

FUNCTION MENU

Table 11-1 TRANSCEIVER FUNCTION SETTING

FUNC. No.	FUNCTION	SETTING RANGE	DEFAULT
0-1	MEMORY GROUP 1 CHANNELS	1 ~ 99	01-99
0-2	MEMORY GROUP 2 CHANNELS	0 ~ 99	OFF
0-3	MEMORY GROUP 3 CHANNELS	0 ~ 99	OFF
0-4	MEMORY GROUP 4 CHANNELS	0 ~ 99	OFF
0-5	MEMORY GROUP 5 CHANNELS	0 ~ 99	OFF
0-6	QUICK MEMORY CHANNELS	1 ~ 5	5
0-7	NONE		
0-8	V ► M AUTO CHANNEL UP	ON / OFF	OFF
0-9	NONE		
1-0	VFO A & B DIAL SPEED	x 2, x 4	x 4
1-1	SHUTTLE JOG DIAL SPEED	1 ~ 100ms	50ms
1-2	IF SHIFT / WIDTH STEP SIZE	10 / 20 Hz	10 Hz
1-3	MAIN VFO-A TUNING STEP SIZE	0.625 ~ 20 Hz	10 Hz
1-4	SUB VFO-B TUNING STEP SIZE	0.625 ~ 20 Hz	10 Hz
1-5	CHANNEL STEP SIZE	1 ~ 100 kHz	10 Hz
1-6	QUICK SPLIT OFFSET	1 ~ 100 kHz (±)	5 Hz
1-7	AUTOMATIC SELECTION OF THE AGC DECATE TIME	ON / OFF	OFF
1-8	CLAR M-TUNE FUNCTION	ON / OFF	ON
1-9	CLAR TUNING STEP SIZE	0.625 ~ 20 Hz	10 Hz
2-0	SCAN PAUSE	ON / OFF	ON
2-1	SCAN RESUME MODE	CAR STOP / CAR SLOW / CAR TIME	CAR STOP
2-2	NONE		
2-3	MEMORY SCAN SPEED (DWELL TIME)	100 ms ~ 1 s	200 ms
2-4	VFO SCAN SPEED (DWELL TIME)	1 ~ 100 ms	10 ms
2-5	AUTO MEMORY WRITE	OFF / GROUP 1 / GROUPS ALL	OFF
2-6	MEMORY SCAN SKIP	OFF / ALL	OFF
2-7	SCAN DELAY TIME	1 ~ 10 s	5 s
2-8	NONE		
2-9	IF NOTCH MODE	IF NOTCH / AUTO / SELECT	IF NOTCH
3-0	FREQUENCY DISPLAY	OFFSET / CARRIER	OFFSET
3-1	DISPLAY RESOLUTION	10 Hz / 100 Hz / 1 kHz	10 Hz

