

MULTI-750X



**2 METER ALL MODE 1/20 W
PLL TRANSCEIVER**

INSTRUCTION MANUAL

FDK

FDK INTERNATIONAL CORPORATION

GENERAL INFORMATION

The FDK INTERNATIONAL CORP. Model MULTI-750XX mobile and base station 2 meter all mode transceiver is reliable and "MULTI" functionable amateur radio unit. It is designed and assembled with selected components to give reliable performance and is all solid-state. In normal use, and with proper care, it will give long and trouble-free service.

Communication range depends upon the usual factors such as antenna in use, operating location, RF output power level and band conditions. Read the manual carefully before putting the equipment into use.

NOTE:

This transceiver has provisions for use with an EXPANDER-430X UHF cross-band transverter system. For further details of specification and method of operation, please refer to the later paragraphs in this manual under the heading "EXPANDER-430X UHF/VHF OPERATION".

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SPECIFICATIONS

GENERAL;

Frequency range:	144.000 – 145.999.9MHz 144.000 – 147.999.9MHz
Frequency selection:	100Hz or 5kHz steps using main dial rotary knob, or UP/ DOWN Microphone switch on any mode.
Operation mode:	FM: Reactance Mod. (F3), USB/LSB: Balanced. (A3j), CW: Carrier Keying. (A1).
Antenna impedance:	50 – 52 ohms (unbalanced).
Power supply:	11 – 15 volts DC (Negative ground), 13.8 volts nominal.
Power consumption:	5 Amps at 20W Transmit, 2 Amps at 1W Transmit, .8 Amps at Audio Max. on Receive, .4 Amps at Audio Squelched, 1.5 mA at Back-up (typical) current.
Operation temperature:	-10° C to +60° C.
Frequency stability:	Less than 500Hz after 1–30 Min, Less than 200Hz after 1 Hour.
Dimensions:	162W x 62H x 260D in mm.
Weight:	Approx. 2.6Kg

TRANSMITTER;

R.F output power:	20 watts at High, 1W at Low (by rear switch).
Max. Deviation:	+/-5kHz (factory pre-set).
Unwanted spurious:	Better than 60dB.
Carrier suppression:	Better than 40dB below carrier.
Sideband suppression:	Better than 40dB below carrier.
Microphone impedance:	500 – 600 ohms dynamic microphone with Up/Down counter switch and PTT function switch.

RECEIVER;

Receiving system:	USB/LSB & CW: Single-Superheterodyne, FM: Double-superheterodyne.
Intermediate frequency:	1st: 10.7MHz, 2nd: 455kHz.
Sensitivity:	SSB/CW: -8dBu at 10dB S/N, FM: -4dBu at 20dB Noise Quieting. Better than 60dB below carrier. SSB/CW: More than 2.2kHz at -6 dB, Less than 6 kHz at -60dB. FM: More than 15kHz at -6dB, Less than 25kHz at -70dB.
Audio output power:	More than 1.2 watts at 10% T.H.D.
Audio impedance:	8 ohms.

NOTE: The specifications may change without notice due to technical improvements.

OUTSTANDING FEATURES

* Compact Size and Simple Operation with Many Features:

Although only the same size as an ordinary FM transceiver, the MULTI-750XX has all the facilities and features of a MULTI-MODE base station. For SSB operation there is an SSB/CW Noise Blanker, R. F. gain control, RIT and 100Hz or 5kHz click stop tuning steps using endless rotary switch.

For FM operation, features include SQUELCH control, SIMPLEX/+ or - REPEATER offset/FREE split CROSS operation selector, MHz shift/Step, Tone-Burst/and two VFO function using built-in memory.

* UP/DOWN microphone

The UP/DN buttons on the microphone have a dual function. They can be used for manual selection of the chosen frequency instead of using the main tuning knob. Alternatively they can be used for selecting AUTO-SCAN MODE ON BUSY CHANNELS.

* Semi Break-in System for CW operation

The transmit mode is selected automatically whenever the CW key is operated.

* Blue Digital Frequency Display for Accurate and Safe Readout:

The large Blue Fluorescent Displayer indicates frequency down to 100Hz and provides clear readout for safe day or night operation.

* A Dual VFO Selects Two Independent Frequencies Anywhere in the Band:

VFO A and B permit 2 independent frequencies to be programmed anywhere in the frequency range and on any mode. In addition, they may also be used for VHF or UHF band operation and CROSS-BAND VHF/UHF operation when used in conjunction with the optional EXPANDER-430 UHF transverter.

