ONT-506 Optical Network Tester

Mainframe, V 20.0.x

Operating Manual | BN 3062/01, Series A ...

BN 3062/98.21
2013.03 (V 20.0.x)
English

JDSU

Please direct all enquiries to your local JDSU sales company.
The addresses can be found at:
www.jdsu.com/test

Copyrights

JDSU Deutschland GmbH
Mühleweg 5, 72800 Eningen u. A.

Order no.: BN 3062/98.21

Edition: 2013.03 (V 20.0.x)

Previous Edition: 2012.12 (V 19.0.x)

Note: Changes may be made to specifications, descriptions and delivery information.

Printed in Germany

Contents

1 Introduction

This user manual provides information on operating and maintaining the ONT-506.

Included topics

- Document roadmap
- Copyright
- Symbols and formatting conventions
- Terms and definitions
- ONT-5xx overview

1.1 Document roadmap

This section is intended to help you find your way through the manual.

Section 1: Introduction

The first section introduces the formatting conventions used throughout this manual and provides an overview about the ONT-5xx family.

Section 2: Safety instructions

Every user of an ONT-5xx has to be familiar with the safety instructions.

Misuse may cause damage of the instrument or severe injury or death.

! Please read this section carefully!

Section 3: Concepts

This section presents the basic system use concepts.

Section 4: Getting started

This section is targeted at new users to the ONT-5xx.

It describes how to get to an instrument ready to use.

Section 5: Day to day operation

This section offers formulas ('how to ...') addressing measurement related tasks occurring during daily work. The intended audience are the standard users (compared to administrators).

Section 6: Administration & maintenance

As in the previous, this section serves as a type of cookbook. The focus of this section is on administration and maintenance related tasks requiring special knowledge and permissions.

Section 7: Reference

This section contains a complete and detailed description of the system's functionality. The topics are grouped by GUI pages (section 7.1) and by category (section 7.2 - 7.n).

Section 8: Appendix

This section contains information regarding trouble shooting, any issues that arise, the detailed specifications of the test unit and contact information.

1.2 Copyright

1.3 Symbols and formatting conventions

This section lists and explains symbols, icons, terms and formatting conventions used in this operating manual.

Included topics

- Warning messages
- Formatting conventions
- Conditional matters

1.3.1 Warning messages

Warning messages are represented in a consistent way throughout this operating manual. This section explains these formatting conventions.

DANGER **Danger of damage, severe injury or death**

Follow the instructions carefully to avoid **damage**, **severe injury** or **death**.

DANGER **Danger from high voltage**

This safety instruction is given when **high voltage** causes the danger.

Follow the instructions carefully to avoid **damage**, **severe injury** or **death**.

DANGER **Danger from laser radiation**

This safety instruction is given if there is danger from **laser radiation**. Additional information specifies the laser class.

Follow the instructions carefully to avoid **damage** or **severe injury**.

WARNING **Danger of damage and injury**

Follow the instructions carefully to avoid **damage** or **injury**.

CAUTION **Danger of damage**

Follow the instructions carefully to avoid **damage**.

1.3.2 Formatting conventions

Throughout this manual specific types of information are represented in consistent ways. This section explains these formatting conventions.

Information	Formatting
Very important information	! Make sure that you protect yourself and others from exposure to laser light. Advices of this kind should be followed carefully.
GUI items	**OK** Buttons, menu items and labels are formatted this way.
Instruction	⇨ Select button **OK**. A user interaction is required.
System reaction	*The **Load application** dialog opens.*
Prerequisite	✓ The mainframe has been switched on. This requirement has to be completed before proceeding.
Cross references	(see "Formatting conventions" on page 4) Cross references are marked in blue. Click on the blue marked text to skip to the named topic.
Steps of a procedure	**Step** **Action** **1** ⇨ Select **Applications > Save...**from the main menu. Denotes that a step should be executed. **[1a]** ⇨ Select port (if more than one port is available) Denotes that a step may optionally be executed depending on the user's desired situation.

1.3.3 Conditional matters

This manual covers conditional information, saying information which is relevant only to parts of the audience. This section explains the formatting conventions used.

Mainframes

As a rule the information given in this manual applies to all the mainframes. The abbreviation 'ONT-5xx' instead of 'ONT-503/506/512' is widely used for simplicity reasons.

ONT-503 specific information for example is depicted as follows:

Information concerning the ONT-503 mainframe...

This concept is also used for information specifically related to a Java or operating system version.

Symbols

The following symbols are used:

ONT-503

ONT-506

ONT-512

SuSE 9.2

SuSE 10.0

Java 1.6

Java 1.6

Java 1.7

Java 1.7

1.4 Terms and definitions

This section explains the terms used in this manual.

- **Classic applications**
  Classic applications are fixed regarding their internal layer structure. Every test module (single blade or group of adjacent boards) offers a set of standard applications the user may choose from.

To decide on an application to be loaded implies the decision for a layer stack. If another stack is required, another application has to be loaded.

- **Layered applications**

  Layered applications have been designed to increase flexibility. Applications are now built using 'layer components', which can be 'stacked' under control of the user. It is also possible to rebuild the layer stack without unloading the entire application. The concept of layered applications is supported by the Module E 10G/2.5G, the MTM Module, the 40/45G packages and the 40/100G package.

- **Built-in PC**

  A PC board plugged into the ONT-5xx mainframes (normally as part of a controller board). Allows the user to drive a display and run a local GUI.

- **External PC**

  Synonym for a computer (PC, workstation, MAC, ...) allows for remote operation of an ONT-506.

- **Test module**

  Group of one or more intelligent boards (blades with a CPU) and (optional) passive boards (blades without a CPU).

  This includes in the simplest form a single intelligent board (e.g. Module E 10G/2.5 G).

  The following characteristics form a test module:

  - Self-contained group of boards / blades offering measurement capabilities.
  - It offers ports allowing to run applications.

- **Port**

  A port refers to a piece of hardware being independently usable. Simply put, it consists of a TX / RX connector. A test module may carry multiple ports.

  The following characteristics form a port:

  - It is required in order to run an application.
  - It can be operated independently from other ports.
  - It can be locked/reserved for later use.
  - It can be named by the user in order to ease handling.

  ! Please be aware of the difference between a 'port' described in this section and a 'TCP port' which refers to a virtual software port not a physical port as described in this section.

1.5 ONT-5xx overview

This section introduces the ONT-5xx concept.

Included topics

- ONT-5xx mainframes
- ONT-5xx test modules
- Applications

1.5.1 ONT-5xx mainframes

This section is designed to familiarize you with the key features and functions of the ONT-5xx mainframe family.

Key features:

- **Multi-Application support**
  SONET/SDH, NewGen, Ethernet, OTN, Jitter, DSn/PDH
- **Multi-Port testing**
  All interfaces run simultaneously and independently
- **Multi-Users**
  Share modules with log-in control
- **Multi-Channel**
  Check SONET/SDH channels simultaneously
- **40/43G**
  Industry first 40/43G SDH/SONET/OTN and unframed BERT testing with jitter/wander capability
- **Jitter/Wander**
  High-accurate Jitter/Wander test according to ITU-T O. 172 Appendices VII + VIII and O.173
- **Module E 10G**
  All rates covered from 9.95 to 11.32 G
- **Automation made easy**
  Linux OS, Tcl/Tk, C- and LabWindows driver libraries
- **ONT-503/506/512**
  3/6/12 slots for high coverage of device under test, independent use of modules speeds up testing

The ONT-5xx family offers mainframes equipped with 3/6/12 free slots for various test modules, which can be fitted when the instrument is in use on-site. With its n-slot design the ONT-5xx offers true multi-port operation running tests on each of the modules simultaneously. All test modules are plug-in's. Thus, easy upgrade makes the ONT-5xx the ideal choice to grow with your future needs.

Focus has been given to easily integrate ONT-5xx into automated environments. Support of Tcl/Tk and LabWindows libraries and the Linux operating system minimize efforts controlling ONT-5xx remotely.

Test modules, applications and the operating concept are described in separate chapters.

1.5.2 ONT-5xx test modules

This section lists all test modules available for the ONT-5xx together with the number of required slots and the ordering number.

100GE Modules and Software	Slots	
100G Module CFP slot	2	BN 3061/92.49
100G Module CFP slot V2	2	BN 3061/92.50
Physical layer validation		BN 3061/92.52
40G Ethernet		BN 3061/94.51
Multi-stream / IP		BN 3061/94.54
111G OTN Bulk		BN 3061/94.55
Skew Variation Generation		BN 3061/94.56

40/43G solution	Slots	
40G SDH/SONET	3	BN 3061/91.51
40G SDH/SONET for ONT-503	2	BN 3075/91.51
40G SDH/SONET electrical	3	BN 3061/91.54
40G SDH/SONET Jitter	5	BN 3061/91.61
40/43G Wander		BN 3061/93.93
43G Jitter		BN 3061/91.62
40G SDH/SONET NRZ V2	3	BN 3061/91.81
40G SDH/SONET Jitter V2	5	BN 3061/91.91
43G OTN	1	BN 3061/91.52
43G OTN Bulk Client		BN 3061/91.53
43G OTN Multiplexing		BN 3061/93.14
43G OTN Bulk Client (DPSK)	3	BN 3061/91.55
43G OTN SDH/SONET Client		BN 3061/91.56
43G OTN V2		BN 3061/93.29
43G OTN Bulk Client V2 (DPSK)	3	BN 3061/91.85
43G OTN SDH/SONET Client V2 (DPSK)		BN 3061/93.28
43G Jitter V2		BN 3061/91.92

Module E 10G LAN/WAN/FC/SONET/SDH/OTN	Slots	
Module E 10G XFP slot	2	BN 3061/92.10
Module E 10G 1310 nm	2	BN 3061/92.11
Module E 10G 850/1310 nm	2	BN 3061/92.12
Module E 10G 1310/1550 nm	2	BN 3061/92.13
Module E 10G 850/1310/1550 nm	2	BN 3061/92.14
Module E 10G XFP slot for ONT-503	1	BN 3075/92.10
Module E 10G 1310 nm for ONT-503	1	BN 3075/92.11
Module E 10G 850/1310 nm for ONT-503	1	BN 3075/92.12
Module E 10G 1310/1550 nm for ONT-503	1	BN 3075/92.13
Module E 10G 850/1310/1550 nm for ONT-503	1	BN 3075/92.14
Electrical interfaces 10G		BN 3061/92.19
OC-192c/STM-64c		BN 3061/93.35
SDH/SONET Single Channel		BN 3061/93.36
Multi-Channel 10G High Order		BN 3061/93.37

Module E 10G LAN/WAN/FC/SONET/SDH/OTN	Slots	
10G VCAT HO		BN 3061/93.39
10G GFP-F		BN 3061/93.45
10G Fiber Channel		BN 3061/93.46
10GigE LAN		BN 3061/93.47
10GigE WAN		BN 3061/93.48
OTN 10.7 G		BN 3061/93.49
OTN 11.05/11.1 G		BN 3061/93.50
OTN 11.27/11.32 G		BN 3061/93.51
OTN Data (11.05/11.1/11.27/11.32 G)		BN 3061/93.52
OTN 10.7 to 11.32 G		BN 3061/93.53
OTN Multiplexing OTU2		BN 3061/93.54
MAC-in-MAC 802.1 ah		BN 3061/93.60
IPv6		BN 3061/93.62
Capture MAC/IP		BN 3061/93.65
Module E 10GigE LAN XFP Slot	2	BN 3061/92.30
Module E 10GigE LAN 1310	2	BN 3061/92.31
Module E 10GigE LAN 850/1310	2	BN 3061/92.32
Module E 10GigE LAN 1310/1550	2	BN 3061/92.33
Module E 10GigE LAN 850/1310/1550	2	BN 3061/92.34
10G Transport Solution		BN 3061/93.75
10G VCAT HO Solution		BN 3061/93.76
10G Ethernet Solution		BN 3061/93.77
10G OTN Multiplexing Solution		BN 3061/93.78
MultiChannel 10G HO Upgrade (requires 93.36)		BN 3061/93.79

Jitter/Wander applications 155 up to 10.7 Gb/s	Slots	
Jitter module 2.5G-B	1	BN 3061/90.96
Jitter module 2.5/2.7G-B	1	BN 3061/90.92
Wander 2.5/ 2.7G		BN 3061/93.92
Jitter module 10G-B	1	BN 3061/90.95
Jitter module 10/10.7G-B	1	BN 3061/90.93
Wander 10/10.7G		BN 3061/93.91
Differential interface module	1	BN 3061/90.94
Jitter 2.5/2.7G-C	1	BN 3061/90.89
Jitter 2.5G-C	1	BN 3061/90.90
Jitter 10G-C	1	BN 3061/90.98
Jitter 10/10.7G-C	1	BN 3061/90.97

Jitter Based on Module E	Slots	
Jitter Module 10G-D 1310nm	1	BN 3061/90.86
Jitter Module 10G-D 1550nm	1	BN 3061/90.88
Jitter 10G 10.3G - D		BN 3061/93.70
Jitter 10G 10.7G - D		BN 3061/93.71
Wander 10/11G		BN 3061/93.95
Wander DS1/E1+BITS		BN 3061/93.96
Wander 10/11G Expert		BN 3061/93.97

Multi-Channel SONET/SDH application	Slots	
Multi-Channel extension module	1	BN 3061/90.82

Data over SONET/SDH applications	Slots	
NewGen solution 2.5G, 1310 & 1550 nm/electrical	1	BN 3061/90.41
NewGen solution 2.5G-B, 1310 & 1550 nm/electrical	1	BN 3061/90.43
NewGen solution 10G, 1550 nm/electrical	2	BN 3061/90.45
GFP-T processing		BN 3061/93.08
Ethernet 10/100/1000M	1	BN 3061/90.71
Mixed Ethernet module 2 ports 10/100/1000M, 2 ports 1G	1	BN 3061/90.72
Ethernet module 1G - 4 ports 1G	1	BN 3061/90.73

DSn/PDH applications	Slots	
DSn/PDH module single port	1	BN 3061/90.61
DSn/PDH module dual port	1	BN 3061/90.62

SONET/SDH/PoS applications	Slots	
Module 2.5G, 1310 & 1550 nm/electrical	1	BN 3061/90.18
Module 2.5G, 1310 nm	1	BN 3061/90.80
Module 2.5G-B, 1310 & 1550 nm/electrical	1	BN 3061/90.26
Module 10G, 1310 nm	1	BN 3061/90.15
Module 10G, 1550 nm	1	BN 3061/90.16
Module 10G-B, 1310 nm/electrical	2	BN 3061/90.21
Module 10G-B, 1550 nm/electrical	2	BN 3061/90.19
PoS processing		BN 3061/93.03

OTN/SONET/SDH applications	Slots	
OTN module 2.5/2.7 G, 1310/1550 nm/electrical	1	BN 3061/90.17
OTN module 2.5/2.7G-B, 1310 & 1550 nm/electrical	1	BN 3061/90.27
OTN module 10/10.7G, 1550 nm	2	BN 3061/90.30
OTN module 10/10.7G-B, 1550 nm/electrical	2	BN 3061/90.32
OTN module 10/10.7G-B, 1310 nm/electrical	2	BN 3061/90.33

1.5.3 Applications

This section describes the main applications of the ONT-5xx.

Testing design and conformance of 40/43G Networks and Line Cards

40 Gb/s is the next natural data rate to become commercially deployed. The drivers are the needs to transport 40 Gb/s IP services generated by routers, and the desire to reduce network costs through lower transport cost and fewer wavelengths to manage. Consequently 43G OTN technology with it robustness and long reach advantages becomes of interest for Network Equipment Manufacturers and Carriers as well.

The ONT-5xx with its 40/43G SDH/SONET/OTN testing functionality is the first single box solution that enables testing of overheads, alarms and errors, service disruption and pointer operations at these bit rates. With the optional jitter/wander testing capabilities the ONT-5xx performs highly accurate and repeatable jitter measurements according to O.172 and O.173.

Module E 10G

Unmatched breadth and depth of testing with the ability to cover all rates from 9.95G to 11.32G . Module E is the first test module capable of testing 10 line rates in this range. All relevant interfaces needed in the R&D and SVT environments are now covered with a single tester.

Today´s market is facing tremendous growth of packet-based services, such as VoIP and IPTV. This level of growth, combined with an increase in end user demand for direct Ethernet access, has caused an urgent need for cost-effective high-speed Ethernet transmission systems. The establishment of 10G Ethernet not only in Access but in Metro and Core Networks as well is a topic many standardization organizations like IEEE, ITU and MEF are dealing with. The implemented testing capabilities on Layer 1 and 2 for LAN and WAN bit rates as well as for LAN OTN and WAN OTN. The feature set reaches from VLAN-stacking, MPLS testing and Mac-in-Mac to 256 independent flows, unframed BERT Testing and OTN wrapper/de-wrapper test.

Next Generation SONET/SDH network elements

Most recent SONET/SDH network elements are playing a key role in the metro area of today's networks. They allow service providers to gain efficiency, e.g. due to lower cost and easier and faster service provisioning. Combining several functions like grooming, switching and add-drop multiplexing, they are also referred to as 'Next Generation SONET/SDH devices'. Next Generation SONET/SDH devices are highly integrated platforms (e.g. MSPPs - Multi Service Provisioning Platforms). They provide very high port density and port counts as well as the ability to support multiple SONET/SDH rings. Several protection schemes are supported for line and path level, allowing to build up Path Protected Mesh Networks. Thus, these devices are much more complex than legacy SONET/SDH equipment giving new challenges to design appropriate test procedures. Another aspect of Next Generation devices is the integration of interfaces and services like Ethernet. Resulting test applications are covered by JDSU's Ethernet over SONET/SDH solution. The ONT-5xx with Multi-port and Multi-channel testing is focusing on the challenges given to test SONET/SDH grooming and switching performance of Next Generation devices.

Multi-channel

While current test procedures are based on using one working channel to perform tests, the numerous interconnections taking place in Next Generation devices require more comprehensive load structures (mixed mappings) and the ability to check numerous channels simultaneously. As examples, flooding of path level errors and alarms may occur on several ports when simulating just one line event. Or, for switching matrix handling high channel count, service disruption time needs to be checked not only for one channel (typical results), but also under load conditions for all channels handled by that matrix.

The ONT-5xx with Multi-channel test and Multi-port configuration is the answer for manufacturers' development/ system verification as well as service providers' acceptance testing. ONT-5xx's mixed mapping load generation and full parallel analysis gets testing away from typical results - and the risk to take chances when relying on a single test channel. Multiple ports allow to load/analyze line interfaces simultaneously. This high coverage helps to achieve higher quality, as potential line card dependencies will be identified.

2 Safety instructions

The ONT-506 was shipped in perfect condition. To maintain this condition and ensure safe operation of the instrument, please follow the instructions below.

WARNING Warning symbols for potential hazard

In all cases where the ONT-506 or its test modules are labeled with a warning symbol, the operating manual of the device concerned must be consulted to learn more about the nature of the potential hazard and any action that has to be taken.

Included topics

- General safety instructions
- ONT-506 related safety instructions
- Laser related safety instructions
- Ventilation

2.1 General safety instructions

Please be aware of the following general safety instructions.

Included topics

- Certifications
- High voltage
- Inappropriate use
- Safe operation
- Liquid entering the instrument

2.1.1 Certifications

The unit also complies to the CE mark regulations.

Compliance mark:

2.1.2 High voltage

Live parts may be exposed when pluggable optics are removed, covers are opened, or parts are removed using a tool. Dangerous voltages may also be present at connectors, pins and terminals.

DANGER High voltage

AC line voltage, nominal range	110 V~ to 240 V~
Frequency	50 Hz or 60 Hz

- ⇨ Check building installation for sufficient power and fusing before connecting AC line cord to mains outlet.
- ⇨ Before opening the instrument, shutdown the system, switch it off at the main power switch. Disconnect it from all power sources.
- ! Simply switching to standby is insufficient.
- ⇨ Take care of electrostatic discharging (see "Electrostatic discharge" on page 17)

The ONT-506 follows the safety concept of the IEC/EN 61010-1 by connecting the chassis with the protective earthing (PE) system of the power supply network (safety class 1 equipment).

The AC line cord supplied with the instrument has a protective earth conductor.

- ! The AC line plug must only be connected to AC line connectors equipped with a protective earth connection.
- ! The protective earth connection must not be broken.

2.1.3 Inappropriate use

Inappropriate use can cause damage/destruction of instrument.

CAUTION Inappropriate use

Incorrect use, damage and incorrect repairs can affect the safety, function and accuracy of the instrument. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- ⇨ Only use the instrument under the conditions and for the purpose for which it was constructed. (see "Specifications" on page 229)
- ⇨ Only JDSU test modules dedicated for use in the ONT-506 are allowed to be installed in and operated with the mainframe.
- ⇨ Only JDSU test modules dedicated for use in the ONT-506 are allowed to be installed in and operated with the mainframe.

- ⇨ Only JDSU authorized repair depots may open the chassis. There are no user serviceable parts contained within the chassis. Attempts to open the chassis may result in voiding of the product warranty.
- ⇨ Check the instrument regularly for signs of damage.
- ⇨ Make sure that any repairs are made by trained professionals only.

2.1.4 Safe operation

Take the device out of service if safe operation seems to not be possible.

CAUTION **Safe operation**

- ⇨ If safe operation seems to no longer be possible, take the instrument out of service and make sure it is not used.

  This may be the case, if the ONT-506
  - shows visible signs of damage,
  - does not work,
  - has been subjected to excessive stress of any kind,
  - has been stored or transported in unfavorable conditions.

  If this is the case, contact your local JDSU Sales Company. The addresses of the local sales companies are listed on the Internet at http://www.jdsu.com.

2.1.5 Liquid entering the instrument

Liquid entering the instrument can cause a short circuit or make a dangerous connection to the AC power supply.

DANGER **Liquid entering the instrument**

- ! Make sure that no liquid gets into the instrument.
- ! If liquid entering the instrument, allow it to dry out thoroughly in a well-ventilated place. Water entered impairs the safety of the instrument.
- ! Liquid entering the instrument can cause corrosion.

2.2 ONT-506 related safety instructions

Please be aware of the following mainframe related safety instructions.

Included topics

- Personal qualification
- Configuration
- Opening the chassis
- No 'hot swap' supported
- Not occupied slots
- Lithium batteries
- Data loss during emergency shutdown
- Damage of module sealings
- Damage to optical inputs and outputs
- Electrostatic discharge
- Short-circuits
- Automatic restart
- Electromagnetic compatibility (EMC)
- Dampness during storage

2.2.1 Personal qualification

All work on the open chassis must be carried out by suitably qualified personnel only who is familiar with the dangers both to people and to the instrument itself.

CAUTION Personal qualification

Work on the opened chassis must only be done by professionals who are familiar with the risks to themselves and to the instrument. Only a trained professional can determine whether calibration, maintenance or repair is only possible with the chassis opened (and under power). If you are unsure, please contact your local JDSU Sales Company. The addresses of the local Sales Companies are listed at the end of this Operating Manual.

2.2.2 Configuration

Due to limited mainframe cooling air flow, configuration restrictions apply when using Jitter 10G-D.

CAUTION Configuration

⇨ When configuring the ONT-506 mainframe, it is not recommended to use the Jitter 10G-D module in slot 4-6 of the mainframe when operating the instrument in an elevated temperature environment (T_{amb} > 27°C/80°F).

Not doing so might result in an automatic overtemperature shutdown!

2.2.3 Opening the chassis

Live parts may be exposed when covers are opened or parts removed.

DANGER Opening the chassis

Dangerous voltages may also be present at pins and terminals.

! Only qualified JDSU service technicians may open the chassis. Attempts to open the chassis by non-qualified personnel may void the product warranty.

! Disconnect the AC line cord before opening the chassis.

! Capacitors inside the instrument may still be charged, even after the unit has been disconnected from all power sources.

! Take care of electrostatic discharging.

2.2.4 No 'hot swap' supported

Risk of test module damage in case of installing or removing test modules without switching off the ONT-506.

CAUTION No "hot swap" supported

! In any case and before installing or removing test modules the ONT-506 must be switched of.

2.2.5 Not occupied slots

Always close not occupied slots using blind covers.

WARNING Not occupied slots

! In any case and before connecting the ONT-506 to the mains power all slots not occupied by an ONT-506 module must be closed with blind slot covers (see "Installing a blind slot cover" on page 208)

- For safety reasons (the mainframe as well as the test modules may have high voltage and/or high energy circuits).
- For proper ventilation (see "Ventilation" on page 23).
- For electromagnetic compatibility reasons.

2.2.6 Lithium batteries

Lithium batteries are used to power real time clock and data memory.

ONT-506: Type 1/2 AA 3.6 V.

CAUTION Lithium batteries used

These batteries can be replaced only by qualified service personel.

2.2.7 Data loss during emergency shutdown

An emergency shutdown may lead to loss of data.

CAUTION Data loss during emergency shutdown

If the ONT-506 is not turned off properly, then

- applications will not be closed properly and
- instrument settings and measurement results may not be saved to the mass storage.

2.2.8 Damage of module sealings

Sealings may be damaged when assembling the module without using the plastic strips delivered with the module.

CAUTION Damage of Module Sealings

The modules are fitted with special sealings at the front edges to protect the module and other electronic equipment from electromagnetic influences. These sealings may be damaged when assembling the module without using the plastic strips delivered with the module.

2.2.9 Damage to optical inputs and outputs

Bending the optical connector when inserting optical fiber can damage the optical inputs and outputs.

CAUTION Damage to optical inputs and outputs

! Make sure that the connectors are not angled by more than 10°.

! Make sure that the lug on the connector is located precisely in the notch in the test adapter before screwing up the cable fastening.

2.2.10 Electrostatic discharge

Risk of damage due to electrostatic discharge.

CAUTION Electrostatic discharging

The test modules contain highly sensitive CMOS components which can easily be destroyed as a result of electrostatic discharges.

! Never touch contacts, printed circuit boards or electronic components. Always store the test modules in an ESD protected packaging. Carry out all work at a workplace that is protected against electrostatic discharging.

! When pulling out a test module take care of electrostatic discharging and put the module immediately in a ESD protection package.

! Always follow proper ESD procedures when removing or inserting CFP, SFP or XFP pluggable interfaces.

2.2.11 Short-circuits

Danger of destruction due to short-circuits.

CAUTION Short-circuits

Metal objects may drop into an open slot and cause a short-circuit.

! Always disconnect the power plug before removing or installing a test module. Make sure that no metal objects, such as paper clips, hairpins or jewelry, are able to drop inside the instrument.

Inexpert installation or removal may result in plug contacts becoming bent and possibly causing a short-circuit.

! Be very careful never to bend plug contacts.

2.2.12 Automatic restart

To ensure remote access is re-enabled, the ONT-506 restarts automatically (depending on the system controller and system set-up) after a power supply interruption.

CAUTION Automatic restart

! If the ONT-506 is not used for a long time, the mainframe should be switched off. If the ONT-506 is not used for a long time, the mainframe should be switched off (ONT-506/512) or disconnected from the mains power supply (ONT-503).

2.2.13 Electromagnetic compatibility (EMC)

EMC can only be guaranteed under specific conditions.

CAUTION Electromagnetic compatibility (EMC)

To ensure the electromagnetic compatibility, all slots not occupied by a test module must be closed with blind slot covers.

For electrical signal connections properly screened cables of good quality must be used.

For EMC reasons the ONT-506 is intended for use only within telecommunication centers or in non-residential properties having their own main power transformer for its power supply voltage network (EMC Class A Equipment).

2.2.14 Dampness during storage

Damage caused by dampness during storage.

CAUTION Damage caused by dampness during storage

! Saturated drying agent within a seal box or bag can increase the humidity.

! Never use any saturated drying agent. The indicator label of the drying agent bag changes color from blue to pink when it is saturated.

! Do not store the instrument in a humid atmosphere.

2.3 Laser related safety instructions

The ONT-506 mainframe and some test modules include laser sources. The test modules may be equipped with user pluggable laser sources in the form of CFP, SFP, and XFP devices. Invisible optical radiation is present at the output connectors of these test modules. Also, interfaces or test cables emitting optical laser radiation are connected to the inputs of the test modules.

Included topics

- Invisible laser radiation
- Invisible laser radiation (Class 1 laser products)
- Invisible laser radiation (Class 1M laser products)
- ONT-506 mainframe includes laser sources
- Test modules include different laser sources
- Laser classification of optical XFP transceivers
- Laser classification of optical CFP transceivers
- Laser classification of optical SFP transceivers

2.3.1 Invisible laser radiation

Laser radiation can cause irreparable damage to the eye and skin.

DANGER **Invisible laser radiation**

- ! Follow the laser safety regulations that apply in your area.
- ! Take note of the laser classification of the individual test module.
- ! Take note of the laser classification or hazard level of the device under test.
- ! Make sure that you protect yourself and others from exposure to laser radiation.
- ! Never look into optical outputs of devices or into the plug end surfaces (free ends) of optical fibers.
- ! Always cover disconnected optical plugs or disconnected optical cable connectors with protective caps.
- ! Always disconnect the instrument from main power and disconnect it from any fiber optic cables before inspecting or cleaning the optical cable connectors.
- ! Make sure that the fiber optic cables are disconnected from all sources of radiation before they are cleaned or inspected and ensure that they are not reconnected until cleaning or inspection has been completed.

2.3.2 Invisible laser radiation (Class 1 laser products)

Even Class 1 laser products have to be handled with care.

CAUTION **Invisible laser radiation (Class 1 laser products)**

Class 1 laser products are defined as safe under normal operation under reasonably foreseeable conditions.

- ! Although the laser radiation from a Class 1 laser product will not harm neither eyes nor skin, follow the general laser safety instructions to ensure maximum safety when working with laser sources (see "Invisible laser radiation" on page 19)

2.3.3 Invisible laser radiation (Class 1M laser products)

Class 1M laser products have a significant higher laser radiation than Class 1 laser products.

DANGER **Invisible laser radiation (Class 1M laser products)**

Viewing the laser output of a Class 1M laser product with certain optical instruments (for example eye loupes, magnifiers, microscopes) may pose an eye hazard.

- ! Do not expose to the beam within a distance of 100 mm.
- ! Do not view the laser output with optical instruments.
- ! Follow the general laser safety instructions (see "Invisible laser radiation" on page 19).

Maximum permissible output power level according to IEC60825-1:20071

850nm[1)]	1310nm[2)]	1550nm[3)]
10,21 mW (10,09 dBm)	52,54 mW (17,21dBm)	136,45 mW (21,35 dBm)

1) Multi Mode Fiber, nom. 50u core diameter, NA=0.21

2) Single Mode Fiber, nom. 9u core diameter with 10u modal field diameter

3) Single Mode Fiber, nom. 9u core diameter with 11u modal field diameter

2.3.4 ONT-506 mainframe includes laser sources

ONT-506 mainframe may include different laser sources with different laser classifications.

DANGER **ONT-5xx mainframes include laser sources**

Mainframe laser classification

Laser source	Laser classification according to IEC 60825-1:2007
CD-ROM drive	Class 1 laser product

2.3.5 Test modules include different laser sources

Test modules may include different laser sources with different laser classification.

! Please check up on the specific test module / layer manual for more detailed information.

DANGER **Test modules include different laser sources**

To find out the appropriate laser classification, associated wavelengths and optical power levels, see the laser warning labels on the test module cover plate.

Test modules laser classification

Test module	Laser classification according to IEC 60825-1:2007
Module 2.5G Module 2.5G-B	Class 1 laser product
Module 10G Module 10G-B	Class 1M laser product
OTN Module 2.5/2.7G OTN Module 2.5/2.7G-B	Class 1 laser product
OTN Module 10/10.7G OTN Module 10/10.7G-B	Class 1M laser product
NewGen Solution 2.5G NewGen Solution 2.5G-B	Class 1 laser product
NewGen Solution 10G	Class 1M laser product
Base Module 40/43G	Class 1M laser product
Main Module 40/45G	Class 1M laser product
Jitter Module 40/43G-B	Class 1M laser product
Ethernet Module 40/100G	Determined by customers transceiver
Ethernet Module 1G	Class 1 laser product
Mixed Ethernet	Class 1 laser product
Module E 10G Module E 10G LAN	Class 1 laser product
Jitter-D	Class 1 laser product
OSA-16x OSA-20x OSA-30x	Class 1 laser product

2.3.6 Laser classification of optical XFP transceivers

The laser classification of the optical XFP transceiver in a XFP slot of a test module can differ from the laser classification of the test module itself.

DANGER Laser classification of the optical XFP transceiver

The user is free to use any XFP transceiver compatible with the XFP Multi Source Agreement (MSA) in the ONT-506, including for example an 850 nm XFP transceiver which is a Class 1 Laser Product.

! In this case you shall observe the laser classification of the inserted XFP transceiver and its safety instructions.

2.3.7 Laser classification of optical CFP transceivers

The laser classification of the optical CFP transceiver in a CFP slot of a test module is determined by the customer's transceiver.

DANGER Laser classification of the optical CFP transceiver

The user is free to use any CFP transceiver compatible with the CFP Multi Source Agreement (MSA).

! In this case you shall observe the laser classification of the inserted CFP transceiver and its safety instructions.

2.3.8 Laser classification of optical SFP transceivers

The laser classification of the optical SFP transceiver in an SFP slot of a test module is determined by the customer's transceiver.

DANGER Laser classification of the optical SFP transceiver

The user is free to use any SFP transceiver compatible with the SFP Multi Source Agreement (MSA).

! In this case you shall observe the laser classification of the inserted SFP transceiver and its safety instructions.

2.4 Ventilation

Because of the compact and portable design of the ONT-506 the system needs effective cooling realized with powerful built-in fans. Please observe the following safety information to ensure that the effectiveness of the built-in fans is not reduced.

Included topics

- Insufficient cooling
- Lightweight objects

2.4.1 Insufficient cooling

The ONT-506 and the test modules can be damaged or destroyed if the passage of cooling air is insufficient.

CAUTION Insufficient cooling

- ⇨ Keep all input and output openings free and do not block the ventilation openings.
- ⇨ Make sure that there is adequate space between the ONT-506 and other instruments or sources of heat.
- ⇨ Ensure that the warm output air is not directed by obstacles to the air input openings.
- ⇨ Position the ONT-506 so that warm air from adjacent instruments or other sources of heat is not sucked into the device.
- ⇨ Do not mount the ONT-506 on top of other equipment with cooling air output on top side.
- ⇨ Do not operate the ONT-506 in a dusty environment.
- ⇨ Do not operate the ONT-506 if you recognize that one or more built in fans do not operate.
- ⇨ Do not use the ONT-506 without its casing.
- ⇨ Always close not occupied slots with blind slot covers (see "Installing a blind slot cover" on page 208).

2.4.2 Lightweight objects

Lightweight objects can be sucked into the ONT-506.

WARNING Lightweight objects

- ! Keep papers, tissues, and other loose items away from the air intake vents to prevent potential blocking hazards.
- ! Do not come too close with your hair to the air input of the ONT-506.

3 Concepts

This section explains the basic concepts of the ONT-506 system.

Included topics

- Overall software structure
- Modes of operation
- ONT-506 software
- ONT-506 software version control
- Application
- Session
- Port
- Result
- Date and time
- ONT-5xx user
- Networking
- Layered application
- Device configuration

3.1 Overall software structure

This section explains the main layers composing the ONT-506 software structure.

The ONT-506 system consists of three main software layers:

Linux operating system

The Linux operating systems offers the infra structure to the system.

The following aspects are handled on Linux system level:

- Networking (detailed settings)
- Peripheral equipment (keyboard, display, ...)
- Mass storage (disk, DVD, USB, ...)
- Recovery

ONT-506 software

The ONT-506 software is intended to perform measurements and generate results. It utilizes sessions and applications in order to do so.

The ONT-506 software deals with:

- Sessions
- Applications
- Ports
- Results
- Administrative functions (date & time, ...)

Session / application

Sessions & applications are performing the real measurements delivering results to the user.

3.2 Modes of operation

The ONT-506 implements a client-server architecture. One part of the system ('server') is always running on the ONT-506 (working directly with the hardware), the other part ('client') accesses the server functionality and offers an interface to the user. The client may run on the ONT-506 or an external PC.

Client and server are connected via a network - either internal (inside the ONT-506) or external (LAN/WAN). The interface offered may be either graphical (Graphical User Interface, GUI) or command based (SCPI, drivers, ...). Dependent on the type, more than one client may be started and connected.

Derived from the type of client, the system distinguishes between different modes of operation:

- Local operation
- Remote operation
- Remote Control

These modes differ regarding several aspects, shown by the following table:

Mode of operation	Mode of access	Client running on ...	User mode	Linux system level access
Local operation	GUI	ONT-506	single-user[1)]	Yes
Remote operation	GUI	External PC	multi-user	No
Remote control	Commands	External PC	multi-user	No

1) Additional users may access the system remote operated or remote controlled.

