

## IC-706MKIIG Alignment Procedure

### \* Front Board

#### RIT/SHIFT knob alignment

- Hold both "P.AMP/ATT" and "RIT" buttons, and turns radio on. (The radio should indicate "SHIFT-ADJ" on LCD display)
- Set "SHIFT" knob to center
- Repress "MENU" button for more than 2 seconds. (The radio should show "Good" on the display)

### \* PLL Board

#### Reference oscillator

- Set L623 to center
- Connect RF volt meter to P681
- Adjust L681 and L682 for maximum level
- Set frequency counter to P681
- Adjust L601 for 60.000000MHz  
(If L601 is outside of alignment range, align R60 and L36 as well)
- Verify P681 output level for more than 0dBm

#### LPL lock voltage

- Set display to 0.03MHz and USB
- Connect multi-meter to CP131
- Adjust C4 for 2V

#### VCO1 lock voltage

- Set display to 128.99999MHz and USB
- Connect multi-meter to CP401
- Adjust C306 for 4V

#### VCO2 lock voltage

- Set display to 199.99999MHz and USB
- Connect multi-meter to CP401
- Adjust C335 for 4V

### VCO3 lock voltage

- Set display to 470.00000MHz and USB
- Connect multi-meter to CP401
- Adjust C367 for 4V

### 1st LO

- Set display to 0.03MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 29.99999MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 30.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 59.99999MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 60.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 128.99999MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 129.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 144.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 146.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 148.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm

- Set display to 430.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 440.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm
- Set display to 450.00000MHz
- Connect RF volt meter to P891
- Verify output voltage for more than -15dBm

#### BFO

- Connect frequency counter to P991
- Receive FM signals
- Verify P991 output frequency for 9.4665MHz
- Connect RF volt meter to P991
- Verify P991 output signal for more than -20dBm

#### \* Main Board

##### Transmitter Alignment

- Set R945 and R896 for center
- Set R1225 to 90 degrees position
- Set display to 14.10000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector (ANT1)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/3mV signals to mic connector
- Transmit
- Adjust L566, L563, L562, L512 and L511 for maximum level.
  
- Set display to 52.00000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector(ANT1)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/3mV signals to mic connector
- Transmit
- Adjust R579 for 50W

- Set display to 14.10000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector(ANT1)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/30mV signals to mic connector
- Transmit
- Adjust R1082 for 105.0W
  
- Set display to 52.00000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector (ANT1)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/30mV signals to mic connector
- Transmit
- Adjust R1084 for 100W
  
- Set display to 145.00000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector (ANT2)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/30mV signals to mic connector
- Transmit
- Adjust R1086 for 50W
  
- Set display to 435.00000Mhz, USB, high power and mic gain 5
- Connect RF power meter to antenna connector (ANT2)
- Connect AF signal generator to mic connector
- Apply 1.5KHz/30mV signals to mic connector
- Transmit
- Adjust R1088 for 21W

#### Carrier Suppression

- Set display to 14.10000Mhz, USB, high power and mic gain 5
- Connect Spectrum analyzer to antenna connector
- Connect AF signal generator to mic connector
- Apply no signals to mic connector
- Transmit
- Adjust R1045 for minimum level on both USB and LSB

### FM VCO

- Set display to 29.10000Mhz, FM, Tone off, high power and mic gain 5
- Connect RF power meter to antenna connector
- Connect Multi-meter to CP1011
- Apply no signals to mic connector
- Transmit
- Adjust C1022 for 1.8V

### FM Transmit Modulation

- Set display to 29.10000Mhz, FM, Tone off, high power and mic gain 5
- Connect deviation meter to antenna connector
- Connect AF signal generator to mic connector
- Apply 1KHz/30mV signals to mic connector
- Transmit
- Adjust CR1002 for 4.5KHz
- Apply 1KHz/3mV signals to mic connector
- Verify transmit modulation for 3.5KHz
- Set mode to narrow FM
- Apply 1KHz /30mV signals to mic connector
- Verify transmit modulation for 2.0-2.5KHz

### Residual AM

- Set display to 29.10000Mhz, FM, Tone off, high power and mic gain 5
- Connect RF power meter to antenna connector
- Connect AF signal generator to mic connector
- Apply 1KHz/30mV signals to mic connector
- Transmit
- Adjust L511, L512, L562, L563 and L566 for minimum difference with mic audio and without mic audio.
- Verify previous set transmit power

