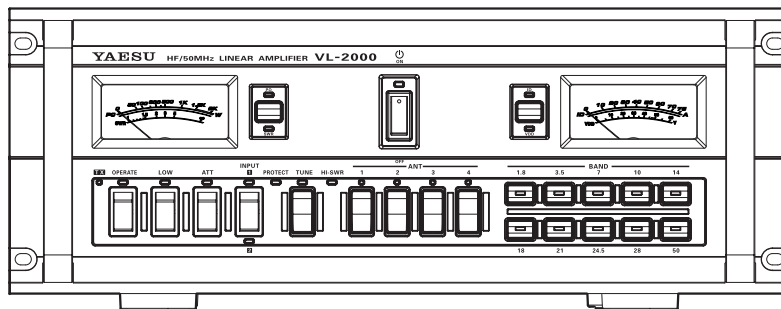




HF/50 MHz LINEAR AMPLIFIER

VL-2000

OPERATING MANUAL



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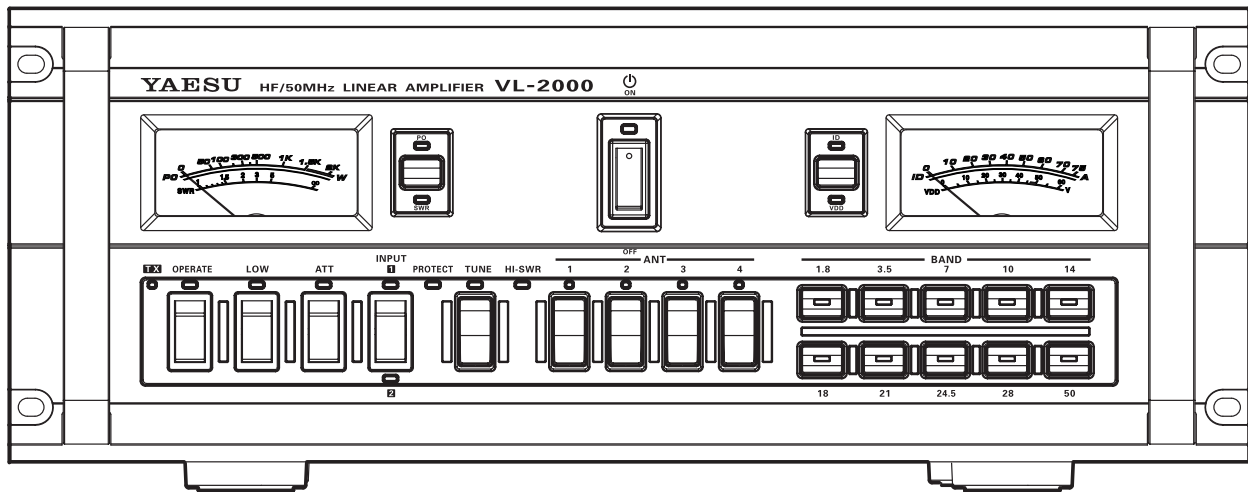
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Contents

General Description.....	1
Front Panel Controls & Switches.....	2
Rear Panel Connectors & Switches.....	4
Installation & Interconnections.....	6
FTDX9000 Series.....	6
FTDX5000.....	7
FT-2000/D.....	8
FT-950.....	9
FT-450/D.....	10
FT-897/D.....	11
FT-857/D.....	12
Multi Connection.....	13
General Transceiver.....	14
Operation.....	16
Preparations.....	16
Linear Amplifier Operation.....	17
Automatic Antenna Tuner Operation.....	18
SO2R (Single Operator Two Radios) Feature.....	19
ANTENNA DIRECT Feature.....	19
Trouble Shooting.....	20
Specifications.....	21

General Description



Congratulations! You are now the owner of the Yaesu **VL-2000** Linear Amplifier, which brings you leading-edge technology for the ultimate in operating convenience and reliability. We appreciate your investment in Yaesu equipment, and wish you many years of satisfying operation using your new amplifier!

The **VL-2000** is an all-solid-state linear amplifier operating on the 160 through 6 meter amateur bands at a power output level of 1500 Watts on all modes*. The **VL-2000** includes a built-in antenna tuner with 470 memories for tuning data, and microprocessor control of the tuning circuitry. The **VL-2000** features input jacks for two different exciters, as well as five antenna jacks for connection of antennas for different bands.

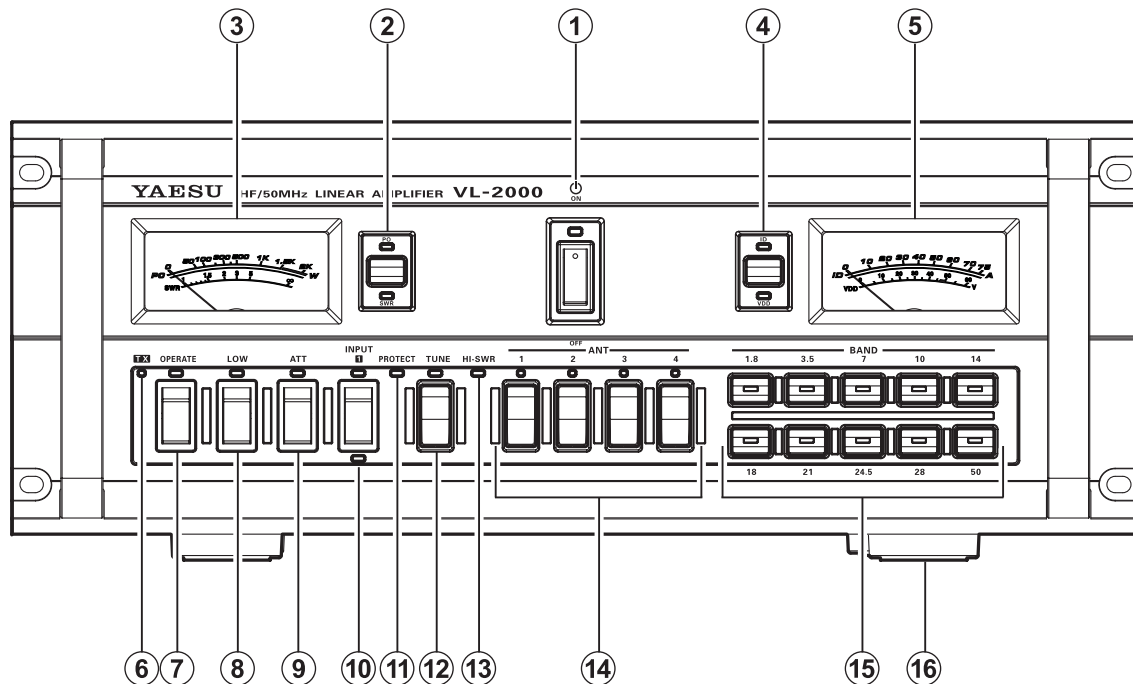
The separate **VP-2000** Power Supply Unit provides the +48 Volts required by the PA transistors, as well as all required control voltages for the amplifier. The **VL-2000** normally is powered via 220 Volt AC mains, although it can be operated, at the 500 Watt level, from 120 Volt AC power.

We encourage you to read this manual thoroughly before beginning installation and operation of your **VL-2000** Linear Amplifier. The details regarding proper installation and operating advice contained in these pages will help you derive maximum satisfaction from your new Yaesu equipment. Be certain to observe all due safety precautions when using this high-power device!

SUPPLIED ACCESSORIES

ITEM	QUANTITY
Antenna Cable (T9101600).....	1
Control Cable (T9101599)	1
RCA Plug (P0091365)	2
8-pin DIN Plug (P0090651).....	1
Operating Manual	1
Warranty Card.....	1

Front Panel Controls & Switches



① POWER Switch

This switch turns the **VL-2000** “on” and “off”.

When the **VP-2000** [POWER] switch is set to the “off” position, this switch will not function.

If using the Yaesu transceiver with a BAND DATA Cable, the **VP-2000** AC power will be remotely controlled by the transceiver’s power switch when the **REMOTE** switch on the rear panel of the **VL-2000** is set to “on”.

Caution: Never turn “off” this switch while transmitting.

② METER-1 Switch

Press this switch to toggle the **METER-1** function between “**PO**” meter and “**SWR**” meter.