3.3 ONT-506 software

The ONT-506 software is intended to perform measurements and generate results. It utilizes sessions and applications in order to do so.

The ONT-506 software deals with:

- Sessions
- Applications
- Ports
- Results
- Administrative functions (date & time, ...)

3.4 ONT-506 software version control

The ONT-506 software is subjected to ongoing enhancements and improvements. Software releases are published regularly.

Included topics

- ONT-506 software release
- ONT-506 beta software release

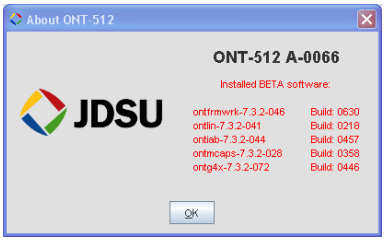
3.4.1 ONT-506 software release

Distribution of an upgraded, fully tested version of the ONT-506 software.

3.4.2 ONT-506 beta software release

Distribution of a preliminary version of the ONT-506 software.

A beta software release shows the writing 'Beta' during start-up. In addition, the **Help > About...** dialog provides the information.



3.5 Application

An application consists of measurement capabilities together with configuration parameters and results.

The following characteristics form an application:

- It offers specific measurement capabilities.
- It requires a specific port.
- It allows to be configured via parameters ('settings').
- It allows to perform measurements.
- It offers the results of the (last) measurement.
- It allows to save settings in order to ease replicating measurements.
- It allows to save results for later evaluation.
- It can be exported / imported in order to be exchanged between mainframes.

During loading phase, all parameters are set to default or to the values previously saved. The user may of course change these settings and save again either overwriting the existing setup or giving a new name creating a new application.

In order to support collaboration in a multi-user environment the ONT-506 software distinguishes between different categories of applications:

- **Standard application**

Standard applications are configured by JDSU. After loading all parameters are set to factory defaults, the values may be changed and saved giving a new name. Overwriting standard applications is not possible.

- **Public application**
  Public applications are configured by an ONT-506 user and afterwards offered to the other users. The application may be modified by other users later on.
- **Private application**
  Private applications belong to one specific ONT-506 user and are not visible (saying not loadable) to other users.

3.6 Session

A session clips applications and provides mechanisms to ease the handling of a whole group of applications.

Often more than one application is required in order to perform a measurement task (e.g. to access different interfaces in parallel).

The following characteristics are forming a session:

- It allows to load all the contained applications (together with its settings) with just one user interaction.
- It allows to save the whole group (together with its settings).
- It offers common start/stop capabilities.
- It belongs to one ONT user.
- It may run in parallel with other sessions.
- It occupies the ports its applications are using.
- It is always required; it is not possible to load an application without a session context.

In other words a session is some kind of administrative unit, easing some standard tasks.

3.7 Port

A port refers to a piece of hardware being independently usable. Simply put, it consists of a TX / RX connector. A test module may carry multiple ports.

The following characteristics form a port:

- It is required in order to run an application.
- It can be operated independently from other ports.
- It can be locked/reserved for later use.
- It can be named by the user in order to ease handling.

! Please be aware of the difference between a 'port' described in this section and a 'TCP port' which refers to a virtual software port not a physical port as described in this section.

3.8 Result

'Result' is a generic term subsuming all the possible outcomes of running an application.

The following result types are supported by the ONT-506 software:

- Reports

Tabular description of application settings and results. Format may be PDF, HTML or CSV.

- Screenshots
- TIE data
- Capture files

3.9 Date and time

This section describes the date and time concept used within the ONT-506 system.

Included topics

- UTC
- Date and time concept
- NTP (Network Time Protocol)

3.9.1 UTC

UTC (Universal Time Coordinated) is a functional equivalent of GMT (Greenwich Meantime). GMT is equal to Western European (UK) time in winter, while British Summer Time (BST) equals GMT + 1 hour.

3.9.2 Date and time concept

This section describes the date and time concept of the ONT-506.

Note: In order to understand the date and time concept of the ONT-506 it is essential to be aware of the client server structure of the system.

The following facts characterize the concept:

- The clock module distributes actual date and time to all the test modules during boot-phase. This means that internally (on the server) all time stamps are UTC and can thus be easily shared in an international environment.

  Note: Changes to the time settings will only have effect after a re-boot of the system.

- What it is finally presented to the user depends on the mode of operation.

Mode of operation / Client type	**Time stamps**
Local operation / local GUI, VNC	The local GUI running on the ONT-506 considers the time zone setting of the ONT-506. That means that all date and time information is converted into local time by the GUI automatically.
Remote operation / Java Web Start	A Java Web Start client converts date and time information into local time as well. Contrary to a VNC client it does not consider the time zone setting of the ONT-506, but the time zone set on the local PC running the client. **Note:** Users operating the same application from different time zones will see different time stamps (for they are converted to local time). Of course time stamps are identical on an UTC base.
Remote control	All date and time information retrieved via the command line interface (SCPI commands) in an automated environment will be UTC time stamped. No conversion to local time takes place, no time zone setting is considered.

Note: All reports (PDF, CSV, ...) will always use UTC time in order to make them comparable with result files generated at other locations.

3.9.3 NTP (Network Time Protocol)

This section describes the NTP concept.

The Network Time Protocol (NTP) is a protocol for distributing the Coordinated Universal Time (UTC) by means of synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. NTP uses UDP port 123 as its transport layer. It is designed particularly to resist the effects of variable latency by using a jitter buffer (Wikipedia).

3.10 ONT-5xx user

An ONT-5xx user is characterized by the permission to access ports, sessions and applications.

The ONT-5xx software is designed to support multiple users running applications independently from each other. In order to avoid bothering interference access to ports, sessions and applications can be restricted on a per user base. In other words, a user may have private applications not visible to the user community.

The following characteristics are forming the user concept:

- A user is identified by a unique name and a password.
- A user may create new sessions or load sessions saved by himself.
- A user may load standard/public applications and create new private or public applications.
- A user may lock ports for later use.
- A standard user 'ont' is pre-configured.
- A user 'Administrator' allows to perform administrative tasks.

For access to sessions and applications requires the permission to do so, it is always required to log on to the system. On the other hand, especially ONT-503 and ONT-506 might be used by just one person/user not willing to go through the login procedure. The ONT-5xx deals with this discrepancy by offering two different start-up modes:

- **Single-user mode**
  No explicit login is required; the standard user 'ont' is logged in automatically.
  (see "Starting an ONT-506 GUI in single-user mode" on page 147)
- **Multi-user mode**
  The user has to go through the login procedure giving user name and password.
  (see "Starting an ONT-506 GUI in multi-user mode" on page 147)

ONT-5xx user	Password	Comment
ont	acterna	Standard user, always logged in in single-user mode
Administrator	Administrator	Special user, given the permission to perform administrative tasks

Note: The table above shows the factory settings. Additional users may be created by the administrator, passwords may be changed.

3.11 Networking

Each ONT-506 can be connected to a LAN (Local Area Network).

To address the ONT-506 in a LAN, it needs a unique TCP/IP address.

To address the test modules in a LAN, they need unique TCP/IP addresses.

A valid IP address can be obtained in two different ways:

- **DHCP**

  A valid IP address is assigned during boot-up automatically. As a prerequisite, a DHCP server has to be active.

  The usage of DHCP is configured as a factory default.

- **Static IP address**

  A static IP address is assigned. It is up to the user to avoid collisions caused be duplicate addresses.

3.12 Layered application

Layered applications follow the approach that network systems consist typically of a stack of different network technologies depending on the network equipment and transported service. When loading an application users choose from a number of available application stacks or wrapper/de-wrapper applications.

3.13 Device configuration

Device configuration lists the main components forming a specific ONT-506.

The information is gathered and written during the boot phase of the device. Before overwriting the existing files are copied ('LastConfigurationInfo---.xyz'). This procedure allows to access the configuration info even if the device does not boot properly. All the files are archived in the **Remote File Access** area.

PDF, HTML and CSV representations are available. In order to allow reproducing changes of the configuration, the configuration info files are archived in the **oldConfigurations** directory.

The following shows how to remote access the configuration info files using Tcl as an example:

```
> package require http
> set url "http://10.49.75.235/exports/
ConfigurationInfo.csv"
> set filename "10.49.75.235.csv"
> set httpurl [::http::geturl $url]
> set httpdata [::http::data $httpurl]
```

```
> set file [open $filename a 0644]
> puts $file $httpdata
> close $file
```

Note: The configuration info can be displayed at any time (see "Getting information regarding device configuration" on page 130).

4 Getting started

This section is targeted at new users to the ONT-506. It describes how to get to the instrument ready to use and contains information to be considered in order to get the instrument working properly.

Included topics

- Initial setup
- Important operating considerations

4.1 Initial setup

This section describes the initial setup procedure.

Included topics

- Unpacking the instrument
- Positioning the instrument
- Connecting peripheral equipment
- Connecting the ONT-506 to the AC line
- Switching the ONT-506 on
- Adapting the keyboard layout
- Setting the time zone of an ONT-506
- Preparation for LAN access
- Connecting to the LAN

4.1.1 Unpacking the instrument

Use this procedure to unpack the instrument.

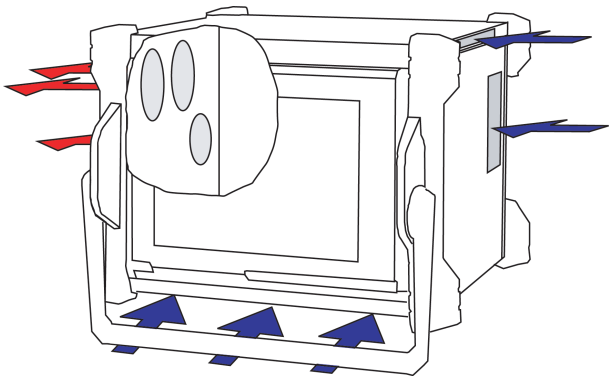
Step	Action
1	⇨ Remove the packaging
2	⇨ Keep the packaging The packaging is designed to be re-used if it is not damaged during transport or when it is opened. The instrument is only protected reliably from damage during transport if the original packaging is used. ⇨ Store the packaging and the padding material and drying agent in a safe place.
3	⇨ Check for completeness The packaging should contain: • ONT-506 BN 3062/01 • Test modules (including accessories) according to configuration • 1 AC line cord • 1 Operating manual • 1 Remote control operating manual
4	⇨ Check the ONT-506 for transport damage After you have unpacked the ONT-506, check it for transport damage. Such damage is likely if the packaging itself has been clearly damaged. ! Do not try to use an instrument that is visibly damaged, as further damage may result.
5	⇨ Give time for recovery after storage and transport ! Condensation may form on an instrument that has been stored or transported at low temperatures when it is brought into a warmer environment. To prevent damage, wait until all the condensation on the instrument surfaces has evaporated before switching the unit on. The instrument is only ready to use when it has reached a temperature that is within the specified operating range (+5 °C to +40 °C).

4.1.2 Positioning the instrument

Use this procedure to position the instrument.

Step	Action
1	⇨ Place the instrument on a desk or table.
2	⇨ Ensure proper ventilation requirements. The ONT-506 is equipped with several fans. These fans protect the ONT-506 from overheating during operation. The ventilation of the plug-in module area is from the bottom to the left hand side of the ONT-506 (referred to front view). Additional ventilation openings for input air are on the right hand side above the plug-in modules. The ventilation of the power supply area is from the right hand side to the left hand side (referred to front view).

Step	Action



Note: Take into account that the speed of the built-in fans increases with raising input air temperatures.

CAUTION **Insufficient cooling**

- ⇨ Keep all input and output openings free and do not block the ventilation openings.
- ⇨ Make sure that there is adequate space between the ONT-506 and other instruments or sources of heat.
- ⇨ Ensure that the warm output air is not directed by obstacles to the air input openings.
- ⇨ Position the ONT-506 so that warm air from adjacent instruments or other sources of heat is not sucked into the device.
- ⇨ Do not mount the ONT-506 on top of other equipment with cooling air output on top side.
- ⇨ Do not operate the ONT-506 in a dusty environment.
- ⇨ Do not operate the ONT-506 if you recognize that one or more built in fans do not operate.
- ⇨ Do not use the ONT-506 without its casing.
- ⇨ Always close not occupied slots with blind slot covers (see "Installing a blind slot cover" on page 208).

4.1.3 Connecting peripheral equipment

Use this procedure to connect peripheral equipment.

Step	Action
1	⇨ Connect peripheral equipment.

If you are going to use the ONT-506 you can connect various peripheral equipment. The ONT-506 is equipped with standard connectors, e.g. for the following:

- Mouse (PS/2 plug)
- Keyboard (PS/2 plug)
- External monitor (VGA or DVI)

Note: The peripherals listed here are not included with the instrument.

4.1.4 Connecting the ONT-506 to the AC line

Use this procedure to connect the ONT-506 to the AC line.

Step	Action
1	AC line voltage and frequency The ONT-506 operates from AC power supplies having a nominal voltage between 100 V and 240 V, at a frequency of 50 or 60 Hz. Range switching is not necessary. **AC line connector socket** ! The AC line cord supplied has a protective ground conductor. The AC line plug must only be connected to AC power outlets equipped with a protective ground connection.

4.1.5 Switching the ONT-506 on

Use this procedure to switch the ONT-506 on.

Step	Action
1	⇨ Set the POWER I/O switch to 'I' (1).

2	⇨ Press the green Standby button on the lower left corner at the front side of the unit (2). *The fans start to operate, the system boots up.* *The ONT-506 software is started.* *An ONT-506 GUI is started in single-user mode.*

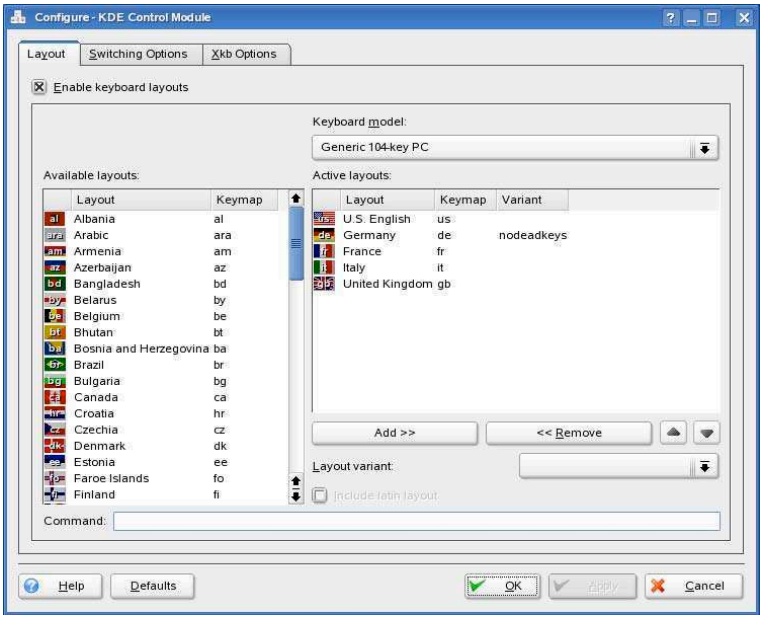
4.1.6 Adapting the keyboard layout

Use this procedure to adapt the keyboard layout

Note: If an external keyboard is connected to the ONT-506, the keyboard layout is set to US layout by default.

Note: The remote controlled GUI uses the standard keyboard layout of the used PC.

Step	Action
1	⇨ Select the **US banner** from the Linux task bar.
2	⇨ Select **continue**. *The Configure - KDE Control Module opens.*



3	⇨ Move the desired standard layout on top of the right stack.
4	⇨ Click the **OK button**.

4.1.7 Setting the time zone of an ONT-506

Use this procedure to set the time zone of an ONT-506 (factory setting is USA, Pacific).

Note: 'Administrator' permissions are required to set the time zone.

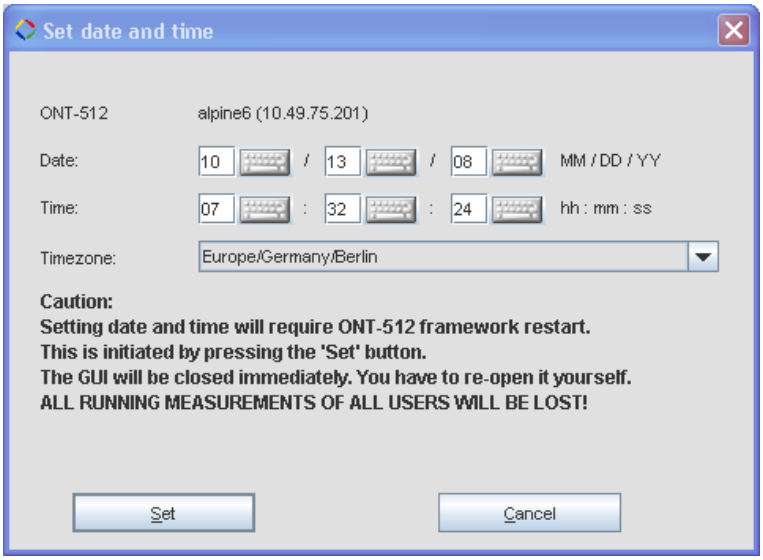
Note: You should be aware of possible consequences.

Step	Action
1	⇨ Select **Tools > Set date & time...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

Step	Action

2 ⇨ Type in administrator password (default: 'Administrator') and select the **OK** button.

*The **Set date and time** dialog opens.*



3 ⇨ Select the appropriate timezone from the **Timezone** list.

4 ⇨ Select button **Set**.

! The ONT-506 software has to be re-started, all running measurements will be lost.

4.1.8 Preparation for LAN access

Use this procedure to prepare the ONT-506 for LAN access.

The ONT-506 is factory configured to use DHCP in order to obtain all IP address configuration information. You may change this in order to program static information.

Optionally you may want to connect the ONT-506 to your Local Area Network (LAN).

A network connection is required in order to use one (or more) of the following features:

- Printing
- Remote operation
- Remote control

As a factory default the ONT-506 is pre-configured to use DHCP

(see "Networking" on page 163).

The ONT-506 offers an easy way to switch to a static IP address

(see "Provisioning LAN access using a static IP address" on page 128).

In case of more detailed settings are required the standard configuration tool KDE Control Center and the YaST modules have to be used.

(see "Provisioning LAN access using DHCP (advanced setting)" on page 165) and

(see "Provisioning LAN access using a static IP address (advanced setting)" on page 169).

Note: ONLY perform changes to eth0 - all others must not be changed.

Note: Contact your local IT department in order to avoid network problems.

4.1.9 Connecting to the LAN

Use this procedure to connect the ONT-506 to the LAN.

Step	Action
1	⇨ Connect the LAN cable to socket [07] (see "Controller & clock module" on page 196)
2	⇨ Reboot the instrument (see "Rebooting the ONT-506 " on page 192) ! Reboot is unconditional essential in order to ensure proper operation of the ONT-506.

4.2 Important operating considerations

This section contains information to be considered in order to get the instrument working properly.

Included topics

- General
- Networking
- Java Web Start
- VNC
- Results

4.2.1 General

This section contains some general information.

- **Linux**
  We highly recommend not to change the Linux configuration (with exception of the steps described in the manual). The test set highly depends on correct internal configuration and may show unexpected behavior.
- **USB stick plugged during boot phase**
  A plugged USB stick may prevent the device from booting.
- **Load of user applications (SDH Bert, SONET Bert, classical MultiChannel)**
  The list of loadable user applications includes all applications previously stored, independent of the concrete type of hardware the application was running on at store time (e.g. the list of loadable user applications on a 2.5G board will contain user applications previously stored running the application on a 10G board).

  Selecting an application stored on a different type of hardware will cause errors during the load phase. No settings will be applied. The applications SDH Bert, SONET Bert and (classical) MultiChannel are affected.
- **Load/Store of sessions or applications during running measurements**
  In case of running measurements (all different types, including overhead capture) load/store of sessions or applications is not possible, or may lead to incompletely stored result data.

  ==> Please stop all running measurements before you save or load settings or results.
- **Load/Unload of Jitter applications (legacy jitter, not connected to a Module E)**
  In order to perform a Jitter / Wander measurement at bit rates up to 10.7G, two applications (one on the base module and one on the jitter module) have to be loaded. Please be careful to load those applications sequentially without any overlapping in time; loading in parallel may cause unpredictable problems. This has also to be considered during 'unload'.
- **Automated measurement sequences**
  Please be careful not to close the underlying application while an automated measurement sequence (RFC 2544, MTJ, MTW, ...) is running. Doing so may lead to severe software problems which can not be resolved without re-starting the system.

4.2.2 Networking

This section contains information related to networking.

- **Internal Ethernet**

This test set uses an internal Ethernet communication network (named eth1 interface). Changing any setting of this Ethernet interface will result in unexpected behavior of your ONT-5xx test set! Please do not modify any of the settings belonging to the eth1 interface (see "Networking" on page 163).

- **Firewall**
  Please do not modify any of the firewall settings of the test set as it may result in unexpected behavior of your test set!
- **DHCP Server**
  Please do not modify any of the DHCP server settings of the test set as it may result in unexpected behavior of your test set!
- **OSA**
  In case of running an OSA module in an ONT-5xx not connected to a network, the network configuration must be set to a static IP address. Switching to DHCP will lead to a not working OSA application.

4.2.3 Java Web Start

This section contains information related to the use of Java Web Start.

- **HTTP Proxy configuration**
  Choose 'None' or 'Manual'. If 'Manual' is selected, please enter HTTP Proxy and port **and** exclude your ONT-506's IP address or the subnet your ONT-506 is connected to.
  Example of syntax: 10.49.75.231, 10.49.*.
- **Remote operating one ONT-5xx from another ONT-5xx is not possible**
  Due to a bug in Java Web Start it is currently not possible to remote operate one ONT-5xx from another ONT-5xx using Java Web Start. In this case usage of VNC is recommended.
- **Java Web Start requires Java VM 1.6 or 1.7**
  Java 1.5 is no longer supported with the current release.
- **Clearing the Java Web Start cache**
  If settings of Java Web Start or communication settings of the ONT have been changed, JDSU recommends to clear Java Web Start's internal cache. In case of problems while operating Web Start (e.g. dialogs not showing up) clearing the cache may help.
- **Connection via NAT or VPN**
  It is not possible to use Java Web Start for remote operation if the ONT-506 is behind a NAT or VPN. In this case VNC has to be used. Ports 5830 and 5930 of the ONT-506 must be reachable.
- **Connection via Firewall**
  If the ONT-506 is located behind a firewall, the firewall must be opened for a number of communication ports (80, 5000, 12345, 23071-23082). The remote GUI additionally uses up to 5 ports beginning with 10000. The firewall has to be configured in a way that these additional ports are open in both directions.
- **Interruption of network connection**
  Interruption of the network connection between a remote GUI and the ONT-506 will impact other clients (time-outs may occur). Especially remote control scripts running in parallel will be affected. It is recommended to close all remote GUIs which are no longer necessary.

4.2.4 VNC

This section contains information related to the use of VNC.

- **HTTP Proxy configuration**
  Choose 'None' or 'Manual'. If 'Manual' is selected, please enter HTTP Proxy and port **and** exclude your ONT-506's IP address or the subnet your ONT-506 is connected to.

Example of syntax: 10.49.75.231, 10.49.*.

- **VNC viewer issues**
  When a remote VNC desktop shows the error message 'Malformed URL ...' or the desktop area is black, please log out using the **Log out ...** menu entry in panel menu. In **End session for 'ont'** dialog select **End current session**.

  The VNC connection is closed. After setting up a new VNC connection, the desktop will be shown as expected.

4.2.5 Results

This section contains information related to results (including reports).

- **Report creation during running measurements**
  In case of running measurements (all different types, including overhead capture) creating reports is not possible, or may lead to wrong or incomplete contents.
  ==> Please stop all running measurements before creating a report.
- **Firefox**
  Mozilla Firefox is the browser best suitable in order to view HTML reports generated by the ONT-506.
- **Event lists truncated**
  Due to internal limitations event lists may be truncated by the report generator. A 'truncated' mark will be shown.
- **Storing reports on the local hard disk (Windows)**
  Due to a known Windows bug the 'Store report' dialog does not allow to create sub-directories in 'My Documents'. Please use the Windows environment to create directory before storing the report.
- **Clearing of history results**
  Changing receiver settings will not automatically clear history results. They can be manually cleared by starting a new measurement.
- **Graphic views showing random data**
  When setups and results are stored (see "Saving an application" on page 76) and no measurement has been run since the application was opened (there are no results to store!), it is possible that graphic views show random data after loading of such a setup.
  ==> Toggle the measurement start/stop button to clear the graphic views.
- **Load/Store/Export of results containing a large amount of events**
  When storing/loading/exporting settings with results containing lots of events/alarms/service-disruptions, it may take several minutes until this operation is finished due to a data restructuring needed during this period of time.
  ==> Please allow the instrument to finish that operation before any settings can be changed.

5 Day to day operation

This section helps with standard tasks occurring during daily work.

Included topics

- Performing a measurement
- Creating a layered application
- Editing the configuration of a layered application
- Remote controlling the ONT-506

5.1 Performing a measurement

This section describes how to perform a measurement.

✓ You are familiar with the safety instructions.

✓ Initial setup has been carried out successfully.

Included topics

- Logging in (single-user mode)
- Getting a session context
- Configuring a session
- Configuring an application
- Starting a measurement
- Stopping a measurement
- Saving the configuration
- Creating a report and saving it locally

5.1.1 Logging in (single-user mode)

Use this procedure to log in (single-user mode).

Once the ONT-506 has been switched on and the software has been loaded, the ONT-506 user 'ont' is logged in automatically.

Note: To use another log in name (not the default 'ont') the GUI has to be started in multi-user mode (see "Starting an ONT-506 GUI in multi-user mode" on page 147).

5.1.2 Getting a session context

Use this procedure to get a session context.

A session is created automatically without further user interaction. Depending on session start-up mode (see "Selecting session start-up mode" on page 92) it will be a new one or the one last saved.

Note: In case of running a Java Web Start client the user has to select a session.

5.1.3 Configuring a session

Use this procedure to configure a session.

Session configuration tells which applications are running on which test modules/ports.

Step	Action
1	⇨ Select a port by selecting the button **Application...** of a test module/port. (see "Selecting a port" on page 94).
2	⇨ Perform one of the following tasks: • Load an application (see "Loading an application" on page 73) • Change an application (see "Changing an application" on page 74) • Unload an application (see "Closing an application" on page 78)
3	⇨ Go back to step 1 until the session configuration meets the demands.

5.1.4 Configuring an application

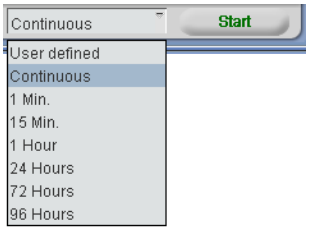
Use this procedure to configure an application.

Step	Action
1	⇨ Set the application parameters as required by the measurement task to be carried out. ! Please refer to the application specific user manual for further details.

5.1.5 Starting a measurement

Use this procedure to start an application level measurement.

Step	Action
1	⇨ Select page **Measurements**.
2	⇨ Select measurement GUI of the application to be started.
3	⇨ Set desired measurement time.

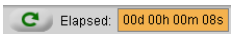


4	⇨ Select button **Start**.

The application is started.

5	*The elapsed time is displayed.*

Note: Layered applications allow to restart the measurement without stopping it.



5.1.6 Stopping a measurement

Use this procedure to stop an application level measurement.

Step	Action
1	⇨ Select page **Measurements**.
2	⇨ Select measurement GUI of the application to be stopped.
3	⇨ Select button **Stop**.

The application is stopped.

5.1.7 Saving the configuration

Use this procedure to save the complete session or single applications.

Saving settings makes measurements easily reproducible and helps to reduce setup effort next time. Loading a saved session or application later on will accurately restore the settings.

Whether to store the whole session or only parts of it depends on the specific circumstances.

Step	Action
1	⇨ Perform one of the following tasks: • Save one or more applications (see "Saving an application" on page 76) • Save the whole session (see "Saving a session" on page 86) • Save the whole session giving it a new name (see "Saving a session under a new name" on page 87)

5.1.8 Creating a report and saving it locally

Use this procedure to create a report for a completed measurement and save it locally.

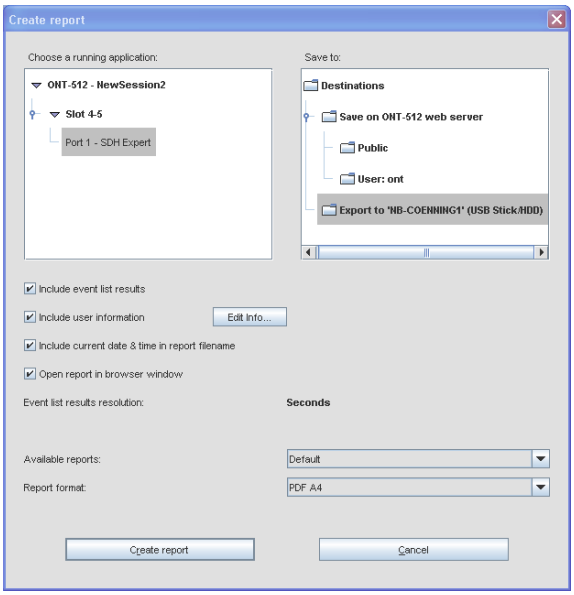
Note: 'Locally' means on your PC in case of remote operation via Web Start or on the built-in PC in case of local operation or VNC client.

Note: Due to internal constraints it may be necessary to truncate event lists. Depending on the output format the number of reported events is limited as follows:

- PDF: at most 500 per event list
- HTML: 5000
- CSV: 300000

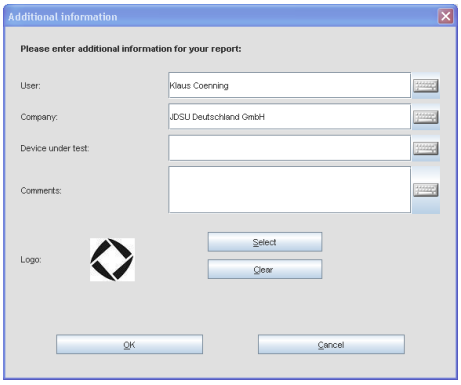
A warning ('Event list truncated after 500 entries') will be included in the report.

Step	Action
1	⇨ Select **Results > Create report...** from the main menu. *The **Create report** dialog opens.*



2	⇨ Select the application you want to create a report of from the left side tree-view.
3	⇨ Select **Export to '<PC name>' (USB Stick/HDD)** from the right side tree-view.
4	⇨ Check box **Include event list results** to include event list results.
5	⇨ Check box **Include current date & time in report filename** to attach date and time information to the filename (in order to generate unique filenames).
6	⇨ Uncheck box **Open report in browser window** to prevent browser from opening.
7	⇨ Check box **Include user Information** to include additional information. ⇨ Select button **Edit info ...** to edit user specific information. *The **Additional information** dialog opens.*

Step	Action



8 ⇨ Enter the additional information, select a logo (if desired) and select button **OK**

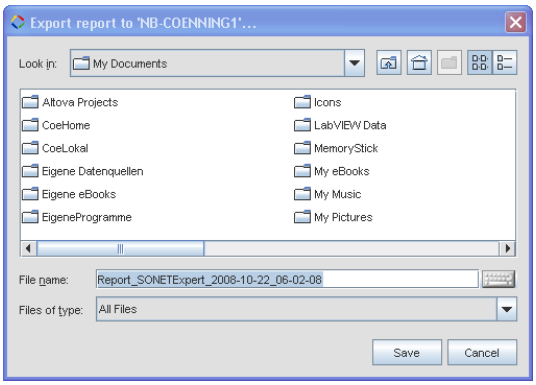
Note: The logo (saying the corresponding graphic file) has to be imported before being integrated in a report (see "Importing a logo" on page 100).

9 ⇨ Select a report filter from the **Available reports** list.

10 ⇨ Select an output format from the **Report format** list.

11 ⇨ Select button **Create report**.

*The **Export to '<PC name>'** dialog opens*

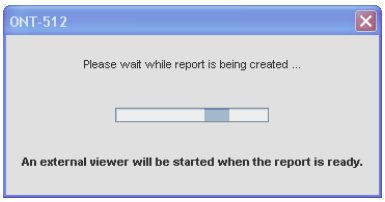


12 ⇨ Select the destination directory.

13 ⇨ Select entry field **File name** and enter / modify the file name.

14 ⇨ Select button **Save**.

The report is created.



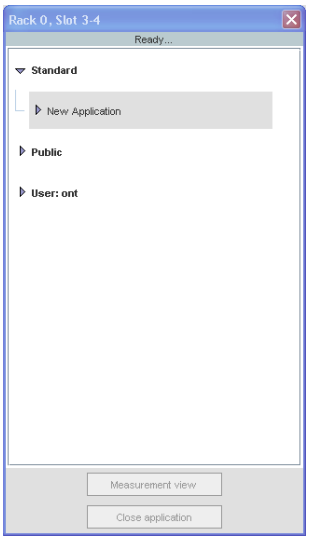
The dialogs are closed.

5.2 Creating a layered application

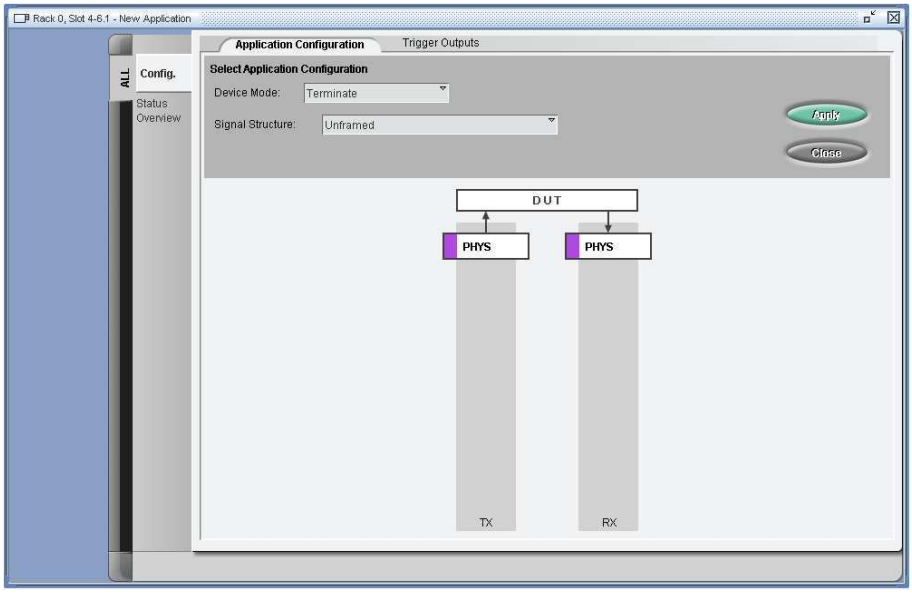
Use this procedure to create a layered application.

✓ A port has been selected by selecting the **Application...** button.

Step	Action
1	*A dialog opens showing all loadable applications for this port.*

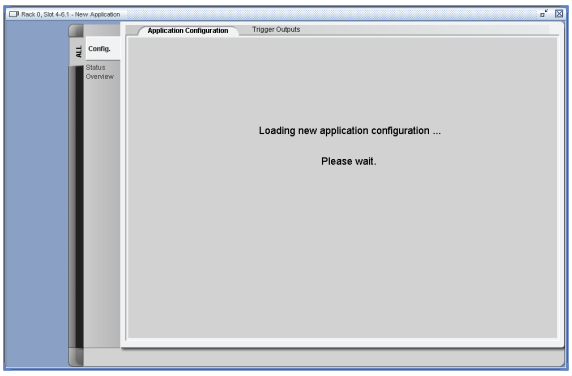


2	⇨ Select **New Application** *The background color of the **Application...** button changes to orange.* *The application starts loading.*
3	*The page **Measurements** opens and the user interface of the loaded application is displayed showing the **Application Configuration** page.*

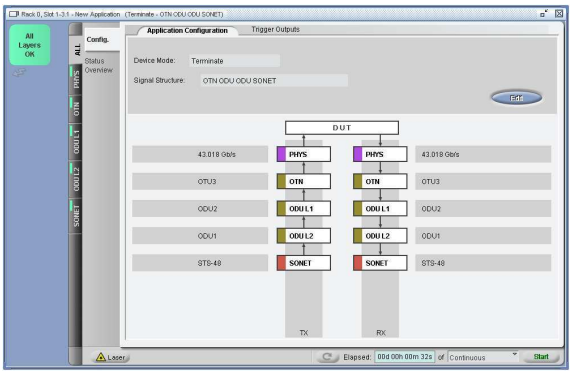


4	⇨ Select the desired **Device Mode** from the list.

