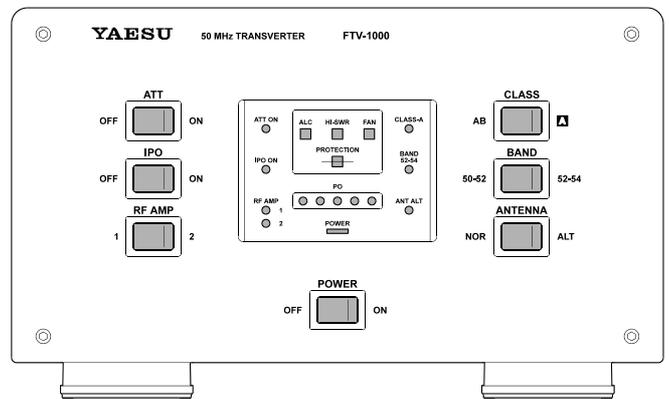




50MHz Transverter

FTV-1000

Operating Manual



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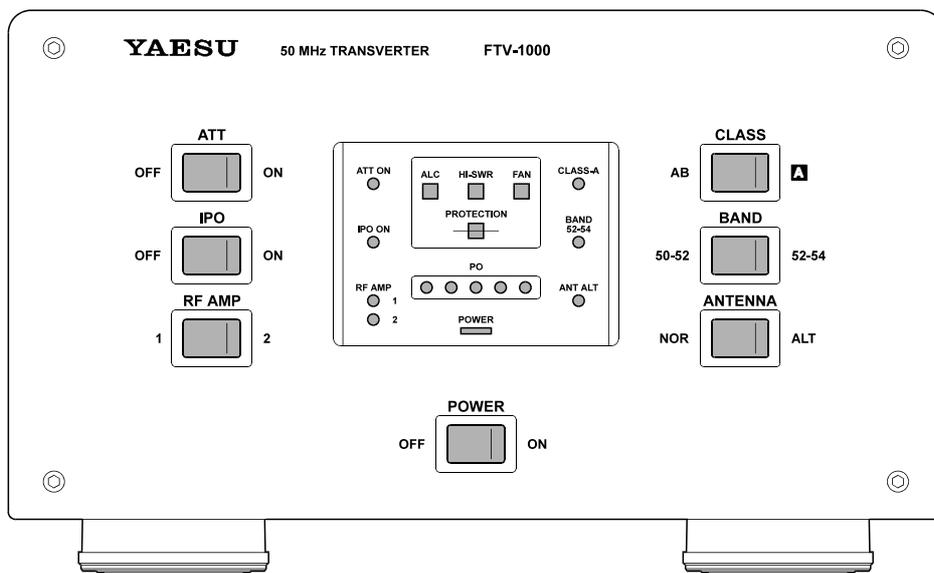
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The **FTV-1000** is a high-performance, high-power 50-54 MHz transverter compatible with the Yaesu **MARK-V** FT-1000MP transceiver. Providing excellent receiver performance and up to 200 Watts of power output, the **FTV-1000** is specifically designed for the demanding requirements of 50 MHz DX operators.

Among the leading-edge features of the **FTV-1000** is a Class-A operating bias selection for the transmitter's power amplifier stage; during Class-A operation, power output is reduced to 50 Watts, and the high bias current leads to an extraordinarily clean SSB wave-form, with 5th-order intermodulation (IMD) typically suppressed by at least 65 dB.

The **FTV-1000**'s feature complement includes selectable receiver preamplifiers, two antenna jacks, Intercept Point Optimization (direct feed to mixer during strong signal conditions), and convenient interface jacks for accessories.

