

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

## Exhibit 10 - Components, Tune Up

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**1            2.1033 (c) (10) Function of Active Circuit Devices**

**1.1           Printed Board RSU 1900 MHz GMSK/8-PSK ROA 117 8461/1**

**1.1.1        Function Block LTU**

Product ROZ 104 243/1  
Revision A

Pos	Prod name/Func des	Product number
V500	DIODE/SCHx2 70V 70mA SOT23 Serial	RKZ 323 08/2
Z500	MICROCIRCUIT/REG LIN+ ADJ 1.8-20V +/-1% 500	RYT 113 6303/1
Z501	MICROCIRCUIT/74'74 AC SOP14 2xD FLIP-FLOP	RYT 318 0074/C
Z503	MICROCIRCUIT/MB15E07 PFV-ER	RYT 102 6057/1
Z504	OSCILLATOR/26.000MHZ	RTL 202 610/02
Z505	MICROCIRCUIT/74'04 LVC SSOP14 6x INVERTER	RYT 331 0004/C
Z506	MICROCIRCUIT/74'04 ACT TSSOP14 6x INVERTER	RYT 317 6004/22C
Z507	MICROCIRCUIT/74'04 ACT TSSOP14 6x INVERTER	RYT 317 6004/22C

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**1.1.2 Function Block DC/DC**

Product ROZ 104 219/1  
Revision A1

Pos	Prod name/Func des	Product number
N714	MICROCIRCUIT/REG LIN+ ADJ 1.8-20V +/-1% 500	RYT 113 6303/1
N715	MICROCIRCUIT/2 Chan Sync Current Mode PWM	RYT 113 142/C
N716	MICROCIRCUIT/SUP.Vx3 3.3V/1.8V/ADJ L RESET	RYT 113 6319/2
N717	MICROCIRCUIT/2991 REG NEGADJ 1A LOW DROP	RYT 113 330/C
N718	MICROCIRCUIT/REG SW- ADJ 1.5A	RYT 113 6373/1
N719	MICROCIRCUIT/PWM ADJ 0.8V to 90% of VIN	RYT 113 6374/1
N720	MICROCIRCUIT/REG SW- ADJ 150kHz 0.5A	RYT 113 6320/1
R815	TEMPERATURE SENSOR/KTY13A	RYT 124 6001/2C
T700	TRANSFORM/INDUCTOR/FORWARD 7V7A	REG 256 2331
T702	TRANSFORMER/FORWARD 3.3V5A	REG 254 2455
V700	RECTIFIER/SCHx2 30V 2x15A D2PAK	RKZ 323 6012/3
V702	RECTIFIER/SCHx2 30V 2x6A DPAK(TO252AA)	RKZ 323 6047/1
V703	OVERVOLTAGE ARRESTER/DIODE TS 36V 30A DO-214AB	RKZ 223 485/36
V708	RECTIFIER/REC 200V 1A SMA/DO214AC 35ns	RKZ 123 05/2
V709	RECTIFIER/REC 200V 1A SMA/DO214AC 35ns	RKZ 123 05/2
V711	TRANSISTOR/NFET 100V 7A SO8 0.022ohm	RYN 123 6060/1
V712	TRANSISTOR/NFET 100V 7A SO8 0.022ohm	RYN 123 6060/1
V715	TRANSISTOR/NFET 30V 14A SO8 0.008ohm	RYN 123 6012/1
V716	TRANSISTOR/NFET 30V 14A SO8 0.008ohm	RYN 123 6012/1
V718	TRANSISTOR/NFET 30V 14A SO8 0.008ohm	RYN 123 6012/1
V720	TRANSISTOR/NFET 30V 14A SO8 0.008ohm	RYN 123 6012/1
V722	DIODE/SCHx2 40V 0.12A SOT23 Serial	RKZ 323 17/1
V727	TRANSISTOR/N chanl. MOSFET	RYN 123 251/C
V728	TRANSISTOR/N chanl. MOSFET	RYN 123 251/C
V729	DIODE/SWlx2 70V .2A SOT23 Common_Cat	RKZ 123 03/3
V736	REGULATOR DIODE/REG 12.0V 6% 0.2W SOT-23	RKZ 223 01/18
V738	OVERVOLTAGE ARRESTER/DIODE TS 36V 30A DO-214AB	RKZ 223 485/36
V747	DIODE/SWlx2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
V748	DIODE/SWlx2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
V749	TRANSISTOR/NFET 100V 7A SO8 0.022ohm	RYN 123 6060/1
V750	TRANSISTOR/NFET 100V 7A SO8 0.022ohm	RYN 123 6060/1
V752	TRANSISTOR/PFET 12V 12A SO8 0.007_Ohm	RYN 122 685/1
V754	DIODE/SCHOTTKY 40V 1A DO214AC	RKZ 323 488/04
V755	DIODE/SCHOTTKY 40V 1A DO214AC	RKZ 323 488/04
V756	DIODE/SWlx2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
V757	TRANSISTOR/NPN 45V 100mA SOT23	RYN 121 629/1
V758	TRANSISTOR/NPN 45V 100mA SOT23	RYN 121 629/1
V759	RECTIFIER/SCH 25V 2A SMB	RKZ 323 6038/1
V760	DIODE/SCHx2 40V 0.12A SOT23 Common a	RKZ 323 17/3
Z705	MICROCIRCUIT/LM431 ADJ REGULATOR	RYT 113 008/3C
Z851	MICROCIRCUIT/COMP x2 36V	RYT 101 6169/1

