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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBR1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

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 104 033/1
Revision PF1

| Pos | Prod name/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 104 032/1
 Revision M

| Pos | Prod name/Des | Product number |
|------|--|----------------|
| T700 | TRANSFORMER/PLANARTRANSFORMER T40 | REG 735 305/2 |
| T702 | TRANSFORMER/PLANARTRANSFORMER T25 | REG 735 304/2 |
| V700 | RECTIFIER/SCHx2 30V 2x15A D2PAK | RKZ 323 6012/3 |
| V702 | RECTIFIER/SCHx2 30V 2x6A DPAK(TO252AA) | RKZ 323 6047/1 |
| V703 | OVERVOLTAGEPROT./DIODE TS 36V 30A DO-214AB | RKZ 223 485/36 |
| V708 | RECTIFIER/REC 200V 1A 35ns SMA (DO214AC) | RKZ 123 05/2 |
| V709 | RECTIFIER/REC 200V 1A 35ns SMA (DO214AC) | RKZ 123 05/2 |
| V710 | TRANSISTOR/NFET 100V 6A SO8 0.026ohm | RYN 123 6032/1 |
| V711 | TRANSISTOR/NFET 100V 6A SO8 0.026ohm | RYN 123 6032/1 |
| V712 | TRANSISTOR/NFET 100V 6A SO8 0.026ohm | RYN 123 6032/1 |
| V714 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V715 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V716 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V717 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V718 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V719 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V720 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V721 | TRANSISTOR/NFET 30V 14A SO8 0.008ohm | RYN 123 6012/1 |
| V722 | RECTIFIER/SCH 25V 10A SMB | RKZ 323 6038/1 |
| V723 | RECTIFIER/SCH 25V 10A SMB | RKZ 323 6038/1 |
| V724 | RECTIFIER/SCH 25V 10A SMB | RKZ 323 6038/1 |
| V725 | RECTIFIER/SCH 25V 10A SMB | RKZ 323 6038/1 |
| V727 | TRANSISTOR/N chanl. MOSFET | RYN 123 251/C |
| V728 | TRANSISTOR/N chanl. MOSFET | RYN 123 251/C |
| V729 | DIODE/SWI 75V 0.25A SOT23 | RKZ 123 612 |
| V730 | DIODE/SWI 75V 0.25A SOT23 | RKZ 123 612 |
| V736 | REG.DIODE/REG 12.0V 6% 0.2W SOT-23 | RKZ 223 01/18 |
| V738 | OVERVOLTAGEPROT./DIODE TS 36V 30A DO-214AB | RKZ 223 485/36 |
| V746 | DIODE/SWI 75V 0.25A SOT23 | RKZ 123 612 |
| V747 | DIODE/DUAL SERIES 70V .2A 6ns SOT-23 | RKZ 123 03/1 |
| V748 | DIODE/DUAL SERIES 70V .2A 6ns SOT-23 | RKZ 123 03/1 |
| V749 | TRANSISTOR/NFET 100V 6A SO8 0.026ohm | RYN 123 6032/1 |
| V750 | TRANSISTOR/NFET 100V 6A SO8 0.026ohm | RYN 123 6032/1 |
| Z703 | MICROCIRCUIT/REG SW- ADJ 150kHz 0.5A | RYT 113 6320/1 |
| Z705 | MICROCIRCUIT/LM431 ADJ REGULATOR | RYT 113 008/3C |
| Z709 | MICROCIRCUIT/REG SW- 1.26-2.5V +/-1.2% 20A | RYT 113 6175/1 |
| Z710 | MICROCIRCUIT/PWM CURR.-M 5.0V +/-1.5% 1MHz | RYT 113 6053/4 |

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|------|---|----------------|
| Z711 | MICROCIRCUIT/PWM CURR.-M 5.0V +/-1.5% 1MHz | RYT 113 6053/4 |
| Z712 | MICROCIRCUIT/VOLTAGE REG, INVERTING, -5V | RYT 113 256/C |
| Z851 | MICROCIRCUIT/COMP x2 36V | RYT 101 6169/1 |
| Z853 | MICROCIRCUIT/COMP x2 36V | RYT 101 6169/1 |
| Z854 | MICROCIRCUIT/COMP x2 36V | RYT 101 6169/1 |
| Z855 | MICROCIRCUIT/COMP x2 36V | RYT 101 6169/1 |
| Z856 | MICROCIRCUIT/SUP.V 2.93V L/NIN RESET | RYT 113 6166/2 |
| 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 |
| Z862 | MICROCIRCUIT/MOSFET DRIVERx2 NONINV /4427 | RYT 109 6204/2 |
| 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 J

