



BSR75 TECHNICAL INFORMATION

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DATE: 17/08/09

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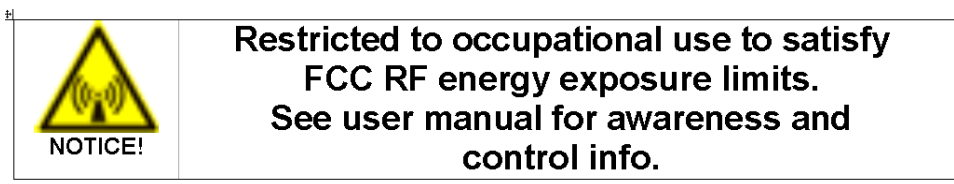
CAUTION TO USERS

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This device is approved with emissions having a source-based time-averaging duty factor not exceeding 50%.

Vehicle – Antenna Installation:

- Antennas used for this transmitter must not exceed an antenna gain of 3 dBi with a minimum cable loss of 1dB.
- For rear deck trunk and roof top installations, the antenna must be located at least 91 cm (36 inches) away from rear-seat passengers and bystanders in order to comply with the FCC RF exposure requirements.

The following label will be mounted in conspicuous view on the radio.



Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.



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1. BSR75

1.1. INTRODUCTION

The BSR75 is a digital RF transceiver with a transmitter output power of 75 W. It is manufactured following a robust mechanical modular design which allows simple and economic maintenance.

The BSR75 is available in the following frequency bands:

- 380 - 400 MHz
- 410 - 430 MHz
- 450 - 470 MHz
- 806 - 870 MHz

The modules that form the BSR75 are:

- RPS75 (Repeater Power Supply)
- RPA75 (Repeater Power Amplifier)
- RTX75 (Repeater Transmitter)
- RRX (Repeater Receiver)
- BSYNC (BSR75 Synchronism) - OPTIONAL
- RCPU (Repeater Control Processing Unit)



CAUTION: Switch the BSR75 off before inserting/removing any of its modules.



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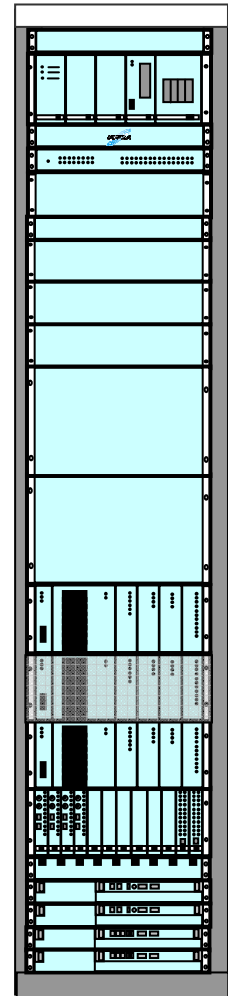
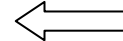
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1.2. VIEW AND LOCATION

The BSR75 typical location is in a Base Station Site.





