

Prepared (also subject responsible if other) EAB/FPP/UDI Rolf Åhman		No. 1/194 01-APZ 212 40 Uen		
Approved EAB/FTE/U (Lars Alaeus)	Checked	Date 2007-10-04	Rev C	Reference

Regional Processor Bus-Ethernet, RPB-E

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1 Introduction

1.1 Scope

The main reason for introducing the Ethernet based Regional Processor Bus, RPB-E, is to offer higher bandwidth to each RP compared with the serial RPB, RPB-S. Information about RPB-S can be found in the PED 1/194 01-APZ 212 20.

This document provides information to perform Site Engineering for the Ethernet RP-bus.

The numbering used in this description is based on document 1952-BYB 501+ Positioning/Numbering in equipment practice BYB 501.

Note: The standard on which the BYB 501 is based on, uses the term subrack. However, in AXE terminology, the word magazine is often used.

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2 System Description

2.1 General

RPB-E is designed for use in APZ 212 40 and has the following advantages compared with RPB-S:

- Ethernet is a widely used Local Area Networking (LAN) technology.
- Capacity improvements are easy to introduce into an existing system. Possibility to run different parts of the network at different speed.
- The network is offering higher bandwidth to each RP and each magazine, which makes the possibility to decrease the systems footprint.
- Flexible utilization of the bandwidth

The maximum bandwidth on APZ 212 40 is currently limited to 100 Mb/s.

For more information about RPB-E read the description for RPS-B, 1551–ANZ 212 12.

2.2 Architecture

RPB-E offers a service to the application up to layer 6 in the OSI model, where the two lowest layers consist of Ethernet DIX version. On top of Ethernet an Ericsson developed protocol, TIPC, is used. TIPC takes care of layer 3 to 5 in the OSI model. The RPB Conversation layer corresponds to layer 6 in the OSI model and provides mechanisms to make the bus fit into the AXE system. That layer corresponds to the presentation layer, layer 6, in the OSI model.

The AXE principles of redundancy to ensure robustness and reliability is kept. The RPB-E consists of two independent nets that are continuously supervised and in case of permanent failure in one of the communication nets between the processors in the system, an alarm is issued and an automatic switch of the signalling is performed to the redundant net. After repair of the faulty unit (cable or switch) the signalling will automatically return to the original net.

For more information about RPB-E read the description for RPS-B, 1551–ANZ 212 12.

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3 System Structure

The Regional Processor Subsystem (RPS) is divided into the following subsystems:

RPS-B ANZ 212 12

RPS-2 ANZ 212 14

RPS-M ANZ 212 15

Only RPS-B and RPS-2 are affected by RPB-E. A classification of the different RPs and to which RP family they belong can be found in the description for RPS-B, 1551-ANZ 212 12.

3.1 RPS-B

RPS-B comprises the functions, which are needed in all exchanges. That is, RPS-B contains the software which always is required to support and maintain the RPs, that are connected directly on the RP-bus in an AXE exchange, no matter what kind of RP it is.

3.2 RPS-2

RPS-2 is additional software needed only in an AXE exchange to support and maintain a specific type of RP. RPS-2 includes the hardware functions, microprograms (where applicable) and the OS functions for members of the RP families RP2, RPD, RPP, GEMRP and RPI. The RPS- 2 subsystem contains software for the maintenance function, Restart dump and software for the support functions Program test and Program correction.

3.3 Function Blocks

3.3.1 SCB-RP

The following function blocks are mandatory:

- RIEX, the executive program
- RPFDD, the RP fault detection
- RPMBH, the hardware inventory (HWI)
- RPMM, power supervision

3.3.2 GESB

Currently the processor in GESB is not activated as an RP.

3.3.3 GARP

See Plant Engineering Description for GARP, 8/194 01-APZ 212 20.

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4 Hardware Implementation

4.1 SCB-RP

The Support and Connection Board with an Regional Processor (SCB-RP) board is designed to be used in the GEM. For redundancy reasons each GEM will be equipped with two SCB-RP boards.