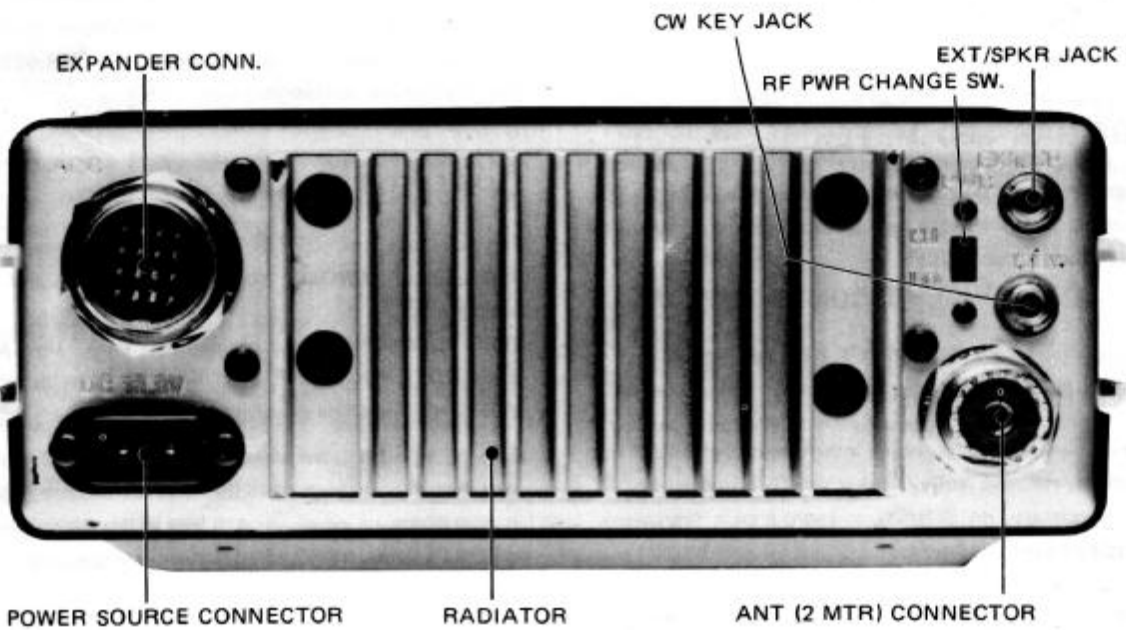
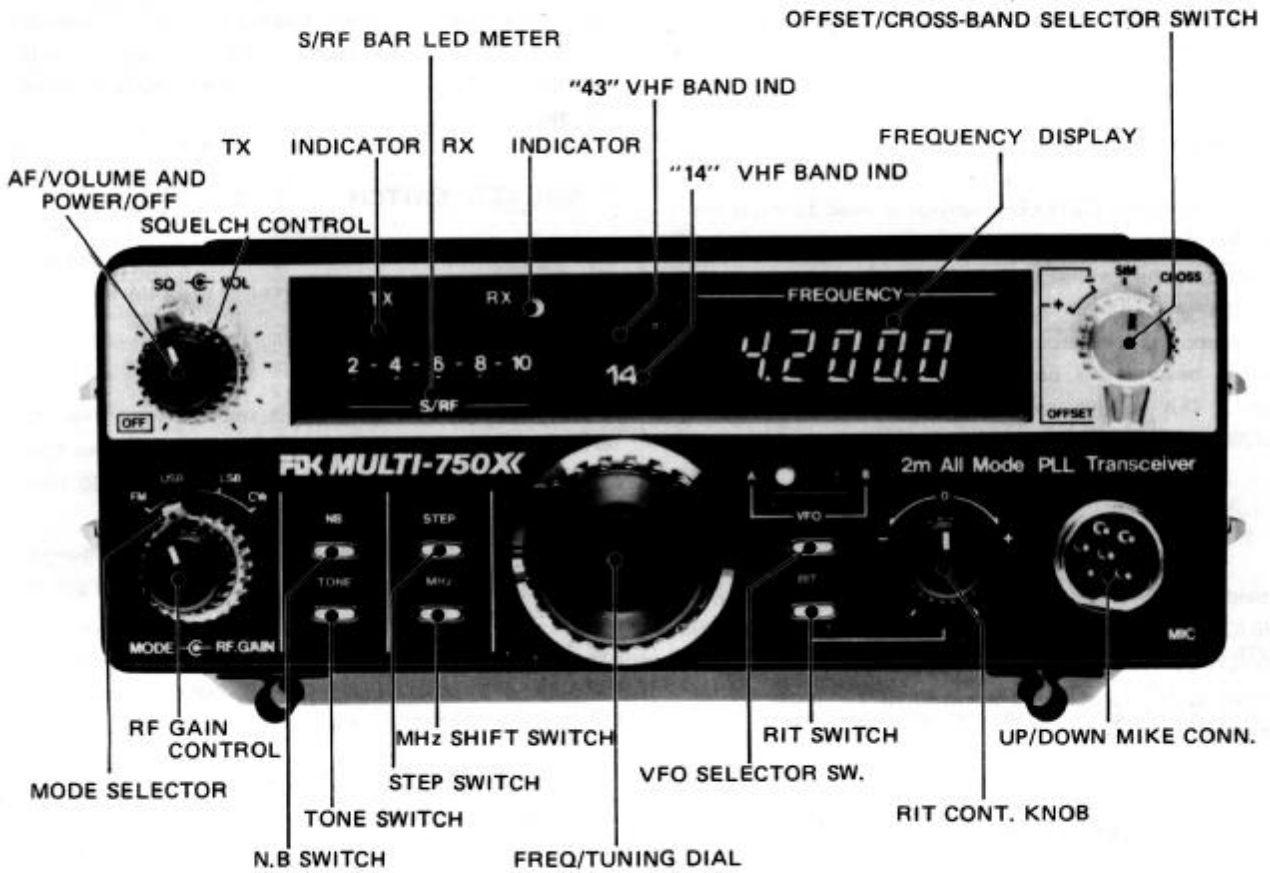
* Excellent Cross-modulation Characteristics, Sideband Suppression, and Output Protection Circuits:

Band pass Helical-Resonator section with dualgate MOSFET in receiver Front-end gives improved rejection of adjacent service and greater freedom from cross-modulation and blocking. In the event of accidental high VSWR or open/short circuit antenna connection, the power input to the transmitter section is automatically reduced.

* Selectable R.F. Output Power and Discrete P.A Stage:

The desired R.F output power of either 1 watt or 20 watts can be selected for both SSB/CW and FM operation. The linear amplifier comprises discrete components rather than a hy-brid package in order to ensure clean and spurious free output.

CONTROLS AND LAYOUT:



CONTROL FUNCTIONS

* OFF/VOLUME CONTROL

This is combined with an ON/OFF power switch and VOLUME control, which adjusts the received signals to a comfortable level.