③ METER-1

This is the two functions (**PO/SWR**) meter which is determined by the “**METER-1**” switch selection.

PO: Indicates the RF Power Output, from 0 to 2k watts on transmit.

SWR: Indicates the antenna system observed standing wave ratio (SWR), from 1.0 to 5.0.

④ METER-2 Switch

Press this switch to toggle the **METER-2** function between “**ID**” meter and “**VDD**” meter.

⑤ METER-2

This is the two functions (**ID/VDD**) meter which is determined by the “**METER-1**” switch selection.

ID: Indicates the final amplifier drain current, from 0 to 75 A.

VDD: Indicates the final amplifier drain voltage (nominal value: 48 V).

⑥ TX Indicator

This indicator glows red when the **VL-2000** is transmitting.

⑦ OPERATE Switch

This switch turns the power amplifier section of the **VL-2000** “on” and “off”.

When the power amplifier is activated, the LED will glow red.

Note: This switch does not effect while transmitting.

⑧ LOW Switch

This switch selects the RF output power.

When in the “LOW” position, the RF output power will be reduced to (approximately) 500 watts PEP, and the LED will glow red.

Note: This switch does not effect while transmitting.

Front Panel Controls & Switches

⑨ ATT Switch

This switch activates a 3 dB input RF power attenuator, to reduce excessive input power from the exciter. It should be “on” if exciter output exceeds 100 watt PEP, as is the case when using the **FTdx9000** series transceiver. The LED will glow red, when this switch is “on”.

Note: This switch does not effect while transmitting.

⑩ INPUT Switch

This switch selects the exciters which connected to the **INPUT 1** and **INPUT 2** jacks on the rear panel.

The “**INPUT 1**” or “**INPUT 2**” LED will glow red to indicate which exciter is in use.

Note: This switch does not effect while transmitting.

⑪ PROTECT LED

This LED blinks red when the Linear Amplifier is abnormal.

⑫ TUNE Button

This is the on/off switch for the **VL-2000**'s Automatic Antenna Tuner.

Press this button briefly, places the antenna tuner in line between the transmitter final amplifier and the antenna connector (The LED will glow red, and reception is not affected).

Press and hold this button for 1/2 second, while receiving in an a mature band, activates the transmitter for a few seconds while the Automatic Antenna Tuner rematches the antenna system impedance for minimum SWR. The LED will blink red when the antenna tuning is processing.

Pressing this button briefly, while the Tuner is engaged, will take the Automatic Antenna Tuner out of the transmit line.

⑬ HI-SWR LED

This LED blinks red when the antenna system is abnormally high SWR condition (over 3.0:1) that cannot be resolved by the Automatic Antenna Tuner.

When this LED blinks, the exciter output delivers to the antenna connector directly without through a linear amplifier.

Note: Check to be sure that you have the correct antenna selected on the current operating band when this LED blinks red. If so, you will need to check the condition of the antenna, its coaxial cable and/or the connectors on the cable so as to locate and correct fault.

⑭ ANT Button

These momentary buttons select the antenna jack on the rear panel, with the selection indicated by the red LED in each button.

Note: These buttons does not effect while transmitting.

⑮ BAND Button

These momentary buttons select the amateur band for the operation, with the selection indicated by the LED in each button.

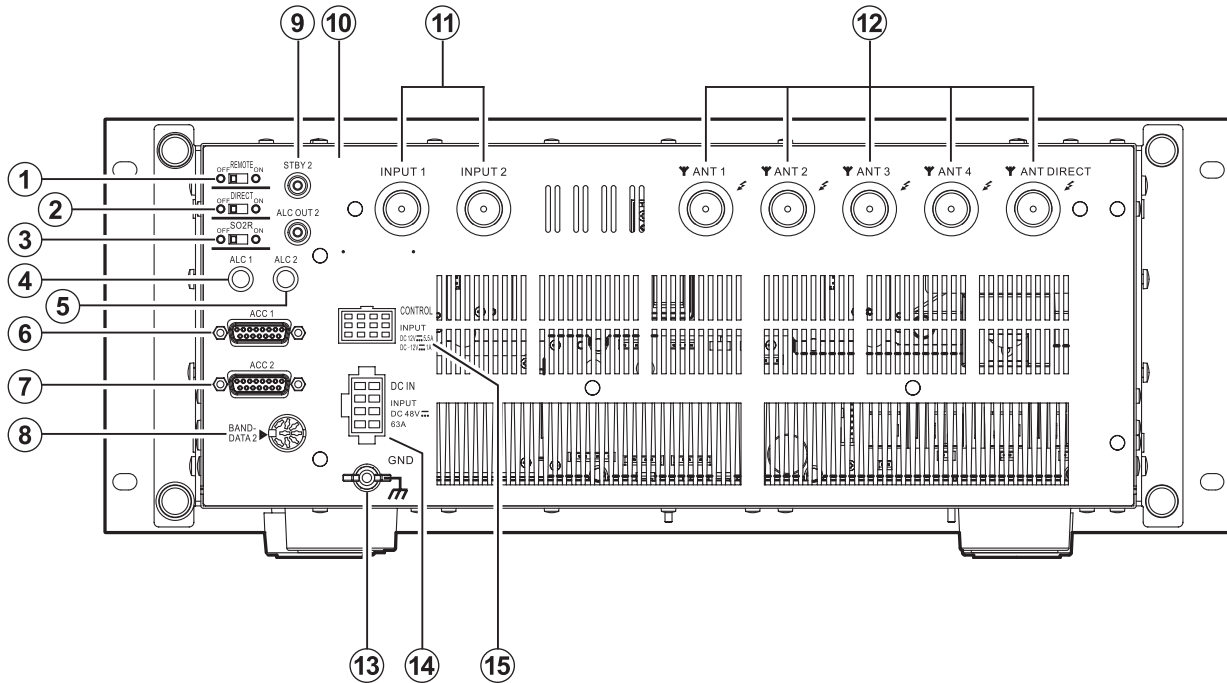
If using the Yaesu transceiver with a BAND DATA Cable, the **VL-2000** operation band will be remotely controlled by the transceiver's **BAND** switch.

Note: These buttons does not effect while transmitting.

⑯ Forefeet

These forefeet enable to extend the length of the forefoot for easy viewing by rotating the outer ring of the forefeet.

Rear Panel Connectors & Switches



① REMOTE Switch

When this switch is set to “on” position, the **VL-2000**’s **POWER** switch will be controlled by the transceiver’s **POWER** switch if you using a Yaesu transceiver with a BAND DATA Cable.

② DIRECT Switch

When this switch is set to “on” position, the exciter power which is connected to the **INPUT 2** jack deliver to the **ANT DIRECT** connector directly, without passing the Linear Amplifier and Antenna Tuner.

③ SO2R Switch

When this switch is set to “on” position, the receiving signal is sent to the both transceivers which is connected to the **INPUT 1** and **INPUT 2** jack. This feature is very useful for the “SO2R” (Shingle Operator, Two Radio) operation.

④ ALC-1 Potentiometer

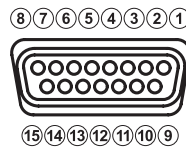
This potentiometer adjusts the maximum output power of the **VL-2000** when operating with the exciter which is connected to the **INPUT 1** jack.

⑤ ALC-2 Potentiometer

This potentiometer adjusts the maximum output power of the **VL-2000** when operating with the exciter which is connected to the **INPUT 2** jack.

⑥ ACC-1 Jack

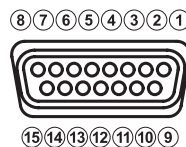
This D-SUB 15-pin Jack is connected to the Yaesu transceiver which is connected to the **INPUT 1** jack, to allow automatic band selection, T/R control, and power on/off control.



- ①: +13.5 V (IN)
- ②: TX GND
- ③: GND
- ④: BAND DATA A
- ⑤: BAND DATA B
- ⑥: BAND DATA C
- ⑦: BAND DATA D
- ⑧: TX INH (OUT)
- ⑨: F SET COMMON
- ⑩: F SET 1
- ⑪: F SET 2
- ⑫: RX D (TTL Level)
- ⑬: TX D (TTL Level)
- ⑭: EXT ALC
- ⑮: GND

⑦ ACC-2 Jack

This D-SUB 15-pin Jack is connected to the Yaesu transceiver which connected to the **INPUT 2** jack, to allow automatic band selection, T/R control, and power on/off control.