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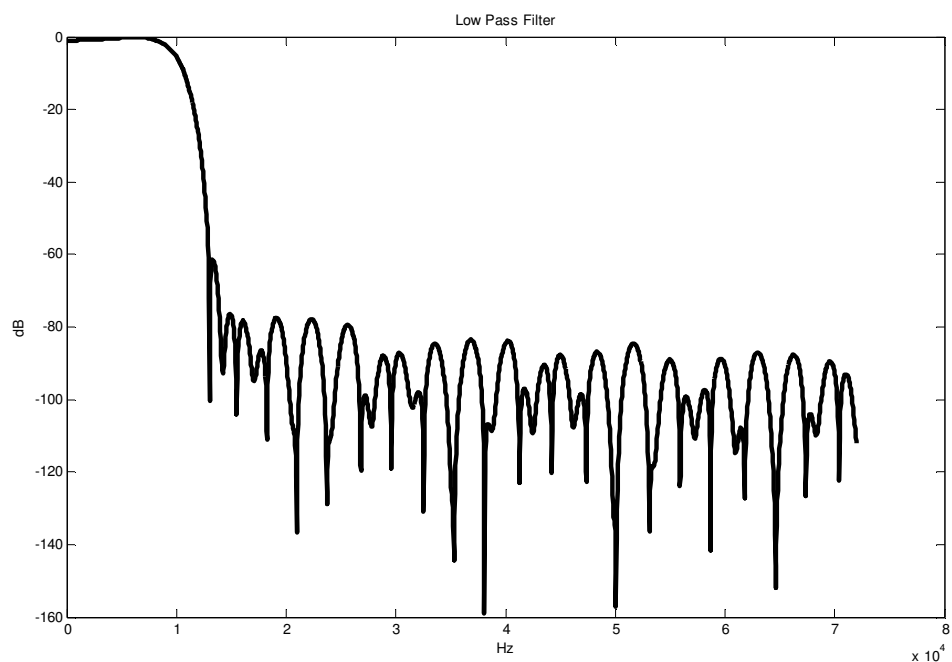
1.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- Frequency bands: 380-400, 410-430, 450-470, 806-870 MHz.
- Transmit offset frequency: 45MHz for 806-870 MHz band; any for other frequency bands.
- Channel spacing: 6.25 KHz, 12.5 KHz or 25 KHz.
- Time Division Multiple Access (TDMA): 4 physical channel per carrier.
- Modulation: $\pi/4$ -DQPSK.
- Emissions Designators: 20K0D7W, 20K0D7E, 20K0D7D.
- Data bit rate: 36 Kbits/s.
- Ethernet interface: IEEE 802.3u,x.
- BSR75 is hot swap as a unit, but individual modules (RPS75, RPA75, RTX75, RRX, BSYNC, RCPU) are not.

Electrical characteristics:

- Nominal voltage: 26,4 Vdc (21.1 – 31.7 Vdc).
- Consumption: 500 W maximum.
- Transmitter:
 - RF Output Power: 75 W (+48.75 dBm) and from 40 W to 0.6 W in 2 dB steps.
 - Transmitter Frequency Range: 380 - 400, 410 - 430, 450 - 470, 851 - 870 MHz.
 - Frequency Accuracy: ± 0.1 ppm.
 - Spurious Emissions: < -70 dBc.
 - Adjacent Channel Power (ACP) Ratio: > 60 dB.
 - Inter-modulation attenuation: > 40 dB.
 - Modulation Fidelity (Digital): < 5%.
 - Audio low pass filter response:





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- Receiver:
 - Receiver Frequency Range: 380 - 400, 410 - 430, 450 - 470, 806 - 825 MHz.
 - Sensitivity: < -115 dBm (0.4 uV).
 - Faded Sensitivity: < -106 dBm.
 - Selectivity: > 45 dB.
 - Co-Channel Rejection: < 19 dB.
 - Spurious response rejection: > 67 dB.
 - Intermodulation response rejection: > 65 dB.
 - Unwanted conducted emissions: < -57 dBm.

Data rate:

- Ethernet interface: bandwidth for dimensioning WAN link between Master Site and Base Station Site: 40 Kbps.
- Ethernet interface: bandwidth for dimensioning Base Station Site LAN: 60 Kbps.

Environmental characteristics:

- Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- Dimensions (Length x Height x Width): 379mm x 133mm(3U) x 483mm.
- Weight: 10250 gr. (10500 gr. with BSYNC).
- BSR75 is assembled in a 19"-wide 3U-high rack.



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2. BSR75 MODULES

BSR75 is formed by the following modules, interconnected through the BSR75 rack back-plane board:

- ❑ RPS75 (Repeater Power Supply)
- ❑ RPA75 (Repeater Power Amplifier)
- ❑ RTX75 (Repeater Transmitter)
- ❑ RRX (Repeater Receiver)
- ❑ BSYNC (BSR75 Synchronism) - OPTIONAL
- ❑ RCPU (Repeater Control Processing Unit)



CAUTION: Switch the BSR75 off before inserting/removing any of its modules.