* SQUELCH CONTROL

The outer knob SQUELCH control is used to mute the receiver in the absence of incoming signals, and removes the annoying rushing sound that would otherwise be present. It is normally rotated clockwise until the background noise just disappears without an incoming signal. To advance the control beyond this point could mean missing a weak signal. This squelch control is not operational on the CW/SSB modes.

* RF GAIN CONTROL

Provides manual control of the receiver RF gain on both SSB/CW and FM modes. Although primarily intended for SSB/CW operation it may also be used on FM to prevent Front-end blocking in the presence of extremely strong signals.

* MODE SELECTOR SWITCH

This outer control selects the mode indicated immediately above the knob.

* S/RF BAR LED METER

Five-segment LED bar display indicates the strength of incoming signals on receive, and gives a relative power output indication on transmit.

* NOISE-BLANKER SWITCH

In case of ignition pulse noise interference as caused by automobiles, etc., the Noise-Blanker switch is pushed on. This only operates on SSB/CW and will enable even weak signals to be heard clearly.

* STEP SWITCH

For normal operation the frequency step is 100 Hz. Pressing the step button "in" changes the frequency step to 5 kHz.

* TONE SWITCH

This TONE switch selects TONE-BURST function. The European model has 1,750Hz approx. 1 sec, Tone-Burst installed. This tone is activated in FM mode position with microphone PTT switch, and is used for repeater access operation.

* MHz STEP SWITCH

Selects the range 144 to 145MHz or 145 to 144MHz and 144-145-146-147MHz then returns to 144MHz.

NOTE:

This switch not only gives 1MHz steps between 144-145 MHz or 144-147MHz, but also 1MHz steps between 430-439MHz when connected with the EXPANDER-430 UHF transverter unit.

The frequency can automatically be read on the frequency display which shows the last MEGAHERTZ digit of frequency plus 4 digits to 100Hz.

For further details of EXPANDER-430X UHF operation and frequency display, please refer to operating procedure in instruction manual.

* MAIN TUNING DIAL

Selects the frequency in either 100Hz or 5kHz steps by STEP push switch. This rotary switch continuously covers the entire the frequency range of the transceiver, even in UHF band frequency, if used with EXPANDER-430X UHF band transverter operation.

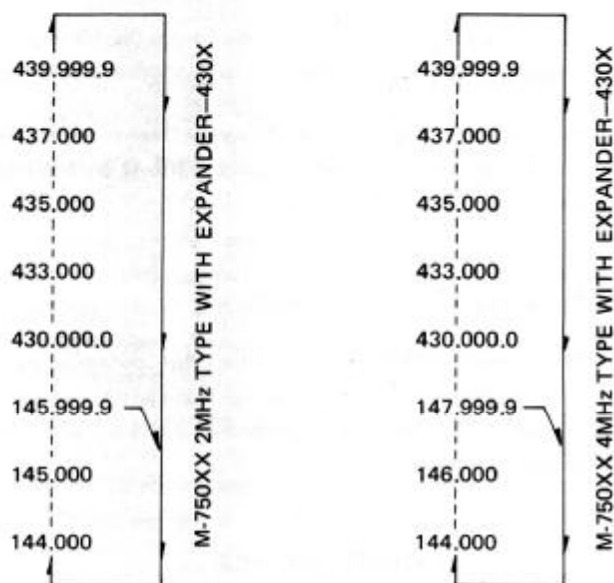
* SELECTOR SWITCH

This changes the OFFSET + or - and also provides SIMPLEX or "CROSS" operation between A and B VFO frequencies.

This "CROSS" position operates with the optional EXPANDER-430X UHF band linear transverter providing VHF/UHF operation possibilities as follows;

For both, shift frequency is 100Hz or 5kHz steps continuously through 145.999.9MHz or 147.999.9MHz to 430.000MHz on up to 439.999.9MHz when connected with the EXPANDER-430X UHF transverter unit.

CONTROL FUNCTIONS



For desired mono-band or cross-band VHF/UHF OFFSET using "CROSS" operation, simply set the required frequencies using both VFO A and VFO B. Selects the desired receive frequency on VFO A or B. The other VFO will then be "TRANSMIT" channel when using "CROSS" operation. For reverse operation just push VFO selector again.

* FREQUENCY DISPLAY

The Five digit Fluorescent Display Tube gives an accurate frequency display from internal frequency synthesizer and also last MEGAHERTZ digit of UHF transverter.

It also displays programmed OFFSET and VHF/UHF cross-band frequencies when used with EXPANDER-430. However, it does not display RIT frequency deviation on reception.

* VFO SELECTOR SWITCH

When programmed, the frequencies in A or B VFO can instantly be recalled backwards and forwards. This permits 2 channel operation and VFO A or B is indicated by LED indicators.

This VFO function can also be used for CROSS-BAND/SHIFT operation when selector switch is set to "CROSS" position.

Once each VFO has been programmed with desired frequency, the selector can be set to "CROSS". This then permits transmit on "A" and receive on "B" or vice versa. The true frequency is indicated on digital display.

* RIT CONTROL KNOB & SWITCH

The RIT covers approx. ± 2.5 kHz from the center of the "0" position. Receiver Incremental Tuning gives proper adjustment of incoming frequency at the receiver without tuning the main dial or transmitter frequency when RIT switch is pushed "ON".

* MIKE CONNECTOR

This unit is supplied with a Push-To-Talk Up/Down counter control microphone. If using replacement microphone, use dynamic type of 500-600 ohms impedance. The Up/Down control switch is supplied with 5 volts DC common line. For further details and wiring, consult general assembly diagram.

* ACCESSORY SOCKET

This is for use with EXPANDER-430 UHF linear transverter control connection. Do not extend to use these pins or short any of the connector pins.

* EXT. SPEAKER JACK

Internal speaker disconnected when used for an external speaker.

