesired Sideband Suppression:	Greater than 60 dB @ 1 kHz.
Microphone Input:	High impedance.
VSWR Turndown (Nominal):	
@ 1:1 :	0%
@ 2:1 :	10%
@ 3:1 :	25%
@ 4:1 :	50%
@ 5:1 and Above:	90%


DRAKE

DRAKE.

NEW DRAKE PRODUCTS

MODEL PS75 POWER SUPPLY

The PS75 is a high current, 13.6 VDC power supply for use with solid state transceivers in CW or SSB modes. The supply operates from a primary voltage of 100, 120, 200 or 240 VAC, 50-60 Hz (switch programmed), and provides 15 amperes continuous at an unregulated voltage of 13.6 VDC (nominal) for use with solid state power amplifiers and a 3 ampere regulated output for use with the remainder of the transceiver. In addition, a regulated 13.6 VDC at 1 ampere is provided for auxiliary equipment.

The supply was designed primarily for SSB operation at current levels of 15 amperes average and 25 amperes peak but will also provide reliable performance on CW at current levels of up to 25 amperes. Some CW signal quality degradation due to the increased ripple may be noticed at CW power levels which exceed 15 amperes current drain (usually about 75 watts).

Specifications

Ac Input:	100, 120, 200, or 240 VAC + 10% 50-60 Hz
DC Output:	13.6 VDC (nominal) Unregulated @ 15 Amps Continuous, 25 Amps Intermittant 13.6 VDC Regulated @ 3 Amps
DC Aux Volts:	13.6 VDC Regulated @ 1 Amp
Connectors:	AUX DC - Phone Jack ALC - Phone Jack VOX - Phone Jack Ground Connection
Dimensions:	Width = 9-5/8" (24.4 cm) Height = 5-1/6" (12.8 cm) Depth = 10-7/8" (27.6 cm)
Weight:	20-1/2 lbs. (9.3 kg)

LIST PRICE $199.00

MODEL SP75 SPEECH PROCESSOR

The SP75 Speech Processor is designed to provide an increase in average power/readability of a single sideband voice signal during weak signal, high interference conditions. The SP75 is connected between the microphone and microphone input of the single sideband transmitter, thus requiring no modification of the existing transmitter or transceiver. A front panel switch allows the processor to be switched in or bypassed as conditions warrant. Two additional inputs, such as a tape player or phone patch, may be front panel selected in place of the normal microphone input.

The amount of RF envelope clipping is adjustable between zero and twenty decibels by a front panel control. A LED indicates proper audio input level. Because of the pre-clipping audio compression, small changes in voice levels do not widely affect the clipping level.

Muting circuitry reduces gain during speech pauses, thus reducing undesirable background noise pickup and allowing VOX operation with the processor on.

Specifications

Processing Type:	Preclipping audio compression followed by RF envelope clipping at the processor intermediate frequency.
RF Clipping Range:	Adjustable 0 to 20 dB from front panel control.
Input Level Microphone Input):	3.5 mV minimum for full processing. Gain adjustable to accomodate up to 300 mV maximum.
Input Level Tape & Patch Inputs):	50 mV minimum for full processing. 100 mV maximum.
Input Impedance (Microphone):	1 Megohm
Input Impedance (Tape & Patch):	50 K ohm
Output Level w/Processing	0-50 mV adjustable into 50 K ohm load
Output Impedance:	50 K ohm
Muting (Microphone Input Only):	10 to 20 dB attenuation during speech pauses
Frequency Response:	400-6000 Hz @ -6 dB
Distortion:	Less than 5% T.H.D. @ 1kHz, 20 dB clipping
Supply Requirements:	11-16 VDC @ 95 mA
Size:	7" L x 6-1/4" W x 2-1/4" H (17.3 cm x 15.9 cm x 5.4 cm)
Weight:	1.4 lb. (.63 kg)

LIST PRICE $159.00

DRAKE.

DRAKE 7-Line Family

A pacesetter since 1943, Drake led in 1963 with 9 MHz i-f transceiving, and now with 48 MHz i-f "Up Conversion" . . . Drake brings you tomorrow's state of the art today.

Model 1528

Drake L7

Continuous Duty
160-15* Meters

2kW Linear Amplifier

Temperature-controlled design for "key-down" operation over a wide frequency range.

2 kW PEP, 1 kW cw, RTTY, SSTV operation—all modes full rated input, continuous duty cycle.

160-15* meter amateur band coverage, plus expanded ranges for any future hf band expansions or additions within FCC rules. These ranges also include increased coverage for MARS, embassy, government, or other such services.

The Drake L7 utilizes a pair of Eimac 3-500 Z triodes for rugged use, and lower replacement cost compared to equivalent ceramic types.

Accurate built-in rf wattmeter, with forward/reverse readings, is switch selected. Calibrated 300/3000 watt scales.

Temperature controlled two speed fan is a high volume low noise type and offers optimum cooling.

Adjustable exciter agc feedback circuitry permits drive power to be automatically controlled at proper levels to prevent peak clipping and cw overdrive. Front panel control.

By-pass switching is included for straight through, low power operation without having to turn off amplifier.

Bandpass tuned input circuitry for low distortion and 50 ohm input impedance.

Amplifier is comprised of two units—rf deck for desk top and separate power supply.

Operates from 120/240 V-ac, 50/60 Hz primary line voltage.

DRAKE L7 SPECIFICATIONS

• **Frequency Coverage*:** Ham bands 160 through 15 meters*. Non-amateur frequencies between 6.5 and 21.5 MHz may be covered with some modification of the input circuit. • **Plate Power Input:** 2000 watts PEP on ssb and a-m. 1000 watts dc on cw, RTTY, and SSTV. • **Drive Power Requirements:** 100 watts PEP on ssb and 75 watts on cw, a-m, RTTY, and SSTV. • **Input Impedance:** 50 ohms. (Bandpass tuned input) • **Output Impedance:** Adjustable pi-network matches 50 ohm line with SWR not to exceed 2:1. • **Intermodulation Distortion Products:** In excess of −33 dB. • **Wattmeter Accuracy:** 300 watts forward and reflected, ±(5% of reading + 3 watts). 3000 watts forward, ±(5% of reading + 30 watts). • **Power Requirements:** 240 volts 50-60 hertz 15 amperes, or 120 volts 50-60 hertz 30 amperes. • **Tube Complement:** Two of 3-500Z or 8802/3-500Z or 3-400Z. • **Dimensions: Amplifier** 13.69"W x 6.75"H x 14.25"D (34.8 x 17.1 x 36.2 cm). **Power Supply** 6.75"W x 7.88"H x 11"D (17 x 20 x 28 cm). • **Weight:** Amplifier 27 lbs (12.25 kg), **Power Supply** 42.5 lbs (19.3 kg).

**Export model includes coverage of the 10-meter Ham Band.*

Model 1539

Drake Matching Networks MN7 and MN2700

Models 1538 and 1539

- **Frequency Coverage:** 1.8 - 30 MHz
- **Antenna Choice:** Matches antennas fed with coax, balanced line (use optional B-1000 Balun), or random wire.
- **Antenna/By-Pass Switching:** Allows matching unit by-pass regardless of antenna in use, and selects various antennas.
- **Extra Harmonic Reduction:** Employs "pi-network" low pass filter type circuitry for maximum harmonic rejection.
- **Built-in Metering:** Accurate Rf Wattmeter and VSWR Reading, pushbutton controlled from front panel.
- **Input Impedance:** 50 ohms resistive.
- **Power Capability:** MN7—250 watts average continuous duty (0-300 W scale). MN2700—1000 watts average continuous duty (2000 watts PEP). (0-200 or 0-2000 W scale).
- **Dimensions:** MN7—13.1"W x 4.53"H x 8.5"D excluding knobs and connectors (33.26 x 11.5 x 21.6 cm). MN2700—13.1"W x4.53"H x 13"D excluding knobs and connectors (33.26 x 11.5 x 33 cm).
- **Weight:** MN7—10 lbs (4.5 kg). MN2700—11 lbs (5 kg).

Drake MN7 and MN2700 Specifications

• **Frequency Coverage:** 1.8 to 30 MHz. Band Switch marked for 160, 80, 40, 20, 15, and 10 meter amateur bands; however, frequency coverage between amateur bands is possible by using the nearest band positions with a small reduction in matching capability. • **Input Impedance:** 50 ohms (resistive). • **Load Impedance:** 50 ohm coaxial with VSWR of 5:1 or less at any phase angle (3:1 on 10 meters). 75 ohm coaxial at a lower VSWR can be used. • **Balanced Feedlines:** With the Drake B-1000 accessory balun, which mounts on rear panel, tunes feed point impedances of 40 to 1000 ohms, or 5:1 VSWR referenced to 200 ohms (3:1 on 10 meters). • **Long-Wire Antennas:** Feed point impedances up to 5:1 VSWR referenced to 50 ohms. Also, 5:1 referenced to 200 ohms with the Drake B-1000 accessory balun (3:1 on 10 meters). • **Meter:** Reads VSWR or forward power. • **Wattmeter Accuracy:** ±5% of reading ±1% of full scale. • **Insertion Loss:** 0.5 dB or less on each band after tuning. • **Front Panel Controls:** Provide for the adjustment of resistive and reactive tuning, antenna switching, band switching, VSWR calibration, and selection of watts or VSWR calibration, and selection of watts or VSWR functions of the meter. • **Rear Panel Connectors:** The rear panel has four type SO-239 connectors (one for input and 3 for outputs), three screw terminal connections (for long-wire and open-wire feeder systems), and a ground post.

Specifications, availability and prices subject to change without notice or obligation.

R.L. DRAKE COMPANY DRAKE

540 Richard St., Miamisburg, Ohio 45342, USA
Phone: (513) 866-2421 • Telex: 288-017

DRAKE 7-Line Family

ACCESSORIES

A Model 7077 Dynamic Desk Microphone

• **Audio and level characteristics** custom designed to match the transmit audio requirements of the Drake TR7. • **Features both VOX and PTT** operation without modification. • **High Impedance** • **Includes coil cord and plug** wired for direct connection to the Drake TR7. • **Style and color** provide a beautiful match to the Drake 7-line • **Size** 4.3"W x 5.8"D x 9.3"H (10.9 x 14.7 x 23.6 cm). **Weight** 1 lb 7 oz (650 g).

Model 1553

C SP75 Speech Processor

Provides an increase in average power/readability of a single sideband voice signal during weak signal, high interference conditions. The SP75 is connected between the microphone and microphone input of the ssb transmitter, requiring no modification of existing transmitter or transceiver. A front panel switch allows the processor to be switched in or bypassed. Two additional inputs, such as a tape player or phone patch, may be front panel selected.

Rf envelope clipping adjustable between zero and twenty decibels. LED indicates proper audio input level.

Muting circuitry reduces gain during speech pauses, allowing VOX operation with the processor on.

