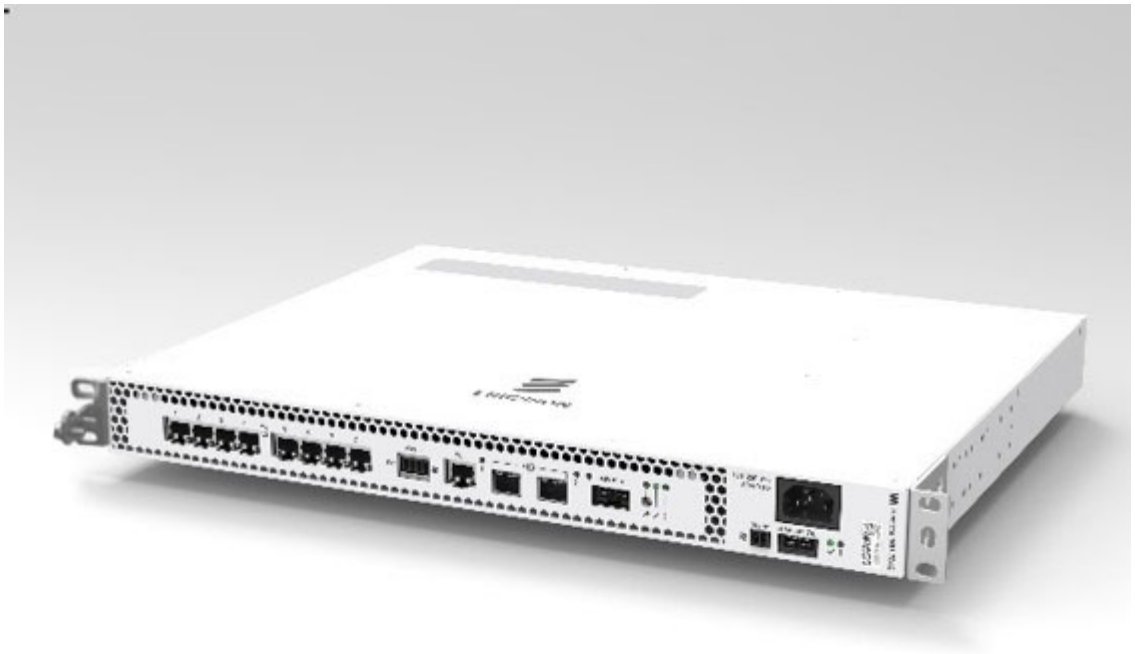
Remote IRU Enclosure 2242 Description

Radio Dot System

Description



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Contents

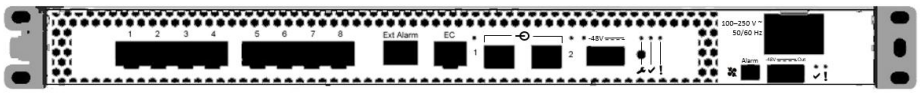
1 Remote IRU Enclosure 2242 Overview

The remote IRU enclosure with an integrated support unit is designed to house one IRU 2242 unit for distributed or standalone IRU deployment powered by a commercial AC mains supply.

The enclosure is a 1U 19” sheet metal enclosure with a removable front panel.

