

# Commissioning Procedure

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*The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing.*

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# 1 General

## 1.1 Commissioning

The commissioning is divided into two parts. This first part describes the HW (Hardware) Commissioning Procedure for the Base Radio Unit 1 (BRU1) and the second part describes the SW (Software) Commissioning Procedure. After installation of the BRU1, it is recommended to carry out the tests described below on site.

**The test procedures described in this section require that the installation has been successfully completed in accordance with the installation instructions found in *Node Hardware Library/BRU1/Site Requirements and Installation Instructions*.**

When performing the hardware commissioning procedure, the following documents are also required:

- *Node Hardware Library/BRU1/FBTEST Reference Manual*
- *Node Software Library*
- *BRU1 - Site Documentation*

**Note:** The *Site Documentation* is not included in the electronically published version of the *Mobitex NTE Client Library* but is delivered on paper together with the hardware.

The results of the commissioning are entered in the *Commissioning Test Record* included in the *BRU1 - Site Documentation*.

Each check or test described below has a specific name. After each check has been carried out, the corresponding check box in the *Commissioning Test Record* is to be completed by entering the value of the test result, or for some tests, just by selecting the check box.

If the result of the commissioning procedure does not correspond with the information given in this document, or if a malfunction is suspected, please refer to *Node Hardware Library/BRU1/Operation and Maintenance Instructions/Troubleshooting*.

## 1.2 Function Check

If required by the operator, the *Function Check* described in *Node Hardware Library/BRU1/Operation and Maintenance Instructions*, may be used as an extended hardware commissioning test.

## 2 Hardware Commissioning

### 2.1 General

The test equipment listed below is required when carrying out hardware commissioning procedure. Other equivalent test equipment may be used instead if performance and tolerances meet the specifications stated below.

**Note:** The test instruments should be properly calibrated as any inaccuracy in the instruments may deteriorate system quality.

### 2.2 Test Equipment

The following equipment is required when carrying out hardware commissioning of the BRU1:

- Portable PC including VT-100 emulation software
- BRU3 Console Cable TSRA 902 0190 or equivalent
- FBTEST software
- Frequency counter 1 GHz (accuracy 0.01 ppm)
- RF Power Meter
- Multimeter
- RF Attenuator 1 GHz, 30-50 dB
- Mobitex radio modem

**Note:** Ericsson does not supply the test equipment except for FBTEST software.

### 2.3 Documentation Required

- *Commissioning Test Record*, included in the *BRU1 - Site Documentation*.
- *FBTEST Reference Manual*, located in the *NTE Client Library/Node Hardware Library/BRU1*.

### 3 Part A - Installation Inspection

- A1 Make sure that the site is clean and not damaged.
- A2 Make sure that the BRU1 is correctly mounted in accordance with the installation instructions given in *Node Hardware Library/BRU1/Site Requirements and Installation Instructions*.
- A3 Verify that the delivered equipment and serial numbers correspond to the specifications in the *BRU1 - Site Documentation*.
- A4 Make sure that the combined Rx/Tx antenna is installed.
- A5 Make sure that the required power supply cable is correctly installed.
- A6 Make sure that the connection line cable is correctly installed.

For more site-specific information, please refer to the *BRU1 - Site Documentation*.

## 4 Part B - Power Test

### Requirements

The incoming DC supply must be within 21 - 32V DC.

### Test equipment

- Multimeter

### Test procedure

1. Disconnect the incoming Power supply cable.
2. Measure the incoming +24V DC Power supply cable connector.
3. Reconnect the Power supply cable to the BRU1.
4. Make sure the green “System OK” LED is lit, and that the red LED “Error” goes out after a few seconds.

## 5 Part C - Transmitter Test

### 5.1 C1 - Reference Oscillator

In the BRU1, the reference oscillator controls the channel unit frequency. Thus, an adjustment of the reference oscillator, in accordance with the following procedure, implies control of the channel unit frequency accuracy.

**Note:** Only authorized personnel are allowed to adjust the frequency of the reference oscillator.

#### Requirements

**Note:** The frequency counter and the BRU1 must be powered up at least 10 min. before proceeding with the test.

The measurement must be carried out on the correct carrier frequency for the site.

For **900** BRU1 the carrier frequency is between 935.0125 and 940.9875 MHz. The carrier wave must not have a frequency error exceeding  $\pm 0.1$  ppm.

#### Example:

For a carrier frequency of 936.0 MHz, the frequency error may not exceed  $\pm 93.6$  Hz.

