

Exploded View & Miscellaneous Parts

REF.	DESCRIPTION	VALUE	V/W	TOL.	MFR'SDESIG	YAESU P/N	VERS.	LOT.	SIDE
*** MAIN ASSY ***									
C 0001	AL.ELECTRO.CAP.	100uF	16V		SMG1CVB101M 100UF	K40129060		2-	
FN0001	FAN				JF0410S1HB-086 DC12V	M2090024		1-	
FN0002	FAN				JF0410S1HB-086 DC12V	M2090024		1-	
L 0001	TOROIDALCORE				ESD-R-12C	L9190069		2-	
L 0002	FERRITEBEADS				FSOC171RT01B	L9190116		2-	
L 0003	FERRITEBEADS				ESD-FPL-13	L9190114		2-	
P 0001	WIRE ASSY				A0898 #241890	T9206734		1-	
P 0003	WIRE ASSY				A0898 #241891	T9206735		1-	
P 0005	WIRE ASSY				A0898 #241892	T9206736		1-	
P 0007	WIRE ASSY				A0898 #241888	T9206732		1-	
P 0009	WIRE ASSY				A0898 #241887	T9206731		1-	
P 0011	WIRE ASSY				A0898 #241889	T9206733		1-	
P 0013	WIRE ASSY				A0898	T9206744		1-	
P 0014	CT CABLE				8P-4PX2 530MM	T9101492		1-	
P 0014	CT CABLE				8P-4PX2 530MM	T9101492A		2-	
P 0016	WIRE ASSY				A0898 M	T9206740	USA	1-	
P 0016	WIRE ASSY				A0898 N	T9206741	EXPORT	1-	
P 0016	WIRE ASSY				A0898 N	T9206741	AUSTRALIA	1-	
P 0017	WIRE ASSY				A0898 M	T9206740		1-	
P 0018	WIRE ASSY				A0898	T9206750		1-	
P 0101	WIRE ASSY				GRA 240 TMP/TMP	T9309401		1-	
P 0101	WIRE ASSY				GRA 235 TMP/TMP	T9318095		2-	
P 0103	WIRE ASSY				RED290 TMP/TMP	T9311404		1-	
P 0103	WIRE ASSY				RED265 TMP/TMP	T9318096		2-	
P 0105	WIRE ASSY				GRA 200 TMP/TMP	T9311403		1-	
P 0107	WIRE ASSY				ORG 210 TMP/TMP	T9317850		1-	
P 0109	WIRE ASSY				RED300 TMP/TMP	T9311408		1-	
P 0111	WIRE ASSY				RED170 TMP/TMP	T9318092		2-	
P 0113	WIRE ASSY				GRA 138 TMP/TMP	T9318097		2-	
S 0001	ROTARYENCODER				RES20D50-201-1D	Q9000709		1-	
SP0001	SPEAKER				VS-50-0827B 1.5W/8-OHM	M4090135		2-	

Introduction and Precautions

The following procedures cover adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts subsequently are replaced, 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 by authorized Yaesu service technicians, who are experienced with the circuitry and fully equipped for repair and alignment. If a fault is suspected, contact the selling dealer for instructions regarding repair. Authorized Yaesu service technicians have the latest modification information, and realign all circuits and make compete performance checks to ensure compliance with the factory specifications after repairs.

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 must reserve 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 the need for 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 unauthorized adjustments made with improper test equipment is not covered by warranty. Although most steps do not require all of the equipment listed, the interaction 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. Rather, have all test equipment ready before beginning, and follow all of the steps in a section in the order they are presented.

Required Test Equipment

- Digital DC Voltmeter (high-Z, 1 M Ω /V)
- DC Ammeter
- AC Voltmeter
- RF Standard Signal Generator w/ calibrated output and dB scale, 0 dB μ = 0.5 μ V
- AF Signal Generator with calibrated output
- Frequency Counter
- 50- Ω Dummy Load (150 ~ 250 watts)

- 50- Ω Resistor, 1 Watt (low-power dummy load for circuit termination)
- 16.6- Ω Dummy Load (150 watts)
- In-Line Wattmeter (150 ~ 250 watts, 50- Ω)
- Linear Detector
- RF Attenuator (150 watts, 50 dB) or sampling coupler
- Spectrum Analyzer good to at least 1 GHz
- SINAD Meter

Alignment Preparation & Precautions

A 50- Ω dummy load and in-line wattmeter must be connected to the antenna jack in all procedures that call for transmission, except where specified otherwise. Correct alignment is not possible with an antenna. Except where specified otherwise, the transceiver should be tuned to 14.2000 MHz, USB mode, and these controls set as indicated:

- AF fully CCW
- SQL/RF fully CCW

The transceiver's Alignment Routine is required for some procedures. If an Alignment Routine cannot be selected, power may have to be switched off then back on to re-enable menu selection.