Figure 1 Remote IRU Enclosure 2242

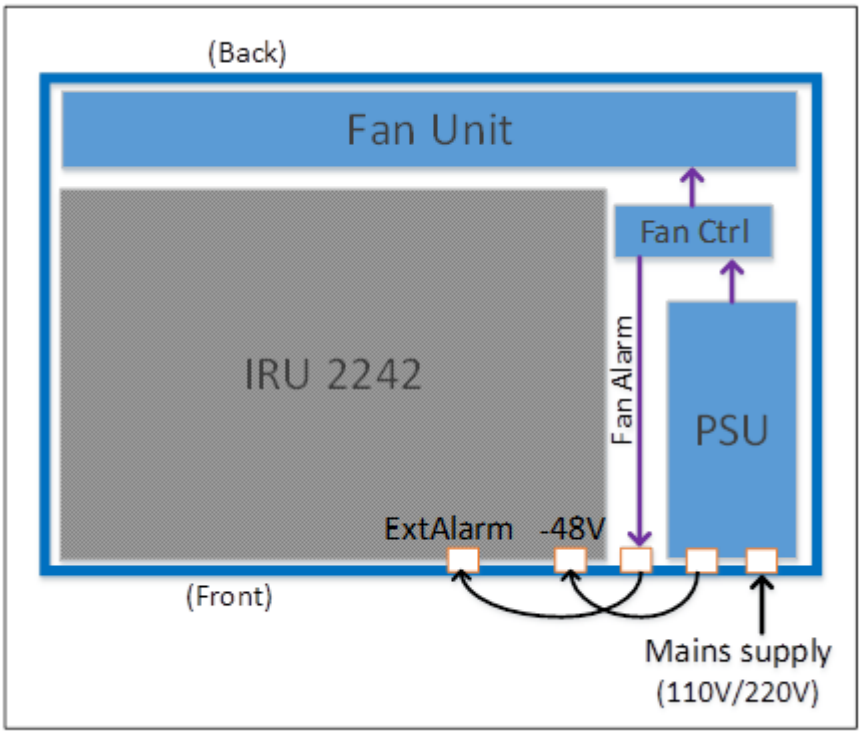
The Remote IRU Enclosure does not come with an IRU pre-installed in it. The IRU needs to be installed in the field. The Remote IRU Enclosure faceplate needs to be removed and the IRU inserted in the enclosure. For installation information refer to *Install Remote IRU Enclosure 2242, 1/1531-FGB 101 0308/1*.



The support unit consists of:

- Power Supply Unit (PSU)
- fan control unit
- fans

The functional overview is shown in the following figure:



The remote IRU enclosure is designed for mounting in a 19-inch rack according to IEC60297. It is also designed to support wall-mount installation.

The height of the enclosure is set to 1U to achieve the smallest possible footprint for the planned RBS applications.

The PSU is powered from a commercial single phase 110V - 220 V AC mains supply. It provides DC power to the fan control unit and -48 V DC power to the IRU. The -48 V DC port is accessible at the front panel.

The fans are located at the rear of the enclosure to provide airflow through the enclosure from front to back. The IRU, PSU, and fan control unit are ventilated by the same fans.

The fan control unit regulates the fan speed and generates a fan alarm in the event of a fan failure. The fan alarm port is accessible at the front panel.

The -48 V DC output from the PSU and the fan alarm port at the front panel is located to the right-side of the IRU 2242 (front view) for optimal external connection to the respective ports of the IRU.

The placement and interconnection of the fans, fan control unit, and the PSU in the enclosure are optimized to allow ease of on-site installation or replacement of the IRU.

The fans, fan control unit, and the PSU are not field-replaceable.

The enclosure provides visual indicators (LEDs) at the front panel showing the state (fault or operational) of the support unit when it is powered from mains supply.

1.1 Restrictions and Limitations

The following are restrictions and limitations associated with using or installing the Remote IRU Enclosure 2242:

- The Remote IRU Enclosure is not dependent of any software release. The dependency resides on the IRU located inside the enclosure.
- The IRU requires to be at release L14B/W15A as a minimum to support the external alarm feature.
- Only Port 1 of the external alarm port on the IRU can be used to propagate the enclosure fans alarm to the Digital Unit.
- OSS-RC Cabinet Viewer is not supported.
- IRU must be configured as a Remote IRU.
- The alarm port on the IRU must be provisioned as "Normally Closed" state (normallyOpen = false).
- In a vertical wall mount deployment scenario, the installation must observe adequate separation between CAT cables and power cables. See *RDI Cabling Guidelines, 56/1553-LZA 701 6009/1*.
- Autointegration of the Remote IRU Enclosure 2242 is not supported with DUW and DUS based nodes.
- The Remote IRU Enclosure 2242 requires 100 mm minimum clearance space behind the unit for airflow and proper cooling.