Step	Action
5	⇨ Select the desired **Signal Structure** from the list.
6	⇨ Select button **Apply**. *The application configuration is changed.*



Step	Action
7	*The application shows the new configuration and is now ready to use.*

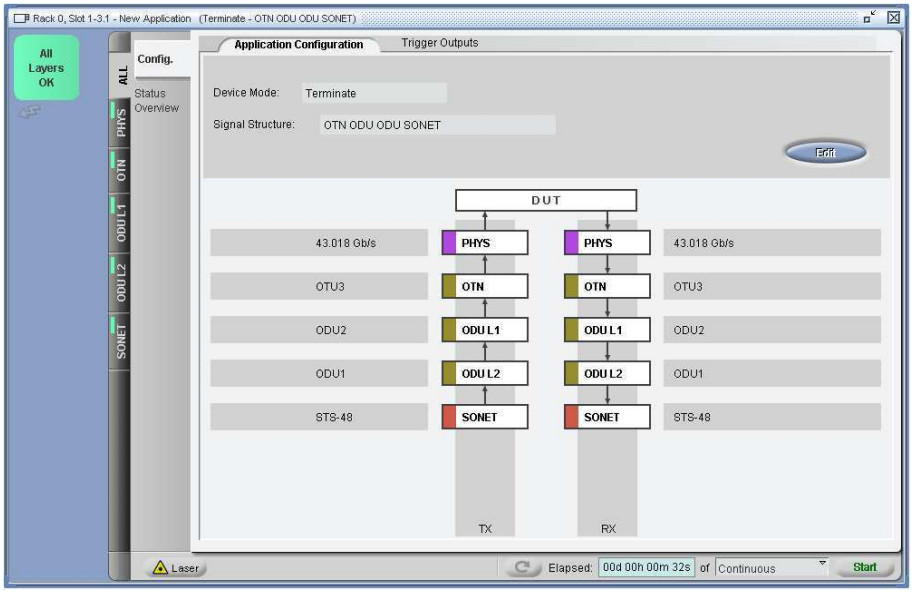


5.3 Editing the configuration of a layered application

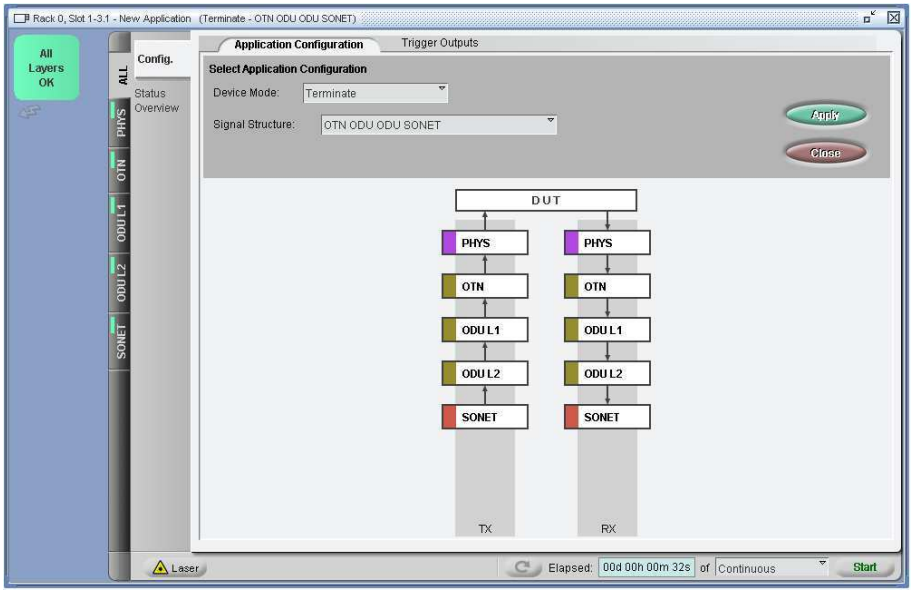
Use this procedure to edit the configuration of a layered application.

Step	Action
1	✓ A layered application has been loaded. ⇨ Select the **ALL** tab. *The **Application Configuration** page opens.*

Step	Action



2 ⇨ Select button **Edit**



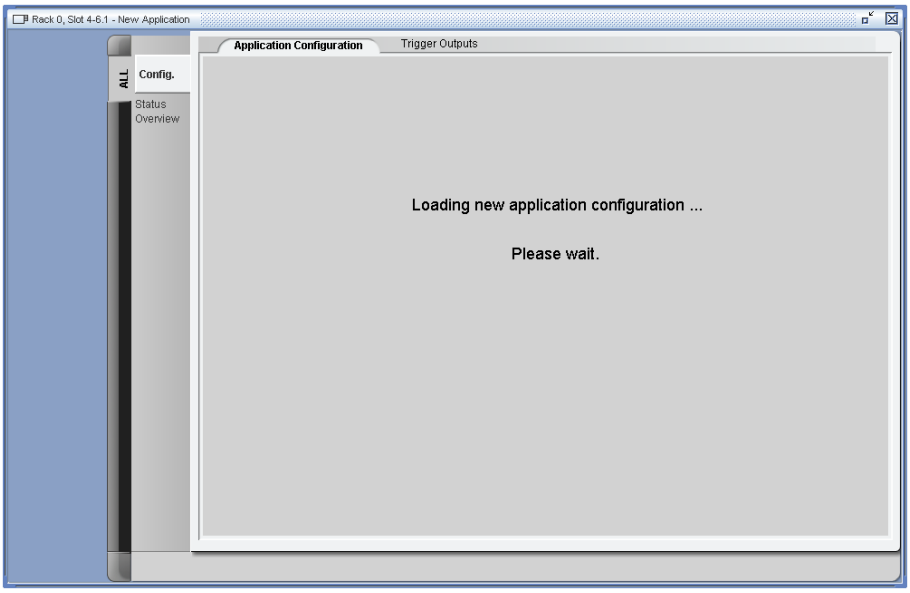
3 ⇨ Select the desired **Device Mode** from the list.

4 ⇨ Select the desired **Signal Structure** from the list.

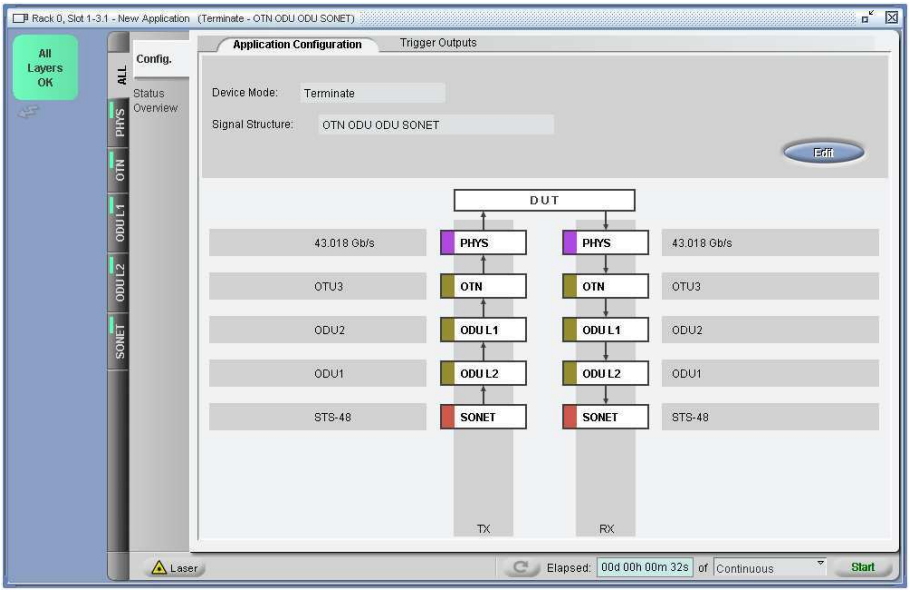
5 ⇨ Select button **Apply**.

The application configuration is changed.

Step	Action



6 *The application shows the new configuration and is now ready to use.*



5.4 Remote controlling the ONT-506

This section describes how to remote control the ONT-506.

✓ You are familiar with the safety instructions.

✓ Initial setup has been carried out successfully.

✓ The instrument has been connected to the network.

The complete documentation of the Remote Control can be found in the ONT-506 Remote Control Operating Manual, BN 3061/98.39.

6 Administration & Maintenance

This section helps with administration and maintenance tasks occurring during daily work.

Included topics

- Updating the software
- Installing a test module
- Preparing the pluggable optical connectors
- Preparing the optical connectors

6.1 Updating the software

Use this procedure to update the software

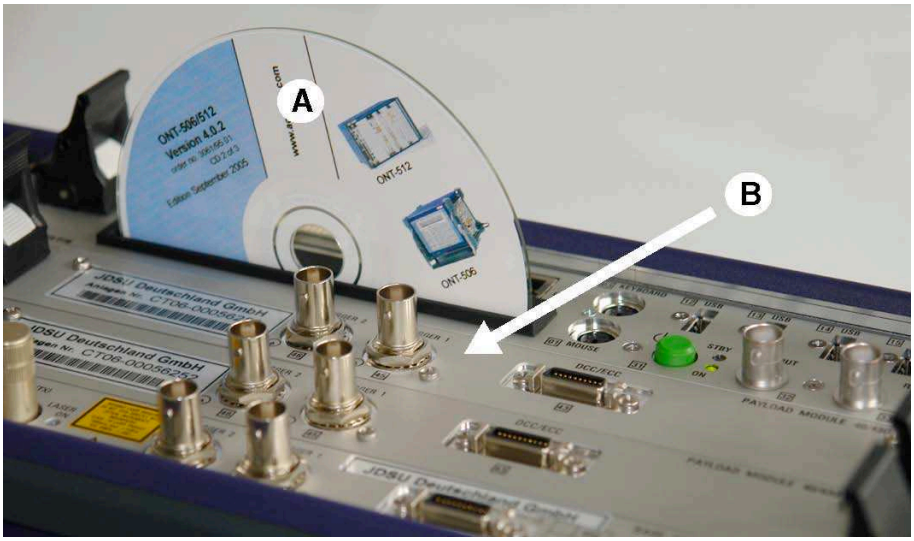
P7x

Step	Action
1	⇨ Insert USB stick. *The **Autorun** dialog opens.* 
2	⇨ Select **Yes** to confirm. *A new window opens.*
3	⇨ Enter Linux root password (default: 'acterna') *The installation is started and will take up to 10 minutes.*
4	⇨ Select **Enter** to reboot the system *The ONT-506 reboots to finalize the installation. After rebooting the ONT-506 software is started to finalize the software installation on the test modules. During this installation (appr. 15 minutes) the screen display of the modules turns to yellow.* ! Do not switch off the instrument as long as test modules are depicted with a dark yellow background. **Note:** The installation is finalized when the module names are visible. **Note:** The touch screen may need to be re-calibrated after installing software (see "Calibrating touch screen" on page 194).

P6A

Step	Action
1	⇨ Insert CD labeled "Software" (CD 1 of 2) into CD-ROM drive. The CD label (A) must point to the module (B).

Step	Action



*The **A data CD was found** dialog opens.*

2 ⇨ Select **YES** to confirm.

A new window opens, showing the CD contents.

3 ⇨ Select icon **Install** to start installation.

4 ⇨ Enter Linux root password (default: 'acterna')

The installation is started and will take up to 10 minutes. After installation the CD is ejected and can be removed.

5 ⇨ Select **Enter** to reboot the system

The ONT-506 reboots to finalize the installation. After rebooting the ONT-506 software is started to finalize the software installation on the test modules. During this installation (appr. 15 minutes) the screen display of the modules turns to yellow.

! Do not switch off the instrument as long as test modules are depicted with a dark yellow background.

Note: The installation is finalized when the module names are visible.

Note: The touch screen may need to be re-calibrated after installing software (see "Calibrating touch screen" on page 194).

Note: If you discover any issues after a software upgrade, please reboot the system (see "Rebooting the ONT-506 " on page 192).

6.2 Installing a test module

Use this procedure to install a test module

Note: Only JDSU test modules dedicated for use in the ONT-506 are allowed to be installed in and operated with the mainframe.

DANGER **High voltage**

AC line voltage, nominal range	110 V~ to 240 V~
Frequency	50 Hz or 60 Hz

⇨ Check building installation for sufficient power and fusing before connecting AC line cord to mains outlet.

⇨ Before opening the instrument, shutdown the system, switch it off at the main power switch. Disconnect it from all power sources.

! Simply switching to standby is insufficient.

⇨ Take care of electrostatic discharging
(see "Electrostatic discharge" on page 17)

The ONT-506 follows the safety concept of the IEC/EN 61010-1 by connecting the chassis with the protective earthing (PE) system of the power supply network (safety class 1 equipment).

The AC line cord supplied with the instrument has a protective earth conductor.

! The AC line plug must only be connected to AC line connectors equipped with a protective earth connection.

! The protective earth connection must not be broken.

CAUTION **No "hot swap" supported**

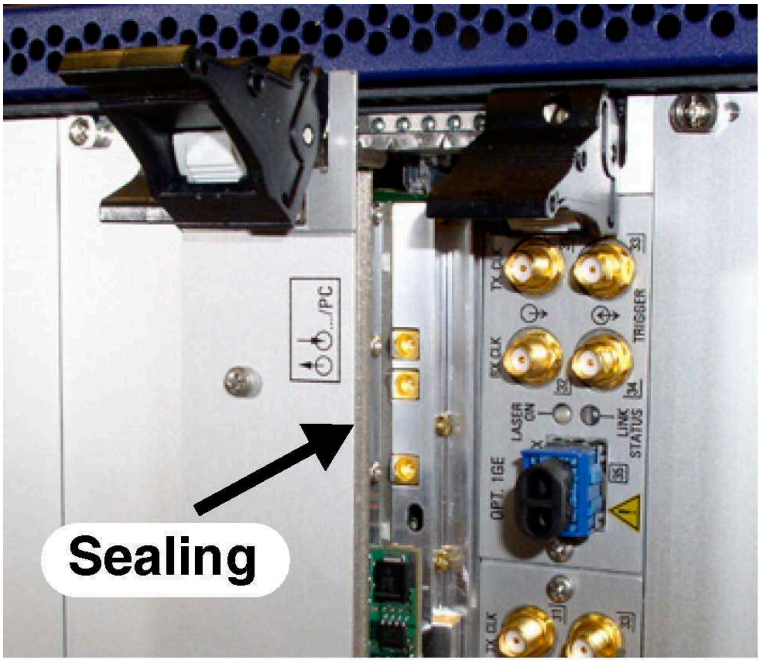
! In any case and before installing or removing test modules the ONT-506 must be switched of.

✓ The instrument is disconnected from all power sources.

✓ The latest software delivered with the module has been installed.

Step	Action
1	⇨ Determine a valid slot position For some test modules the position of the test module relative to the neighbored module(s) can be relevant, particularly if the neighbored modules are used within the same application.
2	⇨ Open the screws on top and bottom of the blind slot cover.
3	⇨ Screw until you hear a clicking noise.
4	⇨ Remove the cover by pulling it at the screws. **Note:** Hold cover tightly to avoid that it may fall inside the unit.
5	⇨ Take the new test module out of package, just holding it at the two holders.
6	⇨ First insert card at lower guide by tilting it a bit backwards, then insert it in upper guide. Push module into slot stopping appr. 5 cm before full insertion.

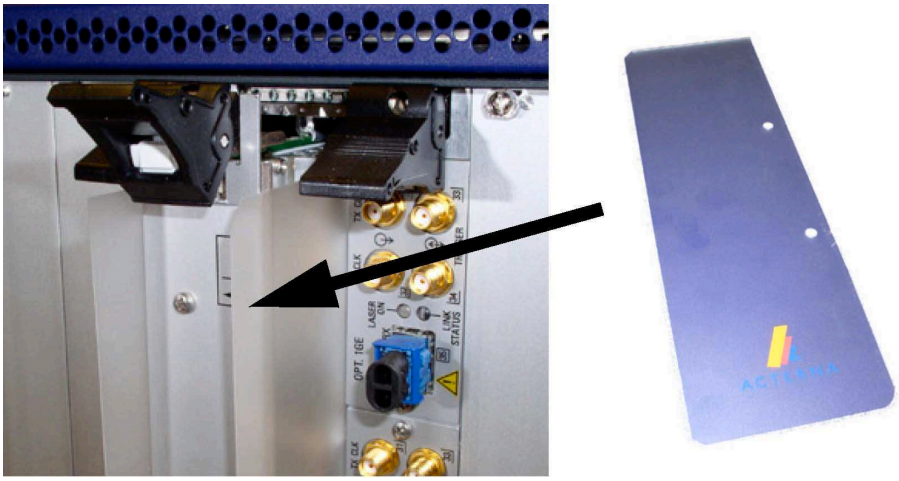
Step	Action



CAUTION **Damage of Module Sealings**

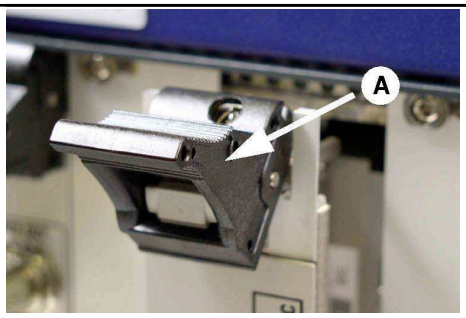
The modules are fitted with special sealings at the front edges to protect the module and other electronic equipment from electromagnetic influences. These sealings may be damaged when assembling the module without using the plastic strips delivered with the module.

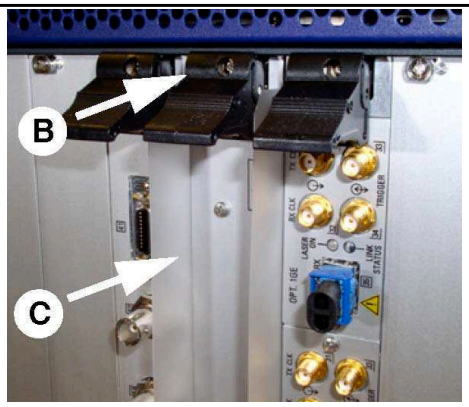
7 ⇨ Insert the two plastic strips (delivered with your module) to both sides of the module and allow the ends to overlap for appr. 2 cm.



8 ⇨ Take care that both holders are brought to their maximum upper and lower position (A). Insert module fully until holders lock (B). Pay attention to the strips still overlap the module for appr. 2 cm (C).

Step	Action





9 ⇨ Slowly pull both strips out of the slot. Due to the tight closing sealings this may need some force.

10 ⇨ Tighten screws of both holders.

6.3 Preparing the pluggable optical connectors

Use this procedure to prepare the pluggable optical connectors.

ONT-506 test modules permit XFP, QSFP, SFP, and CFP ports. JDSU supplies these components that have been tested with the ONT-506 to operate within the full range of line rates available.

Note: Carefully keep all of the protective covers supplied.

Step	Action
1	⇨ Remove the protective plastic cover over the port casing, and keep it in a safe place for future use.
2	⇨ Insert the applicable pluggable optical connector required for your test. The latch handle should be at the top and the "finger connectors" at the back should be on the bottom.
3	⇨ To remove a pluggable optical connector, pull the latch at the top of the device, and the pluggable optical connector will be released from the housing.
4	⇨ Replace the protective plastic cover on any unused ports to prevent dust from entering, and to ensure proper cooling of the unit.

6.4 Preparing the optical connectors

Use this procedure to prepare the optical connectors.

Series BN 2060/00.xx test adapters with sprung housings (from our range of accessories for SDH, SONET and OTN) are used to match the test modules to the test interfaces (plug connectors or bare fibers). At least one test adapter is included with the instrument. All common types of plug connector can be connected to the standard sockets on the optical inputs and outputs of the test modules.

Note: Carefully keep all of the protective covers supplied.

Step	Action
1	⇨ Unscrew the metal protective cover and keep it in a safe place.
2	⇨ Remove any plastic sleeving from the plug pin.
3	⇨ Dab the end surface of the fiber in the optical connector with cleaning tape.
4	⇨ Remove the test adapter from its packing. Store any protective covers in a safe place.
5	⇨ If necessary, blow out the test adapter using clean compressed air.
6	⇨ Fit the test adapter and turn the inner part until the anti-twist lock clicks into place.
7	⇨ Screw down the outer part (sleeve).
8	⇨ Fit the protective cover to the test adapter.

CAUTION Damage to optical inputs and outputs

! Make sure that the connectors are not angled by more than 10°.

! Make sure that the lug on the connector is located precisely in the notch in the test adapter before screwing up the cable fastening.

9	⇨ Loosen the sleeve nut and remove the test adapter.
10	⇨ Pack the test adapter away (with its protective covers if possible) in a clean place, if it is no longer required.
11	⇨ Screw the metal protective covers over the optical connectors, if the ONT-506 is to be transported or stored without its test adapters.

7 References

This section contains the reference part of this manual. The topics are grouped by GUI pages and by category.

Included topics

- GUI client
- Layered application
- Linux system level functions
- Mainframe & hardware
- ONT-5xx General Information and Test Tool

7.1 GUI client

This section describes the GUI client.

Included topics

- Common GUI controls
- Main menu
- Session configuration page
- Session status page
- Measurements page
- Main clock settings page
- Application handling
- Session handling
- Port handling
- Results
- Tools
- Date and time
- ONT-5xx users
- Option handling
- Networking
- Device configuration

7.1.1 Common GUI controls

This section references GUI controls widely-used.

Included topics

- Soft keyboard
- Shortcut to Measurement view

7.1.1.1 Soft keyboard

This section describes the soft keyboard

Most of the dialogs offer a soft keyboard in order to allow for information entry while using a touch screen.

Step	Action
1	⇨ Select the soft keyboard symbol. 
2	*The soft keyboard opens.* 
3	⇨ Enter information by selecting the buttons.
4	⇨ Select button **OK**.

7.1.1.2 Shortcut to Measurement view

This section describes a shortcut to get to the measurement view of an application

The shortcut is available at the **Session configuration** and **Session status** page for all ports.

Step	Action
1	⇨ Select the measurement view symbol.

Step	Action
	
2	*The software switches to the **Measurements** page and brings the application specific measurement view to the front.*

7.1.2 Main menu

This section references the functions accessible via the main menu.

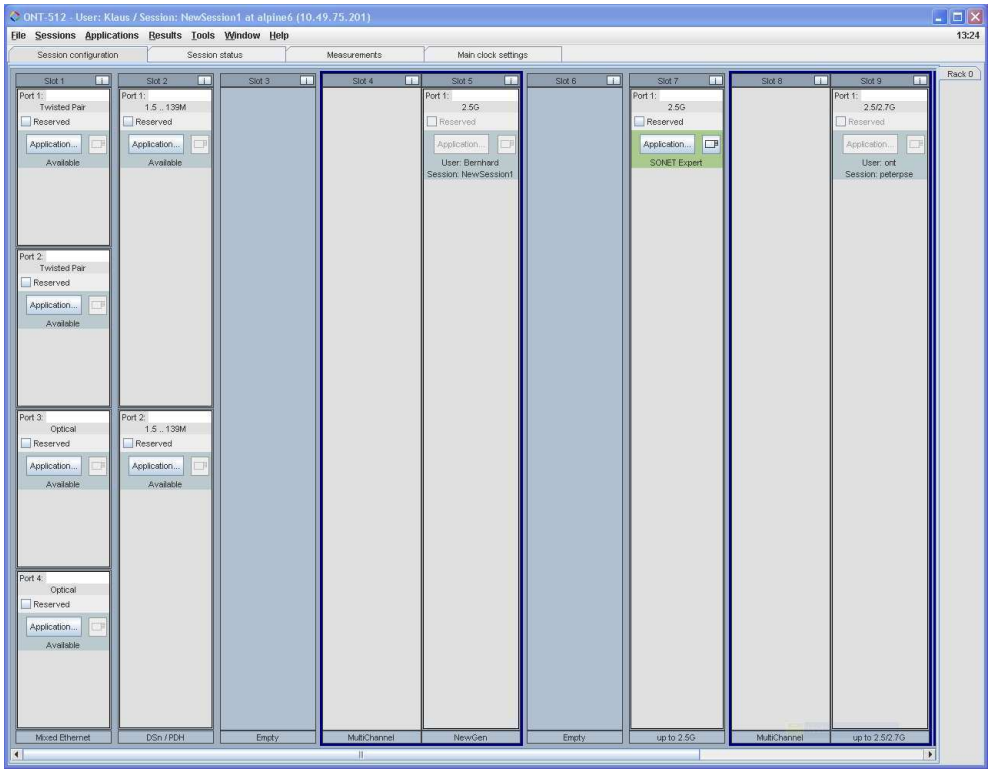
Menu entry	Description
File	
Exit	Use this procedure to close a running session. (see "Closing a session" on page 87)
Sessions	
Save	Use this procedure to save a session. (see "Saving a session" on page 86)
Save as...	Use this procedure to save a session under a new name. (see "Saving a session under a new name" on page 87)
Change...	Use this procedure to change the current session. The session actually running is closed and another one will be opened. (see "Changing the current session" on page 86)
Close...	Use this procedure to close a running session. (see "Closing a session" on page 87)
Manage sessions...	Deleting sessions (see "Deleting saved sessions" on page 88) Rename a session (see "Renaming a session" on page 89) Setting session start-up mode (see "Selecting session start-up mode" on page 92)
Applications	
Save	Use this procedure to save settings (and results) of a running application. (see "Saving an application" on page 76)
Export	Use this procedure to export applications. (see "Exporting applications" on page 80)
Import	Use this procedure to import an application (see "Importing applications" on page 82)

Menu entry	Description
Manage applications...	Deleting applications. (see "Deleting saved applications" on page 83) Renaming applications. (see "Renaming saved applications" on page 84)
Results	
Create report...	Use this procedures to create a report. (see "Creating a report and saving it locally" on page 96) (see "Creating a report and saving it on the ONT-5xx Web Server" on page 98)
Manage reports...	Viewing reports (see "Viewing a report" on page 102) Deleting reports (see "Deleting a report" on page 102)
Manage logos...	Importing logos (see "Importing a logo" on page 100) Deleting logos (see "Deleting a logo" on page 101)
Manage captured data...	Managing captured data (see "Managing captured data" on page 103)
Tools	
Print screenshot...	Use this procedure to make a screenshot and print it. (see "Printing a screenshot" on page 105)
Make screenshot...	Use this procedure to make a screenshot and save it to a file. (see "Making a screenshot and saving it to a file" on page 106)
Lock touch screen	Use this procedure to lock the touch screen of the ONT-506. (see "Locking touch screen" on page 195)
Calibrate touch screen...	Use this procedure to calibrate the touch screen of the ONT-506. (see "Calibrating touch screen" on page 194)
Pop-up error log on error	Defines whether the error log pops up on error or not.
Manage users...	Adding users (see "Adding an ONT-506 user" on page 117) Deleting users (see "Deleting an ONT-506 user" on page 118)
Change password...	Use this procedure to change the password of the ONT-506 user. (see "Changing the ONT-506 user password" on page 119)
Manage options...	Adding options (see "Adding an option" on page 121)

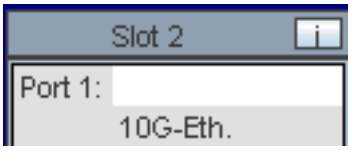
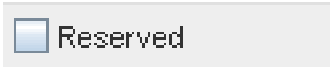
Menu entry	Description
	Removing options (see "Removing an option" on page 123)
Set date/time...	Use this procedure to set date and time of an ONT-506. (see "Setting date and time of an ONT-506 " on page 111)
Configure NTP...	Use this procedure to synchronize date and time of an ONT-506 with a NTP server. (see "Using a NTP server" on page 113)
View NTP log...	Use this procedure to check the NTP log file. (see "Viewing the NTP log file" on page 114)
View connections statistics...	Use this procedure to show the connection statistics. (see "Showing connection statistics" on page 108)
View active clients...	Use this procedure to list all clients connected to the ONT-506. (see "Showing active clients" on page 109)
IP address...	Use this procedure to activate DHCP or for setting a static IP address. DHCP (see "Provisioning LAN access using DHCP" on page 126) Static IP address (see "Provisioning LAN access using a static IP address" on page 128)
Check configuration...	Use this procedure to check the configuration of an ONT-506. (see "Checking device configuration" on page 131)
Restart ONT-5xx...	Use this procedure to restart the ONT-506 software. (see "Restarting the ONT-506 software" on page 107)
Window	
Error Log...	Lets the error log open and brings it to the front.
<application>	Short-cut in order to bring the measurement window of the selected application to the front.
Help	
About...	Use this procedure to get information about the software release currently installed. (see "Getting information about the ONT-506 software release" on page 108)
Configuration info...	Use this procedure to get information regarding the configuration of an ONT-506. (see "Getting information regarding device configuration" on page 130)

7.1.3 Session configuration page

This page gives an overview, which modules are installed and allows to configure the session.



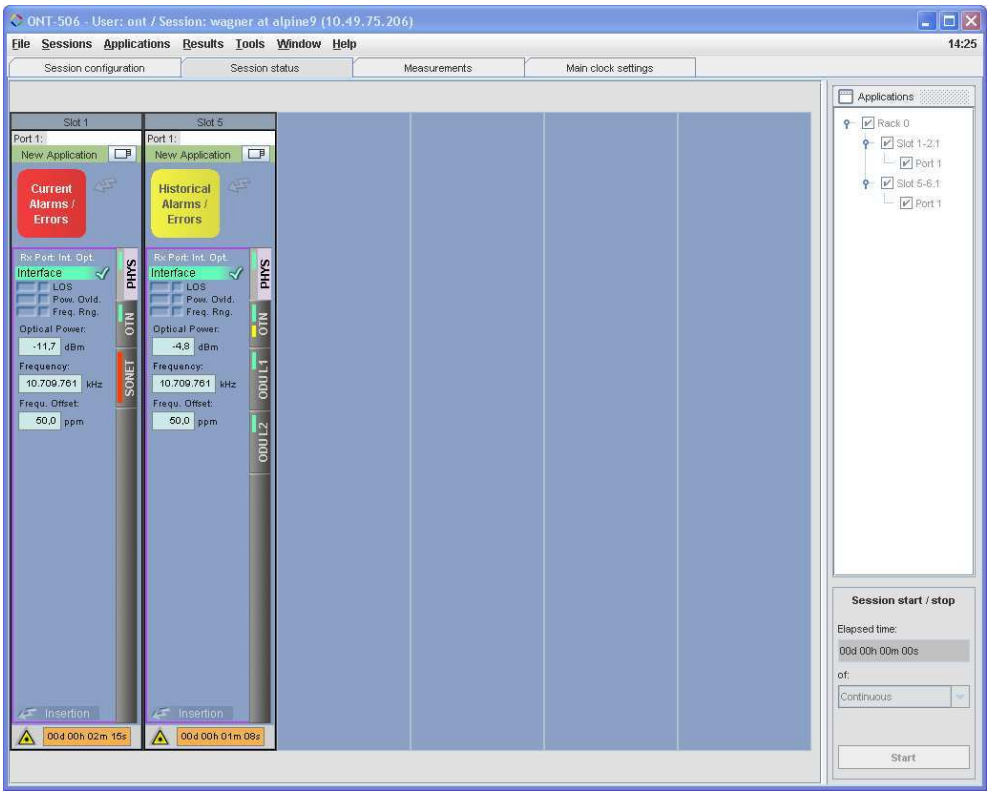
For each test module offers 1 to n ports, the complete view is divided into particular views for each port.

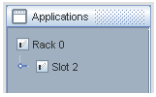
GUI control	Description
Port <number> 	Use this procedure to name a port in order to ease handling. (see "Naming a port" on page 93)
Reserved 	A port can be locked by a user. (see "Port lock" on page 94)
Application... 	Load an application (see "Loading an application" on page 73) Change an application (see "Changing an application" on page 74) Unload an application (see "Closing an application" on page 78)
	This section describes a shortcut to get to the measurement view of an application (see "Shortcut to Measurement view" on page 64)

GUI control	Description

7.1.4 Session status page

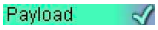
This page shows a condensed overview of all events of all applications belonging to one user session.



GUI control	Description
	This section describes a shortcut to get to the measurement view of an application (see "Shortcut to Measurement view" on page 64)
Applications 	Use this procedure to exclude applications from a session measurement. (see "Configuring a session measurement" on page 91)

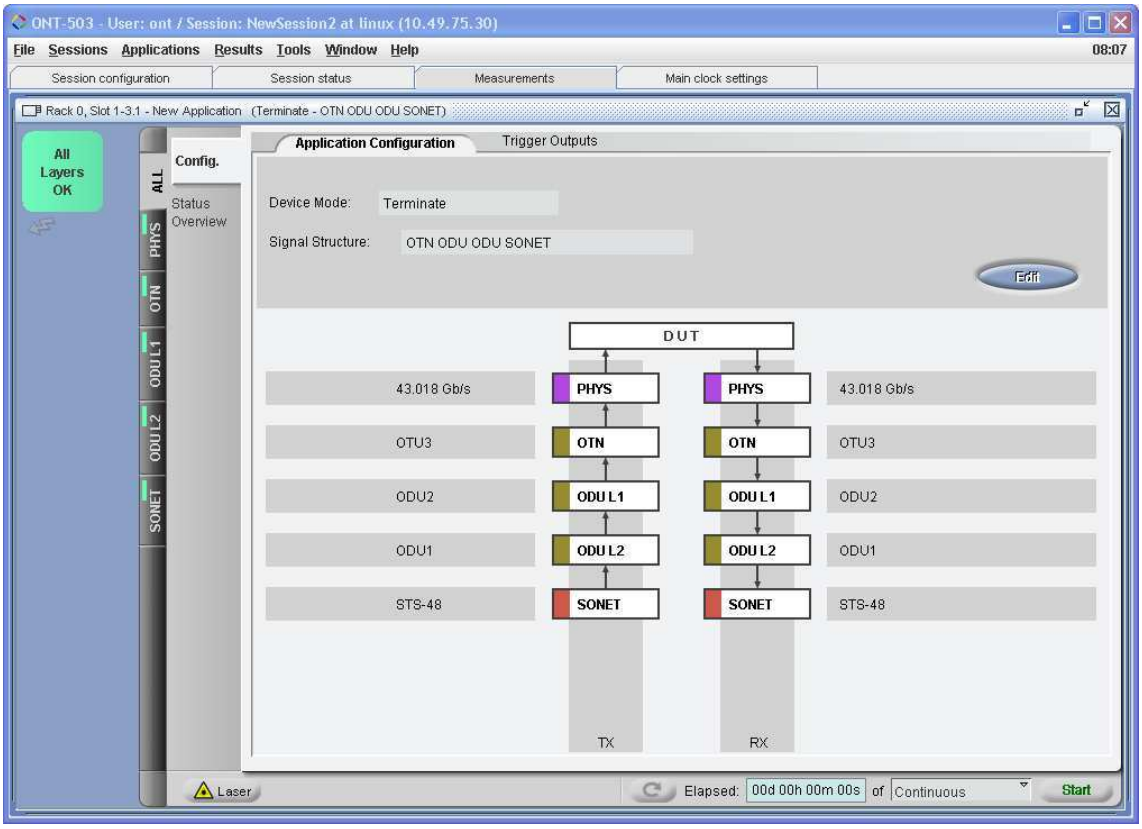
The overview contains LEDs and in some applications input power and frequency offset additionally. The following symbols are used:

Element	Description
	Empty box: No event has occurred currently
	Red triangle: An event is present (Fail state)

	Green box: Indicates currently an OK status of the element.
	Empty square: The event has not occurred since the last measurement start.
	Yellow square: The event has occurred at least once since the last Start of the measurement (Fail state).
	No alarms or errors are active at the moment.
	At least one alarm or error is active at the moment.
	Orange arrow: Alarm/error insertion is on.
	Blank arrow: Alarm/error insertion is off.
	Orange arrow and box: An alarm/error is actually inserted.
	Blank arrow and box: No alarm/error is actually inserted.