To begin, turn the transceiver off. Press the **A**, **B**, and **C** keys together while turning the transceiver on again, then press and hold the **FUNC** key.

In the alignment procedure, each alignment parameter is selected by rotating the main **DIAL**. To exit the alignment routine, press the **FUNC** key. After performing the system alignment in its entirety, individual settings can be returned to and adjusted should the need arise.

Read each step to determine if the same test equipment used in the previous step will be required. If not, remove the test equipment (except dummy load and wattmeter, if 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 within 20 ~ 30°C (68 ~ 86°F). If the transceiver is brought into the shop from hot or cold air, it should be allowed time for thermal equalization with the environment before alignment. Alignments must only be made with oscillator shields and circuit boards firmly affixed in place. Also, the test equipment must be thoroughly warmed up before beginning.

Notes: Signal levels in dB referred to in alignment are based on
0 dB μ = 0.5 μ V.

Table Note: DC voltages should be within \pm 10 % of those listed in the voltage tables.

Alignment

Local Oscillator Adjustments

Reference Frequency Adjustment

- Remove the coaxial plug from J2005 and connect the frequency counter across its socket.
- Adjust trimmer capacitor TC2801 for 57.279999 MHz ± 60 Hz on the frequency counter.
- Disconnect the frequency counter, and replace the plug into J2005.

2nd Local Adjustment

- Connect the 50- Ω resistor and RF millivoltmeter to J2005.
- Adjust T2003 and T2004 for maximum indication on the RF millivoltmeter (at least 180 mV).
- Disconnect the frequency counter, and replace the plug into J2005.

3rd Local Adjustment

- Set the RF power to the minimum (using Menu #21), and select the CW mode. Connect the 50- Ω resistor and RF millivoltmeter to J2004.
- Key the transmitter, and adjust T2001 and T2002 for maximum indication on the RF millivoltmeter (at least 80 mV).
- Replace the RF millivoltmeter with the frequency counter, and confirm that the local frequency is 11.705 MHz (± 1 kHz) on the frequency counter.
- Disconnect the frequency counter, and replace the plug into J2004.

PLL Adjustments

VCO VCV Adjustment

- Connect the DC voltmeter to TP2001, and referring to table below, tune the transceiver to each frequency listed. Then confirm that the correct voltage is present, or adjust the listed component for the required voltage.

Tune to:	Adjust/Confirm	For
449.99999 MHz	Adjust TC2005	7.4 V ± 0.1 V
420.00000 MHz	Confirm	2.0 V \sim 4.8 V
381.99999 MHz	Adjust TC2006	7.4 V ± 0.1 V
108.00000 MHz	Confirm	1.2 V \sim 4.0 V
245.99999 MHz	Adjust TC2004	7.4 V ± 0.1 V
60.00000 MHz	Confirm	0.8 V \sim 4.0 V
197.99999 MHz	Adjust TC2003	7.4 V ± 0.1 V
33.00000 MHz	Confirm	1.2 V \sim 4.0 V
170.99999 MHz	Adjust TC2002	7.4 V ± 0.1 V
15.00000 MHz	Confirm	1.4 V \sim 4.2 V
14.99999 MHz	Adjust TC2001	7.4 V ± 0.1 V
0.03000 MHz	Confirm	1.5 V \sim 4.0 V

1st Local Output Level

- With the 50- Ω resistor and RF millivoltmeter connected to the J2003, and referring to table below, tune the transceiver to each frequency listed, then confirm that the required output level is present at the listed frequency.

Tune to:	For
14.175 MHz	11 dBm ± 3 dB
52.050 MHz	11 dBm ± 3 dB
146.500 MHz	11 dBm ± 3 dB
440.500 MHz	11 dBm ± 3 dB

PA Unit Adjustments

Before beginning, remove the coaxial plugs from J3503 and J3005, and connect 50- Ω resistors across the sockets for these jacks (shunt to ground at each jack).