1.2 Shipping Box Content

The Remote IRU Enclosure 2242 (1/BFL 901 141/1) shipping box comes with the following content:

- Qty 2 - Small L Bracket
- Qty 2 - Large L Bracket
- Qty 1 - Ground Bracket
- Qty 8 - M4 bracket screws

- Qty 1 - Alarm Cable
- Qty 1 - DC Power cable

2 Technical Data

This section lists the technical data for the Remote IRU Enclosure 2242.

2.1 Dimensions and Weight

Table 1 Dimensions and Weight

Unit	Height	Width	Depth	Weight
Remote IRU Enclosure 2242	44 mm	440 mm [1]	352 mm	3.6 kg

[1] This dimension is without brackets

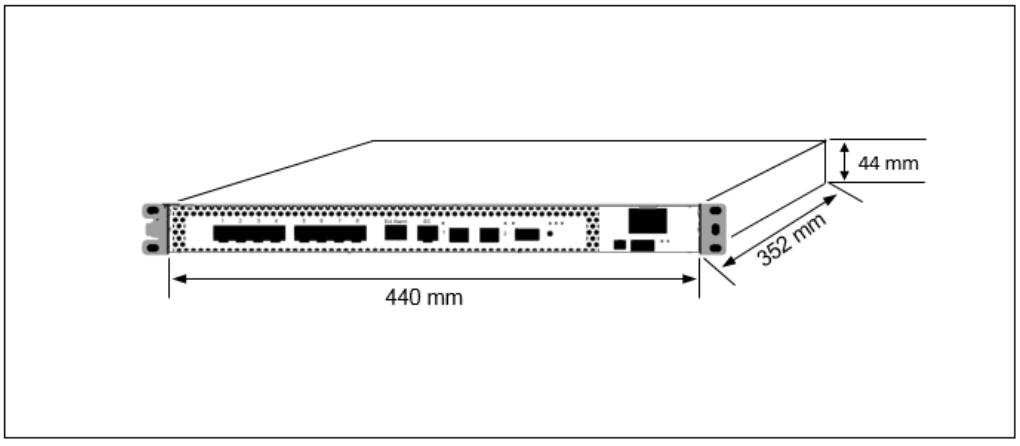


Figure 2 Remote IRU Enclosure 2242 Dimensions

2.2 Structural Load Requirements

The Remote IRU Enclosure 2242 can manage a load from one IRU with a height of 30 mm and a maximum weight of 3.2 kg.

The Remote IRU Enclosure 2242 is compliant to the seismic requirements of Earthquake Zone 4.

2.3 Power Supply Characteristics

The maximum power consumption of the Remote IRU Enclosure is 340 W. The consumption is roughly twice the heat dissipation (170 W) because the IRU provides power for the Radio Dots.

The Remote IRU Enclosure power supply characteristics are listed in the following table:

Table 2 Remote IRU Enclosure Power Supply

AC Power Supply	Value
PSU Nominal Input Voltage Range	100 - 250 V AC (RMS)
PSU Extended Input Voltage Range	90 - 275 V AC (RMS)
Frequency Range	45 - 65 Hz
PSU power output	-48 V DC (nominal descriptor, actual set point is -54.5 V DC) 280 W max (includes 18 W max for fans)

2.3.1 Protection and Fuse Recommendations

The AC input of the Remote IRU Enclosure requires to be protected with a single 250 V fuse or Circuit Breaker (CB) with the following data:

- Current rating: 15 A minimum, 16 A maximum.
- Breaking Capacity: ≥ 6 kA
- Fuses Characteristics: gG-gL-gD type according to IEC 60 269-1 and UL248-8.
- Thermal-magnetic Circuit Breaker and Hydraulic-Magnetic Circuit Breaker: Curve C (see Figure below) or similar according to IEC 60 947-2 and UL489.

Note: The requirement that both poles are interrupted in the event of the phase to earth fault in IT systems (reference IEC 60 950-1) is handled at the higher level product with a 2-pole circuit breaker. The use of dual fuses can also be acceptable.