SPECIFICATIONS • **Processing Type:** Preclipping audio compression followed by rf envelope clipping at the processor intermediate frequency. • **Rf Clipping Range:** Adjustable 0 to 20 dB from front panel control. • **Input Level (Microphone Input):** 3.5 mV minimum for full processing. Gain adjustable to accommodate up to 300 mV maximum. • **Input Level (Tape and Patch Inputs):** 15 mV minimum for full processing, 30 mV maximum. • **Input Impedance (Microphone):** 1 megohm. • **Input Impedance (Tape and Patch):** 50 kilohm. • **Output Level w/Processing:** 0-50 mV adjustable into 50 kilohm load. • **Output Impedance:** 50 kilohm. • **Muting (Microphone Input Only):** 10 to 20 dB attenuation during speech pauses. • **Frequency Response:** 400-6000 Hz@6 dB. • **Distortion:** Less than 5% T.H.D.@1kHz, 20 dB clipping. • **Power:** 11-16 V-dc@95 mA. • **Size:** 7"L x 6¼"W x 2¼"H (17.3 x 15.9 x 5.4 cm). • **Weight:** 1.4 lbs. (.63 kg).

Model 1520

D P75 Phone Patch

Hybrid Phone Patch for use with 7-line or other receiver/transmitter combination. • In/out Switching • Adjustable TX and RX level controls.

Model 1535

E CS7 Coax Switch

• Switches up to five coax-fed antennas via one main feed line. • Allows selection of up to five radios at other end of main feed line. • Minimizes amount of coax needed for multi-antenna installation. • Grounds unused inputs (both local and remote).

DRAKE CS7 SPECIFICATIONS • **Maximum Input Power:** 2000 watts PEP • **Frequency Range:** Up to 30 MHz, insertion of Switch changes VSWR no more than 1.05:1. From 30 MHz to 150 MHz, insertion changes VSWR no more than 1.5:1 (both switches). • **Operating Temperature Range:** −40°F. to 150°F. • **Supply Voltage:** 120 V-ac or 240 V-ac selectable, 50/60 Hz, 50 watts. • **Dimensions & Weight: Console**—5.25"H x 6.81"W, 7.06" cabinet depth (13.3 x 17.3 x 17.9 cm); 4.33 lbs (1.96 kg); **Remote Antenna Switch**—7.13"H x 5.88"W x 4.39"D (18.1 x 15.0 x 11.1 cm). 8.19" (20.8 cm) center to center mounting; 5 lbs (2.27 kg).

Model 1531

B MS7 Matching Speaker

• **Size:** 7.5"D x 6.9"W x 4.6"H excluding feet (19 x 17.5 x 11.6 cm). • **Weight:** 2.5 lbs (1.13 kg).

"Dry" Dummy Loads

—no oil required

Model 1551

Model 1550

Model 1551 Drake DL-1000

• **1000 watts** for 30 seconds, with derating curve to 5 minutes. Accepts Drake FA7 cooling fan for extended high power operation. • **VSWR of 1.5:1 max.** 0-30 MHz • **SO-239 coax connector** • **Rubber feet** for desk or bench use • **Size** 14" x 3.6" (35.6 x 9.1 cm). **Weight:** 2 lbs (910 g).

Model 1550 Drake DL-300

• **300 watts** for 30 seconds, with derating curve to 5 minutes. • **Built-in PL-259** coax connector for direct connection to rear of transceiver or transmitter—no jumper coax necessary. • **VSWR of 1.1:1 max.** 0-30 MHz 1.5 max 30-160 MHz • **Ideal as bench test device** for amateur or commercial hf and vhf gear. • **Small size** fits conveniently in any field service tool box. 6.7" x 2.08" (17.0 x 5.3 cm). **Weight:** 11 oz (310 g).

WH7 Directional Rf Wattmeter

Model 1514

• Directional, in-line wattmeter. • Removable coupler provides remote metering. • Three calibrated scales (0-20, 0-200, and 0-2000 watts. • Fourth scale provides direct reading VSWR.

SPECIFICATIONS: • **Frequency Coverage:** 1.8-30 MHz. • **Line Impedance:** 50 ohm resistive. • **Power Capability:** 2000 W continuous. • **Jacks, Removable Coupler:** Two SO-239 input and output connectors. • **Semiconductors:** Two power meter rectifiers. • **Accuracy:** ±(5% of reading + 1% of full scale). • **VSWR Insertion:** Insertion of wattmeter in line changes VSWR no more than 1.05:1. • **Shipping Weight:** 3 lbs (1.4 kg). • **Dimensions:** 5.3"H x 6.9"W x 7.5"D (13.5 x 17.5 x 19 cm).

Model 1230

LA7 Line Amplifier

Line output, 1 mW nominal into 600 ohm balanced, adjustable by internal pre-set level control.

TV Interference Filters

High Pass Filters for TV Sets

More than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

Model No. 1603
Drake TV-300-HP

For 300 ohm twin lead. New terminals for easy installation.

Model No. 1610
Drake TV-75-HP

For 75 ohm TV coaxial cable; TV type "F" connectors installed.

Low Pass Filters for Transmitters

Four pi sections for sharp cut off above the hf amateur bands and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Model No. 1608 **Drake TV-3300-LP**

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as harmonic interference.

Model No. 1605 **Drake TV-42-LP**

A four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

Specifications, availability and prices subject to change without notice or obligation.

R. L. DRAKE COMPANY DRAKE

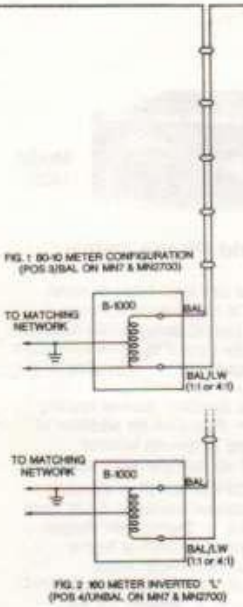
540 Richard St., Miamisburg, Ohio 45342, USA Phone: (513) 866-2421 • Telex: 288-017

Litho in U.S.A.

Drake ACCESSORIES

Model 1555
AK75
Multi-band Antenna

The AK75 is a versatile antenna for 160 thru 10 meters when used with an antenna tuner and balun (such as the Drake MN7 or MN2700 with the B-1000). Consists of 100 ft of 470 ohm balanced feedline connected to 135 ft dipole with specially designed strain-relief center insulator. Isolating insulators are attached at antenna ends.



Model 1556
AA75 Antenna Accessory Kit

Contains the insulators needed for constructing dipole type antennas. The center insulator is designed to provide strain relief for RG58 coax feedlines or 300-500 ohm twin lead feedlines.

"Dry" Dummy Loads

—no oil required

Model 1551

Model 1551 Drake DL-1000

- **1000 watts** for 30 seconds, with derating curve to 5 minutes. Accepts Drake FA7 cooling fan for extended high power operation. • **VSWR of 1.5:1 max.** 0-30 MHz • **SO-239 coax connector** • **Rubber feet** for desk or bench use • **Size** 14" x 3.6" (35.6 x 9.1 cm). **Weight:** 2 lbs (910 g).

Model 1550

Model 1550 Drake DL-300

- **300 watts** for 30 seconds, with derating curve to 5 minutes. • **Built-in PL-259** coax connector for direct connection to rear of transceiver or transmitter—no jumper coax necessary. • **VSWR of 1.1:1 max.** 0-30 MHz 1.5 max 30-160 MHz • **Ideal as bench test device** for amateur or commercial hf and vhf gear. • **Small size** fits conveniently in any field service tool box. 6.7" x 2.08" (17.0 x 5.3 cm). **Weight:** 11 oz (310 g).

WH7
Directional
Rf Wattmeter
Model 1514

- Directional, in-line wattmeter. • Removable coupler provides remote metering. • Three calibrated scales (0-20, 0-200, and 0-2000 watts. • Fourth scale provides direct reading VSWR.

SPECIFICATIONS: • **Frequency Coverage:** 1.8-30 MHz. • **Line Impedance:** 50 ohm resistive. • **Power Capability:** 2000 W continuous. • **Jacks, Removable Coupler:** Two SO-239 input and output connectors. • **Semiconductors:** Two power meter rectifiers. • **Accuracy:** ±(5% of reading + 1% of full scale). • **VSWR Insertion:** Insertion of wattmeter in line changes VSWR no more than 1.05:1. • **Shipping Weight:** 3 lbs (1.4 kg). • **Dimensions:** 5.3"H x 6.9"W x 7.5"D (13.5 x 17.5 x 19 cm).

Model 1533 CS7 Coax Switch

Control Console

Remote Switch

- Switches up to five coax-fed antennas via one main feed line • Allows selection of up to five radios at other end of main feed line • Minimizes amount of coax needed for multi-antenna installation • Grounds unused inputs (both local and remote).

DRAKE CS7 SPECIFICATIONS • **Maximum Input Power:** 2000 watts PEP • **Frequency Range:** Up to 30 MHz, insertion of switch changes VSWR no more than 1.05:1. From 30 MHz to 150 MHz, insertion changes VSWR no more than 1.5:1 (both switches). • **Operating Temperature Range:** −40°F. to 150°F. • **Supply Voltage:** 120 V-ac or 240 V-ac selectable, 50/60 Hz, 50 watts • **Dimensions & Weight: Console**—5.25"H x 6.81"W, 7.06" cabinet depth (13.3 x 17.3 x 17.9 cm); 4.33 lbs (1.96 kg); **Remote Antenna Switch**—7.13"H x 5.88"W x 4.39"D (18.1 x 15.0 x 11.1 cm). 8.19" (20.8 cm) center to center mounting; 5 lbs (2.27 kg).

Remote Switch installed on tower

Power Supplies

Model 1570 Drake PS75 120/240 V-ac Supply for intermittent duty (15 amps continuous, 25 amps intermittent).

The PS75 is a high current, 13.6 V-dc power supply for use with solid state transceivers in cw or ssb modes. The supply operates from a primary voltage of 100, 120, 200 or 240 V-ac, 50-60 Hz (switch programmed), and provides 15 amperes continuous at an unregulated voltage of 13.6 V-dc (nominal) for use with solid state power amplifiers and a 3 ampere regulated output for use with the remainder of the transceiver. In addition, a regulated 13.6 V-dc at 1 ampere is provided for auxiliary equipment.

The supply was designed primarily for ssb operation at current levels of 15 amperes average and 25 amperes peak but will also provide reliable performance on cw at current levels of up to 25 amperes. Some cw signal quality degradation due to the increased ripple may be noticed at cw power levels which exceed 15 amperes current drain (usually about 75 watts).

Size: 9.63"W x 5.06"H x 10.88"D (24.4 x 12.8 x 27.6 cm) **Weight:** 20.5 lbs (9.3 kg)

Model 1502 Drake PS7 120/240 V-ac Supply for continuous duty (25 amps).

Size: 13.6"Wx4.6"Hx12.5"D (34.6x11.6x31.8 cm). **Weight:** 38 lbs (17.3 kg).

