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## Test Instruction for GESB (ROJ 208410/1)

### 1 Abstract

This document is a test instruction for the system test of the, ROJ 208 410/1 board (GESB, Gigabit Ethernet Switch Board), which shall be run on the DEST Client.

### 2 Purpose

The purpose of this document is to give the test operator sufficient information to set ups and run the tests and also to understand the fault messages from the test program.

### 3 Document History

Describe the document changes below.

| Date     | From | To  | Changes and reason for changes |
|----------|------|-----|--------------------------------|
| 01-07-10 |      | PA1 | First draft                    |
| 01-07-26 | PA1  | A   | Release                        |

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## 4

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## 5

### Test object

Test is valid for: ROJ 208 410/1, se reference 1.

## 6

### Test Sequence

The test is divided into three parts: Initial test, System test and RPB-S test. All three parts are shortly described below.

### 6.1

#### Initial Test

This is a test of RAM and it is executed before the GESB starts up. If test passes the GESB boots in a normal way and execution of test programs can start. If test fails Ethernet communication is initiated from DPRAM and test result can be fetched from board to the DEST client.

### 6.2

#### System Test

System test itself is divided into three parts: Ethernet test, DEST and Maintenance Bus test. The tests are shortly described below.

|                                              |         |                          |     |           |
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### 6.2.1

#### DEST

DEST (Downloadable Ethernet based Self-Test) is used for memory tests, FIA processor interface test and read/write operation to certain components connected to processor or FIA. DEST on GESB also set up the Gigabit Ethernet Switch for communication. DEST is divided into 12 subtests. Subtest 1-5 is general for all PBA's using the RPI-block and 7 subtest are specific for the GESB. Each of them performs test of some functionality on the PBA or does some necessary set ups used by other subtest. All subtests are briefly described in table 1.

**Table 1: Subtest in DEST for SCB-RP**

| Subtest | Name of the subtest      | Description                                         |
|---------|--------------------------|-----------------------------------------------------|
|         | <b>Test of RPI-block</b> |                                                     |
| 1       | FIA                      | Test of FIA ASIC, Ctrl logic, addr & data bus       |
| 2       | Short RAM test           | Test of RAM                                         |
| 3       | Long RAM test            | Test of RAM                                         |
| 4       | Temp sensor              | Test of temperature sensor in RPI-Block             |
| 5       | ReadPos                  | Read out board position and subrack ID              |
|         | <b>Test of GESB</b>      |                                                     |
| 6       | Setup                    | Settings for QSPAN in MPC860                        |
| 7       | QSPAN                    | Test of interface between QSPAN and MPC860          |
| 8       | Init PCI                 | Initiation of PCI interface, BCM5680 - QSPAN        |
| 9       | BCM5680                  | Test of interface between BCM5680 and QSPAN         |
| 10      | Init BCM5404             | Initiation of PHY:s                                 |
| 11      | BCM5404                  | Test of PHY:s                                       |
| 12      | Interrupt                | Test of interrupt between BCM5680, QSPAN and MPC860 |

The DEST downloads and executes from the DEST client. If an error appears the DEST generates an error message that reports what part of the test failed, expected and received data.

### 6.2.2

#### Test of Maintenance bus

This is a test of maintenance bus in GEM. The SCB-RP provides the maintenance bus interface. This is implemented as a normal I<sup>2</sup>C bus. The SCB-RP acts as the master on this bus, but has also a slave interface like all other boards in the GEM magazine. The maintenance bus also gives the possibility to point out specific PBA in a magazine by controlling the MIA-LED. The test of maintenance bus is to turn the MIA-LED on and off within all PBA's in GEM. The test runs from DEST client.