- ①: +13.5 V (IN)
- ②: TX GND
- ③: GND
- ④: BAND DATA A
- ⑤: BAND DATA B
- ⑥: BAND DATA C
- ⑦: BAND DATA D
- ⑧: TX INH (OUT)
- ⑨: F SET COMMON
- ⑩: F SET 1
- ⑪: F SET 2
- ⑫: NC
- ⑬: NC
- ⑭: EXT ALC
- ⑮: GND

Rear Panel Connectors & Switches

⑧ BAND-DATA 2 Jack

This 8-pin DIN Jack is connected to the Yaesu transceiver which is connected to the **INPUT 2** jack, to allow automatic band selection.



- ①: +13.5 V (IN)
- ②: TX GND
- ③: GND
- ④: BAND DATA A
- ⑤: BAND DATA B
- ⑥: BAND DATA C
- ⑦: BAND DATA D
- ⑧: TX INH (OUT)

⑨ STBY 2 Jack

When this RCA jack is shorted to ground, it put the **VL-2000** into the transmit mode. Connect this jack to the **TX GND** jack of the exciter which is connected to the “**INPUT 2**” jack.

⑩ ALC OUT 2 Jack

This RCA jack provide the ALC (output) voltage for control of the exciter’s RF drive level which is connected to the “**INPUT 2**” jack.

⑪ INPUT 1/2 Jacks

These type M (SO-239) jacks should be connected through a supplied Antenna Cable to the (transmitting) antenna jack of the transceivers.

⑫ ANT Jacks

Connect these type M (SO-239) jacks to your antennas using large (RG-239 or larger) 50 ohm coaxial cable with mating plugs (Type M: PL-259).

⑬ GND Terminal Post

Connect this terminal to a good earth ground using the shortest practical length of heavy braided cable. All other station equipment should be grounded to the same ground system.

⑭ DC IN Connector

Connect this 8-pin connector to the **DC OUT** connector on the Yaesu **VP-2000** AC Power Supply. This connector provides +48V DC supply voltage for the power amplifier of the **VL-2000**.

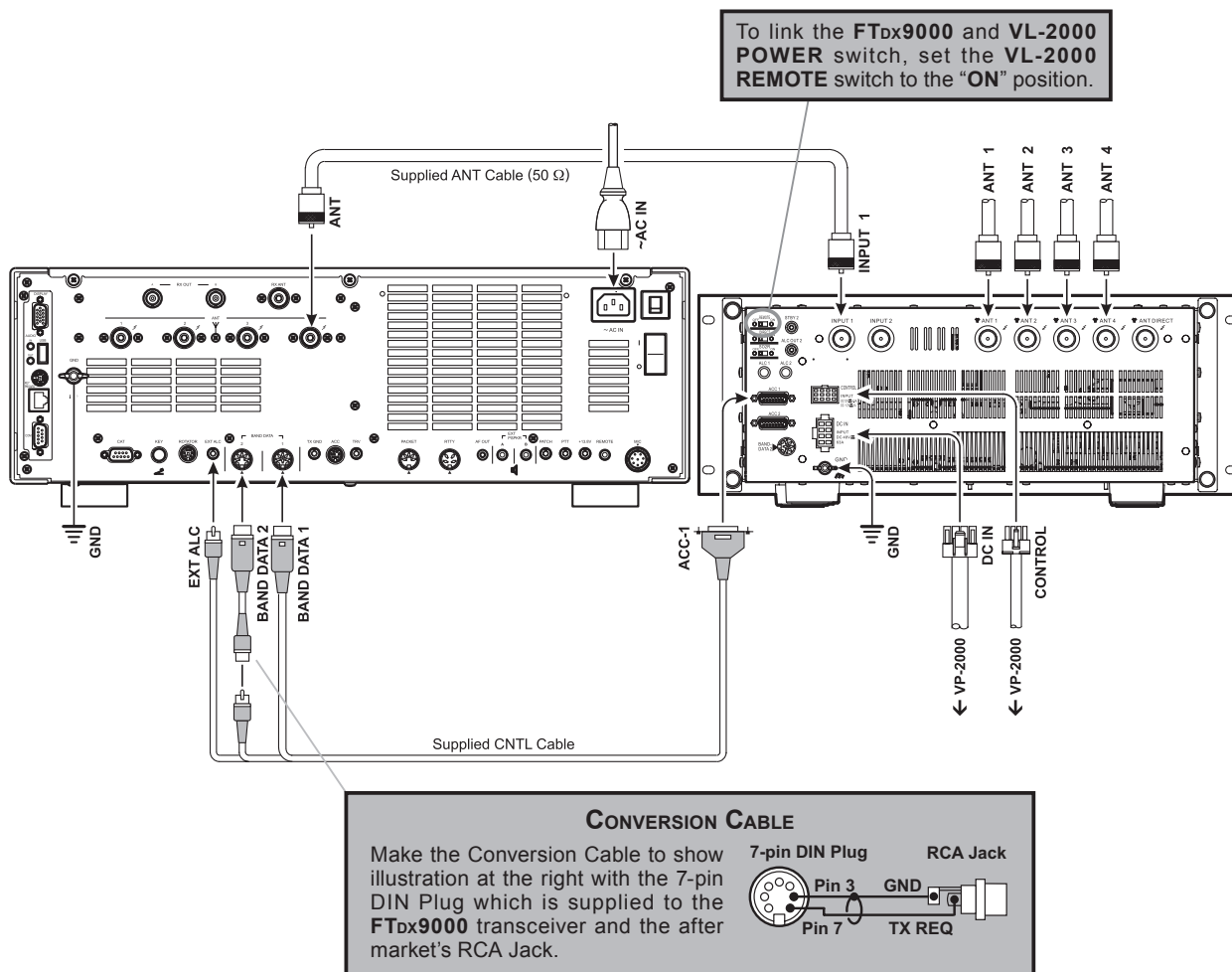
⑮ CONTROL Connector

Connect this 8-pin connector to the **CONTROL** connector on the Yaesu **VP-2000** AC Power Supply. This connector provides $\pm 12V$ DC supply voltage and control signals for the **VL-2000**.

Installation & Interconnections

FTDx9000 SERIES

Be sure both **FTDx9000** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- ❑ When operate the **VL-2000** with the **FTDx9000MP**, should be set the **ATT** switch on the **VL-2000** front panel to "on" position, and set the maximum RF output power level to "200 W" via menu item "**TX GNRL 173 TX MAX POWER**" on the **FTDx9000MP**. The 400 watt power output from the **FTDx9000MP** is far in excess of what is required to drive the **VL-2000** to its full rated output.
- ❑ When operate the **VL-2000** with the **FTDx9000D** or **FTDx9000Contest**, should be set the **ATT** switch on the **VL-2000** front panel to "on" position. The 200 watt power output from the **FTDx9000D** or **FTDx9000Contest** is far in excess of what is required to drive the **VL-2000** to its full rated output.
- ❑ The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- ❑ Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

