ALIGNMENT PROCEDURE

MODEL: 18WX ST II

REVISION: 00

DATE: AUGUST 09, 2000

PREPARED BY: 

CHECKED BY: 

APPROVED BY: 

TOTAL PAGES:
18WS2 ALIGNMENT INSTRUCTION

1.0  TEST CONDITION:

1.1. STANDARD DC POWER:     EXT.DC  13.8VDC
1.2. MEASUREMENT CHANNEL:    CB   CH19 (27.185MHz)
                              WX   CH3 (162.475MHz)
1.3. STANDARD AUDIO LOADING:   CB/WX  8 Ω
1.4. ANTENNA IMPEDANCE:      CB/WX  50 Ω
1.5. STANDARD REF. MODULATION:  CB   30% (AM)
                               WX     ±3KHz (FM)
1.6. STANDARD REF. AUDIO OUTPUT:  CB/WX  0.5W

1.7. FREQUENCY TABLE

<table>
<thead>
<tr>
<th>CB CH NO.</th>
<th>BAND FREQ. (MHz)</th>
<th>WX CH NO.</th>
<th>BAND FREQ. (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>26.965</td>
<td>01</td>
<td>162.550</td>
</tr>
<tr>
<td>02</td>
<td>26.975</td>
<td>02</td>
<td>162.400</td>
</tr>
<tr>
<td>03</td>
<td>26.985</td>
<td>03</td>
<td>162.475</td>
</tr>
<tr>
<td>04</td>
<td>27.005</td>
<td>04</td>
<td>162.425</td>
</tr>
<tr>
<td>05</td>
<td>27.015</td>
<td>05</td>
<td>162.450</td>
</tr>
<tr>
<td>06</td>
<td>27.025</td>
<td>06</td>
<td>162.500</td>
</tr>
<tr>
<td>07</td>
<td>27.035</td>
<td>07</td>
<td>162.525</td>
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<tr>
<td>08</td>
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<td>09</td>
<td>27.065</td>
<td>09</td>
<td>161.775</td>
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<tr>
<td>10</td>
<td>27.075</td>
<td>10</td>
<td>163.275</td>
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<tr>
<td>11</td>
<td>27.085</td>
<td>11</td>
<td>163.500</td>
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<tr>
<td>12</td>
<td>27.105</td>
<td>12</td>
<td>164.000</td>
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<tr>
<td>13</td>
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<td>16</td>
<td>27.155</td>
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<td>165.275</td>
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<td>27.185</td>
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<td>165.500</td>
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<td>27.215</td>
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<td>165.575</td>
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<td>27.235</td>
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<td>165.675</td>
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<td>24</td>
<td>27.245</td>
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<td>25</td>
<td>27.255</td>
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<td>165.775</td>
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<td>26</td>
<td>27.265</td>
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<td>165.800</td>
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<tr>
<td>27</td>
<td>27.275</td>
<td>27</td>
<td>165.825</td>
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<td>27.285</td>
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<td>27.305</td>
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<td>165.900</td>
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<td>31</td>
<td>27.315</td>
<td>31</td>
<td>165.925</td>
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<td>32</td>
<td>27.325</td>
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<tr>
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<td>27.335</td>
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<td>165.975</td>
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<tr>
<td>34</td>
<td>27.345</td>
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<td>166.000</td>
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<tr>
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<td>27.365</td>
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<td>166.050</td>
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<td>27.375</td>
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<td>27.385</td>
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<td>166.100</td>
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<td>39</td>
<td>27.395</td>
<td>39</td>
<td>166.125</td>
</tr>
<tr>
<td>40</td>
<td>27.405</td>
<td>40</td>
<td>166.150</td>
</tr>
</tbody>
</table>
1.8. TEST EQUIPMENT SETUP AS BELOW:

A. TX test equipment setup:

B. RX test equipment setup:

Note: D.U.T. = device under test
2.0 ALIGNMENT

2.1 LOCAL FREQ. ALIGNMENT

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION &amp; PROCEDURE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VCO Frequency</td>
<td>Connect a 5pf capacitor to TP7.</td>
<td>Adjust <strong>VC1</strong> FOR 16.485 MHz at the frequency counter.</td>
</tr>
<tr>
<td></td>
<td>Set CB mode RX CH19.</td>
<td></td>
</tr>
<tr>
<td>2. 10.245MHz frequency</td>
<td>Connect a 5pf capacitor to TP8.</td>
<td>Adjust <strong>VC2</strong> FOR 10.245 MHz at the frequency counter.</td>
</tr>
<tr>
<td></td>
<td>Set CB mode RX CH19.</td>
<td></td>
</tr>
</tbody>
</table>