### 6.2.3

#### Test of Gigabit Ethernet Switch

This part test, the Gigabit Ethernet Switch on GESB. GESB provides eight 1000Base-T ports towards the front. The test is to send an "is alive" to SCB-RP trough GESB. SCB-RP provides a 1000baseT port towards the front and provides accessibility to all PBA within the backplane in GEM via 10/100-BaseT Ethernet. THE DEST program for GESB set up the switch for gigabit Ethernet traffic. To test all eight Gigabit ports on GESB there have to connection from a test computer whit a 1000Base-T Network Interface Card via GESB to the gigabit Ethernet port on SCB-RP. The test is an "is alive" test and it's runs from the DEST client. If all ports reply the "is alive" test, the switch works correct.

|                                                                                 |         |                                 |          |           |
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### 6.3 RPB-S Test

For communication with the CP, the SCB-RP provides an RPB-S interface. RPB-S is connected to the SCB-RP via a front connector and distributed to the backplane. Each RPI in the magazine is connected to two RPB-S/M branches, since there are two SCB-RP boards in each GEM magazine. CP-RP communication is simulated with Serpent. The test is performed by deblocking the RP in GESB and by sending echo signals to it. RP is then blocked again. PBOOT has to be loaded on the GESB in order to perform this test.

## 7 Requirements

### 7.1 Hardware

Hardware needed to test SCB-RP is outlined in table 2. For cables see reference 3.

**Table 2. Hardware needed to test SCB-RP**

| Qty | Article      | Name                          |
|-----|--------------|-------------------------------|
| 1   |              | Test PC whit a 1000Base-T NIC |
| 1   |              | TFTP-server                   |
| 1   |              | PC for Serpent                |
| 1   | BFD508002/1  | GEM                           |
| 2   | ROJ208323    | SCB-RP                        |
| 2   |              | Network Cable                 |
| 1   | TSR4910274   | Ethernet straight (for NIC)   |
| 2   | TSR4910273   | Ethernet crossed              |
| 1   | TSR4910225   | RPB-S                         |
| 4   | TSR4900101/1 | -48V                          |

### 7.2 Software

Software needed to test GESB is outlined in the table 3.

**Table 3. Software needed to test SCB-RP**

| Article      | Name        | Usage                                        |
|--------------|-------------|----------------------------------------------|
|              | DEST client | Control test execution                       |
|              | Serpent     | Control RPB-S test                           |
|              | EBOOT       | Communication between boards and DEST client |
|              | GESB DEST   | Test program                                 |
| CXC 106 0046 | V24_load    | OS and board parameters                      |
| CXC 106 0046 | PBOOT       | Downloaded to boards before delivery         |

## 8 Connections before set up

### 8.1 Hardware preparation before test

Place two SCB boards in GEM and a GESB in the magazine.

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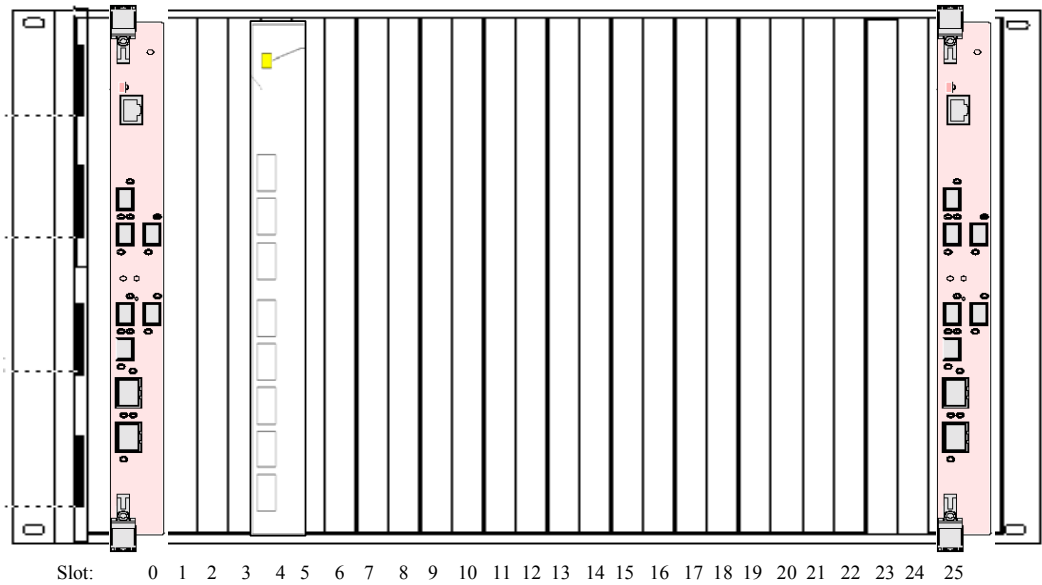