| Pos | Prod name/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 | DIRECTION 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/ATF-34143 | RYN 123 697/1 |
| V1051 | TRANSISTOR/ATF-34143 | RYN 123 697/1 |
| V1052 | TRANSISTOR/ATF-34143 | RYN 123 697/1 |
| V1053 | TRANSISTOR/ATF-34143 | RYN 123 697/1 |
| V1054 | TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460 | RYN 120 614/1 |
| V1112 | DIODE/DUAL SERIES 70V .2A 6ns SOT-23 | RKZ 123 03/1 |

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|-------|---|----------------|
| 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 |
| 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 GMSK/8-PSK 1900 MHz

Product
ROZ 104 042/2
Revision A

| Pos | Prod name/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 | ASIC/ASIC QIM | ROP 101 1115/C |
| Z1308 | ASIC/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 GMSK/8-PSK 1900 MHz

Product
ROZ 104 043/2
Revision A

| Pos | Prod name/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 | ASIC/ASIC QIM | ROP 101 1115/C |
| Z2302 | ASIC/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

Product
ROZ 104 029/1
Revision K

| Pos | Prod name/Des | Product number |
|-------|--|--------------------|
| L3100 | FILTER/EMI,3A 50 OHM 1206 SMD | REG 706 21/1 |
| V3100 | LED/LED Red 20mA 0.5-1.3mcd 1.6x3. | RKZ 433 606/3 |
| V3900 | LED/LED RED 56-140mcd 20mA 4x3.8x4 | RKZ 433 681/1 |
| V3901 | LED/LED GREEN 90-180mcd 20mA 4x3.8 | RKZ 433 681/5 |
| V3902 | LED/LED YELLOW 90-224mcd 20mA 4x3. | RKZ 433 681/4 |
| V3903 | LED/LED YELLOW 90-224mcd 20mA 4x3. | RKZ 433 681/4 |
| Z3000 | MICROCIRCUIT/74'04 LVC SSOP14 6x INVERTER | RYT 331 0004/C |
| Z3001 | MICROCIRCUIT/NOR GATE,QUAD,74LVC08 | RYT 331 0008/3C |
| Z3100 | MICROCIRCUIT/PowerPC405GP 266MHz rev D | RYT 123 6091/3 |
| Z3101 | MICROCIRCUIT/74'138 LVC TSSOP16 3:8 LINE DE | RYT 331 0138/3C |
| Z3102 | MICROCIRCUIT/DC-DC CONV ADJ 1.1-VIN +/-1% 2 | RYT 113 6236/1 |
| Z3104 | MICROCIRCUIT/Zero delay buffer 3.3V | RYT 108 107/C |
| Z3301 | MICROCIRCUIT/74'244 LVC SSOP20 8x BUFFER NO | RYT 331 0244/C |
| Z3302 | MICROCIRCUIT/74'139 LVC TSSOP16 2x DECODER | RYT 331 0139/3C |
| Z3303 | MICROCIRCUIT/74'14 LVC TSSOP14 6x INVERT SC | RYT 331 0014/3C |
| Z3400 | MICROCIRCUIT/SDRAM CL=2 16M16 100M 3.3V C | RYT 119 6142/4 |
| Z3400 | MICROCIRCUIT/SDRAM CL2+3 16M16 133M 3.3V C | RYT 119 6142/5 |
| Z3401 | MICROCIRCUIT/SDRAM CL=2 16M16 100M 3.3V C | RYT 119 6142/4 |
| Z3401 | MICROCIRCUIT/SDRAM CL2+3 16M16 133M 3.3V C | RYT 119 6142/5 |
| Z3402 | MICROCIRCUIT/SDRAM CL=2 16M16 100M 3.3V C | RYT 119 6142/4 |
| Z3402 | MICROCIRCUIT/SDRAM CL2+3 16M16 133M 3.3V C | RYT 119 6142/5 |
| Z3403 | MICROCIRCUIT/FLASH TB 2M16 90NS 3.3V I | RYT 118 6152/4 |
| Z3404 | MICROCIRCUIT/FLASH 8M16 150ns 3.3V E | RYT 118 6153/1 |
| Z3601 | MICROCIRCUIT/LVDS QUAD LINE DRIVER | RYT 109 126/5C |
| Z3602 | MICROCIRCUIT/LVDS QUAD LINE RECEIVER | RYT 109 127/5C |
| 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 |

