SECTION 5 ADJUSTMENT PROCEDURES

5-1 PREPARATION BEFORE SERVICING

The receiver (IC-PCR1000) can be adjusted by sending adjustment data to the RS-232C port via a PC. Most of the adjustments in this section must use **EX-2099,** an adjustment program for IC-PCR1000. The software that comes with the IC-PCR1000 is not necessary for adjustments in this section.

■ SYSTEM REQUIREMENTS

- IBM PC compatible computer
- An RS-232C serial port (38400 bps or faster)
- Microsoft Windows 95
- Intel i486DX4 processor or faster (pentium 100 MHz or faster recommended)
- At least 16 MB RAM
- At least 10 MB of hard disk space
- 640 × 480 pixel display (800 × 600 pixel display recommended)

■ SOFTWARE INSTALLATION

NOTE: Before using the program, make a backup copy of the original disk. After making a backup copy, keep the original disk in a safe place.

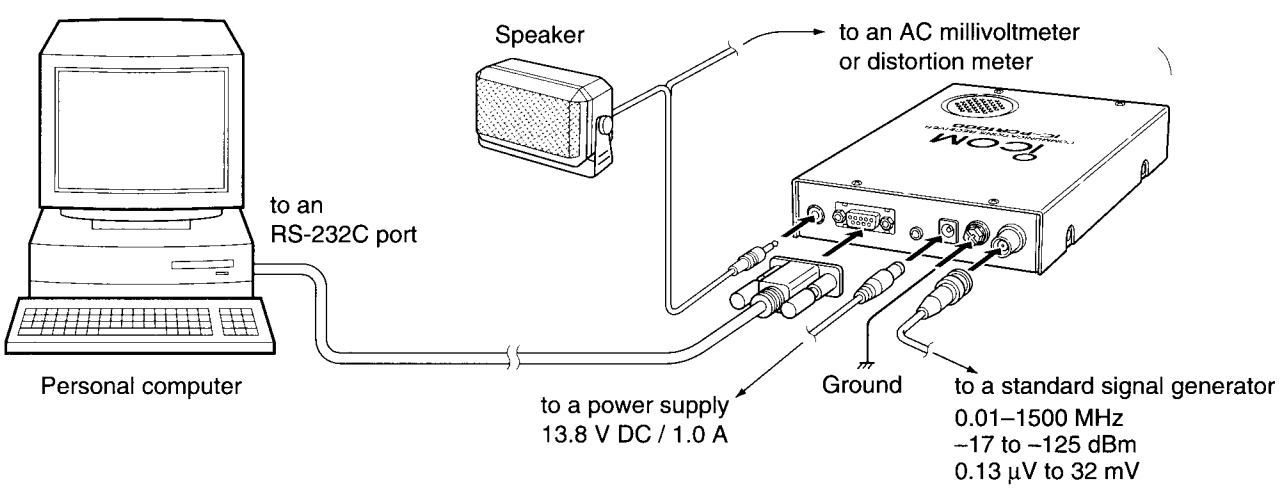
① Boot up Windows.
 - Quit all applications when Windows is running.
② Insert the backup disk 1 into the appropriate floppy drive.
③ Select 'Run' from the [Start] menu.
④ Type the setup program name using the full path name, then push the [Enter] key. (A:\ setup [Enter])
⑤ Follow the prompts.
⑥ Program group 'IC-PCR1000' appears in the 'Programs' folder of the [Start] menu.