HF/50MHz Driver Section Idling Current

- Remove the coaxial plug from J3001, and connect a 50- Ω resistor across its socket. Remove the jumper connector at J3504. Connect the ammeter to J3504 (pin 1: “-” lead, pin 2: “+” lead).
- Tune the transceiver to the 14.2000 MHz and select the USB mode
- Key the transmitter, and adjust VR3004 for a reading of 50 \sim 55 mA on the ammeter.
- Disconnect the ammeter, and reinstall the jumper connector at J3504.
- Remove the jumper connector at J3003. Connect the ammeter to J3003 (pin 1: “-” lead, pin 2: “+” lead).
- Key the transmitter, and adjust VR3001 for a reading of 1.1 A on the ammeter (within 50 mA).
- Disconnect the ammeter, and reinstall the jumper connector at J3003.

HF/50 MHz Final Idling Current Adjustment

- Leave the coaxial plug disconnected from J3001, and be sure that the 50- Ω resistor is connected across its socket. Connect the ammeter between the transceiver’s 13.8VDC connector and the DC power supply.
- Tune the transceiver to the 14.2000 MHz and select USB mode.
- Key the transmitter, and adjust VR3002 for a reading of 1.6 A on the ammeter (within 50 mA).
- Adjust the VR3003 for a reading of 2.1 A (± 50 mA) on the ammeter.

VHF/UHF Driver Section Idling Current

- Remove the coaxial plug from J3501, and connect a 50- Ω resistor across its socket. Remove the jumper connector at J3502. Connect the ammeter to J3502 (pin 1: “-” lead, pin 2: “+” lead).

- Tune the transceiver to the 144.5000 MHz, and select the USB mode
- Key the transmitter, and adjust VR3501 for 1.5 ~ 1.6 A on the ammeter.
- Disconnect the ammeter, and reinstall the jumper connector at J3502.

VHF/UHF Final Idling Current Adjustment

- Leave the coaxial plug disconnected from J3501, and be sure that the 50- Ω resistor is connected across its socket. Connect the ammeter between the transceiver's 13.8VDC connector and the DC power supply.
- Tune the transceiver to 144.5000 MHz, and select the USB mode.
- Key the transmitter, and adjust VR3502 for 2.3 A \pm 0.1 A on the ammeter.
- Disconnect the ammeter, and reinstall the jumper connector at J3501.

TX and RX IF Adjustments

HF Band RX IF Sensitivity (Coarse Adjust)

- Preset "Alignment" Menu items F-03 [HF RX IF G], F-04 [50 RX IF G], F-05 [144 RX IF G], and F-06 [430 RX IF G] to "194" if they are not already set to that value.
- Connect the RF signal generator to the HF/50MHz antenna jack, and connect a 4- Ω speaker and AC voltmeter to the EXT SP jack.
- Set the transceiver to 14.10000 MHz, and select the USB mode. Inject a signal from the signal generator to 14.10000 MHz so as to get a reading on the AC voltmeter.
- Adjust T1023, T1025, T1027, T1028, T1030, T1032 ~ T1037, and T1039 in succession several times for maximum indication on the AC voltmeter.

1st Mixer Balance

- Tune the transceiver to 14.10000 MHz, but inject no signal to the antenna jack.
- Adjust VR1001 for minimum noise output from the speaker.

HF/50 MHz Band RX IF Sensitivity

- Connect the RF signal generator to the HF/50MHz antenna jack, and leave the 4- Ω speaker and AC voltmeter connected to the EXT SP jack.
- Inject a signal from the signal generator at 0 dB μ on 14.10000 MHz, and receive in the USB mode.
- Adjust T1023, T1025, T1027, T1028, T1030, T1032 ~ T1037 and T1039 in succession several times for maximum indication on the AC voltmeter.

- Disconnect the AC voltmeter, and connect the SINAD meter to the EXT SP jack. Select the FM mode.
- Inject a signal from the signal generator at 0 dB μ on 14.10000 MHz (\pm 3.5 kHz deviation of a 1 kHz tone), and adjust T1025, T1027, and T1039 for optimum SINAD.

144/430 MHz Band RX IF Sensitivity

- Connect the RF signal generator to the VHF/UHF antenna jack, and connect the 4- Ω speaker and AC voltmeter to the EXT SP jack. Select the USB mode.
- Inject a signal from the signal generator at 0 dB μ on 145.10000 MHz, and adjust T1003, T1006, T1009, and T1012 in succession several times for maximum indication on the AC voltmeter.