**Figure 1. GEM with two SCB-RP boards and one GESB.**

|                                              |         |                          |     |           |
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Connect the SCB boards to power, Serpent and Test PC. Chose one of the three Ethernet ports on SCB board for connection from the Test PC (see figure 2).

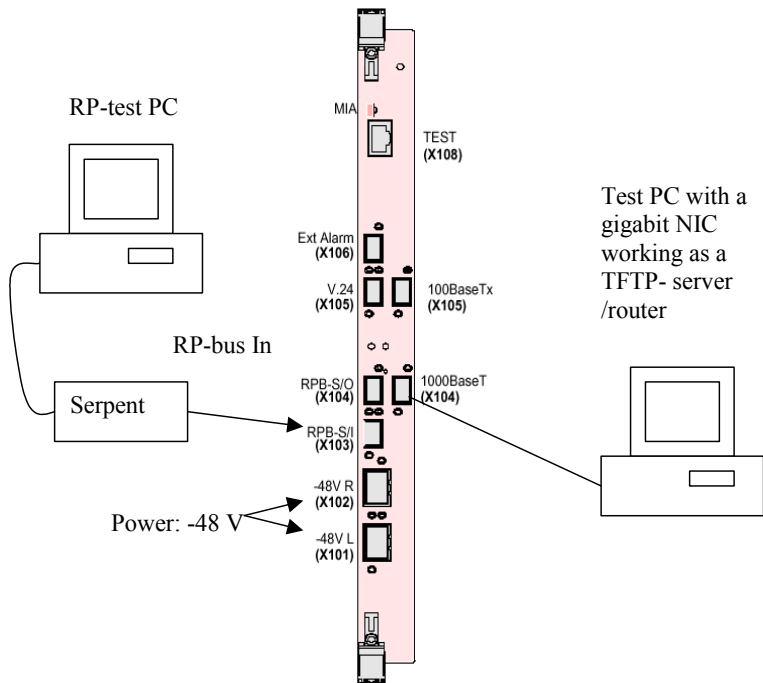


Figure 2. External connections of power and test equipment for SCB-RP.

8.2      **Setting IP-addresses**

Ethernet address for a PBA in GEM depends on three things, magazine, slot and left or right SCB-RP. The Ethernet address looks like 192.168.X.YZZ. The first numbers are hard coded in EBOOT, X is the number of the upper address plug in the GEM, Y is 1 if the left SCB should be used and 2 if it is the right SCB and ZZ is the slot number plus 1.  
*Example: The left SCB-RP in a GEM (slot 0) with number 4 on the upper address plug has the IP-addresses 192.168.4.101 and 192.168.4.201.*

9            **Test execution**

9.1        **Initial Test**

Before the board starts after power up the processor makes a complete RAM test on the board. This will take some time. If test passes the board boots in a normal way and execution of system test can start. If test fails Ethernet is initiated from DPRAM and test result can be fetched from board to DEST client with a "is alive" command. A "is alive" is also a test of communication between GESB and a test PC. In order to run "Is Alive"-test, right-click on a slot in DEST Client and choose "Is Alive", as figure 3 shows.