FUNC. No.	FUNCTION	SETTING RANGE	DEFAULT
3-2	ETS (Enhanced Tuning Scale)	CLAR / DIAL	CLAR
3-3	Transverter Frequency Display	OFF / 50 / 144 / 430	OFF
3-4	Dimmer (Display Brightness)	LOW / HI	HI
3-5	Panel Display Mode	PITCH / CLAR / CH FREQ / OFFSET	CLAR
3-6	SUB VFO-B S-Meter	ON / OFF	ON
3-7	MAIN VFO-A Meter Peak-Hold	ON / OFF	OFF
3-8	SUB VFO-B Meter Peak-Hold	ON / OFF	OFF
3-9	NONE		
4-0	RF Output Power (limit)	100 / 50 / 10 W	100W
4-1	KEY & PANEL BEEPER	ON / OFF	ON
4-2	KEY & PANEL BEEP PITCH	220 ~ 7040 Hz or BEEP TUN ON / OFF	880 Hz
4-3	TUNING DRIVE (AUTO POWER-DOWN)	10 / 50 / 100 W	50
4-4	TX AUDIO EDSP	OFF, 1, 2, 3, 4	OFF
4-5	<i>EDSP Filters</i> SSB LPF SSB HPF CW BPF AM LPF AM HPF DIGITAL FILTER	100 ~ 3200 Hz 100 ~ 1800 Hz 60 / 120 / 240 Hz 1000 ~ 3200 Hz 100 ~ 1800 Hz PKT / SSTV / FAX	3200 Hz 100 Hz 240 Hz 3200 Hz 100 PKT
4-6	DVS RX RECORDING	MAIN VFO / SUB VFO	MAIN VFO
4-7	DVS PTT CONTROL	ON / OFF	ON
4-8	HEADPHONE AUDIO	MONO / STEREO 1 / STEREO 2	STEREO 1
4-9	AF GAIN BALANCE CONTROL	SEPARATE / BALANCE	SEPARATE
5-0	8.2 MHz FILTER	2.4 K ON / OFF	ON
5-1	8.2 MHz FILTER	2.0 K ON / OFF	OFF
5-2	8.2 MHz FILTER	500 ON / OFF	ON
5-3	8.2 MHz FILTER	250 ON / OFF	OFF
5-4	455 KHz FILTER	2.4 K ON / OFF	ON
5-5	455 KHz FILTER	2.0 K ON / OFF	OFF
5-6	455 KHz FILTER	500 ON / OFF	OFF
5-7	455 KHz FILTER	250 ON / OFF	OFF
5-8	SUB VFO RX FILTER	ON / OFF	OFF
5-9	TX EDSP FILTER	6.0 kHz / 2.0 kHz	6.0 kHz
6-0	RTTY SHIFT	170 / 425 / 850 Hz	170 Hz
6-1	RTTY POLARITY	NORMAL / REVERSE	NORMAL
6-2	RTTY TONE PAIR	HIGH TONE / LOW TONE	HIGH TONE

FUNC. No.	FUNCTION	SETTING RANGE	DEFAULT
6-3	RTTY FREQUENCY DISPLAY	CARRIER / OFFSET	OFFSET
6-4	PACKET FREQUENCY DISPLAY OFFSET	±3.000 kHz	-2.125 kHz
6-5	PACKET TONE FREQUENCY	1170 - 2215 Hz	2215 kHz
6-7	CTCSS TONE SELECT	67.0 - 250.3 Hz	88.5 Hz
6-8	TONE MODE	CONTINUOUS / BURST	CONTINUOUS
6-9	REPEATER SHIFT (TX OFFSET)	0 - 200 kHz	100 Hz
7-0	ELECTRONIC KEYER MODE	IAMBIC 1 / BUG / IMABIC 2	IMABIC 1
7-1	KEYER DOT WEIGHTING	0 (0.5) ~ -127 (2.0)	10 (1 : 1)
7-2	KEYER DASH WEIGHTING	0 (2.0) ~ 127 (4.5)	30 (1 : 3)
7-3	KEYER CONTEST NUMBER	0000 - 9999	0000
7-4	KEYER BREAK-IN TIME	0 - 30 ms	5 ms
7-5	KEYER DELAY TIME	0.00 - 5.10	0.00
7-6	CONTEST NO. PLAYBACK STYLE	ID NO. 1, 2, 3, 4, 5, 6, 7, 8, 9, STYLE	
7-7	EDSP MODULATION & DEMODULATION	SSB (Rx) 100-3100Hz, 300-2800 Hz, OFF SSB (Tx) 100-3100Hz, 150-3100 Hz, 200-3100Hz, 300-3100 Hz, OFF CW (Rx) 100-3100Hz, OFF AM (Rx) 70-3800Hz, OFF	OFF OFF OFF OFF
7-8	SUB RECEIVER	ON / OFF	ON
7-9	REMOTE CONTROL FUNCTION	EL / PANEL / AIO / BIO	EL
8-0	FAST KEY OPERATION	CONTINUOUS / TOGGLE	TOGGLE
8-1	LOCK SELECTION	DIAL / PANEL / PRIMARY	DIAL
8-2	SPLIT OPERATION	NORM / AUTO / A-B	NORM
8-4	FRONT END RF AMP SELECTION	TUNED / FLAT	FLAT
8-5	ANT KEY FUNCTION	AUTO / ON / OFF	AUTO
8-6	USER SETTING MODE DISPLAY OFFSET RECEIVE PLL RECEIVE CARRIER TRANSMIT PLL TRANSMIT CARRIER RTTY OFFSET EASY SET	LSB, USB, CW (U&L), RTTY (U&L), PKT ±5.000 kHz ±5.000 kHz 450.000 ~ 460.000 kHz ±5.000 kHz 450.000 ~ 460.000 kHz ±5.000 kHz OFF / SSTV / FAX	LSB } see Table 11-4~ 11-7 (P.28) 0.000 kHz OFF
8-7	SUB RX AGC	AUTO / SLOW / FAST	AUTO
8-8	TUNER	ON / OFF	ON
8-9	CARRIER OFFSET RX LSB CARRIER TX USB CARRIER PROC. LSB CARRIER CARRIER OFFSET RX LSB CARRIER TX USB CARRIER PROC. USB CARRIER TX AM CARRIER	-0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz -0.200 ~ 0.500 kHz	0.000 kHz