The SCB-RP board serves a number of functions, where these are relevant to RPB-E:

- Delivering power (-48V) to all boards in GEM.
- SCB-RP is an Ethernet switch, able to handle communication between boards in GEM as well as communication to GEM-external stations.
- SCB-RP is connected to GESB or IPNX via a front connection port, thereby connecting RPB-E to the backplane.
- SCB-RP houses an RPI.
- Up to 4 RPB-S can be connected, where each RPB-S is connected to a quarter of the boards . For this application only one RPB-S is used, connected to RPB-S inlet 1. There is no output port for RPB-S. This means that the incoming RPBs are terminated in the magazine. Fore more information read the PED for RPB-S, 1/194 01–APZ 212 20.

For communication with the CP, the SCB-RP requires connection via RPB-S.

For more information read the description 1551–ROJ 208 323/3.

4.2 GESB

The Gigabit Ethernet Switch Board (GESB) is 30 mm wide and designed to be used in a GEM magazine. Only revision R3A or higher can be used. Today each GEM is equipped, for redundancy reasons, with two GESB boards. The GESB serves two main functions:

- GESB is an 8–port 1000Base-T Ethernet switch, able to handle communication between boards in GEM as well as communication to external GEMs.
- GESB houses an integrated RP, RPI. This RP is currently not activated.

For more information read the description 1551–ROJ 208 410/1

4.3 GARP

The Generic Application Resource Processor (GARP) is a PowerPC based regional processor and used for different applications requiring high processor performance. The board is 15 mm wide and designed to be used in the GEM.

GARP has one front port Ethernet 100BaseTx connection and two backplane ports for connection to RPB-E.

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For further information see the Plant Engineering Description for GARP, 8/194 01-APZ 212 20.

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5 Floor Planning

Not applicable.

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6 Allocation

6.1 Allocation of RPB

APG40 is not connected to RPB and thus RPB 0 can be used for APT RPs. The maximum RPB-S bus length is 60 meters, defined as the sum of lengths of cable links from RPH-S to the last application magazine on the bus branch. The maximum RPB-E Ethernet cable length is 60 meters.

Only one RPB-S can, for this application, be connected to board SCB-RP on position 1.

6.1.1 Allocation of RP-addresses

RPB-E is regarded as only one bus branch, which can house all RP-addresses from 0 to 1023.

In this first application of RPB-E, the physical RP-addresses for RP's connected to RPB-S and RPB-E must comply to each other since they use the same magazine address plug. This means that a maximum of 16 magazines can be connected to one RPB-E.

As an SE application rule, specify the RP-addresses like this:

- Give SCB-RP the first two RP-addresses within the RPB.
- Give the application boards, like GARP, RP-addresses in sequence within the RPB branch.

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7 Allocation Data

7.1 Command List

The following allocation commands are to be specified:

DBTRI, function block DBCOH, subsystem DBS

DBTSI, function block DBCOH, subsystem DBS

DBTRE, function block DBCOH, subsystem DBS

EXRPI, function block RPADC, subsystem RPS-B

EXRUI, function block RPADC, subsystem RPS-B

7.2 Command Description

DBTRI

DATABASE, TRANSACTION INITIATE

Initiates a database transaction.

DBTSI

DATABASE, TABLE SPECIFICATION, INITIATE

Specifies an entry into a database table.

DBTRE

DATABASE, TRANSACTION END

Completes the database transaction.

Example 1 One magazine GEM GARP with IPNX as first level switch.

```
DBTRI;
DBTSI:TAB=RPSRPBESWS, SWNO=4, BRNO=5, MAGNO=0, SLOTN0=1; !GESB!
DBTSI:TAB=RPSRPBESWS, SWNO=5, BRNO=5, MAGNO=0, SLOTN0=23; !GESB!
DBTRE:COM;
```

Switch numbers (SWNO) 0 and 1 are reserved for the first level switches, when these are GESBs without IPNX. Switch numbers 2 and 3 are reserved for GESBs in the same magazine as the first level switch. Switch numbers 4 to 255 are used for the other GESBs, where GESB on the left are given even numbers and GESB on the right are given odd numbers. For information, read the operational description 10/154 31-ANZ 212 12. Example 1 shows the command for Figure 1.