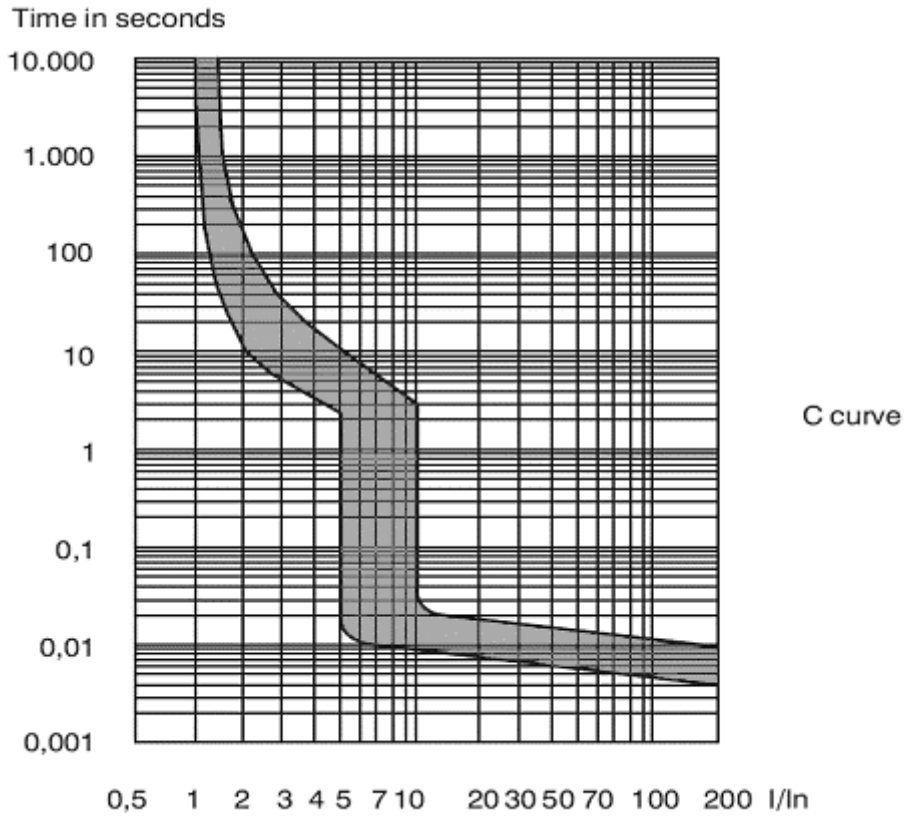


Figure 3 AC Circuit-Breaker trip characteristics (min-max trip limits) Reference design Heinemann Curve C

2.3.2 Power Distribution

The Remote IRU Enclosure PSU supplies the following functions with power:

- DC out to IRU: DC out is supplied with a short circuit protected power -48 V DC feeding.
- Internal fan control module and fans: The fan control module is supplied with DC power. The supply voltage can be different from -48 V DC.

2.3.2.1 PSU Turn-On Delay

The PSU does not enter turn-on delay until the output voltage has dropped below -39.0 V DC.

For AC interruptions (-100%) longer than 100 ms, the PSU can shut down and enter turn-on delay even if the output voltage is above -39.0 VDC. No alarm is triggered against the PSU.

2.3.2.2 PSU Ramp-Up Time

The PSU output ramp up time, from 10% to 90% of nominal voltage value, is in the range of 10 µs to 300 ms. The ramp up time is verified with 80% resistive load. No alarm is triggered against the PSU.

2.4 Mounting Options

The Remote IRU Enclosure 2242 can be mounted in the following ways:

- Rack Mount
- Wall Mount - Single
- Wall Mount - Dual

To mount the Remote IRU Enclosure 2242, refer to *Install Remote IRU Enclosure 2242, 1/1531-FGB 101 0308/1*.

2.4.1 Rack Mount

The unit can be mounted horizontally in a 19-inch rack with intake air entering the front and air exhausting the rear.

It is possible to assemble multiple Remote IRU Enclosures above each other on a 19-inch rack, each unit taking a single 1U slot.