2.2 VCO ALIGNMENT

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION &amp; PROCEDURE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CB VCO Voltage</td>
<td>1. Connect a digital multi-meter to TP1</td>
<td>Adjust <strong>L11</strong> for 1.0 ± 0.1 V.</td>
</tr>
<tr>
<td></td>
<td>2. Set CB RX mode: CH1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Set CB TX mode</td>
<td>Check CH40 ≤ 4.5V.</td>
</tr>
<tr>
<td>2. WX VCO Voltage</td>
<td>1. Connect a digital multi-meter to TP1</td>
<td>Adjust <strong>L1</strong> FOR 1.5 ± 0.1V.</td>
</tr>
<tr>
<td></td>
<td>2. Set WX mode CH08.</td>
<td>Check CH1 0 ≤ 3.0V.</td>
</tr>
</tbody>
</table>

2.3 WX RECEIVER

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION &amp; PROCEDURE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Audio output level</td>
<td>1.Set WX mode, CH3.</td>
<td>1. Adjust <strong>L9</strong> for maximum audio output &amp; minimum distortion at the distortion meter.(Distortion less than 8% )</td>
</tr>
<tr>
<td></td>
<td>2.Output of signal generator thru a 0.01µF to TP3.</td>
<td>2. Set volume control to maximum position, audio power output shall be more than 3 Watts.</td>
</tr>
<tr>
<td></td>
<td>3.RF Gen. set 10.7MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.Set volume control to middle position.</td>
<td></td>
</tr>
<tr>
<td>2. WX sensitivity</td>
<td>1.Output of signal generator to antenna input terminal.</td>
<td>1.Adjust <strong>L4</strong> and <strong>L3</strong> for more than 12dB at the SINAD meter.</td>
</tr>
<tr>
<td></td>
<td>2. RF Gen. set 162.475MHz, Fmod= 1KHz, Dev.= ± 3KHz, RF level: 1µV</td>
<td>2. Repeat as needed. Check all channels sens. must met D.T.S.</td>
</tr>
<tr>
<td></td>
<td>3. WX set CH3.</td>
<td></td>
</tr>
</tbody>
</table>
### 2.4 CB Receiver Alignment

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION &amp; PROCEDURE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Audio output level</td>
<td>1. CB RX mode.</td>
<td>1. Adjust <strong>L8</strong> and <strong>L23</strong> for maximum audio output &amp; minimum distortion at the distortion meter. (Distortion less than 5%)</td>
</tr>
<tr>
<td></td>
<td>2. ST to OFF</td>
<td>2. Set volume control to maximum position, audio power output shall be more than 3 Watts.</td>
</tr>
<tr>
<td></td>
<td>3. Output of signal generator thru 0.01uF to TP3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. RF Gen. set 10.7MHz, Fmod= 1KHz, AM= 30%, level: 1mV.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Set Volume control to middle position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Set Squelch to minimum.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Output of signal generator to antenna input terminal.</td>
<td>2. Repeat as needed.</td>
</tr>
<tr>
<td></td>
<td>3. RF Gen. set 27.185MHz, fm: 1kHz, AM= 30%, RF level: 1μV.</td>
<td>Check CH1 and CH40.</td>
</tr>
<tr>
<td></td>
<td>4. Rotate the Squelch control to fully clockwise position</td>
<td></td>
</tr>
<tr>
<td>3. SQUELCH control</td>
<td>1. Set normal band CH19.</td>
<td>1. Slowly turn <strong>VR5</strong> to a position that the audio output waveform at the oscilloscope just appears from no output.</td>
</tr>
<tr>
<td>(Tight Squelch)</td>
<td>2. Output of signal generator to the antenna input terminal.</td>
<td>2. Must open at 4000μV.</td>
</tr>
<tr>
<td></td>
<td>3. RF Gen. set 27.185MHz , Fmod= 1KHz, AM= 30%, RF level: 2500 μV.</td>
<td>3. Must not open at 800μV.</td>
</tr>
<tr>
<td></td>
<td>4. Rotate the Squelch control to fully clockwise position</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Output of signal generator to antenna input terminal.</td>
<td>2. Increase RF level by 30dB. The signal meter should be displayed at “+30” position.</td>
</tr>
<tr>
<td></td>
<td>RF Gen. set 27.185MHz, no modulation, RF level: 100 μV.</td>
<td></td>
</tr>
<tr>
<td>(ST must be on)</td>
<td>2. RF Gen. set 27.185MHz,30% modulation</td>
<td>1000uV ≥ 50dB.</td>
</tr>
<tr>
<td>a) S/N</td>
<td>3. S/N @ RF level 1.0uV</td>
<td>2. ST audio output change</td>
</tr>
<tr>
<td></td>
<td>@ RF level 1000uV</td>
<td>2-8dB from OFF to ON.</td>
</tr>
<tr>
<td>b) Audio Gain</td>
<td>4. Audio Gain @ 100uV 50% Mod.</td>
<td></td>
</tr>
</tbody>
</table>
## 2.5 CB Transmitter Alignment