7.1.5 Measurements page

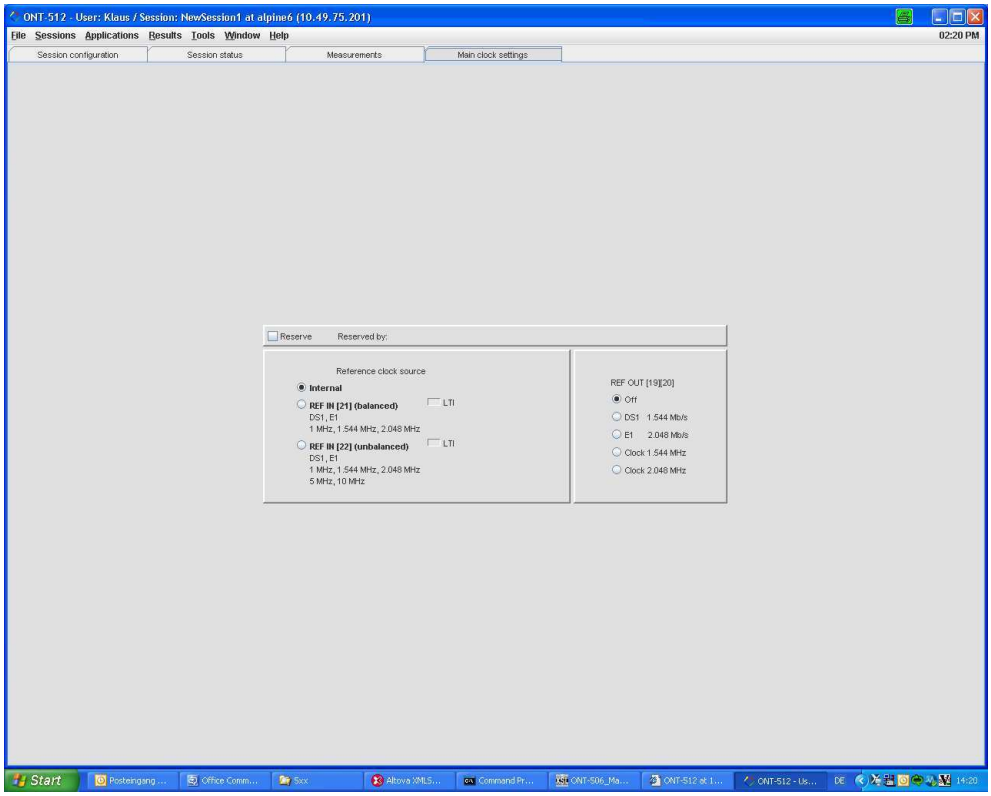
In the Measurements page one can set parameters of each selected application, start/stop the measurement individually and look at the results.



For further information about the settings please refer to the operating manual of the specific application.

7.1.6 Main clock settings page

This page allows to setup the clock module.



GUI control	Description
Reserve	Clock module can be reserved (locked) by a user. (see "Clock module reservation" on page 204)
Reference Clock Source	Reference Clock Source. (see "Reference Clock Source" on page 203)
REF OUT [19][20]	REF OUT [19][20]. (see "REF OUT [19][20]" on page 203)
LTI	Display of a clock error. (see "Display of a clock error" on page 204)

7.1.7 Application handling

This section describes the application handling using a GUI client.

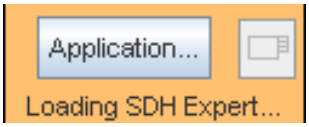
Included topics

- Loading an application
- Changing an application
- Configuring an application
- Saving an application
- Starting a measurement
- Stopping a measurement
- Closing an application
- Exporting applications
- Importing applications
- Deleting saved applications
- Renaming saved applications

7.1.7.1 Loading an application

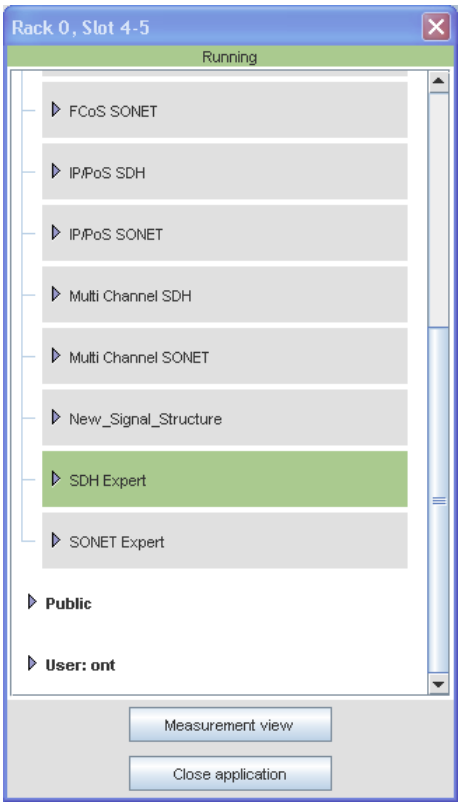
Use this procedure to load an application.

Step	Action
1	✓ A port has been selected by selecting the **Application...** button. *A dialog opens showing all loadable applications for this port.*
2	⇨ Select the application category (Standard, Public or User)

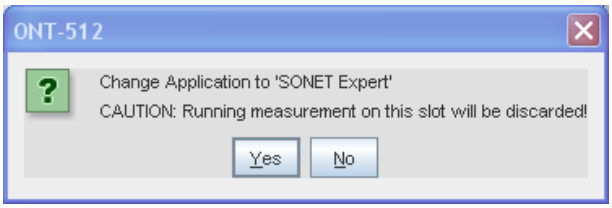
Step	Action
	(see "Application" on page 27). *All loadable applications of the selected category are listed.*
3	⇨ Select the desired application from the list. *The background color of the **Application...** button changes to orange.* *The application starts loading.* 
4	*The page **Measurements** opens and the user interface of the loaded application is displayed.*

7.1.7.2 Changing an application

Use this procedure to switch between applications.

Step	Action
1	✓ A port has been selected by selecting the **Application...** button. *A dialog opens showing all loadable applications for this port.* 
2	⇨ Select the application category (Standard, Public or User)

Step	Action
	(see "Application" on page 27).
	All loadable applications of the selected category are listed.
3	⇨ Select the desired application from the list.
	A confirmation dialog opens.



4	⇨ Select button **Yes**.
	The loaded application gets unloaded, the desired application starts loading.
	*The background color of the **Application...** button changes to orange.*
	*The page **Measurements** opens and the user interface of the loaded application is displayed.*

7.1.7.3 Configuring an application

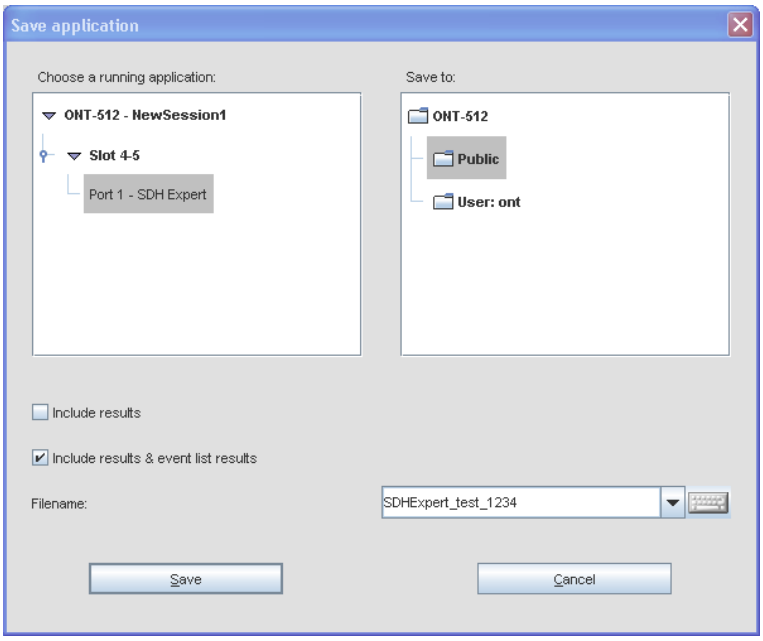
Use this procedure to configure an application.

Step	Action
1	⇨ Set the application parameters as required by the measurement task to be carried out.
	! Please refer to the application specific user manual for further details.

7.1.7.4 Saving an application

Use this procedure to save settings (and results) of a running application.

Step	Action
1	⇨ Select **Applications > Save...** from the main menu. *The **Save application** dialog opens.*

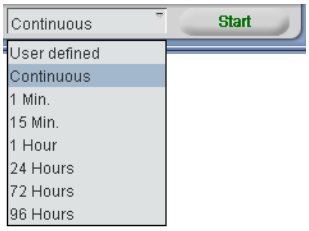


2	⇨ Select the application you want to save in the left tree-view.
3	⇨ In the right tree-view select whether the saved data shall be **Public** (available for all ONT users) or **User** specific.
4	⇨ Check box **Include results** to save summarized results only.
5	⇨ Check box **Include results & event list results** to save all results.
6	⇨ Select field **Filename** and enter a name for the set of data to be saved.
7	⇨ Select button **Save**. *Settings (and results) are saved.*

7.1.7.5 Starting a measurement

Use this procedure to start an application level measurement.

Step	Action
1	⇨ Select page **Measurements**.
2	⇨ Select measurement GUI of the application to be started.
3	⇨ Set desired measurement time.

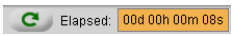


4	⇨ Select button **Start**.

The application is started.

5	*The elapsed time is displayed.*

Note: Layered applications allow to restart the measurement without stopping it.



7.1.7.6 Stopping a measurement

Use this procedure to stop an application level measurement.

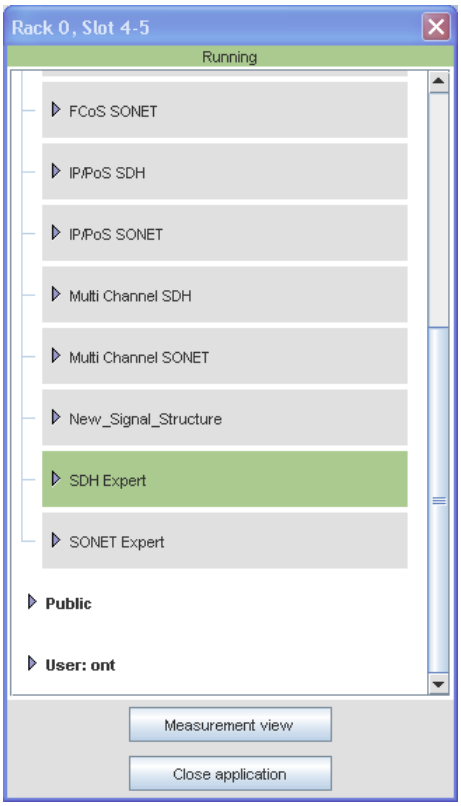
Step	Action
1	⇨ Select page **Measurements**.
2	⇨ Select measurement GUI of the application to be stopped.
3	⇨ Select button **Stop**.

The application is stopped.

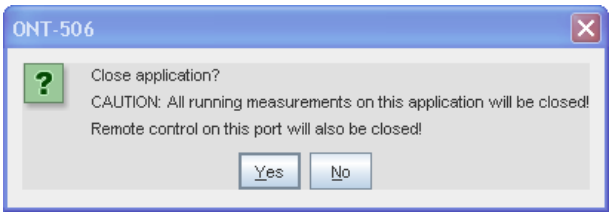
7.1.7.7 Closing an application

Use this procedure to close / unload an application.

Step	Action
1	✓ A port has been selected by selecting the **Application...** button. *A dialog opens showing all loadable applications for this port.*

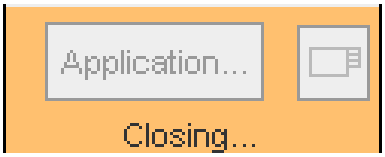


2	⇨ Select button **Close application**. *A confirmation dialog opens.*



3	⇨ Select button **Yes**. *The background color of the **Application** button changes to orange.*

Step	Action



The active application is closed.

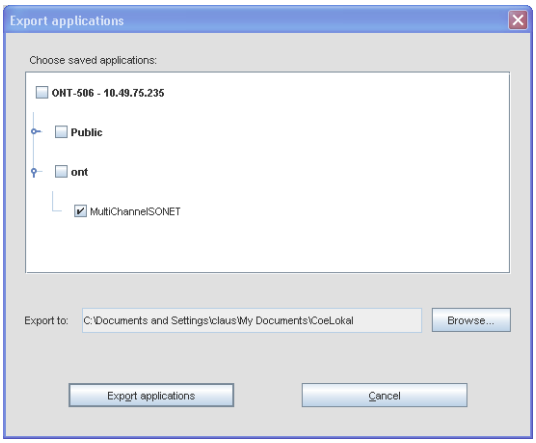
*The background color of the **Application** button changes to gray.*

7.1.7.8 Exporting applications

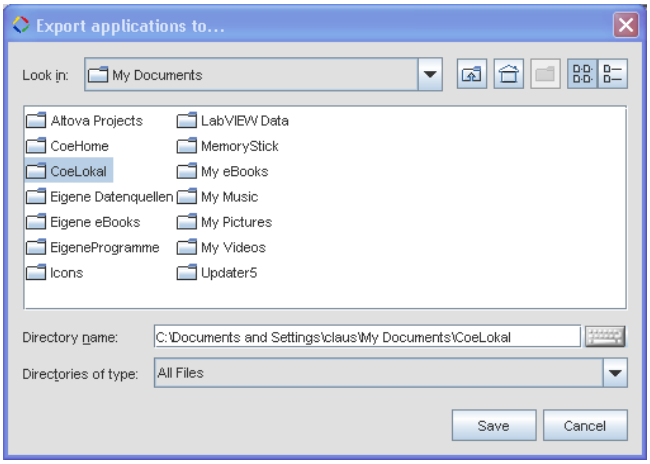
Use this procedure to export applications.

Exchanging applications between mainframes is required in order to harmonize test procedures. 'Export' allows to extract an internal representation of a previously saved application (together with its settings and results) from the database and save it to a file. 'Import' (see "Importing applications" on page 82) works vice versa.

Step	Action
1	⇨ Select **Applications > Export...** from the main menu. *The **Export applications** dialog opens.* ⇨ Check one or more applications or a complete directory.



2	⇨ Select button **Browse...** in order to select the target destination. *The **Export applications to...** dialog opens.*



3	⇨ Select desired destination directory.
4	⇨ Select button **Select**. *The dialog disappears.*

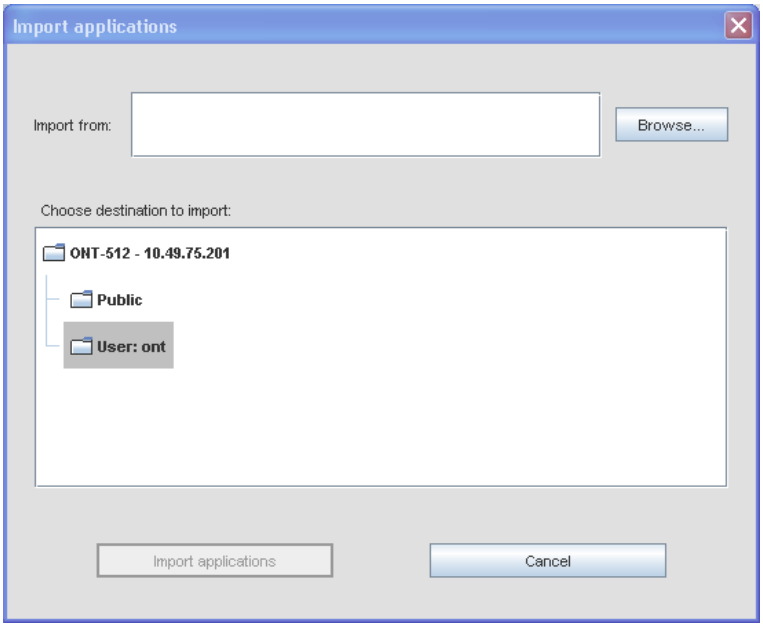
Step	Action
5	⇨ Select button **Export applications**. *The selected applications are exported to files in the destination directory (ZIP format, file extension '.zip').* *The **Export applications to...** dialog disappears.*

7.1.7.9 Importing applications

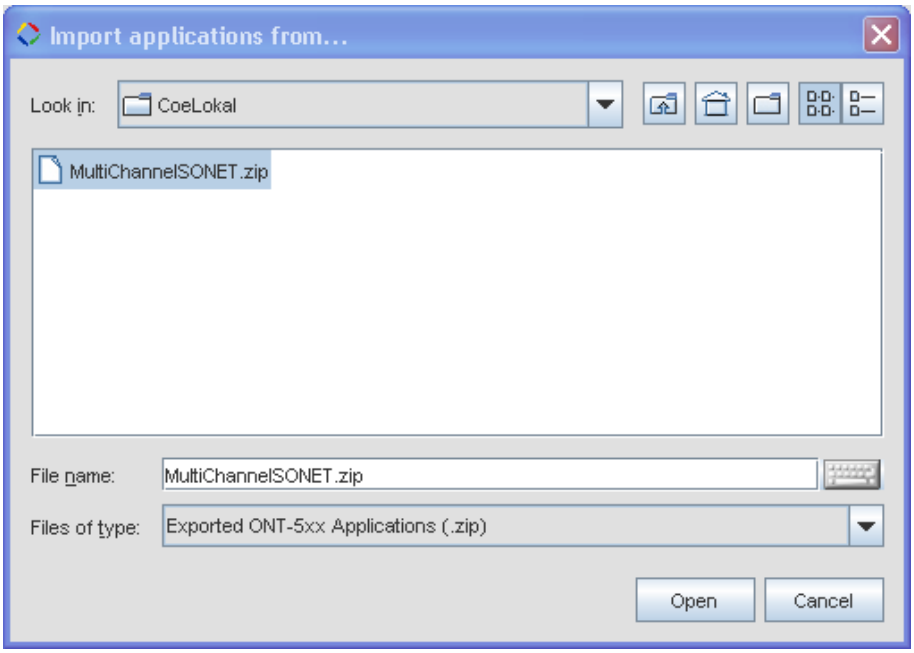
Use this procedure to import an application

'Import' reads an internal representation of an application previously exported (see "Exporting applications" on page 80) from a file (ZIP format, file extension '.zip') and store it in the local database.

Step	Action
1	⇨ Select **Applications > Import...** from the main menu. *The **Import applications...** dialog opens.*



2	⇨ Select button **Browse...** in order to select applications to be imported. *The **Import applications from...** dialog opens.*

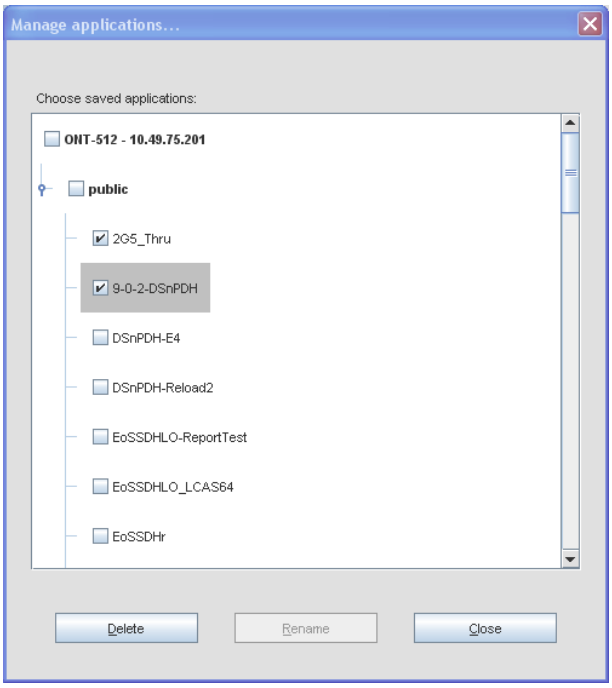


Step	Action
3	⇨ Browse to the directory containing the applications to be imported.
4	⇨ Select the applications to be imported (file extension '.zip'). **Note:** Only applications previously exported can be imported.
5	⇨ Select button **Select**. *The dialog disappears.*
6	⇨ Select button **Import applications**. *The selected applications are imported into the local database.*

7.1.7.10 Deleting saved applications

Use this procedure to delete saved applications from the database.

Step	Action
1	⇨ Select **Applications > Manage applications...** from the main menu. *The **Manage applications...** dialog opens.*
2	⇨ Check one or more applications or the complete directory.

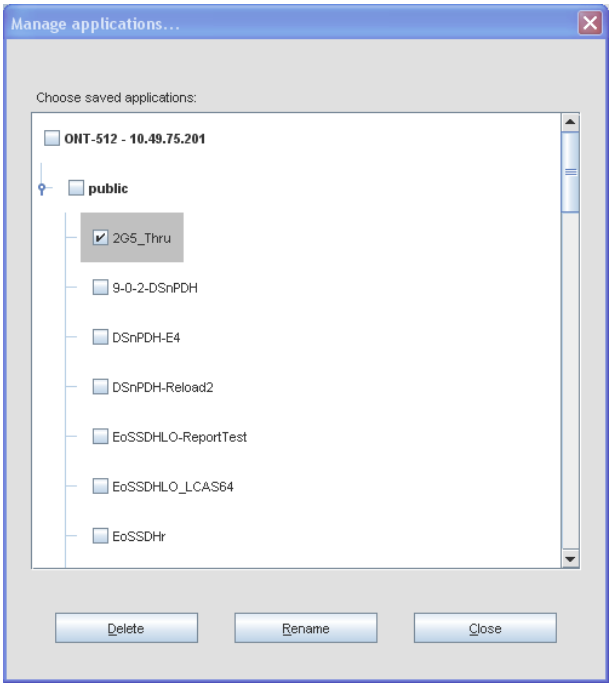


3	⇨ Select button **Delete**. *The selected applications are deleted from the database.*

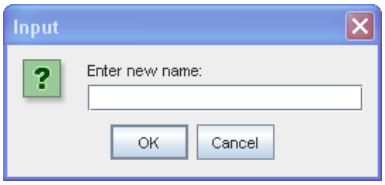
7.1.7.11 Renaming saved applications

Use this procedure to rename saved applications.

Step	Action
1	⇨ Select **Applications > Manage applications...** from the main menu. *The **Manage applications...** dialog opens.*
2	⇨ Check one application.



3	⇨ Select button **Rename**. *The **Input** dialog opens.*



4	⇨ Enter the new application name.
5	⇨ Select button **OK**. *The selected applications is renamed.*

7.1.8 Session handling

This section describes the session handling using a GUI client.

Included topics

- Getting a session context
- Configuring a session
- Changing the current session
- Saving a session
- Saving a session under a new name
- Closing a session
- Closing a GUI client
- Deleting saved sessions
- Renaming a session
- Starting a session measurement
- Configuring a session measurement
- Stopping a session measurement
- Selecting session start-up mode

7.1.8.1 Getting a session context

Use this procedure to get a session context.

A session is created automatically without further user interaction. Depending on session start-up mode (see "Selecting session start-up mode" on page 92) it will be a new one or the one last saved.

Note: In case of running a Java Web Start client the user has to select a session.

7.1.8.2 Configuring a session

Use this procedure to configure a session.

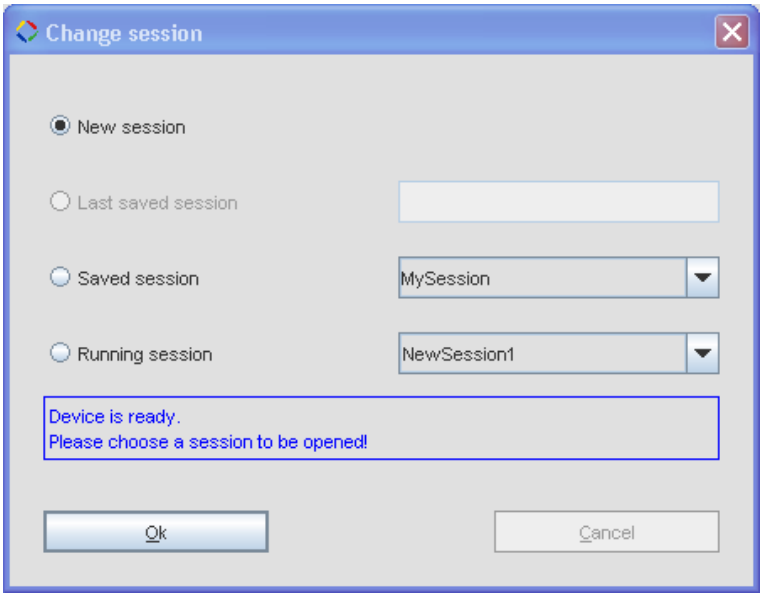
Session configuration tells which applications are running on which test modules/ports.

Step	Action
1	⇨ Select a port by selecting the button **Application...** of a test module/port. (see "Selecting a port" on page 94).
2	⇨ Perform one of the following tasks: • Load an application (see "Loading an application" on page 73) • Change an application (see "Changing an application" on page 74) • Unload an application (see "Closing an application" on page 78)
3	⇨ Go back to step 1 until the session configuration meets the demands.

7.1.8.3 Changing the current session

Use this procedure to change the current session. The session actually running is closed and another one will be opened.

Step	Action
1	⇨ Select **Session > Change** from the main menu. *A confirmation dialog opens.*
2	⇨ Select **Yes**. *The actually running session is closed.* *The **Change session** dialog opens.*



The dialog offers the following options:

- **New session** opens a new session.
- **Last saved session** opens the last saved session.
- **Selected saved session** opens one out of all saved sessions.
- **Selected running session** connects to an already running session.

3	⇨ Select an option (and a session if required)
4	*All the applications being saved as part of the session are loaded.* **Note:** In case of a new session, no applications are loaded.

7.1.8.4 Saving a session

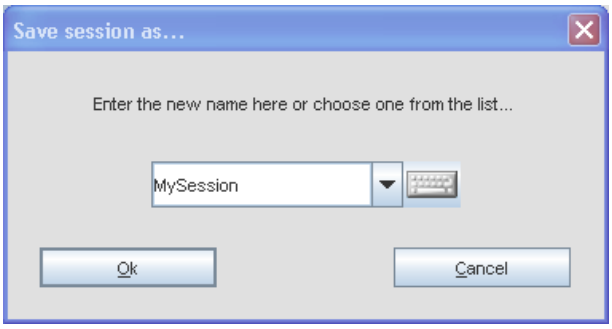
Use this procedure to save a session.

Step	Action
1	⇨ Select **Session > Save** from the main menu. *The actual session is saved using the current name.*

7.1.8.5 Saving a session under a new name

Use this procedure to save a session under a new name.

Step	Action
1	⇨ Select **Session > Save as...** from the main menu. *The **Save session as...** dialog opens.*

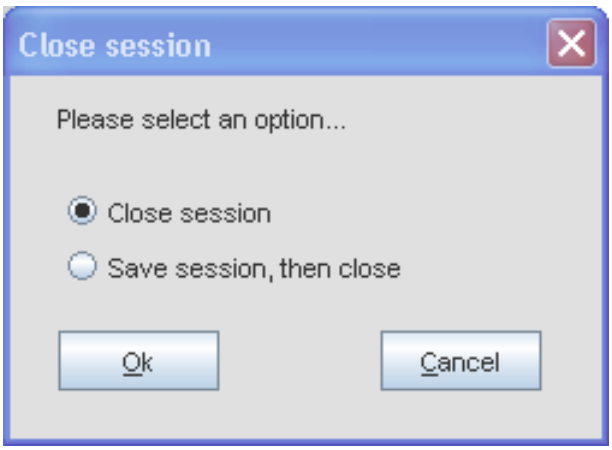


2	⇨ Either type in a name or select one from the list.
3	⇨ Select **Ok**. *The session including all parameters of the related applications is saved.*

7.1.8.6 Closing a session

Use this procedure to close a running session.

Step	Action
1	⇨ Select **Session > Close** from the main menu. *In case of no running applications the session is closed immediately.* *In case of running applications the **Close session** dialog opens.*



2	⇨ Check one of the options: **Close session** closes the session and all the applications. **Save session, then close** saves the session and closes it.

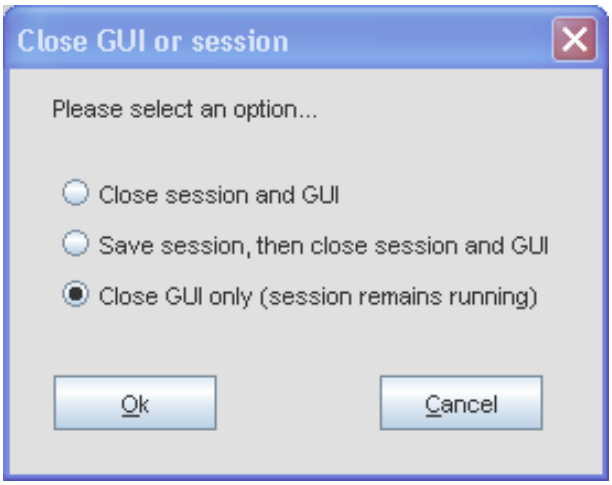
Step	Action
3	⇨ Select button **Ok**. *The session is closed, the user is logged out.* *The GUI is closed.*

7.1.8.7 Closing a GUI client

Use this procedure to close a GUI client.

During long term measurements it might be helpful to close the GUI, but not the session with it's running applications. The user can re-connect to a running session later on at any time (see "Getting a session context" on page 85).

Step	Action
1	⇨ Select **File > Exit** from the main menu. **Note:** Alternatively select the cross symbol in the top right edge of the ONT-506 main window. *The **Close GUI or session** dialog opens.*



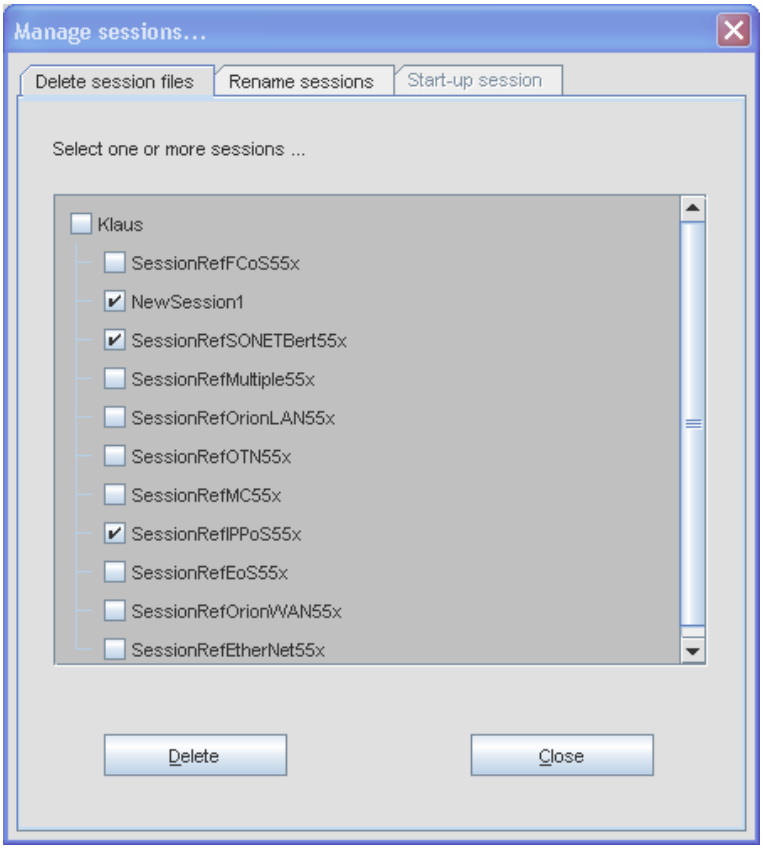
Step	Action
2	⇨ Check **Close GUI only**. *The GUI client is closed, the session remains running.*

7.1.8.8 Deleting saved sessions

Use this procedure to delete sessions previously saved.

Step	Action
1	⇨ Select **Session > Manage sessions...** from the main menu. *The **Manage sessions...** dialog opens.*

Step	Action



2 ⇨ Check the boxes of all saved sessions you want to delete.

3 ⇨ Select **Delete**.

The selected sessions are deleted from the data base.

7.1.8.9 Renaming a session

Use this procedure to rename a session.

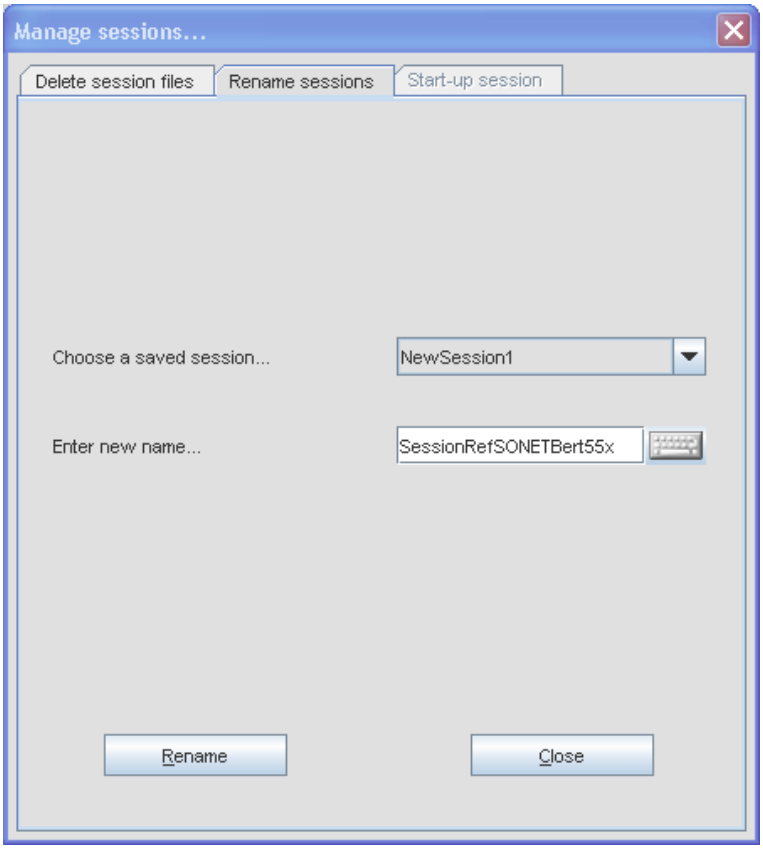
The system creates new sessions using a standard naming convention ('NewSession1', 'NewSession2', ...). Renaming it (e.g. to 'PetersSDHTest') eases identification of saved sessions.

Step	Action

1 ⇨ Select **Session > Manage sessions...** from the main menu.

*The **Manage sessions...** dialog opens.*

Step	Action



2 ⇨ Select the session you want to rename from the list.

3 ⇨ Select field **Enter new name...** and edit the name.

4 ⇨ Select button **Rename**.

The session is renamed.

If the session to be renamed is currently running, the new name appears in the title bar.

7.1.8.10 Starting a session measurement

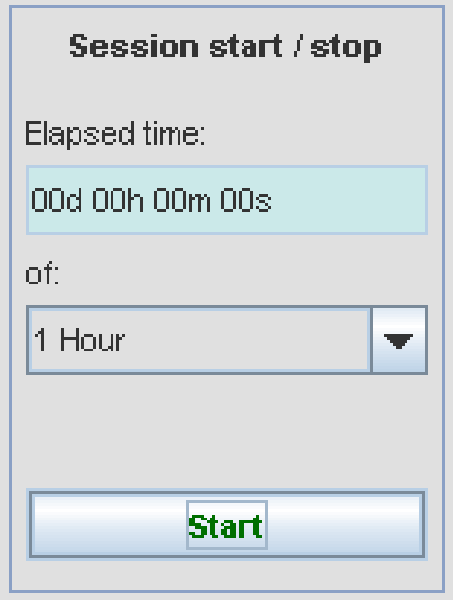
Use this procedure to start all the applications belonging to the session.

Step	Action

1 ⇨ Select page **Session status**.

2 ⇨ Set desired measurement time.

Step	Action



Note: The maximum measurement duration of this measurement will be set to the smallest maximal available time of the application (time is rounded).

3 ⇨ Select button **Start**.

All the applications belonging to the session are started.

The elapsed time is displayed.

7.1.8.11 Configuring a session measurement

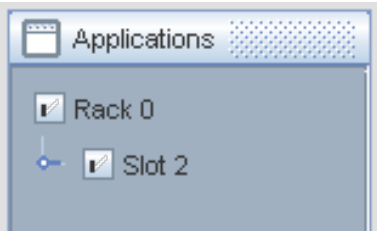
Use this procedure to exclude applications from a session measurement.

Note: Applications excluded from the session start are still part of the session. (see "Configuring a session" on page 85)

Step	Action

1 ⇨ Select page **Session status**.

2



⇨ Uncheck box **Slot <n>** to exclude the application running on that slot from session start.

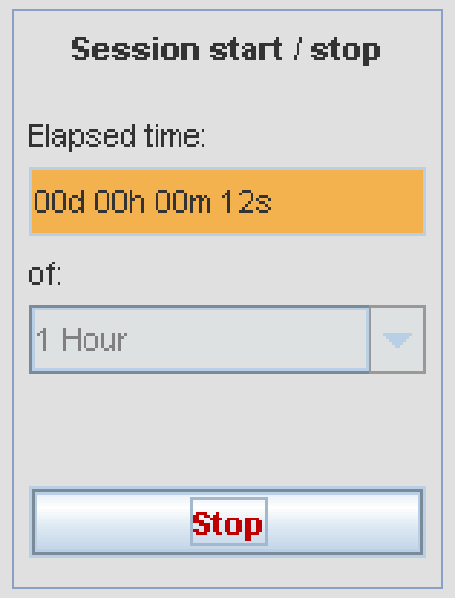
The application is excluded from session start.

