

IC-706MKIIG ADJUSTMENT PROCEDURES

1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GREDE AND RANGE	EQUIPMENT	GREDE AND RENG
DC power supply	Output voltage : 13.8 V DC Current capacity : 30 A or more	Distortion meter	Frequency range : 1 kHz $\pm$ 10 % Measuring range : 1–100 %
RF power meter (terminated type)	Measuring range : 10–200 W Frequency range : 1.8–500 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Oscilloscope	Frequency range : DC–100 MHz Measuring range : 0.01–10 V
Frequency counter	Frequency range : 0.1–500 MHz Frequency accuracy : $\pm$ 1 ppm or better Sensitivity : 100 mV or better	Digital multimeter	Input impedance : 10 M Ω /DC or beter
RF voltmeter	Frequency range : 0.1–500 MHz Measuring range : 0.01–10 V	AC millivoltmeter	Measuring range : 10 mV–10 V
Standard signal generator (SSG)	Frequency range : 0.1–30 MHz Output level : 0.1 μ V–32 mV (–127 to –17 dBm)	DC voltmeter	Input impedance : 50 k Ω /V DC or better
FM deviation meter	Frequency range : 0–500 MHz Measuring range : 0 to $\pm$ 5 kHz	DC ammeter	Measurement capability: 1 A/50 A
Modulation analyzer	Frequency range : At least 500 MHz Measuring range : 0–100 %	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
		Spectram analyzer	Frequency range : At least 1000 MHz Spectraum bandwidth : 100 kHz or more
		Attenuator	Power attenuation : 50 or 60 dB Capacity : 150 W or more
		External speaker	Input impedance : 8 Ω Capacity : 5 W or more

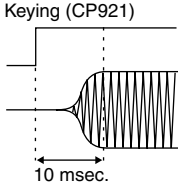
2 PLL ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1	- Display frequency: Any - L623 (PLL unit) : Center - Receiving	PLL	Connect an RF voltmeter to check point P681.	Maximum level (0 dB or more)	PLL	L681, L682
	2			Connect a frequency counter to check point P681.	60.000000 MHz		L601 L623 R602
REFERENCE LOOP LOCK VOLTAGE	1	- Display frequency: 0.0300 MHz - Mode : USB - Receiving	PLL	Connect a digital multimeter or oscilloscope to check point CP131.	2.0 V	PLL	C4
MAIN LOOP LOCK VOLTAGE	1	- Display frequency: 128.99999 MHz - Mode : USB - Receiving	PLL	Connect a digital multimeter or oscilloscope to check point CP401.	4.0 V	PLL	C306
	2	- Display frequency: 199.99999 MHz - Mode : USB - Receiving			4.0 V		C335
	3	- Display frequency: 470.00000 MHz - Mode : USB - Receiving			4.0 V		C367

3 TRANSMITTER ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
TRANSMIT TOTAL GAIN	1	- Display frequency: 14.10000 MHz - Mode : USB [Q1 RF POWER] : H - Connect an audio generator to [MIC] connector and set as: 1.5 kHz/3 mV - Transmitting	Rear Panel	Connect an RF power meter to [ANT1] connector.	Maximum RF power	MAIN	L511, L512, L562, L563, L566
	2	Transmitting			50 W		R579
OUTPUT POWER	1	- Display frequency: 14.10000 MHz - Mode : USB [Q2 MIC GAIN] : 5 - Connect an audio generator to [MIC] connector and set as: 1.5 kHz/30 mV - Transmitting	Rear Panel	Connect an RF power meter to [ANT1] connector.	100 W	MAIN	R1082
	2	- Display frequency: 52.00000 MHz - Transmitting			100 W		R1084
	3	- Display frequency: 145.00000 MHz - Transmitting		Connect an RF power meter to [ANT2] connector.	50 W		R1086
	4	- Display frequency: 435.00000 MHz - Transmitting			20 W		R1088
CARRIER SUPPRESSION	1	- Display frequency: 14.10000 MHz - Mode : USB and LSB - Apply no signal to [MIC] connector. - Transmitting	Rear Panel	Connect a spectrum analyzer to [ANT1] connector via an attenuator.	Minimum carrier level	MAIN	R1045