SCANNING AND ACCESSORIES

* AUTO/Manual Scanning (FM & SSB)

Manual frequency selection can be done by depressing the UP or DN microphone button. Each time the buttons are pressed, the frequency will move up or down one step (5KHz or 100Hz). If the button is held down for approximately one second AUTO-SCAN will start and will continue, even after the button is released, until a signal is found. However, if the received signal ceases, AUTO-SCAN will not recommence until the UP or DN button is pressed again for one second more.

To stop the AUTO-SCAN manually, either press UP/DN buttons momentarily or briefly press PTT switch. However, opening the squelch control will also stop scanning.

If it is desired to reverse the scanning direction then the scanning must first of all be stopped in the unwanted direction as described above, and then the new scanning direction can be selected as described above.

Manual frequency selection can also be carried out by continuously holding down the UP or DN button. In this method of operation the scanning circuit will not stop the tuning even if a signal is heard. To stop the tuning, release button and then briefly press it again. This will stop the tuning. If the exact tuning point has not been reached, briefly push the button several times until the exact frequency required is displayed.

Please note that AUTO-SCANNING will only operate when the squelch control is in operation. In cases of reverse electrical FM noise, the AUTO-SCANNING may not operate correctly.

* KEY JACK

This socket is used for CW Telegraph/Electronic Keyer. The Keyer used should have good contacts in order to avoid key-click appearing on transmission.

* ANTENNA CONNECTOR

This female (SO-239) UHF connector connects to a suitable resonated 2 meter antenna. If the antenna or cable is open or shorted, will automatically operate transmitter power protection circuit.

* DC 13.8V POWER SOURCE

Battery voltage should be checked on transmit load as if this falls much below 12 volts, output power, stability and quality will suffer. Must be correct connection to battery polarity with supply BLACK (Negative) and RED (Positive) twin cable.

When using a power supply unit, it must be of a regulated type and capable of more than 5 Amps at 13.8 volts for the full 20 watts output power to be obtained.

ACCESSORY

Microphone (Up/Down + PTT) with plug	1
Microphone hanger	1
Mibile Mounting bracket with screws	1
Red/Black twin power cord with plug	1
EXT/SPKR & CW KEY plugs	2
Desk top angle stand	1
Glass fuse (10 Amps)	1
Instruction manual	1

GENERAL OPERATION

Connect the DC power cable to a proper power source, plug in suitable antenna and connect up microphone. For CW operation and external speaker use appropriate plugs.

RECEIVER OPERATION:

The receiver becomes operative when the audio volume control is rotated clockwise. The power switch is a part of the volume control and power is ON, unless turned fully counterclockwise. Adjust the audio volume control to appropriate sound level.

After turning power on, allow 1 to 2 seconds for FDT frequency displayer to reach full brightness. It should read 4.000MHz. Select the appropriate frequency for the mode of operation desired, using main tuning dial and 1MHz step switch.

FM OPERATION:

Set the mode selector switch to the FM position with the selector switch in SIMPLEX position. The required frequency can now be set in 5kHz steps. For rapid tuning the 1MHz step button may also be used. The frequency may also be selected by the hand UP/DOWN Microphone control. Two desired frequencies can be quickly recalled by selecting frequencies on both VFO A and B.

In the FM mode all controls are operative with the exception of the Noise Blanker.

With the R.F gain control almost fully clockwise, the squelch control should be set either just below noise level, or at a setting that will open the receiver at a desired level of incoming signal.

SSB/CW OPERATION:

For operation on SSB, preset the controls on the front panel as below; The RF gain control fully clockwise, set the MODE switch to the desired sideband position, Select the frequency as required, and select SIMPLEX or CROSS position.

If looking for stations on SSB or CW first set the step switch to 5kHz. Then rotate dial slowly or press UP/DOWN mic control. As soon as any signal is heard, return step switch to 100Hz for final tuning. When using 5kHz steps, rapid tuning of the band can be made to look for any active stations.

For CW operation set the mode switch to CW position and tune as for sideband reception described above.

TRANSMITTER OPERATION:

It is good operating practice to use the minimum R.F output power to secure good communication, according to distance and band conditions. Output level is controlled by the rear panel "High/Low" switch.

The transmitter becomes operative on FM/SSB when the microphone is plugged in and the Push-To-Talk switch is depressed. On CW a telegraph or electronic key must be plugged into rear socket of transceiver and the PTT switch depressed. The "CROSS" position is used with the two VFO channels and also with the EXPANDER-430X UHF transverter for VHF/UHF cross-band operation or mono-band "FREESPLIT" operation.

CROSS OPERATION: (DUPLEX)

The CROSS function switch selects two independent VFO's, A & B, and provides transmit and receive on two different frequencies anywhere in the transceiver frequency range. These two VFO's act like memories and retain the selected frequencies at all times whilst the power source is connected. (If the power source or battery is disconnected, the memory will be lost).

When the power switch is first operated the transceiver should automatically select VFO "A" but the other desired frequency will still be retained in VFO "B". This is desirable when VFO "A" and "B" are used for a particular in-band frequency offset and with optional EXPANDER-430X UHF transverter for CROSS-BAND or VHF/UHF operation.

For reverse frequency shift operation, simply push the VFO selector switch once. This reverses the transmit and receive frequencies.

