

VX-3000U Alignment

The VX-3000U is carefully aligned at the factory for the specified performance across the frequency range specified for each version. Realignment should therefore not be necessary except in the event of a component failure, or altering version type. All component replacement and service should be performed only by an authorized Yaesu representative, or the warranty policy may be void.

The following procedures cover the sometimes critical and tedious adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts subsequently are placed, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

We recommend that servicing be performed only by authorized Yaesu service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Yaesu service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components.

Those who do undertake any of the following alignments are cautioned to proceed at their own risk. Problems caused by unauthorized attempts at realignment are not covered by the warranty policy. Also, Yaesu reserves the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners.

Under no circumstances should any alignment be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and realignment determined to be absolutely necessary.

The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy. While most steps do not require all of the equipment listed, the interactions of some adjustments may require that more complex adjustments be performed afterwards.

Do not attempt to perform only a single step unless it is clearly isolated electrically from all other steps. Have all test equipment ready before beginning, and follow all of the steps in a section in the order presented.

Required Test Equipment

- RF Signal Generator with calibrated output level at 500MHz
- Deviation Meter (linear detector)
- In-line Wattmeter with 5% accuracy at 500MHz
- 50- Ω RF Dummy Load with power rating 100W at 500MHz
- 4- Ω AF Dummy Load
- Regulated DC Power Supply adjustable from 3 to 15V DC, 15A
- Frequency Counter with 0.2ppm accuracy at 500MHz
- AF Signal Generator
- AC Voltmeter
- DC Voltmeter
- VHF Sampling Coupler
- SINAD Meter
- IBM PC / compatible Computer with Microsoft Windows v3.1 or later operating system
- Yaesu VPL-1 Connection Cable & Alignment program

Alignment Preparation & Precautions

A 50-Ω RF Dummy Load and in-line wattmeter must be connected to the main antenna jack in all procedures that call for transmission, except where specified otherwise. Correct alignment is not possible with an antenna.

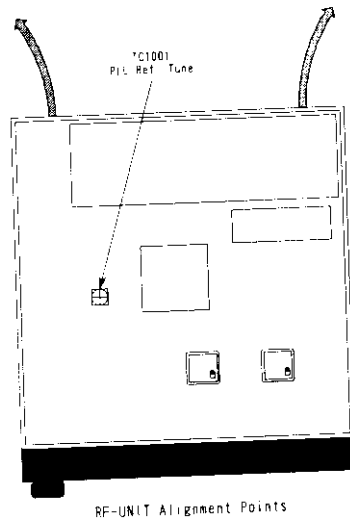
After completing one step, read the following step to determine whether the same test equipment will be required. If not, remove the test equipment (except dummy load and wattmeter, in connected) before proceeding.

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 20 and 30°C (68 ~ 86 ° F). When the transceiver is brought into the shop from hot or cold air, it should be allowed time to come to room temperature before alignment.

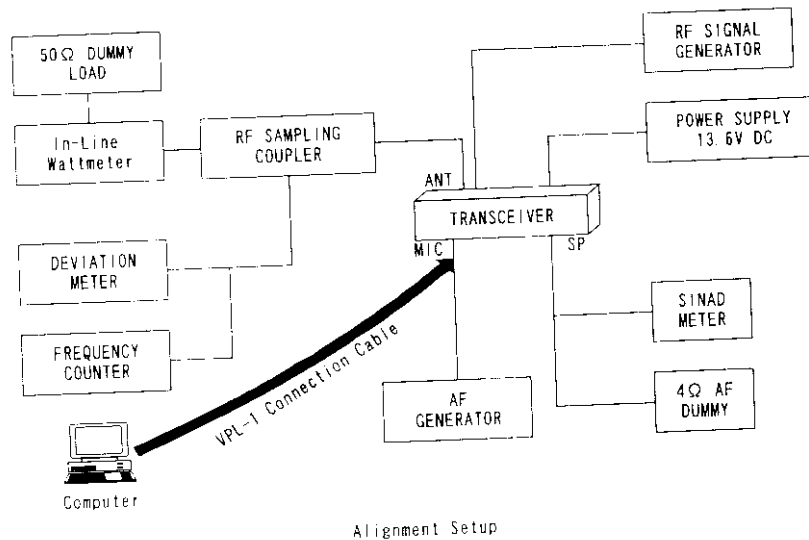
Whenever possible, alignments should be made with oscillator shields and circuit boards firmly affixed in place.