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2.1. RPS75

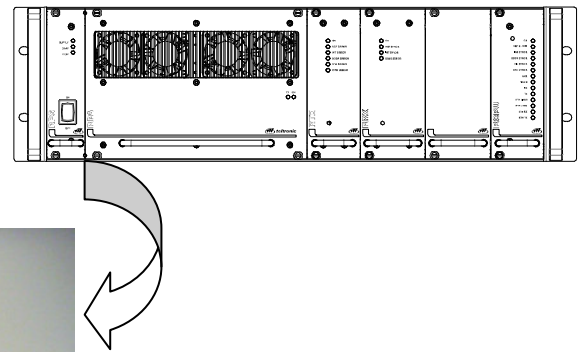
2.1.1. INTRODUCTION

RPS75 (Repeater Power Supply) module provides power supply to the rest of BSR75 modules.

This module features an external switch to turn on or off power supply to the BSR75 modules.

2.1.2. VIEW AND LOCATION

RPS75 module is inserted into slot 1 of the BSR75 Rack..





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2.1.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- ❑ The RPS75 module features an external switch for turning on or off supply of power to the rest of the modules in the BSR75.

Electrical characteristics:

- ❑ RPS75 module can supply up to 3 amperes at 13.2-volt output voltage.
- ❑ RPS75 module can supply up to 30 amperes at 26.4-volt output voltage.
- ❑ RPS75 PCB tracks are over-sized in order to support up to 30-amperes input current.

characteristics:

- ❑ Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- ❑ Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- ❑ Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- ❑ Eurocard format.
- ❑ Dimensions (Length x Height x Width): 325mm x 128mm (3U) x 33mm (6UP).
- ❑ Weight: 250 g.



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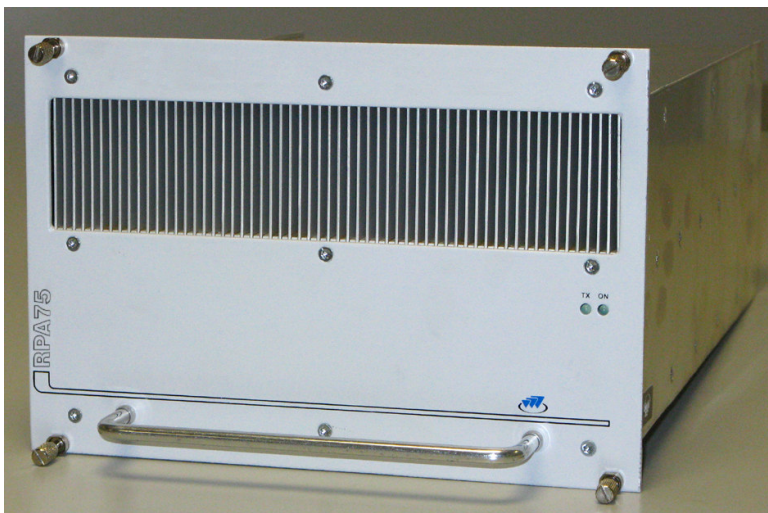
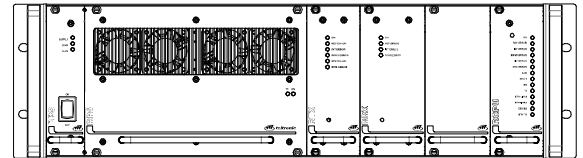
2.2. RPA75

2.2.1. INTRODUCTION

The RPA75 module (Repeater Power Amplifier) is the module that amplifies transmitter signal level up to its final output power.

2.2.2. VIEW AND LOCATION

The RPA75 module is inserted in slot 2 of the BSR75 Rack.





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2.2.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- ❑ The RPA75 Module amplifies the signal modulated by the RTX75 module to its final power level.
- ❑ The RPA75 Module informs the RTX75 Module about the power amplifier temperature.
- ❑ The RPA75 Module informs the RTX75 Module about the forward power level and about the reverse power level.

Electrical characteristics:

- ❑ The RPA75 Module obtains from the BSR75 Back Plane the voltage levels +26.4Vdc and +13.2Vdc. It also uses two voltage regulators to obtain +10Vdc and +3.3Vdc.
- ❑ Consumption: 350 W max.
- ❑ Output power: 75 W.
- ❑ Gain: 36 dB min.