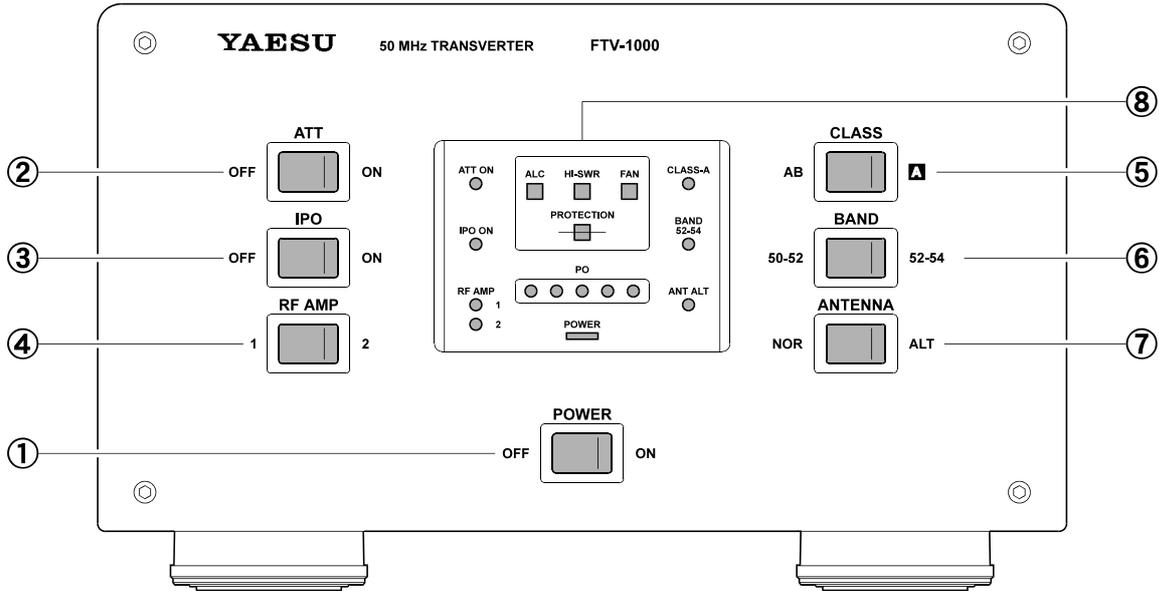
The **FTV-1000** is fully compatible with Yaesu's **VL-1000** Quadra System Linear Amplifier, which includes coverage of the 50 MHz band. The **MARK-V** FT-1000MP, **FTV-1000**, and **VL-1000** provide unparalleled performance on all bands between 1.8 and 54 MHz, and especially on the six meter band.

Thank you for your investment in the **FTV-1000**! We recommend that you read this manual thoroughly, so as to understand fully the features and the operating procedures that will ensure that you get the most out of your leading-edge Yaesu 50 MHz station!

Supplied Accessories

DC POWER Cable (T9022699; 1.2 m)	1
ANTENNA Cable (T9101513; M-type ↔M-type, 1.2 m)	1
BAND DATA Cable (T9101510; 8-pin DIN ↔8-pin DIN, 1.2 m)	1
ALC Cable (T9101514; "GRAY" RCA ↔"GRAY" RCA, 1.2 m)	1
TRV Cable (T9101515; "BLACK" RCA ↔"BLACK" RCA, 1.5D2V 1.2 m)	1
Operating Manual	1
Warranty Card	1

Front Panel Controls & Switches



① POWER Switch

This is the main ON/OFF switch for the **FTV-1000**. When you turn the **FTV-1000** on, the PA section of the **MARK-V FT-1000MP** will be disabled automatically, so your station won't attempt to put out full power on 28 MHz at the same time you're using the **FTV-1000**.

② ATT Switch

This switch engages the receiver front-end attenuator, which will reduce all signals and noise on the 50 MHz band by 12 dB. This switch should only be engaged for local communications when signals are very strong, as receiver sensitivity will be significantly reduced when the attenuator is in line.

③ IPO Switch

This Intercept Point Optimization switch may be used to optimize receiver front-end overload characteristics, for strong-signal or noisy environments. Selecting **IPO** bypasses the front-end RF amplifier, and feeds the received signals directly to the first mixer.

④ RF AMP Switch

Selects the desired receiver front-end preamplifier configuration:

PREAMPLIFIER	NOISE FIGURE	IMD REJECTION
1	Very Good	Excellent
2	Excellent	Very Good

This switch changes the final amplifier operating mode to **Class-A**. When operating the final amplifier in the **Class-A** mode, the maximum output power will be reduced to approximately 50 watts. Operating SSB in **Class-A** yields an ultra-clean signal waveform.