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Z855 MICROCIRCUIT/COMP x2 36V	RYT 101 6169/1
Z857 MICROCIRCUIT/COMP x2 36V	RYT 101 6169/1
Z858 MICROCIRCUIT/MOSFET DRIVERx2 INV/NONINV /44	RYT 109 6204/1
Z859 MICROCIRCUIT/MOSFET DRIVERx2 INV/NONINV /44	RYT 109 6204/1
Z860 MICROCIRCUIT/OPAMP 2.5V/30V R/R 21MHz	RYT 101 6339/1
Z861 MICROCIRCUIT/OPAMP 2.5V/30V R/R 21MHz	RYT 101 6339/1
Z863 MICROCIRCUIT/MOSFET DRIVERx2 NONINV /4427	RYT 109 6204/2

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### 1.1.3 Function Block Rx Frontend 1900 MHz

Product ROZ 104 089/1  
Revision N

Pos	Prod name/Func des	Product number
D1050	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
D1051	MICROCIRCUIT/74'04 HC1G SSOP5-P 1x INVERTER	RYT 326 6004/C
D1052	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
D1053	MICROCIRCUIT/74'04 HC1G SSOP5-P 1x INVERTER	RYT 326 6004/C
D1054	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
N1050	MICROCIRCUIT/OPAMP x1 +/-6V	RYT 101 6161/1
N1051	MICROCIRCUIT/SPDT switch DC-2.5GHz	RYT 101 6410/1
N1052	MICROCIRCUIT/attenuator AA106-86	RYT 115 6032/1
N1053	MICROCIRCUIT/OPAMP x1 +/-6V	RYT 101 6161/1
N1054	MICROCIRCUIT/attenuator AA106-86	RYT 115 6032/1
N1055	MICROCIRCUIT/OPAMP x1 +/-6V	RYT 101 6161/1
N1057	MICROCIRCUIT/attenuator AA106-86	RYT 115 6032/1
N1058	MICROCIRCUIT/OPAMP x1 +/-6V	RYT 101 6161/1
N1059	MICROCIRCUIT/attenuator AA106-86	RYT 115 6032/1
N1060	DIRECTIONAL COUPLER/PD18-73 Y010	UND 106 039/1
N1200	MICROCIRCUIT/RF SYNT RX 1900	RYT 902 6005/2
N1201	MICROCIRCUIT/RF SYNT RX 1900	RYT 902 6005/2
N1202	MICROCIRCUIT/TEMP SENSOR, SOT-23, LM50C	RYT 124 6009/C
N1203	MICROCIRCUIT/IC ASIC ULLA II	ROP 101 664/C
N1204	MICROCIRCUIT/IC ASIC ULLA II	ROP 101 664/C
N1205	MICROCIRCUIT/TEMP SENSOR, SOT-23, LM50C	RYT 124 6009/C
N1206	MICROCIRCUIT/RF SYNT RX 1900	RYT 902 6005/2
N1207	MICROCIRCUIT/RF SYNT RX 1900	RYT 902 6005/2
T1200	TRANSFORMER/SMD TRANSFORMER	REG 135 55/7
T1201	TRANSFORMER/SMD TRANSFORMER	REG 135 55/7
T1202	TRANSFORMER/BALUN 50/50 OHM 1880 MHZ	REG 135 58/5
T1203	TRANSFORMER/BALUN 50/50 OHM 1880 MHZ	REG 135 58/5
T1204	TRANSFORMER/SMD TRANSFORMER	REG 135 55/7
T1205	TRANSFORMER/SMD TRANSFORMER	REG 135 55/7
T1206	TRANSFORMER/BALUN 50/50 OHM 1880 MHZ	REG 135 58/5
T1207	TRANSFORMER/BALUN 50/50 OHM 1880 MHZ	REG 135 58/5
V1050	TRANSISTOR/RF_HEMT 4V 60mA SC70 (SOT343)	RYN 123 697/1
V1051	TRANSISTOR/RF_HEMT 4V 60mA SC70 (SOT343)	RYN 123 697/1
V1052	TRANSISTOR/RF_HEMT 4V 60mA SC70 (SOT343)	RYN 123 697/1
V1053	TRANSISTOR/RF_HEMT 4V 60mA SC70 (SOT343)	RYN 123 697/1
V1054	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V1112	DIODE/SWix2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
X1200	FILTER/1880MHz BP BW=30MHZ	RTN 202 709/02
X1201	FILTER/1880MHz BP BW=30MHZ	RTN 202 709/02
X1202	FILTER/1880MHz BP BW=30MHZ	RTN 202 709/02
X1203	FILTER/1880MHz BP BW=30MHZ	RTN 202 709/02