■ OPERATING INSTRUCTIONS

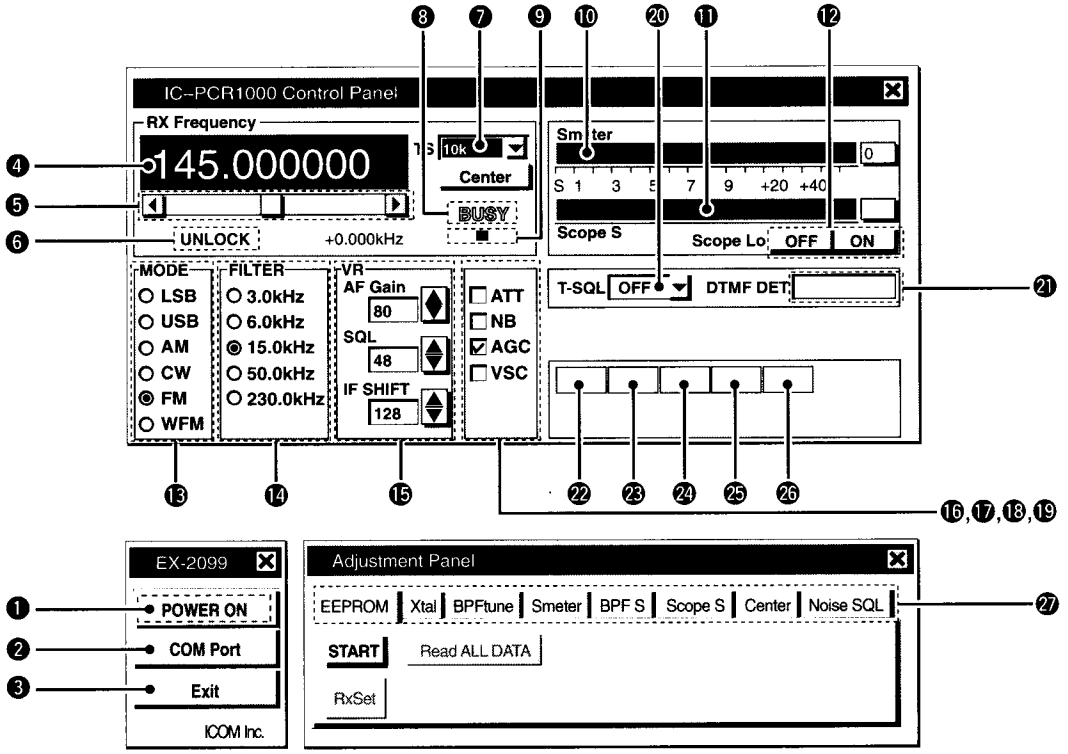
The adjustment program window contains 3 panels; the Power Panel, Control Panel and Adjustment Panel. The Power Panel will appear at start up the program.

① Connect IC-PCR1000 and PC with an RS-232C serial cable.
② Boot up Windows.
③ Click the "EX-2099 for IC-PCR1000" in the program group 'IC-PCR1000' to start the program.
 • The Power Panel appears.
④ Click "POWER ON" on the Power panel.
 • Control Panel and Adjustment Panel appear.
⑤ Click "START" on the Adjustment Panel when starting the SOFTWARE adjustment.
 • Data panel appears at the bottom side of the Adjustment panel.
⑥ Click "Read ALL DATA" on the Adjustment Panel.
 • Application reads adjustment data of the connected receiver.
⑦ Set or modify adjustment data as desired. See the following SOFTWARE adjustments.

■ BASIC CONNECTION



■ PANEL DESCRIPTIONS



♦ POWER PANEL

❶ POWER button
Turns IC-PCR1000 on and off.

❷ COM port button
Used to select a COM port.

❸ EXIT button
Quits the program.

♦ CONTROL PANEL

❹ FREQENCY indication
Indicates or inputs the receive frequency.

❺ FREQUENCY scroll bar
Used to change the receive frequency. Moving the button to the right increases the frequency; to the left decreases the frequency.

❻ UNLOCK indicator
Appears when the PLL is unlocked.

❼ Tuning step button
Used to change the tuning step.

❽ BUSY indicator
Appears when receiving a signal or when signal noise opens the squelch.

❾ FM center indicator
Indicates the tuning level when selecting the 6 kHz or 15 kHz IF filter in FM mode.

❿ S-meter indicator
Indicates the receive signal strength.

⓫ Scope S indicator

⓬ Scope Lo (ON/OFF) button

⓭ Receive mode buttons
Select a receive mode.

⓮ FILTER (IF filter) buttons
Change the IF filter in use.

⓯ Volume buttons
Adjust the audio output, squelch level and set the signals passband position.

⓰ ATT (Attenuator) button
Turns the attenuator on and off.

⓱ NB (Noise Blanker) button
Turns the noise blanker function on and off. The noise blanker is used to reduce pulse type noise.

⓲ AGC (Automatic Gain Control) button
Turns the AGC function on and off.

⓳ VSC (Voice Scan Control) button
Turns the voice scan control function on and off. This function detects whether signals are modulated (contain voice or music components, etc.) or not.

⓴ T-SQL (Tone squelch) button
Indicates or selects tone frequency for the tone squelch.

㉑ DTMF decode indicator
Indicates the decoded DTMF signals.

㉒ AD1 (SMAD) indicator
Indicates voltage level for the S-meter.

㉓ AD2 (CMAD) indicator
Indicates voltage level for the center meter.