R.L. DRAKE COMPANY DRAKE

540 Richard St., Miamisburg, Ohio 45342, USA
Phone: (513) 866-2421 • Telex: 288-017

Drake ACCESSORIES

Model 7077

Dynamic Desk Microphone

• **Audio and level characteristics** custom designed to match the transmit audio requirements of the Drake TR7. • **Features both VOX and PTT** operation without modification. • **High Impedance** • **Includes coil cord and plug** wired for direct connection to the Drake TR7. • **Style and color** provide a beautiful match to the Drake 7-line • **Size** 4.3"W x 5.8"D x 9.3"H (10.9 x 14.7 x 23.6 cm). **Weight** 1 lb 7 oz (650 g).

Model 1553

SP75 Speech Processor

Provides an increase in average power/readability of a single sideband voice signal during weak signal, high interference conditions. The SP75 is connected between the microphone and microphone input of the ssb transmitter, requiring no modification of existing transmitter or transceiver. A front panel switch allows the processor to be switched in or bypassed. Two additional inputs, such as a tape player or phone patch, may be front panel selected.

Rf envelope clipping adjustable between zero and twenty decibels. LED indicates proper audio input level.

Muting circuitry reduces gain during speech pauses, allowing VOX operation with the processor on.

SPECIFICATIONS • **Processing Type:** Preclipping audio compression followed by rf envelope clipping at the processor intermediate frequency. • **Rf Clipping Range:** Adjustable 0 to 20 dB from front panel control. • **Input Level (Microphone Input):** 3.5 mV minimum for full processing. Gain adjustable to accommodate up to 300 mV maximum. • **Input Level (Tape and Patch Inputs):** 15 mV minimum for full processing. 30 mV maximum. • **Input Impedance (Microphone):** 1 megohm. • **Input Impedance (Tape and Patch):** 50 kilohm. • **Output Level w/Processing:** 0-50 mV adjustable into 50 kilohm load. • **Output Impedance:** 50 kilohm. • **Muting (Microphone Input Only):** 10 to 20 dB attenuation during speech pauses. • **Frequency Response:** 400-6000 Hz@6 dB. • **Distortion:** Less than 5% T.H.D.@1kHz, 20 dB clipping. • **Power:** 11-16 V-dc@95 mA. • **Size:** 7"L x 6¼"W x 2¼"H (17.3 x 15.9 x 5.4 cm). • **Weight:** 1.4 lbs. (.63 kg).

Model 1531

MS7 Matching Speaker

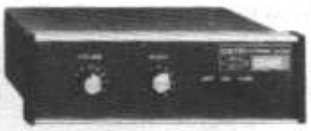
• **Size:** 7.5"D x 6.9"W x 4.6"H excluding feet (19 x 17.5 x 11.6 cm). • **Weight:** 2.5 lbs (1.13 kg).

Model 1520

P75 Hybrid Phone Patch

• Phone patch for use with 7-line or most other transceiver or receiver/transmitter combinations. • Hybrid design nulls receiver audio at transmitter output to allow automatic VOX operation if desired. • Adjustable receiver and transmitter audio gain controls. • Built-in relay for positive receiver muting during transmit. • Provision for addition of holding coil for use in remote control applications such as repeater auto patches.

DRAKE P75 SPECIFICATIONS • **Receiver Audio Input Impedance:** standard 3.2-16 ohm speaker impedance. • **Transmitter Output Impedance:** matches 1 kilohm or higher transmitter microphone circuit input impedance. • **Size:** 7.0"L x 6.25"W x 2.25"H (17.3 x 15.9 x 5.4 cm). • **Weight:** 1.4 lbs (.63 kg).



Model 1507

CW75 Keyer

• Iambic keying. • Built-in side tone. • Optically coupled keyline for grid block or direct keying. • Speed and volume control. • Self completing dots and dashes. • Operates from external 7-14 volt supply or 9 volt battery (internal optional). • 5-50 WPM. • Squeeze keyer, semi-automatic "bug" or straight key operation. • **Size:** 7.0"L x 6.25"W x 2.25"H (17.3 x 15.9 x 5.4 cm). • **Weight:** 1.4 lbs (.63 kg).

Model 3506

RP700 Receiver Protector

The RP700 Receiver Protector offers receiver protection necessary in close proximity to high-power transmitters. The solid state circuitry furnishes protection to all rf signals, even those in the microwave band.

With the RP700 the receiver is protected at all times, even when in the off position or tuned to other frequencies. The protector is inserted in the transmission line between the antenna and the receiver (no power required) and limits the signal level applied to the receiver while providing very low insertion loss under lower signal conditions.

The RP700 will handle 3.5 amps rms (10A peak-to-peak). 175 volts rms (500 V peak-to-peak) behind 50 ohms.

Size: 3.38"L x 2.0"W x 1.5"H (8.5 cm x 5 cm x 3.8 cm). **Weight:** 4 ounces (125 gm).

Model 1230

LA7 Line Amplifier

Accessory pc board to be installed inside radio. Line output, 1 mW nominal into 600 ohm balanced, adjustable by internal pre-set level control.

Other Drake Accessories

Model	
7021	SL-300 Cw Filter, 300 Hz
7022	SL-500 Cw Filter, 500 Hz
7023	SL-1800 Ssb/RTTY Filter, 1.8 kHz
7026	SL-4000 A-m Filter, 4.0 kHz
7024	SL-6000 A-m Filter, 6.0 kHz
1537	NB7 Noise Blanker (for TR7)
1532	NB7A Noise Blanker (for R7)

TV Interference Filters

High Pass Filters for TV Sets

More than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

Model No. 1603
Drake TV-300-HP

For 300 ohm twin lead. New terminals for easy installation.

Model No. 1610
Drake TV-75-HP

For 75 ohm TV coaxial cable; TV type "F" connectors installed.

Low Pass Filters for Transmitters

Four pi sections for sharp cut off above the hf amateur bands and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Model No. 1605 **Drake TV-42-LP**

A four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

Model No. 1608 **Drake TV-3300-LP**

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as harmonic interference.

Model 1240

R7

Synthesized General Coverage Receiver

Full general coverage reception, 0-30 MHz, with no gaps or range crystals required.

Continuous tuning all the way from vlf thru hf. Superb state-of-the-art performance on a-m, ssb, RTTY, and cw—and it transceives with Drake TR7.

- **100% solid state broadband design,** fully synthesized with a permeability tuned oscillator (PTO) for smooth, continous tuning.
- **Covers the complete range 0 to 30 MHz** with no gaps in frequency coverage. Both digital and analog frequency readout.
- **Special front-end circuitry** employing the high level double balanced mixer and 48 MHz "up-converted" 1st i-f for superior general coverage, image rejection and strong signal handling performance.
- **Complete front-end bandpass filters** are included that operate from hf thru vlf. External vlf preselectors are not required.
- **10 dB pushbutton-controlled broadband preamp** can be activated on all ranges above 1.5 MHz. Low noise design.
- **Various optional selectivity filters** for cw, RTTY and a-m are switch-selected from the front panel. Ssb filter standard.
- **Special new low distortion "synchro-phase" a-m detector** provides superior international shortwave broadcast reception. This new technique permits 3 kHz a-m sideband response with the use of a 4 kHz filter for better interference rejection.
- **Tunable i-f notch filter** effectively reduces heterodyne interference from nearby stations.
- **The famous Drake full electronic passband tuning system** is employed, permitting the passband position to be adjusted for any selectivity filter. This is a great aid in interference rejection.
- **Three agc time constants** plus "Off" are switch-selected from the front panel.
- **Complete transceive/separate functions** when used with the Drake TR7 transceiver are included, along with separate R7 R.I.T. control.
- **Special multi-function antenna selector/50 ohm splitter** is switch-selected from the front panel, and provides simultaneous dual receive with the TR7. This makes possible the reception of two different frequencies at the same time. Main and alternate antennas and vhf/uhf converters may also be selected with this switching network.
- **The digital readout** of the R7 may be used as a 150 MHz counter, and is switched from the front panel. Access thru rear panel connector.
- **The built-in power supply** operates from 100, 120, 200, 240 V-ac, 50/60 Hz, or nominal 13.8 V-dc.
- **The R7 includes a built-in speaker,** or an external Drake MS7 speaker may be used.
- **Built-in 25 kHz calibrator** for calibration of analog dial.
- **Low level audio output** for tape recorder.
- **Up to eight crystal controlled fixed channels** can be selected. (With Drake Aux7 installed.)
- **Optional Drake NB7A Noise Blanker** available. Provides true impulse type noise blanking performance.

R7

Accessories available

Model 1531	Drake MS7 Speaker
Model 7021	Drake SL-300 Cw Filter, 300 Hz
Model 7022	Drake SL-500 Cw Filter, 500 Hz
Model 7023	Drake SL-1800 Ssb/RTTY Filter, 1800 Hz
Model 7024	Drake SL-6000 A-m Filter, 6.0 kHz
Model 7026	Drake SL-4000 A-m Filter. 4.0 kHz
Model 1532	Drake NB7A Noise Blanker
Model 1536	Drake Aux7 Range Program/Fixed-Frequency Board
Model 1548	Drake R7/TR7 Interface Cable Kit
Model 385-0005	Drake R7 Service/Schematic Book
Model 3506	Drake RP700 Receiver Protector
Model 1230	Drake LA7 Line Amplifier

R7 SPECIFICATIONS

Frequency Coverage, continuous tuning 0.01 to 30.0 MHz

Plus any eight additional 500 kHz segments between 0 and 30 MHz when programmed into Aux7 Board.

Crystal Controlled Fixed Frequencies: Up to eight crystal-controlled fixed frequencies within the 0-30 MHz range with Aux7 Accessory Board. Proper 500 kHz range for desired fixed frequency is also programmed into Aux7.

Frequency Stability: Less than 1 kHz first hour. Less than 150 Hz per hour after 1 hour warm up. Less than 100 Hz for ± 10% line voltage change.

Digital Readout Accuracy: (DR-7 installed) 15 PPM ± 100 Hz

Analog Dial Accuracy: Better than ±1 kHz when calibrated to nearest calibrator marker.

Modes of Operation: Ssb, cw, RTTY, SSTV, a-m.

Sensitivity (ssb): 1.8-30 MHz Less than .20μV for 10dB (S+N)/N with preamp on (typically .15μV) (Noise floor typically −134 dBm) Less than .50μV for 10 dB (S+N)/N without preamp (typically .30μV) (Noise floor typically −128dBm). .01-1.5MHz Less than 1.0μV for 10 dB (S+N)/N

Sensitivity (a-m): 1.8-30MHz Less than 1.2μV for 10dB (S+N)/N @ 30% modulation, preamp on. Less than 2.0μV for 10 dB (S+N)/N @ 30% modulation, preamp off. .01-1.5 MHz Less than 4.0μV for 10 dB (S+N)/N @ 30% modulation.