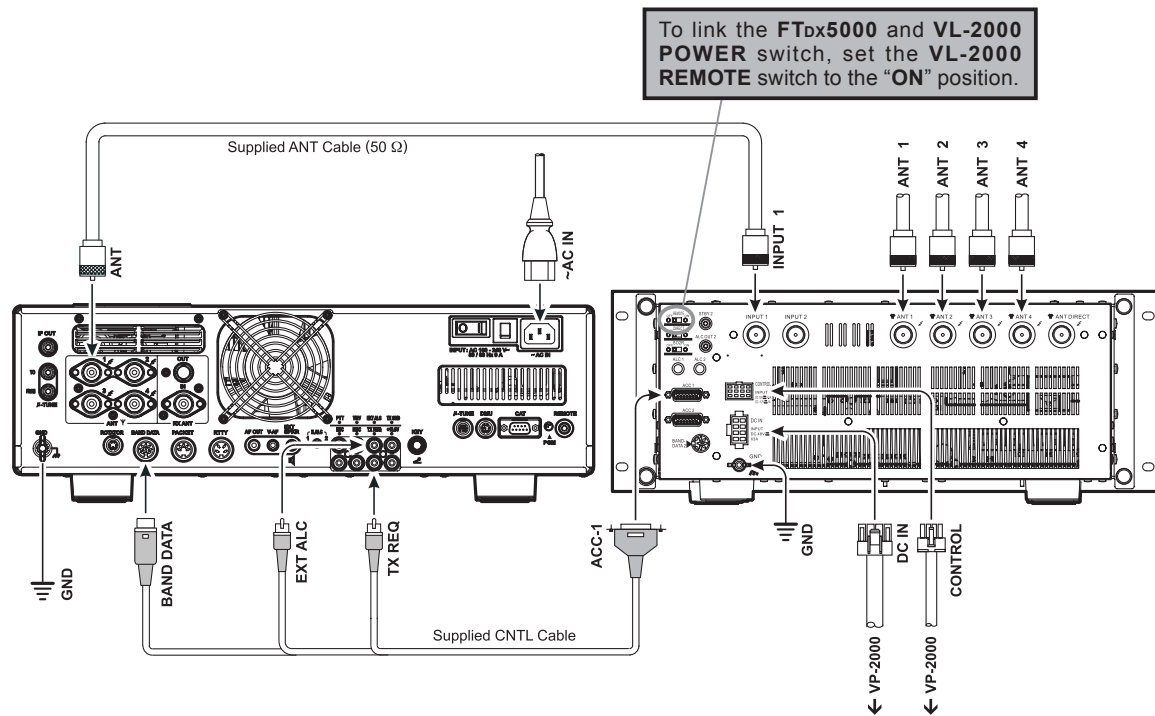
NOTE

- ❑ When the **VL-2000 POWER** switch is turned "off", the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- ❑ If you want to link the **VL-2000** and **FTDx9000** series **POWER** switches, set the **VL-2000 REMOTE** switch to the "on" position.

Installation & Interconnections

FTDx5000

Be sure both **FTDx5000** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- ❑ When operate the **VL-2000** with the **FTDx5000**, should be set the **ATT** switch on the **VL-2000** front panel to "on" position. The 200 watt power output from the **FTDx5000** is far in excess of what is required to drive the **VL-2000** to its full rated output.
- ❑ The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- ❑ Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

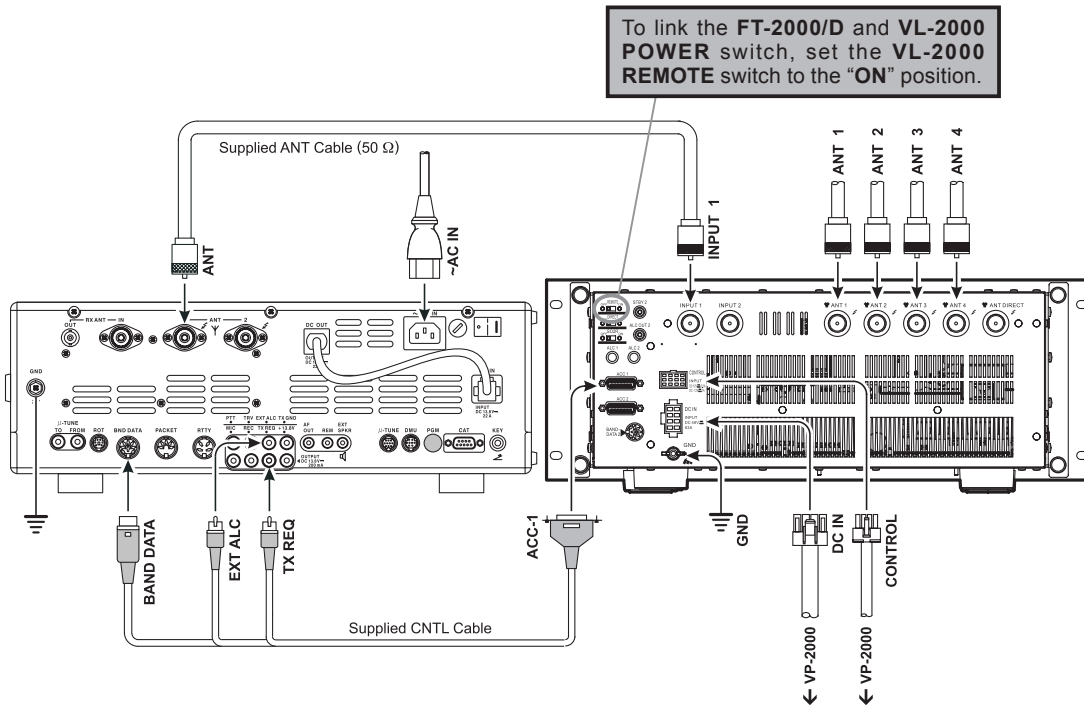
NOTE

- ❑ When the **VL-2000**'s **POWER** switch is turned "off", the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- ❑ If you want to link the **VL-2000** and **FTDx5000** **POWER** switches, set the **VL-2000** **REMOTE** switch to the "on" position.

Installation & Interconnections

FT-2000/D

Be sure both **FT-2000/D** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- When operate the **VL-2000** with the **FT-2000D**, should be set the **ATT** switch on the **VL-2000** front panel to "on" position. The 200 watt power output from the **FT-2000D** is far in excess of what is required to drive the **VL-2000** to its full rated output.
- The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

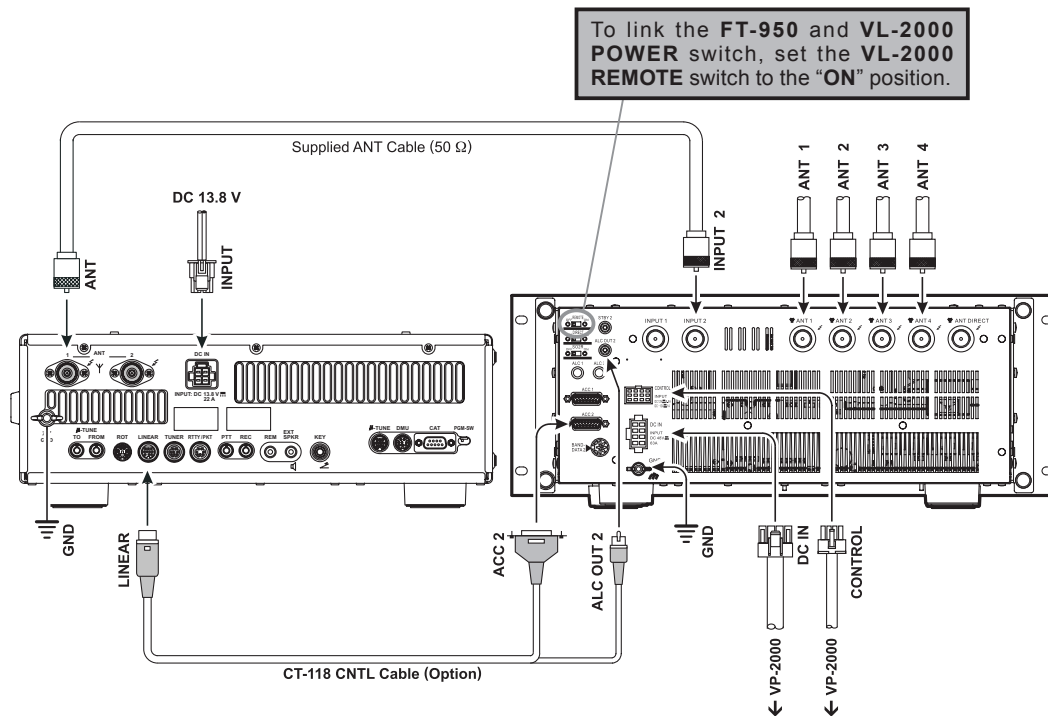
NOTE

- When the **VL-2000 POWER** switch is turned "off", the exciter output is delivered as follows:
 - INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- If you want to link the **VL-2000** and **FT-2000/D POWER** switches, set the **VL-2000 REMOTE** switch to the "on" position.