### AM Modulation Level

- Set display to 14.10000Mhz, AM, high power and mic gain 5
- Connect RF power meter to antenna connector
- Connect Oscilloscope to CP1041
- Connect AF signal generator to mic connector

- Apply no signals to mic connector
- Un-plug P891 from J281 on the main board
- Transmit
- Adjust R1042 for 100mVp-p
- Re-seat P891 to J281 on the main board
- Adjust R1080 for 35W
- Apply 1KHz/30mV to mic connector
- Adjust R999 for 90% modulation

#### CW Carrier Level

- Set display to 14.10000Mhz, CW, high power
- Set KEYSPEED to "60" and PADDLE to "n"
- Connect RF power meter to antenna connector
- Connect one channel on oscilloscope to CP921 and Loosely couple RF with other channel on oscilloscope
- Connect paddle to key jack, and transmit "dot"
- Adjust beginning point of transmit signals with R921 for 10ms after the raising voltage of CP921
- Verify previous set transmit power

#### Receiver

- Set display to 14.10000Mhz, USB, RIT Off, AGC Fast, NB Off, Preamp ON
- Connect standard signal generator to antenna connector
- Connect SNARDER to SP Jack
- Apply 14.1015MHz to antenna connector
- Receive
- Adjust L731 and L741 for maximum sensitivity.
- Apply 14.1015MHz/54dBu with no modulation to antenna connector, and turn on/off the RF signals
- Adjust R741 for 30dB gain when turning on/off RF signals on standard signal generator
- Set mode to WFM
- Connect multi-meter to CP631
- Apply 14.10000MHz/54dBu to antenna connector
- Adjust L632 for 4.0V

## Noise Blanker

- Set display to 14.10000Mhz, USB, RIT Off, AGC Fast, NB Off, Preamp ON
- Connect noise generator to antenna connector
- Connect oscilloscope to CP632
- Apply 25dBu noise signals to antenna connector
- Receive
- Adjust L621 and L633 for maximum signals.
- Apply 20dBu noise signals to antenna connector
- Turns on noise blanker
- Adjust R623 for the beginning point of noise blanker effect

## Receiver (BPF)

- Connect standard signal generator to antenna connector
- Connect SINARDER to SP jack
- Install jumper plug to CI-V jack
- Turns on the radio while holding "P.AMP" and "TUNER" buttons  
(The radio display should show "Set uP")
  
- Repress "F2" button
- Apply 60.0515Mhz/-17dBu signals to antenna connector  
(The radio should show "VHF1 BPF1 L" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button  
(The radio should show "VHF1 BPF2 L" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 90.5015MHz/-17dBu signals to antenna connector.  
(The radio should show "VHF1 BPF1 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button  
(The radio should show "VHF1 BPF2 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 128.9515MHz/-17dBu signals to antenna connector.

- (The radio should show "VHF1 BPF1 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
- (The radio should show "VHF1 BPF2 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 129.1015MHz/-17dBu signals to antenna connector.
- (The radio should show "VHF2 BPF1 L" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
- (The radio should show "VHF2 BPF2 L" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 145.1515MHz/-17dBu signals to antenna connector.
- (The radio should show "VHF2 BPF1 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
- (The radio should show "VHF2 BPF2 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 170.0015MHz/-17dBu signals to antenna connector.
- (The radio should show "VHF2 BPF1 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
- (The radio should show "VHF2 BPF2 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 400.0015MHz/-17dBu signals to antenna connector.
- (The radio should show "UHF BPF1 L" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
- (The radio should show "UHF BPF2 L" on the display



- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 435.1515MHz/-17dBu signals to antenna connector.  
(The radio should show "UHF BPF1 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button  
(The radio should show "UHF BPF2 M" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 470.0015MHz/-17dBu signals to antenna connector.  
(The radio should show "UHF BPF1 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button  
(The radio should show "UHF BPF2 H" on the display
- Adjust main tuning knob for maximum sensitivity
- Repress "MENU" button
  