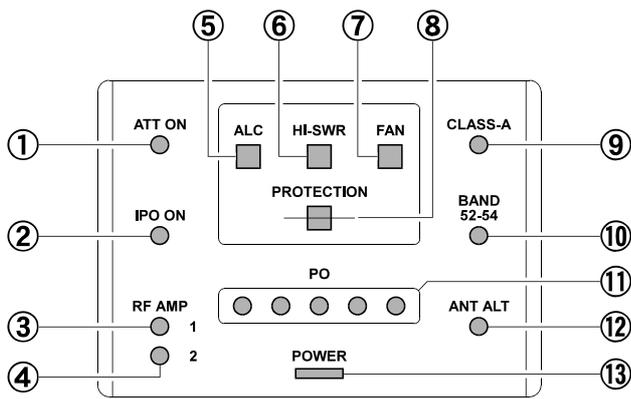
⑥ BAND Switch

This switch selects the 50 MHz amateur band segment to be used. When this switch is set to the "50-52" position, the **FTV-1000** will operate in the segment 50 MHz ~ 52 MHz. When this switch is set to the "52-54" position, the **FTV-1000** will operate on 52 MHz ~ 54 MHz. In either case, frequency conversion to the range 28 ~ 30 MHz takes place, for compatibility with the **MARK-V FT-1000MP**.

⑦ ANTENNA Switch

This switch selects either the **NOR** or **ALT** antenna jack on the rear panel, and allows convenient antenna switching.

⑧ Displays



① ATT ON

This red indicator lights up when the receiver front-end attenuator is engaged.

② IPO ON

This red indicator lights up when the receiver signal bypasses the front-end RF amplifier in the Intercept Point Optimization (IPO) mode.

③ RF AMP 1

This red indicator lights up when receiver front-end preamplifier "1" is selected.

④ RF AMP 2

This red indicator lights up when receiver front-end preamplifier "2" is selected.

⑤ ALC

This red indicator lights up when an abnormally high ALC (Automatic Level Control) voltage is detected.

⑥ HI SWR

This red indicator lights up when an abnormally high SWR condition is detected.

⑦ FAN

This red indicator lights up when the cooling fan is activated. This does not indicate a "dangerous" condition, and it may occur in the receive mode, as well as during transmission.

⑧ PROTECTION

This red indicator lights up when the power amplifier's temperature is abnormally high.

⑨ CLASS-A

This red indicator lights up when the final amplifier operating mode is set to **CLASS-A**.

⑩ BAND 52-54

This red indicator lights up when the operating band is set to 52 ~ 54 MHz. When the indicator is not illuminated, operation is taking place on 50 ~ 52 MHz.

⑪ PO meter

Indicates the RF power output. When the RF power output is at 200 watts, all five LEDs will be illuminated.

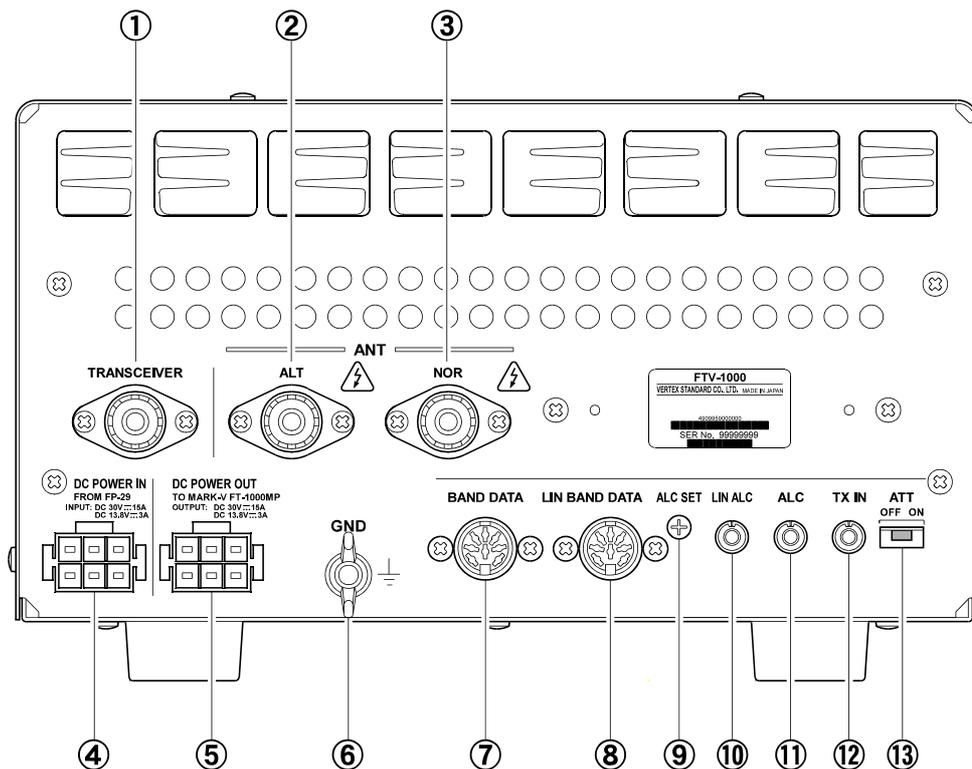
⑫ ANT ALT

This red indicator lights up when the **ALT** antenna jack is selected.