7.1.8.12 Stopping a session measurement

Use this procedure to stop all the applications belonging to the session.

Note: Instead of stopping the session it is also possible to wait for the gating time to expire.

Step	Action
1	⇨ Select page **Session status**.
2	⇨ Select button **Stop**.



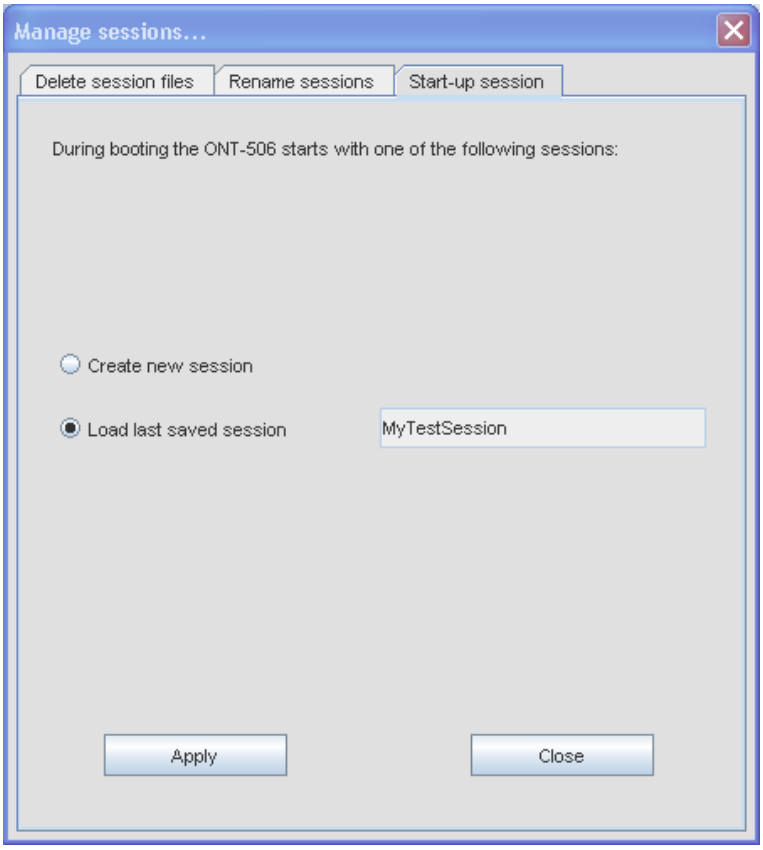
The session is stopped.

7.1.8.13 Selecting session start-up mode

Use this procedure to determine the session start-up behavior.

Step	Action
1	⇨ Select **Session > Manage sessions...** from the main menu. *The **Manage sessions...** dialog opens.*

Step	Action



The dialog allows to define the behavior of the ONT-506 during the session start-up phase:

- **Create new session** causes the **Open session** dialog to be displayed during the start-up phase.
- **Load last saved session** causes the last saved session to be loaded without showing a dialog.

2 ⇨ Check one of the options and select **Apply**.

7.1.9 Port handling

This section describes the port handling using a GUI client.

Included topics

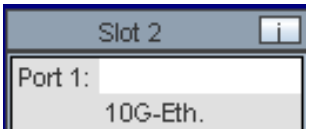
- Naming a port
- Selecting a port
- Port lock

7.1.9.1 Naming a port

Use this procedure to name a port in order to ease handling.

Step	Action
1	⇨ Select entry field **Port <number>** and enter the identifier.

Step	Action



7.1.9.2 Selecting a port

Use this procedure to select a port in order to load/unload an application.

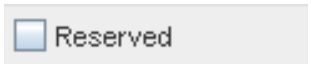
Step	Action
1	⇨ Select page **Session configuration**.
2	⇨ Select button **Application...** of the test module/port you want to select. The following explains how to detect selectable ports.

State	Description
Selectable	**Active ports of current session - highlighted in green and labeled with the application title (e.g. DSn/PDH).**
Selectable	**Free ports - labeled with 'Available'.**
Not selectable	**Active ports of other sessions - labeled with the 'user name' and the 'session name'.**

7.1.9.3 Port lock

A port can be locked by a user.

No other user will be able to use this port until it is unlocked by the owner.



7.1.10 Results

This section describes the result handling using a GUI client.

Included topics

- Creating a report and saving it locally
- Creating a report and saving it on the ONT-5xx Web Server
- Importing a logo
- Deleting a logo
- Viewing a report
- Deleting a report
- Managing captured data
- Printing a screenshot
- Making a screenshot and saving it to a file

7.1.10.1 Creating a report and saving it locally

Use this procedure to create a report for a completed measurement and save it locally.

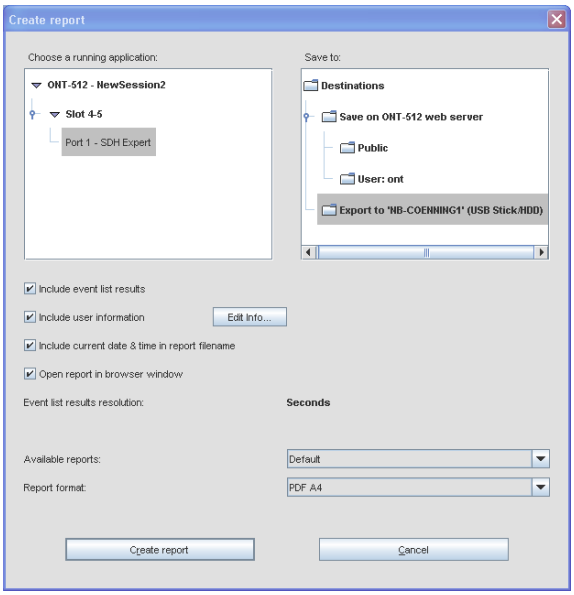
Note: 'Locally' means on your PC in case of remote operation via Web Start or on the built-in PC in case of local operation or VNC client.

Note: Due to internal constraints it may be necessary to truncate event lists. Depending on the output format the number of reported events is limited as follows:

- PDF: at most 500 per event list
- HTML: 5000
- CSV: 300000

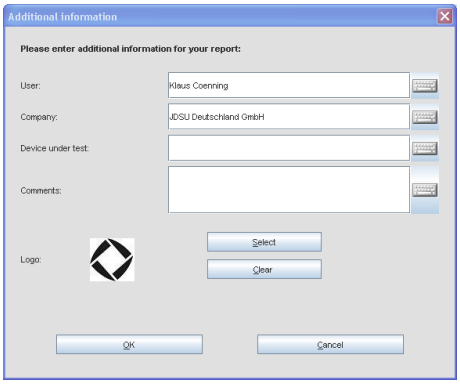
A warning ('Event list truncated after 500 entries') will be included in the report.

Step	Action
1	⇨ Select **Results > Create report...** from the main menu. *The **Create report** dialog opens.*



2	⇨ Select the application you want to create a report of from the left side tree-view.
3	⇨ Select **Export to '<PC name>' (USB Stick/HDD)** from the right side tree-view.
4	⇨ Check box **Include event list results** to include event list results.
5	⇨ Check box **Include current date & time in report filename** to attach date and time information to the filename (in order to generate unique filenames).
6	⇨ Uncheck box **Open report in browser window** to prevent browser from opening.
7	⇨ Check box **Include user Information** to include additional information. ⇨ Select button **Edit info ...** to edit user specific information. *The **Additional information** dialog opens.*

Step	Action



8 ⇨ Enter the additional information, select a logo (if desired) and select button **OK**

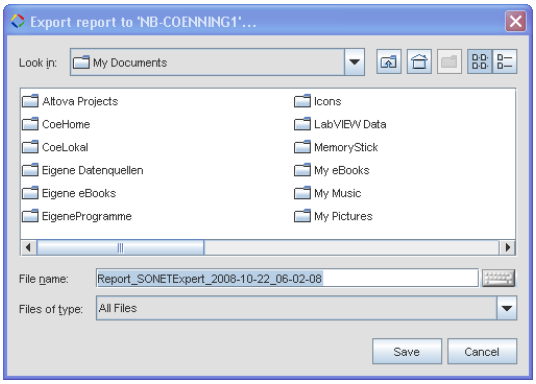
Note: The logo (saying the corresponding graphic file) has to be imported before being integrated in a report (see "Importing a logo" on page 100).

9 ⇨ Select a report filter from the **Available reports** list.

10 ⇨ Select an output format from the **Report format** list.

11 ⇨ Select button **Create report**.

*The **Export to '<PC name>'** dialog opens*

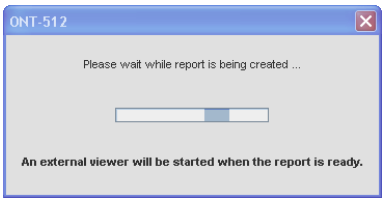


12 ⇨ Select the destination directory.

13 ⇨ Select entry field **File name** and enter / modify the file name.

14 ⇨ Select button **Save**.

The report is created.



The dialogs are closed.

7.1.10.2 Creating a report and saving it on the ONT-5xx Web Server

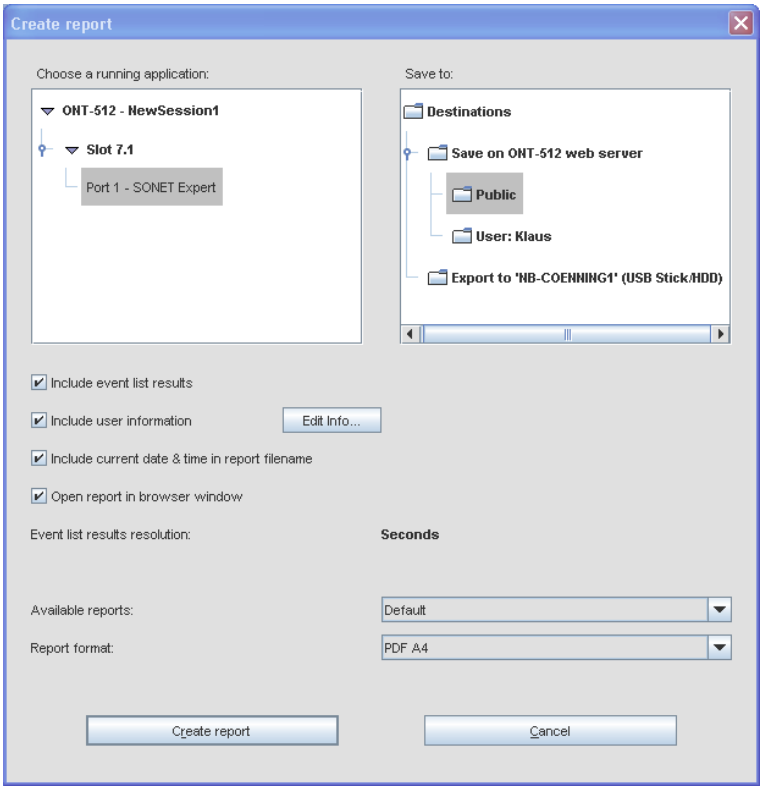
Use this procedure to create a report for a completed measurement and save it on the ONT-5xx Web Server.

Note: Due to internal constraints it may be necessary to truncate event lists. Depending on the output format the number of reported events is limited as follows:

- PDF: at most 500 per event list
- HTML: 5000
- CSV: 300000

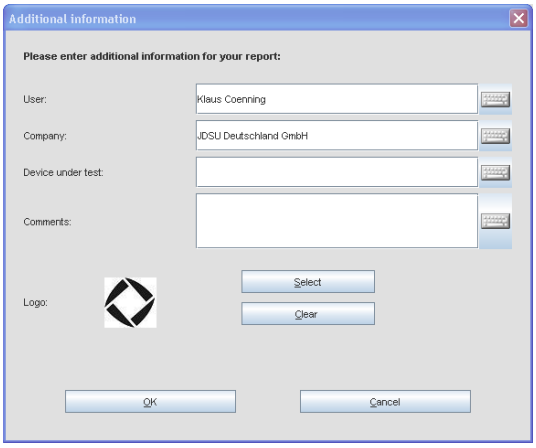
A warning ('Event list truncated after 500 entries') will be included in the report.

Step	Action
1	⇨ Select **Results > Create report...** from the main menu. *The **Create report** dialog opens.*



2	⇨ Select the application you want to create a report of from the left side tree-view.
3	⇨ Select **Public** or **User <user name>** from the right side tree view.
4	⇨ Check box **Include event list results** to include all results.
5	⇨ Check box **Include current date & time in report filename** to attach date and time information to the filename (in order to generate unique filenames).
6	⇨ Check box **Include user information** to include additional information. ⇨ Select button **Edit info ...** to edit user specific information. *The **Additional information** dialog opens.*

Step	Action



7 ⇨ Enter the additional information, select a logo (if desired) and select button **OK**

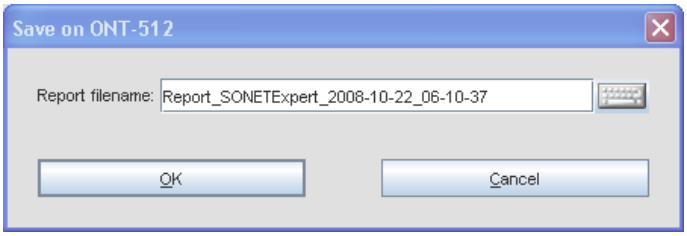
Note: The logo (saying the corresponding graphic file) has to be imported before being integrated in a report (see "Importing a logo" on page 100).

8 ⇨ Select a report filter from the **Available reports** list.

9 ⇨ Select an output format from the **Report format** list.

10 ⇨ Select button **Create report**.

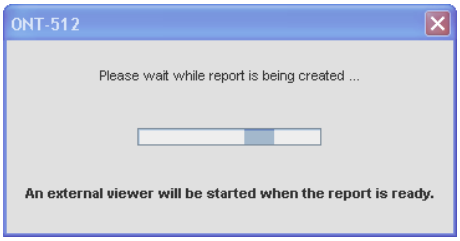
*The **Save on ONT-506***



11 ⇨ Select entry field **Report file name** and enter / modify the file name.

12 ⇨ Select button **OK**.

The report is created.

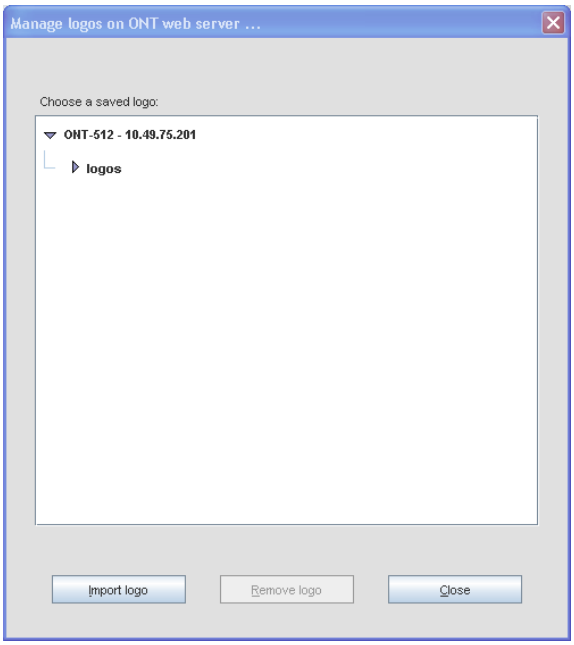


The dialogs are closed.

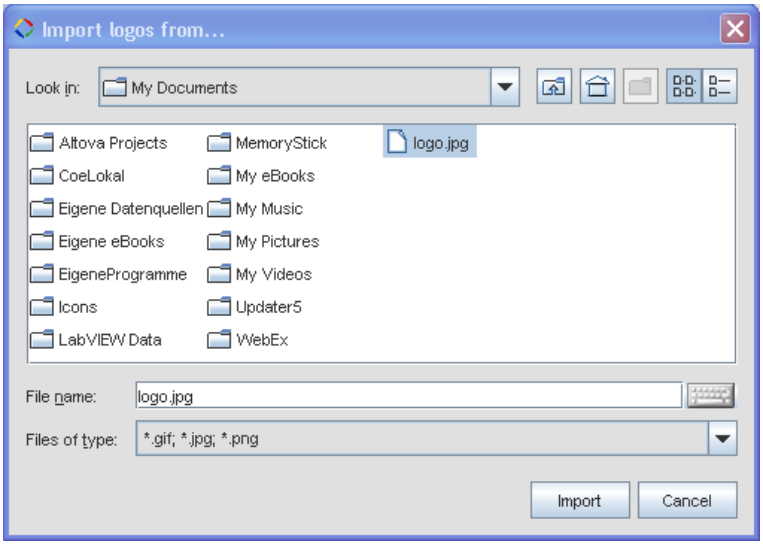
7.1.10.3 Importing a logo

Use this procedure to import a logo.

Step	Action
1	⇨ Select **Results > Manage logos...** from the main menu. *The **Manage logos on ONT web server...** dialog opens.*



2	⇨ Select button **Import logo...** in order to select the logo to be imported. *The **Import logos from...** dialog opens.*

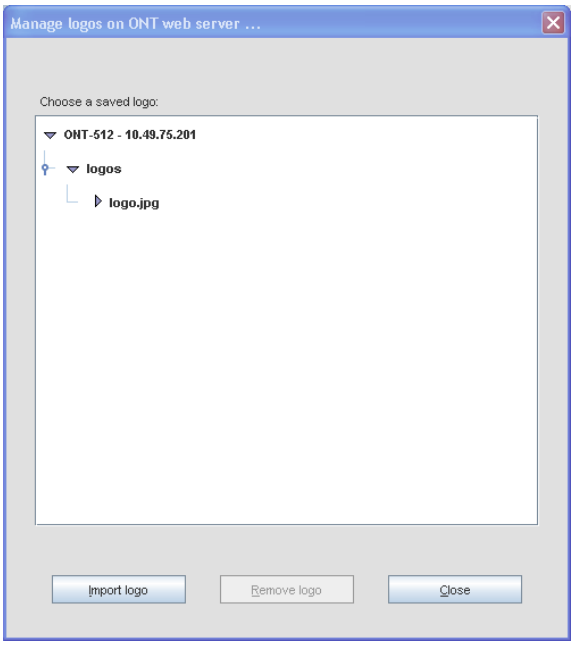


3	⇨ Browse to the desired directory and select the logo to be imported. **Note:** JPG or PNG formatted files are best suited. GIFs may show unexpected behavior.
4	⇨ Select buttons **Import** and **Close**.

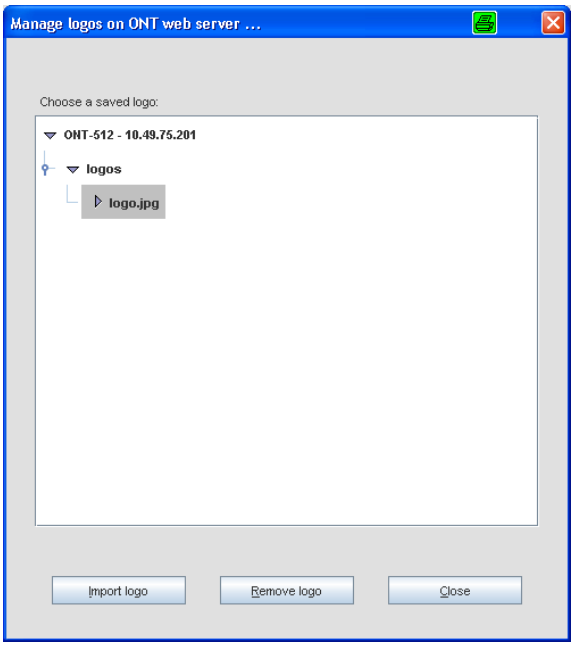
7.1.10.4 Deleting a logo

Use this procedure to delete a logo from the ONT web server.

Step	Action
1	⇨ Select **Results > Manage logos...** from the main menu. *The **Manage logos on ONT web server...** dialog opens.*



2	⇨ Select the logo to be deleted.

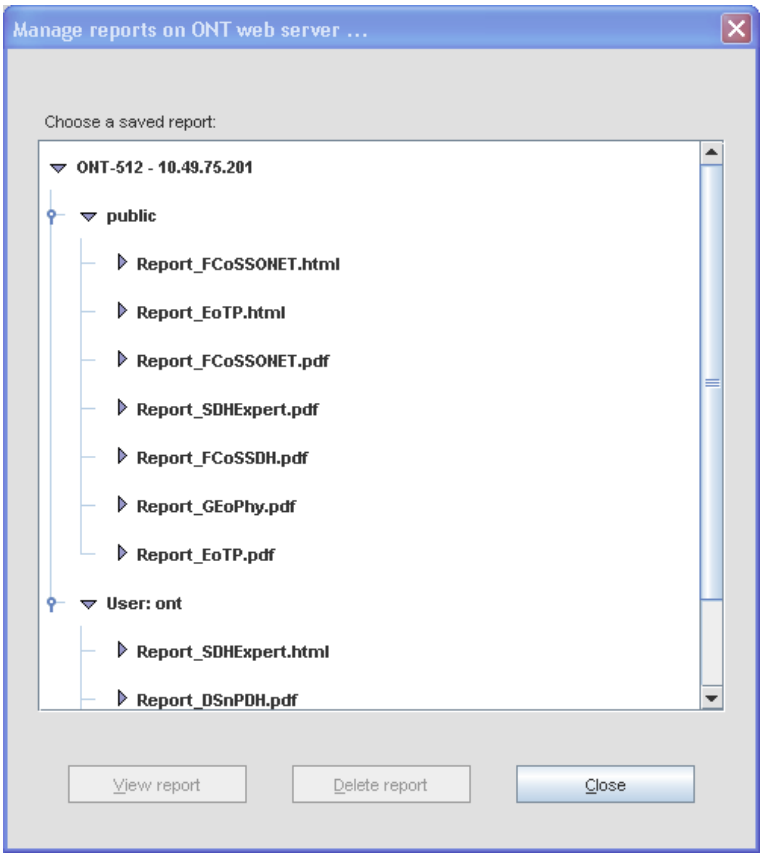


3	⇨ Select button **Remove logo**.
4	⇨ Select button **Close**.

7.1.10.5 Viewing a report

Use this procedure to open a report previously saved on the ONT-5xx Web Server.

Step	Action
1	⇨ Select **Results > Manage reports...** from the main menu. *The **Manage reports on ONT web server...** dialog opens.*



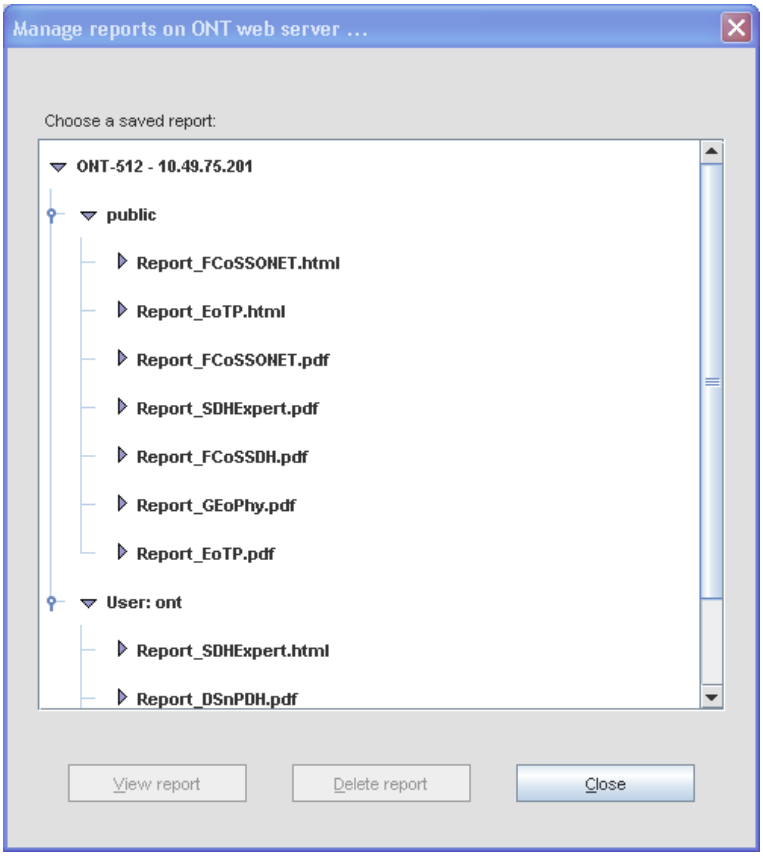
2	⇨ Select a report (sorted by category).
3	⇨ Select button **View report**. *The report opens in a separate browser window.*

7.1.10.6 Deleting a report

Use this procedure to delete a report previously saved on the ONT-5xx Web Server.

Step	Action
1	⇨ Select **Results > Manage reports...** from the main menu. *The **Manage reports on ONT web server...** dialog opens.*

Step	Action



2 ⇨ Select a report (sorted by category).

3 ⇨ Select button **Remove reports**.
The report is deleted from the database.

7.1.10.7 Managing captured data

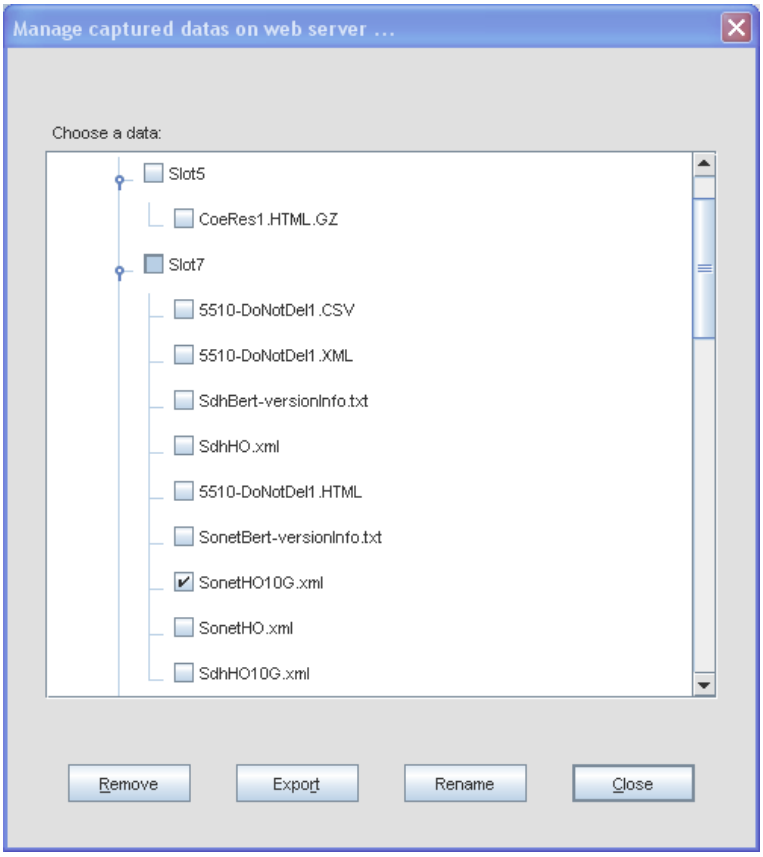
Use this procedure to manage captured data.

Step	Action

1 ⇨ Select **Results > Manage captured data...** from the main menu.
*The **Manage captured data on web server...** dialog opens.*

2 ⇨ Select data file(s).

Step	Action



3 ⇨ Select button
- **Remove** in order to remove the files or
- **Export** to export the files to your PC or
- **Rename** to rename the file

4 ⇨ Select button **Close**

7.1.10.8 Printing a screenshot

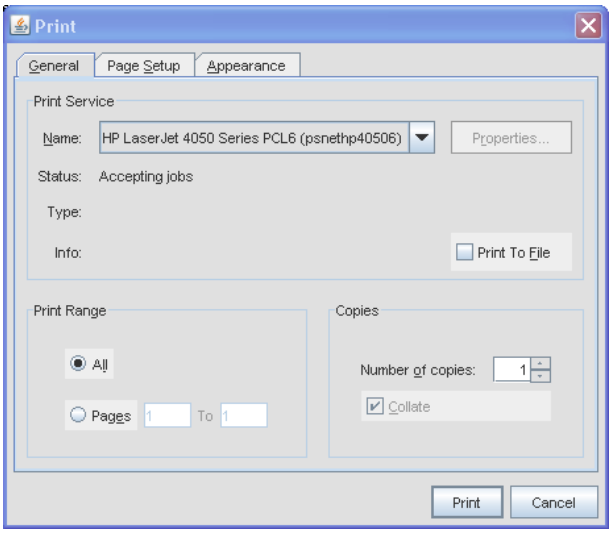
Use this procedure to make a screenshot and print it.

✓ A printer has to be installed already.

Note: If you are connected to an ONT-506 via a Java Web Start client, the printers reachable from your local PC are relevant.

Step	Action
1	⇨ Select **Tools > Print screenshot...** from the main menu. *The **ONT-5xx - Print screenshot...** dialog opens.*

2	⇨ Select the object to be printed (whole screen, ONT-5xx window, region of window). ⇨ Select button **Ok**.
3	⇨ If **Region of ONT-506 window** was selected, mark the desired area with the appearing crosslines.
4	⇨ Select the desired printer from the list.



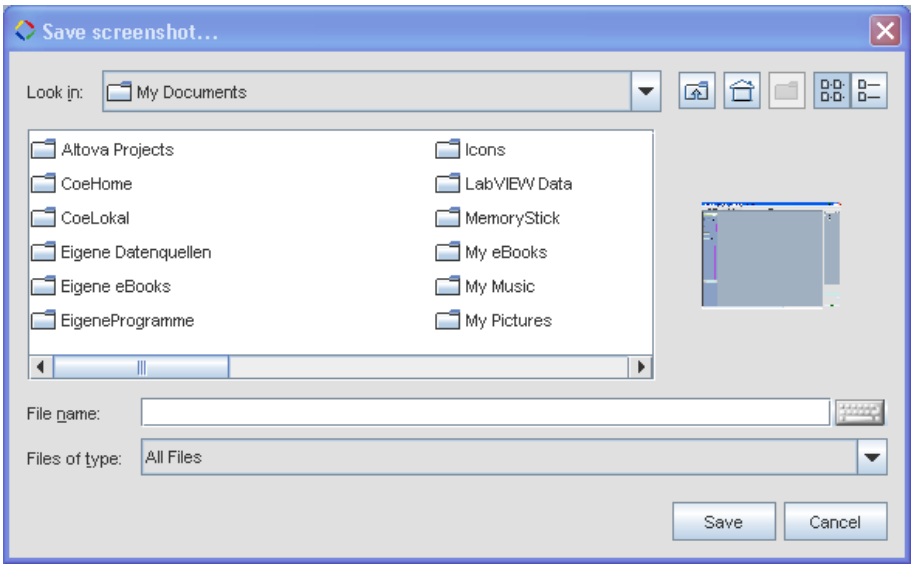
5	⇨ Select button **Print**. *The screenshot is printed.*

7.1.10.9 Making a screenshot and saving it to a file

Use this procedure to make a screenshot and save it to a file.

Step	Action
1	⇨ Select **Tools > Make screenshot...** from the main menu. *The **ONT-506 - Create screenshot...** dialog opens.*

2	⇨ Select the object to be saved (whole screen, ONT-5xx window, region of window). ⇨ Select button **Ok**.
3	⇨ If **Region of ONT-506 window** was selected, mark the desired area with the appearing crosslines.
4	*The **Save screenshot...** dialog opens.*



5	⇨ Select desired destination directory.
6	⇨ Select entry field **File name** and enter desired file name.
7	⇨ Select the desired graphic format from the **Files of type** list.
8	⇨ Select button **Save**. *The screenshot is saved.*

7.1.11 Tools

This section introduces some tools helping to deal with the ONT-506.

Included topics

- Restarting the ONT-506 software
- Getting information about the ONT-506 software release
- Showing connection statistics
- Showing active clients

7.1.11.1 Restarting the ONT-506 software

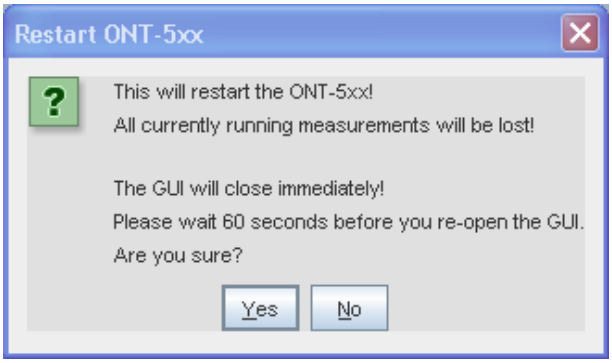
Use this procedure to restart the ONT-506 software.

Note: 'Administrator' permissions are required to restart the ONT-506 software.

! When restarting the framework all measurements are stopped and have to be restarted again. Do not use this function if other users are working with the ONT-506.

Step	Action
1	⇨ Select **Tools > Restart ONT-506...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Restart ONT-506** dialog opens.*

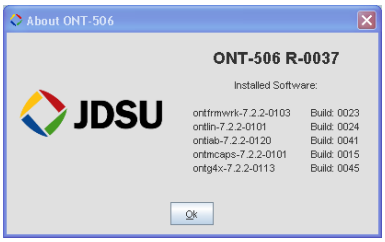


3	⇨ Select the **Yes** button. *The restart is executed.*

7.1.11.2 Getting information about the ONT-506 software release

Use this procedure to get information about the software release currently installed.

Step	Action
1	⇨ Select **Help > About...** from the main menu. *The **About ONT-506** dialog opens.*

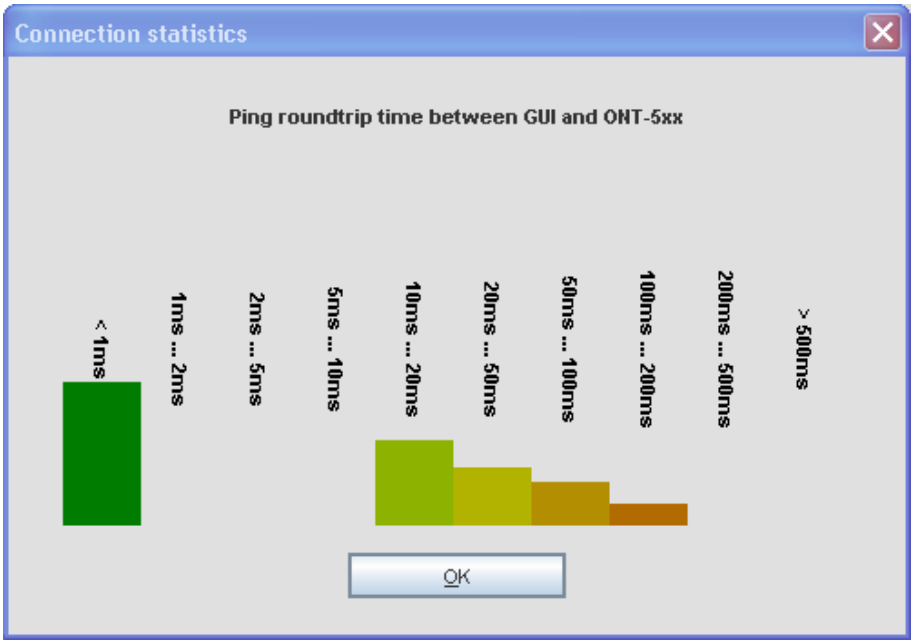


7.1.11.3 Showing connection statistics

Use this procedure to show the connection statistics.

Note: This tool measures runtime of packages exchanged between GUI client and server. It is only useful in case of running a remote GUI (Java Web Start). Accessing the tool via VNC will produce misleading results (client and server are both running on the ONT-506).

