

TRANSISTOR, DIODE, AND IC FUNCTIONS

RULE PART NUMBER: 2.1033 c (10)

**MDP TRANSCEIVER**

<b><u>Manufacturer Part#</u></b>	<b><u>JDT Part#</u></b>	<b><u>References</u></b>	<b><u>Function</u></b>
BB535	623-5005-022	CR139	Diode for Cap Multiplier
MMBV609	623-5005-023	CR140	2nd LO Tuning Varactor
MMBV3401	623-1504-001	CR202	Transmit to Receive Switch
BB535	623-5005-022	CR210	RX Front End 2 Pole Preselector Main RX
BB535	623-5005-022	CR211	RX Front End 2 Pole Preselector Main RX
MMBD6050	623-1504-002	CR220	LNA Overload Protection Diode Main RX
BB535	623-5005-022	CR230	RX Front End 3 Pole Preselector Main RX
BB535	623-5005-022	CR231	RX Front End 3 Pole Preselector Main RX
BB535	623-5005-022	CR232	RX Front End 3 Pole Preselector Main RX
BB535	623-5005-022	CR233	RX Front End 3 Pole Preselector Main RX
BB535	623-5005-022	CR236	RX Front End 3 Pole Preselector Main RX
BB535	623-5005-022	CR237	RX Front End 3 Pole Preselector Main RX
BZX84C	623-2016-519	CR30	Flash Voltage Switch
BB535	623-5005-022	CR310	RX Front End 2 Pole Preselector Diversity RX
BB535	623-5005-022	CR311	RX Front End 2 Pole Preselector Diversity RX
MMBD6050	623-1504-002	CR320	LNA Overload Protection Diode Diversity RX
BB535	623-5005-022	CR330	RX Front End 3 Pole Preselector Diversity RX
BB535	623-5005-022	CR331	RX Front End 3 Pole Preselector Diversity RX
BB535	623-5005-022	CR332	RX Front End 3 Pole Preselector Diversity RX
BB535	623-5005-022	CR333	RX Front End 3 Pole Preselector Diversity RX
BB535	623-5005-022	CR336	RX Front End 3 Pole Preselector Diversity RX
BB535	623-5005-022	CR337	RX Front End 3 Pole Preselector Diversity RX
BZX84C	623-2016-519	CR453	Protection Diode
BZX84C	623-2016-519	CR456	Protection Diode
BZX84C	623-2016-519	CR457	Protection Diode
BZX84C	623-2016-519	CR485	Protection Diode
BZX84C	623-2016-519	CR486	Protection Diode
BZX84C	623-2016-519	CR488	Protection Diode
MR2535L	623-2906-001	CR600	Voltage Suppressor
BB535	623-5005-022	CR605	Power Control Diode
BB535	623-5005-022	CR610	TX Enable Diode
BB535	623-5005-022	CR614	Drop V Below Op-Amp Rail V for Current Sense
BB535	623-5005-022	CR616	Drop V Below Op-Amp Rail V for Current Sense
MMBD701LT1	623-1504-016	CR620	Antenna Switch
BZX84C	623-2016-519	CR630	Power Control Limit
MA47059	623-1504-032	CR640	Antenna Switch
MA47059	623-1504-032	CR650	Antenna Switch
MBAV99	623-1504-023	CR70	Negative Voltage Regulator
MBAV99	623-1504-023	CR72	Negative Voltage Regulator
BZX84C	623-2016-519	CR78	Protection Diode
BB535	623-5005-022	CR805	Diode for Cap Multiplier
BB535	623-5005-022	CR900	Modulation Varactor
BB535	623-5005-022	CR904	VCO Varactor, Freq Tuning
BB535	623-5005-022	CR906	VCO Varactor, Freq Tuning

TRANSISTOR, DIODE, AND IC FUNCTIONS (Continued)