⑬ POWER

This red indicator lights up when the **FTV-1000** is turned on.

Rear Panel Controls & Connectors



① TRANSCEIVER Jack

This jack should be connected to the **ANT** jack of the **MARK-V FT-1000MP**, providing converted receive signals to the transceiver. When the **FTV-1000** is turned off, the **ANT NOR** jack (which may be connected to your HF antenna system) will be connected, through the **TRANSCEIVER** jack, to the **MARK-V FT-1000MP**.

② ANT ALT Jack

Connect your 50 MHz antenna's 50 Ω coaxial cable to this **M-type** ("SO-239") connector.

③ ANT NOR Jack

Connect your antenna's 50 Ω coaxial cable (either HF or 50 MHz) to this **M-type** ("SO-239") connector.

④ DC POWER IN Jack

This is the power input jack of the **FTV-1000**. Connect the DC power cable from the **FP-29** AC power supply to this jack.

⑤ DC POWER OUT Jack

This jack provides DC voltages to the **MARK-V FT-1000MP**. When the **FTV-1000** is switched off, the DC voltages from the **FP-29** AC power supply will automatically be fed to the **MARK-V FT-1000MP**.

⑥ GND Terminal

Use this terminal to connect the **FTV-1000** to a good earth ground, for safety and optimum performance. Use a large diameter, short braided cable.

⑦ BAND DATA Jack

This 8-pin DIN jack connects to the **BAND DATA** jack of the **MARK-V FT-1000MP** via a supplied control cable.

⑧ LIN BAND DATA Jack

This 8-pin DIN jack connects to the **BAND DATA** jack of the **VL-1000** solid-state Linear Amplifier, providing control signals for the **VL-1000**.

⑨ ALC SET Potentiometer

Insert a small insulated screwdriver here, and turn the trimmer inside to adjust the maximum output power of the **FTV-1000**.

⑩ LIN ALC Jack

This RCA jack provides for input of ALC voltage from the **VL-1000** Linear Amplifier, for control of the **MARK-V FT-1000MP**'s drive level.

⑪ ALC Jack

This RCA jack provides ALC (output) voltage, for control of the **MARK-V FT-1000MP**'s drive level. The ALC control voltage range is 0 to -4 VDC.

⑫ TX IN Jack

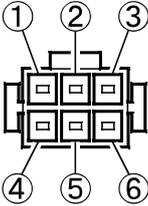
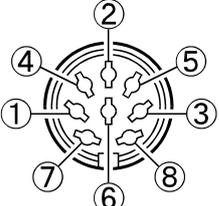
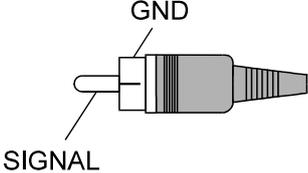
This RCA jack is for connection to the **TRV** jack of the **MARK-V FT-1000MP**. The optimum drive level is approximately 50 mVrms at 50 Ω .