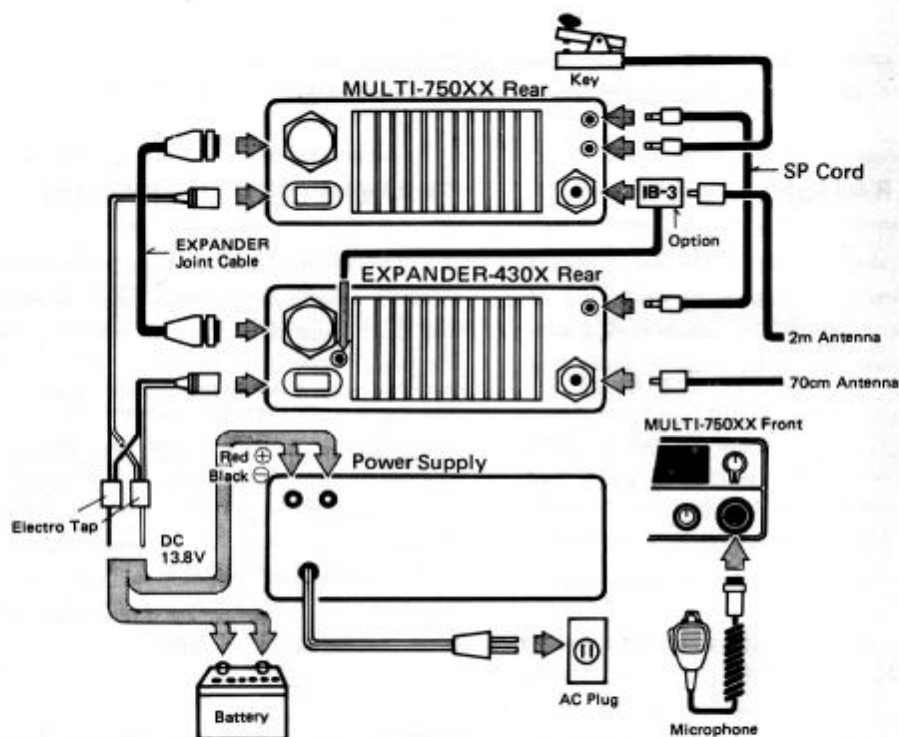
UHF OFFSET FREQUENCY:

"OFFSET FREQUENCY" of this unit has been programmed with a +/-600kHz in VHF band and +/-1.6MHz, or +/-5.0MHz or +/-7.6MHz frequencies in UHF band before shipment from factory.

The UHF offset frequency is selected automatically when connected for use with EXPANDER-430X UHF band transverter. The Multi-750XX is normally programmed to suit local UHF shifts.

EXPANDER-430X UHF/VHF BAND OPERATION

CONNECTION PROCEDURE:



IB-3

This is an isolation box used to reject signals with more than 45 dB, leaking from 2M antenna line, when both TX and RX are operating at 430MHz. It is designed uniquely to our transverter model EXP-430/X.

Please refer to the diagram above when connecting the cable.

The special connecting cable should be plugged into the rear of the MULTI-750XX and EXPANDER-430X transverter unit.

Separate 2 meter and 70cm antennas should be used. Both antennas should be resonant within the desired operating frequency range and have the correct impedance of 50 ohms.

It is recommended that both VHF and UHF antennas have a VSWR of less than 1.5:1 and that the longest possible diameter coax be used on 70cm.

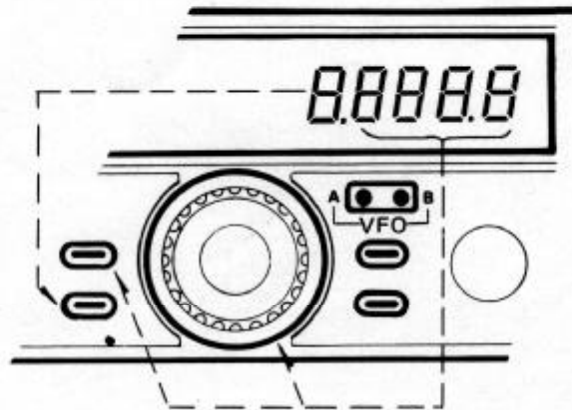
COMPREHENSIVE OPERATION:

In order to recognize the exact operating frequency of the MULTI-750XX PLUS EXPANDER-430X combinations, observe the designation of the function selected by the "Selector Switch" and the frequency displayed by the "MHz" step switch. The "MHz" starts at 144 and goes up to 439 MHz in ONE MEGAHERTZ steps. However, the KiloHertz/Hertz frequency will only be controlled by main dial knob.

If operating only on the VHF band the "14" LED should be displayed at all times. If the "43" light operates, this indicates that the EXPANDER-430X has been activated.

The offset and simplex operations should be selected as desired by the selector function switch which operates up to 439.999.9 MHz.

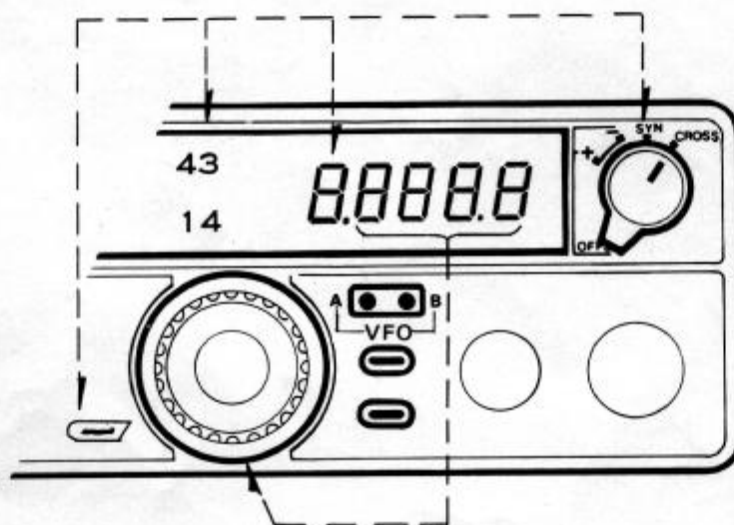
Normal +/-600kHz offset is automatically selected whilst operating in the VHF (144-146/144-148 MHz) range. When the frequency goes onto the "43" position the frequency is in the UHF (430-440 MHz) band and repeater shift changes automatically to 1.6, 5 or 7.6 MHz depending on local programming requirements.