(B) Direct-Access Menu Mode

Besides pushing the [FAST] and [ENT] keys, there is another, more direct, way in which to access five frequently-used Menu items. By pushing [FAST] and the key shown below, the Menu Item shown in Figure 10-1 will be activated automatically, without the need to rotate the [MEM/VFO CH] knob.

Table 11-1 Direct-Access Menu Mode

Number	Function	Switch
2-9	Notch Operation	NOTCH Switch
3-4	LCD Display Brightness	VCC MIC(METER) Switch
4-5	EDSP Receive Band Pass Filter	EDSP Switch
7-5	Keyer Delay	BK-IN Switch
8-7	SUB VFO Receiver AGC	RX-(SUB VFO-B) Indicator

(C) [USER] Key

The FT-1000MP is designed to allow the user to program custom settings of the carrier injection point, frequency display technique, or other aspects of transceiver configuration of importance in digital communication. Once programmed, this custom configuration can be activated by pressing the [USER] key.

The functions which may be programmed in this manner, via Menu Item 8-6, include:

① Basic Mode

This selection defines the operating mode, similar to the pushing of one of the front panel Mode switches. It is important to set the correct mode, as it is impossible to modulate the transceiver via the Packet jack, for example, when the transceiver is in the USB mode.

The FM mode is not available via the [USER] key.

Table 11-2 Basic Mode Selections

MODE			
Display	Mode	Display	Mode
L S b	LSB	r t t y - l	RTTY(LSB)
u S b	USB	r t t y - u	RTTY(USB)
R i - u P P E r	CW(USB)	P R c - l o	PKT(LSB)
R i - l o	CW(LSB)		Default LSB

② Display Offset

This setting allows the frequency display to reflect the carrier frequency, which may be (depending on the mode) different from the receiving zero-beat frequency. Total adjustment range is ± 5 kHz, with 5 Hz resolution.

Table 11-3 Display Offset Adjustment

Display	dSP·oFSt						
	Display Offset						
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)
Default Value	0.000kHz	0.000kHz	0.700kHz	-0.700kHz	-2.125kHz	2.125kHz	-2.125kHz
Range	-5.000kHz~5.000kHz						

③ Receiving PLL Offset

This setting allows alignment of the receive PLL and IF filter offset frequency.

Total adjustment range is ± 5 kHz, with 5 Hz resolution.

Table 11-4 RX PLL Oscillator Offset Adjustment

Display	r-PLL						
	RX PLL Frequency Offset						
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)
Default Value	-1.450kHz	1.450kHz	0.700kHz	-0.700kHz	-2.210kHz	2.210kHz	-2.210kHz
Range	-5.000kHz~5.000kHz						

④ Receiving Carrier Point

This setting allows alignment of the center frequency of the IF filter passband, without changing the RX frequency itself. This function is a "preset" for the IF Shift feature. The range of adjustment is 450~460 kHz.

Table 11-5 RX PLL Carrier Injection Point Adjustment

Display	r-cRr						
	RX Carrier Point						
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)
Default Value	456.450kHz	453.550kHz	454.300kHz	455.700kHz	457.210kHz	452.790kHz	457.120kHz
Range	-5.000kHz~5.000kHz						

⑤ Transmit PLL Offset

This setting allow adjustment of the transmit carrier point, which sets the IF filter passband as in the case of the Receiving Carrier Point. In the case of Packet operation, this important setting determines the frequency range of the input tones from the TNC which will be permitted to pass without attenuation, an important consideration when setting up pseudo-USB AFSK operation in the "PKT-LSB" mode.