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Example 2 Two magazines GEM GARP with GESB as first level switch.

```
DBTRI;
DBTSI:TAB=RPSRPBESWS, SWN0=0, BRN0=5, MAGN0=0, SLOTN0=1; !GESB!
DBTSI:TAB=RPSRPBESWS, SWN0=1, BRN0=5, MAGN0=0, SLOTN0=23; !GESB!
DBTSI:TAB=RPSRPBESWS, SWN0=4, BRN0=9, MAGN0=4, SLOTN0=1; !GESB!
DBTSI:TAB=RPSRPBESWS, SWN0=5, BRN0=9, MAGN0=4, SLOTN0=23; !GESB!
DBTRE:COM;
```

Example 2 shows the command for Figure 3.

Note: When connected to RPB-E, the value for parameter MAGNO must be unique for the concerned magazines.

Example 3 One magazine GEM GARP.

```
DBTRI;
DBTSI:TAB=RPSRPBSP0S, RPADDR=160, BRN0=5, MAGN0=0, SLOTN0=0, BUSCONN=YES; !SCB-RP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=161, BRN0=5, MAGN0=0, SLOTN0=25, BUSCONN=YES; !SCB-RP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=162, BRN0=5, MAGN0=0, SLOTN0=3, BUSCONN=NO; !GARP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=163, BRN0=5, MAGN0=0, SLOTN0=5, BUSCONN=NO; !GARP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=164, BRN0=5, MAGN0=0, SLOTN0=7, BUSCONN=NO; !GARP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=165, BRN0=5, MAGN0=0, SLOTN0=14, BUSCONN=NO; !GARP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=166, BRN0=5, MAGN0=0, SLOTN0=16, BUSCONN=NO; !GARP!
DBTSI:TAB=RPSRPBSP0S, RPADDR=167, BRN0=5, MAGN0=0, SLOTN0=18, BUSCONN=NO; !GARP!
DBTRE:COM;
```

EXRPI

EXCHANGE DATA, RP INITIATE

Specification of different types of RPs connected to the RP bus.

Example 4 One magazine GEM GARP.

```
EXRPI:RP=160, TYPE=RPSCB1A;
EXRPI:RP=161, TYPE=RPSCB1A;
EXRPI:RP=162, TYPE=GARP1E;
EXRPI:RP=163, TYPE=GARP1E;
EXRPI:RP=164, TYPE=GARP1E;
EXRPI:RP=165, TYPE=GARP1E;
EXRPI:RP=166, TYPE=GARP1E;
EXRPI:RP=167, TYPE=GARP1E
```

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EXRUI

EXCHANGE DATA, RP SOFTWARE UNITS

Insertion of software units in a loadable RP.

Example 5 One magazine GEM GARP.

```
EXRUI:RP=160,      SUID="9000/CXC 146 13 R4A04"; !RIEXR!  
EXRUI:RP=160,      SUID="9000/CXC 146 10 R1B01"; !RPFDR!  
EXRUI:RP=160,      SUID="9000/CXC 146 20 R1A06"; !RPMMR!  
EXRUI:RP=160,      SUID="9000/CXC 146 21 R1A05"; !RPMBHR!  
EXRUI:RP=161,      SUID="9000/CXC 146 13 R4A04"; !RIEXR!  
EXRUI:RP=161,      SUID="9000/CXC 146 10 R1B01"; !RPFDR!  
EXRUI:RP=161,      SUID="9000/CXC 146 20 R1A06"; !RPMMR!  
EXRUI:RP=161,      SUID="9000/CXC 146 21 R1A05"; !RPMBHR!  
EXRUI:RP=162,      SUID="9000/CXC 146 069 R1B02"; !GPEXR!  
EXRUI:RP=162,      SUID="9000/CXC 146 05 R1A03"; !RPDFR!  
EXRUI:RP=162,      SUID="9000/CXC 146 066 R1A20"; !INETR!  
|  
EXRUI:RP=167,      SUID="9000/CXC 146 069 R1B02"; !GPEXR!  
EXRUI:RP=167,      SUID="9000/CXC 146 05 R1A03"; !RPDFR!  
EXRUI:RP=167,      SUID="9000/CXC 146 066 R1A20"; !INETR!
```