㉔ AD3 (L1AD) indicator
Indicates the 1st LO PLL lock voltage level.

㉕ AD4 (SCAD) indicator
Indicates voltage level for the scope signal.

㉖ AD5 (CTAD) indicator
Indicates voltage level for the CTCSS decoded signal.

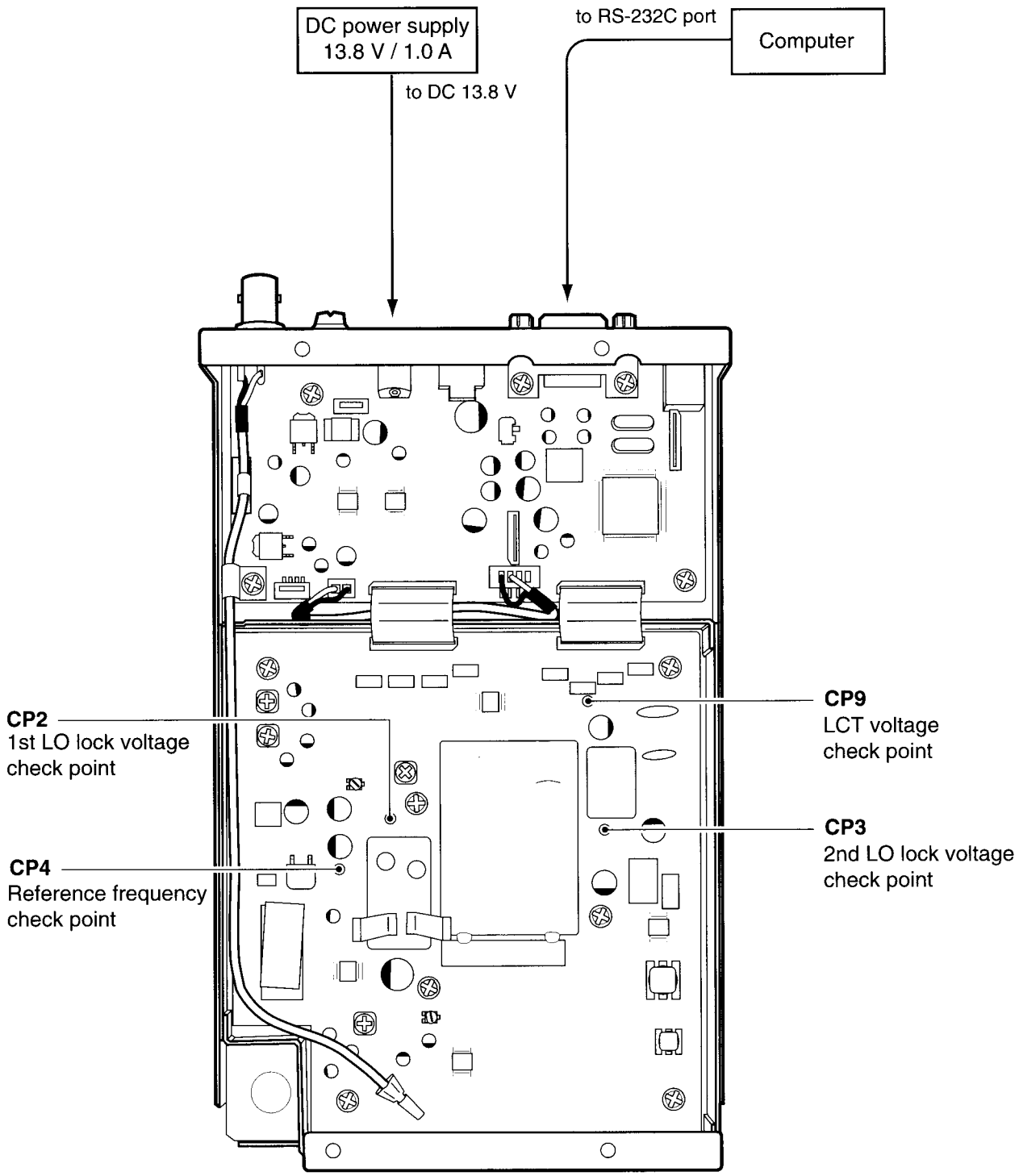
♦ ADJUSTMENT PANEL

㉗ Item select buttons
Used to select the adjustment items.