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Z1050 MICROCIRCUIT/LIN REG- 5.0V INV 15mA ADJ	RYT 113 6063/1
Z1051 MICROCIRCUIT/REG LDO+ 5.0V +/-1% 800mA 1.0V	RYT 113 6091/3
Z1052 MICROCIRCUIT/REG LDO+ 5.0V +/-1% 800mA 1.0V	RYT 113 6091/3
Z1200 MICROCIRCUIT/AS186-302	RYT 101 6438/1
Z1201 MICROCIRCUIT/AS186-302	RYT 101 6438/1

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**1.1.4 Function Block RX IF1 EDGE 1800/1900 MHz**

Product ROZ 104 042/2  
Revision D

Pos	Prod name/Func des	Product number
T1301	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
T1302	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
X1301	FILTER/201MHz BP SAW	RTN 201 851/03
X1302	FILTER/201MHz BP SAW	RTN 201 851/03
Z1303	MICROCIRCUIT/201 MHz	RYT 901 6148/3
Z1304	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z1305	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z1306	MICROCIRCUIT/REG LIN+ 5.0V +/-0.5% 100mA 0.	RYT 113 6005/2C
Z1307	PROD. ADAPT. CIRCUIT/ASIC QIM	ROP 101 1115/C
Z1308	PROD. ADAPT. CIRCUIT/ASIC QIM	ROP 101 1115/C
Z1401	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z1402	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z1403	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z1404	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z1406	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z1407	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2

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**1.1.5 Function Block RX IF2 EDGE 1800/1900 MHz**

Product ROZ 104 043/2  
Revision D

Pos	Prod name/Func des	Product number
T2301	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
T2302	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
X2301	FILTER/201MHz BP SAW	RTN 201 851/03
X2302	FILTER/201MHz BP SAW	RTN 201 851/03
Z2301	PROD. ADAPT. CIRCUIT/ASIC QIM	ROP 101 1115/C
Z2302	PROD. ADAPT. CIRCUIT/ASIC QIM	ROP 101 1115/C
Z2303	MICROCIRCUIT/201 MHz	RYT 901 6148/3
Z2304	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z2305	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z2306	MICROCIRCUIT/REG LIN+ 5.0V +/-0.5% 100mA 0.	RYT 113 6005/2C
Z2401	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z2402	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z2403	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z2404	MICROCIRCUIT/DUAL SIGMA-DELTA MODULATOR	RYT 120 6061/2
Z2406	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2
Z2407	MICROCIRCUIT/REG LIN+ 5V 150mA 0.6V	RYT 113 6076/2



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**1.1.6 Function Block CPU**