|                                              |         |                          |     |           |
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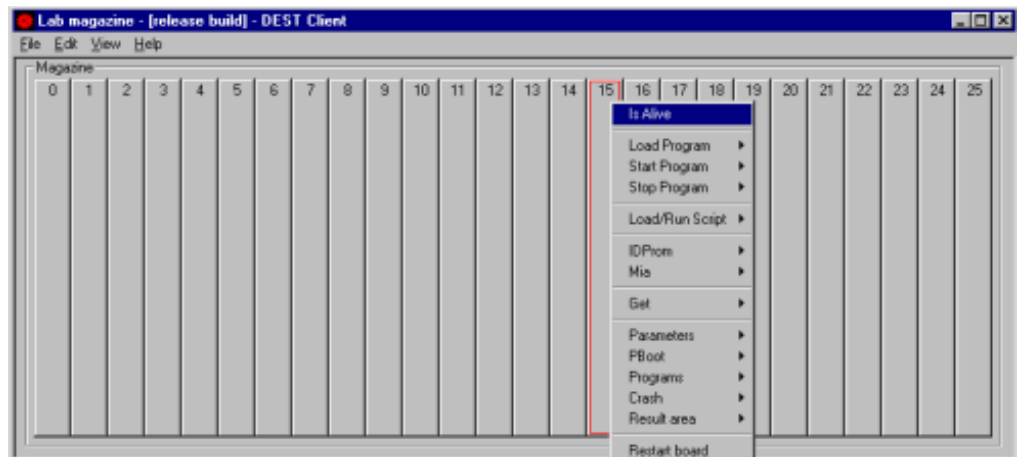


Figure 3: "Is alive" command in DEST client.

## 9.2 System Test

System test is divided in three parts.

### 9.2.1 DEST

This is a self-test on the GESB. The test downloads to GESB from DEST client. Figure 3 is the settings for a GESB magazine 8 and slot 15. Test program name is GESB\_DEST. The DEST is placed on the TFTP-server with IP-address 192.168.1.1, test program number is 101 for test of RPI core of GESB and number loops is 1(see figure 3).

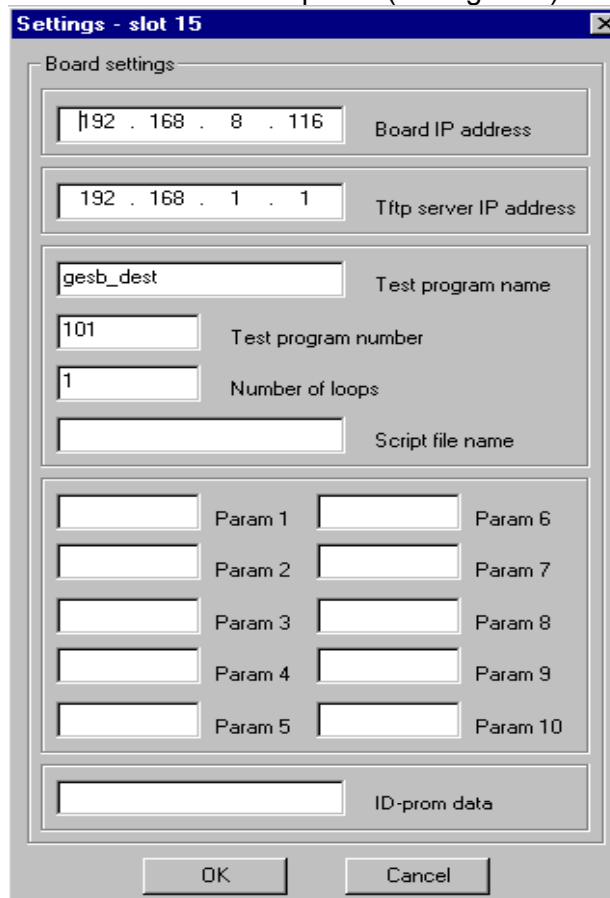


Figure 3: Settings for GESB before DEST.

|                                              |         |                          |     |           |
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To download the test program to a board, follow this procedure:

- Make settings showed in *Figure 3*. *Figure 3* shows a GESB in magazine 8 and slot 15. Name of the test program is GESB\_DEST
- Load program with "Load Program"-command in DEST Client.
- Use "Get Load Status"-command to find out when the program is loaded. Load status is zero whens the program is loaded.
- DO NOT save this program!
- Start test program from DEST Client. Verify that the test program has started by using the "Is Alive"-command. If "Is Alive Status" is 1, the test is still running.
- When "Is Alive Status" is zero again the test is completed and test result can be read out with "Get Errors" and "Get Messages".