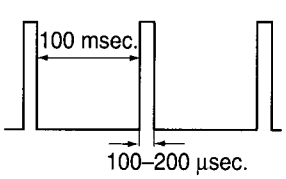
5-2 PLL ADJUSTMENT AND IF PEAK ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT
			UNIT	LOCATION		
REFERENCE FREQUENCY	1	• Display freq. : Any	RF	Connect a frequency counter to check point CP4.	10.250000 MHz	Use the adjustment software. **(see page 5-6)**
1ST LO PLL LOCK VOLTAGE	1	• Display freq. : 265.7000 MHz	RF	Connect a digital multi-meter or oscilloscope to check point CP2.	2.0–6.0 V	Verify
	2	• Display freq. : 383.2000 MHz			13.5–17.7 V	
	3	• Display freq. : 383.3000 MHz			3.0–7.0 V	
	4	• Display freq. : 483.2000 MHz			10.0–14.0 V	
	5	• Display freq. : 483.3000 MHz			1.5–5.5 V	
	6	• Display freq. : 633.2000 MHz			12.5–16.5 V	
	7	• Display freq. : 633.3000 MHz			4.0–8.0 V	
	8	• Display freq. : 799.9000 MHz			12.5–16.5 V	
2ND LO PLL LOCK VOLTAGE	1	• Display freq. : 265.0000 MHz	RF	Connect a digital multi-meter or oscilloscope to check point CP3.	6.5–10.5 V	Verify
	2	• Display freq. : 266.0000 MHz			6.6–10.6 V	
	3	• Display freq. : 267.0000 MHz			6.4–10.4 V	
LCT TERMINAL	1	• Display freq. : Any frequency of the 1st LO and 2nd LO are locked.	RF	Connect a digital multi-meter or oscilloscope to check point CP9.	Less than 1.5 V	Verify
IF PEAK	1	• Display freq. : 130.0200 MHz • Mode : FM • AGC : ON • Filter : 15 kHz • R521 (RF unit) : Center • R523 (RF unit) : Center • Connect a standard signal generator to [ANT] and set as: Frequency : 130.0200 MHz Level : 50 µV* (–73 dBm) Modulation : OFF • Receiving			Maximum S-meter level	Use the adjustment software. **(see page 5-6, Tuned BPF)**
	2	• Display freq. : 149.9800 MHz • Set an SSG as : Frequency : 149.9800 MHz • Receiving				

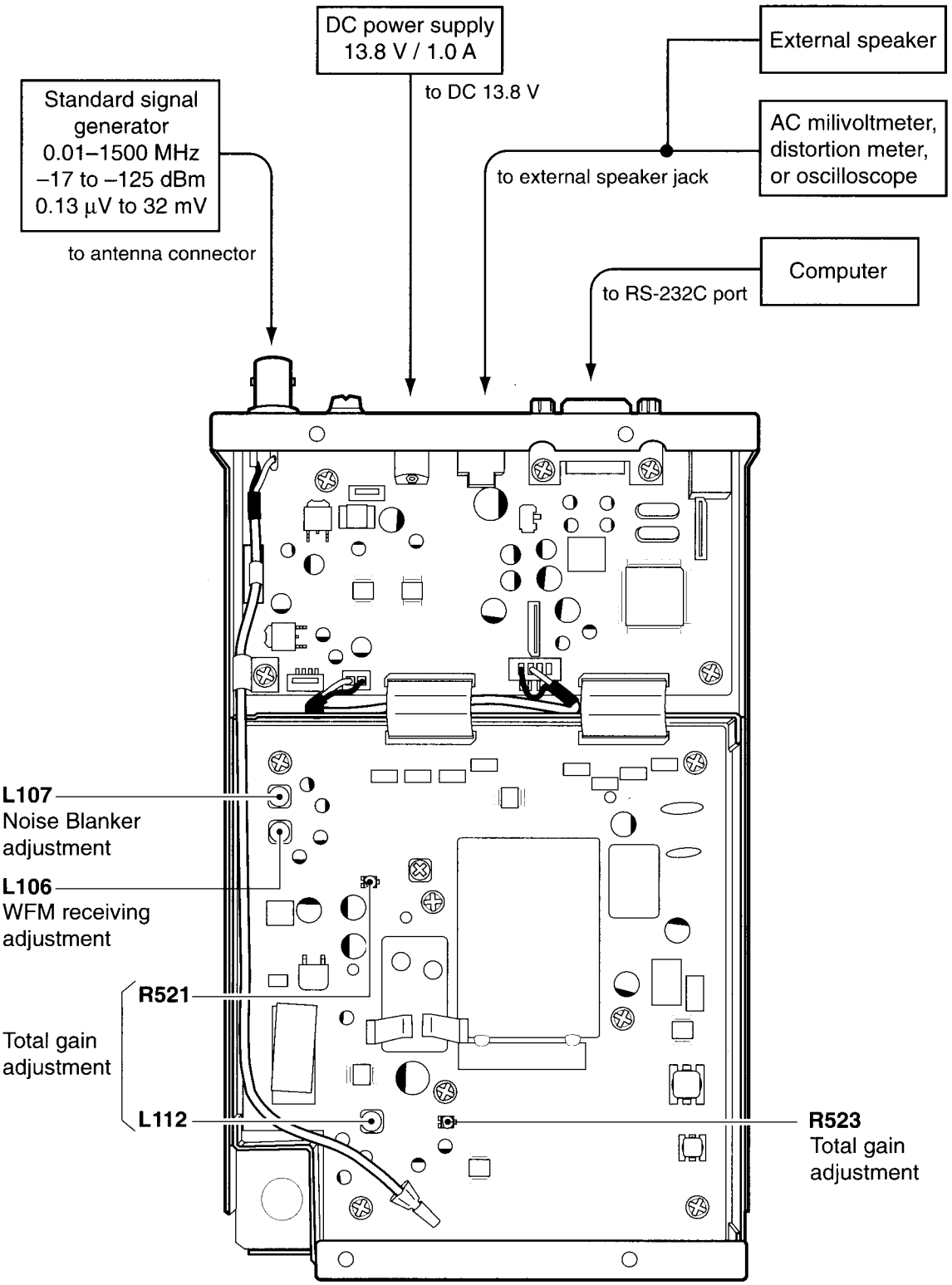
*This output level of a standard signal generator (SSG) is indicated as SSG's open circuit.