Table 11-6 TX PLL Oscillator Offset Adjustment

Display	t-PLL						
	TX PLL Frequency Offset						
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)
Default Value	-1.500kHz	1.500kHz	0.700kHz	-0.700kHz	-2.125kHz	2.125kHz	-2.120kHz
Range	-5.000kHz~5.000kHz						

⑥ Transmit Carrier Point

Table 11-7 TX PLL Carrier Injection Point Adjustment

Display	t-cRr							
	TX Carrier Point							
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)	
Default Value	456.500kHz	453.500kHz	455.000kHz	455.000kHz	455.000kHz	455.000kHz	457.120kHz	
Range	LSB : 456.300kHz~460.000kHz			PKT : 456.300kHz~460.000kHz			USB : 450.000kHz~453.700kHz	Others : 450.000kHz~460.000kHz

⑦ RTTY Shift

This setting allows the RTTY Shift specification to be changed from its default 170 Hz specification. Note that, although a maximum shift of 5 kHz is possible to be programmed through software, the maximum realizable shift is 2.4 kHz, the width of the transmitter IF filter. This does not represent an operational limitation in practice, as the shifts used in the real world are much less than 2.4 kHz.

* Prior to Production Lot 05, the value for "TX-CAR" could not be set below 456.300kHz. For these earlier versions, the use of 456.300 kHz should produce satisfactory results.

Table 11-8 RTTY SHIFT Adjustment

Display	r-tty-Sft						
	RTTY SHIFT Offset						
	LSB	USB	CW(USB)	CW(LSB)	RTTY(USB)	RTTY(LSB)	PKT(LSB)
Default Value	0.000kHz	0.000kHz	0.000kHz	0.000kHz	-0.170kHz	0.170kHz	0.000kHz
Range	-5.000kHz~5.000kHz						

(D) Customization of Carrier Points (Not in USER Mode)

The USB and LSB (suppressed) carrier injection point may be modified via Menu Item 8-9, so as to roll off either high-frequency or low-frequency components in the voice envelope. Similar to the receiver's "IF Shift" feature, this presetting of the carrier point provides yet another area whereby the frequency response of the transceiver may be tailored to the needs of the owner.

Permitted shifts in the carrier point are from -200 Hz to +500 Hz (in 10 Hz increments) on USB and LSB, and -3 kHz to +3 kHz on AM.

12. Personal Computer Control : The CAT (Computer Aided Transceiver) System

In the early 1980s, Yaesu pioneered the concept of the use of external control of an amateur radio transceiver, using a personal computer, with the introduction of the FT-980. More than a decade later, the FT-1000MP carries on this proud tradition.

Applications which support the FT-1000MP and other Yaesu transceivers are widely available for a wide variety of functions in a modern amateur radio station, including contest and DX logging, record-keeping, propagation studies, spectrum analysis, and shortwave listening. New on the FT-1000MP is the inclusion of a single-IC TTL-to-RS-232C level converter, thus eliminating the need for an external interface box as was previously required. Now, a standard serial data cable bearing a female DB-9 type connector may be connected directly to the FT-1000MP's rear panel CAT jack.

(A) Serial Communication Data Format

A typical five-byte command is shown in Figure 11-1 below. Note that the data bite are sent in reverse order, with the Least Significant Digit first, and the Most Significant Digit last. Set your computer's serial communications port for "4800,N,8,2" format (one start bit is used, as usual).

Table 12-1 CAT 5-BYTE COMMAND STRUCTURE

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Argument	Argument	Argument	Argument	Instruction OPCODE

Table 12-2 CAT DATA BYTE FORMAT

Start Bit	0	1	2	3	4	5	6	7	Stop Bit	Stop Bit

Example #1 : Set Main VFO-A to 14.25000 MHz

Breaking 14.250.00 MHz into its BCD component, we arrive at :

10's Hz	100's Hz	1's kHz	10's kHz	100's kHz	1's MHz	10's MHz	100's MHz
0	0	0	5	2	4	1	0
00		50		42		01	
Byte 1		Byte 2		Byte 3		Byte 4	

Inserting the 4-byte BCD-coded frequency (00, 50, 42, 01), the resulting 5-byte block should now look like this (again, in hex format) :

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
00	50	42	01	0AH
DATA / ARGUMENT BYTES				OPCODE



(B) Typical CAT Program Listing

A simple BASIC program listing, showing the procedure for storing a frequency into VFO-A and a memory register, is shown below.