Selectivity (2.3 kHz filter supplied): 2.3 kHz at −6 dB, 4.4 kHz at −60 dB (1.8:1) shape factor. Optional 300 Hz, 500 Hz, 1800 Hz, 4 kHz, and 6 kHz filters are available as follows:

Accessory Crystal Filters

SL-300 cw filter: 300 Hz @ 6 dB, 700 Hz @ 60 dB
SL-500 cw, RTTY Filter: 500 Hz @ 6 dB, 1100 Hz @ 60 dB
SL-1800 ssb/RTTY Filter: 1800 Hz @ 6 dB, 3600 Hz @ 60 dB
SL-4000 a-m Filter: 4 kHz @ 6 dB, 8 kHz @ 60 dB
SL-6000 a-m Filter: 6 kHz @ 6 dB, 12 kHz @ 60 dB

Ultimate Selectivity: Greater than 100 dB

Intermodulation:

Two-tone dynamic range: 99 dB *	1.8-30 MHz
Third order intercept point: +20 dBm	preamp off
Two-tone dynamic range: 95 dB *	1.8-30 MHz
Third order intercept point: +10 dBm	preamp on

Blocking: >145 dB above noise floor

** (at tone spacings of 100 kHz and greater)*

I-f and Image Rejection: Greater than 80 dB (48.05 MHz 1st i-f) (5.645 MHz 2nd i-f) (50 kHz 3rd i-f)

Agc Performance; Less than 4 dB audio output variation for 100 dB input signal change above agc threshold. Agc threshold is typical .8μV with preamp off and .25μV with preamp on.

Attack time: 1 millisecond. Three selectable release times: Slow—2 seconds; Med—400 m sec; Fast—75 m sec. Also, "Off" position is provided.

Antenna Input Impedance: Nominal 50 ohms

Audio Output: 2.5 watts with less than 10% T.H.D. into nominal 4 ohm load.

Power Requirements: 100/120/200/240 V-ac ±10%, 50/60 Hz, 60 watts or 11.0 to 16.0 V-dc (13.8 V-dc nominal), 3 amps

External Counter Mode (DR-7 installed): Readout: to 100 Hz. Accuracy: 15 PPM ±100 Hz. Maximum input frequency: 150 MHz. Input level range: 50 mV to 2 V rms.

Dimensions/Weight:

Depth—13.0 in (33.0 cm) excluding knobs and connectors.
Width— 13.6 in (34.6 cm)
Height— 4.6 in (11.6 cm) excluding feet
Weight— 18.4 lbs (8.34 kg)

Specifications, availability and prices subject to change without notice or obligation.

R.L. DRAKE COMPANY

DRAKE

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Litho in U.S.A.

PS-7 Power Supply Shut-Down
Using The SP-75 Speech Processor

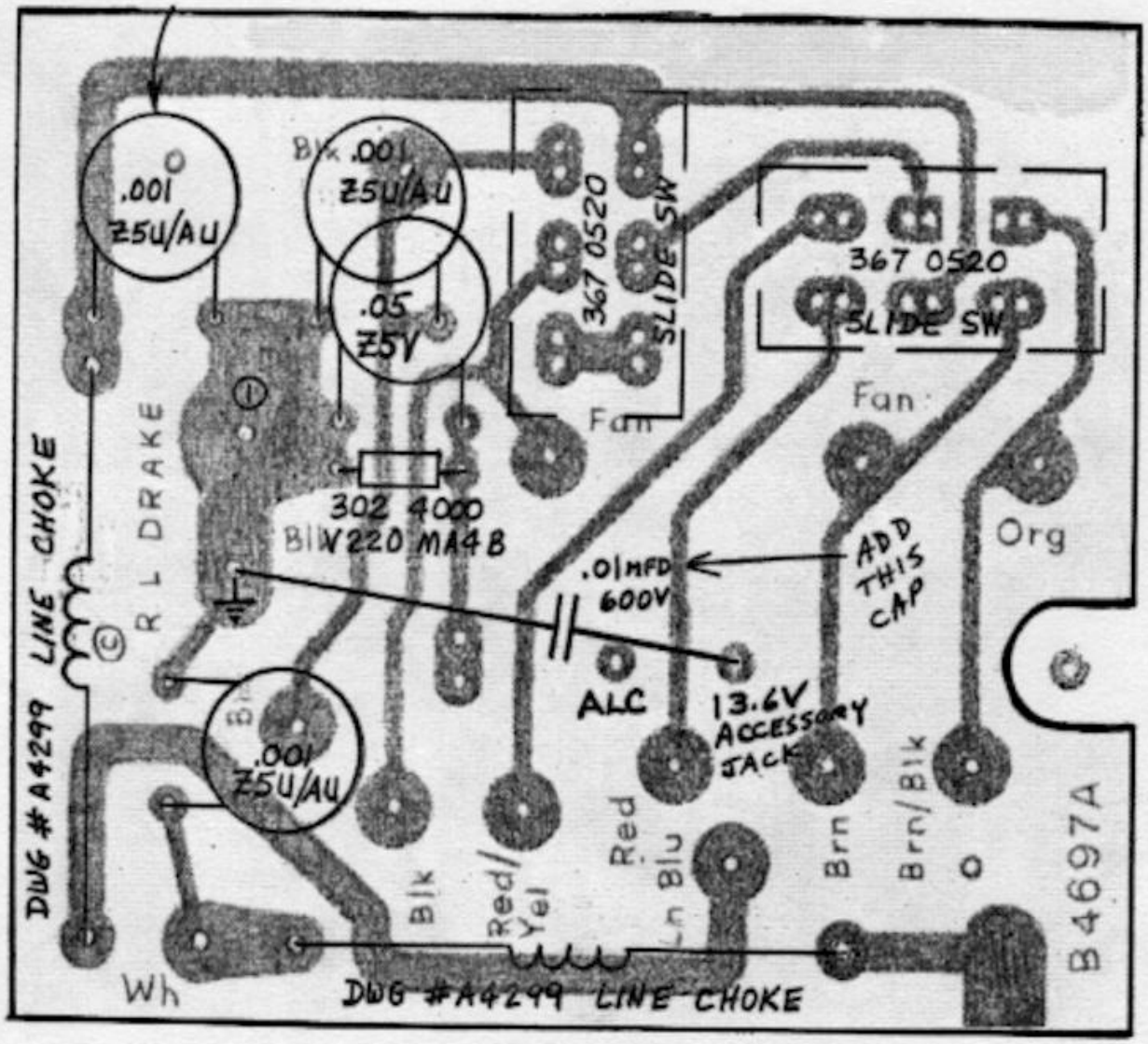
http://www.wb4hfn.com/DRAKE/DrakeArticles/PS7_Shutdown.htm

PS-7 SHUTDOWN AND THE SP-75

The PS-7 Power Supply may be susceptible to RF entering through the accessory 13.6 VDC phono jack in some station installations where this jack is used, such as when the SP-75 is plugged into this jack. It will cause the PS-7 protection circuit to activate, shutting down the power supply, or create power supply oscillations.

To eliminate this, a .01 MFD/600 V disc capacitor should be added from the tip of the 13.6 VDC accessory jack to ground.

The later PS-7 power supply mounts the 13.6 VDC accessory jack into a printed circuit board. Since the board blocks access to the jack's ground lug, the ground lead of this .01 MFD disc capacitor should be connected to the ground foil of the circuit board. A small amount of spaghetti insulation should be used on the capacitor leads to prevent possible shorts.



CIRCUIT SIDE VIEW OF P.C. BOARD

Using the P-75 Phone Patch With The SP-75 Speech Processor

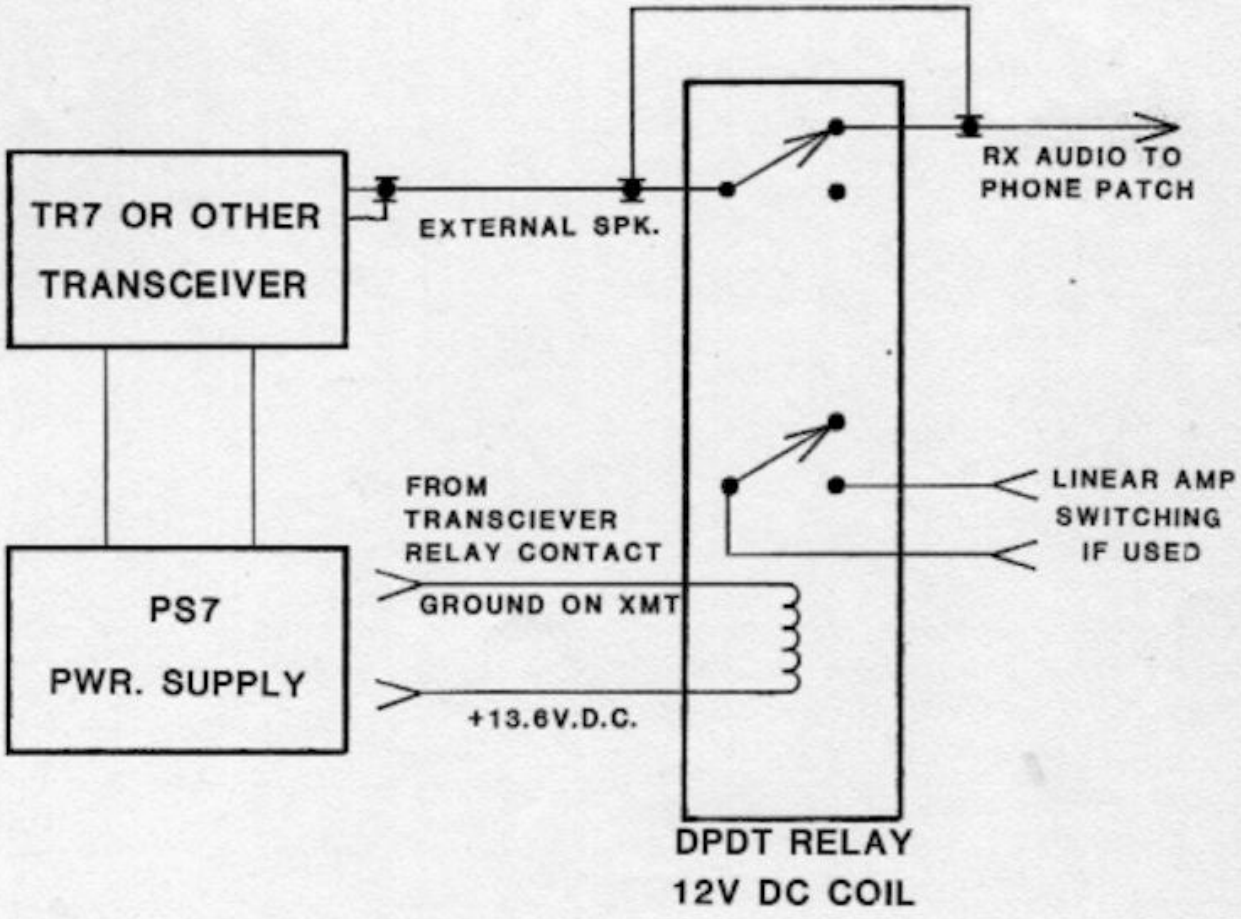
http://www.wb4hfn.com/DRAKE/DrakeArticles/SP75-P75_Using_Together.htm

USE OF A PHONE PATCH WITH SP75 SPEECH PROCESSOR

Under some conditions, use of a phone patch with a speech processor may cause a feedback condition. This condition results if the transceiver still has a very small amount of audio present at its output in the transmit mode. This can be caused because of less then 100% muting, or because of RF rectification in the receiver audio amplifier. Although this condition may be completely unnoticeable in a speaker, when connected to the phone patch, and with the added gain of the speech processor, a feedback condition can result.