DC power supply
13.8 V / 1.0 A
to DC 13.8 V
to RS-232C port
Computer
CP2
1st LO lock voltage
check point
CP4
Reference frequency
check point
CP9
LCT voltage
check point
CP3
2nd LO lock voltage
check point

5-3 RECEIVE ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
TOTAL GAIN	1	• Display freq. : 149.97000 MHz • Mode : USB • Filter : 3.0 kHz • Set an SSG as : Frequency : 149.97015 MHz Level : 1.8 µV* (–102 dBm) Modulation : OFF • Receiving	Rear Panel	Connect an AC millivoltmeter to the [EXT SP] jack with an 8 Ω dummy load.	Maximum AF level	RF	L112
	2	• Display freq. : 149.97000 MHz • Mode : FM • Filter : 15.0 kHz • Set an SSG as : Mode : FM Level : 1.0 mV* (–47 dBm) Modulation : 1 kHz Deviation : 3.5 kHz • Receiving			Any AF level	Computer display	AF Gain
	3	• Display freq. : 149.97015 MHz • Mode : USB • Filter : 3.0 kHz • Set an SSG as : Level : 1.0 mV* (–47 dBm) Modulation : OFF • Receiving			Same AF level as step 2	RF	R523
	4	• Set an SSG as : Level : OFF • Receiving			20 dB of AF level difference as step 3		R521
WFM RECEIVER	1	• Display freq. : 149.97000 MHz • Mode : WFM • Filter : 230.0 kHz • Set an SSG as : Mode : FM Level : 1.0 µV* (–47 dBm) Modulation : 1 kHz Deviation : 75 kHz • Receiving	Rear Panel	Connect a distortion meter to the [EXT SP] jack with an 8 Ω dummy load.	Minimum distortion level	RF	L106
NOISE BLANKER	1	• Display freq. : 149.97000 MHz • Mode : USB • Filter : 3.0 kHz • NB : ON • Apply the following noise signal to the [ANT] connector.  • Receiving	Rear Panel	Connect an oscilloscope to the [EXT SP] jack with an 8 Ω dummy load.	Minimum noise level	RF	L107

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


DC power supply
13.8 V / 1.0 A
to DC 13.8 V
External speaker
AC milivoltmeter,
distortion meter,
or oscilloscope
to external speaker jack
Standard signal
generator
0.01–1500 MHz
–17 to –125 dBm
0.13 µV to 32 mV
to antenna connector
Computer
to RS-232C port
L107
Noise Blanker
adjustment
L106
WFM receiving
adjustment
R521
Total gain
adjustment
L112
R523
Total gain
adjustment