■ SAMPLE PROGRAM LISTING (N88-BASIC/PC-9800 SERIES)

```

10 `CAT System Test Program for FT-1000MP
20 OPEN "COM ; N83NN" AS #1 : DIM RS (8)
30 PRINT ; INPUT "COMMAND 5times "; IS, JS, KS, LS, MS
40 R$(1) = " " : R$(2) = " " : R$(3) = " " : R$(4) = " " : R$(5) = " " : R$(6) = " " : R$(7) = " " : R$(8) = " " : F = 1
50 AS = CHR$( VAL ("&H"+LS)) : BS = CHR$( VAL ("&H"+KS)) : CS = CHR$( VAL ("&H"+JS)) : DS = CHR$( VAL ("&H"+IS)) : ES = CHR$( VAL ("&H"+MS))
60 PRINT #1, AS; BS; CS; DS; ES;
70 FOR I = 0 TO 30 : NEXT : GS = " "
80 IF LOC (1) = 0 TO 30 : NEXT : GS = " "
90 IF LEN (GS) < 255 THEN GS = GS + INPUT$( 1, #1) ELSE RS (F) = GS : GS = " " : F = F + 1
GOTO 80
100 GOTO 80
110 RS (F) = GS : IF LEN (RS (1)) = 0 THEN 30
120 L LEN (RS (1)) = LEN (RS (2)) + LEN (RS (3)) + LEN (RS (4)) + LEN (RS (5)) + LEN (RS (6)) + LEN (RS (7)) + LEN (RS (1))
130 PRINT : PRINT " ANSWER"; " L ; BYTE " : PRINT
140 FOR S = 1 TO 8
150 IF LEN (RS (S)) = 0 THEN 190
160 FOR Q = 1 TO LEN (RS (S))
170 PS = MID$( RS (S), Q, 1) : PR$ = RIGHTS (" 0" + HEX$( ASC (PS)), 2) + " "
180 PRINT PR$ ; : NEXT
190 NEXT : PRINT : GOTO 30
    
```

13. Data Communication Features Of The FT-1000MP

The FT-1000MP has the most complete package of data-mode operating features and flexibility available on any amateur radio transceiver. The FT-1000MP is easy to interface to popular terminal units, and operation is straightforward.

Dedicated Packet (AFSK) and RTTY (FSK) modes are provided on the FT-1000MP, allowing the user great flexibility in interfacing to a wide variety of FSK Terminal Units (TUs) or FSK/AFSK Terminal Node Controllers (TNCs). By using the different available modes (RTTY(USB), RTTY(LSB), PKT(LSB), PKT(FM), and the USER function), optimized carrier points, display offsets, and receive filter settings can be provided for the many operating modes utilized by today's active digital operator.

And while operation typically takes place on the Main VFO via the rear panel RTTY and Packet jacks, an internal switch may be set to route audio only from the Sub VFO, in case casual packet, fax, or other digital-mode monitoring is desired.

(A) Connections for AFSK Operation: Use Packet Jack/ Packet Mode (Or USER Mode)

For Audio Frequency-Shifted Keying (AFSK) operation, including Baudot AFSK generation by a TNC, the rear-panel Packet Jack and the front-panel "PKT" (Packet) mode selection generally provide the easiest interface and operation procedures.

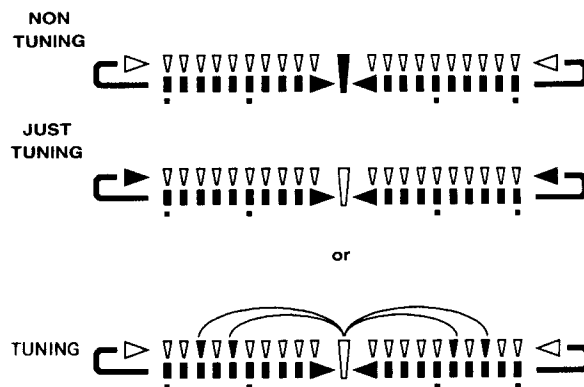
Table 13-1 RTTY MODE MENU SETTINGS

MENU NUMBER	COMMENT	SETTING
6-0	Shift Width Setting	170/425/850
6-1		NORMAL/REVERSE
6-2	Tone Pair (Mark Signal)	HIGH 2125Hz/LOW 1275Hz