The Remote IRU Enclosure mounting bracket is mountable in three positions: 0 mm, 50 mm, and 80 mm.

2.4.2 Wall Mount - Single

One Remote IRU Enclosure can be mounted on a wall in a vertical orientation using short brackets supplied with the unit.

Note: When mounted correctly, there is a 15 mm gap between the enclosure and the wall to allow for CAT6A cable latch access.

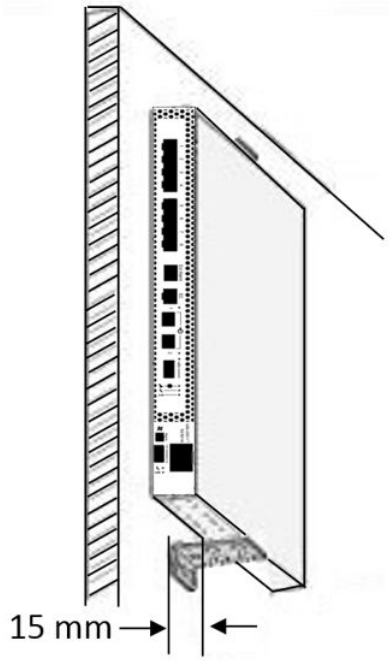


Figure 4 Remote IRU Enclosure 2242 Distance from the Wall

2.4.3 Wall Mount - Dual

Two Remote IRU Enclosures can be mounted vertically on a wall beside each other. Use the longest bracket supplied with the unit when using the dual mounting configuration.

The second Remote IRU occupies 1U of width beside the first unit.

It is possible to install one unit onto the wall at a time.

Note: When mounted correctly, there is a 15 mm gap between the first enclosure and the wall to allow for CAT6A cable latch access.