5-4 SOFTWARE ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	OPERATION
REFERENCE FREQUENCY	1	• Click adjustment item [Xtal] on the Adjustment Panel. • Connect a frequency counter to check point CP4 on the RF unit **(see page 5-4)**.	• Click "▲" or "▼" to set reference frequency to 10.250000 MHz.
TUNED BPF	1	• Click adjustment item [BPFtune] on the Adjustment Panel. • Select "BPF 4-1" at the left side of Adjustment Panel. • Manual/Auto Tune : Manual • Set an SSG as : Frequency : 50.02 MHz Level : 50 µV* (–73 dBm) Modulation : OFF • Receiving	• Move the scroll bar at the bottom side of Adjustment Panel, and set maximum S-meter level on the Control Panel. • Then, click "Write" switch to store into memory.
	2	• Same operation as step 1 for the listed frequencies. BPF 4-2 – 58.28 MHz, BPF 4-3 – 58.32 MHz, BPF 4-4 – 88.02 MHz, BPF 4-5 – 108.28 MHz, BPF 4-6 – 108.32 MHz, BPF 4-7 – 130.02 MHz, BPF 4-8 – 149.98 MHz, BPF 5-1 – 150.02 MHz, BPF 5-2 – 183.28 MHz, BPF 5-3 – 183.32 MHz, BPF 5-4 – 216.02 MHz, BPF 5-5 – 265.68 MHz, BPF 5-6 – 265.72 MHz, BPF 5-7 – 300.02 MHz, BPF 5-8 – 349.98 MHz, BPF 6-1 – 350.02 MHz, BPF 6-2 – 383.28 MHz, BPF 6-3 – 383.32 MHz, BPF 6-4 – 433.32 MHz, BPF 6-5 – 483.28 MHz, BPF 6-6 – 483.32 MHz, BPF 6-7 – 558.32 MHz, BPF 6-8 – 633.28 MHz, BPF 6-9 – 633.32 MHz, BPF 6-10 – 699.98 MHz, BPF 7-1 – 700.02 MHz, BPF 7-2 – 750.02 MHz, BPF 7-3 – 799.98 MHz, BPF 7-4 – 800.02 MHz, BPF 7-5 – 916.68 MHz, BPF 7-6 – 916.72 MHz, BPF 7-7 – 1016.68 MHz, BPF 7-8 – 1016.72 MHz, BPF 7-9 – 1166.68 MHz, BPF 7-10 – 1166.72 MHz, BPF 7-11 – 1299.98 MHz • Receiving	
S-METER	1	• Click adjustment item [Smeter] on the Adjustment Panel. • Select "FM S0" at the left side of Adjustment Panel. • Set an SSG as : Frequency : 149.97000 MHz Mode : FM Level : 0.5 µV* (–113 dBm) Modulation : OFF • Receiving	• Click "Write" switch to store sampled data into memory.
	2	• Same operation as step 1 for the listed levels. • Set an SSG as: FM S3 : 1.3 µV* (–105 dBm) FM S5 : 3.2 µV* (–97 dBm) FM S7 : 13 µV* (–85 dBm) FM S9 : 50 µV* (–73 dBm) FM S9+20 : 280 µV* (–58 dBm) FM S9+40 : 1.6 mV* (–43 dBm) FM S9+60 : 8.9 mV* (–28 dBm) WFM S0 : 0.79 µV* (–109 dBm) WFM S3 : 1.6 µV* (–103 dBm) WFM S5 : 3.2 µV* (–97 dBm) WFM S7 : 13 µV* (–85 dBm) WFM S9 : 50 µV* (–73 dBm) WFM S9+20 : 280 µV* (–58 dBm) WFM S9+40 : 1.6 mV* (–43 dBm) WFM S9+60 : 8.9 mV* (–28 dBm) • Receiving	
S-METER FLAT	1	• Click adjustment item [BPF S] on the Adjustment Panel. • Select "BPF0" at the left side of Adjustment Panel. • Set an SSG as : Frequency : 1.02 MHz Level : 50 µV* (–73 dBm) Modulation : OFF • Receiving	• Click "Write" switch to store sampled data into memory.