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BB535	623-5005-022	CR908	VCO Varactor, Freq Tuning
BB535	623-5005-022	CR910	VCO Varactor, Freq Tuning
4035	623-1504-035	CR912	VCO TX Pin Shift
MUN5213T1	676-0013-046	Q10	RF Enable Override
MSD1819A	676-0013-701	Q11	Modem RF Enable
MSB1218A	676-0013-700	Q110	RX 1st LO Buffer Amplifier Active Bias
MRF9411	676-0003-618	Q111	RX 1st LO Buffer Amplifier
MSD1819A	676-0013-701	Q12	Auxiliary RF Enable
MSD1819A	676-0013-701	Q13	Auxiliary RF Enable
MSD1819A	676-0013-701	Q139	Cap Multiplier on 2nd LO VCO Buffer
MMBT918	676-0003-634	Q140	RX 2nd LO Oscillator
MMBT918	676-0003-634	Q141	2nd LO Buffer Amplifier
MUN5114T1	676-0013-032	Q20	Transceiver Enable
MUN5213T1	676-0013-046	Q21	Transceiver Enable
MSB1218A	676-0013-700	Q220	RX LNA Active Bias Main RX
MRF9411	676-0003-618	Q221	RX LNA Main RX
MMBT918	676-0003-634	Q250	IF Amplifier Main RX
MSB1218A	676-0013-700	Q260	1st LO Amplifier Main RX
MRF9411	676-0003-618	Q261	1st LO Amplifier Main RX
MMBT918	676-0003-634	Q270	2nd LO Supply Switch
MUN5114T1	676-0013-032	Q30	Flash Voltage Switch
MSD1819A	676-0013-701	Q31	Flash Voltage Switch
MSB1218A	676-0013-700	Q320	Diversity LNA Bias
MRF9411	676-0003-618	Q321	Diversity LNA
MMBT918	676-0003-634	Q350	IF Amplifier Diversity RX
MSB1218A	676-0013-700	Q360	1st LO Amplifier Diversity RX
MRF9411	676-0003-618	Q361	1st LO Amplifier Diversity RX
MMBT918	676-0003-634	Q370	2nd LO Supply Switch
MJD42C	676-0002-603	Q40	9.6 V Regulator
MMBT3904	676-0003-658	Q41	9.6 V Regulator
MUN5213T1	676-0013-046	Q410	SCI Control Switch
MMBT4403	676-0003-612	Q50	5.5 V Regulator
MMBT4403	676-0003-612	Q51	5.5 V Regulator
MSB1218A	676-0013-700	Q510	Transmitter Driver Active Bias
MMBT3904	676-0003-658	Q52	5.5 V Regulator
MRF9411	676-0003-618	Q520	Transmitter Driver
MSA2111	676-0003-640	Q550	Buffer/Amp for Transmitter Driver
MUN5213T1	676-0013-046	Q600	TX_Enable
MMBT3904	676-0003-658	Q620	9.6PTx Antenna Switch
MMBT3904	676-0003-658	Q630	Power Control
MJD42C	676-0002-603	Q640	Power Control
MMBT3904	676-0003-658	Q650	Power Control
MMBT3904	676-0003-658	Q660	Power Control
MRF5812	676-0003-604	Q665	Transmitter 250 mW
MRF5003	676-0006-450	Q670	3 W Predriver
MRF5015	676-0006-150	Q680	15W Driver

TRANSISTOR, DIODE, AND IC FUNCTIONS (Continued)

