

CONFIDENTIALITY REQUESTEDFunction of RF Semiconductors & Other Active Devices

Part Number	Ref. Designator	Application	Description
4802233J09	D6751	Charge pump diode	ROHM IMN10T108 diode triple
4802233J09	D6752	Charge pump diode	ROHM IMN10T108 diode triple
4802482J02	D6701	Antenna switch	M/A-Com MA4P959 PIN diode
4802482J02	D6702	Antenna switch	M/A-Com MA4P959 PIN diode
4805218N57	D6730	Tx forward power detector	ROHM RB715f dual Schottky diode
4805218N57	D6731	Tx reverse power detector	ROHM RB715f dual Schottky diode
4805921T04	Q6753	VCO dc power switch	ROHM FMC1AT148 Transistor
4805921T04	Q6755	VCO dc power switch	ROHM FMC1AT148 Transistor
4805921T04	Q6756	VCO dc power switch	ROHM FMC1AT148 Transistor
4805921T04	Q6760	VCO dc power switch	ROHM FMC1AT148 Transistor
4809527E01	RX VC0, Q1	Rx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	RX VC0, Q2	Rx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	RX VC0, Q3	Rx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	RX VC0, Q4	Rx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	TX VC0, Q1	Tx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	TX VC0, Q2	Tx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	TX VC0, Q3	Tx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E01	TX VC0, Q4	Tx VCO amplifier	California Eastern Labs NE85633 Transistor
4809527E41	Q6761	Prescaler buffer amplifier	Infineon IRF949TE6700 Transistor
4809527E41	Q6762	Rx buffer amplifier	Infineon IRF949TE6700 Transistor
4809527E41	Q6764	Tx buffer amplifier	Infineon IRF949TE6700 Transistor
4809527E41	Q6765	Tx buffer amplifier	Infineon IRF949TE6700 Transistor
4809527E41	Q6766	Tx buffer amplifier	Infineon IRF949TE6700 Transistor
4809579E16	Q0954	Power control	Vishay TN0200T-T1 N-channel MOSFET
4809579E16	Q0955	Power control	Vishay TN0200T-T1 N-channel MOSFET
4813824A10	Q6757	Charge pump amplifier	On Semiconductor MMBT3904LT1 Transistor

4813824A10	Q6758	Charge pump amplifier	On Semiconductor MMBT3904LT1 Transistor
4813824A17	Q6759	Charge pump amplifier	On Semiconductor MMBT3904LT1 Transistor
4813828A09	Q6520	Tx driver amplifier	Motorola MRF1517T1 LDMOS amplifier
4813828C46	Q6540	Tx power amplifier	Motorola MRF9045MDR1 LDMOS amplifier
4813828C46	Q6541	Tx power amplifier	Motorola MRF9045MDR1 LDMOS amplifier
4813830A14	VR0950	Power control	ON Semiconductor MMBZ5231BLT1 zener diode
4813833C02	D0950	Power control	ON Semiconductor MMBD6100LT1 diode
4813833C02	D0951	Power control	ON Semiconductor MMBD6100LT1 diode
4813833C02	D0952	Power control	ON Semiconductor MMBD6100LT1 diode
4813833C02	D6750	Power control	ON Semiconductor MMBD6100LT1 diode
4862824C01	RX VCO, D1	Rx VCO varactor diode	Toshiba 1SV229(TPH3) Diode
4862824C01	RX VCO, D1	Rx VCO varactor diode	Toshiba 1SV229(TPH3) Diode
4862824C01	TX VCO, D1	Tx VCO varactor diode	Toshiba 1SV229(TPH3) Diode
4862824C01	TX VCO, D1	Tx VCO varactor diode	Toshiba 1SV229(TPH3) Diode
4880048M01	Q0951	Power control	ROHM DTC144EK NPN switching transistor
4885844C01	Q0952	Power control	Vishay P-channel MOSFET
5105492X03	U6752	Reference oscillator buffer	Toshiba TC7SH04FU(T5LMOT) Not gate
5113819A14	U0955	Power control	ON Semiconductor MC33204 operational amplifier
5113819A14	U0957	Power control	ON Semiconductor MC33204 operational amplifier
5113819A14	U0960	Power control	ON Semiconductor MC33204 operational amplifier
5185130C65	U6500	Tx predriver amplifier	Motorola VHF/UHF/800 MHZ LDMOS driver amplifier
5185143E05	U0959	Power control	Maxim MAX5258 digital to analog converter
5185143E07	Y6750	16.8 MHz reference oscillator	Toyocom ISD4-2A-5624 Reference oscillator IC
5185143E16	U0953	Power control	Analog Devices AD7812 analog to digital converter
5185353D35	U0952	Power control	Maxim MAX5452 digital potentiometer
5185353D92	U6541	Current sensor	Texas Instruments INA138 current shunt monitor

5185956E24	U0956	Power control	National Semiconductor LM6484 operational amplifier
5185963A15	U6540	Temperature sensor	National Semiconductor LM50C temperature sensor
5185963A27	U6751	Frequency synthesizer	Atmel AT25016-0T2T frequency synthesizer IC
5186258W01	Q6763	Rx buffer amplifier	M/A-Com MAALSS0017TR Transistor

COMMENTS: The Motorola designators are special code numbers for active devices used in Motorola radios. These devices are either identical or derived from the device family listed under Source, by the manufacturer or are proprietary to Motorola. Service people do not have access to any cross-references or given any information on proprietary devices and are prevented from making unauthorized substitution.

