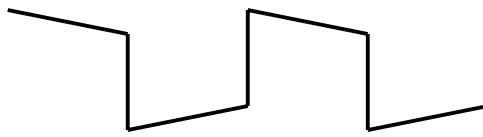


Adjustment for IC-F520

ADJUSTMENT											
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point						
Preparation		Connect the transceiver by cloning cable (OPC-1122) to a PC (IBM compatible) and boot up the cloning software.									
Check points		Be sure to use a tester with more than 50 kohm/V internal resistance during each test.									
Lock Voltage Adjustment		Set the transceiver to the 136 MHz and set the LV voltage as follows C133 during RX, C134 during TX. <table><tr><td>Adj. Freq.</td><td>136 MHz</td></tr><tr><td>RX Side</td><td>1.4V</td></tr><tr><td>TX Side</td><td>1.0V</td></tr></table>	Adj. Freq.	136 MHz	RX Side	1.4V	TX Side	1.0V	1.4V 1.0V	C133 C134	LV
Adj. Freq.	136 MHz										
RX Side	1.4V										
TX Side	1.0V										
Lock Voltage Check		Set the transceiver to the 174 MHz and check that each value is within following values. <table><tr><td>Adj. Freq.</td><td>174 MHz</td></tr><tr><td>RX Side</td><td>3.5V~4.5V</td></tr><tr><td>TX Side</td><td>3.0V~4.0V</td></tr></table>	Adj. Freq.	174 MHz	RX Side	3.5V~4.5V	TX Side	3.0V~4.0V	3.5V~4.5V 3.0V~4.0V		LV
Adj. Freq.	174 MHz										
RX Side	3.5V~4.5V										
TX Side	3.0V~4.0V										
Frequency Adjustment		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 following values. <table><tr><td>Set Frequency</td><td>Set Freq. ± 500 Hz</td></tr></table>	Set Frequency	Set Freq. ± 500 Hz	±500Hz	Adj. Soft TXF	ANT Con				
Set Frequency	Set Freq. ± 500 Hz										

ADJUSTMENT													
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point								
TX Output		Use adjustment software to adjust the adjustment output to the following values. <table><tr><td>Adj. Freq.</td><td>Greatest Low Band Freq.</td></tr><tr><td>Hi Power</td><td>25.0W</td></tr><tr><td>L2 Power</td><td>10.0W</td></tr><tr><td>L1 Power</td><td>2.5W</td></tr></table>	Adj. Freq.	Greatest Low Band Freq.	Hi Power	25.0W	L2 Power	10.0W	L1 Power	2.5W	25.0W 10.0W 2.5W	Adj.Soft Power Hi L2 L1	ANT Con
Adj. Freq.	Greatest Low Band Freq.												
Hi Power	25.0W												
L2 Power	10.0W												
L1 Power	2.5W												
TX Output Check		Check that TX output is within the following value in the range of frequency coverage. <table><tr><td>Hi Power</td><td>20.0~30.0W</td></tr><tr><td>L2 Power</td><td>8.0~12.5W</td></tr><tr><td>L1 Power</td><td>2.0~3.0W</td></tr></table>	Hi Power	20.0~30.0W	L2 Power	8.0~12.5W	L1 Power	2.0~3.0W	20-30W 8-12.5W 2.0-3.0W		ANT Con		
Hi Power	20.0~30.0W												
L2 Power	8.0~12.5W												
L1 Power	2.0~3.0W												
Current Check at TX		Check that the Hi Power current is less than the following value in the range of frequency coverage. <table><tr><td>Hi Power</td><td>Less than 7.0A</td></tr></table>	Hi Power	Less than 7.0A	Less 7.0A								
Hi Power	Less than 7.0A												
Checking Spurious		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 at Hi power, check that spurious is less than the following value in the range of frequency coverage in the bandwidth. <table><tr><td>Spurious</td><td>Less than -70dB of the carrier power</td></tr></table>	Spurious	Less than -70dB of the carrier power	Less than -70 dB		ANT Con						
Spurious	Less than -70dB of the carrier power												