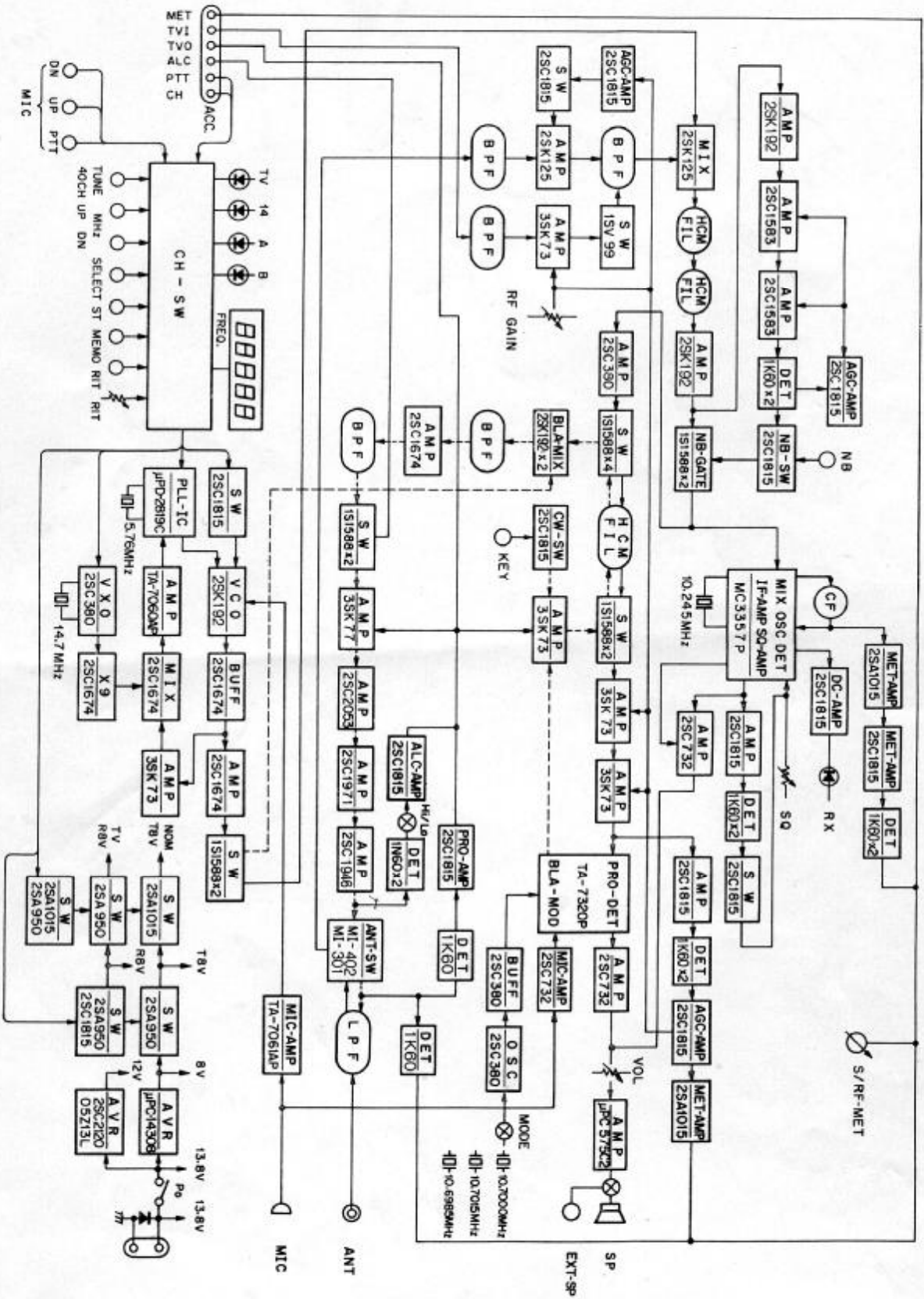
If it is desired to use any other UHF repeater offset or VHF offset or combined VHF/UHF offset, this can be programmed by user. Even shifts as small as 100 Hz can be used.

This free programmable offset uses the facilities of VFO "A" & "B" function switch with the selector switch in the "CROSS" position. VFO A can be used for receive and VFO B for transmit or vice versa. Three possibilities are then available;