Environmental characteristics:

- ❑ Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- ❑ Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- ❑ Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- ❑ Dimensions (Length x Height x Width): 335mm x 129mm (3U) x 191mm (38UP).
- ❑ Weight: 3600g.



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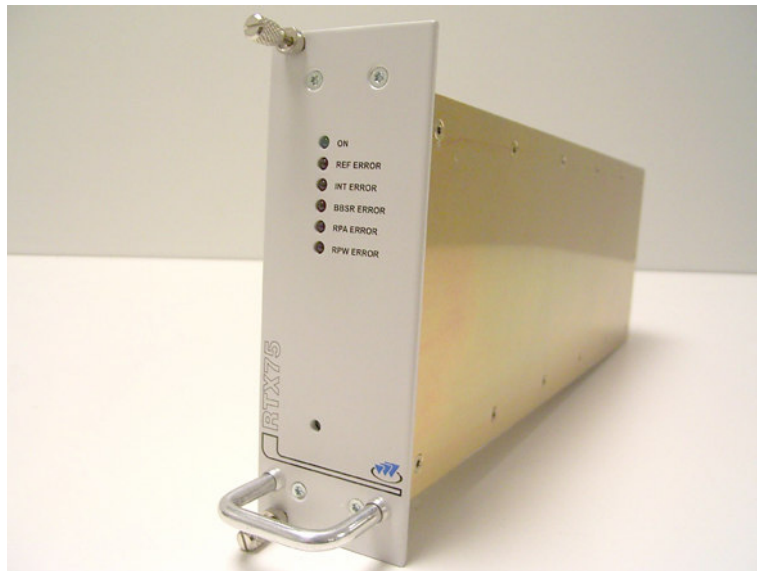
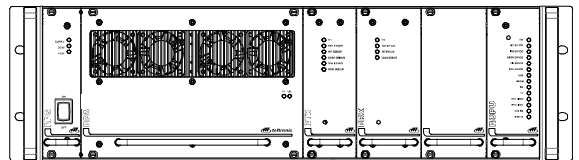
2.3. RTX75

2.3.1. INTRODUCTION

The RTX75 Module (Repeater Transmitter) is the BSR75 transmitter.

2.3.2. VIEW AND LOCATION

The RTX75 Module is inserted in slot 3 of the BSR75 Rack.





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2.3.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- ❑ The RTX75 Module (Repeater Transmitter) generates a low-power signal modulated according to data provided by the RCPU.

Electrical characteristics:

- ❑ Output power: +10 dBm (10 mW).
- ❑ Consumption: 15 W.

Environmental conditions:

- ❑ Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- ❑ Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- ❑ Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- ❑ Dimensions (Length x Height x Width): 323mm x 128mm (3U) x 45mm (9UP)
- ❑ Weight: 600 g



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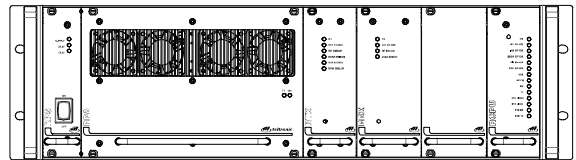
2.4. RRX

2.4.1. INTRODUCTION

The RRX (Repeater Receiver) is the receiver module of the BSR75.

2.4.2. VIEW AND LOCATION

The RRX Module is inserted in slot 4 of the BSR75 Rack.





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2.4.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- ❑ The RRX (Radio Receiver) module performs reception tasks in the BSR75 (Base Station Repeater).
- ❑ To obtain diversity 2, each RRX Module includes two receptors.
- ❑ RRX Modules are managed by the RCPU, which also controls the transmitter module (RTX).

Electrical characteristics:

- ❑ Consumption: 10 W.

Environmental conditions:

- ❑ Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- ❑ Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- ❑ Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- ❑ Dimensions (Length x Height x Width): 332mm x 128mm (3U) x 55mm (11UP).
- ❑ Weight: 650 g.