Rear Panel Controls & Connectors

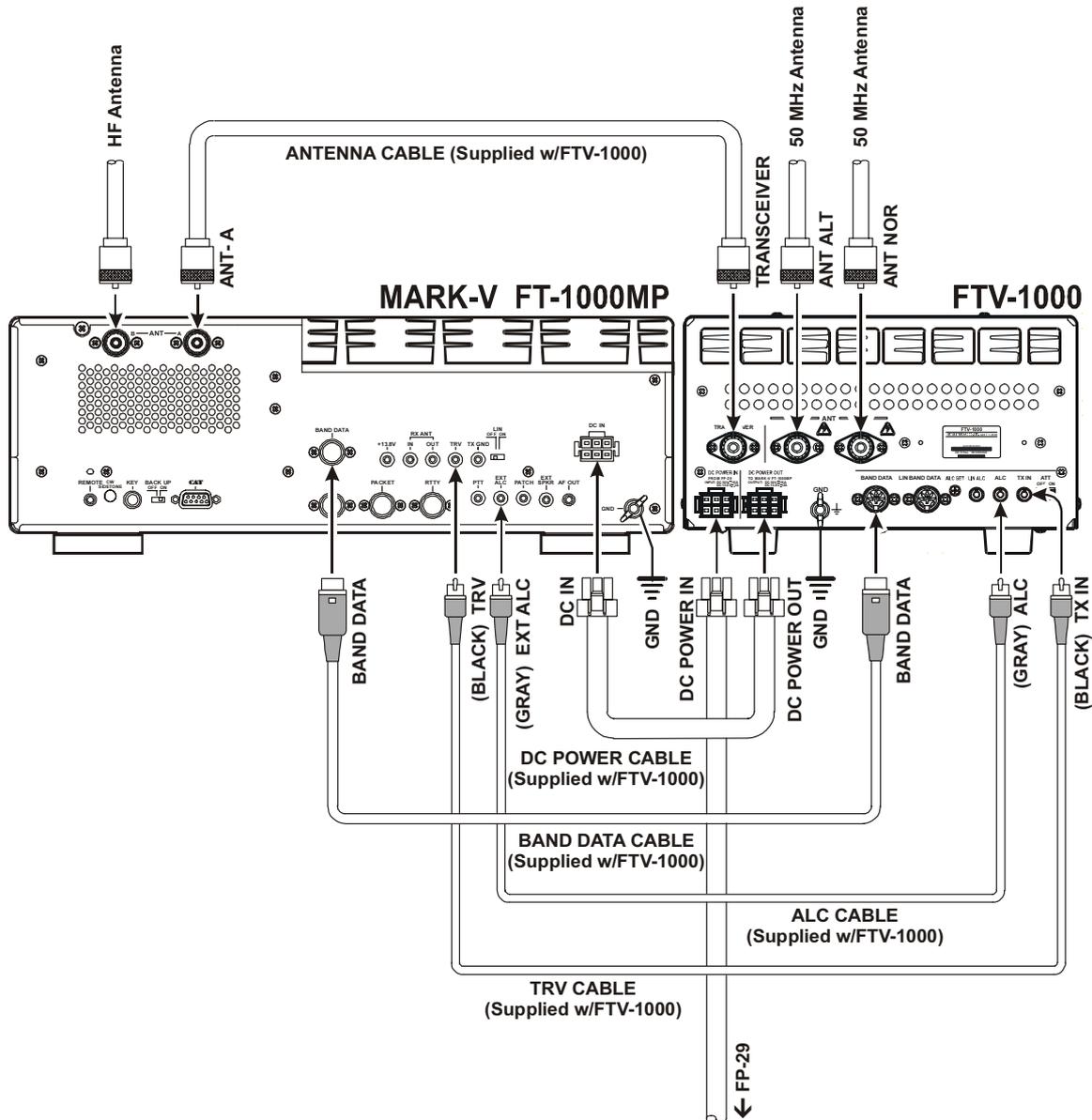
⑬ ATT Switch

This switch activates an input RF power attenuator, to attenuate excessive input power from an exciter by 6 dB. This switch should normally be set to the “off” position when using the **FTV-1000** with the **MARK-V** FT-1000MP.

PLUG/CONNECTOR PINOUT DIAGRAMS

DC POWER IN / DC POWER OUT	BAND DATA / LIN BAND DATA
 <p>(as viewed from the rear panel)</p> <ul style="list-style-type: none"> ① (30 V) GND ② (13.8 V) GND ③ N/A ④ +30 V ⑤ +13.8 V ⑥ N/A 	 <p>(as viewed from the rear panel)</p> <ul style="list-style-type: none"> ① +13V ② TX GND ③ GND ④ BAND DATA A ⑤ BAND DATA B ⑥ BAND DATA C ⑦ BAND DATA D ⑧ LINEAR
ALC / LIN ALC / TX IN	
	