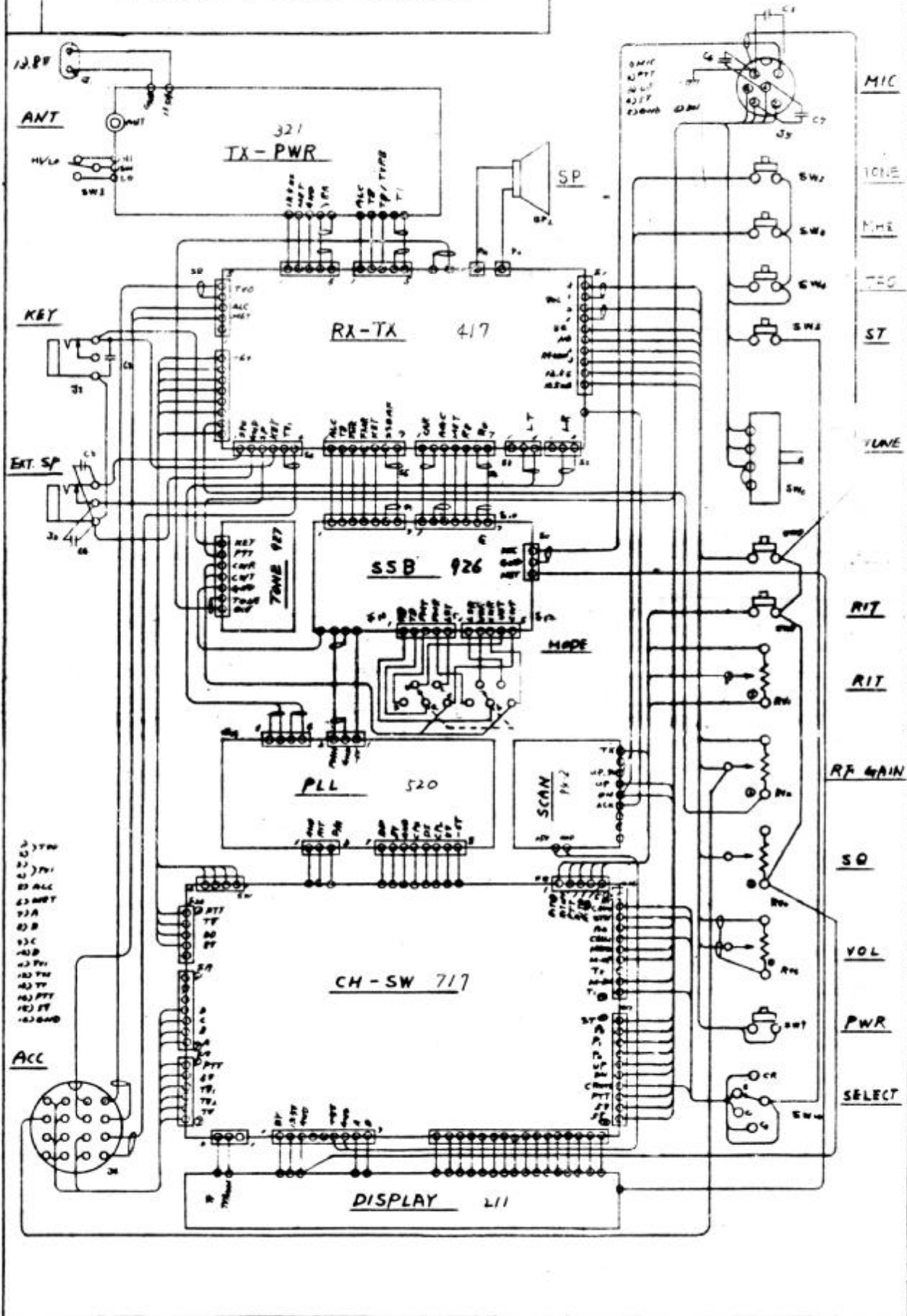
This latter combination provides scope for satellite telecommunications as offset can be used on all modes FM/CW/SSB.