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8 Strap Connectors

8.1 Address Strap Connectors

The address strap connector (STRAB) used for the magazine address is ROJ 119 2189/1.

This STRAB is programmable by means of a 6 way DIP switch, where switches 1 to 5 are used and switch 6 is not connected.

To avoid errors when programming this type of STRAB, a label, SVB 224 02/1 is fixed to it which shows graphically the DIP switch settings for each of the 16 indices. See 1301–SVB 224 01/1 for details.

When the STRAB has been programmed, a label of type SVB 224 02/2 must be affixed to that part of the STRAB which protudes from the magazine to indicate its specific index. Refer to 151 88–ROJ 119 2188+ for the exact position of the label.

Every magazine GEM connected to RPB-E, directly or via GESB, must have an unique strap index between 00 to 15. The two magazines in Figure 2 thus requires straps with index 00 and 01.

8.2 Bus Termination Connectors

Not applicable.

8.3 Functional Strap Connectors

Not applicable.

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9 **Cabling**

The cable connections for the different RP-boards can be found in the document cable information 1070-ROJ.

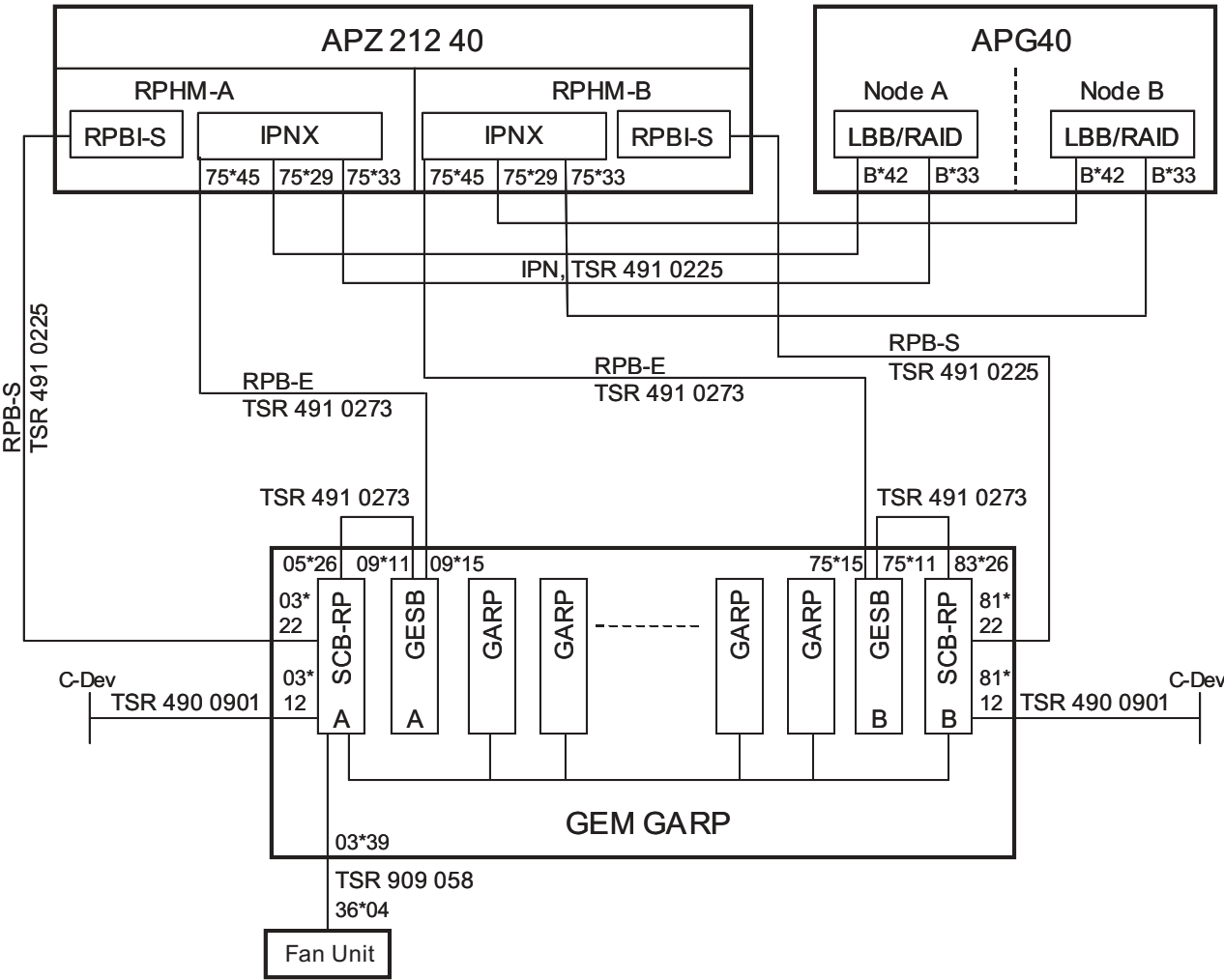


Figure 1 Cabling survey with one magazine GEM GARP.

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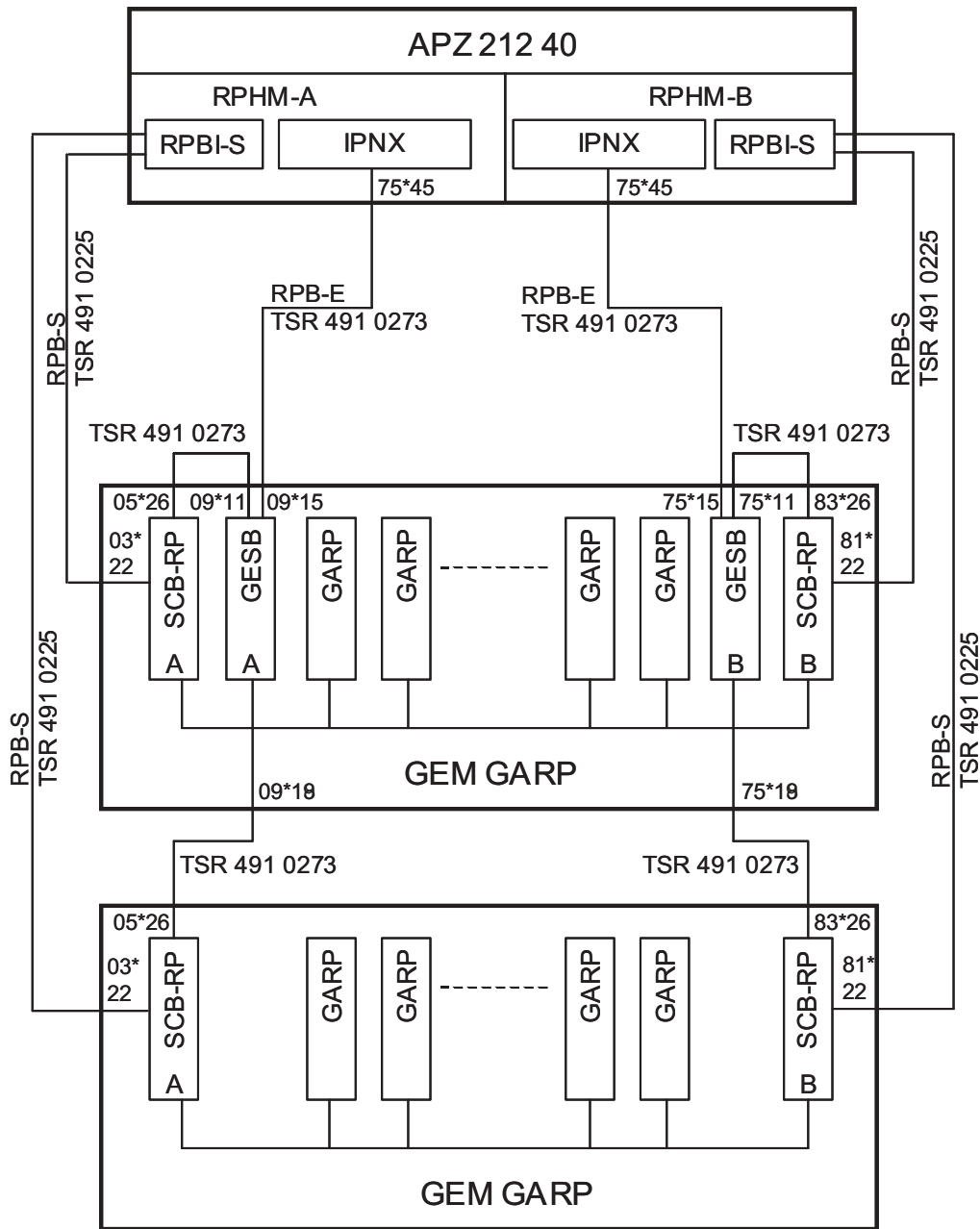