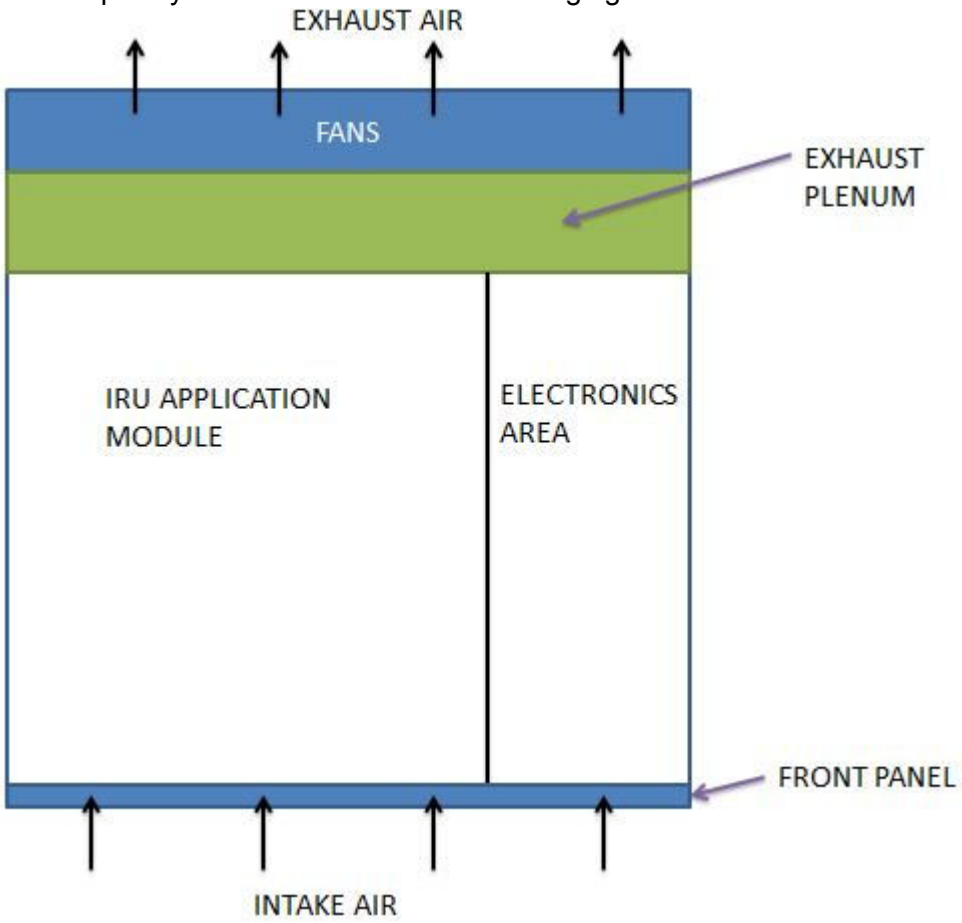
2.4.4 Brackets

Mounting brackets for rack mount and single and dual wall mount are supplied with the unit. All mounting brackets and associated attachment screws are not installed at the time of shipment. These parts are packed separately in the shipping container along with the rest of the unit and are installed in the field.

2.5 Cooling System

2.5.1 Airflow

Fans are mounted at the rear of the enclosure such that air flows from front to rear in a pull system as shown in the following figure:



The IRU slot receives fresh ambient air with no preheating from other heat generated within the enclosure.

2.5.2 Front Panel

The front panel has enough open area such that adequate air is taken in from the front of the enclosure.

The openings for the air intake are in a hex pattern.

There are no air filters in the Remote IRU Enclosure.

2.5.3 Fans

The cooling system provides fan redundancy. When one fan fails, the others deliver the minimum air requirements to the IRU slot and to the electronics enclosure for normal operating conditions. It is permissible to increase the fan speed in the case of a fan fail. The cooling system is capable of operating for 96 hours in the case of a single fan failure.

When all fans are operating, the acoustic noise requirements are met.

Vibrations from the fans are not transferred through the fans to the Remote IRU Enclosure main chassis in such a way that acoustic noise values are affected. Materials and designs are chosen so that vibrations are dampened and natural frequency interference between parts is avoided.

Vibrations from the fans do not jeopardize the functionality of the fan electrical connectors.

2.5.4 Thermal Design Requirements

The cooling system provides adequate cooling to maintain the average heat sink temperature of the IRU module at or below +80 °C when the IRU is dissipating 70 W of heat at +50 °C ambient. The maximum heat dissipation of the Remote IRU Enclosure is 170 W.

The cooling system provides adequate cooling to meet all safety, regulatory, and MTBF requirements when the electronics compartment components are providing full power to the IRU slot and full power to the fans.

2.6 Protection Against Solid Foreign Objects

The Remote IRU Enclosure is fulfills the requirement of IP20 according to IEC 60529.

2.7 Removable Parts

The front faceplate is removable so that the IRU Module can be easily installed or replaced.

A Protective Plate is located on the left side of the enclosure and must be removed before installing the grounding bracket for 19-inch rack mounting. For more information, see *Install Remote IRU Enclosure 2242, 1/1531-FGB 101 0308/1*.

2.8 Operating Environment

This section describes operating environment parameters for the Remote IRU Enclosure 2242.

There are three operating environments for the enclosure:

- Normal: Under normal conditions, all units function as specified.
- Operational: Applies to environmental conditions that deviate from normal operation.
- Non-destruction: Under non-destruction conditions, no equipment function is guaranteed and performance may degrade in an unspecified manner. However, the equipment still fulfill legal requirements and do not become hazardous to people. When conditions return to normal, no on-site intervention is required to restore full performance of the unit.

The following table provides the Remote IRU Enclosure operating environments:

Table 3 Operating Environments

Operating Environment	Temperature	Relative Humidity (% RH)	Absolute Humidity (g/m^3)	Change of Temperature (°C/min)
Normal	0°C to +50°C	5 to 95	1 to 29	0.5
Operational	-5°C to +50°C	5 to 95	1 to 29	0.5
Non Destruction	-15°C to +65°C	5 to 95	1 to 29	0.5

2.9 Earthquake Resistance

The Remote IRU Enclosure 2242 is compliant to the Zone 4 seismic requirements of NEBS GR-63-CORE, Issue 4, April 2012.