144 MHz Band Front End Gain (Preset)

- Set "Alignment" menu item F-01 [144 RF GAIN] to "166" on the transceiver's display.

430 MHz Band Front End Gain (Preset)

- Set "Alignment" menu item F-02 [430 RF GAIN] to "166" on the transceiver's display.

HF Band RX IF Gain Adjustment

- Connect the RF signal generator to the HF/50 MHz antenna jack
- Set the transceiver to 14.200 MHz and select the USB mode.
- Inject a RF signal from the signal generator at +10.0 dB μ on 14.200 MHz.
- Select "Alignment" menu item F-03 [HF RX IF G] and adjust the main **DIAL** for a 1-dot S-meter deflection.

50 MHz Band RX Gain Adjustment

- Connect the RF signal generator to the HF/50 MHz antenna jack
- Set the transceiver to 52.0000 MHz, and select the USB mode.
- Inject an RF signal from the signal generator at +2.0 dB μ on 52.000 MHz.
- Select "Alignment" menu item F-04 [50 RX IF G] and adjust the main **DIAL** for a 1-dot S-meter deflection.

144 MHz Band RX Gain Adjustment

- Connect the RF signal generator to the VHF/UHF antenna jack.
- Set the transceiver to 145.000 MHz, and select USB mode.
- Inject an RF signal from the signal generator at -1.0 dB μ on 145.000 MHz.

Alignment

- Select “Alignment” menu item F-05 [144 RX IF G] and adjust the main **DIAL** for a 1-dot S-meter deflection.

430 MHz Band RX Gain Adjustment

- Connect the RF signal generator to the VHF/UHF antenna jack.
- Set the transceiver to 435.500 MHz, and select the USB mode.
- Inject an RF signal from the signal generator at -1.0 dB μ on 435.500 MHz.
- Select “Alignment” menu item F-06 [430 RX IF G] and adjust the main **DIAL** for a 1-dot S-meter deflection.

S-meter Full Scale Alignment

- Connect the RF signal generator to the HF/50 MHz antenna jack.
- Set the transceiver to 14.200 MHz, and select the USB mode.
- Inject an RF signal from the signal generator at $+95$ dB μ on 14.20000 MHz.
- Select “Alignment” menu item F-07 [S FULL SCALE] and adjust the main **DIAL** for a S9+60dB reading on the S-meter.

Squelch Threshold Level Adjustment

- Select the USB mode, and inject no signal to the antenna jack. Leave the radio set to 14.200 MHz.
- Set the SQL control to the 11 o’clock position. Select “Alignment” menu item F-08 [SSB SQL] and adjust the main **DIAL** so that the squelch just closes.
- Set the SQL control to the 1 o’clock position, and select the FM mode. Select “Alignment” menu item F-10 [FM RF SQL] and adjust the main **DIAL** so that the squelch just closes.
- Set the SQL control to the 10 o’clock position. Select “Alignment” menu item F-09 [FM N SQL] (Noise Squelch) and adjust the main **DIAL** so that the squelch just closes.

Noise Blanker Alignment

- Connect the RF signal generator to the HF/50 MHz antenna jack, and connect the DC voltmeter to TP1010.
- Press the **NB** key to activate the Noise Blanker, then press and hold in the **NB** key for $\frac{1}{2}$ second to activate Menu #60 (NB Level). Set the Noise Blanker level to maximum. Inject an RF signal from the signal generator at $+20$ dB μ .
- Adjust T1029 and T1031 for minimum indication on the DC voltmeter (the voltage will be at least 3.0 V).

TX Adjustments

HF/50 MHz band TX IF Transformers

- Connect the inline wattmeter and 50 Ω dummy load to the HF/50 MHz antenna jack.
- Use Menu #21 to set the RF power for maximum, and tune the transceiver to 14.2000 MHz. Select the CW mode.
- Key the transmitter, and adjust T1008, T1011, T1014, T1020, and T1022 for maximum indication on the inline wattmeter.

144/430 MHz band TX IF Transformers

- Connect the inline wattmeter and 50 Ω dummy load to the VHF/UHF antenna jack.
- Use Menu #23 to set the 144 MHz RF power for maximum, and tune the transceiver to the 145.0000 MHz. Select the CW mode.
- Key the transmitter, and adjust T1018, T1021, T1024, and T1026 for maximum indication on the inline wattmeter.