ADJUSTMENT													
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point								
Preparation for checking modulation adjustment		During the measurements, set the modulation analyzer as follows when there is no specific requirement. <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 after setting above conditions, through the attenuator to the antenna terminal. Connect an oscillo-scope, 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.	HPF	OFF	LPF	20 kHz	De-Emphasis	OFF	Detector	(P-P)/2			
HPF	OFF												
LPF	20 kHz												
De-Emphasis	OFF												
Detector	(P-P)/2												
Modulation Balance Adjustment		Use the adjustment software to adjust the modulation analyzer's detection output horizontal line so that it becomes a Straight line as follows. <table><tr><td>Adjust. Freq.</td><td>Near Center Frequency</td></tr></table> 	Adjust. Freq.	Near Center Frequency	Detection Output	Adj. Soft Balance	ANT Con						
Adjust. Freq.	Near Center Frequency												
Deviation Adjustment		Set the CR oscillator to a 1 kHz sine wave, 40mVrms, and supply the signal to the external mic terminal. Turn 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>	Adjust. Freq.	Near Center Frequency	WIDE	± 4.10 ± 0.05 kHz	NARROW	± 2.10 ± 0.05 kHz	± 4.05 ~ ±4.15kHz ± 2.05 ~ ±2.15kHz	Adj. Soft MOD W MOD N	ANT Con		
Adjust. Freq.	Near Center Frequency												
WIDE	± 4.10 ± 0.05 kHz												
NARROW	± 2.10 ± 0.05 kHz												

ADJUSTMENT													
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point								
Checking Modulation		Check that the deviation in the range of frequency coverage is following values. <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>	WIDE	± 3.60 ~ 4.50 kHz	NARROW	± 1.80 ~ 2.30 kHz	± 3.6 ~ ±4.5kHz ± 1.8 ~ ±2.3kHz		ANT Con				
WIDE	± 3.60 ~ 4.50 kHz												
NARROW	± 1.80 ~ 2.30 kHz												
Checking Modulation		Check that the modulation in the range of frequency coverage is as follows. <table><tr><td>WIDE/NARROW</td><td>2.8 ~ 6 mV rms</td></tr></table> WIDE:±3 KHz DEV ; NARROW:±1.5 KHz DEV	WIDE/NARROW	2.8 ~ 6 mV rms	2.8-6mV rms		ANT Con						
WIDE/NARROW	2.8 ~ 6 mV rms												
CTCSS Deviation Adjustment		Connect a linear detector via the attenuator to the antenna terminal, Set the transceiver to wide ch and CTCSS 88.5Hz. Transmit the transceiver with no input 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>	Adjust. Freq.	Near Center Frequency	WIDE	± 0.7 kHz	±0.7kHz	Adj.Soft CTCS/DTCS	ANT Con				
Adjust. Freq.	Near Center Frequency												
WIDE	± 0.7 kHz												
Checking CTCSS/DTCS/2/5 TONE/DTMF DEVIATION		Set the transceiver with following signaling type to perform the measurements. DTCS CODE 007 CTCSS 88.5 Hz 5 TONE CCIR 11111 DTMF # (Auto Dial Setting) 2 TONE 349.0 Hz check that each version in the range of frequency is following values, 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~± 0.50kHz</td></tr><tr><td>Narrow 2/5 TONE/DTMF</td><td>± 1.20~± 1.80kHz</td></tr></table>	Wide CTCSS/DTCS	± 0.50~± 0.90kHz	Wide 2/5 TONE/DTMF	± 2.40~± 3.60kHz	Narrow CTCSS/DTCS	± 0.25~± 0.50kHz	Narrow 2/5 TONE/DTMF	± 1.20~± 1.80kHz	±0.5-0.9kHz ±2.4-3.6kHz ±.25-.50kHz ±1.2-1.8kHz		ANT Con
Wide CTCSS/DTCS	± 0.50~± 0.90kHz												
Wide 2/5 TONE/DTMF	± 2.40~± 3.60kHz												
Narrow CTCSS/DTCS	± 0.25~± 0.50kHz												
Narrow 2/5 TONE/DTMF	± 1.20~± 1.80kHz												