TYPE PSD1  
Product ROZ 104 194/1

Pos	Prod name/Func des	Product number
L3100	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
V3100	LIGHT EMITTING DIODE/LED Red 20mA 0.5-1.3mcd 1.6x3.	RKZ 433 606/3
V3900	LIGHT EMITTING DIODE/LED SUPER-RED 56-140mcd(20mA)	RKZ 433 681/1
V3901	LIGHT EMITTING DIODE/LED TRUE GREEN 90-180mcd(20mA)	RKZ 433 681/5
V3902	LIGHT EMITTING DIODE/LED YELLOW 90-224mcd(20mA) SID	RKZ 433 681/4
V3903	LIGHT EMITTING DIODE/LED YELLOW 90-224mcd(20mA) SID	RKZ 433 681/4
Z3001	MICROCIRCUIT/NOR GATE,QUAD,74LVC08	RYT 331 0008/3C
Z3100	PROD. ADAPT. CIRCUIT/ASIC POWER GARP	ROP 101 1192/1
Z3303	MICROCIRCUIT/74'14 LVC TSSOP14 6x INVERT SC	RYT 331 0014/3C
Z3400	MICROCIRCUIT/SDRAM 16M16 133MHz CL=3 100MHz	RYT 119 6142/5
Z3401	MICROCIRCUIT/SDRAM 16M16 133MHz CL=3 100MHz	RYT 119 6142/5
Z3402	MICROCIRCUIT/SDRAM 16M16 133MHz CL=3 100MHz	RYT 119 6142/5
Z3403	MICROCIRCUIT/FLASH TB 2M16 90NS 3.3V I	RYT 118 6152/6
Z3404	MICROCIRCUIT/FLASH 8M16 150ns 3.3V E	RYT 118 6153/1
Z3601	MICROCIRCUIT/LVDS LINE DRIVER x4 TSSOP16 /9	RYT 109 6181/2C
Z3602	MICROCIRCUIT/LVDS LINE RECEIVER x4 TSSOP16	RYT 109 6158/2C
Z3603	MICROCIRCUIT/3485 RS485/422 TRANCEIVER	RYT 109 165/C
Z3604	MICROCIRCUIT/3485 RS485/422 TRANCEIVER	RYT 109 165/C
Z3605	MICROCIRCUIT/3485 RS485/422 TRANCEIVER	RYT 109 165/C
Z3606	MICROCIRCUIT/3485 RS485/422 TRANCEIVER	RYT 109 165/C
Z3607	FUNCTIONAL COMPONENT/CDU MUX PLD	RON 107 496
Z3700	MICROCIRCUIT/74'244 LVC SSOP20 8x BUFFER NO	RYT 331 0244/C
Z3701	MICROCIRCUIT/74'244 LVC SSOP20 8x BUFFER NO	RYT 331 0244/C
Z3702	MICROCIRCUIT/74'244 LVC SSOP20 8x BUFFER NO	RYT 331 0244/C
Z3901	MICROCIRCUIT/IC, DIGITAL THERMOMETER AND TH	RYT 124 6006/C

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**1.1.7 Function Block SPARC 1 EDGE**

Product ROZ 104 195/2  
Revision A

Pos	Prod name/Func des	Product number
L5200	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L5201	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L5300	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L5301	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
Z5000	MICROCIRCUIT/NOR GATE,QUAD,74LVC08	RYT 331 0008/3C
Z5200	PROD. ADAPT. CIRCUIT/EDGE BASE BAND ASIC, EBBA	ROP 101 1189/1
Z5201	MICROCIRCUIT/SDRAM 16M16 133MHz CL=3 100MHz	RYT 119 6142/5
Z5300	PROD. ADAPT. CIRCUIT/TARAC_U+	ROP 101 1128/2
Z5301	MICROCIRCUIT/FLASH SPI 128K8 20MHz 2.7V I	RYT 118 6154/2

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**1.1.8 Function Block SPARC 2 EDGE**