Trap Adjustment

- Remove the coaxial plug from J1012, and connect the spectrum analyzer across its socket. Tune the transceiver to 144.0000 MHz, and select the FM mode.
- Key the transmitter, and adjust TC1001 for minimum indication on the 137.97 MHz spurious response on the spectrum analyzer.
- Disconnect the spectrum analyzer, and replace the plug into J1012.

CM Coupler Balance

- Connect the 50- Ω dummy load to the HF/50 MHz antenna jack, and connect the DC voltmeter to L5028 lead (near TC5002 side). Set the transceiver to 52.0000 MHz, and select the FM mode. Use Menu #22 to set the 50 MHz RF power to maximum.
- Key the transmitter with no microphone input, and adjust TC5002 for 0 V on the DC voltmeter.
- Connect the 50- Ω dummy load to the VHF/UHF antenna jack, and connect the DC voltmeter to L5023 lead (near L5029 side). Set the transceiver to 145.5000 MHz, and select FM mode. Use Menu #23 to set the 144 MHz RF power to maximum.
- Key the transmitter with no microphone input, and adjust TC5001 for 0 V on the DC voltmeter.
- Connect the DC voltmeter to L5024 lead (near JP5004 side). Set the transceiver to the 439.5000 MHz, and select FM mode. Use Menu #24 to set the 430 MHz RF power to maximum.

Alignment

- Key the transmitter with no microphone input, and adjust TC5003 for 0 V on the DC voltmeter.

HF/ 50 MHz Band Over-Current ALC Adjustment

- Connect the 50-Ω dummy load to the HF/50 MHz antenna jack. Set the transceiver to 50.1000 MHz, and select the CW mode. Use Menu #22 to set the 50 MHz RF power to maximum.
- Select "Alignment" menu item F-11 [HF IC ALC] and adjust the main **DIAL** for a 1-segment ALC meter deflection.

VHF/UHF Band Over-Current ALC Adjustment

- Connect the 50-Ω dummy load to the VHF/UHF antenna jack. Set the transceiver to 145.0000 MHz, and select CW mode. Use Menu #23 to set the 144 MHz RF power to maximum.
- Select "Alignment" menu item F-12 [V/UHF IC ALC]. Key the transmitter, and adjust the main **DIAL** for a 1-segment ALC meter deflection.

HF band Output Power Adjustment

- With the 50-Ω dummy load and inline wattmeter connected to the HF/50 MHz antenna jack, set the transceiver to 1.8400 MHz (for the "Belgium" version) or 14.2000 MHz (other versions), and select the CW mode. Use Menu #21 to preset the HF RF power to maximum.
- Select "Alignment" menu item F-15 [HF PO 100W]. Key the transmitter, and adjust the main **DIAL** for 100 W on the inline wattmeter.
- Select "Alignment" menu item F-14 [HF PO 50W]. Key the transmitter, and adjust the main **DIAL** for 50 W on the inline wattmeter.
- Select "Alignment" menu item F-13 [HF PO 10W]. Key the transmitter, and adjust the main **DIAL** for 10 W on the inline wattmeter.

50 MHz band Output Power Adjustment

- Leave the 50-Ω dummy load and inline wattmeter connected to the HF/50 MHz antenna jack. Set the transceiver to the 53.5000 MHz, and select the CW mode. Use Menu #22 to preset the 50 MHz RF power to maximum.
- Select "Alignment" menu item F-19 [50 PO 100W]. Key the transmitter, and adjust the main **DIAL** for 100 W on the inline wattmeter.
- Select "Alignment" menu item F-18 [50 PO 50W]. Key the transmitter, and adjust the main **DIAL** for 50 W on the inline wattmeter.
- Select "Alignment" menu F-17 [50 PO 10W]. Key the transmitter, and adjust the main **DIAL** for 10 W on the inline wattmeter.

144 MHz band Output Power Adjustment

- Connect the 50-Ω dummy load and inline wattmeter to the VHF/UHF antenna jack. Set the transceiver to 145.5000 MHz, and select the CW mode. Use Menu #23 to preset the 144 MHz RF power to maximum.
- Select "Alignment" menu item F-22 [144 PO 50W]. Key the transmitter, and adjust the main **DIAL** for 50 W on the inline wattmeter.