This feedback condition can be eliminated in one of two ways. In most cases using the phone patch without processing will eliminate the condition. The SP75 input switching can still be used to select the phone patch but the SP75 ON/OFF switch can be left in the OFF condition.

If processing is desired for phone patch operation, the muting of the transceiver must be improved. This can be done without modification to the transceiver itself by adding an additional relay to break the audio output (speaker) line. The relay can be controlled from the linear amplifier contact of the transceiver as shown in the schematic below.



DRAKE

NB-7 NOISE BLANKER INSTALLATION

Installation of the NB-7 Noise Blanker in the TR-7 is accomplished via the following procedure:

1) Remove all interconnecting cables from the TR-7.
2) Remove the cabinet wraparound by removing eight screws on the bottom and sliding the wrap-around towards the rear of the TR-7.
3) Refer to figure 1 and remove the top cover from the main card case by removing 14 screws. *(12 on top and 2 on the rear.)*

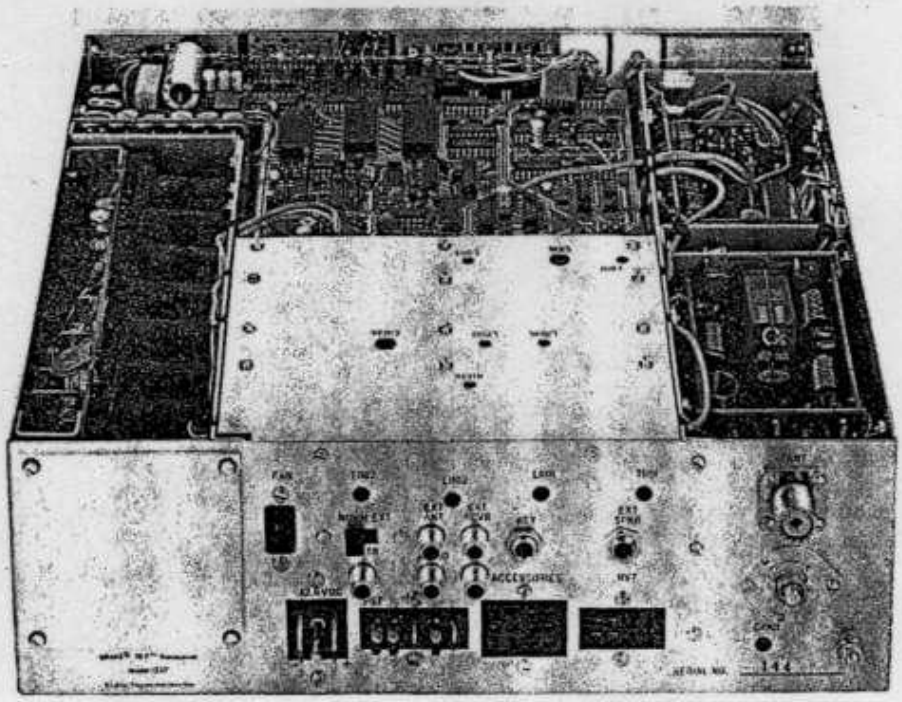


Figure 1—Top Cover (main card cage)

4) Refer to figure 2 and remove the noise blanker dummy card as follows:
   a) Lift card out with supplied card puller.
   b) Unplug coax coming from IF Selectivity card, being careful not to lose grommet.
   c) Remove the noise blanker dummy card.

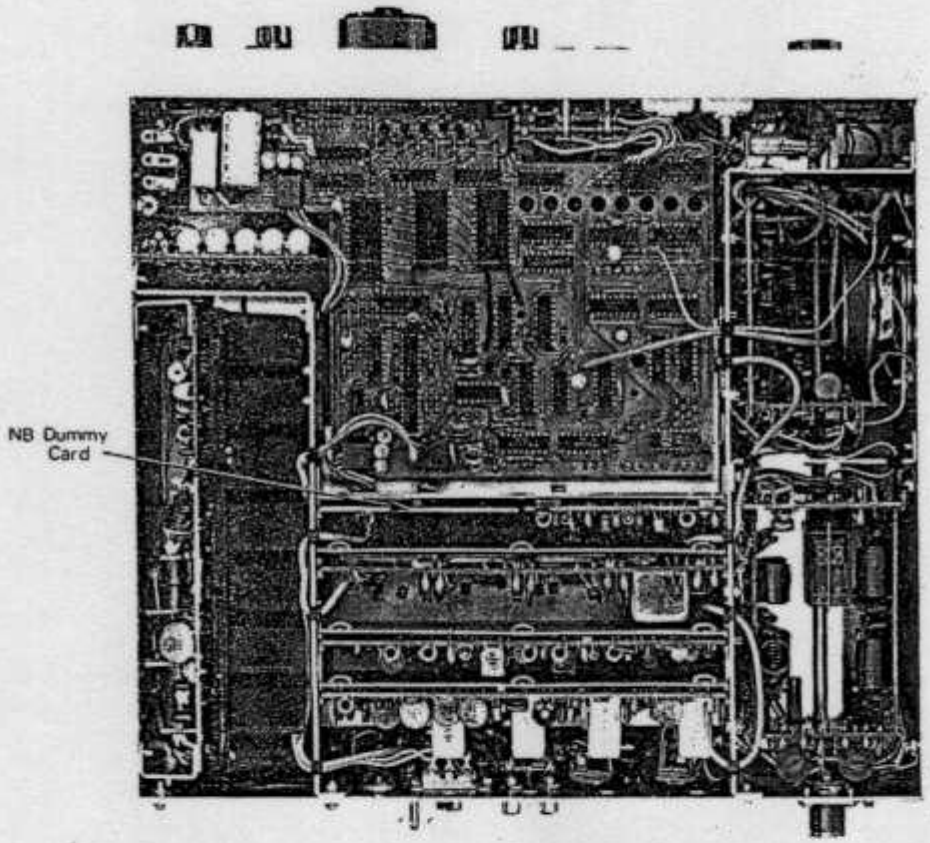


Figure 2—TR-7 Top View

5) Install the NB-7 card as follows:
   a) Carefully plug coax from IF Selectivity card into coax connector on NB-7 card being careful not to bend center conductor of coax.

NOTE

If coax from IF Selectivity board is not long enough to reach connector on NB-7, clip cable tie on IF Selectivity board to gain additional length.

   b) Slide board down into card cage with right edge of board in card guide and making sure board connectors align with pins in the Parent board.

6) Route cable with grommet on card cage edge as before.

7) Reinstall the top cover with 14 screws. Be careful not to overtighten these screws.

8) Reinstall the cabinet wraparound with eight screws in the bottom.

9) Reconnect the TR-7 to other station equipment.

The NB-7 will now operate when the front panel button labeled NB is depressed.

WARNING

The NB-7 is factory aligned. Should it be necessary to re-align the NB-7, refer to Alignment Section for proper alignment procedure.

DRAKE

R7/TR7 ACCESSORY FILTER INSTALLATION

Installation of accessory crystal filters in the TR7 and the R7 is easily accomplished via the following procedure:

1. Remove all interconnecting cables.
2. Remove the cabinet wraparound by removing eight screws on the bottom and sliding the wraparound toward the rear.
3. Remove the top cover from the main card cage by removing 14 screws (12 on top and 2 in the rear). Refer to figure 1A for TR7 Top Cover, and to figure 1B for the R7 Top Cover.

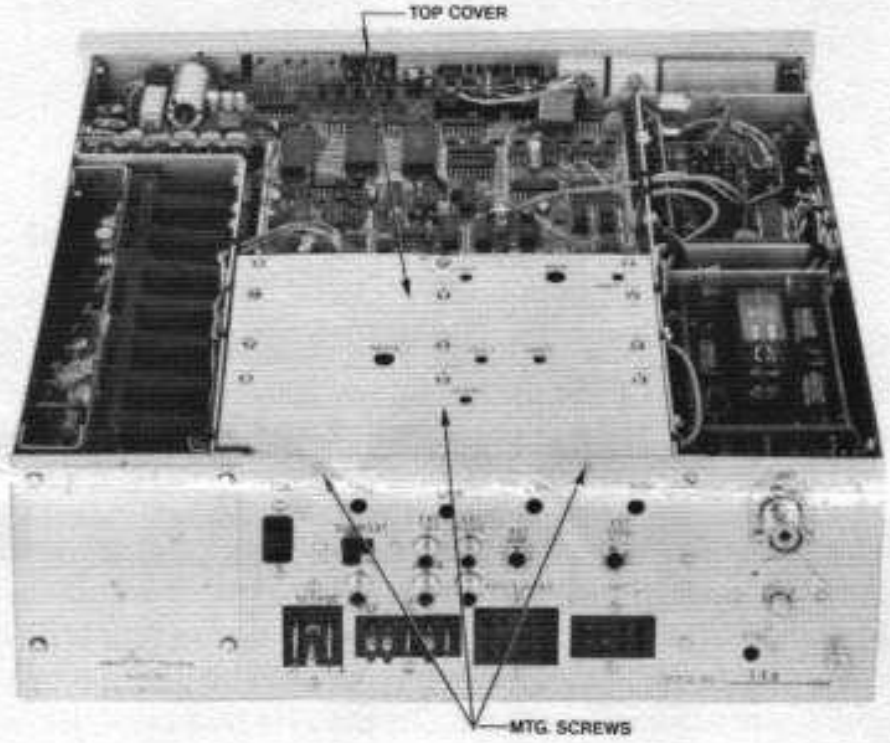


figure 1A – TR7 Top Cover (main card cage)