In this configuration, transmit-audio tones are generated by the TNC which correspond to the expected receive tones; therefore, if the transceiver is properly configured, the frequency-centering

LEDs on the TNC and the computer monitor provide a visual indication of when the transceiver is properly tuned on frequency, no matter what mode is in use. Your transceiver's AFSK tones, being aligned according to what your TNC is "expecting" to receive, will consequently be aligned to what the other station's TNC is "expecting" to receive, and a perfect connection will easily be accomplished.

Fig.13-1 RTTY PACKET TUNING INDICATOR



The four interface lines of interest are: TX Audio, RX Audio, PTT (Push To Talk), and Ground, and they may be connected to the Packet DIN connector. During operation, the microphone is disabled, so it is not necessary to disconnect it. The front panel MIC Gain control, however, is functional, and it may be used in conjunction with the TNC's TX Audio adjustment potentiometer to achieve the proper audio drive level for the FT-1000MP. Even for Baudot operation, AFSK requires the use of the PKT mode.

For AFSK applications using the PKT(LSB) mode, but utilizing pseudo-USB injection, use the "USER" mode settings described on section 11-(C) of this Technical Overview.

Fig.13-2 RTTY/TNC SYSTEM CONNECTIONS

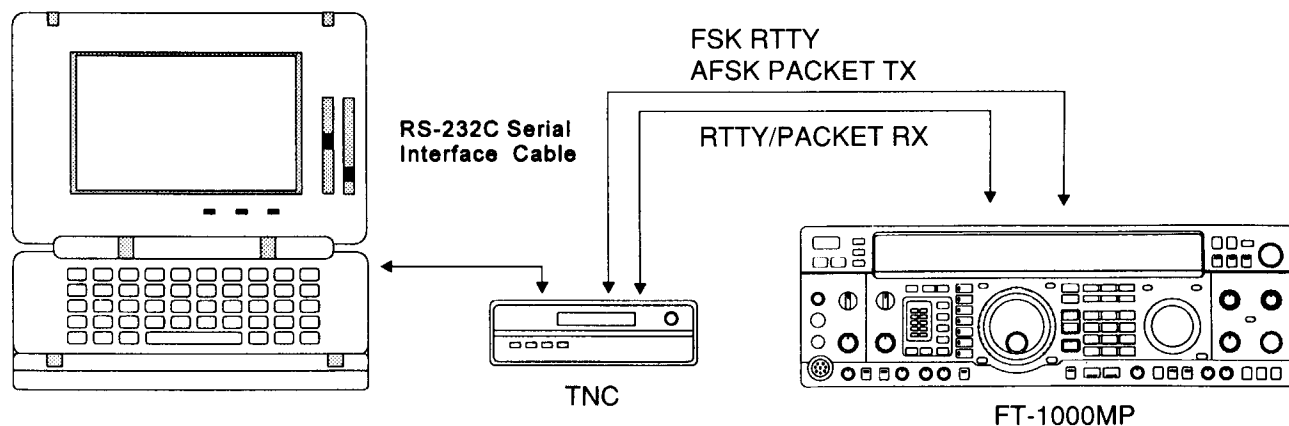


Fig.13-3 RTTY TERMINAL UNIT CONNECTIONS (FSK)