Product ROZ 104 196/2  
Revision A

Pos	Prod name/Func des	Product number
L6200	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L6201	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L6300	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
L6301	FILTER/EMI,3A 50 OHM 1206 SMD	REG 706 21/1
Z6000	MICROCIRCUIT/NOR GATE,QUAD,74LVC08	RYT 331 0008/3C
Z6200	PROD. ADAPT. CIRCUIT/EDGE BASE BAND ASIC, EBBA	ROP 101 1189/1
Z6201	MICROCIRCUIT/SDRAM 16M16 133MHz CL=3 100MHz	RYT 119 6142/5
Z6300	PROD. ADAPT. CIRCUIT/TARAC_U+	ROP 101 1128/2
Z6301	MICROCIRCUIT/FLASH SPI 128K8 20MHz 2.7V I	RYT 118 6154/2

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**1.1.9 Function Block TX1 GMSK 1900 MHZ**

Product ROZ 104 090/1  
Revision G

Pos	Prod name/Func des	Product number
D5701	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
D5702	MICROCIRCUIT/74'32 Z1G SSOP5-P-A 1x 2-INP O	RYT 326 6032/42C
D5703	MICROCIRCUIT/74'32 Z1G SSOP5-P-A 1x 2-INP O	RYT 326 6032/42C
N5500	PROD. ADAPT. CIRCUIT/ASIC NINJA	ROP 101 614/2
N5501	PROD. ADAPT. CIRCUIT/ASIC PENNY	ROP 101 612/2
N5502	FILTER/160MHz BP SAW	RTN 201 867/02
N5503	MICROCIRCUIT/DC-2.8 GHz amplifier	RYT 101 6476/1
T5500	BALUN/1900 MHZ 200 Ohm	REG 735 58/16
T5501	BALUN/1800 MHZ 200 OHM	REG 735 58/9
T5502	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
T5504	BALUN/1900 MHZ 200 Ohm	REG 735 58/16
T5505	BALUN/1800 MHZ 200 OHM	REG 735 58/9
V5500	TRANSISTOR/NPN 100V 1A SOT-223 BCP56-16	RYN 121 637/2
V5700	DIODE/SCHOTTKYDIODE, SINGLE	RKZ 323 220
Z5500	FILTER/1880MHz BP SAW	RTN 201 404/01
Z5501	MICROCIRCUIT/RF SYNT TX 1900	RYT 902 6006/2
Z5502	MICROCIRCUIT/RF SYNT TX 1900	RYT 902 6006/2
Z5503	MICROCIRCUIT/REG LIN+ 5.0V +/-0.5% 100mA 0.	RYT 113 6005/2C
Z5700	MICROCIRCUIT/5 bit attenuator 0.5-2.5GHz	RYT 115 6033/1
Z5701	FILTER/1960MHz BP	RTN 202 1021/01
Z5702	AMPLIFIER/SGA-6389	RYT 101 6414/1
Z5703	AMPLIFIER/SGA-6389	RYT 101 6414/1
Z5704	FILTER/1960MHz BP	RTN 202 1021/01
Z5705	MICROCIRCUIT/SXA-289, MMIC AMPLIFIER	RYT 101 6413/2
Z5800	PROD. ADAPT. CIRCUIT/ASIC SPIRA	ROP 101 616/C
Z5802	MICROCIRCUIT/74'541 HCT TSSOP20 8x BUS BUFF	RYT 310 6023/2C

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### 1.1.10 Function Block TX2 GMSK 1900 MHZ