Figure 2 Cabling survey with two magazines GEM GARP.

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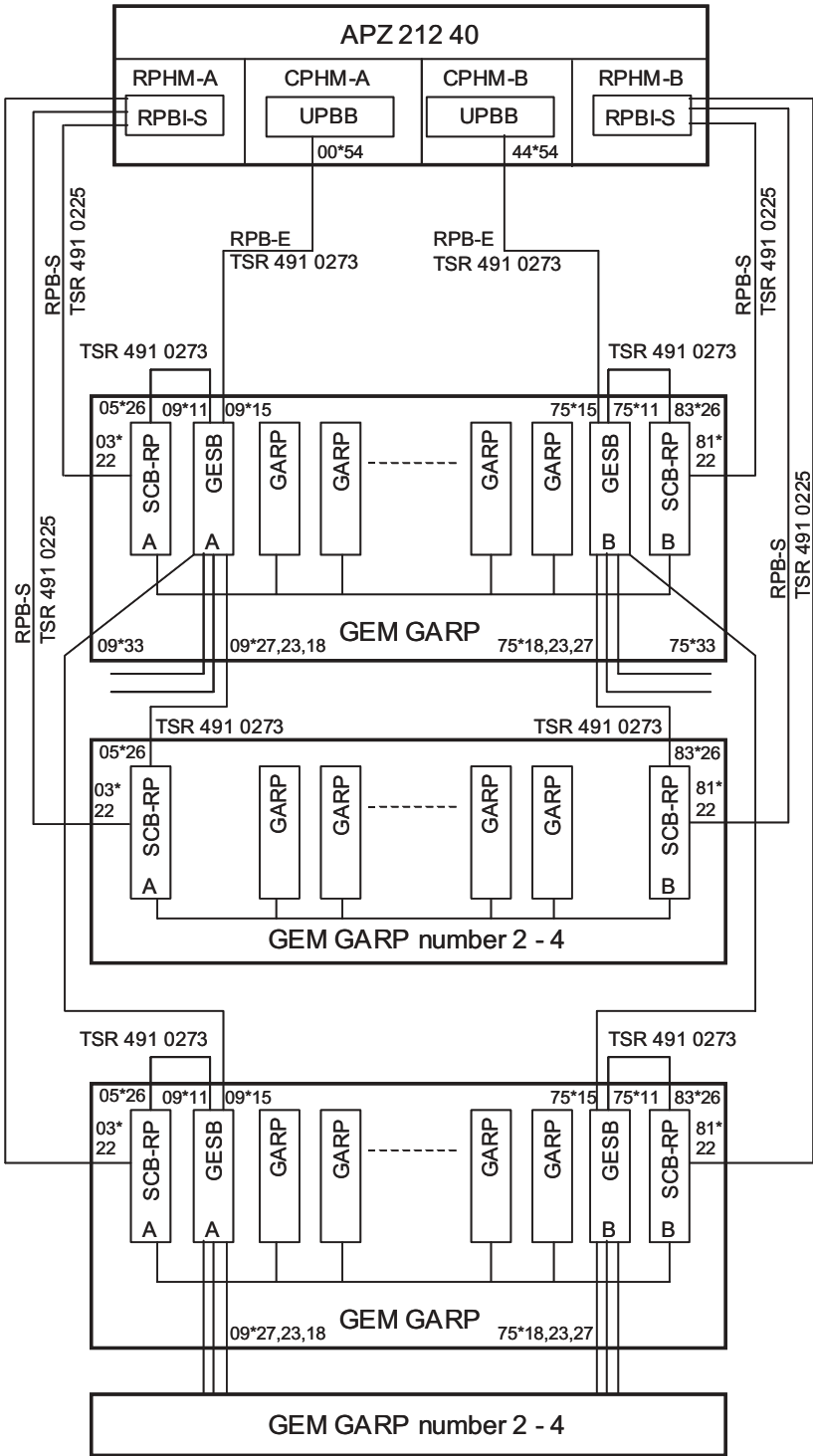