Step	Action
1	⇨ Select **Tools > View connection statistics...** from the main menu. *The **Connection statistics** dialog opens.*



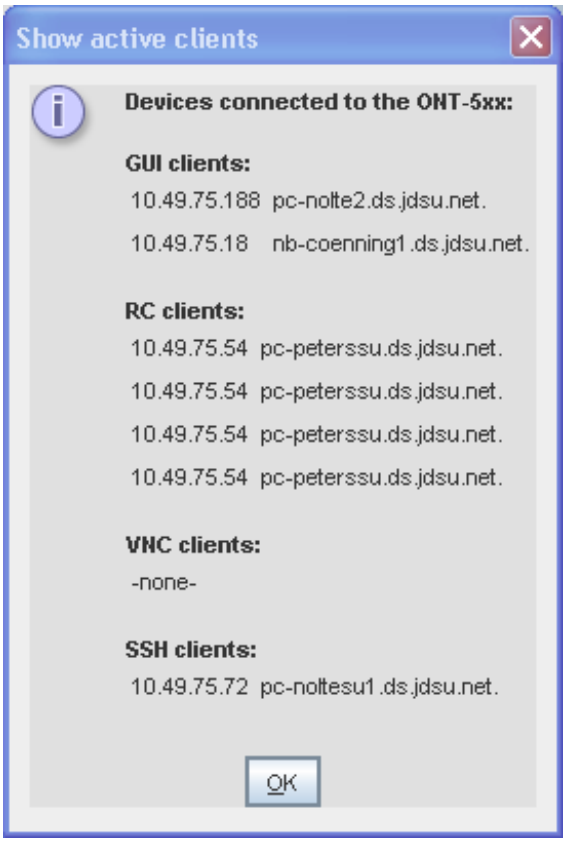
Note: The concentration of the bar chart should be beneath 100 ms. Longer round-trip times do not automatically cause problems, but will lead to a GUI reacting slow.

Step	Action
2	⇨ Select button **OK** to close the dialog.

7.1.11.4 Showing active clients

Use this procedure to list all clients connected to the ONT-506.

Step	Action
1	⇨ Select **Tools > View active clients...** from the main menu. *The **Show active clients** dialog opens.*



The dialog lists all clients connected to the ONT-506 at the moment.

2	⇨ Select button **OK** to close the dialog.

7.1.12 Date and time

This section describes the date and time handling using a GUI client.

Included topics

- Local time display
- Setting date and time of an ONT-506
- Setting the time zone of an ONT-506
- Using a NTP server
- Viewing the NTP log file

7.1.12.1 Local time display

Local time is always displayed in the upper right corner of the ONT-5xx main GUI.

7.1.12.2 Setting date and time of an ONT-506

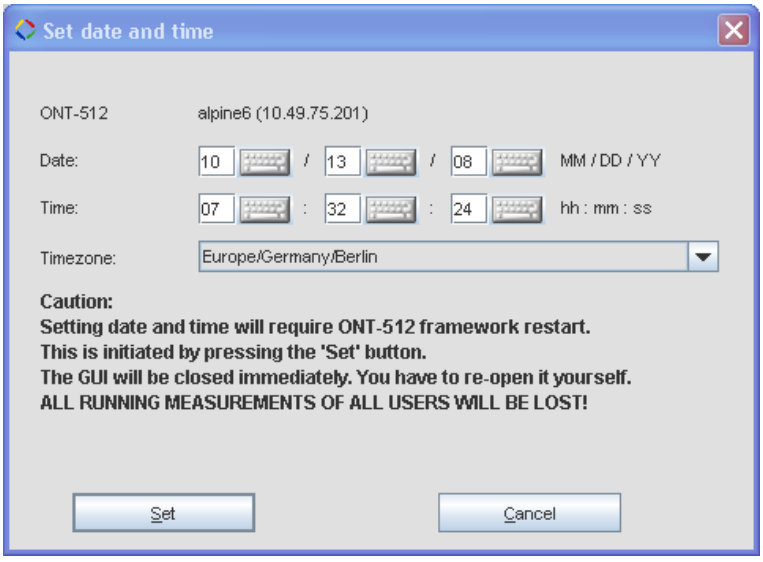
Use this procedure to set date and time of an ONT-506.

Note: 'Administrator' permissions are required to set date and time.

Note: You should be aware of possible consequences.

Step	Action
1	⇨ Select **Tools > Set date/time...** from the main menu.
2	*If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

3	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Set date and time** dialog opens.*



4	⇨ Enter the desired date and time values.
5	⇨ Select the appropriate timezone from the **Timezone** list.
6	⇨ Select button **Set**. ! The ONT-506 software has to be re-started, all running measurements will be lost.

7.1.12.3 Setting the time zone of an ONT-506

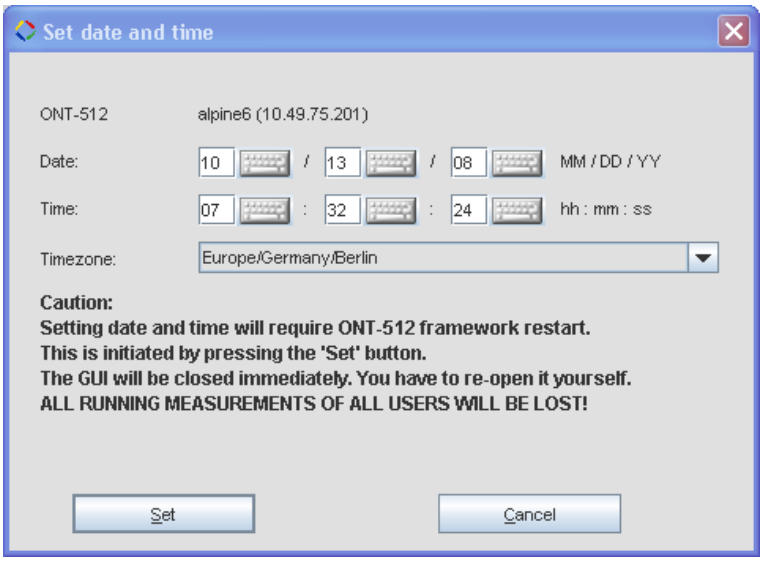
Use this procedure to set the time zone of an ONT-506 (factory setting is USA, Pacific).

Note: 'Administrator' permissions are required to set the time zone.

Note: You should be aware of possible consequences.

Step	Action
1	⇨ Select **Tools > Set date & time...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Set date and time** dialog opens.*



3	⇨ Select the appropriate timezone from the **Timezone** list.
4	⇨ Select button **Set**. ! The ONT-506 software has to be re-started, all running measurements will be lost.

7.1.12.4 Using a NTP server

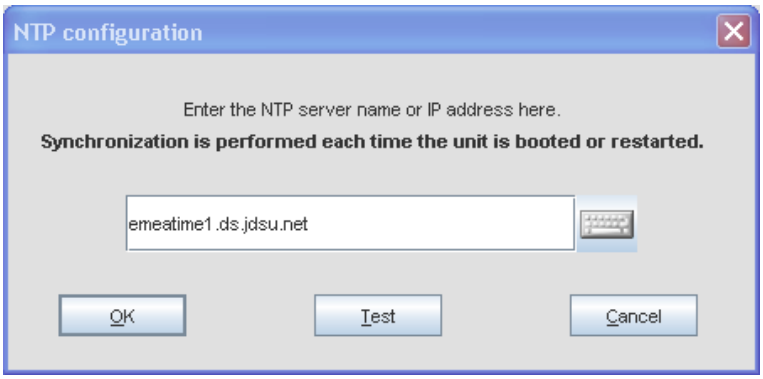
Use this procedure to synchronize date and time of an ONT-506 with a NTP server.

Note: 'Administrator' permissions are required to change the NTP settings.

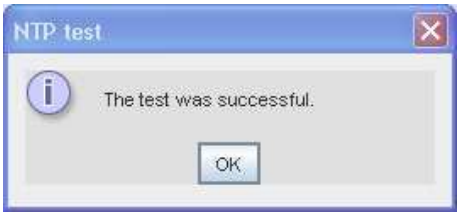
Note: Synchronization is done during every re-start of the ONT-506 framework.

Step	Action
1	⇨ Select **Tools > Configure NTP...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **NTP configuration** dialog opens.*

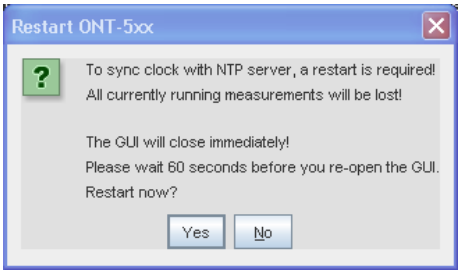


3	⇨ Enter IP address / name of NTP server.
4	⇨ Select button **Test** in order to check the NTP server. *The **NTP test** dialog opens.*



5	⇨ Select button **OK**. *The **NTP test** dialog closes.*

Step	Action
6	⇨ Select button **OK**. *The **Restart ONT-506** dialog opens.*



7	⇨ Select button **Yes**. *The ONT-506 restarts.*

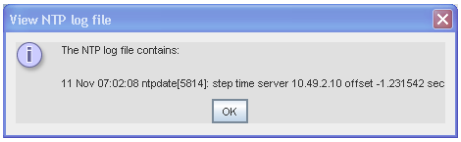
Note: All running measurements will be lost!

Note: In case of selecting **No**, synchronization with the NTP server will take place after the next reboot or restart.

7.1.12.5 Viewing the NTP log file

Use this procedure to check the NTP log file.

Step	Action
1	⇨ Select **Tools > View NTP log...** from the main menu. *The **View NTP log file** dialog opens showing the NTP (client) log file.*



2	⇨ Select button **OK**.

7.1.13 ONT-5xx users

ONT-5xx handling deals with the management of ONT-506 users.

Included topics

- Logging in (single-user mode)
- Logging in (multi-user mode)
- Adding an ONT-506 user
- Deleting an ONT-506 user
- Changing the ONT-506 user password

7.1.13.1 Logging in (single-user mode)

Use this procedure to log in (single-user mode).

Once the ONT-506 has been switched on and the software has been loaded, the ONT-506 user 'ont' is logged in automatically.

Note: To use another log in name (not the default 'ont') the GUI has to be started in multi-user mode (see "Starting an ONT-506 GUI in multi-user mode" on page 147).

7.1.13.2 Logging in (multi-user mode)

Use this procedure to log in (multi-user mode).

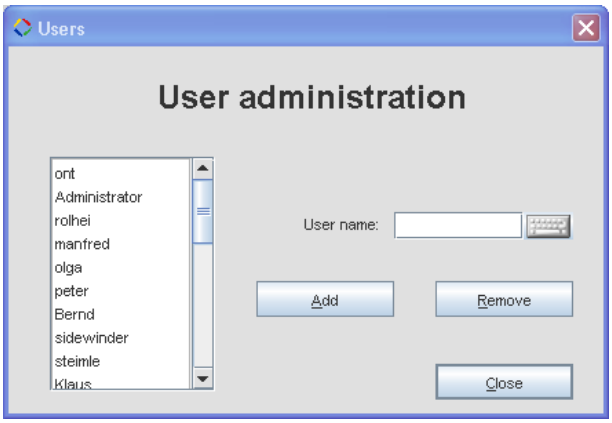
Step	Action
1	*The **Login at ...** dialog opens.*

2	⇨ Select appropriate user from the list.
3	⇨ Select entry field **Password**.
4	⇨ Enter password (default 'acterna' for ONT-506 user 'ont').
5	⇨ Select button **Login**.

7.1.13.3 Adding an ONT-506 user

Use this procedure to add an ONT-506 user.

Note: 'Administrator' permissions are required to create other users.

Step	Action
1	⇨ Select **Tools > Manage users...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.* 
2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Users** dialog opens.* 
3	⇨ Select the entry field **User name** and enter the desired name.
4	⇨ Select button **Add**. *The user is added.* **Note:** The initial password is identical to the user name. You may want to change it afterwards (see "Changing the ONT-506 user password" on page 119).
5	⇨ Select button **Close**.

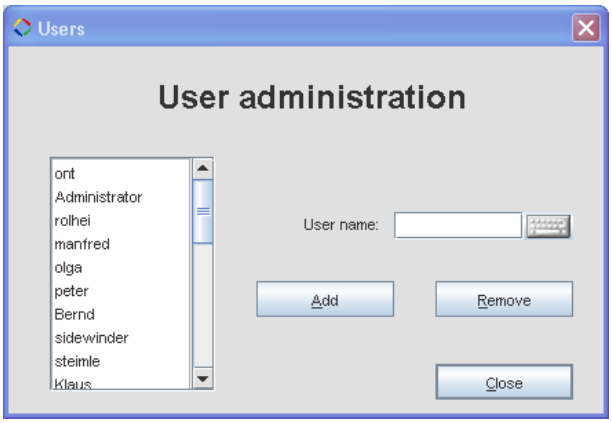
7.1.13.4 Deleting an ONT-506 user

Use this procedure to delete an ONT-506 user.

Note: 'Administrator' permissions are required to delete other users.

Step	Action
1	⇨ Select **Tools > Manage users...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Users** dialog opens.*



3	⇨ Select the user to be deleted from the list box.
4	⇨ Select button **Remove**. *The user is deleted.*
5	⇨ Select button **Close**.

7.1.13.5 Changing the ONT-506 user password

Use this procedure to change the password of the ONT-506 user.

Step	Action
1	⇨ Select **Tools > Change password...** from the main menu. *The **Password** dialog opens.* 
2	⇨ Select the entry field **Current password** and enter the current password.
3	⇨ Select the entry field **New password** and enter the new password.
4	⇨ Select the entry field **Verify** and enter the new password again.
5	⇨ Select button **Change**. *The password is changed.*

7.1.14 Option handling

Option handling deals with the management of software options.

Included topics

- Adding an option
- Removing an option

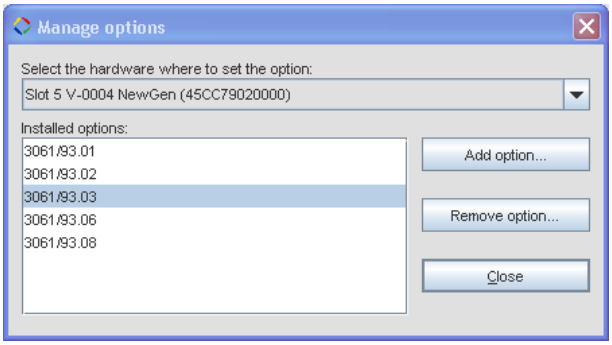
7.1.14.1 Adding an option

Use this procedure to add a software option.

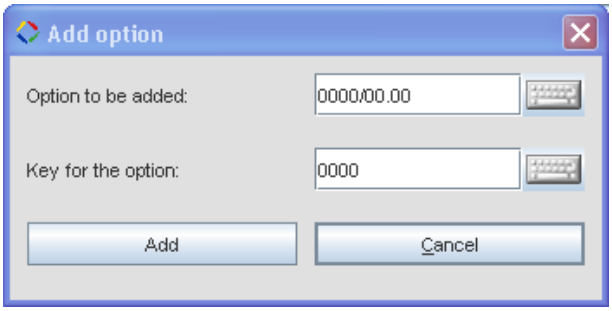
Note: 'Administrator' permissions are required to add options.

Step	Action
1	⇨ Select **Tools > Manage options...** from the main menu.
[1a]	*If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

[1b]	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Manage options** dialog opens.*

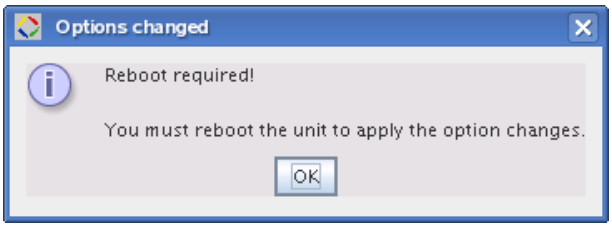


2	⇨ Select the hardware where to set the option from the drop down list. *The **Installed options:** list is updated.*
3	⇨ Select button **Add option...** *The **Add option** dialog opens.*



4	⇨ Select entry field **Option to be added** and enter the option number.

Step	Action
5	⇨ Select entry field **Key for the option** and enter the key.
6	⇨ Select button **Add**.
7	⇨ Select button **Close**. *The **Options changed** dialog opens.*



8	⇨ Select button **OK**. ⇨ Reboot the system

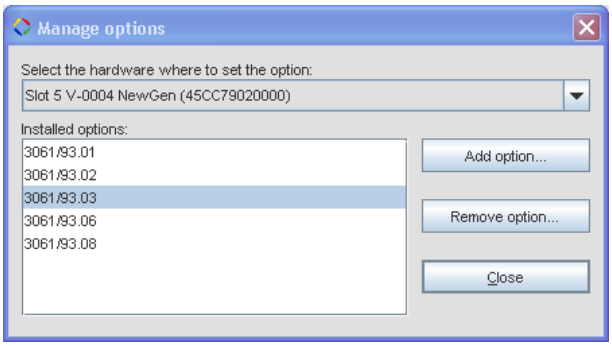
Note: The changes will be not effective without rebooting the system.

7.1.14.2 Removing an option

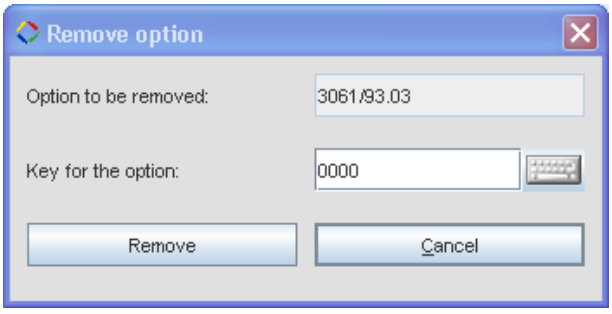
Use this procedure to remove a software option.

Step	Action
1	⇨ Select **Tools > Manage options...** from the main menu.
[1a]	*If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

[1b]	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Manage options** dialog opens.*

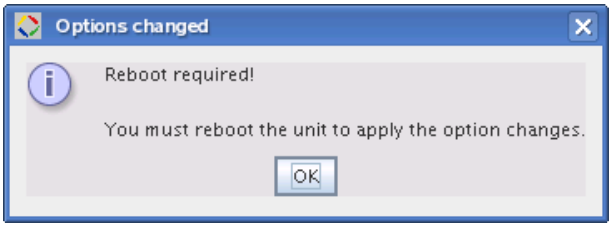


2	⇨ Select the hardware where to remove the option from the drop down list. *The **Installed options:** list is updated.*
3	⇨ Select the option to be removed from the list.
4	⇨ Select button **Remove option...** *The **Remove option** dialog opens.*



5	⇨ Select entry field **Key for the option** and enter the key.

Step	Action
6	⇨ Select button **Remove**.
7	⇨ Select button **Close**. *The **Options changed** dialog opens.*



8	⇨ Select button **OK**. ⇨ Reboot the system

Note: The changes will be not effective without rebooting the system.

7.1.15 Networking

This section describes the handling of networking aspects using a GUI client.

Included topics

- Provisioning LAN access using DHCP
- Provisioning LAN access using a static IP address

7.1.15.1 Provisioning LAN access using DHCP

Use this procedure to connect the ONT-506 to the LAN using DHCP (quick setting).

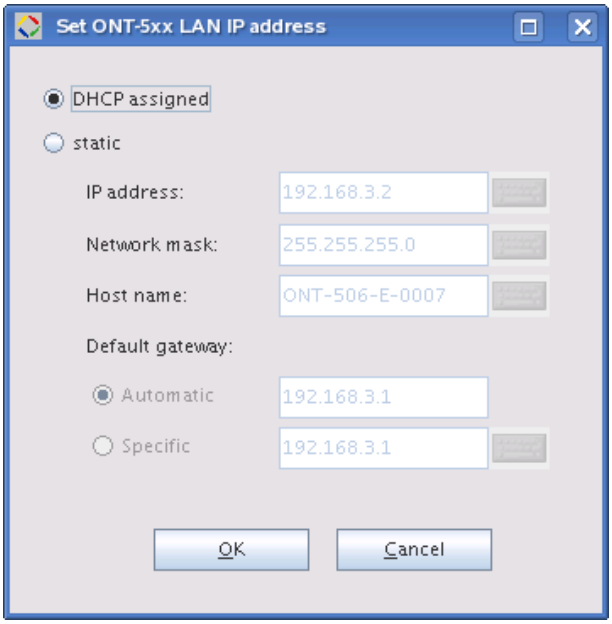
Note: 'Administrator' permissions are required to change network settings.

Note: LAN access can't be configured remotely (via Java Web Start or VNC) but locally.

The IP address is requested from a DHCP server located in the network. All parameters are set automatically.

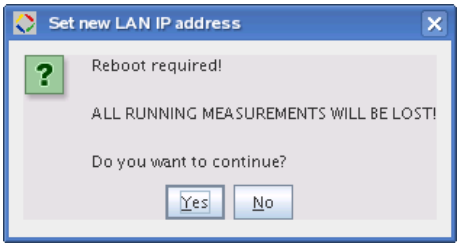
Step	Action
1	⇨ Select **Tools > IP address...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Set ONT-506 LAN IP address** dialog opens.*



3	⇨ Check box **DHCP assigned**.
4	⇨ Select button **OK**. *The **Set new LAN IP address** confirmation dialog opens.*

Step	Action



5 ⇨ Select button **Yes**.

The ONT-506 will now be rebooted and configured according to your settings.

! All measurements will be stopped and all results will be lost!

7.1.15.2 Provisioning LAN access using a static IP address

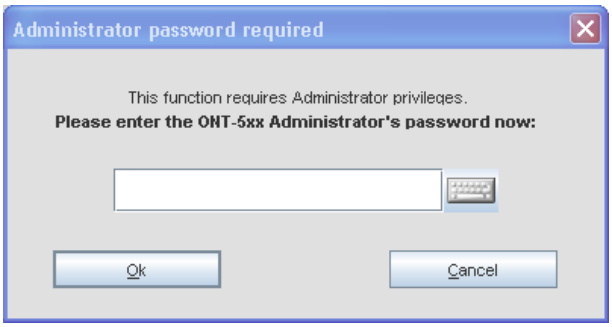
Use this procedure to connect the ONT-506 to the LAN using a static IP address.

Note: 'Administrator' permissions are required to change network settings.

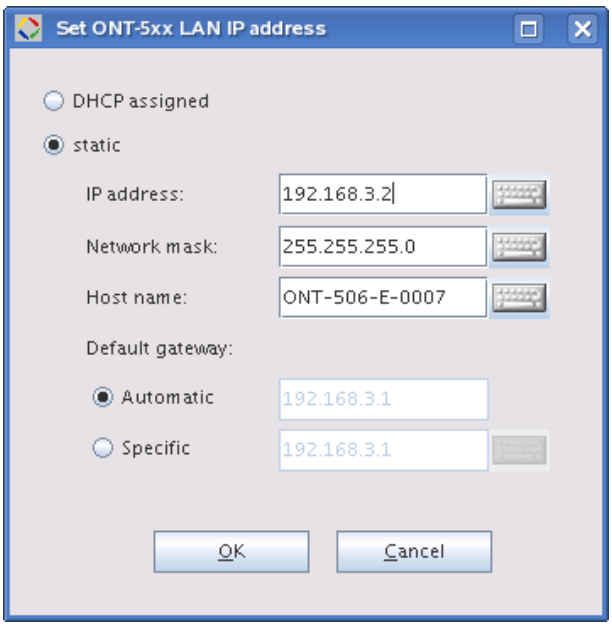
Note: LAN access can't be configured remotely (via Java Web Start or VNC) but locally.

The IP address is set manually together with the other required parameters.

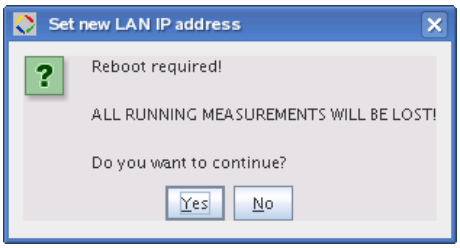
Step	Action
1	⇨ Select **Tools > IP address...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*



2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *The **Set ONT-506 LAN IP address** dialog opens.*



3	⇨ Check box **static**.

Step	Action
4	⇨ Enter required settings: • **IP address** type in IP address • **Network Mask** Insert the network mask for the IP address as selected above. • **Host name** This field defines the host name of the ONT-506. To simplify the handling a default name is displayed consisting of the ONT-506 and the serial number. • **Default gateway** Automatic: default gateway IP address is set to static IP address of the unit with '.1' at the end (xxx.xxx.xxx.1). Specific: default gateway IP address can be set independently. Please ask your system administrator for further help.
5	⇨ Select button **OK**. *The **Set new LAN IP address** confirmation dialog opens.* 
6	⇨ Select button **Yes**. *The ONT-506 will now be rebooted and configured according to your settings.* ! All measurements will be stopped and all results will be lost!

7.1.16 Device configuration

This section describes the device configuration handling using a GUI client.

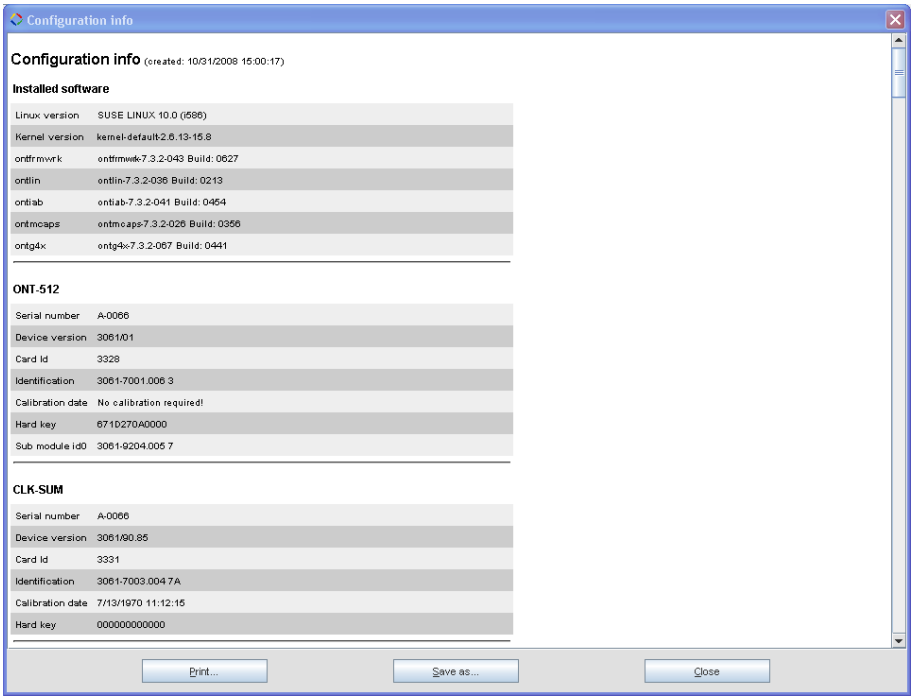
Included topics

- Getting information regarding device configuration
- Checking device configuration

7.1.16.1 Getting information regarding device configuration

Use this procedure to get information regarding the configuration of an ONT-506.

Step	Action
1	⇨ Select **Help > Configuration info...** from the main menu. *The **Configuration info** dialog opens.*

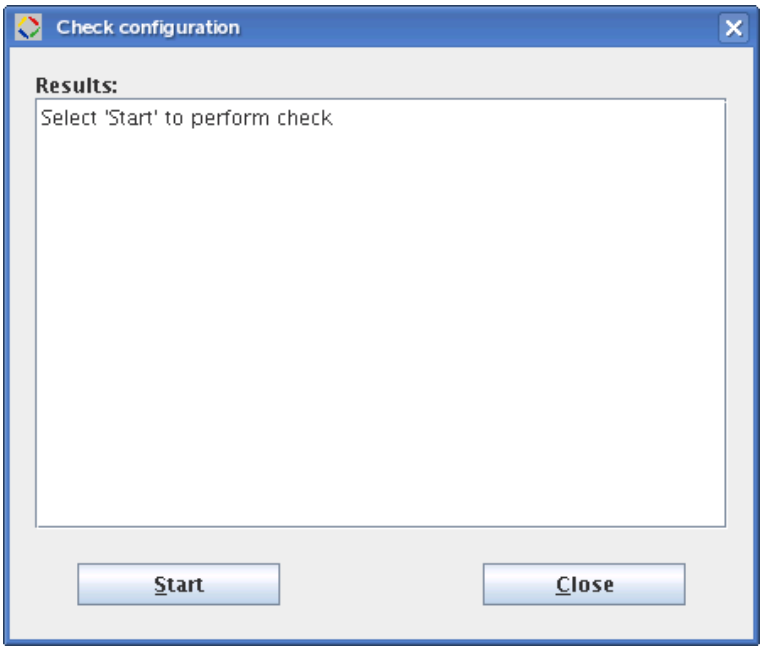


2	⇨ Select button **Print** to print the document.
3	⇨ Select button **Save as ...** to save the document (locally on your PC).
4	⇨ Select button **Close**.

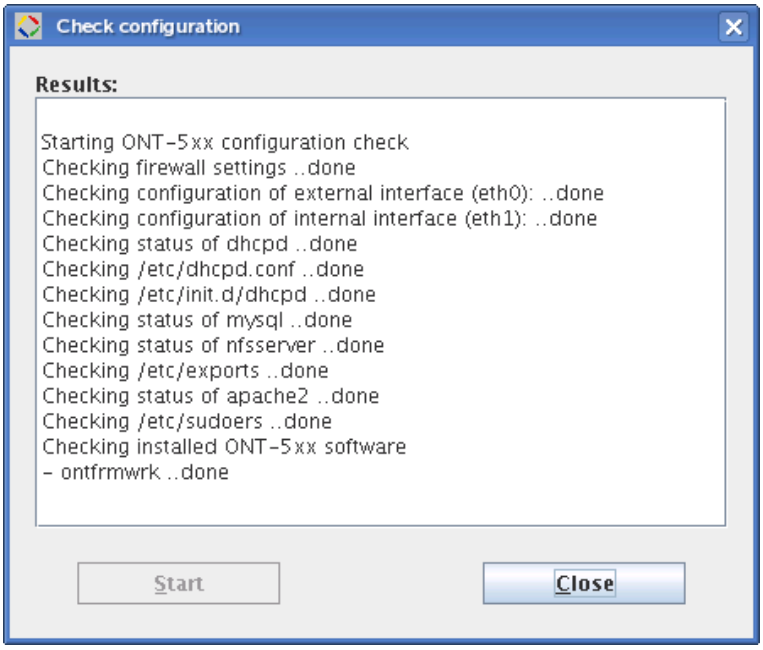
7.1.16.2 Checking device configuration

Use this procedure to check the configuration of an ONT-506.

Step	Action
1	⇨ Select **Tools > Check configuration...** from the main menu. *The **Check configuration** dialog opens.*

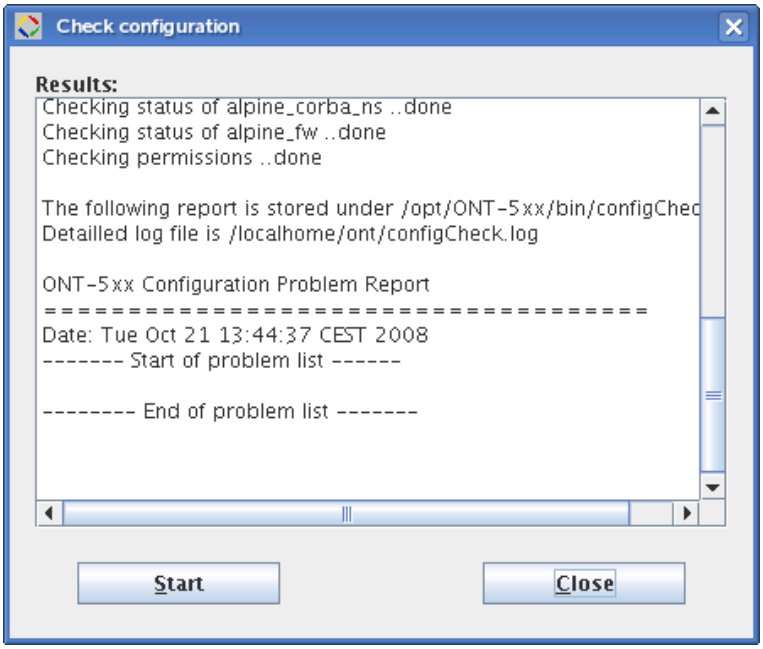


2	⇨ Select button **Start**. *The configuration check starts.*



3	*The configuration check stops.*

Step	Action



⇨ Check the problem list which should be empty.

⇨ React according to the detected problems.

7.2 Layered application

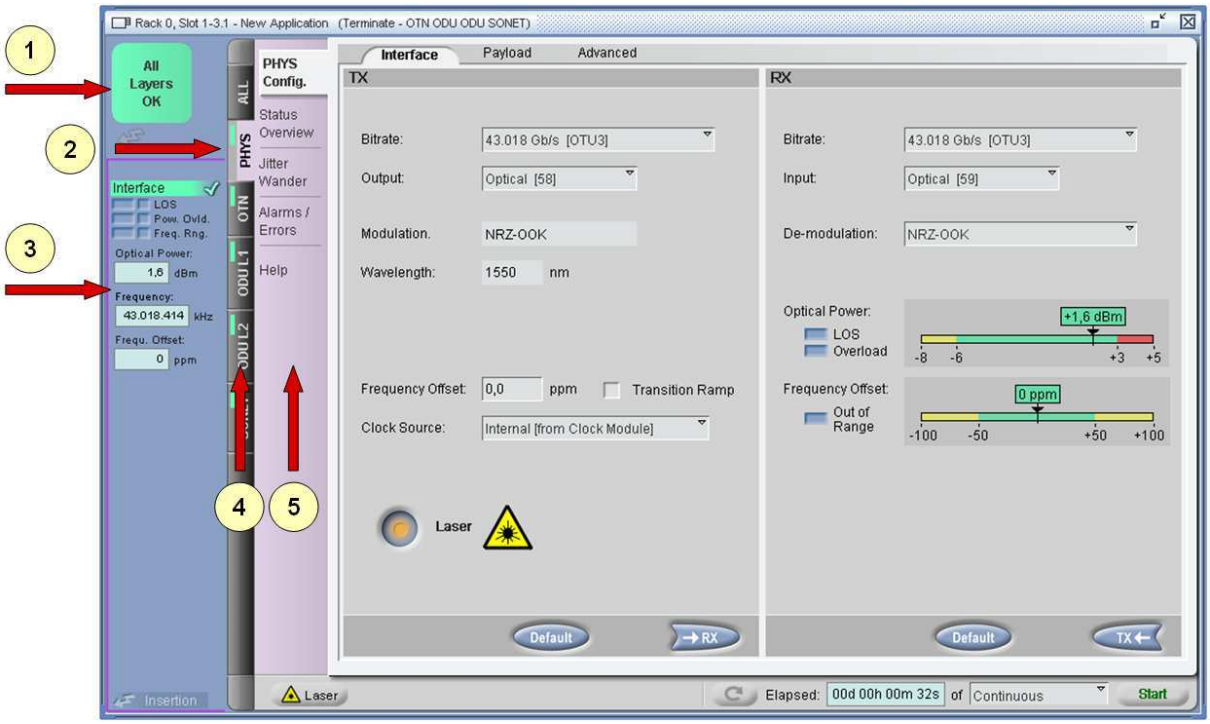
Layered applications follow the approach that network systems consist typically of a stack of different network technologies depending on the network equipment and transported service. When loading an application users choose from a number of available application stacks or wrapper/de-wrapper applications.

Included topics

- Operation concept
- Changing the application configuration
- Status overview
- Device mode
- Trigger interfaces

7.2.1 Operation concept

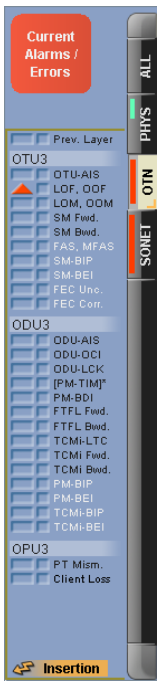
This section introduces the operation concept of layered applications.



Nr.	Element	Description
1	Overall stack status	The upper left corner of the GUI always shows the overall status of all layers in the loaded application. If this status overview shows a red or yellow alarm indication select the corresponding layer tab to see more details of that specific layer.
2	Overall layer status	Impacted layer shows red / yellow indication.
3	Layer status overview	The layer status overview shows a status overview of the selected layer.
4	Layer tabs	The individual configurations and results of a particular stack element can be shown by selecting the corresponding user interface tab.

Nr.	Element	Description
		The 'ALL' tab shows an overview of the chosen application stack and a summary of key settings.
5	Chapter tabs	Chapters are used to structure layer specific settings and results.