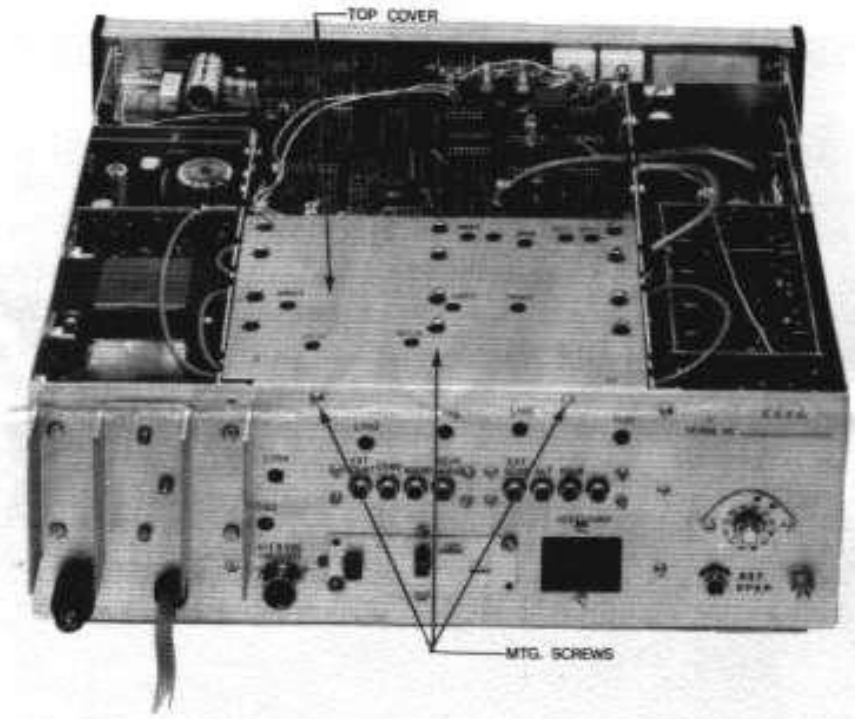


figure 1B – R7 Top Cover (main card cage)

4. Remove the IF Selectivity module as follows. Refer to figure 2A for TR7 Top View and to figure 2B for R7 Top View.
   a) For the TR7, unplug the coax from the 2nd IF/AGC Board. For the R7, two (2) coaxes must be unplugged from the 2nd/3rd IF/AGC Board. This is accomplished by first unplugging coax #1. Then remove the 2nd/3rd IF/AGC Board and unplug coax #2 from it.
   b) Remove the NB Board. If you do not have a Noise Blanker Board in your unit, then you should remove the NB Dummy Board in the TR7 or the NB IF Jumper Board in the R7. Unplug the coax.
   c) Remove the IF Selectivity Board.

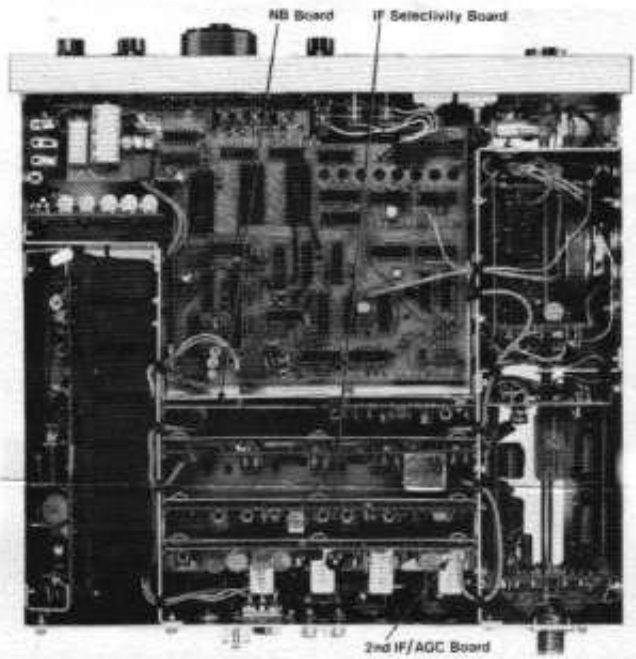


figure 2A – TR7 Top View

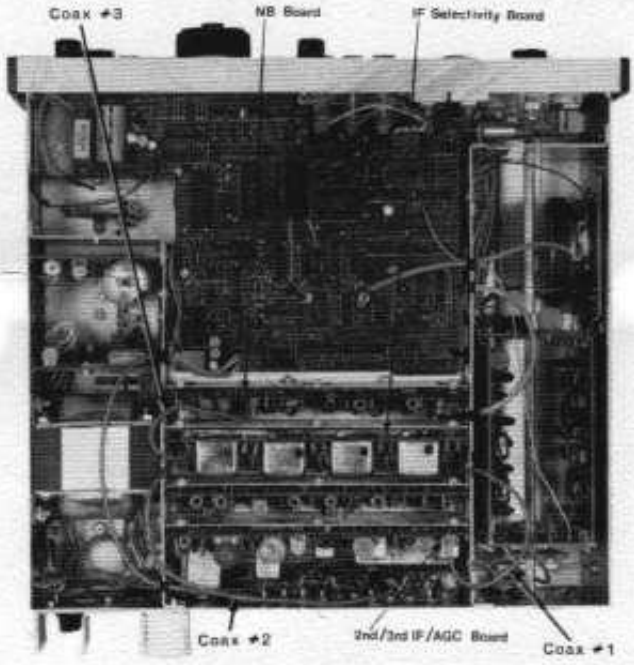


figure 2B – R7 Top View

5. In the TR7, determine in which location (A, B or C) the accessory filter will be installed. Refer to figure 3A and identify this location.

NOTE

The standard 2.3 kHz filter must not be removed from the TR7 IF Selectivity Board or changed to a different location on the board.

6. For the R7, refer to figure 3B and install appropriate filters ir the positions shown as they correspond with Selectivity board and switch wiring

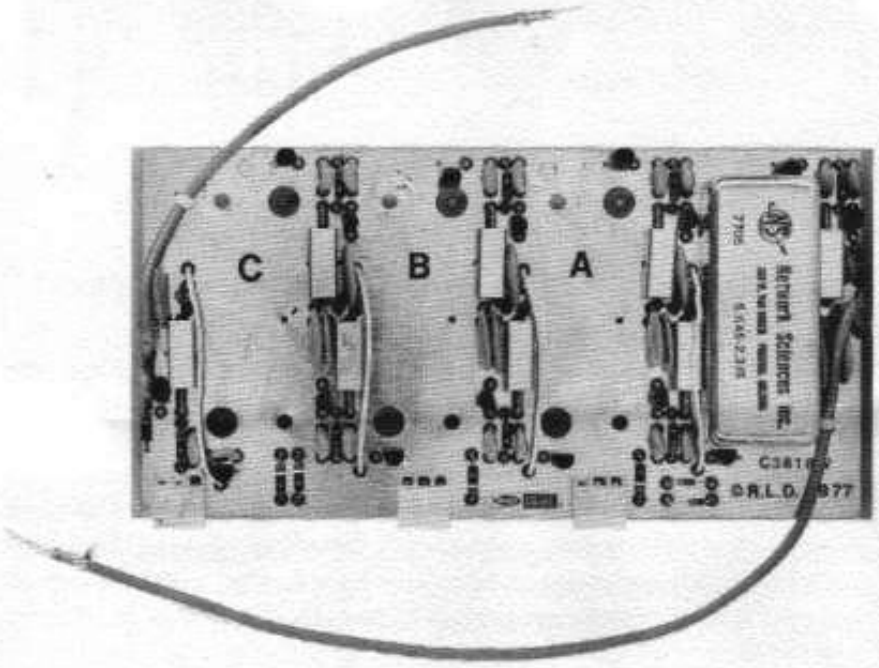


figure 3A – TR7 IF Selectivity Board (filter locations)

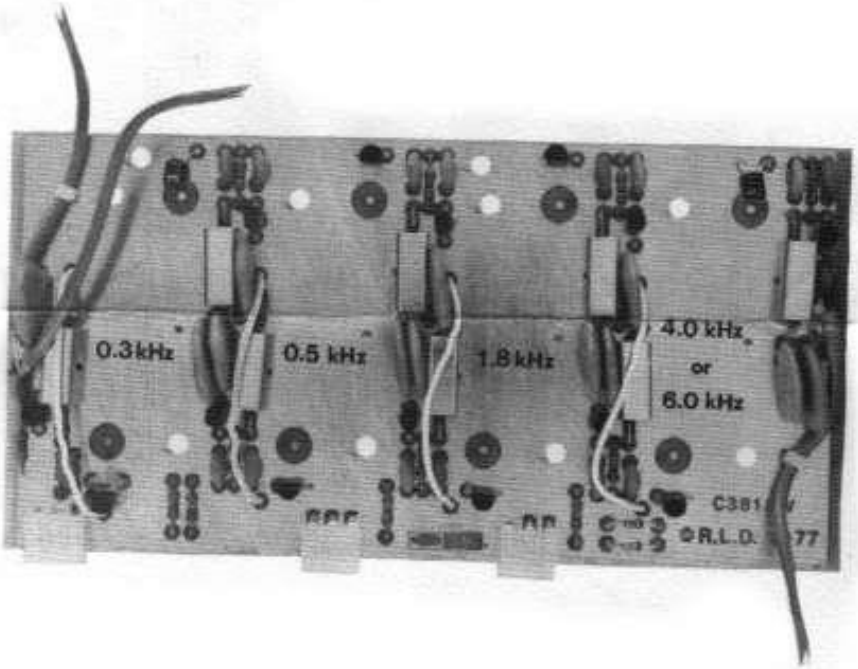


figure 3B – R7 IF Selectivity Board (filter locations)

7. Inspect the accessory filter to be sure that the pins are straight. If they are not, straighten them *very carefully* with a minimum of force.
8. Remove the lockwashers and nuts from the two studs and install the filter in the selected location by aligning the pins and studs with the holes on the IF Selectivity board, pressing the filter straight down onto the board. Use a minimum of force; if all parts are properly aligned, the filter should drop in with ease.
9. Check to be sure that no wires are pinched between the filter and the board and install the lockwashers and nuts on the two filter mounting studs that were removed in the preceding step. Solder the three filter pins to the associated circuit foils on the board.

10. Inspect the board for solder splatters or bridges, pinched wires, etc. and correct any defects.
11. Reinstall IF Selectivity board, making sure to align the board connectors with the pins on the parent board.
12. For the TR7, reinstall the coax cables and NB board. Route the cables through grommets as before. For the R7, reinstall coax #2 to 2nd/3rd IF/AGC board bottom connector, and carefully plug board into radio. Reinstall coaxs #1, 3 and NB board. Route the cables through grommets as before.
13. Reinstall the top cover with 14 screws. Be careful not to overtighten these screws.
14. Reinstall the cabinet wraparound with eight screws in the bottom.
15. Reconnect unit to other station equipment. The accessory filter(s) will be selected when the appropriate button(s) on the front panel of the TR7 is depressed, or the appropriate selectivity switch position on the front panel of the R7 is selected. See the Operator's Manual for your unit for additional information.

DRAKE

AUX7 AUXILIARY PROGRAM BOARD, MODEL 1536

INSTALLATION & OPERATING INSTRUCTIONS

1 Introduction

The AUX7 is a plug-in unit which allows the user to program up to 8 auxiliary 500 kHz frequency ranges for instant selection from the front panel of a TR7 or R7. In addition, a crystal socket is provided for each of the eight auxiliary ranges to allow fixed frequency receive and/or transmit *(in the case of a TR7)* operation within a selected range.

For receive only applications, programming is accomplished by using one RRM7 Range Receive Module per band segment. One of these modules is included with the AUX7. For transceive operation, one RTM7 Range Transceive Module per band segment is required.