Installation & Interconnections

FT-950

Be sure both **FT-950** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- ❑ The **FT-950** enables to connect only to the **INPUT 2** connector. Set the **INPUT** switch to the "INPUT 2" side after assemble the equipment.
- ❑ The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- ❑ Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

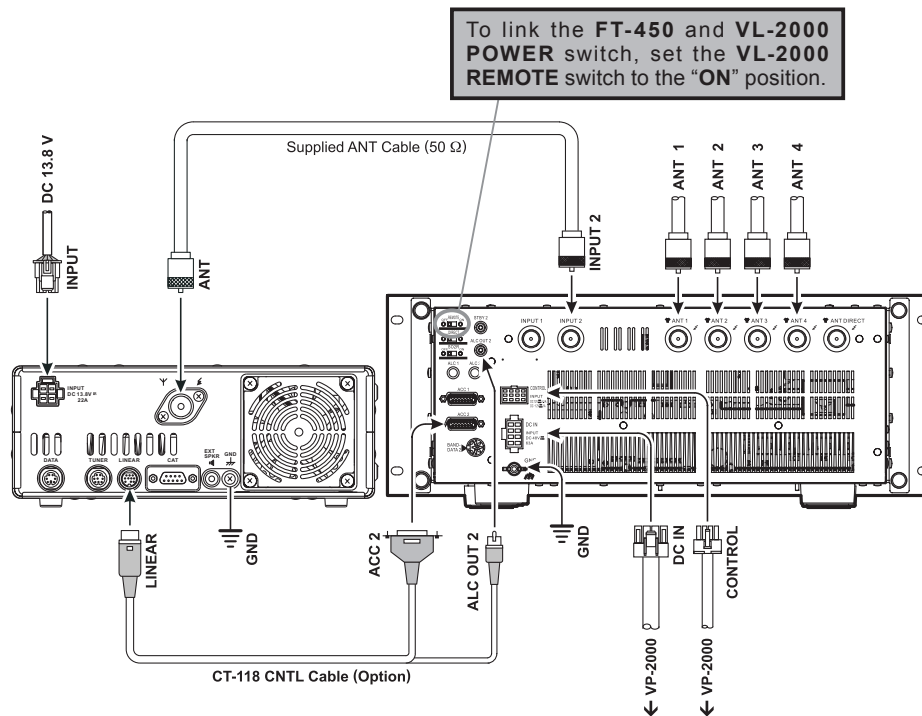
NOTE

- ❑ When the **VL-2000**'s **POWER** switch is turned "off", the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- ❑ If you want to link the **VL-2000** and **FT-950** **POWER** switches, set the **VL-2000** **REMOTE** switch to the "on" position.

Installation & Interconnections

FT-450/D

Be sure both **FT-450/D** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- ❑ The **FT-450/D** enables to connect only to the **INPUT 2** connector. Set the **INPUT** switch to the "**INPUT 2**" side after assemble the equipment.
- ❑ The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- ❑ Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

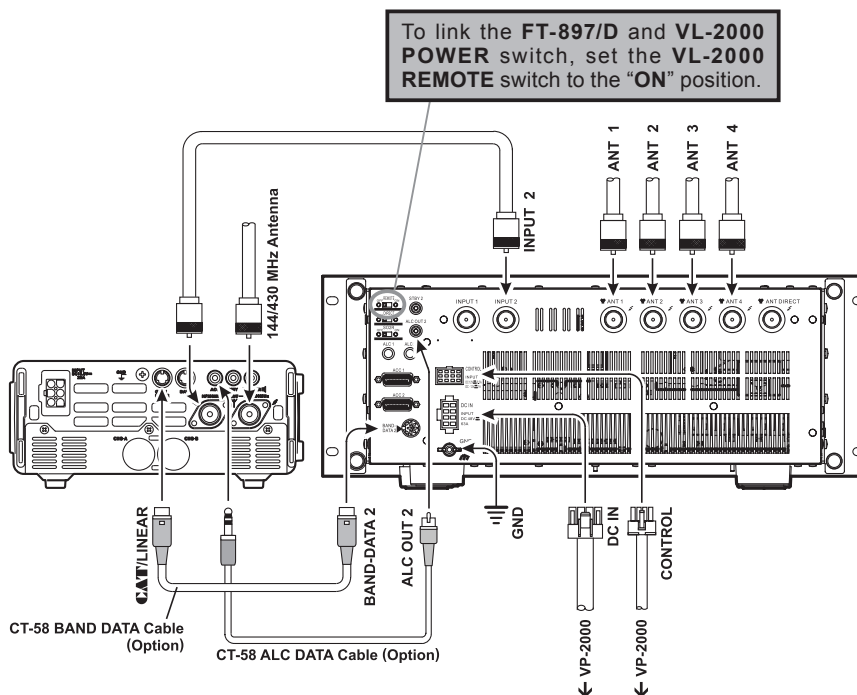
NOTE

- ❑ When the **VL-2000 POWER** switch is turned "off", the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- ❑ If you want to link the **VL-2000** and **FT-450/D POWER** switches, set the **VL-2000 REMOTE** switch to the "on" position.

Installation & Interconnections

FT-897/D

Be sure both **FT-897/D** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- The **FT-897/D** enables to connect only to the **INPUT 2** connector. Set the **INPUT** switch to the “**INPUT 2**” side after assemble the equipment.
- The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

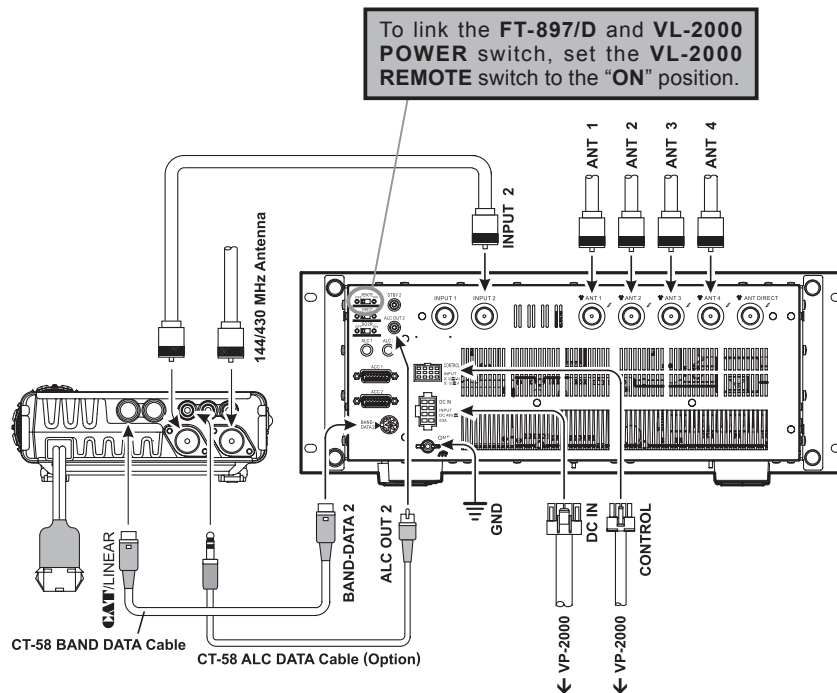
NOTE

- When the **VL-2000**'s **POWER** switch is turned “off”, the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- If you want to link the **VL-2000** and **FT-897/D** **POWER** switches, set the **VL-2000 REMOTE** switch to the “on” position.