Active signal manipulation / 'Loss of Previous Layer' alarm



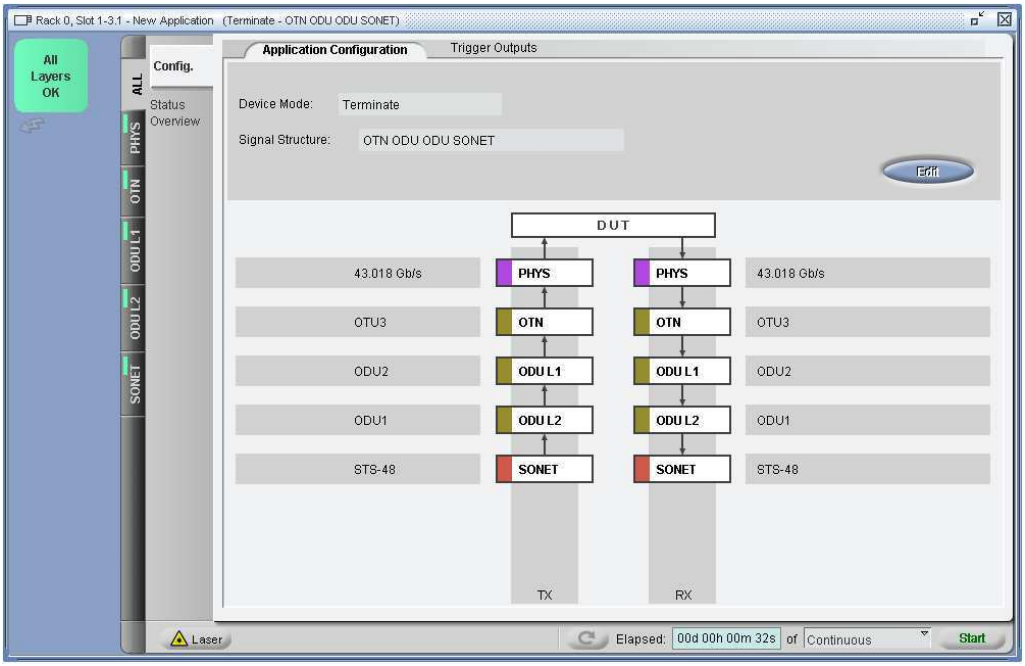
The Layer status overview shows an orange flash in case of an active signal manipulation (e.g. an alarm or error insertion) on the individual layers.

Even if the individual network technologies do not need to know much about each other when they are stacked together, there is one important thing each layer needs: a valid input signal!

A 'Loss of Previous Layer' alarm in each layer (except PHYSical) indicates that the corresponding layer has an invalid input signal due a problem in the previous layer. An active LOPL alarm will prevent the layer with this error from taking invalid measurement result. The LOPL in a specific layer corresponds to a pseudo LOS (Loss of Signal) for that layer.

7.2.2 Changing the application configuration

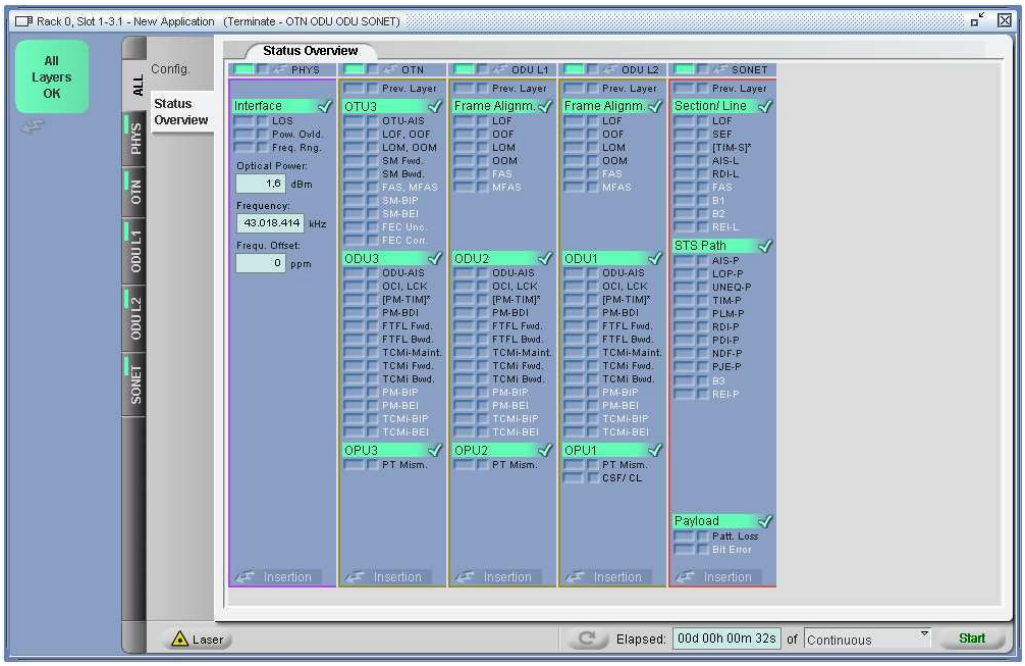
The application stack can be modified after pressing the **Edit** button (if no measurements are currently running) by selecting device mode (see "Device mode" on page 136) and signal structure and finally applying the new configuration.



Available stack configurations are depending on the underlying test-set hardware, the hardware version and available software options of that specific board. Individual boards in a single ONT-506 mainframe may have different hardware and options available and may therefore support different stack configurations.

7.2.3 Status overview

Selecting the 'Status Overview' chapter of the 'ALL' tab shows the overview status of all active layers on a single page.



Note: This page is reachable via a quick link from the 'Overall stack status' sign.

7.2.4 Device mode

Device mode determines the relation of transmitter and receiver.

Included topics

- Terminate mode
- Through mode
- Wrapper test mode
- De-wrapper test

7.2.4.1 Terminate mode

With device mode 'terminate', transmitter and receiver are running with the same signal structure.

All available signal structures (depending on hardware capabilities) are applicable.

7.2.4.2 Through mode

Through mode loops back the received signal to the transmitter.

Note: Through mode capabilities are hardware dependent and may not be available.

The **ALL** tab of layered applications allows the configuration of the device mode and through mode, if the underlying test-set hardware does support through mode.

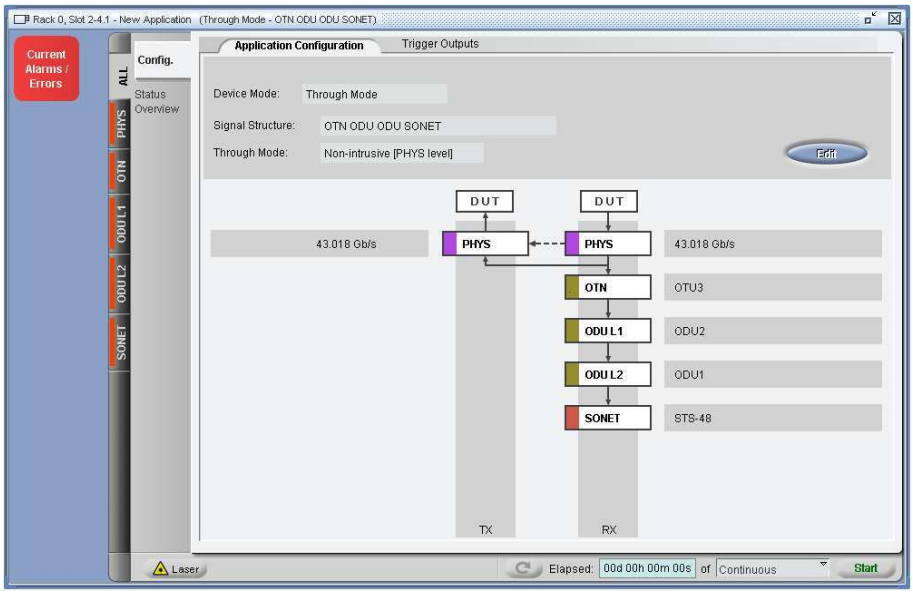
When the device mode is set to **Through Mode** the configuration of the through mode type allows the selection of the stack position in which the received signal is looped back to the transmitter (depending on hardware capabilities).

Two different types of through mode are possible:

- Non-intrusive (PHYS level)
- Intrusive (e.g. OTN level)

Non-intrusive through mode always means, that the RX signal is directly looped back on the PHYSical layer, without any influence on the digital content of the received signal. The RX side however, keeps the full analysis capabilities (monitoring through mode).

Intrusive through mode is able to loop back the RX signal and have some additional signal manipulation capabilities (like error, alarm insertion, overhead manipulation, etc.) on the layer where the signal is looped back.



7.2.4.3 Wrapper test mode

Device mode 'wrapper test' is used to test a DUT (device under test) with wrapper functionality.

The signal sent by the transmitter is wrapped by the DUT and than analyzed by the receiver.

An error-free DUT transports the OTN payload without modification. Therefore all available tests can be performed on the OTN payload.

With this device mode, only signal structures containing OTN are applicable.

7.2.4.4 De-wrapper test

Device mode 'de-wrapper test' is used to test a DUT (device under test) with de-wrapper functionality.

The OTN signal sent by the transmitter is de-wrapped by the DUT and the OTN payload signal sent by the DUT is analyzed by the receiver.

An error-free DUT transports the OTN payload without modification. Therefore all available tests can be performed on the OTN payload.

With this device mode, only signal structures containing OTN are applicable.

7.2.5 Trigger interfaces

The hardware trigger interface are shared between layers are therefore configured in the **ALL** tab / **Trigger-Outputs** section of the user interface.

Configuration is different depending on hardware capabilities and version. Currently only the PHYS and SDH layers of the 40/43/45G modules do support hardware triggering.

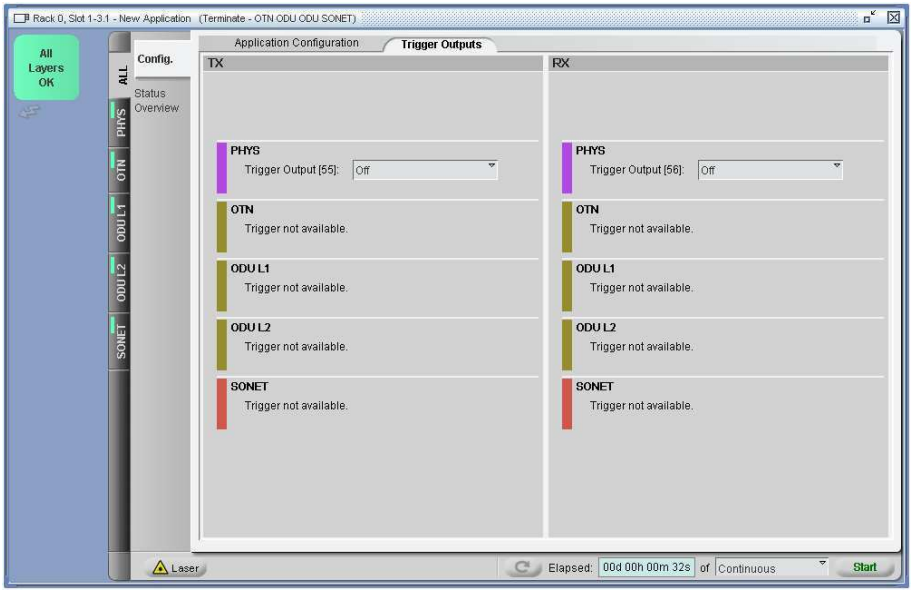
The individual trigger capabilities can be found in the corresponding layer description.

Included topics

- Trigger outputs 40/43G modules
- Trigger outputs 40/45G modules

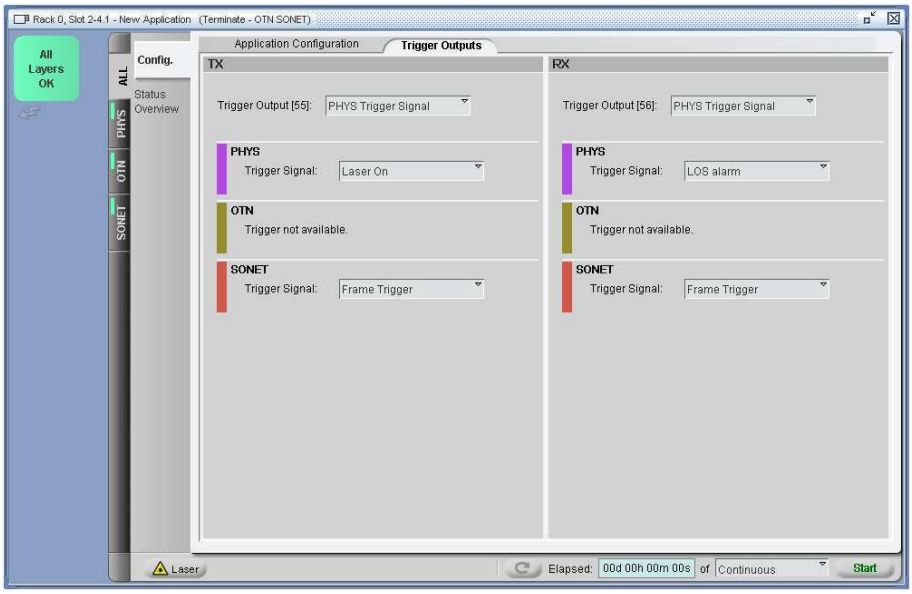
7.2.5.1 Trigger outputs 40/43G modules

40/43G module packages do have trigger interfaces on the base and payload modules and therefore the trigger outputs can be activated on the individual layers independently. Trigger Interfaces are switched off by default.



7.2.5.2 Trigger outputs 40/45G modules

40/45G module packages have only one (shared) trigger interface for the RX and TX side on the Main-Modules. The trigger source therefore must be selected before the individual trigger signals are activated. Trigger Interfaces are switched off by default.



7.3 Linux system level functions

This section describes the Linux system level functions.

Included topics

- Linux operating system
- Software update and recovery
- Networking
- Virtual Network Computing (VNC)
- Java Web Start

7.3.1 Linux operating system

This section describes the Linux operating system.

Included topics

- Linux operating system
- Linux desktop reference
- Linux user handling
- Starting an ONT-506 GUI
- Installing a network printer
- USB memory stick
- Adapting the keyboard layout
- Linux recovery

7.3.1.1 Linux operating system

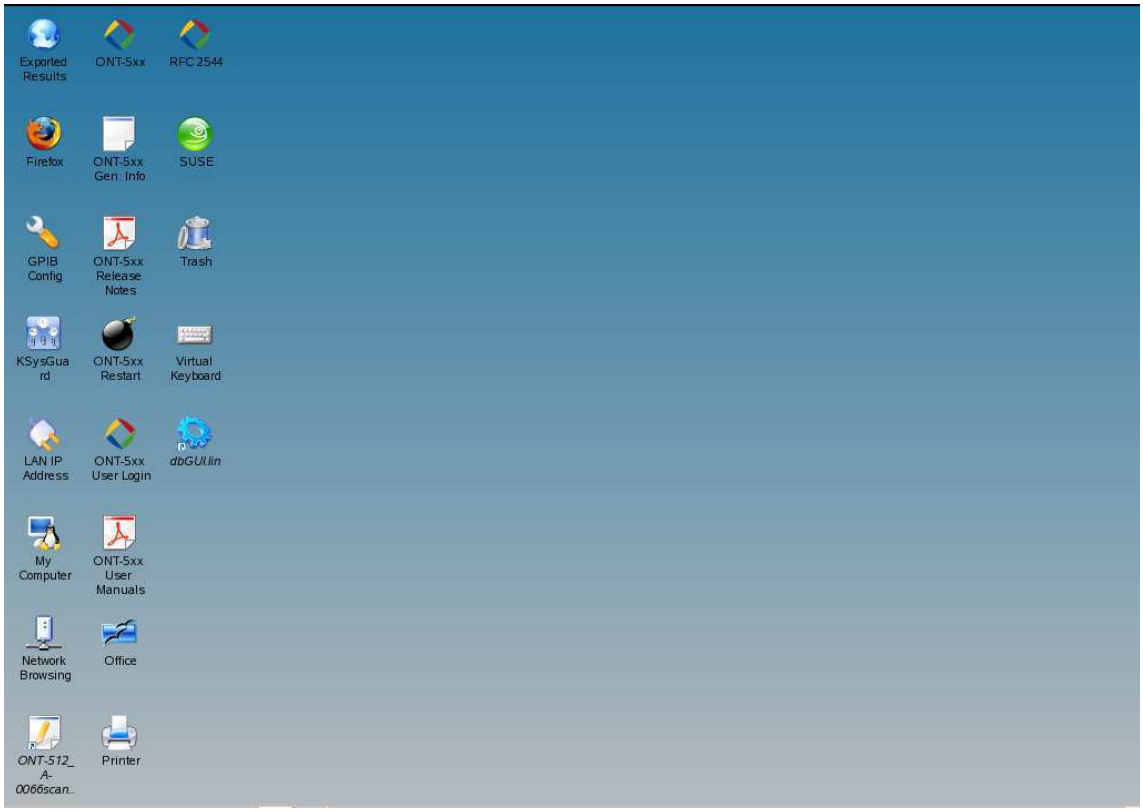
The Linux operating systems offers the infra structure to the system.

The following aspects are handled on Linux system level:

- Networking (detailed settings)
- Peripheral equipment (keyboard, display, ...)
- Mass storage (disk, DVD, USB, ...)
- Recovery

7.3.1.2 Linux desktop reference

This section references all functions accessible via the Linux desktop.



GUI control	Description
ONT-5xx 	Use this procedure to start an ONT-506 GUI in single-user mode. (see "Starting an ONT-506 GUI in single-user mode" on page 147)
ONT-5xx User Login 	Use this procedure to start an ONT-506 GUI in multi-user mode. (see "Starting an ONT-506 GUI in multi-user mode" on page 147)
ONT-5xx Gen. Info	The 'ONT-5xx General Information and Test Tool' allows to gather and display all relevant information about the ONT-506.

GUI control	Description
	(see " ONT-5xx General Information and Test Tool" on page 214)
Touch calibration 	Use this procedure to calibrate the touchscreen. (see "Calibrating the touchscreen" on page 226)
ONT-5xx Restart 	Use this procedure to restart the ONT-506 software. (see "Restarting the ONT-506 software" on page 221)
LAN IP Address 	Use this procedure to configure the IP addressing. (see "Provisioning LAN access" on page 224)
ONT-5xx Config Check 	Use this procedure to check the configuration of an ONT-506. (see "Checking device configuration" on page 131)

7.3.1.3 Linux user handling

This section deals with all aspects related to the Linux users.

Included topics

- Linux users
- Logging in as user 'root'
- Changing the password of a Linux user

7.3.1.3.1 Linux users

Different Linux users are required in order to restrict access to system level functions.

As almost every operating system, Linux prevents standard users from accessing system level functions. Only a special user (an 'administrator' called 'root') given specific permissions is allowed to do so.

During day-to-day operation Linux users do not appear, for the standard Linux user 'ont' is logged in automatically during system start-up.

The system will ask for the root password if 'root permissions' are required. There is no need to run the system as user 'root'.

As a rule no other Linux users are required.

Linux user	Password	Comment
ont	acterna	Standard user, logged in automatically during system start-up
root	acterna	Special user, given permissions to access system level functions

Note: The table above shows the factory settings. Passwords may have been changed.

7.3.1.3.2 Logging in as user 'root'

Use this procedure to log in as user 'root'.

Note: This procedure is activated by the system automatically in case of root privileges are required in order to go on.

Step	Action
1	*The **Run as root** dialog opens*
2	⇨ Select field **Password** and enter the root password (default: 'acterna').

Step	Action

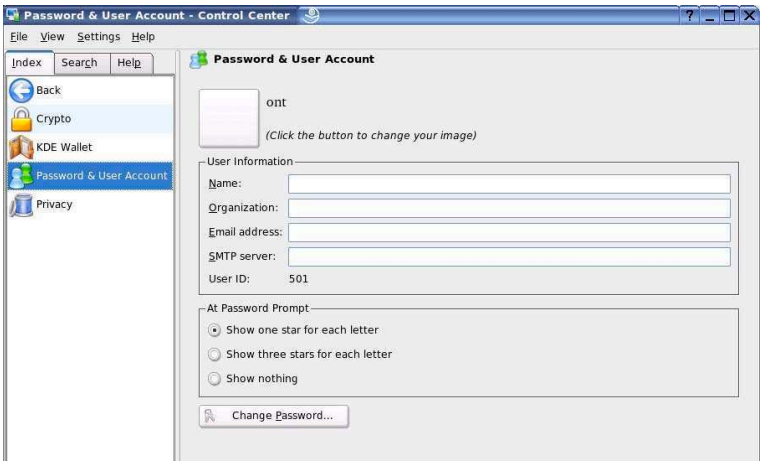
3 ⇨ Select button **OK**.

7.3.1.3.3 Changing the password of a Linux user

Use this procedure to change the password of the Linux user actually logged in.

Step	Action
1	⇨ Select button **KDE menu** *The KDE menu opens.*
2	⇨ Select **Control Center** from the KDE menu.
3	⇨ Select **Security & Privacy**.

4	⇨ Select **Password & User Account**.



5	⇨ Select **Change Password...**.
6	⇨ Enter the current password.
7	⇨ Enter and verify the new password.

7.3.1.4 Starting an ONT-506 GUI

This section describes how to start an ONT-506 GUI.

Included topics

- Starting an ONT-506 GUI in single-user mode
- Starting an ONT-506 GUI in multi-user mode

7.3.1.4.1 Starting an ONT-506 GUI in single-user mode

Use this procedure to start an ONT-506 GUI in single-user mode.

Step	Action
1	⇨ Select the icon **ONT-506 default login** from the Linux desktop.

The ONT-506 GUI starts.

The default user 'ont' is logged in automatically.

7.3.1.4.2 Starting an ONT-506 GUI in multi-user mode

Use this procedure to start an ONT-506 GUI in multi-user mode.

Step	Action
1	⇨ Select the icon **ONT-506 user login** from the Linux desktop.

The ONT-506 GUI starts.

The user is asked to log in (see "Logging in (multi-user mode)" on page 116).

7.3.1.5 Installing a network printer

Use this procedure to install a network printer.

✓ The ONT-506 has to be already connected to your TCP/IP network.

Step	Action
1	⇨ Select **System > YaST** from the Linux start menu.

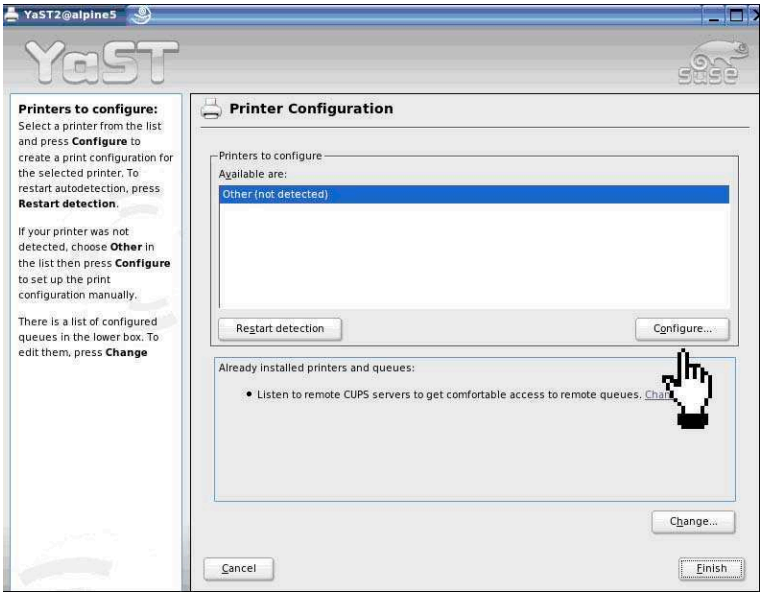
*The **Run as root** dialog opens*

2	⇨ Select field **Password** and enter the root password (default: 'acterna').

3	⇨ Select button **OK**.
4	⇨ Select icon **Printer**.

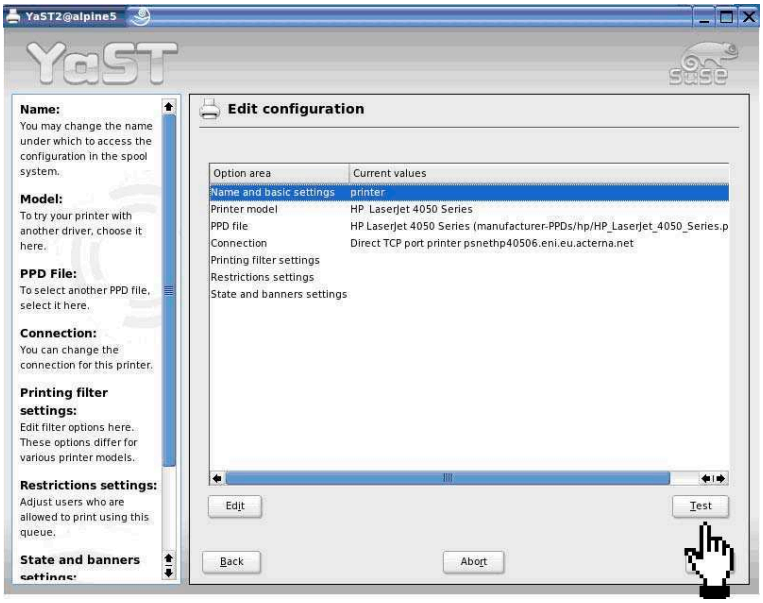
Step	Action

5 ⇨ Select **Other (not detected)**.



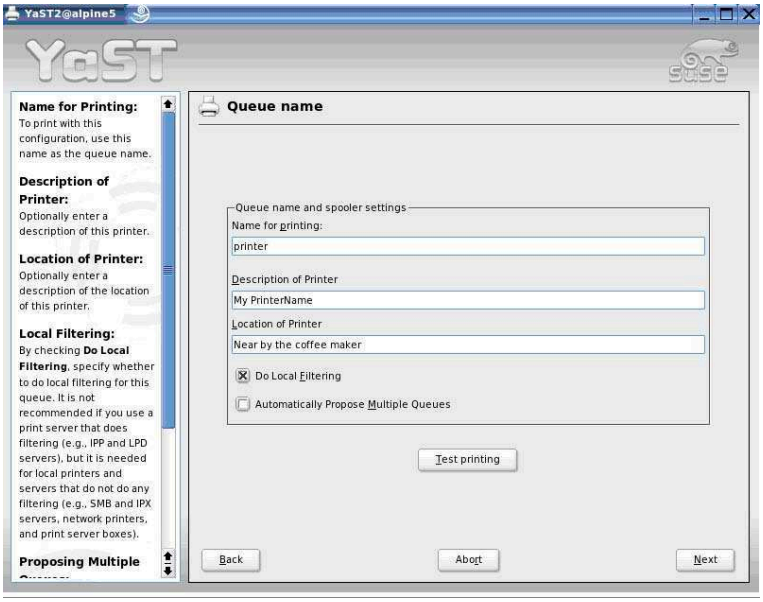
6 ⇨ Select **Printer**.

Step	Action



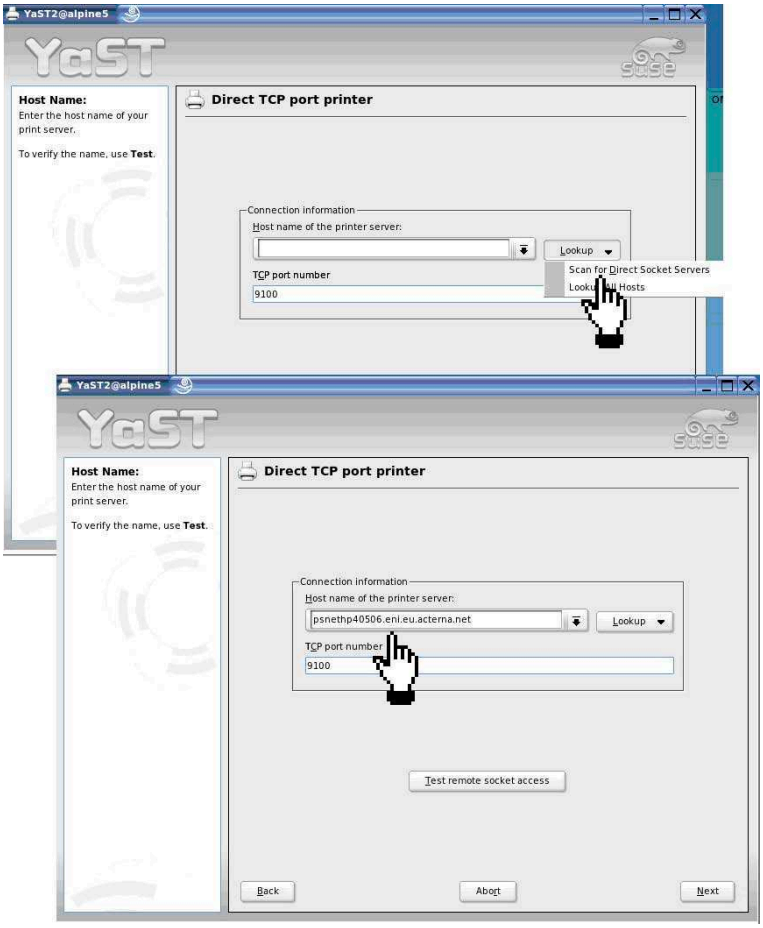
7 ⇨ Select button **Test**.

8 ⇨ Edit your preferred printer designations.

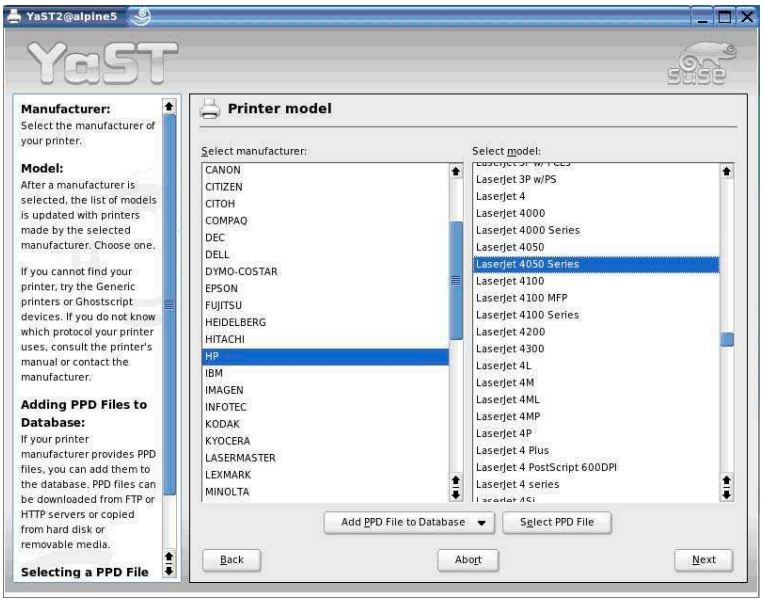


9 ⇨ Scan for available printers

Step	Action



10 ⇨ Select the appropriate printer driver from the list.



11 ⇨ Select **Next** to conclude your printer installation.

7.3.1.6 USB memory stick

This section describes the handling of USB memory sticks.

Included topics

- Mounting the USB stick
- Unmounting the USB stick

7.3.1.6.1 Mounting the USB stick

Use this procedure to mount an USB memory stick.

Step	Action
1	⇨ Insert the stick into the USB socket.
2	⇨ Wait until a new Hard Disk (sda1) icon appears on the desktop (this could last up to 20 seconds).
3	⇨ Select this icon. *The stick is automatically mounted and a screen opens showing the files stored on the stick.*

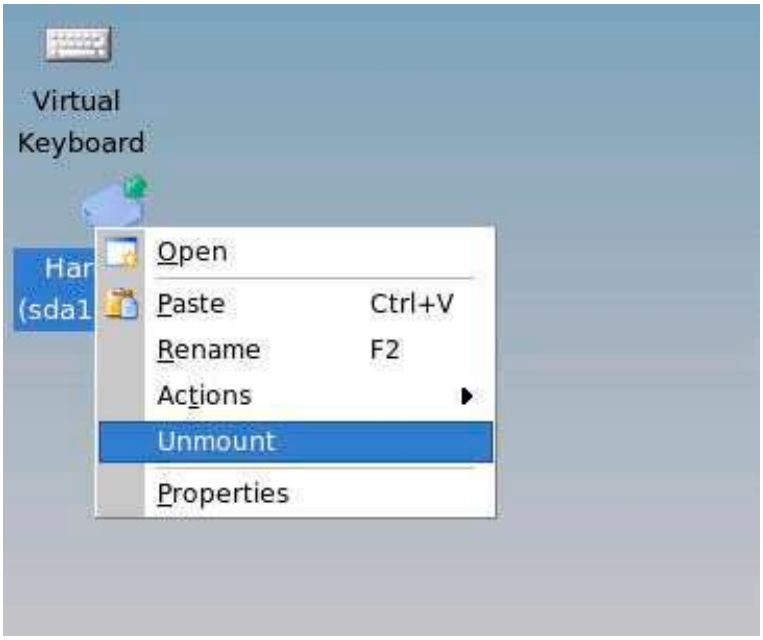
7.3.1.6.2 Unmounting the USB stick

Use this procedure to unmount an USB memory stick.

Note: The procedure depends on the version of the operating system you are using.

Step	Action
1	**Note:** You must unmount the USB stick before you can draw it off. If you draw off a still mounted USB stick, you may have to reboot your system to regain access to your USB stick. ⇨ Right-click the icon **(sda1)** and select **Unmount**.

Step	Action



2 ⇨ Unplug the stick.

Step	Action
1	**Note:** You do not need to unmount the USB stick. ⇨ Wait until the busy LED at the device is off.
2	⇨ Unplug the stick.

7.3.1.7 Adapting the keyboard layout

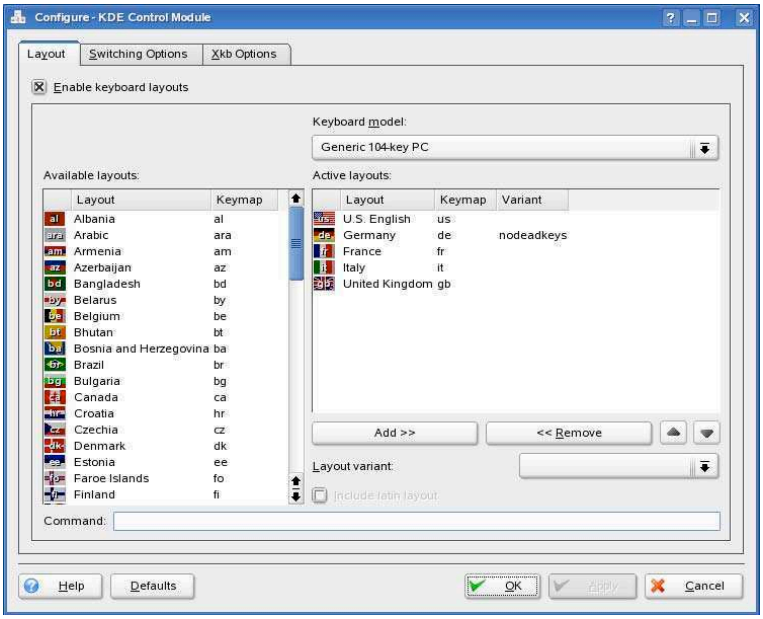
Use this procedure to adapt the keyboard layout

Note: If an external keyboard is connected to the ONT-506, the keyboard layout is set to US layout by default.

Note: The remote controlled GUI uses the standard keyboard layout of the used PC.

Step	Action
1	⇨ Select the **US banner** from the Linux task bar.
2	⇨ Select **continue**. *The Configure - KDE Control Module opens.*

Step	Action



3 ⇨ Move the desired standard layout on top of the right stack.

4 ⇨ Click the **OK button**.

7.3.1.8 Linux recovery

Use this procedure to re-install Linux and set it back to factory status.

Note: The Linux Recovery medium must match to the type of operating computer: USB stick for CPU P7A/B/C, Linux Recovery CD for CPU P6A. To find out your type of operating computer, check the front panel of the controller module (see "Controller & clock module" on page 196).

! When recovering Linux all ONT-506 applications software, all other installations and all related settings will be lost (e.g. the network configuration). Also customized user ID and password administration will be lost. Whereas measurement setting and results on the ONT-506 will not be touched by the installation.

✓ A Keyboard and a mouse have to be connected to your ONT-506.

✓ Installation assumes correct BIOS settings including CD-ROM drive defined as boot drive. In case you are not sure and update fails, please contact local service.

P7x

Step	Action
1	⇨ Shut-down the instrument (see "Shutting down the ONT-506 " on page 188)
2	⇨ Insert USB stick.
3	⇨ Switch instrument on again (see "Switching the ONT-506 on" on page 187)
4	⇨ Select key **F11** *The **Linux Recovery for ONT-506 equipped with CPU P7A/B/C** dialog opens.*
5	⇨ Select **Linux Recovery** and select 'Enter'. *A new window opens.*

Step	Action

6 ⇨ Type in the login 'recovery' and select 'Enter'.

7 ⇨ Type in 'yes' and select 'Enter'.

The installation is executed.

! Do not remove the USB stick!

8 ⇨ Select button **Enter** to reboot the system.

P6A

Step	Action

1 ⇨ Insert Linux Recovery CD into CD-ROM drive.