Figure 3 Cabling survey with two magazines GEM GARP with GESB.

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9.1 Product cabling (Internal Cabling)

Prefabricated cable sets NTM 180 66/xxx for different equipped standard cabinets contains the following cable connections related to the different RP-boards:

- Power connection –48V.
- GESB – SCB-RP.
- Fan supervision.

9.2 Exchange cabling (External cabling)

The following cable connections are used for the external cabling:

- Power connection –48V, cable denomination POWER or cable group XA1.
- RP-bus, cable denomination RPB or cable group XE9.

9.2.1 RPB

APZ 212 40 requires that 1 RPB-S is connected to each GEM even though RPB-E is used. RPB-E is connected to SCB-RP (for example ROJ 208 323/3) via board GESB as can be seen in Figure 1 to Figure 3.

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10 Glossary

CP	Central Processor
CPS	Central Processor Subsystem
GARP	Generic Application Resource Processor
GEM	Generic Ericsson Magazine
GESB	Gigabit Ethernet Switch Board
HWI	HardWare Inventory
LAN	Local Area Network
OPI	Operational Instruction
OSI	Open System Interconnect
PIU	Plug In Unit
RP	Regional Processor
RPB	RP-Bus
RPB-E	Regional Processor Bus of Ethernet type
RPBI	Regional Processor Bus Interface
RPB-S	Regional Processor Bus of Serial type
RPH	Regional Processor Handler
RPH-S	Regional Processor Handler-Serial
SCB-RP	Support and Connection Board with an Regional Processor
SE	Site Engineering
STRAB	STRap Board

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11 References

Table 1

Title	Document Number	Stored
Positioning/Numbering in equipment practice BYB 501	1952-BYB 501+	GASK2
Description RPS-B	1551-ANZ 212 12 Uen	GASK2
PED for RPB-S	1/194 01-APZ 212 20 Uen	GASK2
PED for GARP	8/194 01-APZ 212 20 Uen	GASK2
Cable information SCB-RP	1070-ROJ 208 323/3	GASK2
Cable information GESB	1070-ROJ 208 410/1 Uen	GASK2
Description SCB-RP	1551-ROJ 208 323/3	GASK2
Description GESB	1551-ROJ 208 410/1 Uen	GASK2
Ordering information	131 61-COA/BFD 508 012 Uen	GASK2
Operational description	10/154 31-ANZ 212 12 Uen	GASK2