Installation & Interconnections

FT-857/D

Be sure both **FT-857/D** and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- The **FT-857/D** enables to connect only to the **INPUT 2** connector. Set the **INPUT** switch to the "**INPUT 2**" side after assemble the equipment.
- The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

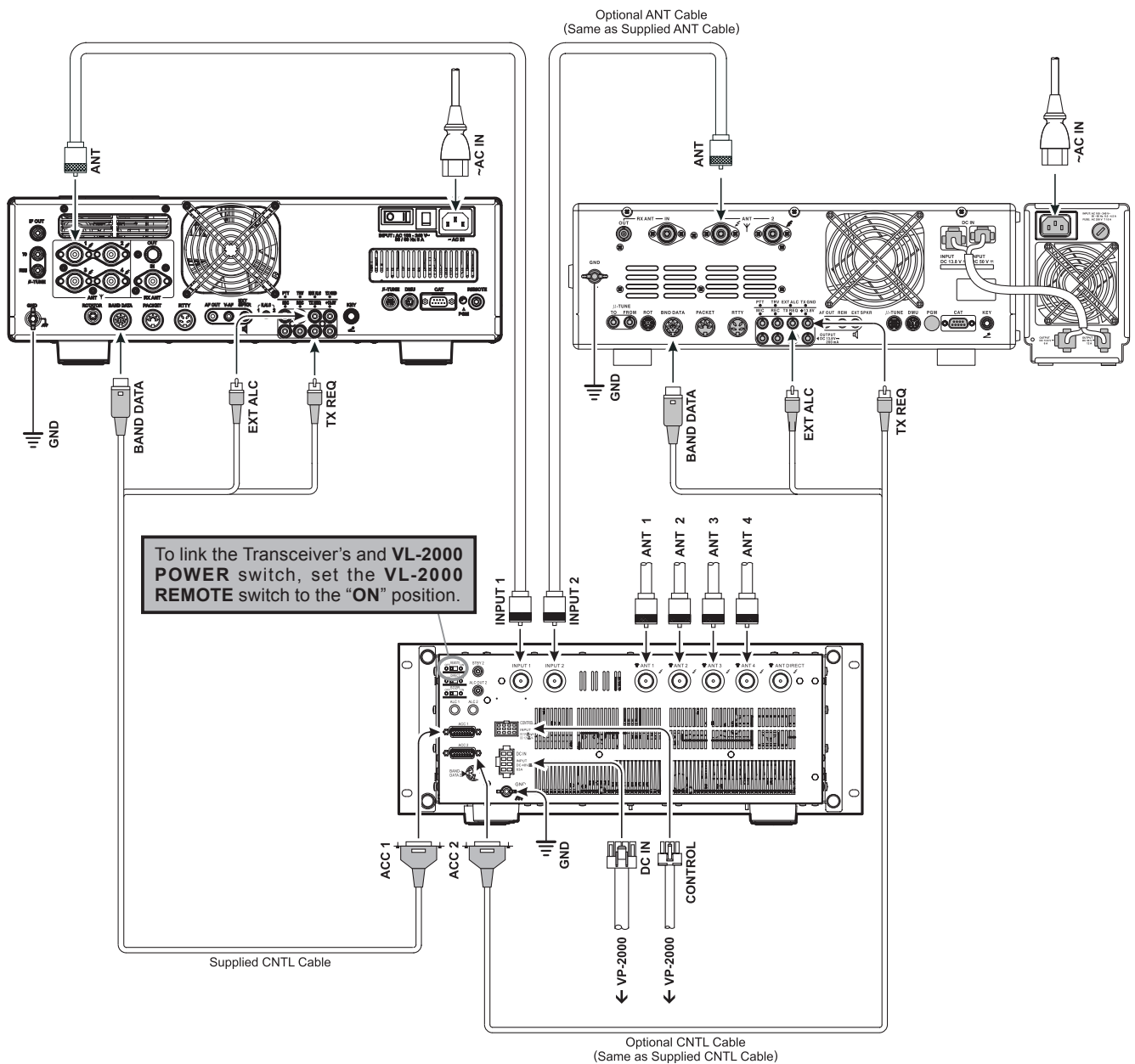
NOTE

- When the **VL-2000 POWER** switch is turned "off", the exciter output is delivered as follows:
 - INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- If you want to link the **VL-2000** and **FT-857/D POWER** switches, set the **VL-2000 REMOTE** switch to the "on" position.

Installation & Interconnections

MULTI CONNECTION (EXAMPLE: FTDX5000 & FT-2000)

Be sure all equipment are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- ❑ When connect the 100 watt transceiver and 200 watt transceivers to the **VL-2000** together, reduce the RF output power of the 200 watt transceiver to 100 watt by the Menu Mode Item. For example above, set the maximum RF output power level to "100 W" via menu item "170 TGEN MAX PWR" on the **FTDX5000**.
- ❑ The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- ❑ Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

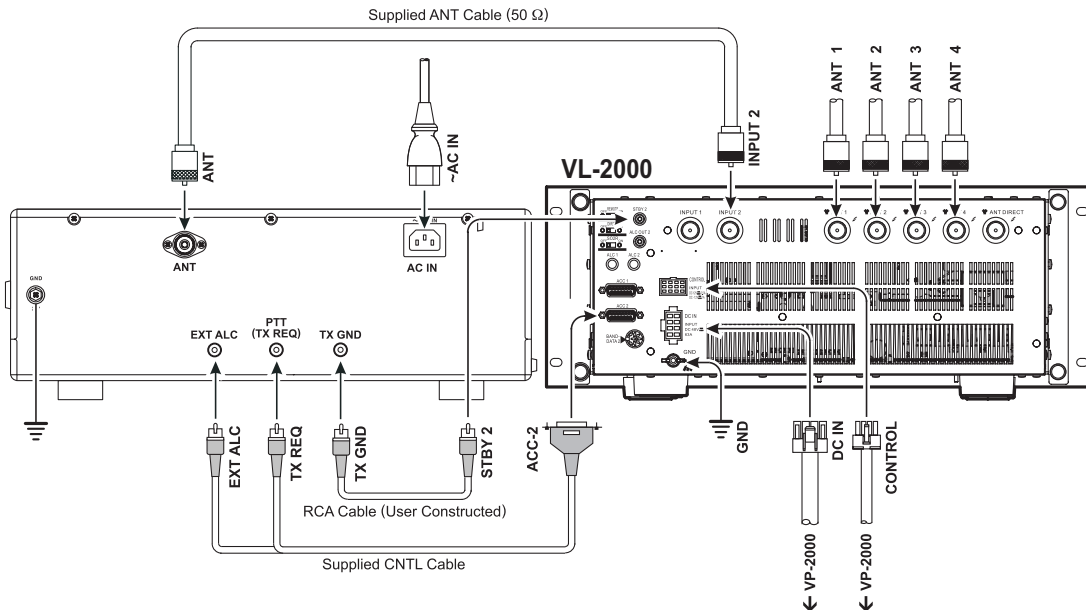
NOTE

- ❑ When the **VL-2000's** **POWER** switch is turned "off", the exciter output is delivered as follows:
 - **INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - **INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.
- ❑ If you want to link the **VL-2000** and transceiver **POWER** switches, set the **VL-2000 REMOTE** switch to the "on" position. When turn "on" one of the transceiver, the **VL-2000** becomes "on" automatically.

Installation & Interconnections

GENERAL TRANSCEIVER

Be sure both transceiver and **VL-2000** are turned off, then follow the installation recommendation contained in the illustration.



IMPORTANT NOTE !

- The general transceiver enables to connect only to the **INPUT 2** connector. Set the **INPUT** switch to the “**INPUT 2**” side after assemble the equipment.
- The ALC cable must be connected between the transceiver and **VL-2000** to prevent overdrive of the amplifier, and especially to facilitate the proper operation of the protection circuitry if sudden antenna system problems should cause the SWR to rise to dangerous levels.
- Do not attempt to connect or disconnect coaxial antenna cables when your hands are wet.

NOTE

- When the **VL-2000 POWER** switch is turned “off”, the exciter output is delivered as follows:
 - INPUT 1** exciter: delivers to the **ANT 1** connector directly.
 - INPUT 2** exciter: delivers to the **ANT DIRECT** connector directly.

Installation & Interconnections

NOTE

Operation

PREPARATIONS

To transmit the high quality RF signal, adjust the ALC voltage in the following procedures, before operating.

IMPORTANT NOTE

- Confirm whether wiring does not have a miss wiring again.
- Connect the Dummy load which have an enough RF Input Power to the Antenna Connector on the rear panel of the VL-2000.
- The VL-2000 requires 220 Volt AC power for 1.5 kW operation, while 117 Volt AC power is possible at the 500 W power output.
- When connect the FT_{Dx}9000D/Contest, FT_{Dx}5000, FT-2000D (200 W transceiver) to the VL-2000, set the ATT switch on the VL-2000 front panel to “on” position to reduce the input power of the VL-2000.
- When connect the FT_{Dx}9000MP (400 W transceiver) to the VL-2000, set the ATT switch on the VL-2000 front panel to “on” position, and set the maximum RF output power level to “200 W” via menu item “TX GNRL 173 TX MAX POWER” on the FT_{Dx}9000MP to reduce the input power of the VL-2000.

