Adjustment for IC-F121S

<table>
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<tr><th>Adjustment</th><th>No.</th><th>Adjustment Condition & Tuning</th><th>Value</th><th>Ref. No.</th><th>CK. Point</th></tr>
<tr><td>Preparation

Check points</td><td></td><td>Connect the transceiver by cloning cable (OPC-1122) to a PC (IBM compatible) and boot up the cloning software.
Be sure to use a tester with more than 50 kohm/V internal resistance when making each test.</td><td></td><td></td><td></td></tr>
<tr><td>Lock Voltage Adjustment</td><td></td><td>Set the transceiver to the 174 MHz and set so that the LV voltage is C134 during RX and C133 during TX.
<table><tr><td>Adj. Freq.</td><td>174 MHz</td></tr><tr><td>RX Side</td><td>3.5V</td></tr><tr><td>TX Side</td><td>3.5V</td></tr></table></td><td>3.5V
3.5V</td><td>C134
C133</td><td>LV</td></tr>
<tr><td>Lock Voltage Check</td><td></td><td>Set the transceiver to the 136 MHz and check that all is within specification.
<table><tr><td>Adj. Freq.</td><td>136 MHz</td></tr><tr><td>RX Side</td><td>0.9V~1.5V</td></tr><tr><td>TX Side</td><td>1.0V~1.6V</td></tr></table></td><td>0.9V-1.5V
1.0V-1.6V</td><td></td><td>LV</td></tr>
<tr><td>Frequency Adjustment</td><td></td><td>Connect a power meter or attenuator to the antenna terminal.
Loose coupling the antenna terminal and frequency counter.
Set the transceiver to near the TX greatest high band frequency and set the unit to TX.
Use adjustment software to adjust the TX frequency to the values below.
<table><tr><td>Set Frequency</td><td>Set Freq. ± 500 Hz</td></tr></table></td><td>±500Hz</td><td>Adj.Soft
TXF</td><td>ANT Con</td></tr>
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<tr><th>Adjustment</th><th>No.</th><th>Adjustment Condition & Tuning</th><th>Value</th><th>Ref. No.</th><th>CK. Point</th></tr>
<tr><td>TX Output</td><td></td><td>Use adjustment software to adjust the adjustment output to the values below.
<table><tr><th>Adj. Freq.</th><th>Greatest Low Band Freq.</th></tr><tr><td>Hi Power</td><td>50.0W</td></tr><tr><td>L2 Power</td><td>10.0W</td></tr><tr><td>L1 Power</td><td>5.0W</td></tr></table></td><td>50.0W
10.0W
5.0W</td><td>Adj.Soft Power
Hi
L2
L1</td><td>ANT Con</td></tr>
<tr><td>TX Output Check</td><td></td><td>Check that the in-band TX output is within the specifications below.
<table><tr><td>Hi Power</td><td>40.0~60.0W</td></tr><tr><td>L2 Power</td><td>20.0~30.0W</td></tr><tr><td>L1 Power</td><td>4.0~6.0W</td></tr></table></td><td>40-60W
20-30W
4.0-6.0W</td><td></td><td>ANT Con</td></tr>
<tr><td>Current Check at TX</td><td></td><td>Check that the in-band power consumption is within the specifications below.
<table><tr><td>Hi Power</td><td>Less than 14.0A</td></tr></table></td><td>Less 14A</td><td></td><td></td></tr>
<tr><td>Checking Spurious</td><td></td><td>Connect a spectrum analyzer to the ANT terminal through an attenuator.
Set the attenuation so that the spectrum Analyzer does not distort.
Set the transceiver to TX and when at Hi power, check that spurious is less than the value below in the bandwidth.
<table><tr><td>Spurious</td><td>Less than –70dB of the fundamental wave</td></tr></table></td><td>Less than -70 dB</td><td></td><td>ANT Con</td></tr>
</table>