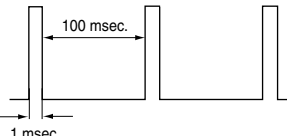
TRANSMITTER ADJUSTMENTS (continued)

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
FM VCO	1	• Display frequency: 29.10000 MHz • Mode : FM • [Q1 RF POWER] : H • [M4 TON] : OFF • Apply no signal to [MIC] connector. • Transmitting	MAIN	Connect a digital multimeter to check point CP1011.	1.8 V	MAIN	C1022
FM DEVIATION	1	• Display frequency: 29.10000 MHz • Mode : FM • [Q1 RF POWER] : H • [M4 TON] : OFF • [Q2 MIC GAIN] : 5 • Connect an audio generator to [MIC] connector and set as: 1 kHz/30 mV • Transmitting	Rear Panel	Connect an FM deviation meter to [ANT1] connector via an attenuator.	±4.5 kHz	MAIN	R1002
RESIDUAL AM	1	• Display frequency: 29.10000 MHz • Mode : FM • [Q1 RF POWER] : H • [M4 TON] : OFF • [Q2 MIC GAIN] : 5 • Connect an audio generator to [MIC] connector and set as: 1 kHz/30 mV and OFF • Transmitting		Connect an RF power meter to [ANT1] connector.	Minimum power difference with modulation and unmodulation.	MAIN	adjust in sequence L511, L512, then adjust L562, L563, L566.
	2	After adjustment, vary the TRANSMIT TOTAL GAIN and OUTPUT POWER adjustments.					
AM MODULATION	1	• Display frequency: 14.10000 MHz • Mode : AM • [Q1 RF POWER] : H • [Q2 MIC GAIN] : 5 • Disconnect the plug from J281 on the MAIN board. • Apply no signal to [MIC] connector. • Transmitting	MAIN	Connect an oscilloscope to check point CP1041.	100 mVp-p	MAIN	R1042
	2	• Connect the plug to J281 on the MAIN board. • Apply no signal to [MIC] connector. • Transmitting	Rear Panel	Connect an RF power meter to [ANT1] connector.	35 W		R1080
	3	• Connect an audio generator to [MIC] connector and set as: 1 kHz/30 mV • Transmitting		Connect a modulation analyzer to [ANT1] connector via an attenuator.	90 % modulation		R999
CW CARRIER LEVEL	1	• Display frequency: 14.10000 MHz • Mode : CW • [Q1 RF POWER] : H • [Q5 KEY SPEED] : 60 • [M4 BRK] : BK (semi break-in) • CW paddle : n • Connect an RF power meter to [ANT1] connector. • Transmit dots for a while using a paddle.		Connect an oscilloscope to check point CP921 and [ANT1] connector.	At the point where the CW carrier completely comes up in a 10 msec. delay after CP921 voltage comes up. 	MAIN	R921

TRANSMITTER ADJUSTMENTS (continued)

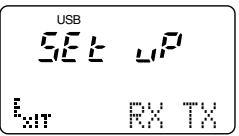
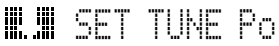
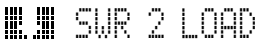
ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT			
			UNIT	LOCATION		UNIT	ADJUST		
IDLING CURRENT (for drive amplifiers)	1	• Display frequency: 14.10000 MHz • Mode : USB • [Q2 MIC GAIN] : 1 (minimum) • turn R162, R174, R175, R214, R231 (on the PA unit) to maximum counterclockwise position. • Disconnect the plug from J571 on the PA unit. • Transmitting	PA	Connect a DC ammeter between the DC power supply and transceiver's DC power socket (P601 on the PA unit).	0.5 A increase from that R162 is in maximum counterclockwise position.	PA	R162		
	2	• Display frequency: 145.10000 MHz • Mode : USB • [Q2 MIC GAIN] : 1 (minimum) • Transmitting					1.0 A increase from step 1.	R214	
	(for final amplifiers)	3					• Display frequency: 14.10000 MHz • Mode : USB • [Q2 MIC GAIN] : 1 (minimum) • Transmitting	1.0 A increase from that R174 is in maximum counterclockwise position.	R174
		4					• Transmitting	1.0 A increase from step 3.	R175
		5					• Display frequency: 145.10000 MHz • Mode : USB • [Q2 MIC GAIN] : 1 (minimum) • Transmitting	2.0 A increase from step 4.	R231
SWR DETECTION	1	• Display frequency: 14.10000 MHz • Mode : USB • Ground CP1071 on the MAIN board. • Connect an audio generator to [MIC] connector and set as: 1.5 kHz/30 mV • Transmitting	Rear Panel	Connect an RF power meter to [ANT1] connector.	100 W	Quick set mode	Q2 MIC GAIN		
	2	• Transmitting	FILTER	Connect a digital multimeter to check point W16.	Minimum voltage	FILTER	C58		
	3	After remove the jumper wire from CP1071 on the MAIN board.							