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<b><u>Manufacturer Part#</u></b>	<b><u>JDT Part#</u></b>	<b><u>References</u></b>	<b><u>Function</u></b>
MRF650	676-0004-402	Q690	50 W Final
MSB1218A	676-0013-700	Q70	Negative Voltage Regulator
MSB1218A	676-0013-700	Q71	Negative Voltage Regulator
MSB1218A	676-0013-700	Q72	Negative Voltage Regulator
MSD1819A	676-0013-701	Q73	Negative Voltage Regulator
MSD1819A	676-0013-701	Q74	Negative Voltage Regulator
MSD1819A	676-0013-701	Q805	Cap Multiplier on VCO
MUN5114T1	676-0013-032	Q820	VCO Pin Shift
MUN5213T1	676-0013-046	Q821	VCO Pin Shift
MMBT4403	676-0003-612	Q90	Main RX enable
NE85633	676-0003-636	Q900	VCO
NE85633	676-0003-636	Q902	VCO Amplifier
NE85633	676-0003-636	Q904	VCO Cascode Amplifier
NE85633	676-0003-636	Q906	VCO Buffer Amplifier
MUN5213T1	676-0013-046	Q91	Main RX enable
MMBT4403	676-0003-612	Q92	Diversity RX enable
MUN5213T1	676-0013-046	Q93	Diversity RX enable
MMBT4403	676-0003-612	Q94	TX Pre-Transmit Enable
MUN5213T1	676-0013-046	Q95	TX Pre-Transmit Enable
LP2951	644-2003-067	U10	5.0 V Regulator
MC14053B	644-3016-053	U110	Mod IN Narrow/Wide Band Switch
MC33172D	644-2019-017	U120	Audio Out Amp Main RX
MC33464	644-MC33464-	U20	MicroController Reset
MC33172D	644-2019-017	U208	Audio Out Amp Diversity RX
LRMS-2MH	644-0007-018	U250	First Mixer Main RX
SA676DK	644-2002-037	U260	IF IC Main RX
LRMS-2MH	644-0007-018	U350	First Mixer Diversity RX
SA676DK	644-2002-037	U360	IF IC Diversity RX
MC33172D	644-2019-017	U40	5.5, 9.6 V Regulator
MC74HC125	644-3766-125	U410	SCI Control
MC68HC908AZ60	644-5008-060	U420	MicroController
MC14053B	644-3016-053	U430	SPI Controller
LM50	644-2032-007	U440	Temp Sensor
MC33172D	644-2019-017	U450	Filter Adjust/ RSSI Compensation Voltage Amp
MC33172D	644-2019-017	U460	Filter Adjust/ RSSI Compensation Voltage Amp
MC33172D	644-2019-017	U600	Power Control
MC14051B	644-3016-051	U80	Negative Voltage Shift for VCO
SA7025DK	644-3954-027	U850	Synthesizer IC
SA676DK	644-2002-037	U860	IF IC Diversity RX
MC33172D	644-2019-017	U880	Modulation Input Amplifier
AD8403	644-0004-212	U890	Digital Pots (Mod Balance, Deviation Adj., P Cntrl)
AD8403	644-0004-212	U890	Fractional Spur Adjust
RO49PB38	621-0004-916	Y420	4.9152 MHz Microcontroller Crystal
618-7009-521	618-7009-521	Y890	17.5 MHz Temp. Comp. Crystal Oscillator (TCXO)

TRANSISTOR, DIODE, AND IC FUNCTIONS (continued)

RULE PART NUMBER: 2.1033 c (10)

**GEMINI MODEM**

<b>Reference designator</b>	<b>Function</b>	<b>Type</b>
D1	Diode,Dual Switching Sot-23	BAV70LT1
D2	Diode,Schotty Rectifier 1a 30v	MBRS130LT3
D3	Diode,Dual Switching Sot-23	BAV70LT1
D4	Diode,Schotty Rectifier 1a 30v	MBRS130LT3
D5	Diode,Dual Switching Sot-23	BAV70LT1
DS1	Led,3mm,Bicolor, 4 Stack	591-3001-1XX
DS2	Led,3mm,Bicolor, 4 Stack	591-3001-1XX
U1	Flash EEPROM Tsop 32 Pin 4 Megabit (Tsop-40)	AT29C040A-10TI
U2	RAM,CMOS,32K X 8, -40/85, SOP-28	TC55257DFL-85L
U3	Micropower Low Dropout Regulator With Shutdown	LT1129IST-3.3
U4	Dual D Type Flip-Flop So-14	74HC74AD
U5	5v Supervisory Circuits IC S0-8	ADM705AR/ MAX705ESA
U6	MICROPROCESSOR 10 Mhz QFP-100	Z84C1510FEC
U7	1.5a,500khz Stepdown Switching Regulat(S0-8)	LT1375IS8-5
U8	Octal Bidirectional Transceiver Sol-20	74LCX245
U9	Ic Octal3-St Sol-20	MC74LCX244DW
U10	Quad-Op Amp So-14	TLC2274I
U11	Stereo Codec Ssop-24	PCM3002E
U12	ADC 4 Channel, Tssop-16	AD7811YRU
U13	Digital Signal Processor	XC56303PV80
U14	Micropower Low Dropout Regulator With Shutdown	LT1129IST-3.3
U15	4 Drivers/4 Receivers Rs232 (Sol-24)	LT1134AISW
U16	MICROPROCESSOR 10 Mhz QFP-100	Z84C1510FEC
U17	4 Drivers/4 Receivers Rs232 (Sol-24)	LT1134AISW
U18	Hex Inverter Cmos(So-14)	74HCT04AD
U19	Quad 2-Input Or Gate (S0-14)	MC74VHC32AD
U20	Hex Inverter (So-14)	74VHC04
U21	MICROPROCESSOR 10 Mhz QFP-100	Z84C1510FEC
U22	4 Drivers/4 Receivers Rs232 (Sol-24)	LT1134AISW
X1	OSCILLATOR H-CMOS SMD 5V 19.6608mhz	F4101R
X2	OSCILLATOR 3.3V SMD 3.3V 12.288mhz	F4100R
G-8	GSM Receiver OEM board Ashtech (Orbitstar)	GPS G-8 OEM