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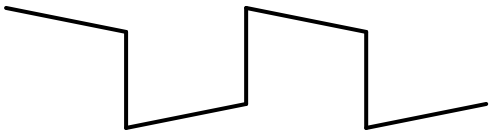
<tr><th>Adjustment</th><th>No.</th><th>Adjustment Condition & Tuning</th><th>Value</th><th>Ref. No.</th><th>CK. Point</th></tr>
<tr><td>Preparation for Checking Modulation Adjustment</td><td></td><td>When there is no particular set limits, set the modulation analyzer for adjustment and checking as below.
<table><tr><td>HPF</td><td>OFF</td></tr><tr><td>LPF</td><td>20 kHz</td></tr><tr><td>De-Emphasis</td><td>OFF</td></tr><tr><td>Detector</td><td>(P ± P)/2</td></tr></table>Connect the modulation analyzer set at the above conditions, through the attenuator to the antenna terminal. Connect an oscilloscope, distortion meter and a level meter to the modulation analyzer’s detection output terminal.
Connect a millivolt meter or a 600 ohm output impedance CR oscillator to the transceiver’s mic terminal.</td><td></td><td></td><td></td></tr>
<tr><td>Modulation Balance Adjustment</td><td></td><td>Use the adjustment software to adjust the modulation analyzer’s detection output horizontal line so that it becomes a Straight line as below
<table><tr><td>Adjust. Freq.</td><td>Near Center Frequency</td></tr></table>  </td><td>Detection Output</td><td>Adj.Soft Balance</td><td>ANT Con</td></tr>
<tr><td>Deviation Adjustment</td><td></td><td>Set the CR oscillator to a 1 kHz sine wave, 40mVrms, and input from the external mic terminal. Set the transceiver to TX and use the adjustment software to adjust to the following values.
<table><tr><td>Adjust. Freq.</td><td>Near Center Frequency</td></tr><tr><td>WIDE</td><td>± 4.10 ± 0.05 kHz</td></tr><tr><td>NARROW</td><td>± 2.10 ± 0.05 kHz</td></tr></table></td><td>± 4.05 ~ ±4.15kHz
± 2.05 ~ ±2.15kHz</td><td>Adj.Soft MOD W MOD Ratio</td><td>ANT Con</td></tr>
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<tr><td>Checking Deviation</td><td></td><td>Check that the deviation in the bandwidth is as the values below.
<table><tr><td>WIDE</td><td>± 3.60 ~ 4.50 kHz</td></tr><tr><td>NARROW</td><td>± 1.80 ~ 2.30 kHz</td></tr></table></td><td>± 3.6 ~ ±4.5kHz
± 1.8 ~ ±2.3kHz</td><td></td><td>ANT Con</td></tr>
<tr><td>Checking Modula-tion</td><td></td><td>Check that the modulation in the bandwidth is as the value below
<table><tr><td>WIDE/NARROW</td><td>2.8 ~ 6 mV rms</td></tr></table>WIDE:±3 KHz DEV ; NARROW:±1.5 KHz DEV</td><td>2.8-6mV rms</td><td></td><td>ANT Con</td></tr>
<tr><td>CTCSS Deviation Adjustment</td><td></td><td>Connect a linear detector via the attenuator to the antenna terminal, Set the transceiver to wide ch and CTCSS 151.4Hz.
Transmit while making sure no input is applied to the mic (or mic terminal)
<table><tr><td>Adjust. Freq.</td><td>Near Center Frequency</td></tr><tr><td>WIDE</td><td>± 0.7 kHz</td></tr></table></td><td>±0.7kHz</td><td>Adj.Soft CTCS/DTCS</td><td>ANT Con</td></tr>
<tr><td>Checking CTCSS/ DTCS/2/5 TONE/ DTMF DEVIATION</td><td></td><td>then reset so that each signaling type can be output.
DTCS CODE 007
CTCSS 151.4 Hz
5 TONE CCIR 11111
DTMF # (Auto Dial Setting)
2 TONE 349.0 Hz