#### Test equipment

- Portable PC including VT-100 emulation software
- Console cable TSRA 902 0190 or equivalent
- FBTEST software
- Frequency counter 1 GHz (Degree of accuracy: 0.01 ppm)
- RF Attenuator 1 GHz, 30-50 dB



## Test procedure

1. Put the BRU1 in command mode by pressing !!! when the following text appears:

```
REVISION : BOOT R1B
Virtual thumb wheel position: Command mode
CPU type:          MC68030
```

Press !!! within 5 seconds, to change current thumb wheel value:

```
0 - Normal position operation
1 - Test (should not be used)
2 - Boot from RAM-disks (MS-DOS format)
3 - Not defined, reserved
4 - Boot from SCSI-disks
5 - Boot from PROM-disks
6 - Boot from old PROM-disk
7 - Command position operation
8 - Not defined, reserved
```

Enter choice (0..8): 7

2. Connect the frequency counter via the RF attenuator to the BRU1 antenna connection.
3. On request, enter !!! and set the virtual thumb wheel to position 7.
4. Use FBTEST to set the transmitter carrier frequency to correct value for the site. Please refer to *Node Hardware Library/BRU1/FBTEST Reference Manual*.
5. Select the power corresponding to 0 dB attenuation of the transmitter.
6. Start the transmitter.
7. Read the frequency measured on the frequency counter display. Check the result against the requirements specified. Note the value in the *Commissioning Test Record*.

## 6 Part D- Hardware Alarms

### 6.1 D1 - Alarm Status

#### Requirements

All alarms shall be in NORMAL mode, defined as follows:

| Alarm                                   | Status         |
|---|----------------|
| Temp alarm LOW                          | INACTIVE (OFF) |
| Temp alarm HIGH                         | INACTIVE (OFF) |
| Temp alarm LOW SHUTOFF                  | INACTIVE (OFF) |
| Temp alarm HIGH SHUTOFF                 | INACTIVE (OFF) |
| DC alarm 5V                             | INACTIVE (OFF) |
| DC alarm 8V                             | INACTIVE (OFF) |
| DC alarm 15V                            | INACTIVE (OFF) |
| External alarm 1<br>(For costumer use.) | INACTIVE (OFF) |
| Radio OFF                               | INACTIVE (OFF) |
| Reflection alarm                        | INACTIVE (OFF) |
| Low output power alarm                  | INACTIVE (OFF) |

**Test equipment**

- Portable PC including VT-100 emulation software
- Console cable TSRA 902 0190 or equivalent
- FBTEST software

**Test procedure**

1. Select “STATUS OVERVIEW” from the Main Menu in FBTEST.
2. Read the alarm status obtained on the terminal screen. Check the result against the requirements specified. Note the value in the *Commissioning Test Record*.

## 7 Part E- LED indicators

### 7.1 E1 - LED indicators

#### Requirements

Check the LED status for the LEDs.

| LED                    | Status  |
|------------------------|---|
| SYSTEM OK              | ON = power ok<br>OFF = internal DC failure<br>FLASHING = FBTEST running |
| ERROR                  | ON = Internal H/W error<br>OFF = No failure                             |
| RS232                  | ON or OFF depending on configuration                                    |
| RS422                  | ON or OFF depending on configuration                                    |
| LINK (RJ-45 Connector) | LINK indicator for Ethernet<br>ON = Good link;<br>OFF = No link         |
| RX (RJ-45 Connector)   | Ethernet activity on RX   |

#### Test equipment

None

#### Test procedure

Check visually that the led indicators; SYSTEM OK is lit and the ERROR is turned off.

## 8 Before Leaving the Site

1. Make sure all plugs and connectors are connected.
2. Set the virtual thumb wheel to position zero “0” for normal node execution.
3. Check that all outstanding items are listed in the *Commissioning Test Record*, and also, that the person and company responsible for the item/-s, is informed.

**When the hardware commissioning procedure is completed, please proceed with the software part of the Commissioning Procedure.**

## 9 Software Commissioning

### 9.1 General

This document describes the measurements and checks to be carried out during the software commissioning procedure. All checks are carried out by using NODOP. Refer to *Node Software Library/NODOP - Reference Manual* for more information regarding applicable commands and qualifiers.

Should the result of the software check deviate from what is described in this document, or if you suspect malfunction, please refer to *Node Hardware Library/BRU1/Operation and Maintenance Instructions*. The other documents in the BRU1 Manual are also recommended reading if you are not familiar with the equipment.