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

5-4 SOFTWARE ADJUSTMENT

<table>
<tr><th colspan="2">ADJUSTMENT</th><th>ADJUSTMENT CONDITION</th><th>OPERATION</th></tr>
<tr><td>REFERENCE FREQUENCY</td><td>1</td><td>• Click adjustment item [Xtal] on the Adjustment Panel.
• Connect a frequency counter to check point CP4 on the RF unit (see page 5-4).</td><td>• Click "▲" or "▼" to set reference frequency to 10.250000 MHz.</td></tr>
<tr><td>TUNED BPF</td><td>1</td><td>• Click adjustment item [BPFtune] on the Adjustment Panel.
• Select "BPF 4-1" at the left side of Adjustment Panel.
• Manual/Auto Tune : Manual
• Set an SSG as :
Frequency : 50.02 MHz
Level : 50 µV* (–73 dBm)
Modulation : OFF
• Receiving</td><td>• Move the scroll bar at the bottom side of Adjustment Panel, and set maximum S-meter level on the Control Panel.
• Then, click "Write" switch to store into memory.</td></tr>
<tr><td></td><td>2</td><td colspan="2">• Same operation as step 1 for the listed frequencies.
BPF 4-2 – 58.28 MHz
BPF 4-3 – 58.32 MHz
BPF 4-4 – 88.02 MHz
BPF 4-5 – 108.28 MHz
BPF 4-6 – 108.32 MHz
BPF 4-7 – 130.02 MHz
BPF 4-8 – 149.98 MHz
BPF 5-1 – 150.02 MHz
BPF 5-2 – 183.28 MHz
BPF 5-3 – 183.32 MHz
BPF 5-4 – 216.02 MHz
BPF 5-5 – 265.68 MHz
BPF 5-6 – 265.72 MHz
BPF 5-7 – 300.02 MHz
BPF 5-8 – 349.98 MHz
BPF 6-1 – 350.02 MHz
BPF 6-2 – 383.28 MHz
BPF 6-3 – 383.32 MHz
BPF 6-4 – 433.32 MHz
BPF 6-5 – 483.28 MHz
BPF 6-6 – 483.32 MHz
BPF 6-7 – 558.32 MHz
BPF 6-8 – 633.28 MHz
BPF 6-9 – 633.32 MHz
BPF 6-10 – 699.98 MHz
BPF 7-1 – 700.02 MHz
BPF 7-2 – 750.02 MHz
BPF 7-3 – 799.98 MHz
BPF 7-4 – 800.02 MHz
BPF 7-5 – 916.68 MHz
BPF 7-6 – 916.72 MHz
BPF 7-7 – 1016.68 MHz
BPF 7-8 – 1016.72 MHz
BPF 7-9 – 1166.68 MHz
BPF 7-10 – 1166.72 MHz
BPF 7-11 – 1299.98 MHz
• Receiving</td></tr>
<tr><td>S-METER</td><td>1</td><td>• Click adjustment item [Smeter] on the Adjustment Panel.
• Select "FM S0" at the left side of Adjustment Panel.
• Set an SSG as :
Frequency : 149.97000 MHz
Mode : FM
Level : 0.5 µV* (–113 dBm)
Modulation : OFF
• Receiving</td><td>• Click "Write" switch to store sampled data into memory.</td></tr>
<tr><td></td><td>2</td><td colspan="2">• Same operation as step 1 for the listed levels.
• Set an SSG as:
FM S3 : 1.3 µV* (–105 dBm)
FM S5 : 3.2 µV* (–97 dBm)
FM S7 : 13 µV* (–85 dBm)
FM S9 : 50 µV* (–73 dBm)
FM S9+20 : 280 µV* (–58 dBm)
FM S9+40 : 1.6 mV* (–43 dBm)
FM S9+60 : 8.9 mV* (–28 dBm)
WFM S0 : 0.79 µV* (–109 dBm)
WFM S3 : 1.6 µV* (–103 dBm)
WFM S5 : 3.2 µV* (–97 dBm)
WFM S7 : 13 µV* (–85 dBm)
WFM S9 : 50 µV* (–73 dBm)
WFM S9+20 : 280 µV* (–58 dBm)
WFM S9+40 : 1.6 mV* (–43 dBm)
WFM S9+60 : 8.9 mV* (–28 dBm)
• Receiving</td></tr>
<tr><td>S-METER FLAT</td><td>1</td><td>• Click adjustment item [BPF S] on the Adjustment Panel.
• Select "BPF0" at the left side of Adjustment Panel.
• Set an SSG as :
Frequency : 1.02 MHz
Level : 50 µV* (–73 dBm)
Modulation : OFF
• Receiving</td><td>• Click "Write" switch to store sampled data into memory.</td></tr>
</table>

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

SOFTWARE ADJUSTMENT (continued)