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| Z3606 | MICROCIRCUIT/3485 RS485/422 TRANCEIVER | RYT 109 165/C |
| Z3607 | FUNCTION COMPONENT/RESET PLD | RON 107 969 |
| 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/DS1621 DIG. TERMOMETER 150mil | RYT 124 7601/C |

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1.1.7 Function Block SPARC 1 GMSK/8-PSK

Product
ROZ 104 030/2
Revision K

| Pos | Prod name/Des | Product number |
|-------|--|----------------|
| Z5000 | FUNCTION COMPONENT/GMUX PLD | RON 107 970 |
| Z5001 | MICROCIRCUIT/EEPROM 128K8 SPI 2.7-5.5V | RYT 118 6154/1 |
| Z5100 | ASIC/TARAC_S+ | ROP 101 617/4C |
| Z5102 | MICROCIRCUIT/XCV50E-6 FPGA 1.8V | RYT 139 055/C |
| Z5200 | ASIC/TARAC_S+ | ROP 101 617/4C |
| Z5201 | MICROCIRCUIT/SDRAM CL2+3 16M16 133M 3.3V C | RYT 119 6142/5 |
| Z5300 | ASIC/TARAC_S+ | ROP 101 617/4C |

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1.1.8 Function Block SPARC 2 GMSK/8-PSK

Product
ROZ 104 031/2
Revision K

| Pos | Prod name/Des | Product number |
|-------|--|----------------|
| Z6000 | FUNKTION COMPONENT/GMUX PLD | RON 107 970 |
| Z6001 | MICROCIRCUIT/EEPROM 128K8 SPI 2.7-5.5V | RYT 118 6154/1 |
| Z6100 | ASIC/TARAC_S+ | ROP 101 617/4C |
| Z6102 | MICROCIRCUIT/XCV50E-6 FPGA 1.8V | RYT 139 055/C |
| Z6200 | ASIC/TARAC_S+ | ROP 101 617/4C |
| Z6201 | MICROCIRCUIT/SDRAM CL2+3 16M16 133M 3.3V | RYT 119 6142/5 |
| | C | |
| Z6300 | ASIC/TARAC_S+ | ROP 101 617/4C |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.1.9 Function Block TX1 GMSK/8-PSK 1900 MHz

Product
 ROZ 104 090/1
 Revision D

| Pos | Prod name/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 | ASIC/ASIC NINJA | ROP 101 614/2 |
| N5501 | ASIC/ASIC PENNY | ROP 101 612/2 |
| N5502 | FILTER/BP 160MHz 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 | ASIC/ASIC SPIRA | ROP 101 616/C |
| Z5802 | MICROCIRCUIT/74'541 HCT TSSOP20 8x BUS BUFF | RYT 310 6023/2C |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.1.10 Function Block TX2 GMSK/8-PSK 1900 MHz

Product
ROZ 104 091/1
Revision D

| Pos | Prod name/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 | ASIC/ASIC NINJA | ROP 101 614/2 |
| N6501 | ASIC/ASIC PENNY | ROP 101 612/2 |
| N6502 | FILTER/BP 160MHz 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 | ASIC/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 |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBR1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.2 Printed Board PBU1 1900 GMSK/8-PSK Hybrid Combiner ROA 219 5387/1

1.2.1 Function Block DC Booster

Product
ROZ 104 91/1
Revision K

| Pos | Prod name/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 |
| L7700 | FERRIT/Ferrite Bead | REG 704 20/2 |
| L7701 | FERRIT/Ferrite Bead | REG 704 20/2 |
| 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) 0.02 | RYN 123 24/1 |
| V7702 | TRANSISTOR/NFET 60V 42A D2PAK(TO263) 0.02 | RYN 123 24/1 |
| V7703 | TRANSISTOR/PFET 60V 30A TO263AB 0.065_Ohm | RYN 122 657/2 |
| V7704 | TRANSISTOR/PFET 60V 30A TO263AB 0.065_Ohm | 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 100mA SOT-223 BCP 53- | RYN 120 615/1 |
| V7710 | DIODE/DIODE 20V 0.1A SOT23 | RKZ 123 641/1 |
| V7711 | REG.DIOD/REG 27.0V 7% 0.2W SOT-23 | RKZ 223 01/26 |
| V7712 | TRANSISTOR/SIL.AF TRANSIST.NPN, SOT23 | RYN 121 6068/1 |
| V7713 | TRANSISTOR/SIL.AF TRANSIST.NPN, SOT23 | RYN 121 6068/1 |
| V7714 | TRANSISTOR/SIL.AF TRANSIST.NPN, SOT23 | RYN 121 6068/1 |
| V7715 | TRANSISTOR/SIL.AF TRANSIST.NPN, SOT23 | RYN 121 6068/1 |
| V7716 | TRANSISTOR/SIL.AF TRANSIST.NPN, SOT23 | RYN 121 6068/1 |
| V7717 | REG.DIOD/REG 5.6V 7% 0.2W SOT-23 | RKZ 223 01/10 |
| V7718 | REG.DIOD/REG 5.6V 2% 0.2W SOT-23 | RKZ 223 01/40 |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