### 9.2 Equipment Required

**Cables:** NODOP cable TSRA 902 0190 (same as BRU3)

**Computer:** Use a portable PC with VT100 emulation software including ZMODEM protocol.

Set up the portable PC as follows:

- Baud: 9600
- 8 bit ASCII
- 1 stop bit
- no parity
- VT100 mode

## 9.3 Connecting the BRU1

### 9.3.1 Connection Procedure

In BRU1, the CONSOLE and NODOP share the same port. Use cable TSRA 902 0190 to connect the portable PC, with VT100 emulation software, to the console and NODOP port

### 9.3.2 NODOP

NODOP (NODE Operator's Program) is used to facilitate fault diagnosis and commissioning of nodes in the Mobitex network. By using NODOP an operator can access information about the set-up of nodes and operation data.

### 9.3.3 Console

The connection of a terminal to a node's console port enables the facility for reading screen messages, thus making it possible to follow what is happening in the node. The screen read-out enables the operator to follow the node both at initial start-up, and also when troubleshooting.

## 9.4 Installation of BRU1 Software

1. Connect the FE Console Cable TSRA 902 0190 between the PC and the console port connector P1-Console in the BRU1.
2. Start the terminal software.
3. Turn the power on by connecting the power cable.
4. At request, enter **!!!** and set the thumb-wheel to position 7.
5. When getting the **<CMD>** prompt, you may set BRU1 baudrate. The maximum possible baudrate is 115200. The higher the baudrate, the faster the loading of the remaining software will be.  
The baudrate is set by entering **SB** and **<RETURN>**, and, when prompted, **[baudrate]** and **<RETURN>**.
6. Change the baudrate of the terminal emulator to that of BRU1.

7. Start the software download function by entering **ASY** and **<RETURN>**.
8. Load the desired software (MAIN, BOOT, FBTEST and optionally CONFIG) by using ZMODEM.

**Note:** The node will restart after each piece of software has been loaded. The two preceding steps must therefore be repeated each time a piece of software is loaded.

9. When getting the **<CMD>** prompt, set BRU1 baudrate to 9600. Set the baudrate of the terminal emulator to 9600.
10. Check the led indicators that the correct serial interface is selected (selection of serial interface is performed in FBTEST).

### First Start-up, CONFIG not Present

1. Check the contents of the WP2 disc by running the following command:

```
CMD>di <RETURN>
WP2: <RETURN>
```

2. Run the following command at the **<CMD>** prompt:

```
CMD> b wp2: a1_XXXXX.mb3
```

3. When the node boots it will not find any CONFIG and therefore you are prompted to enter the node number. After you have entered the node number, the node may reboot for new system parameters.

Example:

```
...
TASK0: Config not found, instead pass 1 can be entered from console
_OWNNODENUMBER: > [node number]
TASK0 : Start handling system parameters
Will autogenerate memory system parameters and reboot
...
```

4. Run the following command at the **<CMD>** prompt:

```
CMD> b wp2: a1_XXXXX.mb3
```

5. After the node has rebooted, you are prompted to enter the communication interface for the slave unit connected to the node. Note that the X.25 option shall be selected whether X.25 or XOT is desired.

Example:



```
TASK0: Enter protocol HDLC/X25/MASC/BIU for unit 0
Enter . to ignore
_Enterprotocol: > X25
_OK?(Y/N) > Y
CFG_DB: Delete CONFIG_DB
```

6. Press **<RETURN>** when the system prompts you to enter user name and password (they are not required at this stage).

7. Verify that the slave unit has started.

```
NODOP> LIST UNIT
```

The status of the unit should be Running.

8. Establish (create) a connection to the superior node. The connection will automatically be enabled after it has been created.

Example:

```
NODOP> CREATE SUPERIOR_CONNECTION [superior node]
```

9. Examine if the connection to the superior node works by issuing the command:

```
NODOP> SHOW CONNECTION [superior node]
```

10. Tell the NCC operator to DISTRIBUTE a proper config to the node, to perform the on-line operation UPDATE SW, and to RESTART the node.

11. When you are prompted, enter **!!!** on the console port and set the virtual thumb wheel to position 0.

12. Set the console printouts on:

```
NODOP> SET CONSOLE ON
```

13. Wait until a screen message indicates that the new NSV (Node Software Version) is permanently installed.

Examine if the NSV is permanently installed by issuing the command:

```
NODOP> SHOW BOOT_SOURCE
```

14. Run the command

```
NODOP> SET CONSOLE OFF
```

15. Terminate the NODOP session by issuing the **<LOGOUT>** command.

**First Start-up, MAIN and CONFIG Present**

1. Check the contents of the WP2 disc by running the following command:

```
CMD>di <RETURN>
```

```
WP2: <RETURN>
```

2. When the node has rebooted automatically, run the following command:

```
CMD> b WP2: a1_xxxxx.mb3 <RETURN>
```

The restart resumes.