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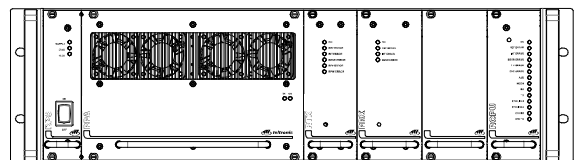
2.5. RCPU

2.5.1. INTRODUCTION

The RCPU module is in charge of controlling the BSR75. It contains the main microcontroller and the DSPs that manage the RTX75 and RRX modules. The RCPU performs the functions corresponding OSI layers 1 and 2.

2.5.2. VIEW AND LOCATION

The RCPU Module is inserted in slot 6 of the BSR75 Rack.





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2.5.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- ❑ The RCPU (Repeater CPU) controls the rest of the BSR75 modules.
- ❑ The RCPU module contains two DSPs, TXDSP and RXDSP, and their associated circuitry. The TXDSP performs modulation tasks while the RXDSP carries out demodulation tasks.
- ❑ The RCPU module calculates the RSSI level of incoming RX frames.
- ❑ The MPC860 microcontroller in the RCPU detects interferences.
- ❑ The RCPU controls the modules RRX and RTX75 via the BSR75 Bus.
- ❑ The RCPU forwards to the Site Controller the data received and informs the Site Controller of its internal status. The Site Controller responds with the necessary information for its correct operation.

Electrical characteristics:

- ❑ Interface with the DSPs via a parallel bus (HPI).
- ❑ Double 100-Mbps Fast Ethernet controller.
- ❑ Serial port with VT-100 protocol over RS-232C level adapter.
- ❑ Consumption: 10W.

Environmental characteristics:

- ❑ Operating Temperature Range: -30°C to +60°C (-22°F to +140°F).
- ❑ Storage Temperature Range: -40°C to +85°C (-40°F to +185°F).
- ❑ Humidity: 0 to 90% RH @ 50°C (122°F).

Mechanical characteristics:

- ❑ Dimensions (Length x Height x Width): 325mm x 128mm (3U) x 45mm (9UP).
- ❑ Weight: 350 g.



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2.6. SYNCHRONISM BOARD

2.6.1. INTRODUCTION

This module carries out two very important tasks in the infrastructure:

- It provides a synchronism signal:
 - It provides an NMEA 0183 V2.01 sequence, consisting of date and time.
 - It also provides a PPS signal (1 pulse per second), retrieved from the GPS as well. This pulse makes it possible to synchronise different Base Station Sites in a network.
 - This feature may optionally be made redundant to yield two equivalent output signals.
- It provides a reference clock signal.
 - The module additionally yields a 10-MHz clock signal with a 0.1 ppm stability.

There are four variants of the synchronism board, depending on its location and availability of GPS in the board . Thus, the board is named MSYNC or MSYNC GPS when it is positioned in the MNI Rack, or BSYNC or BSYNC GPS when it is placed in a BSR75.



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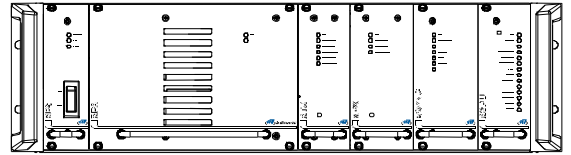
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2.6.2. VIEW AND LOCATION

The BSYNC or BSYNC GPS board is inserted in slot 5 of the BSR75.





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2.6.3. TECHNICAL CHARACTERISTICS

Functional characteristics:

- NMEA 0183 V2.01 sequence.
- 10-MHz clock signal with 0.1-ppm stability.
- PPS signal (Pulse Per Second).

Electrical characteristics:

- Nominal voltage: 26.4Vdc (21.1-31.7Vdc).
- Consumption: 15 W.

Environmental characteristics:

- Operating Temperature Range: -30°C to +60°C (-22°F to +140°F)
- Storage Temperature Range: -40°C to +85°C (-40°F to +185°F)
- Humidity: 0 to 90% RH @ 50°C (122°F)

Mechanical characteristics:

- Dimensions (Length x Height x Width): 288mm x 130mm(3U) x 55mm(11UP for BSYNC– BSYNC GPS) or 40mm (8UP for MSYNC – MSYNC GPS).
- Weight without GPS: 280 g.
- Weight with GPS: 320 g.