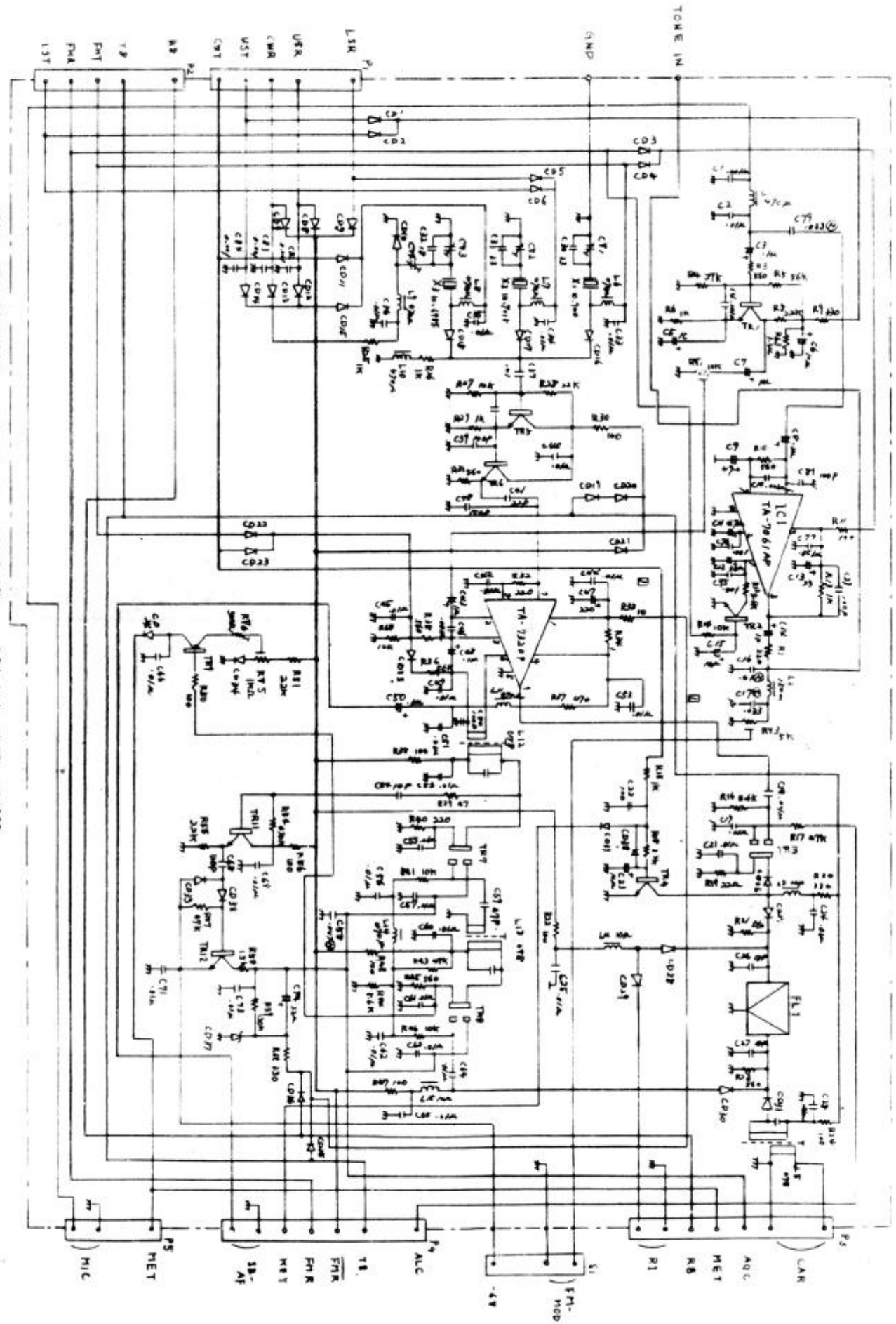
MODEL MULTI-750X



M-750XX WIRING LOCATION

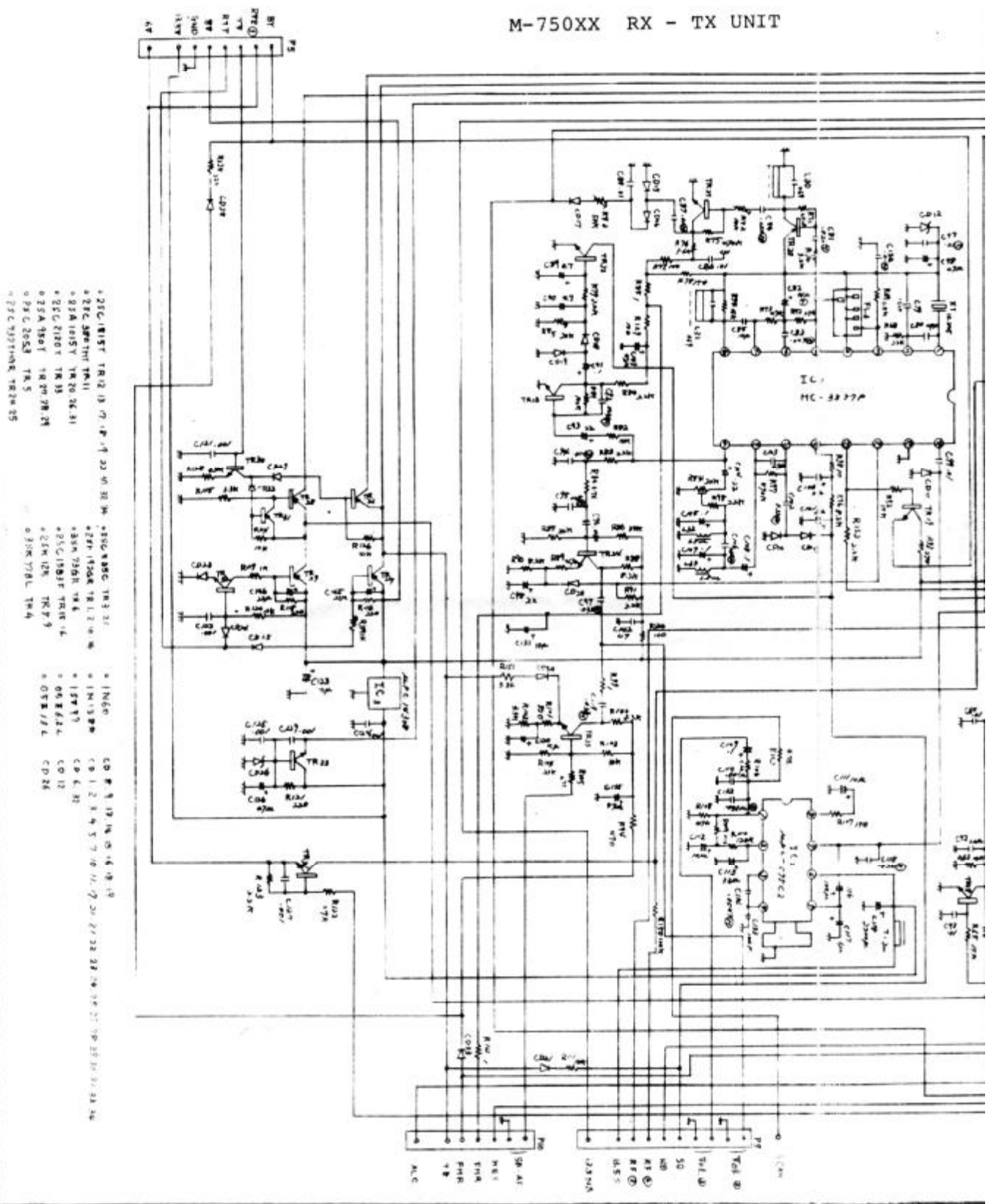


M-750XX SSB UNIT



- TR1 25C 2217MGK
- TR2 25C 2207MT
- TR3 25C 2207MT
- TR4 25C 2207MT
- TR5 25C 2207MT
- TR6 25C 2207MT
- TR7 25C 2207MT
- TR8 25C 2207MT
- TR9 25C 2207MT

M-750XX RX - TX UNIT



- * 25C 1815T TR12 13 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
- * 25C 1815T TR11
- * 25A 1815Y TR 20 26 31
- * 25C 7180X TR 15
- * 25A 1807 TR 27 28 29
- * 25C 2653 TR 5
- * 25C 1815TR TR24 25
- * 1N60
- * 1N15PM
- * 15V 19
- * 05E624
- * 05E 174
- * 1N60
- * 1N15PM
- * 15V 19
- * 05E624
- * 05E 174

X - TX UNIT