3. Wait until the BRU1 is connected to its superior node.

4. Run the following commands and press **<RETURN>**:

```
NODOP> set boot config anydisk [config file] Yes
```

```
NODOP> set boot master anydisk [MAIN software] Yes
```

5. Run the following command to reboot the node:

```
NODOP> boot master 120 Yes <RETURN>
```

6. When you are prompted, enter **!!!** on the console port and set the thumb-wheel to position 0.
7. Check with the NCC operator that no alarms are present.
8. Tell the NCC operator to update the NMS Client.

## 10 Commissioning Procedure

### 10.1 Part SW-A - Commissioning the Computer

Connect the portable terminal to the console port and make sure that the unit is powered.

If the checks make you suspect a malfunction, please refer to *Node Hardware Library/BRU1/Operation and Maintenance Instructions/Troubleshooting*.

SW-A1. Connect the incoming power supply cable.

SW-A2. Read and check that the screen text is correct.

SW-A3. During the start-up, you are asked whether you want to set the virtual thumb wheel position. Enter **!!!** on the console terminal and set the virtual thumb wheel to position zero "0" for normal node execution.

**Note:** Wait until the prompt **<USERNAME:>** is visible. Press **<RETURN>** or, if applicable, enter user name and password.

SW-A4. Enter the NODOP command **<SHOW SYSTEM>**. Write the information in the Test record.

SW-A5. Enter the NODOP command **<LIST UNITS>**, for the unit enter the command **<SHOW UNIT>**. Write the information in the *Commissioning Test Record*.

SW-A6. For the unit, enter the NODOP command **<LIST PORTS>**.

For the port, enter the command **<SHOW PORT>**.

For the port, enter the NODOP command **<LIST CHANNELS>**.

For every channel listed, enter the command  
**<SHOW CHANNEL>**.

Enter the NODOP command **<LIST CONNECTIONS>**.

For every connection listed, enter the command  
**<SHOW CONNECTION>**.

Note the information in the *Commissioning Test Record*.

## 10.2 Part SW-B - Network Test

SW-B1. Use the NODOP command **<SHOW TIME>** and verify that the base has received the correct system time. Set the time, if necessary using the **<SET TIME>** command. Make a note of the test results in the *Commissioning Test Record*.

SW-B2. Use the command **<SHOW DELTA TIME>** and verify that the node has received the correct delta time. Set the time, if necessary, using the **<SET DELTA TIME>** command. Make a note of the test results in the *Commissioning Test Record*.

Use the NODOP command **<LOGOUT>** to terminate the NODOP session.

### 10.3 Part SW-C - Traffic Test

SW-C1. For a radio base station, use a Radio Modem to make a final function check.

Send **STATUS** messages to your own **MAN** and check that the messages return with **TRAFSTAT OK**. Make a note of the test results in the *Commissioning Test Record*.

## 11 Before Leaving the Site

1. Make sure all connectors are connected.
2. Make sure the power supply cable is connected.
3. Set the virtual thumb wheel to position zero “0” for normal node execution.
4. Check that all outstanding items are listed in the *Commissioning Test Record*, and also, ensure that the person and company responsible for the item/items, is informed.

## Appendix 1

# Downloading New MAIN NTE SW to a BRU1 Node

In Mobitex System Release NTE, it is possible to have two MAIN software releases stored in a BRU1 node. One release that the BRU1 is running on, and one release that is used as the fallback release during the installation.

As from System Release NTE, BRU1 nodes are handled in the same way as other node types when downloading new MAIN software from a superior node.

### Example

M7 = current MAIN NTE software

M8 = new MAIN NTE software

M7 is running in the BRU1 node. First, MAIN M8 is downloaded directly from the NCC to the BIN1 download device (where the MAIN software is not running currently) in the BRU1 node. For more information on downloading, please see *System Library/System User Guides/Network Configuration and Software Distribution/Network Program Distribution*.

When the BRU1 executes the node restart order that is sent from the NCC, the BRU1 will check that the current and the new CONFIG file (if any) are stored in the node, and the node will be restarted, running the new MAIN M8 software. For more information on restart orders, please see *NCC Library/NCC NMS/Job Procedures/Restart of the Nodes/Restart a Node from the NMS*.

If the CONFIG files do not exist in the node, the operator will receive a message, and an operator intervention is required.

5. In the BAS Properties window in the NMS, change the Software Device parameter for the BAS from BIN1 to BIN. Subsequent MAIN software releases will then be downloaded to the BIN download device in the BAS node.