Compliance to earthquake requirements were demonstrated for:

- Wall mount configuration
- 19-inch rack configuration

3 Interfaces

3.1 Connectors

The following figure and table represent the ports and connectors on the Remote IRU Enclosure 2242:

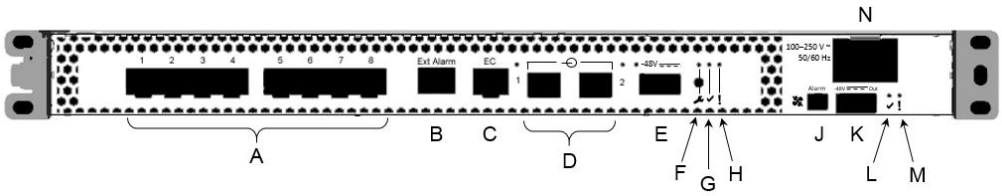


Figure 5 Remote IRU Enclosure 2242 Ports Description

Table 4

Item	Label	Port Type	Description
A	1 to 8	RJ45	Radio Dot Interfaces.
B	Ext Alarm	Pin Head	RIE alarms on Alarm 1 port. (1)
C	EC	RJ45	Used to propagate Alarms to the DU or Baseband. SW support for the EC bus is available from W16A and L16A.
D	1 and 2	SFP+	BBCLK, BFN, ECP, optical and electrical CPRI. #1 connected to DU/Baseband and #2 is for cascading or second DU/ Baseband.
E	- 48 V ⎓	Custom Power port	Power from the Enclosure Power Unit to the IRU.
F		IRU Maintenance button and Indicator	IRU Optical indicator, blue; maintenance. Used to activate maintenance mode.
G		IRU Normal Status Indicator	IRU Optical indicator, green; normal function
H	!	IRU Fault Indicator	IRU Optical indicator, red; fault

Item	Label	Port Type	Description
J	Alarm	Fan Alarm port	Reports the alarms from the Enclosure fans to the IRU alarm port.
K	- 48 V ⎓	Power feed	Power from the Enclosure to the IRU.
L	✔	Enclosure Normal Status Indicator	Enclosure optical indicator, green; normal function
M	!	Enclosure Fault Indicator	Enclosure optical indicator, red; fault
N	100-220 V 50/60Hz	AC Power port	AC Power source input

(1) The four-pin connector uses adjacent pins for two External Alarms (for example, pin 1 and 2 for one alarm and pin 3 and 4 for another). Alarm 1 is used for the Remote IRU Enclosure fan alarms. Alarm 1 is the two pins on the right side of the port.

3.1.1 AC Input Connector

This section describes the connector for AC in 100-250 V AC, 50/60 Hz.

The AC in connector is of type IEC 60320-1 C14 inlet, Bulgin p/n PX0575 series, or equivalent.

The Remote IRU housing maintains the temperature of the AC in connector below +70°C (temperature rating of IEC 60320-1) under all operating conditions, up to a maximum ambient temperature of +50°C. The only requirement at +65°C ambient temperature is no destruction.

The AC cable that connects to the AC in connector is not supplied with the Remote IRU Enclosure. As it is country specific, the AC cable is a separately ordered item.

3.1.2 DC Output Connector

The DC out connector is of type Ericsson no RPV 447 22/001 (TE Connectivity/AMP p/n 1982295-1, Amphenol p/n PWR-MRA0-01)

The Remote IRU Enclosure comes with a mating cable for the DC out connector, Ericsson product number RPM 777 193/00200.

3.1.3 Small Form Pluggable (SFP)

The Remote IRU Enclosure supports the same CPRI links as the distributed IRU. The Small Form Pluggable (SFP) connectors can be electrical or optical depending on the length of the CPRI link needed. The SFPs are inserted in the IRU ports the same way as when the IRU is seated in an RBS. For information on the supported SFPs, refer to SFP Selector Module Guide, 3/006 51-HRB 105 601.