Product ROZ 104 091/1  
Revision G

Pos	Prod name/Func des	Product number
D6701	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
D6702	MICROCIRCUIT/74'32 Z1G SSOP5-P-A 1x 2-INP O	RYT 326 6032/42C
D6703	MICROCIRCUIT/74'32 Z1G SSOP5-P-A 1x 2-INP O	RYT 326 6032/42C
N6500	PROD. ADAPT. CIRCUIT/ASIC NINJA	ROP 101 614/2
N6501	PROD. ADAPT. CIRCUIT/ASIC PENNY	ROP 101 612/2
N6502	FILTER/160MHz BP SAW	RTN 201 867/02
N6503	MICROCIRCUIT/DC-2.8 GHz amplifier	RYT 101 6476/1
T6500	BALUN/1900 MHZ 200 Ohm	REG 735 58/16
T6501	BALUN/1800 MHZ 200 OHM	REG 735 58/9
T6502	TRANSFORMER/SMD TRANSFORMER 4:1	REG 135 55/1
T6504	BALUN/1900 MHZ 200 Ohm	REG 735 58/16
T6505	BALUN/1800 MHZ 200 OHM	REG 735 58/9
V6500	TRANSISTOR/NPN 100V 1A SOT-223 BCP56-16	RYN 121 637/2
V6700	DIODE/SCHOTTKYDIODE, SINGLE	RKZ 323 220
Z6500	FILTER/1880MHz BP SAW	RTN 201 404/01
Z6501	MICROCIRCUIT/RF SYNT TX 1900	RYT 902 6006/2
Z6502	MICROCIRCUIT/RF SYNT TX 1900	RYT 902 6006/2
Z6503	MICROCIRCUIT/REG LIN+ 5.0V +/-0.5% 100mA 0.	RYT 113 6005/2C
Z6700	MICROCIRCUIT/5 bit attenuator 0.5-2.5GHz	RYT 115 6033/1
Z6701	FILTER/1960MHz BP	RTN 202 1021/01
Z6702	AMPLIFIER/SGA-6389	RYT 101 6414/1
Z6703	AMPLIFIER/SGA-6389	RYT 101 6414/1
Z6704	FILTER/1960MHz BP	RTN 202 1021/01
Z6705	MICROCIRCUIT/SXA-289, MMIC AMPLIFIER	RYT 101 6413/2
Z6800	PROD. ADAPT. CIRCUIT/ASIC SPIRA	ROP 101 616/C
Z6802	MICROCIRCUIT/74'541 HCT TSSOP20 8x BUS BUFF	RYT 310 6023/2C
Z6900	MICROCIRCUIT/160MHz	RYT 901 6156/1
Z6901	MICROCIRCUIT/REG LIN+ 5.0V +/-0.5% 100mA 0.	RYT 113 6005/2C