The result of test is present in a log file in DEST client, see figure 4.

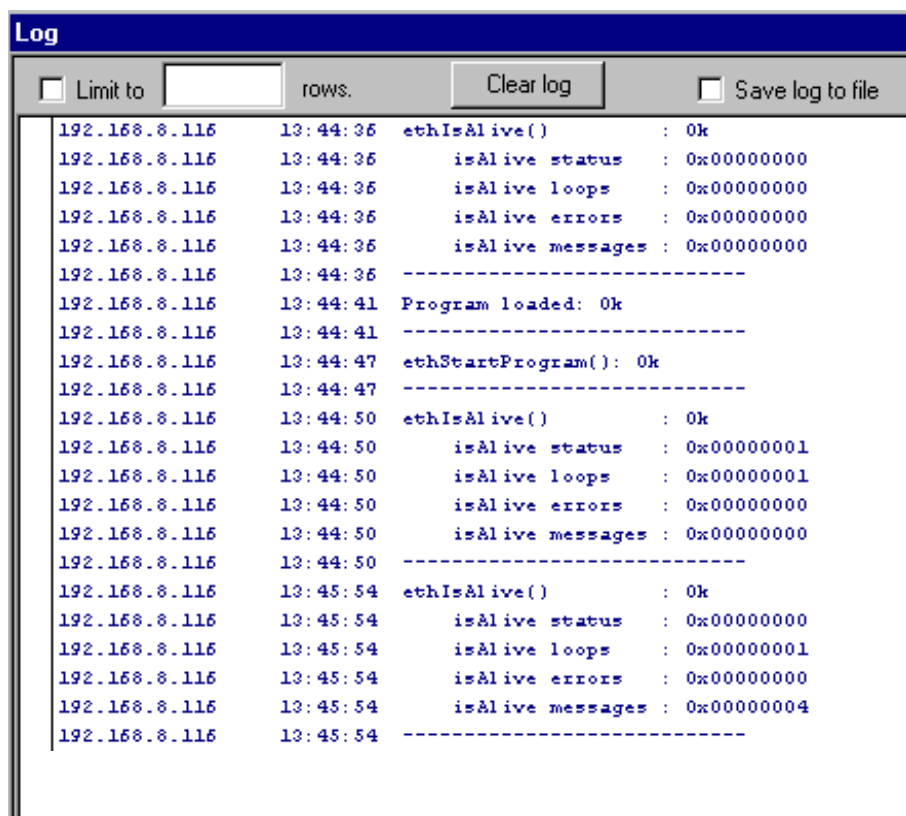


Figure 4: Test result

Get message and error. Check that message leaves correct slot and address plug number. If there is one or more errors test fails. See appendix A, what different error codes means. Otherwise if there is no errors, test passes and now change to set up the switch and do some test of the switch.

- Change test program number to 102. This test will set up the switch for communication and do some test of the switch.
- Start test program from DEST Client again.
- Read out test result again with "Get Errors".
- After set up use test program number 103 to test both RPI core and the switch.

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9.2.2 Ethernet Test

This is a basic test for check that all eight 1000Base-T ports on the switch work. This test executes from DEST client using the "is alive" command on SCB-RP in GEM. Connect the test PC to an SCB-RP via GESB (see figure 5).