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION &amp; PROCEDURE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TP4 Alignment</td>
<td>1. Channel set normal band CH 19.</td>
<td>1. Adjust L7 (double tuned IFT) for maximum RF output waveform at the scope. (Freq. = 27.185MHz)</td>
</tr>
<tr>
<td></td>
<td>2. Set TX mode.</td>
<td>2. Repeat as needed.</td>
</tr>
<tr>
<td></td>
<td>Connect the TP4 (IC8 pin9) thru a 10pF capacitor to the oscilloscope.</td>
<td></td>
</tr>
<tr>
<td>2. TX Carrier output power</td>
<td>1. Channel set normal band CH 19.</td>
<td>1. Adjust L21, L20 and L17 for 4.0 watts RF output power.</td>
</tr>
<tr>
<td></td>
<td>2. Set TX mode.</td>
<td>2. Check TX CH1 and CH40 should meet D.T.S.</td>
</tr>
<tr>
<td></td>
<td>3. Connect an RF wattmeter to the antenna socket.</td>
<td></td>
</tr>
<tr>
<td>3. TX Carrier frequency detector.</td>
<td>1. Channel set CH 19.</td>
<td>TX Frequency for 27.185MHz ± 300Hz at the frequency counter.</td>
</tr>
<tr>
<td></td>
<td>2. Set TX mode.</td>
<td></td>
</tr>
<tr>
<td>4. TX Signal meter</td>
<td>1. Connect an RF wattmeter to the antenna socket.</td>
<td>Adjust VR6 for “4” displayed at the TX signal meter of the LED panel. (red LED)</td>
</tr>
<tr>
<td></td>
<td>2. No modulation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Set TX output power for 3 watts.</td>
<td></td>
</tr>
<tr>
<td>5. MAXIMUM Modulation</td>
<td>1. Set TX mode.</td>
<td>1. Adjust VR2 for 89-91% modulation.</td>
</tr>
<tr>
<td>(AMC control)</td>
<td>Output of AF generator to MIC jack, @ 1000Hz, 5 mV.</td>
<td>2. Distortion less than 8.0% at 80% modulation.</td>
</tr>
<tr>
<td></td>
<td>2. Distortion less than 8.0% at 80% modulation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Check CH1, CH40.</td>
<td></td>
</tr>
<tr>
<td>6. TX 2\textsuperscript{nd} harmonics</td>
<td>1. Connect an RF wattmeter to the antenna socket.</td>
<td>Adjust L14 for less than -60dB at spectrum analyzer.</td>
</tr>
<tr>
<td></td>
<td>2. Set modulation frequency 2500 Hz.</td>
<td></td>
</tr>
<tr>
<td>7. Occupied band width,</td>
<td>1. Set TX High power mode</td>
<td>The frequency spectrum of the harmonics should be at least 2 dB better than the limits of the FCC specification.</td>
</tr>
<tr>
<td>(OBW)</td>
<td>2. Set modulation frequency 2500 Hz.</td>
<td></td>
</tr>
</tbody>
</table>
Alignment Points

SPEAKER
KESP-112
8 ohm/3W

SQUELCH
KER-103P08-1

POWER ON/OFF
KER-503P06-2
VOLUME

MIC
KEJ-241-1
18 WX ST II with TDA2003 Audio Amp