1. Set the **INPUT** switch to the position which is connected to the exciter.
2. Rotate the **ALC-1** (or **ALC-2**: determine to the exciter connected) potentiometer fully counter clockwise.
3. Set the operating band of the exciter and **VL-2000** to the same operating band.
Note: If you connect the supplied **CNTL** Cable between the transceiver and **VL-2000**, the operating band of the **VL-2000** will automatically set when you set the transceiver’s operating band.
4. Set the operation mode of the exciter to the “CW” mode.
5. Set the **OPERATE** switch and **TUNE** button to both “off”.
6. Set the **METER-1** function to “PO” by pressing the **METER-1** switch (The “PO” LED will glow red).
7. Press the one of the **ANT (1 - 4)** buttons corresponding to the antenna jack connecting the Dummy Load.
8. Press the **PTT** switch of the exciter, then adjust the RF output power level of the exciter so that the *exciter’s PO meter* reading becomes 100 watt (or 200 watt).

Note: Refer to the operating manual of the exciter for the adjustment method of the RF output power level of the exciter.

9. Release the **PTT** switch, then set the **OPERATE** switch to “on” (The “OPERATE” LED will glow red).
10. Set the **ATT** switch to “on” (The “ATT” LED will glow red), if the exciter output which you connected exceeds 100 watts PEP.

Caution !: Do not forget this operation, as it may cause a serious damage to the VL-2000 by an over injection.

11. Press the **PTT** switch of the exciter again, then adjust the **ALC-1** (or **ALC-2**) potentiometer so that the **METER-1** (“PO” meter) reading becomes 1500 watt.
12. Release the **PTT** switch.
13. The ALC voltage adjustment is now completed.

ABOUT THE ATT SWITCH

The **VL-2000** requires input drive power of 80 - 100 watts.

When connect the exciter having exceed 100 watts PEP (such as our **FT_{Dx}9000D/Contest**, **FT_{Dx}5000**, or **FT-2000D**), set the **ATT** switch on the **VL-2000** front panel to “on” position to reduce the input power of the **VL-2000**.

FAN OPERATION

The **VL-2000** cooling fans are thermostatically controlled. It turns at low speed at the time of the transmission start, and then fan speed rises in accordance with the temperature rise in the case. The cooling fan operation links the **OPERATE** switch. When turn “off” the **OPERATE** switch (mean disabling the Linear Amplifier), the cooling fan turns “off” for enabling the quiet monitoring.

LINEAR AMPLIFIER OPERATION

Before operating, please check the following items:

- Confirm whether wiring does not have a miss wiring again.
- Confirm that the AC power plug connect to 220 Volt AC power directly. The **VL-2000** requires 220 Volt AC power for 1.5 kW operation
- Confirm that the **ATT** switch is set to “on” position, when connect the exciter having exceed 100 watts PEP.
- Confirm that the antenna SWR is less than 1.5:1.

1. Turn the **VP-2000 POWER** switch “on”, then turn the **VL-2000 POWER** switch “on”.

2. Turn the transceiver’s **POWER** switch “on”.

If using a Yaesu transceiver with a BAND DATA Cable, and the **REMOTE** switch on the rear panel of the **VL-2000** is set to “on”, the **VP-2000** AC power will be remotely controlled by the transceiver’s **POWER** switch.

3. Set the **INPUT** switch to the position which is connected to the exciter.

4. Select the amateur band of the transceiver you wish to operate on.

If using a Yaesu transceiver with a BAND DATA Cable, band selection will occur automatically whenever you change bands on the transceiver. Otherwise, select the amateur band of the **VL-2000** to same as the transceiver.

5. Select the operating mode of the transceiver you wish to operate on.

6. Set the **OPERATE** switch to “on”. The “OPERATE” LED will glow red.

7. Press and hold the **TUNE** button for 1/2 second to begin automatic tuning. The transmitter will be engaged, and the red **TUNE** LED will blink while tuning is in progress. When the optimum tuning point has been reached, the transceiver (and **VL-2000**) will return to receive, and the **TUNE** LED will glow red steadily (instead of blinking).

8. *For SSB and CW operation*, make sure to adjust the Microphone Gain and/or Drive control on the transceiver for proper ALC indication on the transceiver ALC meter, as described in the transceiver manual. Generally, for SSB, the ALC meter indication should not deflect beyond a certain ALC limit (the “ALC” zone on the transceiver’s meter) on voice peaks; on CW, the ALC indication should be just enough to cause slight meter deflection. Higher ALC levels may produce distortion or key clicks, without producing any additional power output.

In the CW mode, the **VL-2000** allows you to full break-in operation. However, the full break-in operation may give the stress to the T/R switching relays.

For FM, SSTV, RTTY, or Packet operation, You may enable 1.5 kW operations, if the following condition is satisfied.

- Normal Temperature: +41 °F to +95 °F
(+5 °C to +35 °C)
- Normal humidity (45 % to 85 %)
- Side Clearance: 10 inches (25 cm)
- Rear Clearance: 12 inches (30 cm).

Otherwise, press the LOW switch to select the LOW power condition to prevent the overheating during continuous operation.

For AM operation, adjust the Drive or RF Power control on the transceiver so that the **METER-1** (“PO” meter) on the **VL-2000** does not exceed 375 watts (on 1.5 kW operation) or 125 watts (on 500 watt operation) when transmitting a carrier.

OPERATING PRECAUTIONS

Summarized below are some precautions to adhere to in order to ensure long life and trouble-free operation with the **VL-2000**.

- Do not turning the **POWER** switch “on” or “off” while transmitting.
- When changing bands, always make certain that the **VL-2000** is set for the same band as the transceiver before transmitting, and that the proper antenna is connected.

Remember that, when the **VL-2000** is switched “off” the **INPUT-1** jack is automatically connected to the **ANT 1** jack and the **INPUT-2** jack is automatically connected to the **ANT DIRECT** jack.

- Reduce the drive power (set the **ATT** switch to “on”), if the exciter output which you connected exceeds 100 watts PEP.

Operation

AUTOMATIC ANTENNA TUNER OPERATION

The Automatic Antenna Tuner built into the **VL-2000** is crafted to ensure a 50-Ohm load for the final amplifier stage of the linear amplifier. We recommend the Automatic Antenna Tuner be used whenever you operate the **VL-2000**.

ADVICE:

- The **VL-2000** Automatic Antenna Tuner, being located inside the station, only adjusts the impedance presented to the transmitter at the station end of your coaxial cable feedline. It does not “tune” the SWR at the antenna feedpoint itself. When designing and building your antenna system, we recommend that every effort be made to ensure a low SWR at the antenna feedpoint.
- The **VL-2000** Automatic Antenna Tuner includes 470 memories for tuning data. These memory allocation is described in the bottom chart.
- The **VL-2000** Automatic Antenna Tuner is designed to match impedances within the range of 16.5 Ohms to 150 Ohms, corresponding to an SWR of 3:1 or less on the HF amateur bands (6 meter amateur band: 25 Ohms to 100 Ohms, corresponding to an SWR of 2:1 or less). Accordingly, simple non-resonant whip antennas, along with random-length wires and the “G5RV” antenna (on most bands) may not be within the impedance matching range of the Automatic Antenna Tuner.
- The **VL-2000** Automatic Antenna Tuner is located between the final amplifier and the rear-panel antenna jack; reception is not affected by the Automatic Antenna Tuner.

1. Confirm the operating band of the **VL-2000** is same as the exciter.
2. Press the **TUNE** button briefly to place the Automatic Antenna Tuner in the transmit line. The **TUNE** LED will glow red.
3. Press and hold the **TUNE** button for 1/2 second to begin automatic tuning. The transmitter will be engaged, and the red **TUNE** LED will blink while tuning is in progress. When the optimum tuning point has been reached, the transceiver (and **VL-2000**) will return to receive, and the **TUNE** LED will glow red steadily (instead of blinking).
4. To disconnect the Automatic Antenna Tuner from the transmit line, press the **TUNE** button briefly. The **TUNE** LED will turn off, confirming that the Automatic Antenna Tuner has been turned off. In the “off” mode, the transceiver will be directly connected to the coaxial cable connected to your antenna, and it will operate based on whatever impedance is present at the station end of the coax.