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| 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 |
| 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 | REG.DIOD/REG 12.0V 6% 0.2W SOT-23 | RKZ 223 01/18 |
| V7728 | REG.DIOD/REG 3.9V 5% 0.2W SOT-23 | RKZ 223 01/6 |
| V7729 | REG.DIOD/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 | REG.DIOD/REG 15.0V 5% 0.2W SOT-23 | RKZ 223 01/20 |
| V7736 | RECTIFIER/SCHx2 30V 2x15A D2PAK | RKZ 323 6012/3 |
| V7738 | TRANSIENT PROT/TVS-Uni 33V 37-41V 1.5KW SMCG | RKZ 223 606/330 |
| V7739 | TRANSIENT PROT/TVS-Bi 33V 36-41V 1.5KW DO214A | RKZ 223 606/33 |
| Z7700 | MICROCIRCUIT/PW-CONTROLLER | RYT 113 006/4C |
| Z7701 | MICROCIRCUIT/PW-CONTROLLER | RYT 113 006/4C |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.2.2 Function Block PA Linearisation GMSK/8-PSK PBU1900

Product
ROZ 104 098/1
Revision L

| Pos | Prod name/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/SW1x2 70V .2A SOT23 COM_CATH | RKZ 123 03/3 |
| V7402 | DIODE/SW1x2 70V .2A SOT23 COM_CATH | RKZ 123 03/3 |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBR1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.2.3 Function Block PA, PBU 1900

Product
ROZ 104 097/1
Revision X

| Pos | Prod name/Des | Product number |
|-------|---|-----------------|
| M7100 | ISOLATOR/1930 to 1990 MHz | UNH 102 3002/02 |
| 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 |
| V7100 | DIODE/SCHx2 20V 5mA SOT363 RF Schot | RKZ 323 6059/1 |
| V7103 | TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460 | RYN 120 614/1 |
| V7104 | TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460 | RYN 120 614/1 |
| V7105 | DIODE/SCHx2 20V 5mA SOT363 RF Schot | RKZ 323 6059/1 |
| V7106 | TRANSISTOR/PNP 45V 100mA SOT23 hFE250-460 | RYN 120 614/1 |
| V7107 | TRANSISTOR/RF POWER FET MRF281Z | RYN 123 683/1 |
| W7100 | CIRCULATOR/1.960GHz | UNK 102 124/02 |
| W7101 | DIRECTION COUPLER/1A1305-20 | UND 106 049/1 |
| W7102 | DIRECTION COUPLER/1850MHz 3dB | UND 106 036/1 |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

1.2.4 Function Block Hybrid Combiner, PBU 1900

Product
ROZ 104 099/1
Revision J

| | | |
|-------|--------------------------------------|----------------|
| Pos | Prod name/Des | Product number |
| N8900 | MICROCIRCUIT/OPAMPx2 2.7V R/R 5.5MHz | RYT 101 6331/2 |
| V8900 | DIODE/SCHx2 20V 5mA SOT363 RF Schot | RKZ 323 6059/1 |
| W8900 | DIRECTION COUPLER/2A1305-3 | UND 106 041/1 |

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

- 1.3 Printed Board PBU1 1900 GMSK/8-PSK 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/8-PSK PBU1900**
See 1.2.2
- 1.3.3 Function Block PA, PBU 1900**
See 1.2.3

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

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.

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| Prepared (also subject responsible if other) | | No. | | |
| ERA/RKF/VR Larry Lindström | | B5KBKRC1311004-1 | | |
| Approved | Checked | Date | Rev | Reference |
| KI/ERA/RKF/VR (L Lindström) | | 2002-05-03 | A | |

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 can the oscillator be phase-locked to the incoming PCM-link frequency or an incoming GPS-link frequency.