NOTE:

Proof of license or other F.C.C. authorization must be submitted to the R. L. Drake Co. in order to obtain RTM7 Range Transceive Modules. All RTM7 Range Transceive Modules will be programmed at the factory to the specified frequency range.

2 Frequency Programming

Each Range Receive Module (RRM7) and Range Transmit Module (RTM7) must be programmed for a specific, integral 500 kHz range. The modules are programmed by removing pins in accordance with the chart shown in figure 1. Note that pin 10 of the RRM7 module has been removed in production to provide the transmit inhibit feature. On the RTM7, *which is provided for transceive operation upon receipt of proof of license*, pin 10 must not be removed unless it is desired to inhibit the transmit function.

Follow the procedure listed in figure 1 *exactly* when programming a module. Carefully note the location of each module pin to be removed in accordance with the chart. Incorrect programming will result in operation on undesired frequencies, and could damage the transceiver.

The service department of the R. L. Drake Company will assist you in programming your RRM7 or RTM7 at no additional charge. Fill in the frequency range desired for each module to be programmed on the card provided. Our service department will fill in the post card, indicating which module pins to remove, and return it to you. *Be sure to include your return address in the space provided.* Note that the card can also serve as a record of what ranges you have programmed into which channels.

Refer to figure 2 and install the range modules into the AUX7 in the desired location. Be sure that all module pins are properly seated in the appropriate socket, and that the index marks on the range modules are correctly oriented.

Note that each range module socket has a corresponding crystal socket. To operate on a fixed receive and/or transmit *(in the case of a TR7)* frequency within a selected range, the proper crystal must be installed in the socket corresponding to the appropriate range module. Use the following formula to determine the crystal frequency:

Crystal Freq. (kHz) = 5050.0 kHz + Desired Carrier Frequency (kHz) − Lowest Range Frequency (kHz).

For example, suppose it is desired to operate on a fixed carrier frequency of 4358.6 kHz. Referring to figure 1, this frequency falls in the 4.0-4.5 MHz range, so a range module must be programmed by clipping pins 2, 3, 4, 9, 11, 12, and 14. This module should be installed in the desired channel location on the AUX7. Channel crystal carrier frequency is then calculated as follows:

5050.0 kHz + 4358.6 kHz − 4000.0 kHz = 5408.6 kHz

Thus, a 5408.6 kHz crystal is required for fixed operation on 4358.6 kHz, along with the appropriate range module. Note that the fixed crystals will always fall in the range 5050.0 kHz to 5550 kHz.

When ordering a fixed channel crystal, always specify the following information:

1. Crystal frequency in kHz.
2. Frequency tolerance ± .003% or better.
3. Parallel resonant, 32 pf load.
4. Series resistance 35 ohms, maximum.
5. HC-25/U Holder.

Crystals of this type are available from several manufacturers, or can be obtained on a special order basis from the R. L. Drake Company.

3 Installation

Once the desired ranges and/or frequencies have been programmed on the AUX7, the module can be installed in the TR7 by following the procedure outlined below. *Refer to figure 3 for module location.*

1. Remove all interconnecting cables from the TR7.
2. Remove the cabinet wraparound by removing eight screws on the bottom and sliding the wraparound toward the rear.

NOTE:

Perform steps 3 through 6 if the DR7 is installed.

3. Unplug the 5 cable connectors connecting the DR7 to the TR7. Carefully position these cables to the side.
4. Unplug the antenna coax and blue/white bandswitch stepping wire from the High Pass Filter module and remove the rubber grommet.
5. Remove the DR7 hold-down screw and lockwasher.
6. Carefully remove the DR7 by hooking the board puller under the rear edge and lifting upward. Once unplugged, the DR7 can be removed toward the rear of the TR7.
7. Plug the AUX7 into the proper connector. *Be sure that all connector pins are aligned and that the board is fully seated in the chassis.* Orient the board so that the component side is toward the rear.

NOTE:

Perform steps 8 through 11 if the DR7 has been removed.

Figure 1—RRM7 and RTM7 Module Programming

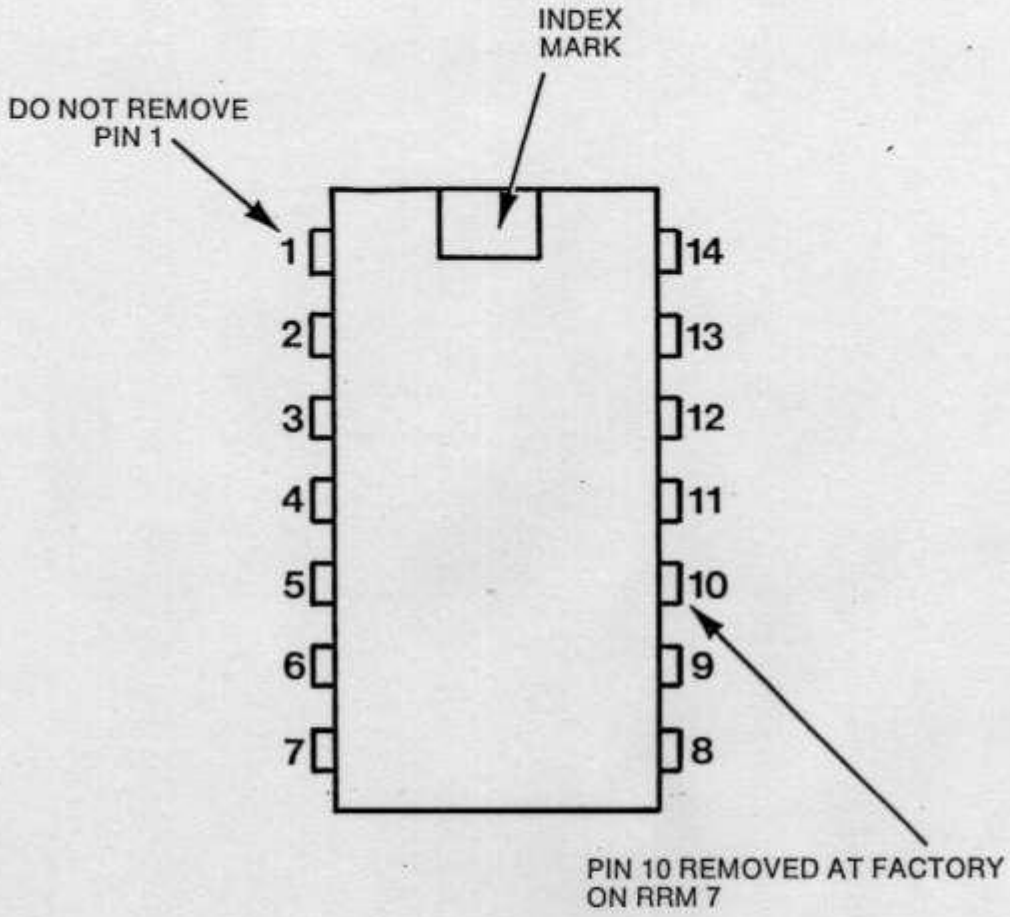
RANGE	MODULE PIN NUMBERS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
*0.0-0.5	COMMON PIN. DO NOT REMOVE.	C			C	C	C	C		LEAVE PIN ON MODULE FOR TRANSMIT. REMOVED AT FACTORY ON RRM7.	C		C	C
*0.5-1.0			C		C	C	C	C			C		C	C
*1.0-1.5		C	C		C	C	C	C			C		C	C
1.5-2.0				C	C	C	C	C			C		C	C
2.0-2.5		C		C	C	C	C	C					C	C
2.5-3.0			C	C	C	C	C	C					C	C
3.0-3.5		C	C	C	C	C	C	C			C	C		C
3.5-4.0			C	C					C		C	C		C
4.0-4.5		C	C	C					C		C	C		C
4.5-5.0					C				C			C		C
5.0-5.5		C			C				C			C		C
5.5-6.0			C		C				C			C		C
6.0-6.5		C	C		C				C			C		C
6.5-7.0				C	C				C			C		C
7.0-7.5		C		C	C				C		C			C
7.5-8.0			C	C	C				C		C			C
8.0-8.5		C	C	C	C				C		C			C
8.5-9.0			C	C		C			C		C			C
9.0-9.5		C	C	C		C			C		C			C
9.5-10.0					C	C			C		C			C
10.0-10.5		C			C	C			C					C
10.5-11.0			C		C	C			C					C
11.0-11.5		C	C		C	C			C					C
11.5-12.0				C	C	C			C					C
12.0-12.5		C		C	C	C			C					C
12.5-13.0			C	C	C	C			C					C
13.0-13.5		C	C	C	C	C			C					C
13.5-14.0			C	C			C		C					C
14.0-14.5		C	C	C			C		C					C
14.5-15.0					C		C		C					C
15.0-15.5		C			C		C		C		C	C	C	
15.5-16.0			C		C		C		C		C	C	C	
16.0-16.5		C	C		C		C		C		C	C	C	
16.5-17.0				C	C		C		C		C	C	C	
17.0-17.5		C		C	C		C		C		C	C	C	
17.5-18.0			C	C	C		C		C		C	C	C	
18.0-18.5		C	C	C	C		C		C		C	C	C	
18.5-19.0			C	C		C	C		C		C	C	C	
19.0-19.5		C	C	C		C	C		C		C	C	C	
19.5-20.0					C	C	C		C		C	C	C	
20.0-20.5		C			C	C	C		C		C	C	C	
20.5-21.0			C		C	C	C		C		C	C	C	
21.0-21.5		C	C		C	C	C		C		C	C	C	
21.5-22.0				C	C	C	C		C		C	C	C	
22.0-22.5		C		C	C	C	C		C			C	C	
22.5-23.0			C	C	C	C	C		C			C	C	
23.0-23.5		C	C	C	C	C	C		C			C	C	
23.5-24.0			C	C				C	C			C	C	
24.0-24.5		C	C	C				C	C			C	C	
24.5-25.0					C			C	C			C	C	
25.0-25.5		C			C			C	C			C	C	
25.5-26.0			C		C			C	C			C	C	
26.0-26.5		C	C		C			C	C			C	C	
26.5-27.0				C	C			C	C			C	C	
27.0-27.5		C		C	C			C	C			C	C	
27.5-28.0			C	C	C			C	C			C	C	
28.0-28.5		C	C	C	C			C	C			C	C	
28.5-29.0			C	C		C		C	C			C	C	
29.0-29.5		C	C	C		C		C	C			C	C	
29.5-30.0					C	C		C	C			C	C	

*Use VLF antenna input (pin 7 on accessory connector) for reception on these ranges. Transmission is not possible between 0.0 and 1.5 MHz. Band switch may be set to 1.5 MHz to extinguish set band indicator.