Also, the test equipment must be thoroughly warmed up before beginning.

Note: Signal levels in dB referred to in the alignment procedure are based on 0dB $\mu = 0.5 \mu V$.



Setup the test equipment as shown for transceiver alignment, apply 13.6V DC power to the transceiver. Refer to the drawings above for Alignment Points.



Receiver parameters

During the alignment mode, the transmitter parameters are stored by control command from the computer (Command + Setting Data). The receiver parameters, command and data are shown below.

Parameters	Control Command		Data	
	1st	2 nd	Fixed	Variable
SINAD Sensitivity	B4	51	--	01~FF(h)
Squelch (WIDE)	B4	53	--	01~FF(h)
Squelch (NARROW)	B4	73	--	01~FF(h)
AF Out (WIDE)	B4	41	--	01~FF(h)
AF Out (NARROW)	B4	61	--	01~FF(h)
Line Out (WIDE)	B4	4C	--	01~FF(h)
Line Out (NARROW)	B4	6C	--	01~FF(h)
CTCSS Decode	B4	58	--	01~FF(h)
DCS Decode	B4	59	--	01~FF(h)

The transceiver must be programmed for use in the intended system before alignment is attempted. The RF parameters are loaded from the file during the alignment process.

In order to facilitate alignment over the complete switching range of the equipment it is recommended that the channel data is the transceiver is first uploaded and then stored to disk. Channels at the upper, lower and middle band edges should then be downloaded. The original data can be replaced at the end of the alignment process.

The alignment mode is accessed by "Auto mode" command from the computer whilst switching on.

Channels	Frequency(Simplex)		
	Ver. A	Ver. D	Ver. F
LOW	400.000	450.000	480.000
MID	430.000	470.000	496.000
HIGH	460.000	490.000	512.000

During the alignment mode, normal operation is suspended. Use the control command from the computer to change the list of test functions.

PLL & Transmitter

Set up the test equipment as shown above for transmitter alignment. Hold the supply voltage constant 13.6V for all steps.

PLL Reference Frequency

Select the MID channel and key the transmitter. Adjust TC1002 on the RF unit, if necessary, so the counter frequency is within 100Hz of the channel center frequency for the transceiver version. Also verify that the HIGH and LOW channels are also within tolerance.

Transmitter parameters except PLL Reference Frequency

During the alignment mode, the transmitter parameters are stored by control command from the computer (Command + Setting Data). The transmitter parameters, command and data are shown below.

Parameters	Control Command		Data	
	1 st	2 nd	Fixed	Variable
TX Power (HIGH)	C4	--	01	01~FF(h)
TX Power (MID)	C4	--	02	01~FF(h)
TX Power (LOW)	C4	--	03	01~FF(h)
MIC Sensitivity	B4	47	--	01~FF(h)
Microphone Deviation (WIDE)	B4	4D	--	01~FF(h)
Microphone Deviation (NARROW)	B4	6D	--	01~FF(h)
TX CTCSS Deviation (WIDE)	B4	54	--	01~FF(h)
TX CTCSS Deviation (NARROW)	B4	74	--	01~FF(h)
TX DCS Deviation (WIDE)	B4	43	--	01~FF(h)
TX DCS Deviation (NARROW)	B4	63	--	01~FF(h)
TX DTMF Deviation (WIDE)	B4	44	--	01~FF(h)
TX DTMF Deviation (NARROW)	B4	64	--	01~FF(h)
TX 2/5 Tone Deviation (WIDE)	B4	57	--	01~FF(h)
TX 2/5 Tone Deviation (NARROW)	B4	77	--	01~FF(h)
TX FFSK Deviation (WIDE)	B4	46	--	01~FF(h)
TX FFSK Deviation (NARROW)	B4	66	--	01~FF(h)