Function of Semiconductors and other Active Devices

Schematic Symbol	Type	Circuit Application	Source
Transceiver			
Q500	NPN	Transmit preamp circuit	SPS
Q501	NPN	Transmit supply switch	SPS
Q502	PNP	3 volt switch	Zetex
Q503	PNP	Transmit switch	SPS
Q504	PNP	Transmit switch	SPS
Q700	NPN	RF Amp	SPS
Q701	PNP	RF Amp switch	SPS
Q702	PNP	B+++ switch	SPS
Q704	PNP	Active bias for 1st mixer	SPS
Q801	PNP	1 volt regulator circuit	SPS
Q901	NPN	VCO	SPS
Q902	NPN	VCO Buffer	SPS
Q903	NPN	First injection doubler	SPS
Q904	NPN	Second injection	SPS
Q905	PNP	2nd VCO B+ switch	SPS
Q911	NPN	B+++ switch	SPS
Q912	Dual NPN	3 volt switch	SPS
Y900	Resonator V1-2	VCO, loop 1	Transtech
U601	VC-TCXO	Reference oscillator	KSS
U801	BICMOS	Low conversion IC	SPS
U701	MESFET	First mixer	SPS
U500	IC	Transmit preamplifier	SPS
U501	IC	Transmit power amp	RF Micro
U901	Regulator	3 volt regulator	Liner Tech
Controller			
Q1	NPN	Back up battery circuit	National
Q2	PNP	LCD	SPS
Q3	NPN	Audio power enable	SPS
Q4	NPN	Audio dc offset	SPS
Q5	MOSFET	Back up battery circuit	National
Q6	PNP	Audio power enable	SPS
Q7	PNP	Vibrator circuit	SPS
Q9	NPN, Darlington	Vibrator circuit	SPS
Q10	PNP	Audio power enable	SPS
Q11	MOSFET	Back up battery circuit	National
Q14	MOSFET	Back up battery circuit	National
Q15	MOSFET	Back up battery circuit	National

Q16	MOSFET	Back up battery circuit	National
Q17	MOSFET	Back up battery circuit	National
CR4	Diode	Vibrator	SPS
CR5	Diode	Back up battery circuit	SPS
Y1	Crystal	38.4 KHz Clock	Seiko

Function of Semiconductors and other Active Devices

Schematic Ref. Designator	Device Source	Circuit Type	Application
Controller			
Q1	NPN	Back up battery circuit	National
Q2	PNP	LCD	SPS
Q3	NPN	Audio power enable	SPS
Q4	NPN	Audio dc offset	SPS
Q5	MOSFET	Back up battery circuit	National
Q6	PNP	Audio power enable	SPS
Q7	PNP	Vibrator circuit	SPS
Q10	PNP	Audio power enable	SPS
Y1	Crystal	38.4 KHz Clock	Seiko
U03	LCD Driver	LCD Driver	SPS
U04	3 volt regulator	3v power management	Maxim
U05			
U06	Audio Amplifier	Audio Amplifier	NJR
U07	OP AMP	Audio Switch	Analog Device
U08	Audio Amplifier	Audio Power Amp	NJR
U10	DRAM	Data storage	Mitsubishi
U100	Digital Signal Processor	DSP	ATT
U301	IC	Code Plug	Atmel
U302	IC	Serial ID	Dallas Semi.
VR100	Zener Diode	Voltage Regulator	Motorola

TUNE UP PROCEDURE

The following tune-up procedure is similar to what will appear in the final service manual enclosed.

Tuning Procedure

1. All parameters are specified at room temperature of 25°C±2°C.
2. The reference oscillator is tuned with the transceiver and controller boards connected by a umbilical cable.
3. Transceiver and controller boards are properly assembled into the customer housing for transmitter tuning. Tuning back cover is used.
4. Software tuned values are stored in the code plug and the transmitter trimmer capacitor is manually tuned. The transceiver and controller must remain together from this point in the process.
5. Battery simulator has proper decoupling.
6. The power supply is set to 1.5 V DC ± 0.01 VDC.

Note: For field tuning, the code plug programmer will provide the download program that is necessary to tune the DAC values into the code plug. The reference oscillator is manually tuned without the download program.

Reference Oscillator

1. Set B+ to 1.5 vdc, B++ to 3.3 vdc
2. Download program from test controller to U.U.T. This includes:

a. Turn off low cell and dead cell trip on controller if necessary.
b. Program U801 Reg B+ 1.0 vdc on.
c. Program Buff_not (TP801) low.
d. Program U900 for transmit, reference to 6250 Hz and first VCO to 450 Mhz.
e. Program U100 A2 output high (TP807) to turn off second LO.
f. Program U801 to turn off signal path and dividers.
g. Turn off U500 and U501.
h. Measure frequency at TP500 using 10 pF capacitor and filter (880 to 920 Mhz) to counter.
I. Reference oscillator is manually tuned to ± 0.5 PPM of 900,006,013 Hz.
Note: This frequency is offset 6.68 PPM.

Tune Transmit Frequency

1. Set B+ 1.5vdc
2. Download program from test controller to U.U.T. This includes:
a. U801 Reg. B+ on 1.0 vdc, signal path and dividers off.
b. U100 set Buff_not low (TP801).
c. U900 for transmit, first LO at 901.506328 MHz.
d. U100 A2 high, second LO off.
e. U801 AFC to DC nominal, Hex 128.
f. U500 and U501 off.
3. Set MDA (modulation domain analyzer):
a. Ext Lo +6 dBm,895 Mhz (10 MHz Ref), auto select.
b. Span 5.6 Khz (700 Hz/Div)
c. Find center frequency
d. Time base: 100 us, Panorama off
e. Sampling: Auto, Int at Center, Auto
f. Averaging On/Off
4. Measure silent carrier at TP51 through 10 pf capacitor, amplifier and 880 to 920 Mhz filter to an MDA is at nominal 901.506328 MHz ± 0.5 PPM.

Balance Tune

1. **Duplicate steps 1-4 in tune transmit frequency.**
2. Generate a sine wave with half level DC offset and 1.7 V p-p applied to U801 modulation DAC with low port Max DAC A at nominal dc.
3. Determine the appropriate dc offset voltage to center modulation.
4. Write the HEX value to the code plug.

Low Port Modulation Tune

1. **Duplicate steps 1-4 in tune transmit frequency**.
2. Generate a sine wave with half level DC offset and 1.7 V p-p applied to U801 modulation DAC with low port Max DAC A at nominal dc.
3. Step dc voltage to tune level on MDA to +800 Hz.
4. Store value in the code plug.
5. Step dc voltage to tune level on MDA to -800 Hz.
6. Store value in the code plug.