3.2 Grounding Points

The Remote IRU Enclosure grounding point is marked with symbol no 5020 according to IEC 417.

Depending on the mounting method, different grounding points are available. It is mandatory to use one of the following:

- For the 19-inch rack mounting method, use the supplied grounding bracket after having removed the protective plate on the left side of the enclosure.
- For the wall mounting method, use the grounding bolt located at the back of the enclosure.
- For dual enclosure mounting, it is mandatory to use one grounding wire per enclosure.

To ensure a low-resistance connection, non-conducting finishes, such as paint and anodizing films, must be removed from the attachment surface to allow full contact to the bonding material.

For information on grounding points and methods, refer to *Install Remote IRU Enclosure 2242, 1/1531-FGB 101 0308/1*.

3.3 Fan Alarm Out to IRU Cable

The Fan Alarm Out to IRU Cable connects the Remote IRU Enclosure fan alarm output to IRU external alarm monitor points. The connector at each end of the cable is keyed, to prevent the two pins from being connected in reverse (wrong polarity). The cable carries low DC voltage and current. If the cable is not connected, the Remote IRU Enclosure operation will be unaffected, but the IRU external fan failure alarm will be triggered.

For additional information on the alarm port, refer to the IRU External Alarm Port.

3.4 Visual Indicators

The enclosure provides visual indicators (LEDs) at the front panel showing the state (fault or operational) of the support unit when it is powered from mains supply.

Table 5 Remote IRU Enclosure Visual Indicators

Indicator	Description
Green LED (Operational)	Indicates that the housing is operating normally (power supply voltage is good and no fan failures).
Red LED (Fault)	Indicates that the housing has one or more fault conditions with either an incorrect power supply voltage or a fan failure.

3.5 Fan Alarm Signal

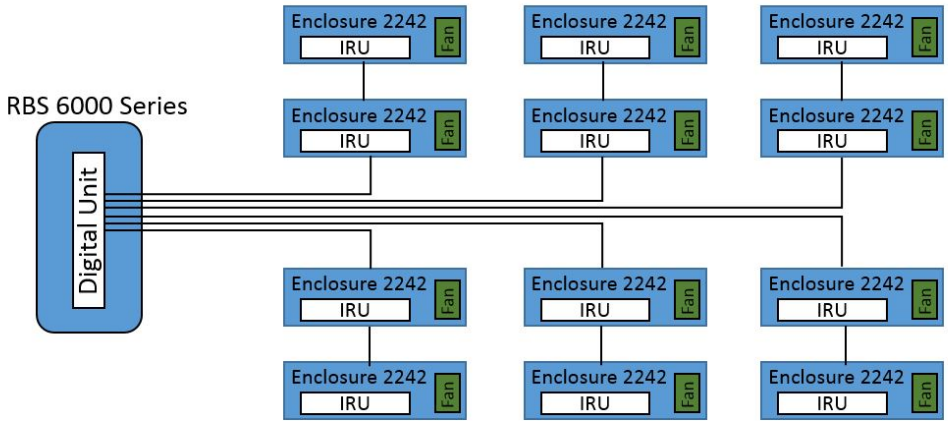
The Remote IRU Enclosure provides the alarm signal from the fan control module, connected to an IRU external alarm. The interface in the fan control module is an open collector type, referenced to the –48 V DC return. It is normally closed (low impedance). At alarm, it is open (high impedance), indicating that one or more of the fan speeds is below minimum speed.

The triggered alarm travels from the Enclosure to the IRU external alarm port and then, carried over the CPRI link to the Digital Unit.

For more information about the alarm, refer to Fault Management Radio Dot System, 2/1553-FGB 101 0308/1.

4 Configuration Overview

Using IRU Cascading, up to 12 Remote IRU enclosures can be connected.



5 Acoustic Noise Emission

The acoustic sound pressure in any direction from the Remote IRU Enclosure does not exceed 50 dBSPL(A).

The acoustic measurements were made as per ISO 7779, Section 8.6.2, “For equipment which does not require operator attention while in the operating mode”.