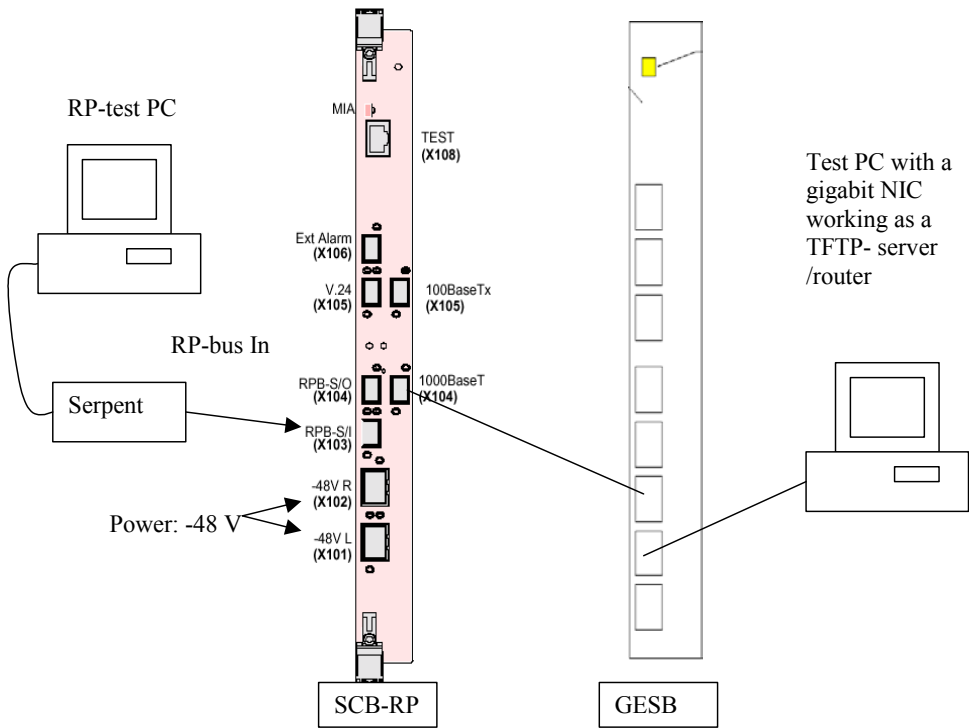


Figure 5: Connections for test of gigabit Switch

Move the cable that connects SCB-RP and GESB to test all eight ports on GESB. If all boards replies whit OK in the log window in DEST client, the Gigabit switch works properly.

9.2.3 Test of Maintenance bus

By using the "MIA -> Turn It On" command in DEST Client, turn on the MIA LED. The MIA LED, situated on the upper part of the board's front, should lit. If it does not, the MIA LED is probably faulty and should be replaced. Turn off the MIA LED by using the "MIA -> Turn It Off" command, see figure 6. EBOOT has to be loaded on the SCB-RP board in order to perform this test. The test is to turn MIA-LED on and off within all PBA's in GEM.

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|                                              |         | Reference                |     |