ADJUSTMENT															
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point										
Checking TX S/N		Connect a linear detector via the attenuator to the antenna terminal, and set to the following conditions. 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 that the deviation is 70%(WIDE:3.5KHz,NAR:1.75KHz) of the maximum permissible deviation. Check that the TX S/N in the range of the Frequency coverage is more than the following values.	Over 40dB Over 34dB		ANT Con										
		<table><tr><td>WIDE</td><td>More than 40 dB</td></tr><tr><td>NARROW</td><td>More than 34 dB</td></tr></table>				WIDE	More than 40 dB	NARROW	More than 34 dB						
WIDE	More than 40 dB														
NARROW	More than 34 dB														
Adjusting RX		during the measurements set the signal Generator as follows when there is no special requirements. <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> Turn the transceiver wide channel and set the signal generator as follows. <table><tr><td>Adjust Freq.</td><td>The lowest frequency</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) ~ (T4) with the adjustment software to gain the maximum sensitivity.	Modulation Freq.	1kHz	WIDE	± 3.5 kHz	NARROW	± 1.75 kHz	Adjust Freq.	The lowest frequency	SG Input level	+20 dBu		Adj.Soft	RSSI Line
		Modulation Freq.	1kHz												
WIDE	± 3.5 kHz														
NARROW	± 1.75 kHz														
Adjust Freq.	The lowest frequency														
SG Input level	+20 dBu														

ADJUSTMENT													
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point								
Checking RX Sensitivity		Check that the signal generator level is as follows when the distortion meter shows 12 dB SINAD in the range of frequency coverage. <table><tr><td>RX Sensitivity</td><td>Less than -10 dBu</td></tr></table> Use the same check method for Narrow channels also.	RX Sensitivity	Less than -10 dBu	Less-10dB		ANT Con SP Jack						
RX Sensitivity	Less than -10 dBu												
Adjusting the S3 LEVEL		This Adjustment should be perform after the RX sensitivity adjustment finished. Set the signal generator following setting for wide channels. <table><tr><td>Adjust Freq.</td><td>Near 136 MHz</td></tr><tr><td>SG Input level</td><td>+23 dBu</td></tr><tr><td>Modulation Freq.</td><td>1kHz</td></tr><tr><td>WIDE</td><td>± 3.5 kHz</td></tr></table> S3 SET COMMAND with the Adjustment software.	Adjust Freq.	Near 136 MHz	SG Input level	+23 dBu	Modulation Freq.	1kHz	WIDE	± 3.5 kHz	Adj.Soft S-METER S3 Level		ANT Con
Adjust Freq.	Near 136 MHz												
SG Input level	+23 dBu												
Modulation Freq.	1kHz												
WIDE	± 3.5 kHz												
Adjusting the S1 LEVEL		Set the signal generator level to the following value. <table><tr><td>SG Output Level</td><td>-7 dBu</td></tr></table> S1 SET COMMAND with the Adjustment software.	SG Output Level	-7 dBu	Adj.Soft S-METER S1 Level		ANT Con						
SG Output Level	-7 dBu												

ADJUSTMENT													
Adjustment	No.	Adjustment Condition & Tuning	Value	Ref. No.	CK. Point								
Adjusting the Squelch		turn the transceiver to the narrow channel at center frequency. Set the signal generator to as following. <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>-14 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.	Modulation Freq.	1kHz	WIDE	± 3.5 kHz	NARROW	± 1.75 kHz	SG Output Level	-14 dBu		Adj.Soft SQL	ANT Con
Modulation Freq.	1kHz												
WIDE	± 3.5 kHz												
NARROW	± 1.75 kHz												
SG Output Level	-14 dBu												
Checking Squelch Sensitivity		Check that the squelch opening point value in the range of frequency condition is as follows. <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 range of frequency condition.	Squelch Sensitivity	Less than -10 dBu	Less-10dB		ANT Con						
Squelch Sensitivity	Less than -10 dBu												

ADJUSTMENT									
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 Is as below. <table><tr><td>AF Output</td><td>More than 3.5 W</td></tr></table>	AF Output	More than 3.5 W	Over 3.5 W @ 4 ohm load		ANT Con SP Jack		
AF Output	More than 3.5 W								
Checking RX S/N		Set the signal generator output level to +60 dBu. Adjust the AF volume so that the AF output reaches 50% of the rated value. Check that the RX S/N in the range of frequency is as following values. <table><tr><td>WIDE</td><td>More than 40 dB</td></tr><tr><td>NARROW</td><td>More than 34 dB</td></tr></table>	WIDE	More than 40 dB	NARROW	More than 34 dB	Over 40dB Over 34dB		ANT Con SP Jack
WIDE	More than 40 dB								
NARROW	More than 34 dB								
Checking Howling		Set the signal generator output to +60 dBu as in RX adjustment with no deviation. 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 following value. <table><tr><td>Max. RX Current</td><td>Less than 1200 mA</td></tr></table>	Max. RX Current	Less than 1200 mA	Less than 1200mA		PWR Con		
Max. RX Current	Less than 1200 mA								