C = Cut off pin

DRAKE

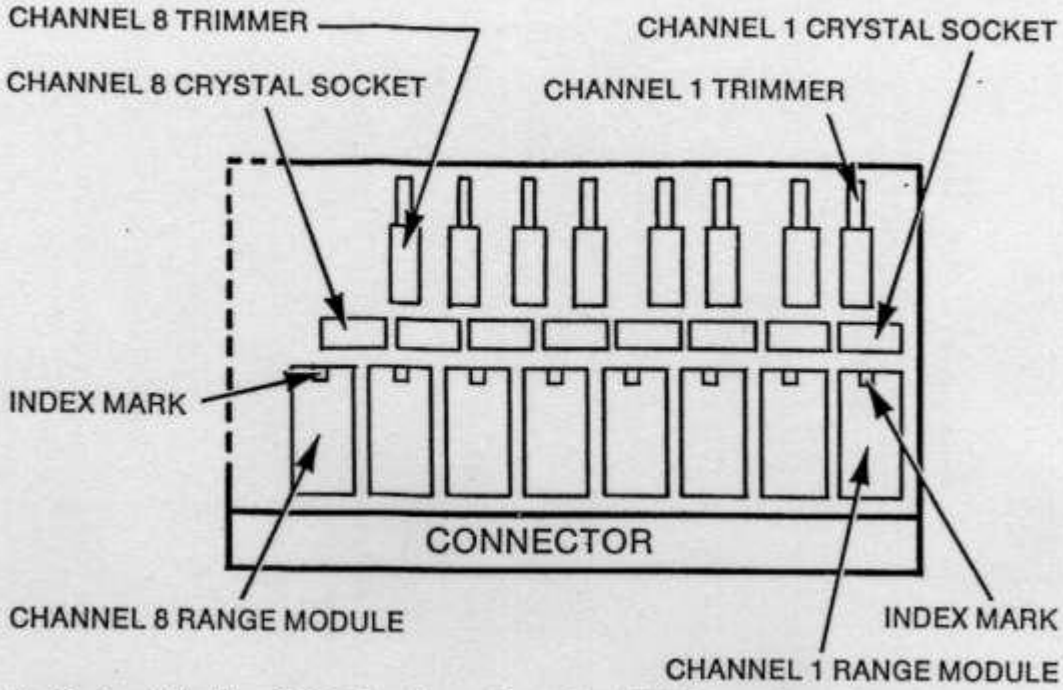
PROGRAM MODULE, TOP VIEW



PROGRAMMING INSTRUCTIONS

1. Find desired range in chart.
2. Orient module as shown and identify pins.
3. Cut off pins indicated in chart by C. Make cut close to body of module to avoid shorts.
4. Straighten remaining pins and check for shorts.

Figure 2—AUX7 Module



8. Reinstall the DR7 by locating the LED readout block in the proper slot in the front panel and lowering the pins on the bottom of the DR7 into their respective sockets. *Be sure that all pins are aligned with the proper sockets, and that the antenna coax is routed through the correct hole on the DR7.*
9. Reinstall the DR7 hold down screw and lockwasher.
10. Reinstall the rubber grommet on the antenna coax and bandswitch stepping wire. Connect these wires to the appropriate connectors and dress the wires and grommet into the slot provided in the chassis.
11. Reconnect the 5 cable connectors to the appropriate pins on the DR7. Be sure to install the connectors so that the black stripe is up *(facing you)*.
12. Check for broken or pinched wires, board misalignment, etc. and correct any problems. Dress all leads down into chassis.
13. Reconnect the TR7 to all other station equipment and set the fixed channel crystals (if installed) on frequency. Note that the crystal trimmers are accessible through the DR7. *See section IV for operating instructions.*
14. Remove all cables from the TR7 and reinstall the cabinet wrap-around *(see step 2)*.

15. Reconnect the TR7 to the other station equipment.

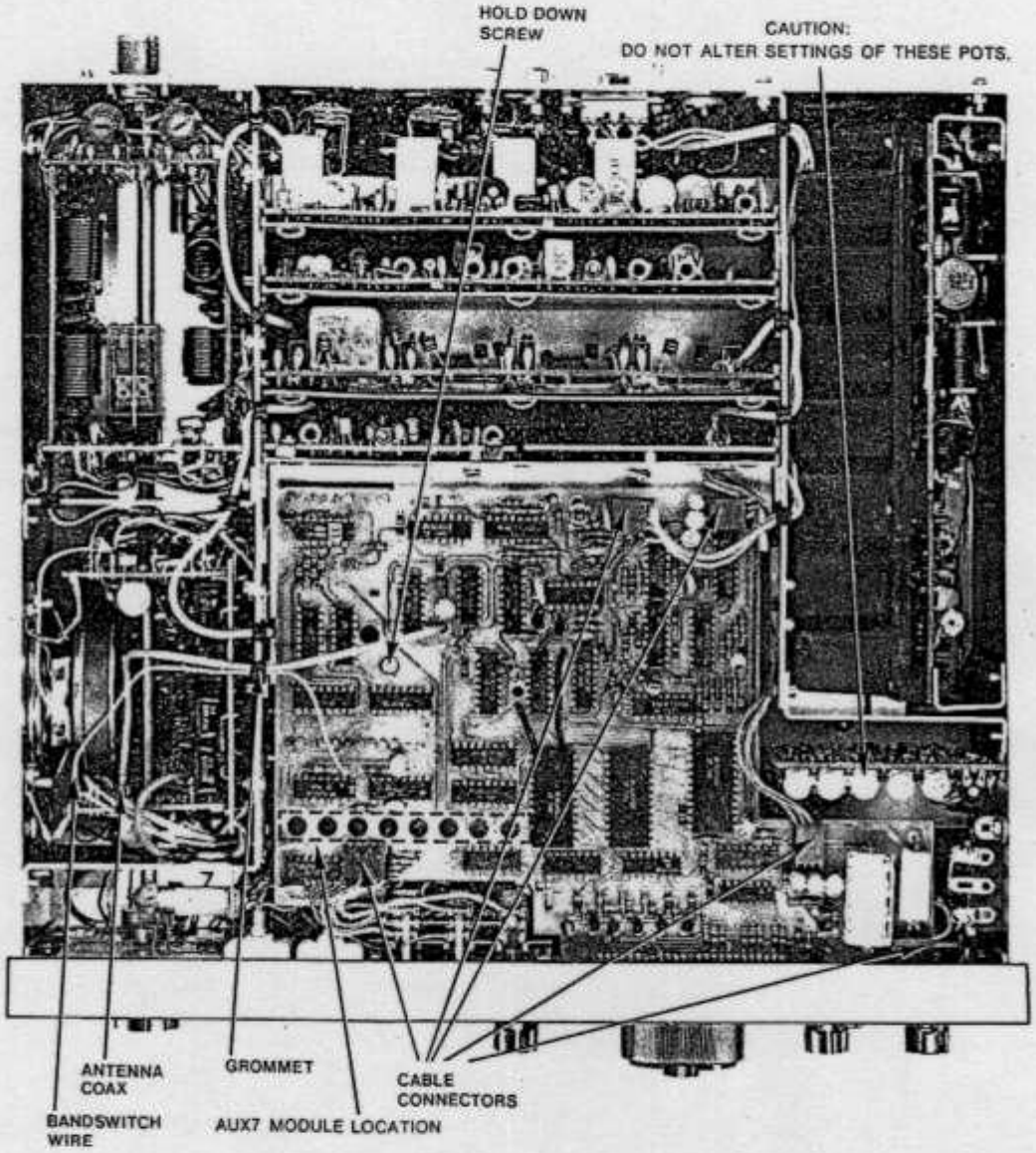


Figure 3—AUX7 Module Location/Installation

4 Operation

Operation of the TR7 with the AUX7 is described in the TR7 Operator's Manual *(see figure 3-1)*. Programmed ranges are selected by the front panel AUX PROGRAM switch (W), and fixed operation is selected by the FIXED XMIT and FIXED RCV pushbuttons (F and G). Channel crystals may be set on frequency by selecting the proper range and fixed mode and adjusting the coresponding trimmer capacitor with a non-metallic tool *(see figure 2)*.

When using an auxiliary range, be sure to set the TR7 BAND selector to the proper position, as indicated by the SET BAND light. The light will extinguish when the BAND setting is correct.

5 Maintenance

If difficulty is encountered with operation of the AUX7, check to be sure that the range modules are programmed correctly and that they are fully seated in the board sockets. If the difficulty is present only in the fixed frequency mode of operation, check to be sure that the crystal is properly installed, and that the oscillator and buffer transistors are operative.

If problems still persist, advise the factory of the difficulties and obtain authorization to return the AUX7 for service *(you need not return the entire TR7)*. Address your request for authorization to:

R. L. DRAKE COMPANY
540 Richard Street
Miamisburg, Ohio 45342
ATTN: Customer Service Department
TELEPHONE: (513) 866-3211
TELEX NO.: 288-017

-OR-

R. L. DRAKE COMPANY
Western Sales & Service Center
2020 Western Street
Las Vegas, Nevada 89012
ATTN: Customer Service Department
TELEPHONE: (702) 382-9470
TELEX NO.: 684-540

DRAKE MODEL 7077 MICROPHONE INSTRUCTION SHEET

The Drake Model 7077 Microphone is factory wired for use with the Drake TR7 Transceiver in either the push-to-talk or VOX mode. The microphone is wired in accordance with the following chart (pin numbers are molded on the front of the plug):

Pin No.	Function
1	Mic. Audio (Low Level Option)
2	Push-To-Talk
3	Ground (Audio & PTT)
4	Mic. Audio (Factory Wired)

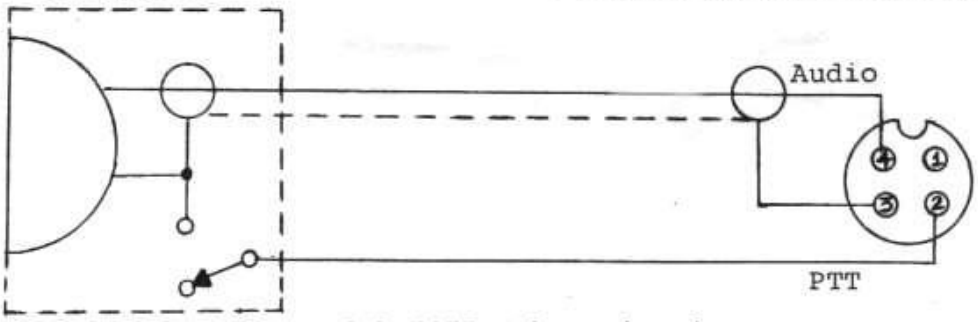
NOTE

Alternate Wiring For TR7 Transceivers With Serial Numbers Above 1400

If your operating habits require additional microphone gain, you may find it beneficial to move the microphone audio line to connector pin 1. This provides approximately 8 dB of additional gain for the audio and VOX channels. For transceivers with serial numbers below 1400, contact the factory regarding modification.

SPECIFICATIONS:

Type:	Dynamic, High Impedance
Output:	-48 dB @ 1 kHz (0 dB = 1 volt/microbar)
Frequency Response:	300 - 5000 Hz
Switching:	VOX or push-to-talk
Connector:	4-pin, compatible with TR7



Model 7077 Schematic Diagram