FTV-1000 / MARK-V FT-1000MP



NOTE

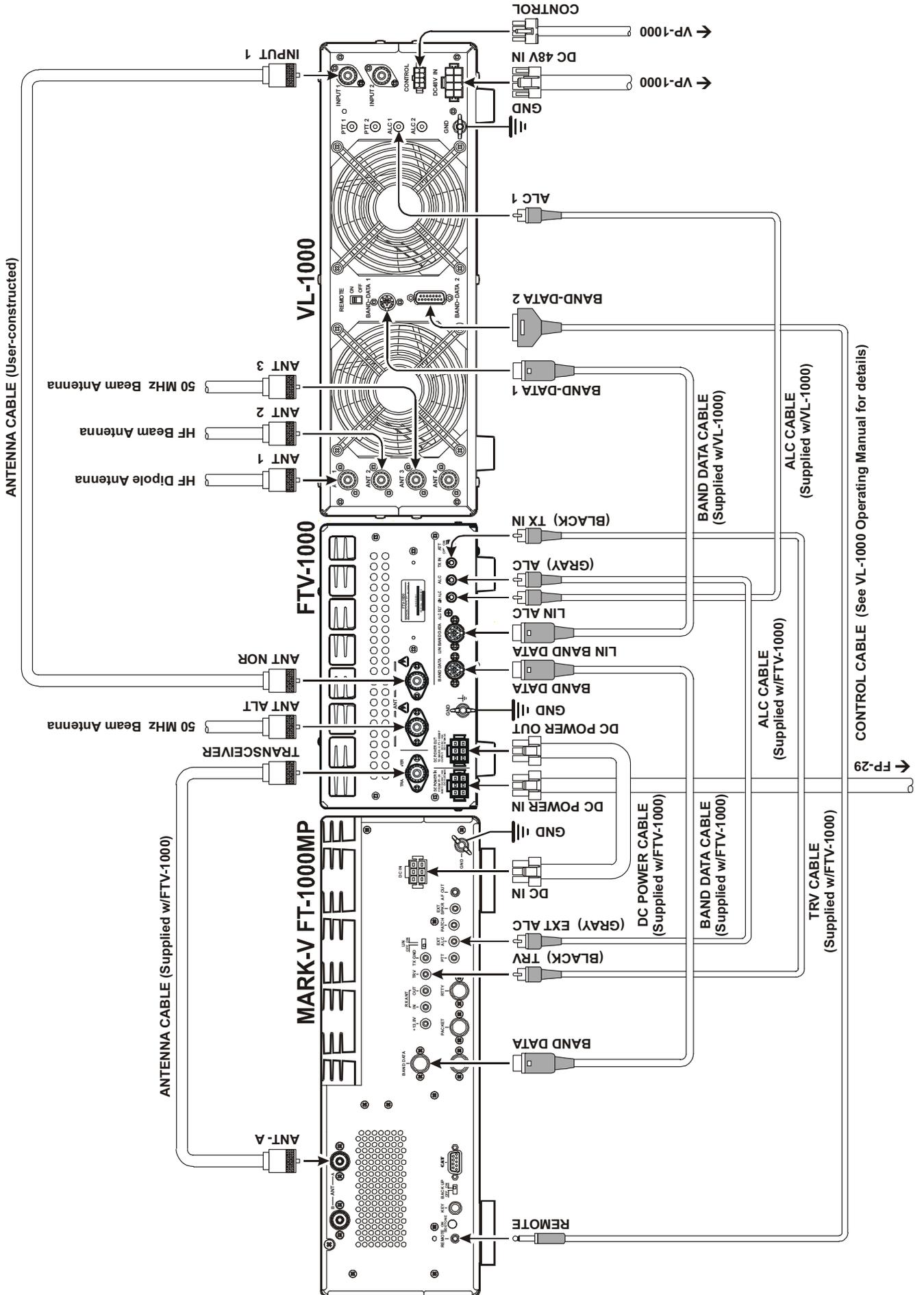
The **FTV-1000** includes two RCA-plug cables as supplied accessories.

One of these connection cables, having a **Black** RCA plug, is the RF cable which connects between the **FTV-1000**'s "TX IN" jack and **MARK-V**'s "TRV" jack.

The other connection cable, having a **Gray** RCA plug, is the ALC cable which connects between the **FTV-1000**'s "ALC" jack and **MARK-V**'s "EXT ALC" jack. This cable is designed for carrying of DC voltage, and does not guarantee the 50-Ohm impedance needed for optimum drive power transfer to the **FTV-1000**.

Take care to ensure that these cables are connected properly.