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

## 1.2 Printed Board PBU1 1900 GSMK Hybrid Combiner ROA 219 5387/1

### 1.2.1 Function Block DC Booster

Product ROZ 104 91/1

Revision T

Pos	Prod name/Func des	Product number
D7700	MICROCIRCUIT/COMP x1 36V	RYT 101 083/C
D7701	MICROCIRCUIT/COMP x2 36V	RYT 101 6169/1
D7702	MICROCIRCUIT/COMP x2 36V	RYT 101 6169/1
L7704	TRANSFORMER/	REG 256 2324
N7700	MICROCIRCUIT/LM431 ADJ REGULATOR	RYT 113 008/3C
N7701	MICROCIRCUIT/MOSFET DRIV. 4.5-13.2V 1.5A	RYT 113 6221/1
N7702	MICROCIRCUIT/MOSFET DRIV. 4.5-13.2V 1.5A	RYT 113 6221/1
N7703	MICROCIRCUIT/OPAMP R/R 1.8-23V	RYT 101 130/2C
N7704	MICROCIRCUIT/OPAMP R/R 1.8-23V	RYT 101 130/2C
N7705	MICROCIRCUIT/OPAMP R/R 1.8-23V	RYT 101 130/2C
N7706	MICROCIRCUIT/OPAMP R/R 1.8-23V	RYT 101 130/2C
N7707	MICROCIRCUIT/LM431 ADJ REGULATOR	RYT 113 008/3C
N7708	MICROCIRCUIT/MOSFET DRIV. 4.5-13.2V 1.5A	RYT 113 6221/1
N7709	MICROCIRCUIT/MOSFET DRIV. 4.5-13.2V 1.5A	RYT 113 6221/1
V7700	RECTIFIER/SCHx2 60V 15/30A 0.62V D2PAK C	RKZ 323 6046/1
V7701	TRANSISTOR/NFET 60V 42A D2PAK/TO263 0.028	RYN 123 24/1
V7702	TRANSISTOR/NFET 60V 42A D2PAK/TO263 0.028	RYN 123 24/1
V7703	TRANSISTOR/PFET 55V 27A D2PAK(TO263AB) 65	RYN 122 657/2
V7704	TRANSISTOR/PFET 55V 27A D2PAK(TO263AB) 65	RYN 122 657/2
V7705	RECTIFIER/SCHx2 30V 2x15A D2PAK	RKZ 323 6012/3
V7706	RECTIFIER/SCHx2 30V 2x15A D2PAK	RKZ 323 6012/3
V7707	TRANSISTOR/NFET 100V 9A DPAK(TO252AA) 0.2	RYN 123 6016/1
V7708	DIODE/SWI 75V 0.25A SOT23	RKZ 123 612
V7709	TRANSISTOR/PNP 100V 0.1A SOT223	RYN 120 615/1
V7710	DIODE/DIODE 20V 0.1A SOT23	RKZ 123 641/1
V7711	REGULATOR DIODE/REG 27.0V 7% 0.2W SOT-23	RKZ 223 01/26
V7712	TRANSISTOR/NPN 45V 100mA SOT23 low noise	RYN 121 6068/1
V7713	TRANSISTOR/NPN 45V 100mA SOT23 low noise	RYN 121 6068/1
V7714	TRANSISTOR/NPN 45V 100mA SOT23 low noise	RYN 121 6068/1
V7715	TRANSISTOR/NPN 45V 100mA SOT23 low noise	RYN 121 6068/1
V7716	TRANSISTOR/NPN 45V 100mA SOT23 low noise	RYN 121 6068/1
V7717	REGULATOR DIODE/REG 5.6V 7% 0.2W SOT-23	RKZ 223 01/10
V7718	REGULATOR DIODE/REG 5.6V 2% 0.2W SOT-23	RKZ 223 01/40
V7719	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7720	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7721	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7722	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7723	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
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V7724	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7725	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7726	DIODE/DIODE 20V 0.1A SOT23	RKZ 123 641/1
V7727	REGULATOR DIODE/REG 12.0V 6% 0.2W SOT-23	RKZ 223 01/18
V7728	REGULATOR DIODE/REG 3.9V 5% 0.2W SOT-23	RKZ 223 01/6
V7729	REGULATOR DIODE/REG 10.0V 6% 0.2W SOT-23	RKZ 223 01/16
V7730	DIODE/DIODE 80V 150mA SOT23 BAV70	RKZ 123 642/1
V7731	TRANSISTOR/NPN 100V 1A SOT-223 BCP56-16	RYN 121 637/2
V7732	REGULATOR DIODE/REG 15.0V 5% 0.2W SOT-23	RKZ 223 01/20
V7736	RECTIFIER/SCHx2 30V 2x15A D2PAK	RKZ 323 6012/3
V7739	TRANSIENT PROTECTOR/TVS-Bi zen 33V 1.5kW(10/1000us	RKZ 223 606/33
Z7700	MICROCIRCUIT/PW-CONTROLER	RYT 113 006/4C
Z7701	MICROCIRCUIT/PW-CONTROLER	RYT 113 006/4C

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

**1.2.2 Function Block PA Linearisation GMSK PBU1900**

Product ROZ 104 098/1  
Revision U

Pos	Prod name/Func des	Product number
N7301	MICROCIRCUIT/5 bit attenuator 0.5-2.5GHz	RYT 115 6033/1
N7302	MICROCIRCUIT/attenuator AA106-86	RYT 115 6032/1
N7303	MICROCIRCUIT/SXA-289, MMIC AMPLIFIER	RYT 101 6413/2
N7304	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
N7306	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
N7401	MICROCIRCUIT/EEPROM, SPI, 32Kx8b, 2MHz, 2.5	RYT 118 2016/C
N7402	MICROCIRCUIT/74'595 HCT TSSOP16 8B S-IN S/P	RYT 310 6031/2C
N7403	MICROCIRCUIT/74'4051 HCT SSOP16 8-CH ANALOG	RYT 310 6017/C
N7404	REGULATOR/REG LIN+ 5.0V +/-8% 1A 0.8V	RYT 113 6013/3
N7405	MICROCIRCUIT/OPAMPx2 2.7V R/R 5.5MHz	RYT 101 6331/2
N7407	MICROCIRCUIT/74'139 LVC TSSOP16 2x DECODER	RYT 331 0139/3C
V7401	DIODE/SWix2 70V .2A SOT23 Common_Cat	RKZ 123 03/3
V7402	DIODE/SWix2 70V .2A SOT23 Common_Cat	RKZ 123 03/3



Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

**1.2.3 Function Block PA, PBU 1900**

Product ROZ 104 097/1  
Revision AT

Pos	Prod name/Func des	Product number
M7100	ISOLATOR/1930 to 1990 MHz	UNH 102 3003/02
M7101	CIRCULATOR/PILL,1930-1990MHZ	KRY 101 1540/2
N7102	MICROCIRCUIT/OPAMPx2 2.7V R/R 5.5MHz	RYT 101 6331/2
N7104	MICROCIRCUIT/TEMP. SENSOR FAHERNHEIT	RYT 124 6015/1
N7105	MICROCIRCUIT/OPAMP x2 +/-15V 4.5MHz	RYT 101 6076/1C
N7106	ATTENUATOR/	REP 015 113
N7107	MICROCIRCUIT/OPAMP x2 +/-15V 4.5MHz	RYT 101 6076/1C
R7214	ATTENUATOR4/3DB SMD,TEMP. COEFF.-0.007	UMF 101 181/37T
V7100	DIODE/SCHx2 20V 5mA SOT363 RF Schot	RKZ 323 6059/1
V7101	TRANSISTOR/BLF2043	RYN 123 1622/1
V7102	TRANSISTOR/RF Power 1.8 to 2.0 GHz	RYN 123 1631/1
V7104	TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460	RYN 120 614/1
V7107	TRANSISTOR/RF POWER FET MRF281Z	RYN 123 683/1
V7109	DIODE/SWlx2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
V7110	DIODE/SWlx2 70V 0.2A SOT23 6ns Seria	RKZ 123 03/1
W7100	CIRCULATOR/1.960GHz	UNK 102 124/02
W7101	DIRECTIONAL COUPLER/1A1305-20	UND 106 049/1

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

**1.2.4 Function Block Hybrid Combiner, PBU 1900**

Product ROZ 104 099/1  
Revision M

Pos	Prod name/Func des	Product number
V8900	DIODE/SCHx2 20V 5mA SOT363 RF Schot	RKZ 323 6059/1
W8900	DIRECTIONAL COUPLER/2A1305-3	UND 106 041/1

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

**1.3 Printed Board PBU1 1900 GMSK wo Hybrid Combiner ROA 219 5388/1**

**1.3.1 Function Block DC Booster**

See 1.2.1

**1.3.2 Function Block PA Linearisation GMSK PBU1900**

See 1.2.2

**1.3.3 Function Block PA, PBU 1900**

See 1.2.3

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

## 2            2.1033(c)(9) Tune-Up Procedure

All the necessary adjustments will be set in the factory, and no adjustments are needed. The output power level is remotely controlled by the Base Station Controller (BSC). If the TRX (one half of dTRU) is not able to maintain the requirements for power output, frequency stability, etc an alarm is sent to the BSC. On severe faults the TRX (or TRX:s with TCC function) will disable transmission.

Prepared (also subject responsible if other) EAB/RBI/R Per Helmersson		No. B5KCKRC1311004-1		
Approved KI/EAB/RBI/R (P Helmersson)	Checked	Date 2003-06-10	Rev A	Reference

### 3 2.1033(c)(9,10) Power Tune-Up – Power Limiting

The TRX (one half of dTRU) measures the output power at its output connector via a RF-detector and the detected value is used by the power loop control block to steer two variable gain amplifiers between the modulator and the power amplifier.

In TCC (Transmitter Coherent Combining) mode is the output power also measured with a RF detector in the non-output branch of the hybride combiner in the dTRU. This output power is kept as low as possible, by keeping the TRX:s output power in phase with each other, to get maximum output power at the output branch of the hybride combiner.

The transmitter in each TRX contains three synthesized oscillators. One PLL gives a 160 MHz signal to the I/Q modulator. The two other generate a 1770 to 1830 MHz signal to the mixer where the modulated signal is converted to the transmit frequency. Two oscillators are needed in frequency hopping mode, one is retuning while the other is active. All three synthesized oscillators have a reference of 13 MHz, which is downmixed by 2, generated in a central synthesized oscillator (PLL) of 26 MHz in the LTU part of the dTRU. This PLL frequency reference is extracted from the 13 MHz signal on the Y-link, which is generated and distributed, by the DXU (Distribution Switch Unit), to all dTRU:s in the basestation.

The frequency reference 13 MHz in the DXU is generated in a voltage controlled oscillator placed in an oven together with and phase-locked to a long term stable oven heated oscillator. As an option the oscillator can be phase-locked to the incoming PCM-link frequency or an incoming GPS-link frequency.