ADVICE

The **VL-2000** Automatic Antenna Tuner makes a note of the positions of the tuning capacitors and the selected inductors when the tuning result is better than SWR 1.5:1. This eliminates the need to re-tune every time you return to a frequency on which you already have completed the tuning process.

NOTE

The **VL-2000** Automatic Antenna Tuner does not tuning in the following situations:

- The exciter (transceiver) is not transmitted.
- No carrier.
- Low injection level.
- Antenna SWR is more than 3.0: 1. (short-circuit or open-circuit)
- Tuning result is more than 3.0: 1.

RESETTING THE ANTENNA TUNING DATA

The **VL-2000** can be reset so as to clear the antenna tuner tuning data; this will be reset to the factory default.

To reset the Antenna Tuning Data, press and hold in the **TUNE** button while you turn the **VL-2000** on.

MEMORY CHANNEL ALLOCATIONS

BAND	MEMORY CHANNEL	STEP
1.8 MHz	20 channels for each ANT Jack (x5)	10 kHz
3.5 MHz	25 channels for each ANT Jack (x5)	20 kHz
7 MHz	6 channels for each ANT Jack (x5)	50 kHz
10 MHz	1 channel for each ANT Jack (x5)	---
14 MHz	5 channels for each ANT Jack (x5)	100 kHz
18 MHz	1 channel for each ANT Jack (x5)	---
21 MHz	6 channels for each ANT Jack (x5)	100 kHz
24 MHz	1 channel for each ANT Jack (x5)	---
28 MHz	9 channels for each ANT Jack (x5)	200 kHz
50 MHz	20 channels for each ANT Jack (x5)	200 kHz

SO2R FEATURE

The SO2R (Single Operator Two Radios) feature allows you to receive the two signals by the two transceivers simultaneously, when connects the two radios to the **VL-2000**. Furthermore, you to operate the **VL-2000** without changing the **INPUT** switch. The **VL-2000** switches the input to the transceiver side which transmitted automatically, regardless the **INPUT** switch setting.

To activate the SO2R feature, turn “on” the **SO2R** switch on the rear panel of the **VL-2000**.

NOTE

- The **VL-2000** Automatic Antenna Tuner works only to the transceiver which connected to the **INPUT** jack that is determined by the **INPUT** switch.
- Cannot select the same antenna in **INPUT 1** and **INPUT 2** while SO2R feature is activated.

ADVICE

Even if the **SO2R** switch is “off”, you can connect the two transceivers deservedly. However, you must switch the **INPUT** switch to the position which is the transceiver that is transmitted manually and you can not receive the signal with the other transceiver while the transceiver is transmitted.

ANTENNA DIRECT FEATURE

The ANTENNA DIRECT feature outputs the **INPUT 2** signal to the **ANT DIRECT** jack directly after having passed the Linear Amplifier and the Automatic Antenna Tuner. As a result, the transmit signal does not pass a complicated antenna change circuit, to keep the loss at the minimum.

To activate the ANTENNA DIRECT feature, turn “on” the **DIRECT** switch on the rear panel of the **VL-2000**.

IMPORTANT NOTE

When activates the ANTENNA DIRECT feature, the all ANT LED (**ANT 1 ~ ANT 4**) turns “off”, confirming that the ANTENNA DIRECT feature has been activated.

Trouble Shooting

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to power up.	POWER Cables.	Check the connections of the POWER Cables.
Operating band does not change.	BAND DATA Cable or CNTL Cable.	Check the connections of the BAND DATA Cable.
TX power output does not appear.	Connection Cable between the transceiver and VL-2000 .	Check the connections of the Connection cable between the transceiver and VL-2000 .
	Antenna Cable.	Check the connections of the Antenna Cable.
	INPUT Switch.	Set the INPUT switch to the position where the transceiver is connected.
	OPERATE Switch.	Turn "on" the OPERATE switch.
TX power output does not appear. (PROTECT LED blinks red)	Excessive the exciter power. (ATT LED blinks red)	<input type="checkbox"/> Reduce the exciter power to the 100 watts. <input type="checkbox"/> Turn "on" the ATT switch.
	Excessive the output power. (PO METER LED blinks red)	Check the connections of the ALC cable.
	Incorrect the operating band or out from the amateur band. (one of the BAND LED blinks red)	<input type="checkbox"/> Set the BAND switch to the correct band. <input type="checkbox"/> Set the transceiver's frequency in the amateur band.
	High Temperature of the Power Transistor.	Stop the transmission immediately, then wait till temperature of the Power Amplifier falls.
	Unbalance the power combine circuit of the final transistor. (OPERATE LED blinks red)	Stop the transmission immediately, then contact your Vertex Standard dealer.
	High or Low drain voltage. (VD METER LED blinks red)	Stop the transmission immediately, then contact your Vertex Standard dealer.
	Excessive the drain current of the Power Transistor. (IDD METER LED blinks red)	Stop the transmission immediately, then contact your Vertex Standard dealer.
Low Transmit Power	Connection Cable between the transceiver and VL-2000 .	Check the connections of the Connection Cable between the transceiver and VL-2000 .
	Lower exciter power.	Adjust the output power of the exciter.
	ALC voltage.	Adjust the ALC voltage.
	Antenna miss-matching.	Adjust the antenna matching (Set the SWR to better than 2.0:1).
	Low AC power.	Prepare 220 V AC for 1.5 kW operation.
Antenna Tuner does not operate.	Connection Cable between the transceiver and VL-2000 .	Check the connections of the Connection Cable between the transceiver and VL-2000 .
HI-SWR LED glows red.	Antenna miss-matching. (SWR is more than 2.0:1)	Adjust the antenna matching.
HI-SWR LED blinks red.	Antenna miss-matching. (SWR is more than 3.0:1)	<input type="checkbox"/> Adjust the antenna matching. <input type="checkbox"/> Check the connections of the Antenna Cable.
ATT LED blinks red.	Excessive the exciter power.	Turn "on" the ATT switch.

GENERAL

Frequency Coverage:	1.8 MHz ~ 50 MHz Amateur Bands
Operating Mode:	SSB, CW, AM, FM, RTTY
Input:	INPUT 1/INPUT 2 (Two System)
Input Impedance:	50 Ω , unbalanced, Type-M connector
Excitation Power:	100 watt or 200 watt (@ATT ON)
Output:	ANT 1 ~ ANT 4 (Four System) plus ANT DIRECT (Sub Antenna System: INPUT 2 ↔ ANT DIRECT)
Output Impedance:	50 Ω , unbalanced, Type-M connector
Power Output:	1500/500 Watts (HI/LOW: 1.8 MHz ~ 28 MHz Amateur Bands) 1000/500 Watts (HI/LOW: 50 MHz Amateur Bands) @ 220V AC Input to VP-2000 Power Supply 500 Watts (1.8 MHz ~ 50 MHz Amateur Bands) @ 120V AC Input to VP-2000 Power Supply
Continuous Transmission Period:	100% @ 1500 Watts
Spurious Radiation:	better than -60 dB @ 1.8 - 28 MHz Amateur Bands better than -73 dB @ 50 MHz Amateur Band
Operating Band Change:	Manual/Automatic (Automatic: requires the BAND DATA Cable)
Final Transistor:	VRF2933 x 8
Final Amplifier Circuit Type:	Class-AB, Push-pull Circuit, Power Combine
Cooling System:	Forced air-cooling (Variable wind velocity)
Operating Temperature Range:	+14 °F ~ +104 °F (-10 °C ~ +40 °C) @1500 Watts Operation +14 °F ~ +122 °F (-10 °C ~ +50 °C) @500 Watts Operation
Case Size (WxHxD):	19" x 7" x 20" (482 x 177 x 508 mm)
Weight (Approx.):	53.4 lbs (24.2 kg)

AUTOMATIC ANTENNA TUNER SECTION

Impedance Matching Range:	25 to 100 Ω , unbalanced @ 1.8 MHz Amateur Band 16.6 to 150 Ω , unbalanced @ 3.5 ~ 50 MHz Amateur Bands
Matching Time:	less than 3 seconds
Matched SWR:	1.5:1 or better

Specifications are subject to change, in the interest of technical improvement, without notice or obligations.

Part 15.21: Changes or modifications to this device not expressly approved by Vertex Standard could void the user's authorization to operate this device.



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