

Alignment Procedure

This radio is adjusted to meet all condition in production except special case.

Readjustment is not requirement.

5-1) The preparation before adjustment.

- 1) Set the power supply voltage to 7.4V and then connect to the radio.
- 2) Connect the connector to radio Antenna terminal.
- 3) Connect the radio to test equipment.

5-2) PLL Synthesizer

- 1) Measure the voltage of TP1 with high impedance voltage meter.
- 2) Adjust L304 at RX channel 0.9 to be 1.1V.
Confirm if it is below 4.2V at RX high channel.
Adjust L307 at TX channel 0.9 to be 1.1V.
Confirm if it is below 4.2 at TX high channel.
- 3) Confirm if channel 1 is in 0.9+/-0.2 in RX

5-3) Adjustment of transmitter [Up+Down+Power on]

- 1) Adjust to tune the set frequency.[D/A]
- 2) Adjust to tune the set power.[D/A]
- 3) Set audio generator to be 1□ 80mVrms and connect to radio external jack.
- 4) Adjust RV301 to tune desired modulation.
- 5) If a channel is set with Sub-tone the modulation of Sub-tone varies based on the size of the modulation.

5-4) Adjustment of receiver

- 1) Set SSG RF level to -47dBm @ 1□ 60% Dev.
- 2) Adjust SSG RF level and confirm if 12dB SINAD is below -119dBm.
- 3) Adjust D/A to open audio at 12dB SINAD.
- 4) Set tone frequency to SSG when there is channel set with Sub-tone and then set deviation to 10% peak Dev. Then check if GREEN LED is on.
- 5) Repeat the above in other channels.

HL-10V2 / HL-10U1 Alignment

The HL-10V2, HL-10U1 has been carefully aligned at the factory for the specified performance across the frequency range specified for each version. Re-alignment should therefore not be necessary except in the event of component failure, or altering version type. All component replacement and service should only be performed by an authorized HEADLINE I&C Ltd representative, or the warranty policy may be void.

Required Test Equipment

- RF signal generator with calibrated output level at 1 μ (or RADIO COMMUNICATION TEST SET)
- Deviation Meter (Liner Detector)
- AC Voltmeter
- SINAD Meter
- In-Line Wattmeter with 5% accuracy at 500 μ
- Regulated DC Power Supply adjustable from 4 to 10V, 3A
- 50 Ω Non-reactive Dummy Load: 10W at 500 μ
- Frequency Counter: ± 0.2 ppm accuracy at 500 μ
- AF Signal Generator
- DC Voltmeter: High impedance

HL-10V2

Low Band Edge (channel 1): 136.000 μ

Band Center (channel 2): 155.000 μ

High Band Edge (channel 3): 174.000 μ

HL-10U1

Low Band Edge (channel 1): 406.000 μ

Band Center (channel 2): 438.000 μ

High Band Edge (channel 3): 470.000 μ

PLL & Transmitter

Set up the test equipment as shown for transmitter alignment Adjust the supply voltage to 7.4V for all steps where not specified otherwise.

PLL VCV (Varactor Control Voltage) – HL10U1

- Connect the DC voltmeter between TP1 on the main unit and ground.
- Set the transceiver to CH1 (low band edge), and adjust L304 on the main unit for 1.0V ± 0.1 V on the DC voltmeter, while receiving.
- Set the transceiver to CH1 (low band edge), and adjust L307 on the main unit for 1.0V ± 0.1 V on the DC voltmeter, while transmitting.
- Set the transceiver to CH3 (high band edge), and confirm the high-end VCV is lower then 4.2V while receiving, and low than 4.2V while transmitting.

PLL Reference

- Set the transceiver to CH1 (low band edge), and adjust trimmer of the VCXO on the main unit for band center frequency $\pm 100\mu$.

Transmitter Output Power-HL10U1

- Set the transceiver to CH1 (low band edge), and adjust D/A1 on the main unit for that the power meter reading is 4W. Confirm that the current consumption is 2.0A or below.
- Set the transceiver to CH1 (low band edge), and adjust D/A1 on the main unit for that the power meter reading is 1W. Confirm that the current consumption is 1.0A or below.

Modulation Level

Max Deviation: (VCO Modulation)

- Set the transceiver to CH2 (band center).
- Inject a 1□ tone at 100mVrms to the MIC jack.
- Adjust RV301 on the main unit for the deviation meter reading is $\pm 4.0\%$ (for 25□ steps) or $\pm 2.0\%$ (for 12.5□ steps) deviation.

MIC Sensitivity

- Set the transceiver to CH2 (band center).
- Inject a 1□ tone at 100mVrms to the MIC jack.
- Adjust tone level so that deviation meter reading is $\pm 3.0\%$ (for 25□ steps) or $\pm 1.5\%$ (for 12.5□ steps) deviation.

CTCSS Deviation

- Set the transceiver to CH2 (band center).
- Check the deviation meter reading is $\pm 0.6\%$ (for 25□ steps) or $\pm 0.35\%$ (for 12.5□ steps) deviation.

CDCSS Deviation

- Check the deviation meter reading is $\pm 0.75\%$ (for 25□ steps) or $\pm 0.4\%$ (for 12.5□ steps) deviation.

Receiver

Set up the test equipment as shown for receiver alignment.

Sensitivity

- Set the transceiver to CH3 (high band edge).
- Turn the RF signal generator to the same frequency of the transceiver, than set the generator output level to -47dBm with $\pm 3\%$ deviation @ 1□ tone modulation.
 - 1) Adjust SSG RF Level and confirm if 12dB SINAD is below -119dBm.
 - 2) Adjust D/A open Audio at 12dB SINAD.
 - 3) Set tone frequency to SSG when there is channel set with Subtone and then set deviation to 10% peak Dev. Then check if GREEN LED is on.
 - 4) Repeat the above in other channels.