4 RECEIVER ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
RECEIVER TOTAL GAIN	1	• Display freq. : 14.10000 MHz • Mode : USB • [RIT] : OFF • [M4 AGC] : Fast (F AGC) • [M3 NB] : OFF • [P.AMP/ATT] : Preamp ON • Connect a standard signal generator to the [ANT1] connector and set as: - Frequency : 14.10150 MHz - Level : 0.5 μV* (–113 dBm) - Modulation : OFF • Receiving	Rear Panel	Connect an AC millivoltmeter to the [EXT SP] jack with an 8 Ω dummy load.	Maximum AF output level	MAIN	L731, L741
	2	• [P.AMP/ATT] : Preamp OFF • Set an SSG as: - Frequency : 14.10150 MHz - Level : 500 μV* (–53 dBm) and OFF - Modulation : OFF • Receiving	Rear Panel	Connect an AC millivoltmeter to the [EXT SP] jack with a 8 Ω dummy load.	30 dB of AF level difference	MAIN	R741
WFM RECEIVING	1	• Display freq. : 14.10000 MHz • Mode : WFM • Set an SSG as: - Frequency : 14.10000 MHz - Level : 500 μV* (–53 dBm) - Modulation : OFF • Receiving	MAIN	Connect a digital multimeter or oscilloscope to check point CP631.	4.0 V	MAIN	L632
NOISE BLANKER	1	• Display freq. : 14.10000 MHz • Mode : USB • [P.AMP/ATT] : Preamp ON • [M3 NB] : OFF • R623 (MAIN) : Center • Connect an SSG to the [ANT1] connector and set as: - Frequency : 14.1015 MHz - Level : 18 μV* (–82 dBm) - Modulation : OFF - and apply the following signal to the [ANT1] connector.  • Receiving	MAIN	Connect an oscilloscope to check point CP632.	Adjust the maximum noise wave displayed on the oscilloscope.	MAIN	L621, L633
	2	• [M3 NB] : ON • Set an SSG as: - Level : 10 μV* (–87 dBm) - Modulation : OFF • Receiving			At the point where the noise just reduces.	MAIN	R623