430 MHz band Output Power Adjustment

- Leave the 50-Ω dummy load and inline wattmeter connected to the VHF/UHF antenna jack. Set the transceiver to the 435.0000 MHz, and select the CW mode. Use Menu #24 to preset the 430 MHz RF power to maximum.
- Select "Alignment" menu F-23 [430 PO 20W]. Key the transmitter, and adjust the main **DIAL** for 20 W on the inline wattmeter.

TX Gain Adjustment

- As you step through the procedures below, connect the 50-Ω dummy load and inline wattmeter to the HF/50 MHz or VHF/UHF antenna jack, as appropriate. Connect the AF generator to the MIC jack.
- Use Menu #25 to set the MIC gain for maximum. Use Menu items #21-24, as appropriate, for setting the RF power to maximum on the band (below) being adjusted.
- Inject a 2.5 mV audio signal at 1 kHz. Select the appropriate "Alignment" menu function in the chart below, and adjust the main **DIAL** for the corresponding power. Remember to move the dummy load and inline wattmeter to the VHF/UHF antenna jack for the last two steps.

Tune to:	Menu #	For
1.9100 MHz	F-24 [1.8 TX IF G]	75 W
3.7500 MHz	F-25 [3.5 TX IF G]	75 W
7.0500 MHz	F-26 [7 TX IF G]	75 W
10.1000 MHz	F-27 [10 TX IF G]	75 W
14.2000 MHz	F-28 [14 TX IF G]	75 W
18.1100 MHz	F-29 [18 TX IF G]	75 W
21.2500 MHz	F-30 [21 TX IF G]	75 W
24.9000 MHz	F-31 [24 TX IF G]	75 W
28.8500 MHz	F-32 [28 TX IF G]	75 W
52.0000 MHz	F-33 [50 TX IF G]	75 W
145.5000 MHz	F-35 [144 TX IF G]	40 W
435.0000 MHz	F-36 [430 TX IF G]	16 W

ALC Meter Sensitivity

- Connect the 50-Ω dummy load and inline wattmeter to the HF/50 MHz antenna jack. Connect the AF generator to the MIC jack.

Alignment

- Tune the transceiver to 14.2000 MHz, select the USB mode, and use Menu #21 to set the HF RF power to maximum.
- Inject a 3.0 mV audio tone at 1 kHz to the MIC jack. Then key the transmitter, and use Menu #25 adjust MIC gain so the ALC meter just begun to deflect.
- Increase the injection level to 7.5 mV. Select "Alignment" menu item F-37 [ALC METER], and adjust the main DIAL so that the ALC meter deflects to the top edge of the ALC meter.

PO Meter Sensitivity

- Connect the 50-Ω dummy load and inline wattmeter to the HF/50 MHz or VHF/UHF antenna jack, as appropriate for the steps below.
- Use Menu #21-24 to set the RF power for maximum on the band being adjusted, and select the CW mode. Tune the transceiver and select an "Alignment" menu item per the chart below. Remember to move the dummy load and inline wattmeter to the VHF/UHF antenna jack for the last two steps.

Tune to:	Menu	For
14.2000 MHz	F-38 [HF PO METER]	10 dots
52.0000 MHz	F-39 [50 PO METER]	10 dots
145.5000 MHz	F-40 [144 PO METER]	6 dots
435.0000 MHz	F-41 [430 PO METER]	4 dots

REV ALC Adjustment

- Connect the 16.6-Ω dummy load (or three 50-Ω loads in parallel) to the HF/50 MHz antenna jack.
- Use Menu #21 and 22 to set the RF power for maximum on the band being adjusted below, and select the CW mode. Tune the transceiver to each frequency shown in the chart below and select the corresponding "Alignment" menu item per the chart.
- Key the transmitter, and adjust the main DIAL for the level shown in each step.

Tune to:	Menu	For
1.8400 MHz	F-42 [HF REV ALC]	2 dots
	for "Belgium" version only	
14.2000 MHz	"	50 W
52.0000 MHz	F-43 [50 REV ALC]	2 dots
	for "France" version only	
		50 W

- Use Menu #23 and 24 to set the RF power for maximum on the band being adjusted below, and select the CW mode. Tune the transceiver to the frequency shown in the chart, and select an "Alignment" menu per the chart (with no connection to the VHF/UHF antenna jack).

- Key the transmitter, and adjust the main DIAL for the level shown in each step.