FTV-1000 / MARK-V FT-1000MP / VL-1000



HF OPERATION

You can operate the **MARK-V** FT-1000MP normally when turn off the **FTV-1000**. However, you must select the transceiver's **ANT A/B** switch to the position which is connected to your HF antenna (either directly connected to the **MARK-V** FT-1000MP, or via the **FTV-1000**'s **NOR** antenna jack).

50 MHz OPERATION

Reception

1. Set the **MARK-V** FT-1000MP operating band to 28 MHz.
2. Disable the front-end RF preamplifier of the **MARK-V** FT-1000MP (be sure the green **IPO** indicator is illuminated), then check to be sure that the **ATT** selector knob of the **MARK-V** FT-1000MP is set to the "0" position.
3. Select the antenna jack "**NOR**" or "**ALT**" (whichever is connected to your 50 MHz antenna, then select the operating band. If you wish to operate on 50 MHz ~ 52 MHz, set the **BAND** switch of the **FTV-1000** to the "**50-52**" position; if you wish to operate on 52 MHz ~ 54 MHz, set the **BAND** switch of the **FTV-1000** to the "**52-54**" position.
4. Turn on the **FTV-1000**, you will now be operating on the 50 MHz band. The **MARK-V** FT-1000MP's frequency display will still be on 28 MHz; however, you can use the transceiver's *Menu system (item 3-3)* to provide frequency readout on 50 MHz while transverting to 28 MHz. See the discussion in the section to follow.

Frequency conversions now will be taking place, based on an HF range of 28 ~ 30 MHz, with conversion either to 50 ~ 52 MHz, or 52 ~ 54 MHz.

Examples of this conversion process are:

- 1) **MARK-V** FT-1000MP: **28.12345** MHz, **FTV-1000**'s **BAND** switch: **50-52** position. Actual frequency is **50.12345** MHz.
- 2) **MARK-V** FT-1000MP: **29.12345** MHz, **FTV-1000**'s **BAND** switch: **52-54** position. Actual frequency is **53.12345** MHz.
- 3) When entering frequencies directly from the keyboard, be sure to enter the appropriate "MHz" digits (either [2] – [8] or [2] – [9]) so as to set the frequency correctly. If you want to enter "50.56789 MHz," press [ENT] → [2] → [8] → [5] → [6] → [7] → [8] → [9] → [ENT]

Advice: You can also change the frequency readout to a "50 MHz format" from the standard "28 MHz format" via *Menu 3-3* on the **MARK-V** FT-1000MP. See the box on the next page.

5. Set the RF preamplifier to "1" or "2," according to the level of the background noise in your location. If preamplifier "1" provides enough gain to produce S-meter movement on the **MARK-V** FT-1000MP's S-meter (with only background noise present), the additional gain of preamplifier "2" will not be necessary. However, in extremely quiet locations, or when using large, quiet antennas for such applications as EME (moonbounce), preamplifier "2" may provide a significant improvement in signal-to-noise ratio, although the strong signal handling capability of preamplifier "1" is slightly superior to that of preamplifier "2."

50 MHz OPERATION

6. Should you experience overloading from very strong adjacent-frequency signals, the RF amplifier can be bypassed by turning on the **IPO** switch. In this mode, the sensitivity will be reduced, and the overloading should be eliminated. When the preamplifier is bypassed, the red "**IPO ON**" indicator will be illuminated.
7. The wide array of receiver features of the **MARK-V FT-1000MP**, such as the EDSP Noise Reduction, Contours, IF Shift, IF Width, IDBT, etc., are all available while operating on the 50 MHz band via the **FTV-1000**. Remember, though, that the frequency conversion is to the 28 MHz band, to the VRF (Preselector) filter will not be available, as it only functions on the 160 – 20 meter bands.

HOW TO CHANGE THE FREQUENCY FORMAT (28 MHz → 50 MHz)

Formatting the display for direct indication of the operating frequency requires that you initialize the operating frequency to a lower band edge, as a starting point. Please initialize the operating frequencies, prior to changing the setting of *Menu #3-3*, to the exact frequencies shown in step (1) below.