<table>
<tr><th colspan="2">ADJUSTMENT</th><th>ADJUSTMENT CONDITION</th><th>OPERATION</th></tr>
<tr><td>S-METER FLAT</td><td>2</td><td colspan="2">• Same adjustment as step 1 for the listed BPFs frequencies.
BPF 1 – 7.02 MHz
BPF 2 – 21.02 MHz
BPF 3 – 40.02 MHz
BPF 4-1 – 50.02 MHz
BPF 4-2 – 58.28 MHz
BPF 4-3 – 58.32 MHz
BPF 4-4 – 88.02 MHz
BPF 4-5 – 108.28 MHz
BPF 4-6 – 108.32 MHz
BPF 4-7 – 130.02 MHz
BPF 4-8 – 149.98 MHz
BPF 5-1 – 150.02 MHz
BPF 5-2 – 183.28 MHz
BPF 5-3 – 183.32 MHz
BPF 5-4 – 216.02 MHz
BPF 5-5 – 265.68 MHz
BPF 5-6 – 265.72 MHz
BPF 5-7 – 300.02 MHz
BPF 5-8 – 349.98 MHz
BPF 6-1 – 350.02 MHz
BPF 6-2 – 383.28 MHz
BPF 6-3 – 383.32 MHz
BPF 6-4 – 433.32 MHz
BPF 6-5 – 483.28 MHz
BPF 6-6 – 483.32 MHz
BPF 6-7 – 558.32 MHz
BPF 6-8 – 633.28 MHz
BPF 6-9 – 633.32 MHz
BPF 6-10 – 699.98 MHz
BPF 7-1 – 700.02 MHz
BPF 7-2 – 750.02 MHz
BPF 7-3 – 799.98 MHz
BPF 7-4 – 800.02 MHz
BPF 7-5 – 916.68 MHz
BPF 7-6 – 916.72 MHz
BPF 7-7 – 1016.68 MHz
BPF 7-8 – 1016.72 MHz
BPF 7-9 – 1166.68 MHz
BPF 7-10 – 1166.72 MHz
BPF 7-11 – 1299.98 MHz
• Receiving</td></tr>
<tr><td rowspan="2">SCOPE S</td><td>1</td><td>• Click adjustment item [Scope S] on the Adjustment Panel.
• Select "S0" at the left side of Adjustment Panel.
• Mode : FM
• Filter : 15.0 kHz
• Set an SSG as :
Frequency : 149.97000 MHz
Level : 0.32 µV* (–117 dBm)
Modulation : OFF
• Receiving</td><td>• Click "Write" switch to store sampled data into memory.</td></tr>
<tr><td>2</td><td colspan="2">• Same operation as step 1 for the listed levels.
• Set an SSG as :
S3 : 3.2 µV* (–97 dBm)
S5 : 10 µV* (–87 dBm)
S7 : 32 µV* (–77 dBm)
S9 : 100 µV* (–67 dBm)
S9+20 : 320 µV* (–57 dBm)
S9+40 : 1.0 mV* (–47 dBm)
S9+60 : 3.2 mV* (–37 dBm)
• Receiving</td></tr>
<tr><td rowspan="2">CENTER INDICATOR</td><td>1</td><td>• Click adjustment item [Center] on the Adjustment Panel.
• Select "CW low" at the left side of Adjustment Panel.
• Set an SSG as :
Frequency : 149.96700 MHz
Level : 50 µV* (–73 dBm)
Modulation : OFF
• Receiving</td><td>• Click "Write" switch to store sampled data into memory.</td></tr>
<tr><td>2</td><td>• Select "CW high" at the left side of Adjustment Panel.
• Set an SSG as :
Frequency : 149.97300 MHz
• Receiving</td><td>• Click "Write" switch to store sampled data into memory.</td></tr>
<tr><td rowspan="3">NOISE SQUELCH</td><td>1</td><td>• Click adjustment item [Noise SQL] on the Adjustment Panel.</td><td>• Click each "Write" switch for Timing and Level.</td></tr>
<tr><td>2</td><td>• Set an Adjustment panel as:
Timing : T2 — 2
T3 — 100
Level : Thresh — 20
Tight — 20</td><td>• Click "▼" then "Write" switches at 'Level' to set Thresh/Tight data until noise disappears.
NOTE: "Write" switch must be clicked at each level, otherwise the level is invalid.</td></tr>
<tr><td>3</td><td>• Set an Adjustment panel as:
Timing : T2 — 2
T3 — 4</td><td>• Click "Write" switch for Timing.</td></tr>
</table>

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