- Apply 14.15150MHz signals to antenna connector.  
(The radio should show "S0 LEVEL" on the display
- Apply no signals to antenna connector
- Repress "MENU" (Down arrow) button  
(The radio should show "S9 LEVEL" on the display
- Apply 14.15150MHz/34dBu signals to antenna connector
- Repress "MENU" (Down arrow) button  
(The radio should show "+60dB LEVEL" on the display
- Apply 14.15150MHz/94dBu signals to antenna connector
- Repress "MENU" (Down arrow) button  
(The radio should show "Set uP" on display again)

## Transmitter

- Install jumper plug to CI-V jack
- Turns on the radio while holding "P.AMP" and "TUNER" buttons  
(The radio display should show "Set uP")
- Connect RF power meter to ANT1 and ANT2 connector
- Install DC current meter to DC cable
- Connect audio signal generator to MIC connector
- Apply 1.5KHz/30mV signals to MIC connector
- Reprress F-3 button  
(The radio display shows "SET IdAPC")
- Transmit
- Adjust R1125 for 15A
- Receive
  
- Reprress "MENU" (Down arrow) button  
(The radio display shows "GO FILTER CAL")
- Hold "MENU" (GO) button for 2 seconds  
(The radio is starting the transmission automatically)
- The radio will return to receive mode, and shows "SET 90%" (14.1MHz)
- Transmit
- Adjust main tuning knob for 90W, and reprress "MENU" (Down arrow) button
- The radio will show "SET 50%" (14.1MHz)
- Adjust main tuning knob for 50W, and reprress "MENU" (Down arrow) button
- The radio will shows "SET TUNE Po" (14.1MHz)
- Adjust main tuning knob for 10W, and reprress "MENU" (down arrow) button
- The radio will shows "SET TUNE Po" (50.1MHz)
- Adjust main tuning knob for 10W, and reprress "MENU" (down arrow) button
- The radio will shows "SET 90%" (145MHz)
- Adjust main tuning knob for 45W, and reprress "MENU" (down arrow) button
- The radio will shows "SET 50%" (145MHz)
- Adjust main tuning knob for 25W, and reprress "MENU" (down arrow) button
- The radio will shows "SET 90%" (435MHz)
- Adjust main tuning knob for 18W, and reprress "MENU" (down arrow) button
- The radio will shows "SET 50%" (435MHz)
- Adjust main tuning knob for 10W, and reprress "MENU" (down arrow) button
- The radio will shows "ALC START"

- Hold "MENU" (down arrow) button for 2 seconds
- The radio will show "SWR 1 LOAD"
- Re-press "MENU" (down arrow) button
- Receive
- Connect dummy load with SWR 2 to antenna connector
- Transmit
- Re-press "MENU" (Down arrow) button
- Receive
- Turn off the radio

#### \* PA Board

##### Fan motor

- Install DC volt meter between J571-1 and ground
- Receive (PA must be cold)
- Verify the voltage for less than 2V
- Install jumper wire between CP281 and CP282 on PLL board
- Verify the voltage for 8.5V
- Remove jumper wire between CP281 and CP282 on the PLL board
- Install jumper wire between CP573 and CP574 on PA board
- Verify the voltage for 12.5V
- Remove jumper wire between CP573 and CP574 on the PA board

##### Idling current alignment

- Set R162, R214, R174, R175 and R231 for CCW
- Set radio to 14.1MHz, SSB with no mic audio input
- Remove J571 and install current meter to P601
- Transmit
- Adjust R162 for 500mA
- Receive
- Set radio to 145.1MHz, SSB with no mic audio input
- Transmit
- Adjust R214 for +1A from current reading
- Set radio to 14.1MHz, SSB with no mic audio input
- Transmit

- Adjust R174 for +500mA from current reading
- Adjust R175 for +500mA from current reading
- Receive
- Set radio to 145.1MHz, SSB with no mic audio input
- Transmit
- Adjust R231 for +2A from current reading
- Install back J571, and re-install P601 connector

#### \* FILTER Board

- Set radio to 14.1MHz, USB
- Connect RF power meter to antenna terminal
- Connect audio signal generator to mic connector
- Ground CP1071 on main board
- Connect DC volt meter to W16
- Transmit
- Apply 1.5KHz signals to mic connector, and adjust mic audio for 100W
- Adjust C58 for minimum voltage reading