Tune to:	Menu	For
145.5000 MHz	F-45 [144 REV ALC]	4 dots
435.0000 MHz	F-46 [430 REV ALC]	3 dots

SWR Meter Adjustment

- Connect the 16.6-Ω dummy load (or three 50-Ω loads in parallel) to the HF/50 MHz antenna jack.
- Set the transceiver to 3.7500 MHz, and use Menu #21 to set the HF RF power for maximum. Select the CW mode. Select "Alignment" menu item F-47 [SWR METER].
- Key the transmitter, and adjust the main DIAL for a "3.0" indication on the transceiver's SWR meter.

CW Carrier Level Adjustment

- Connect the 50-Ω dummy load to the HF/50 MHz antenna jack.
- Set the transceiver to 1.5200 MHz and select the CW mode. Select "Alignment" menu item F-50 [CW CAR LEVEL].
- Key the transmitter, and adjust the main DIAL for a 2-dot low from the full scale indication on the ALC meter.

AM Carrier Level Adjustment

- Leave the 50-Ω dummy load and inline wattmeter connected to the HF/50 MHz antenna jack.
- Set the transceiver to 53.5000 MHz, and use Menu #22 to set the 50 MHz RF power for maximum. Use Menu #25 to set the MIC gain for *minimum*. Select the AM mode, and select "Alignment" menu item F-51 [AM CAR LEVEL].
- Key the transmitter, and adjust the main DIAL for 3-dot indication on the ALC meter.

FM Maximum Deviation

- With the 50 dB attenuator (or 50-Ω dummy load and sampling coupler) and linear detector connected to the HF/50 MHz antenna jack, connect the AF generator to the MIC jack.
- Set the VR1002 to the 3 o'clock position, and enable the CTCSS encoder at a frequency of 88.5Hz.
- Set the transceiver to 29.2000 MHz, and select the FM mode.
- Key the transmitter, and adjust T1040 for ±0.8 kHz on the deviation meter.
- Inject a 10 mV audio signal at 1 kHz to the MIC jack, and disable the CTCSS encoder.
- Key the transmitter, and adjust VR1002 for ±4.5 kHz (±0.1 kHz) on the deviation meter.
- Now adjust VR1003 for ±2.3 kHz (±0.1 kHz) on the deviation meter.

Alignment

FM TX LO Offset Adjustment

- With the 50 dB attenuator (or 50-Ω dummy load and sampling coupler) and frequency counter connected to the HF/50 MHz antenna jack, connect the AF generator to the MIC jack.
- Set the transceiver to 29.200 MHz, and select the FM-N mode. Use Menu #26 to set the FM MIC gain to minimum. Select “Alignment” menu item F-52 [FM TX FREQ].
- Key the transmitter, and adjust the main **DIAL** for 29.2000 MHz (± 50 Hz) on the frequency counter.

TX and RX Carrier Point Adjustment

- With the 50-Ω dummy load and inline wattmeter connected to the HF/50 MHz antenna jack, connect the AF generator to the MIC jack.
- Set the transceiver to 14.2000 MHz, and select the LSB mode. Select “Alignment” menu F-53 [TRX LSB CAR] and preset it to “0” if it is not already set to that value.
- Key the transmitter, and adjust the AF generator’s *frequency* for maximum indication on the inline wattmeter. Then adjust the AF generator’s *level* for 80 W on the inline wattmeter.
- Set the AF generator’s frequency to 350 Hz.

- Key the transmitter, and adjust the main **DIAL** for 20 W (i.e. -6 dB from 80 W) on the inline wattmeter.
- Set the AF generator’s frequency to 2.1 kHz.
- Key the transmitter, and confirm at least 20 W on the inline wattmeter.
- Leave the transceiver on 14.2000 MHz, and select the USB mode. Select “Alignment” menu item F-54 [TRX USB CAR], and preset it to “0” if it is not already set to that value.
- Key the transmitter, and adjust the AF generator’s frequency for maximum indication on the inline wattmeter. Then adjust the AF generator’s level for 80 W on the inline wattmeter.
- Set the AF generator’s frequency to 350 Hz.
- Key the transmitter, and adjust the main **DIAL** for 20 W on the inline wattmeter.
- Set the AF generator’s frequency to 2.1 kHz.
- Key the transmitter, and confirm at least 20 W on the inline wattmeter.

BEEP Level

- Set VR1004 for the position which provides the desired “Beep” level.