*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

5 SET MODE ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	DISPLAY	OPERATION
ENTERING ADJUSTMENT SET MODE	1	- Enter adjustment set mode: - Turn power OFF. - Terminate the [REMOTE] jack with a 3.5(d) mm mini-plug. - While pushing [P.AMP/ATT] and [TUNE/CALL], turn power ON.		Push [F-3 (TX)] to enter the TX adjustment setting mode. Then advance to the following setting, or push [UP]/[DN] to scroll the display.
Id APC	1	- Connect an RF power meter to [ANT1] connector. - Connect a DC ammeter between the DC power supply and transceiver's DC power socket (P601 on the PA unit). - Transmit using an external PTT switch.		Set a total current at 15 A by adjusting R1125 on the MAIN board. Push [MENU] to set the "SET IdAPC" after returning receiving condition.
FILTER CALIBRATION	1	Connect an RF power meter to [ANT1] connector.	GO FILTER CAL	Push and hold [MENU (GO)] to make the calibration. Transceiver transmits for a while.
POWER METER (14 MHz)	1	- Connect an RF power meter to [ANT1] connector. - Transmit using an external PTT switch.		Set to 90 W using [MAIN DIAL], then push [MENU] while transmitting.
	2	Transmit using an external PTT switch.		Set to 50 W using [MAIN DIAL], then push [MENU] while transmitting.
TUNING POWER (14 MHz)	1	- Connect an RF power meter to [ANT1] connector. - Transmit using an external PTT switch.		Set to 10 W using [MAIN DIAL], then push [MENU] while transmitting.
	2	Transmit using an external PTT switch.		Set to 10 W using [MAIN DIAL], then push [MENU] while transmitting.
POWER METER (145 MHz)	1	- Connect an RF power meter to [ANT2] connector. - Transmit using an external PTT switch.		Set to 45 W using [MAIN DIAL], then push [MENU] while transmitting.
	2	Transmit using an external PTT switch.		Set to 25 W using [MAIN DIAL], then push [MENU] while transmitting.
POWER METER (430 MHz)	1	- Connect an RF power meter to [ANT2] connector. - Transmit using an external PTT switch.		Set to 18 W using [MAIN DIAL], then push [MENU] while transmitting.
	2	Transmit using an external PTT switch.		Set to 10 W using [MAIN DIAL], then push [MENU] while transmitting.
ALC METER	1	- Connect an RF power meter to [ANT1] connector. - Connect an audio generator to [MIC] connector and set as : Level : 1.5 kHz/30mV - Transmit using an external PTT switch.		Push and hold [MENU] to set ALC reference level while transmitting.
SWR METER	1	Connect a 50 Ω dummy load or power meter to [ANT1] connector.		Push [MENU] to set SWR reference level.
	2	Connect a 50 Ω dummy load or power meter to [ANT1] connector.		Push [MENU] to set SWR2 level. The display returns to the same as the ADJUSTMENT SET MODE above.
		Push [F-1 (EXIT)] to exit adjustment set mode.		

SET MODE ADJUSTMENT (continued)

ADJUSTMENT		ADJUSTMENT CONDITION	DISPLAY	OPERATION
ENTERING ADJUSTMENT SET MODE	1	- Enter adjustment set mode: - Turn power OFF. - Terminate the [REMOTE] jack with a 3.5(d) mm mini-plug. - While pushing [P.AMP/ATT] and [TUNE/CALL], turn power ON.		Push [F-2 (RX)] to enter the RX adjustment setting mode. Then advance to the following setting, or push [UP]/[DN] to scroll the display.
SENSITIVITY	1	Connect a standard signal generator to [ANT2] and set as: Frequency : 60.05150 MHz Modulation : OFF		Set a connected SSG's level at 10 dB of S/N ratio with AC millivolt-meter.
	2	Receiving		Set maximum AF level using the [MAIN DIAL], then push [MENU] to set the "VHF1 BPF1 L".
	3	- Same operation as step 2 for the listed BPFs. - Set an SSG as: Modulation : OFF VHF1 BPF2 L : 60.05150 MHz VHF1 BPF1 M : 90.50150 MHz VHF1 BPF1 H : 128.9515 MHz VHF2 BPF1 L : 129.1015 MHz VHF2 BPF1 M : 145.1515 MHz VHF2 BPF1 H : 170.0015 MHz UHF BPF1 L : 400.0015 MHz UHF BPF1 M : 435.1515 MHz UHF BPF1 H : 470.0015 MHz - Receiving	VHF1 BPF2 M : Same as left VHF1 BPF2 H : Same as left VHF2 BPF2 L : Same as left VHF2 BPF2 M : Same as left VHF2 BPF2 H : Same as left UHF BPF2 L : Same as left UHF BPF2 M : Same as left UHF BPF2 H : Same as left	
S-METER	1	- Connect an SSG to [ANT1] connector and set as: Frequency : 14.1515 MHz Level : OFF - Receiving		Push [MENU] to set the "S0 level".
	2	- Set an SSG as : Level : 50 μV (−73 dBm) Modulation : OFF - Receiving		Push [MENU] to set the "S9 level".
	3	- Set an SSG as : Level : 50 mV (−13 dBm) Modulation : OFF - Receiving		Push [MENU] to set the "+60 dB level". • The display returns to the same as the ADJUSTMENT SET MODE above.
	Push [F-1 (EXIT)] to exit adjustment set mode.			