1. Set the frequency of the **MARK-V FT-1000MP** to "28.00000 MHz" (exactly) when you intend to operate on 50 ~ 52 MHz. Set the **MARK-V FT-1000MP** to "26.00000 MHz" if you intend to operate on 52 ~ 54 MHz.
2. Press and hold in the **[FAST]** key on the **MARK-V FT-1000MP**; while holding it in, press the **[ENT]** key. The transceiver will now be in the "*Menu*" mode.
3. Rotate the **VRF/MEM CH** knob to select *Menu # 3-3* (tr-disp).
4. Rotate the Main Dial knob to select "50" on the display.
5. Press the **[ENT]** key to save the new setting and exit to normal operation.
6. You may now enter frequencies directly from the transceiver's keypad. Note, however, that you must enter "[2] – [8]" as the "MHz" part of the frequency, not "[5] – [0]" (the transceiver will make this switch automatically for you; do not try to override the change).

NOTES (1): When you wish to return to operation on 28 MHz, you must change the setting of Menu #3-3 to "off."

Note (2): When you wish to change the operating segment on the 50 MHz (**50-52** to **52-54**, or **52-54** to **50-52**), you must perform the above band-edge initialization procedures again.

Transmission

1. All basic transmission features of the **MARK-V FT-1000MP** are the same, as utilized during transverter operation, as they are for HF operation.
2. To transmit on a voice mode (e.g. USB), leave all settings of the **MARK-V FT-1000MP** unchanged, except for the setting of the **RF PWR** control, which initially should be rotated fully counter-clockwise. Close the **PTT** switch on the microphone, and speak into the microphone in your usual voice level; while doing so, advance the setting of the **RF PWR** control until the desired power output level is attained. Once all five LEDs of the **PO** meter are illuminated, full power (200 W) will have been reached. Do not advance the transceiver's **RF PWR** control beyond the point where the **ALC** indicator just begins to flicker.
3. For a very clean SSB waveform, set the **CLASS** switch to the "**A**" position. Power output will be reduced to a maximum of 50 Watts, with the remaining available power being diverted to high levels of bias for the power amplifier. It is not necessary to turn on the **CLASS-A** switch on the **MARK-V FT-1000MP**, as the driver stage of the transceiver (used to excite the **FTV-1000**) is already running in Class A.
4. For AM transmission, do not exceed 50 Watts of carrier power (approximately 2 LEDs of the **PO** meter will be illuminated).
5. For CW transmission, close the key on the **FTV-1000**, and advance the **RF PWR** control on the **MARK-V FT-1000MP** until the desired power output level is obtained. Once all five LEDs of the **PO** meter are illuminated, full power (200 W) will have been reached. Do not advance the transceiver's **RF PWR** control beyond the point where the **ALC** indicator just begins to flicker.
6. For continuous-duty digital modes like RTTY and PSK31, it is recommended that the maximum power output be limited to about 100 Watts (3 LEDs of the **PO** meter illuminated). However, if you make brief transmissions (three minutes duration or less), full power (200 Watts) may be used.
7. The **FTV-1000** is designed for use into a 50 Ohm antenna system. While minor deviations from the 50-Ohm value are of no significance, the automatic protection circuitry of the **FTV-1000** will begin to reduce the power output when the antenna system SWR exceeds 2.5:1.

OPERATION WITH THE VL-1000 LINEAR AMPLIFIER

Operation of the **FTV-1000** in conjunction with the **VL-1000** Linear Amplifier is basically identical to that when using the amplifier with the **MARK-V FT-1000MP** alone. Follow the installation guidelines shown on page 7 for interconnection of the station components. When using the **VL-1000**, maximum power output during 6-meter operation will be 500 Watts (minimum).

The operating procedure, when using the transverter, is the same as when just operating the **MARK-V FT-1000MP** (alone) with **VL-1000**. However, you must be sure that you have set the **VL-1000's ATT** switch "**ON**" position while operating on the 50 MHz band, as you normally would on the HF band, when exciting the **VL-1000** with the **FTV-1000**.

Frequency Range:	50 ~ 54 MHz		
I.F. (Input/Output):	28 ~ 30 MHz		
TX Drive Level:	50 mVrms (-13 dBm)		
TX Power Output:	200 Watts (Class A: 50 W)		
Antenna Impedance:	50 Ohms nominal		
Spurious Emissions:	-60 dB or better		
Power Requirements:	+30 V and +13.8 V DC		
Power Consumption:	13.8 VDC	30 VDC	
(approx.)	Rx (no signal)	0.5 A	-
	Tx (200 W)	0.5 A	14.5 A
Dimensions (WxHxD):	9.8" x 5.4" x 13" (248 x 136 x 332 mm)		
Weight (approx.):	16.5 lb (7.5 kg)		

Note



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