TUNE-UP PROCEDURE

Setup Procedures

1. Connect radio to the computer using programming cable.
2. Connect radio antenna port to Modulation Analyzer.
3. Power up radio and all equipment.
4. Launch the XTL 5000 radio tuner software and click on the “read device” icon. A window will open with a list of the various parameters that may be tuned on this radio. Double click on the parameter to be tuned and follow the instructions below.

Transmitter Alignment Procedure

PA Bias 1

1. Set power supply voltage and current limit.
2. Enter PA Bias 1 alignment screen. When screen is entered, radio enters special bias tune mode and radio current increases by approximately 100 mA.
3. Read baseline current from current meter on power supply.
4. Add baseline current to device bias current to calculate target current.
5. Left-click the Bias Toggle button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved.
7. Left-click the Bias Toggle button to remove bias from gate of device.
8. Left-click the Program All button to save tuned value.
9. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

PA Bias 2

1. Set power supply voltage and current limit.
2. Enter PA Bias 2 alignment screen. When screen is entered, radio enters special bias tune mode and radio current increases by approximately 100 mA.
3. Read baseline current from current meter on power supply.
4. Add baseline current to device bias current to calculate target current.
5. Left-click the Bias Toggle button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved.
7. Left-click the Bias Toggle button to remove bias from gate of device.
8. Left-click the Program All button to save tuned value.
9. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

PA Bias 3

1. Set power supply voltage and current limit.
2. Enter PA Bias 3 alignment screen. When screen is entered, radio enters special bias tune mode and radio current increases by approximately 100 mA.
3. Read baseline current from current meter on power supply.
4. Add baseline current to device bias current to calculate target current.
5. Left-click the Bias Toggle button to apply bias to gate of device.
6. Adjust softpot value until target current is achieved.
7. Left-click the Bias Toggle button to remove bias from gate of device.
8. Left-click the Program All button to save tuned value.
9. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Reference Oscillator

1. Enter Reference Oscillator alignment screen.
2. For R-2670 analyzer, enter test frequency displayed in "RF control" section and under "Meter" section choose RF DISPLAY.
3. Left-click PTT Toggle button to transmit at indicated frequency.
4. Wait five seconds so that analyzer stabilizes and then adjust softpot value to obtain frequency as close as possible to indicated frequency.
5. Left-click the PTT Toggle button to disable transmit mode.
6. Left-click the Program All button to save tuned value.
7. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Power Detection Calibration

1. Set power supply voltage and current limit.
2. Enter Power Detection Calibration alignment screen.
3. Left-click the PTT Toggle button to transmit at indicated frequency.
4. Adjust softpot value until target power is achieved.
5. Left-click the PTT Toggle button to disable transmit mode.
6. Left-click the Program All button to save tuned value.
7. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Tx Power Characterization

1. Set power supply voltage and current limit.
2. Enter Tx Power Characterization alignment screen.
3. Left-click in upper left box under Measured Power 1. Green circle will appear to the left of box indicating active characterization point.
4. Left-click the PTT Toggle button to transmit at indicated frequency and record power measurement with 0.1 W resolution.

5. Left-click the PTT Toggle button to disable transmit mode.
6. Enter power measurement with 0.1 W resolution overwriting any value that may reside in the box from previous tuning.
7. Left-click in upper left box under Measured Power 2. Green circle will appear to the left of box indicating active characterization point.
8. Repeat 4-6.
9. Repeat 3-8 for all frequencies (rows) indicated.
10. Left-click the Program All button to save tuned value.
11. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Tx Current Limit

1. Set power supply voltage and current limit.
2. Enter Tx Current Limit alignment screen.
3. Adjust any one of the softpots to maximum (255) and left-click Program All button. This disables current limiting.
4. Left-click in first (top) frequency softpot box.
5. Left-click the PTT Toggle button to transmit and record radio transmit current. Radio will transmit at high power level indicated by CPS.
6. Left-click the PTT Toggle button to disable transmit mode.
7. Repeat 4-6 for all test frequencies.
8. Left-click in softpot box for test frequency with highest current.
9. Left-click PTT Toggle button and adjust the softpot until transmit power drops 5%.
10. Add required offset to softpot value and left-click PTT Toggle button to disable transmit mode.
11. Left-click Program All to save tuned value.
12. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Tx Deviation Balance

1. Enter Tx Deviation Balance alignment screen.
2. Left-click PTT Tone Low button.
3. Left-click in first (top) test frequency softpot box.
4. Left-click the PTT Toggle button to transmit and wait 5 seconds so that voltage on R-2670 or deviation shown on 8901 series analyzer stabilizes.
5. Measure and record the ac voltage value from the R-2670 analyzer or deviation value from 8901 series analyzer.
6. Left-click PTT Tone High button.
7. Adjust the softpot value until measured deviation/voltage is within +/- 1.5% of the value recorded for low tone.
8. Left-click PTT Toggle button to disable transmit mode.
9. Repeat 2-8 for all test frequencies indicated.
10. Left-click Program All to save tuned value.

11. Left-click Close button to close the screen and return to the Transmitter Alignment menu.

Tx Deviation Limit

1. Enter Tx Deviation Limit alignment screen.
2. Left-click in first (top) test frequency softpot box.
3. Left-click the PTT Toggle button to transmit and wait 5 seconds so that deviation/voltage displayed on analyzer stabilizes.
4. Adjust softpot deviation limit to within 0.158-0.163 Vac (2.785-2.885 kHz) on R-2670.
5. Left-click PTT Toggle button to disable transmit mode.
6. Repeat 2-5 for all test frequencies indicated.
7. Left-click Program All to save tuned value.
8. Left-click Close button to close the screen and return to the Transmitter Alignment menu.