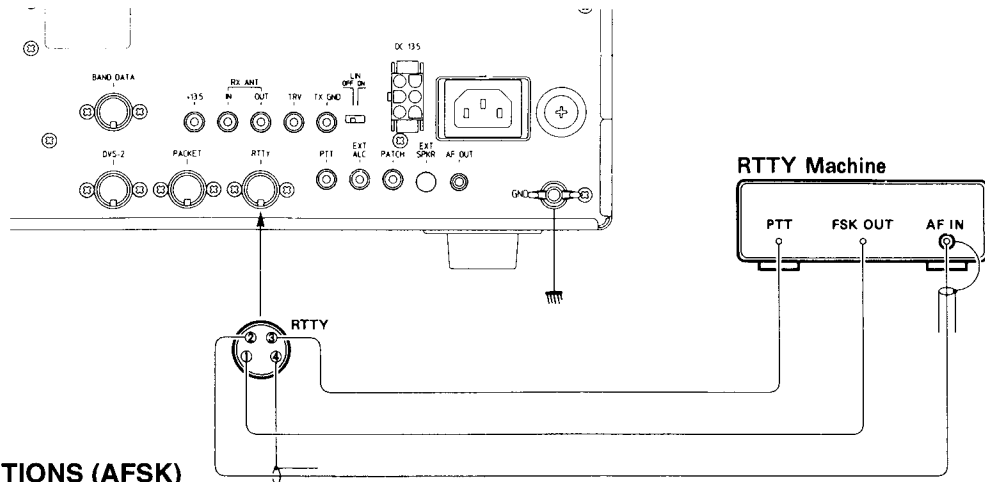
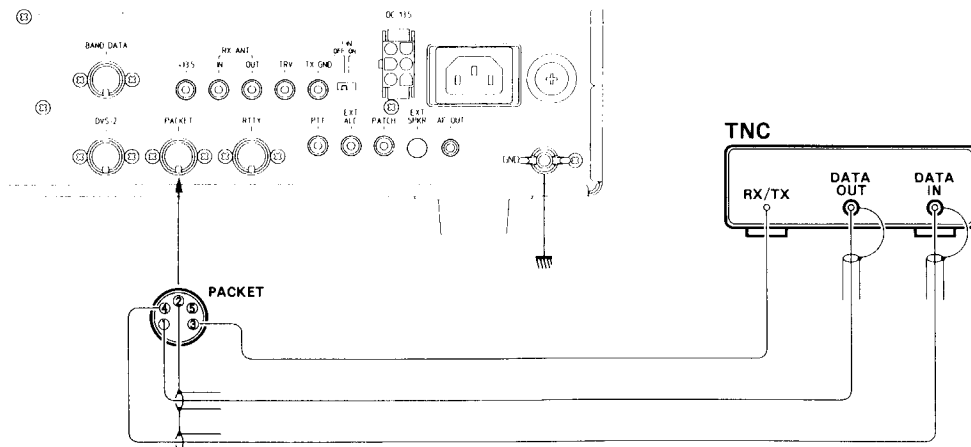


Fig.13-4 TNC CONNECTIONS (AFSK)



(B) Connections for FSK RTTY Operation

Thanks to the very-fast-acting DDS circuits, a true frequency-shifted keying carrier generator is provided on the FT-1000MP for RTTY use. Both USB and LSB injection techniques are available in the RTTY mode.

In this case, the “FSK” lead from the TNC or TU provides a short to ground. The action of opening and closing to/from ground causes the FT-1000MP to generate Mark and Space tones, shifted by the amount pre-determined via the Menu mode (typically, 170, 425, or 850 Hz shifts are used in the amateur service).

The four lines of interest from the TNC or TU to the FT-1000MP are the FSK (“Shift”) line, RX Audio, PTT, and Ground. All these are provided on the rear-panel RTTY DIN jack, and (as in AFSK operation) the microphone is disabled during transmission.

TX Audio from a TNC must not be connected to the “Shift” pin of the RTTY jack, as TX Audio is used in an AFSK environment; the “Shift” pin requires a closure to ground, instead.

(C) Generic Connections to PATCH/PTT/AF OUT Jacks

Instead of using the dedicated “PKT” and “RTTY” modes, it is quite possible to utilize three rear-panel jacks for all data interface connections. Two of these jacks, PATCH and PTT, and RCA

connectors; the AF OUT jack requires a 3.5 mm stereo plug. In this configuration, the microphone must be disconnected from the front panel MIC jack, as it is wired in parallel with the rear panel PATCH jack. Then, select either the USB or LSB mode (not “PKT” or “RTTY”), and commence operation. The carrier point may be adjusted, if needed, via the Menu system, using Item 8-9.

The audio provided via the AF Out jack is stereo, at a fixed level of 200 mV rms per channel; impedance is 600Ω. The Tip connector is Main Receiver audio, and the Ring connector is Sub Receiver audio.

Fig.13-5 SUB BAND RX AUDIO SELECTOR SWITCH (AF UNIT)

