

**CONFIDENTIALITY REQUESTED****Function of RF Semiconductors & Other Active Devices**

<b>Part Number</b>	<b>Reference Number</b>	<b>Description</b>	<b>Manufacturer</b>
4802233J09	D5750,D5751,D5900	DIODE TRIPLE SOT25-RH	ROHM CORP
4802482J02	D5701,D5702,D5703	PIN DIODE SMD	M A COM INC
4805218N55	Q5401	TRANSISTOR 3 LEAD BFG67	PHILIPS SEMICONDUCTORS
4805218N57	D0501	DIODE DUAL	ROHM CORP
4805218N63	Q5002,Q5003,Q5252,Q5501,Q5755,Q5825,Q5826,Q5828,Q5829,Q5902,Q5904,Q5906	RF TRANS SOT 323 BFG67W	PHILIPS SEMICONDUCTORS
4805649Q13	D5003	DIODE VCTR ISV 228	TOSHIBA AMERICA INC
4805656W09	VR0400,VR0402,VR0412,VR0413	DIODE QUAD 20 VOLT ZENER	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4805656W10	VR0404,VR0405,VR0406,VR0407,VR0422,VR0423,VR0424,VR0425	DIODE DUAL 15 VOLT ZENER	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4805656W39	VR0411	QUAD ESD SUPPRESSOR ARRAY -41206ESD	COOPER ELECTRONIC TECHNOLOGIES INC
4805723X03	Q0403,Q0610,Q0611,Q0612,Q0613,Q0960	TRANS DUAL NPN-PNP UMD3N ROHM	ROHM CORP
4805793Y01	Q5901,Q5903,Q5905	TRANS MINI SOT NPN LOW NOISE	CALIFORNIA EASTERN LABORATORIES INC
4805921T04	Q5706,Q5707,Q5708,Q5709,Q5710	XISTOR FMC1 RH REELED	ROHM CORP
4809579E16	Q0954,Q0955	TSTR MOSFET N-CHAN TN0200T	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4809877C13	D5002	DIODE VARACTOR ISV305 SMD	TOSHIBA AMERICA INC
4809995L05	Y0100	XTAL QUARTZ 32.768KHZ CC4V-T1	SWATCH GROUP INC
4813821A09	Q0503	TSTR P-CH 60V 12A _2955_	MOTOROLA SEMICONDUCTOR PRODUCTS
4813824A10	Q5001,Q5250,Q5251,Q5254,Q5255,Q5750,Q5751	TSTR NPN 40V .2A GEN PURP	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813824A17	Q5253,Q5256,Q5258,Q5752	XSTR PNP40V .2A GENP B=100-300	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813825A05	D5704,D5705	DIODE 30V HOT CARRIER MMBD301L	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813828C44	Q5503	TSTR UHF 70W 12.5 VOLTS LD MOS	MOTOROLA SEMICONDUCTOR PRODUCTS
4813830A14	VR0500	DIODE 5.1V 5% 225MW MMBZ5231B_	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813830A24	VR0420,VR0421,VR0501	DIODE 11V 5% 225MW MMBZ5241B_	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813832C75	VR0408,VR0410,VR0414,VR0417,VR0418	DIODE ZENER QU O	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813832C77	VR0950	TRANS SUP .24V HIGH PWR	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4813833C02	D0950,D0951,D0952,D0954,D5833	DIODE DUAL 70V '5B' COMM CATH	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC

4862824C01	D5250,D5251,D5252,D5253,D5832,D5901,D5902,D5903,D5904,D5905,D5906,D5907,D5908,D5909,D5910,D5911,D5912	DIODE VARACTOR	TOSHIBA AMERICA INC
4862824C03	D5827,D5828,D5831	DIODE VARACTOR	TOSHIBA AMERICA INC
4880048M01	Q0200,Q0402,Q0404,Q0500,Q0501,Q0502,Q0504,Q0505,Q0951,Q5257,Q5402,Q5570,U0400	TSTR NPN DIG 47K/47K	ROHM CORP
4880154K03	D5280,D5281,D5282,D5400	DIODE DUAL SCHOTTKY MIXER	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4880154K06	D5300,D5302,D5304,D5305	DIODE PIN SCHOTTKY	AVNET
4882290T04	D5380,D5381	DIODE SI HOT CARRIER HSMS 2812	
4885230C01	Y5400,Y5401	109.65MHZ FILTER 3RD OVERTONE	TOYOCOM USA INC
4885593E04	Y5900	RESONATOR 6MMX6MM COPPER DIELECTRIC COAXIAL RESONATOR	MURATA
4885593E05	Y5901	RESONATOR 6MMX6MM COPPER DIELECTRIC COAXIAL	MURATA
4885593E06	Y5902	RESONATOR 6MMX6MM COPPER DIELECTRIC COAXIAL	MURATA
4885757E02	U5826	RESONATOR 4MM X 4MM COPPER DIELECTRIC COAXIAL	MURATA
4885757E03	U5825	RESONATOR 4MMX4MM COPPER DIELECTRIC COAXIAL	MURATA
4885844C01	Q0952	XSTR FET	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
4886212B01	Q5502	LD MOS PWR TSTR MRF 1518	MOTOROLA SEMICONDUCTOR PRODUCTS
5105109Z31	U0606	IC QUAD 2:1 MUX/DEMUX	TEXAS INSTRUMENTS INCORPORATED
5105109Z38	U0200	3 VOLT LINEAR PCM CODEC FILTER	MOTOROLA SEMICONDUCTOR PRODUCTS
5105492X03	U5751	IC SNG HI SPD L-MOS NOT GATE	TOSHIBA AMERICA INC
5105625U25	U0950,U0951	IC 9.3V REG 2941	NATIONAL SEMICONDUCTOR CORP
5109522E17	U0105,U0307,U0601,U0605,U0609,U0610,U0954,U0958	IC SNGL NAND TC7S00FU	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5109522E53	U0402,U0508,U0963	IC SNGL BUF NC7S125P5X SC70	FAIRCHILD SEMICONDUCTOR CORPORATION
5109522E74	U0308,U0607,U0608	IC 2-INPUT AND GATE	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5113805B33	U5753	IC 8CH MUX/DEMUX	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5113805B39	U0902	IC MUX/DEMUX, TRIP 2-CH ANALOG	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5113816A07	U0503,U0505,U5301	REG 5V POS 500MA MC78M05BDTRK	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5113818A14	U0604	IC DL OP AMP RAIL TO RAIL	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5113819A14	U0201,U0955,U0957,U0960	IC QD OP AMP _33204_	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC

5113837A15	U0103,U0104,U0300,U0303,U0602,U0603	IC 3.3V QUAD BUFFER	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5162852A79	U0203,U0208,U0209,U0210,U0401	IC MOS TTL SPDT ANALOG SC70	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5183308X01	U0500,U5570	IC, LM2941, TO DRPOUT RGTR	NATIONAL SEMICONDUCTOR CORP
5185130C65	U5303,U5501	IC VHF/UHF/800 MHZ LDMOS DRIVER	MOTOROLA SEMICONDUCTOR PRODUCTS
5185130C83	U5300	IC 15DB DIGITAL ATTEUATOR SOT25 PKG	M A COM INC
5185143E05	U0959	IC DAC OCTAL 8 BIT	NATIONAL SEMICONDUCTOR CORP
5185143E16	U0953	IC ANALOG TO DIGITAL CONVERTER	ANALOG DEVICES INC
5185143E43	U0901	IC 23 MACROCELL CPLD	SEIKO INSTRUMENTS INC.
5185143E57	U0506	CMOS TIMER-LMC555CM	NATIONAL SEMICONDUCTOR CORP
5185143E67	U0206	IC LM1971-62 DB LOG POT	NATIONAL SEMICONDUCTOR CORP
5185143E68	U0903,U0965	IC LM7219 HIGH SPEED COMPARATOR	NATIONAL SEMICONDUCTOR CORP
5185353D14	U0962,U5001,U5750	IC SOT23-5 HI PRECISION REG 3V	NATIONAL SEMICONDUCTOR CORP
5185353D35	U0202,U0952	IC DUAL EEPOT 256 TAP	MAXIM INTEGRATED PRODUCTS INC
5185353D46	U0504	IF 4.3V VOLTAGE DETECTOR	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5185353D55	U0501,U0502,U0507	IC VOLTAGE REGULATOR 100MZ ADJ	SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5185353D92	U5503	IC CURRENT SHUNT MONITOR	TEXAS INSTRUMENTS INCORPORATED
5185353D94	U0305	IC RS232 TRANSCEIVER	STMICROELECTRONIC S
5185368C83	U0900	IC 12 BIT DAC	ANALOG DEVICES INC
5185623B01	U0102	HIGH SPEED CMOS INVERTER	TOSHIBA AMERICA INC
5185633C34	U0001	MODULE RAM/MEMORY	MOTOROLA SCOG CGISS
5185794L01	U0204	AUDIO AMP TAPE AND REEL	PHILIPS SEMICONDUCTORS
5185956E24	U0956	QUAD OP AMP RAIL TO RAIL 14	NATIONAL SEMICONDUCTOR CORP
5185963A15	U5502	IC TEMPERTURE SENSOR 1M50C	NATIONAL SEMICONDUCTOR CORP
5185963A27	U5752	IC TESTED AT25016 48 PIN GFP	ATMEL CORP
5185963A85	U5002	IC-ABACUS III-LP	ANALOG DEVICES INC
5185963A87	U5400	IC ATTENUATOR	M A COM INC
5186258W01	U5302	IC GAAS RF GAIN STAGE	M A COM INC
5187970L15	U0304	IC USB TRANS FULL-SPEED	PHILIPS SEMICONDUCTORS
6583049X16	F0400	FUSE 5A FAST ACT	LITTELFUSE INC
9185130D01	FL0900	FLTR SW CAP 3 POLE BUTTERW	MAXIM INTEGRATED PRODUCTS INC

5185143E07

Y5750

IC 16.8 MHZ REF OSC .8 PPM

Toyocom

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 200 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 200 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 30 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 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 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.