## TRANSMITTER TUNE UP PROCEDURE

RULE PART NUMBER: 2.1033 c (9)

### TRANSMITTER TUNE UP PROCEDURE

The output power is controlled by a digital potentiometer which controls the supply voltage to the 250mW buffer/amp. The MDP Transceiver has a tuning procedure built into the software. The following instructions summarize the procedure for tuning the output power.

1. Connect the transceiver to be aligned to a DC power source capable of supplying 10 amps. Connect the output of the transceiver through a watt meter capable of measuring 50 Watts (10W for low power unit) and into a 50 ohm dummy load.
2. From the **Utilities** menu of the MDP 6000 Programmer software select **Tune Radio**. This brings up a box listing all possible tune-up parameters. Click in the box next to **Power Out Adjust**.
3. The transmitter keys up at the low end of the band and prompts the user to use the page-up and page-down keys to set the power to 40 Watts (10W for low power unit). The page-up, page-down keys vary the DAC value of the digital potentiometer. When complete the user clicks on OK, the DAC value is automatically stored. The software loads the next frequency to be set.
4. This process is repeated at four points across the band. Once the DAC value is determined for these four frequencies the processor interpolates the DAC value for frequencies in between the calibrated frequencies. This ensures equal power output across the entire RF band from 403-512MHz.

Deviation is controlled by a digital potentiometer which adjusts the amplitude of the modulating signal. The MDP Transceiver has a tuning procedure built into the software. The following instructions summarize the procedure for tuning the frequency deviation.

1. Connect the transceiver to be aligned to a DC power source capable of supplying 10 amps. Connect the output of the transceiver through a 50 ohm dummy load and into a modulation analyzer. Input a 880 mVrms, 1 KHz sine wave into the TX Mod input.
2. From the **Utilities** menu of the MDP 6000 Programmer software select **Tune Radio**. This brings up a box listing all possible tune-up parameters. Click in the box next to **Deviation Adjust**.
3. The transmitter keys up at the low end of the band and prompts the user to use the page-up and page-down keys to set the deviation to 5 KHz. The page-up, page-down keys vary the DAC value of the digital potentiometer. When complete the user clicks on OK, the DAC value is automatically stored. The software loads the next frequency to be set.
4. This process is repeated at four points across the band. Once the DAC value is determined for these four frequencies the processor interpolates the DAC value for frequencies in between the calibrated frequencies. This ensures constant deviation across the entire RF band from 403-512 MHz.

Note: The final deviation adjust is set on the Gemini modem which also has a digital potentiometer controlling the amplitude of the modulating signal before it reaches the MDP board. This deviation level is set to 4.0 KHz for 25 KHz channels and 2.5 KHz for 12.5 KHz channels with a 1 KHz modulating tone.