check that each version in it’s bandwidth is as the values below, respectively.
<table><tr><td>Wide CTCSS/DTCS</td><td>± 0.50~± 0.90kHz</td></tr><tr><td>Wide 2/5 TONE/ DTMF</td><td>± 2.40~± 3.60kHz</td></tr><tr><td>Narrow CTCSS/DTCS</td><td>± 0.25~± 0.45kHz</td></tr><tr><td>Narrow 2/5 TONE/ DTMF</td><td>± 1.20~± 1.80kHz</td></tr></table></td><td>±0.5-0.9kHz
±2.4-3.6kHz
±.25-.45kHz
±1.2-1.8kHz</td><td></td><td>ANT Con</td></tr>
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<tr><td>Checking TX S/N</td><td></td><td>Connect a linear detector via the attenuator to the antenna terminal, and set to the conditions below.
HPF 50 Hz
LPF 20 kHz
De-emphasis OFF
Level Meter (P/P)/2
Apply a 1 kHz signal from the low frequency oscillator to the mic terminal, and transmit, then adjust the low frequency oscillator output level so that the maximum modulation is 70%.(WIDE:3.5KHz,NAR:1.75KHz)
Check that the TX S/N in the bandwidth is as the values below.
<table><tr><td>WIDE</td><td>More than 40 dB</td></tr><tr><td>NARROW</td><td>More than 34 dB</td></tr></table></td><td>Over 40dB
Over 34dB</td><td></td><td>ANT Con</td></tr>
<tr><td>Adjusting RX Sensitivity</td><td></td><td>When there is no particular set limits, set the RX adjustments and signal generator when checking to the settings below.
<table><tr><td>Modulation Freq.</td><td>1kHz</td></tr><tr><td>WIDE</td><td>± 3.5 kHz</td></tr><tr><td>NARROW</td><td>± 1.75 kHz</td></tr></table>
Set the signal generator in the following way for wide channels.
<table><tr><td>Adjust Freq.</td><td>Near Greatest Lo band F.</td></tr><tr><td>SG Input level</td><td>+20 dBu</td></tr></table>
Connect an 4 ohm non-inductive load and a distortion meter to the external speaker terminal. Adjust BPF (T1) ~ (T2) with the adjustment software, so that the sensitivity is at maximum.</td><td></td><td>Adj.Soft</td><td>RSSI line</td></tr>
</table>

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<tr><td>Checking RX Sensitivity</td><td></td><td>Check that the signal generator level when the RX frequency bandwidth becomes 12 dB SINAD, is the value below.

<table><tr><td>RX Sensitivity</td><td>Less than -10 dBu</td></tr></table>
Use the same check method for Narrow channels also.</td><td>Less-10dB</td><td></td><td>ANT Con
SP Jack</td></tr>
<tr><td>Adjusting the Squelch</td><td></td><td>set the transceiver to the RX frequency bandwidth’s narrow band center frequency.

Set the signal generator to the settings below.

<table><tr><td>Modulation Freq.</td><td>1kHz</td></tr><tr><td>WIDE</td><td>± 3.5 kHz</td></tr><tr><td>NARROW</td><td>± 1.75 kHz</td></tr><tr><td>SG Output Level</td><td>-16.5 dBu</td></tr></table>
In this condition, using the adjustment software, raise the squelch D/A value until the squelch closes once, then lower the D/A value again, and adjust until the squelch opening point.</td><td></td><td>Adj.Soft SQL</td><td>ANT Con</td></tr>
<tr><td>Checking Squelch Sensitivity</td><td></td><td>Check that the squelch opening point value in the RX frequency bandwidth is as below.

<table><tr><td>Squelch Sensitivity</td><td>Less than –10 dBu</td></tr></table>
Next, reduce the signal generator output and check that the squelch closes in the RX bandwidth.</td><td>Less-10dB</td><td></td><td>ANT Con</td></tr>
</table>

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Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point
Checking AF Output		Set the signal generator output level to +60 dBu. The transceiver and SG connection is the same as the squelch adjustment above. Adjust the transceiver volume until the distortion meter reads 5%. Check that the AF output value at this point as below. AF Output: More than 3.5 W	Over 3.5 W @ 4 ohm load		ANT Con SP Jack
Checking RX S/N		Set the signal generator output level to +60 dBu. Adjust the AF volume so that the AF output is 50% of the rated value. Check that the RX S/N in the bandwidth is as the values below. WIDE: More than 40 dB NARROW: More than 34 dB	Over 40dB Over 34dB		ANT Con SP Jack
Checking Howling		Set the signal generator output to +60 dBu as in RX adjustment, and for non modulation. set the internal speaker for operation, and turn the AF volume up to maximum to check that howling does not occur.			ANT Con Int SP
Checking Maximum RX Current		While still in the AF output check status, rotate the volume control clockwise to obtain the maximum AF output. Check that the current consumption at this time is as the value below. Max. RX Current: Less than 1200 mA	Less than 1200mA		PWR Con