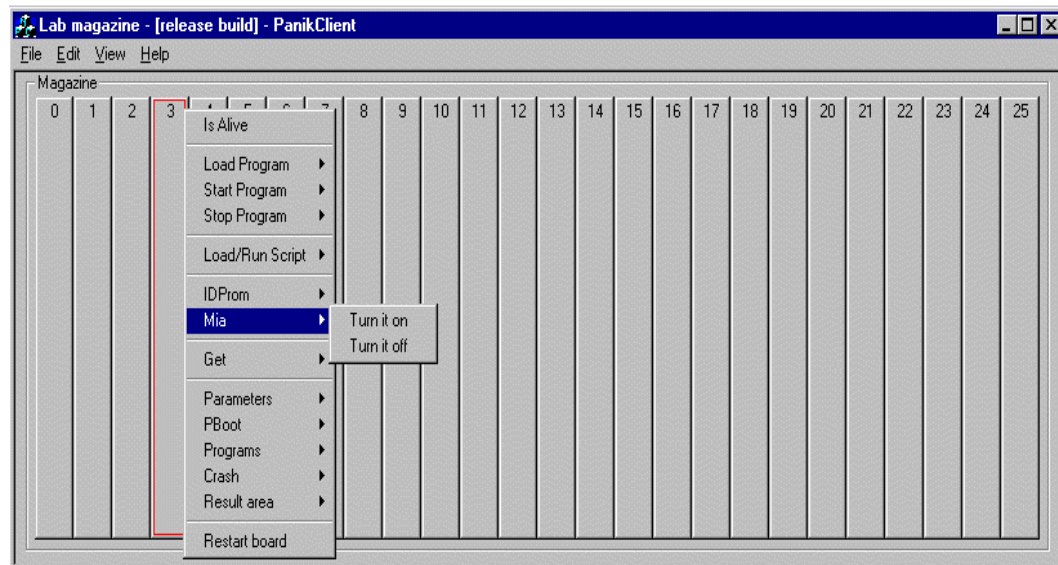


Figure 6: Test of the Maintenance bus.

## 9.2.4

**Requirements after System Test**

After system test would software like OS, parameters and PBOOT be downloaded to GESB and saved into PROM. OS and some parameters are placed in a script file called *scb\_V24\_load* and PBOOT are placed in a file called *ms3pboot*. To download this script file and PBOOT to the PBA follow the procedure below.

- Type in the filename (*scb\_V24\_load*) into the "Script file name"-box in "Settings"-window in DEST Client.
- Load script to GESB boards by using the "Load/Run Script"-command.
- Wait for "Script Status" to be zero. Script status can be checked by "Get Script Status"-command.
- Type in name of the PBOOT file (i.e. *ms3pboot*) in "Test program name"-box.
- Download program to GESB using the "Load Program"-command.
- When "Load Status" is zero again, save PBOOT using "Save PBOOT"-command and wait for "Save PBOOT Status" to be zero.
- Finally restart GESB with the "Restart Board"-command. After this, the boards will not be accessible from the DEST Client.

## 9.3

**RP Test**

This test simulates CP-RP communication for the GESB. The test is performed using the Serpent-box. Serpent-box is controlled from a PC with the Serpent software installed. Run a script for the position in GEM that the GESB is placed in. Test script will send an echo signal and wait for an answer. If this test fails, check that PBOOT is loaded on the GESB. If test fails again, it could depend on hardware fault or parameter error on GESB.

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**Requirements after test**

If all tests pass put a label with "SYS OK" on backside of GESB

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**11****Abbreviation**

|                  |                                            |
|------------------|--------------------------------------------|
| CPU              | Central Processor Unit                     |
| DEST             | Downloadable Ethernet based Self Test      |
| DPRAM            | Dual-Port Random Access Memory             |
| EBOOT            | Ethernet BOOT                              |
| GEM              | Generic Ericsson Magazine                  |
| GESB             | Gigabit Ethernet Switch Board              |
| I <sup>2</sup> C | Inter-Integrated Circuit                   |
| MIA              | Manual Intervention Allowed                |
| NIC              | Network Interface Card                     |
| PBA              | Printed Board Assemble                     |
| RP               | Regional Processor                         |
| RPB              | Regional Processor Bus                     |
| RPB-S            | Serial RP Bus                              |
| SCB              | Support and Control Board                  |
| SDRAM            | Synchronous Dynamical Random Access Memory |
| TFTP             | Trivial File Transfer Protocol             |

**12****References**

| Ref. no | Document number      | Document name                                |
|---------|----------------------|----------------------------------------------|
| [1]     | 102 62-ROJ 208 410/1 | Rev. PA2, Design Specification of the SCB-RP |
| [2]     | 102 62-BFD 508 002/1 | Rev. PB2, Design Specification for GEM       |
| [3]     | 1/0363-3/FCP1051003  | Cables in GEM                                |