2 ⇨ Switch instrument off and on again (see "Switching the ONT-506 on" on page 187)

*The **Boot Option** dialog opens.*

3 ⇨ Select Boot Option **Recovery**

4 ⇨ Select the keyboard language.

5 ⇨ Select button **OK**.

⇨ Follow the instruction given on the screen.

6 ⇨ Type in the login 'recovery' and select 'Enter'.

The message 'THE DATA PARTITION WILL BE PRESERVED' confirms, that your measurement settings and results are saved.

7 ⇨ Select button **Enter**.

The installation is executed. At the end of the installation the CD is ejected and can be removed.

Step	Action
8	⇨ Select button **Enter** to reboot the system. *A **Useful Tips** window pops up.*
9	⇨ Uncheck **show up on startup** and close the window.
10	⇨ Select **Accept** and finish for each new found hardware. In some cases the root password is required (default: 'acterna' (see "Linux users" on page 144).

Note: You have to re-install the ONT-506 software now (see "Updating the software" on page 159).

7.3.2 Software update and recovery

This section deals with all aspects regarding software update and recovery.

The software for the ONT-506 is subject to constant development, as it is continually being extended and adapted to the latest changes in technology.

Installing or updating the software is requested,

- when a new software release is available,
- when inconsistent software requires a new installation,
- after re-installing the Linux recovery.

Included topics

- Software update set
- Updating the software
- Downgrading the software

7.3.2.1 Software update set

Software update set.

The update set consists of three disks and one USB stick:

- Software (disk 1 of 2) (ONT-506 applications software)
- Value disk (disk 2 of 2) (Manuals, data sheets, Remote Control package)
- ONT-506/512 Linux recovery disk for CPU P6A
- USB stick (Linux recovery for CPU P7A/B/C, ONT-506 applications software)

Contact your local JDSU Sales Company to obtain the latest version of the software update set.

7.3.2.2 Updating the software

Use this procedure to update the software

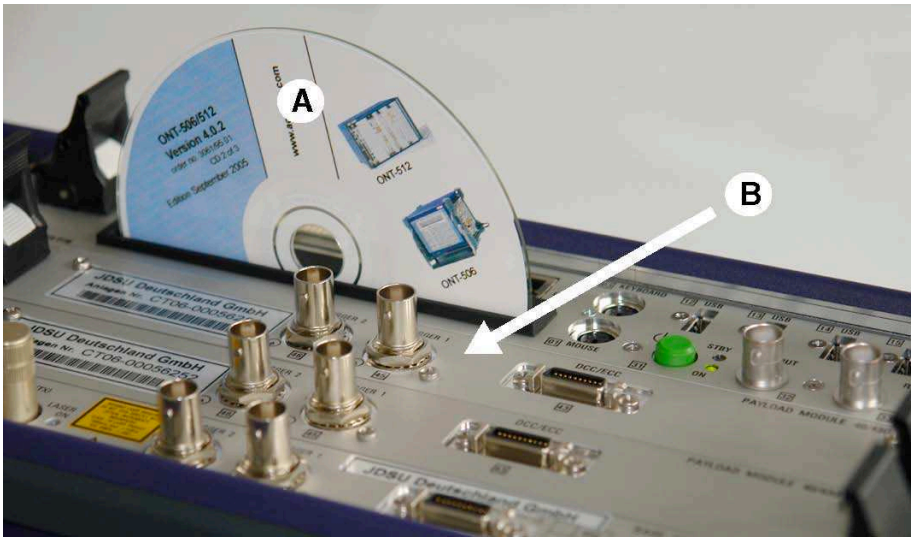
P7x

Step	Action
1	⇨ Insert USB stick. *The **Autorun** dialog opens.* 
2	⇨ Select **Yes** to confirm. *A new window opens.*
3	⇨ Enter Linux root password (default: 'acterna') *The installation is started and will take up to 10 minutes.*
4	⇨ Select **Enter** to reboot the system *The ONT-506 reboots to finalize the installation. After rebooting the ONT-506 software is started to finalize the software installation on the test modules. During this installation (appr. 15 minutes) the screen display of the modules turns to yellow.* ! Do not switch off the instrument as long as test modules are depicted with a dark yellow background. **Note:** The installation is finalized when the module names are visible. **Note:** The touch screen may need to be re-calibrated after installing software (see "Calibrating touch screen" on page 194).

P6A

Step	Action
1	⇨ Insert CD labeled "Software" (CD 1 of 2) into CD-ROM drive. The CD label (A) must point to the module (B).

Step	Action



*The **A data CD was found** dialog opens.*

2 ⇨ Select **YES** to confirm.

A new window opens, showing the CD contents.

3 ⇨ Select icon **Install** to start installation.

4 ⇨ Enter Linux root password (default: 'acterna')

The installation is started and will take up to 10 minutes. After installation the CD is ejected and can be removed.

5 ⇨ Select **Enter** to reboot the system

The ONT-506 reboots to finalize the installation. After rebooting the ONT-506 software is started to finalize the software installation on the test modules. During this installation (appr. 15 minutes) the screen display of the modules turns to yellow.

! Do not switch off the instrument as long as test modules are depicted with a dark yellow background.

Note: The installation is finalized when the module names are visible.

Note: The touch screen may need to be re-calibrated after installing software (see "Calibrating touch screen" on page 194).

Note: If you discover any issues after a software upgrade, please reboot the system (see "Rebooting the ONT-506 " on page 192).

7.3.2.3 Downgrading the software

Use this procedure to downgrade the software

Note: Downgrading isn't possible within one step. You have to uninstall the installed software first.

P7x

Step	Action
1	⇨ Insert USB stick.

Note: The USB stick must contain the software version to be uninstalled. Using the uninstall script of a different version might not work properly.

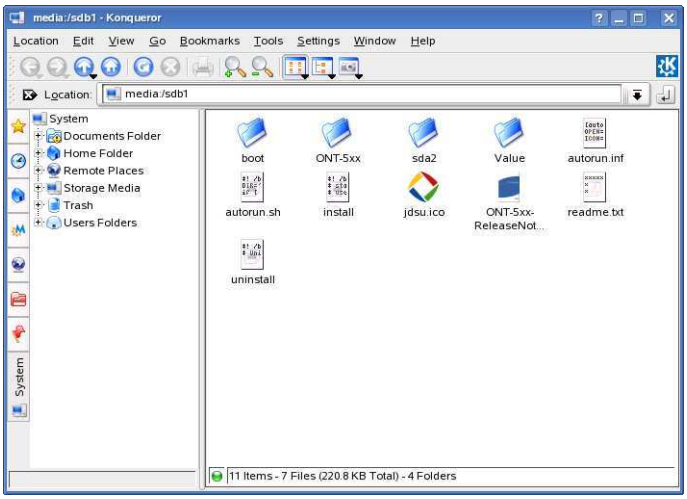
*The **Autorun** dialog opens twice.*

2 ⇨ Select two times **No**.

The dialog disappears.

3 ⇨ Select the USB stick icon from the desktop

*The **Konqueror** dialog opens.*



4 ⇨ Select **uninstall** and follow the instructions.

Step	Action
5	⇨ Install the desired software version (see "Updating the software" on page 159)

P6A

Step	Action
1	⇨ Insert CD instead of USB stick.

7.3.3 Networking

This section describes the networking aspects.

Included topics

- Networking
- Preparation for LAN access
- Provisioning LAN access using DHCP (advanced setting)
- Provisioning LAN access using a static IP address (advanced setting)

7.3.3.1 Networking

Each ONT-506 can be connected to a LAN (Local Area Network).

To address the ONT-506 in a LAN, it needs a unique TCP/IP address.

To address the test modules in a LAN, they need unique TCP/IP addresses.

A valid IP address can be obtained in two different ways:

- **DHCP**

  A valid IP address is assigned during boot-up automatically. As a prerequisite, a DHCP server has to be active.

  The usage of DHCP is configured as a factory default.

- **Static IP address**

  A static IP address is assigned. It is up to the user to avoid collisions caused be duplicate addresses.

7.3.3.2 Preparation for LAN access

Use this procedure to prepare the ONT-506 for LAN access.

The ONT-506 is factory configured to use DHCP in order to obtain all IP address configuration information. You may change this in order to program static information.

Optionally you may want to connect the ONT-506 to your Local Area Network (LAN).

A network connection is required in order to use one (or more) of the following features:

- Printing
- Remote operation
- Remote control

As a factory default the ONT-506 is pre-configured to use DHCP

(see "Networking" on page 163).

The ONT-506 offers an easy way to switch to a static IP address

(see "Provisioning LAN access using a static IP address" on page 128).

In case of more detailed settings are required the standard configuration tool KDE Control Center and the YaST modules have to be used.

(see "Provisioning LAN access using DHCP (advanced setting)" on page 165) and

(see "Provisioning LAN access using a static IP address (advanced setting)" on page 169).

Note: ONLY perform changes to eth0 - all others must not be changed.

Note: Contact your local IT department in order to avoid network problems.

7.3.3.3 Provisioning LAN access using DHCP (advanced setting)

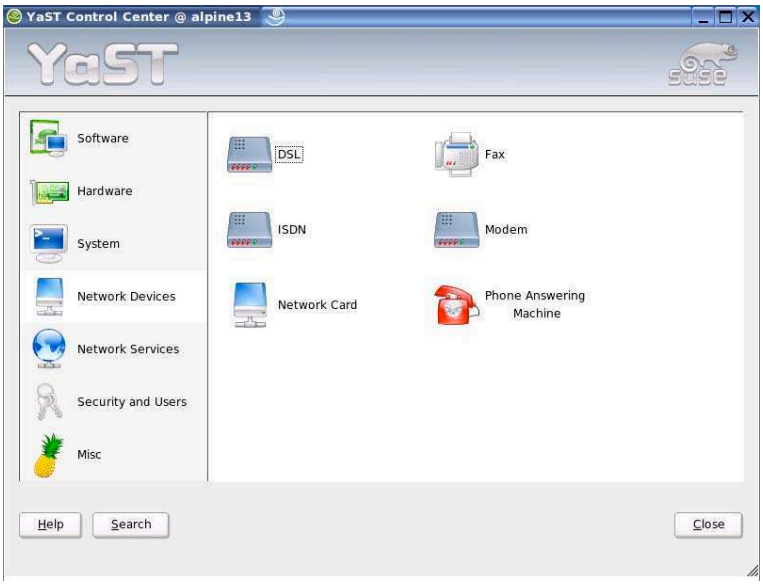
Use this procedure to connect the ONT-506 to the LAN using DHCP (advanced setting).

Note: 'Administrator' permissions are required to change network settings.

Note: LAN access can't be configured remotely (via Java Web Start or VNC) but locally.

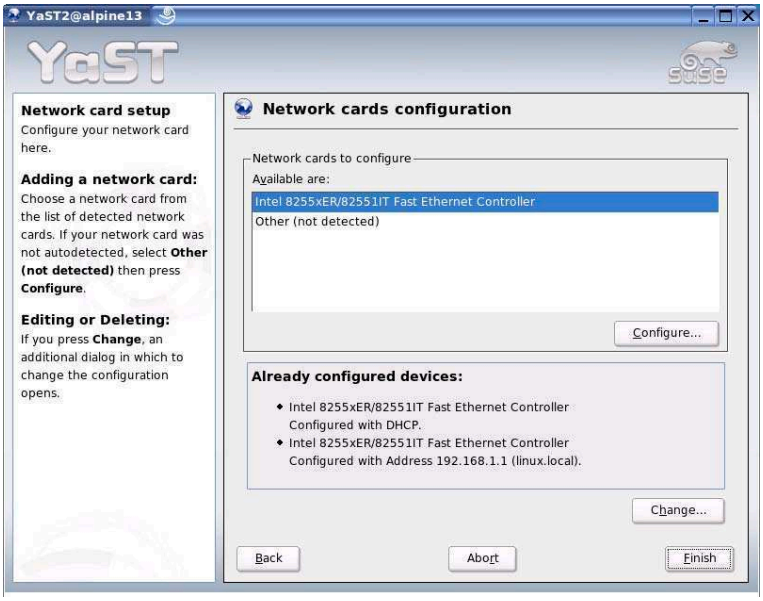
Step	Action
1	⇨ Disconnect the ONT-506 from the network and reboot it.
2	⇨ Select **Start > System > YaST** from the Linux tool bar. *The **Run as root** dialog opens.*

3	⇨ Select field **Password** and enter the root password (default: 'acterna').
4	⇨ Select button **OK**. *The **YaST Control Center** dialog opens.*



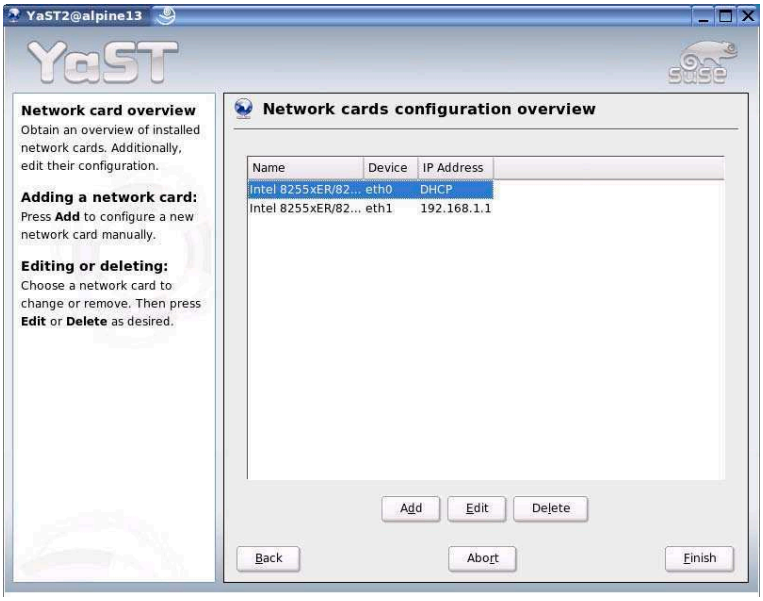
5	⇨ Select **Network Devices** from the left navigation bar, and **Network Card** from the main window. *The **Network cards configuration** dialog opens.*

Step	Action



6 ⇨ Select button **Change ...**.

*The **Network cards configuration overview** dialog opens.*

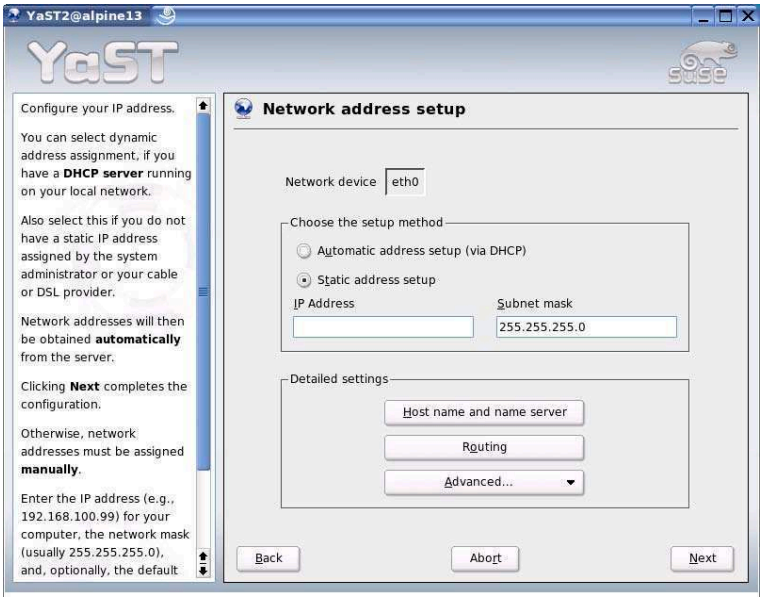


7 ⇨ Select device **eth0** and button **Edit**. Notice:

! Be careful not to select the eth1 device.

*The **Network address setup** dialog opens.*

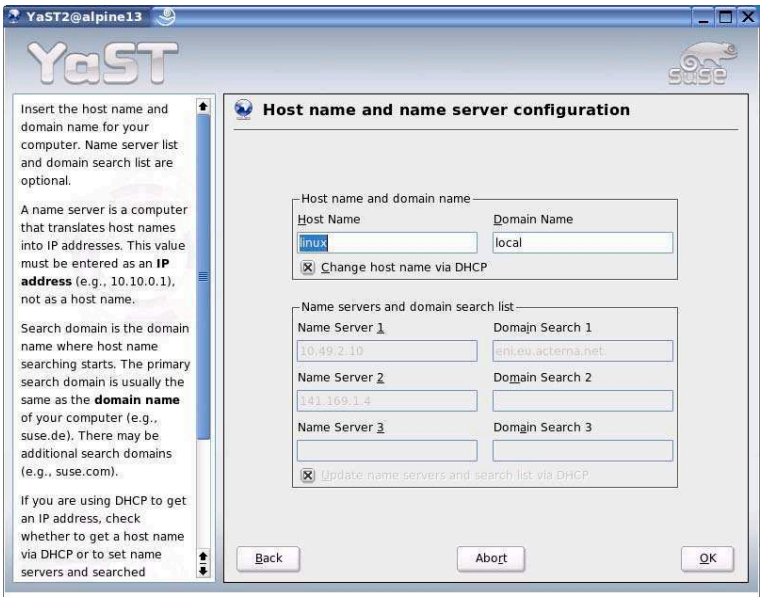
Step	Action



8 ⇨ Check **Automatic address setup (via DHCP)**.

9 ⇨ Select button **Host name and name server**.

*The **Host name and name server configuration** dialog opens.*



10 ⇨ Check **Change host name via DHCP**.

11 ⇨ Check **Update name servers and search list via DHCP**.

! Do not enter values from example above. They do not show valid data.

12 ⇨ Select button **OK**.

*The **Host name and name server configuration** dialog closes.*

13 ⇨ Select button **OK**.

*The **Network address setup** dialog closes.*

Step	Action
14	⇨ Select button **Finish**. *The **Network Cards configuration** dialog closes.*
15	⇨ Close the **YaST Control Center** dialog.
16	⇨ Connect the ONT-506 to the network and reboot it.
17	⇨ Try to ping another host. Try to ping the ONT-506 from another host. Verify that the ONT-506 received a valid name from DHCP server. Your IT department can tell you which names are used by the DHCP server.

7.3.3.4 Provisioning LAN access using a static IP address (advanced setting)

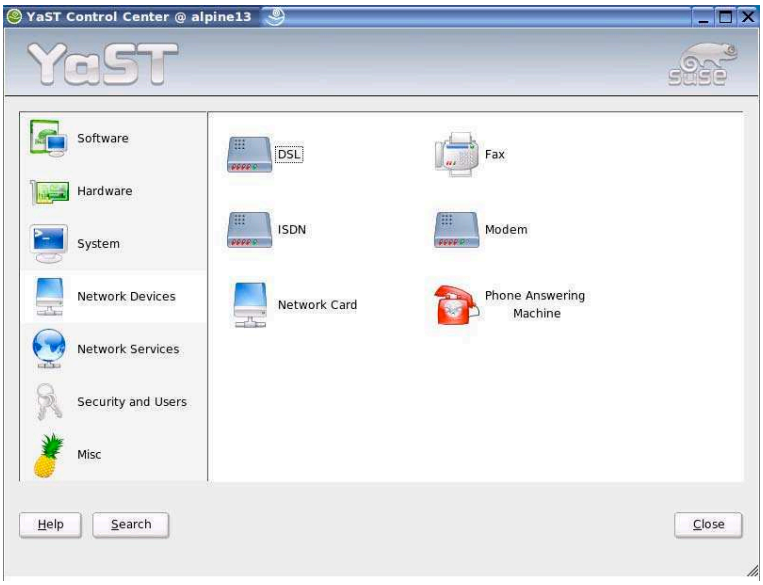
Use this procedure to connect the ONT-506 to the LAN using a static IP address (advanced setting).

Note: 'Administrator' permissions are required to change network settings.

Note: LAN access can't be configured remotely (via Java Web Start or VNC) but locally.

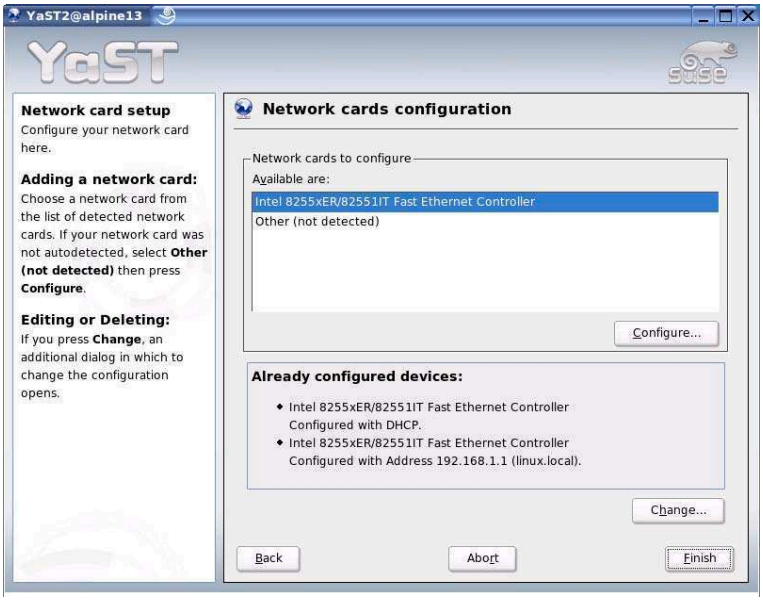
Step	Action
1	⇨ Disconnect the ONT-506 from the network and reboot it.
2	⇨ Select **Start > System > YaST** from the Linux tool bar. *The **Run as root** dialog opens.*

3	⇨ Select field **Password** and enter the root password (default: 'acterna').
4	⇨ Select button **OK**. *The **YaST Control Center** dialog opens.*



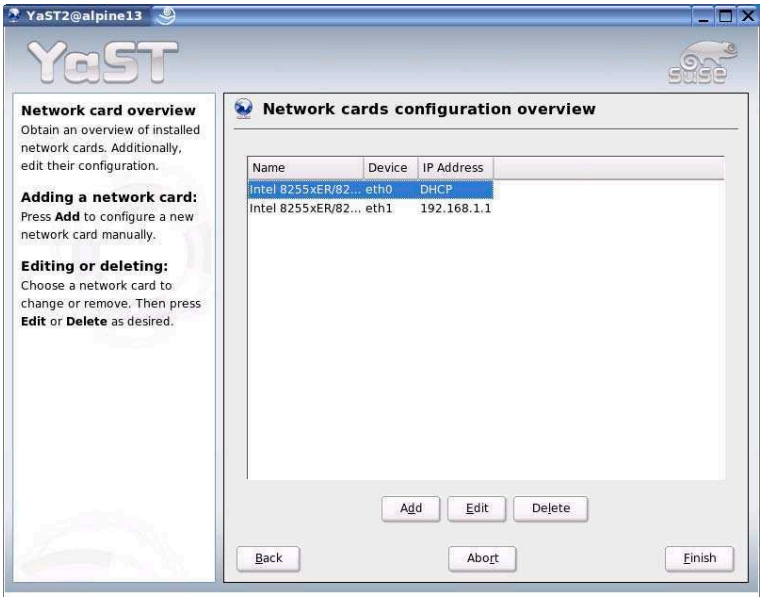
5	⇨ Select **Network Devices** from the left navigation bar, and **Network Card** from the main window. *The **Network cards configuration** dialog opens.*

Step	Action



6 ⇨ Select button **Change ...**.

*The **Network cards configuration overview** dialog opens.*

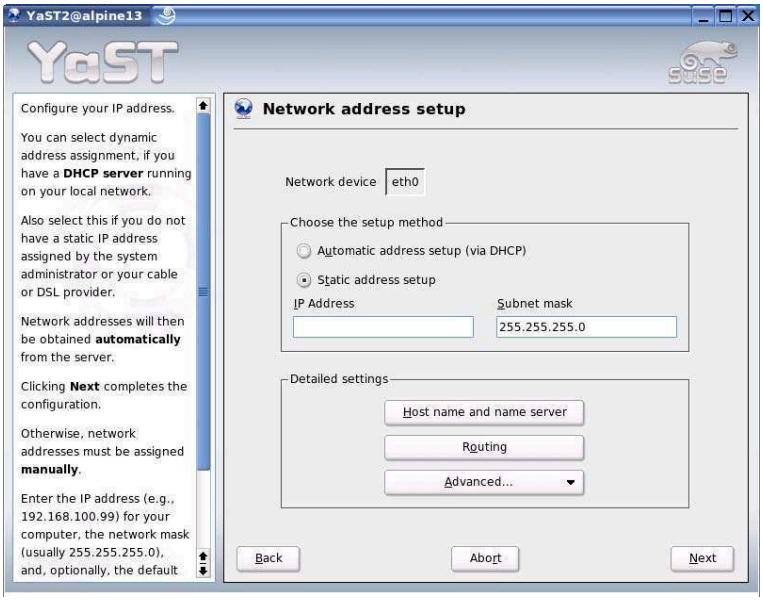


7 ⇨ Select device **eth0** and button **Edit**.

! Be careful not to select the eth1 device.

*The **Network address setup** dialog opens.*

Step	Action



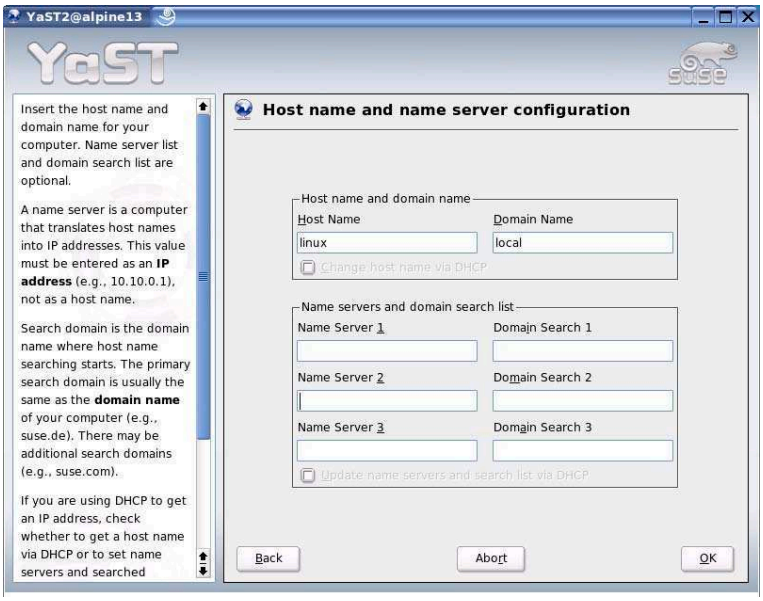
8 ⇨ Check **Static address setup**.

9 ⇨ Select entry field **IP Address** and enter IP address.

10 ⇨ Select entry field **Subnet mask** and enter subnet mask.

11 ⇨ Select button **Host name and name server**.

*The **Host name and name server configuration** dialog opens.*



12 ⇨ Enter **Host Name**, **Domain Name**, **Name Server** list and **Domain search** list.

Step	Action

Rules for setting host name and name server:

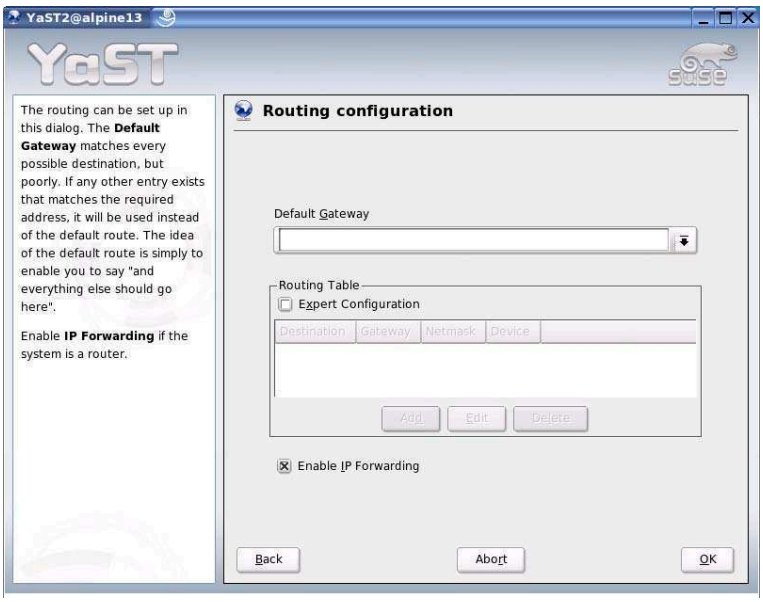
- If you have a host name known to the name server: set this host name, domain name, IP address of the name server(s) and the domain search(es). In this case you are able to remote access the device by using its name.
- If you do not have a valid host name (the name is not known to the name server): keep host name unchanged, set domain name to 'local' and leave all name server and domain search fields empty. In this case you can remote access the unit only by using the device IP address.

13 ⇨ Select button **OK**.

*The **Host name and name server configuration** dialog closes.*

14 ⇨ Select button **Routing** in the **Network address setup** dialog.

*The **Routing configuration** dialog opens.*



15 ⇨ Select entry field **Default Gateway** and enter IP address of your default gateway.

! Do not uncheck **Enable IP Forwarding** for IP forwarding is required for the ONT-506 to work properly.

16 ⇨ Select button **OK**.

*The **Routing configuration** dialog closes.*

17 ⇨ Select button **OK**.

*The **Network address setup** dialog closes.*

18 ⇨ Select button **Finish**.

*The **Network Cards configuration** dialog closes.*

19 ⇨ Close the **YaST Control Center** dialog.

20 ⇨ Connect the ONT-506 to the network and reboot it.

21 ⇨ Try to ping another host. Try to ping the ONT-506 from another host.

7.3.4 Virtual Network Computing (VNC)

This section describes VNC capabilities.

Note: VNC and RealVNC are registered trademarks of RealVNC Limited.

Included topics

- VNC concept
- Starting remote maintenance using a VNC applet
- Installing a VNC client
- Starting remote operation using a VNC client

7.3.4.1 VNC concept

VNC provides a means for remote maintenance of an ONT-506.

While VNC provides remote access to an ONT-506, there is a major difference compared with remote operation via Java Web Start (see "Java Web Start" on page 176). Unlike Web Start, VNC does not start a new GUI client that supports all of the multi-user aspects but instead displays a 1:1 copy of the ONT-506 desktop for direct remote control.

Remote maintenance by VNC can be made in two ways:

- VNC applet
- VNC viewer

Using the VNC applet is a simple and comfortable way to remote access the ONT-506. The VNC applet can easily be downloaded directly from the ONT VNC server. You will then be able to use your web browser for remote operation.

When using the VNC viewer, first a VNC client must be downloaded and installed on your system (a VNC server is already available on the ONT-506). The VNC client then allows you to start the remote operation in an own viewer window (no web browser required).

There are several VNC programs available in the Internet, free of charge. The most common are 'RealVNC' and 'TightVNC'.

7.3.4.2 Starting remote maintenance using a VNC applet

Use this procedure to start remote maintenance using a VNC applet.

Step	Action
1	⇨ Open your web browser.
2	⇨ Type in ONT IP address and port number: http://IP address:5830. *The VNC applet is downloaded from the ONT to your system.* *The VNC authentication window opens.*
3	⇨ Type in VNC password (default: acterna) and Click **OK**. *The ONT-506 desktop is shown on your browser.*

7.3.4.3 Installing a VNC client

Use this procedure to install a VNC client.

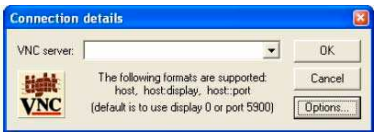
Step	Action
1	⇨ Download the viewer from the Internet • RealVNC: www.realvnc.com • TightVNC: www.tightvnc.com
2	⇨ Install the viewer following the given installation instructions.

7.3.4.4 Starting remote operation using a VNC client

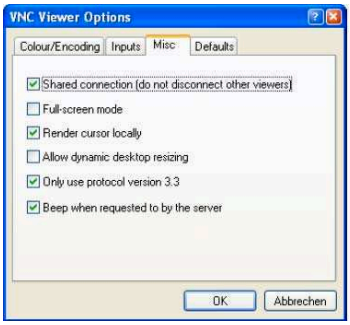
Use this procedure to start remote operation using a VNC client.

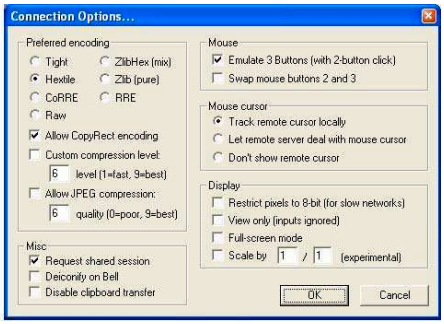
✓ A VNC client has been installed already.

Step	Action
1	⇨ Open the viewer

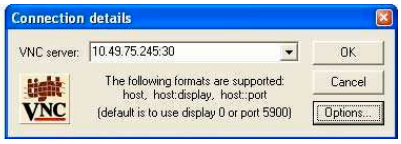


2	⇨ Select button **Options**. *A configuration dialog opens*

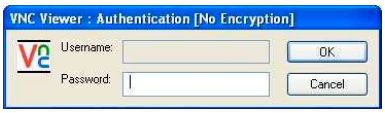




3	⇨ RealVNC: Check **Only use protocol version 3.3**. ⇨ TightVNC: Uncheck **Allow JPEG compression**.
4	⇨ Select button **OK**. *A connection details dialog opens.*
5	⇨ Enter IP address and port number 30 (<IP address>:30).



6	⇨ Select button **OK**. *A authentication dialog opens.*
7	⇨ Enter server password 'acterna'.



8	⇨ Select button **OK**.
9	*The ONT desktop is displayed.*

7.3.5 Java Web Start

This section describes the Java Web Start capabilities.

Included topics

- Java Web Start concept
- Starting remote operation via Java Web Start
- Java Runtime Environment

7.3.5.1 Java Web Start concept

Java Web Start provides a means for remote operation of an ONT-506.

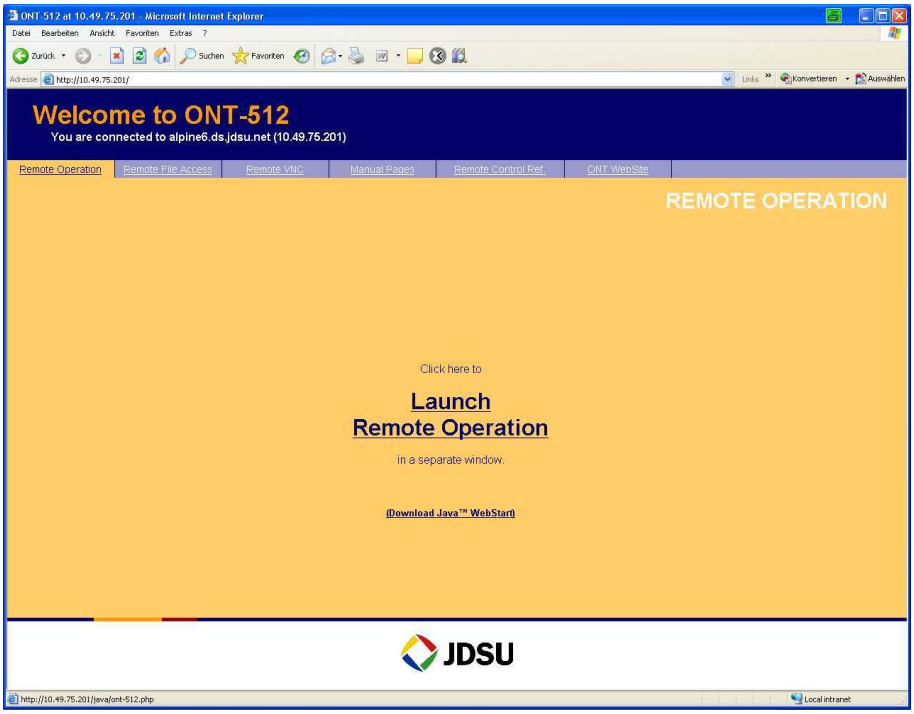
Java Web Start downloads the GUI software to the remote PC and starts the GUI.

7.3.5.2 Starting remote operation via Java Web Start

Use this procedure to start remote operation via Java Web Start.

✓ Java Web Start is installed on your local PC.

Step	Action
1	⇨ Open your web browser.
2	⇨ Enter the IP address of the ONT-506. *The **Welcome to ONT-506** screen opens.*



3	⇨ Select **Launch Application GUI**. *The GUI client is downloaded.*

Step	Action
4	⇨ Accept the safety warning. *The GUI client opens.*

7.3.5.3 Java Runtime Environment

An installation of the Java Runtime Environment is required in order to use Java Web Start..

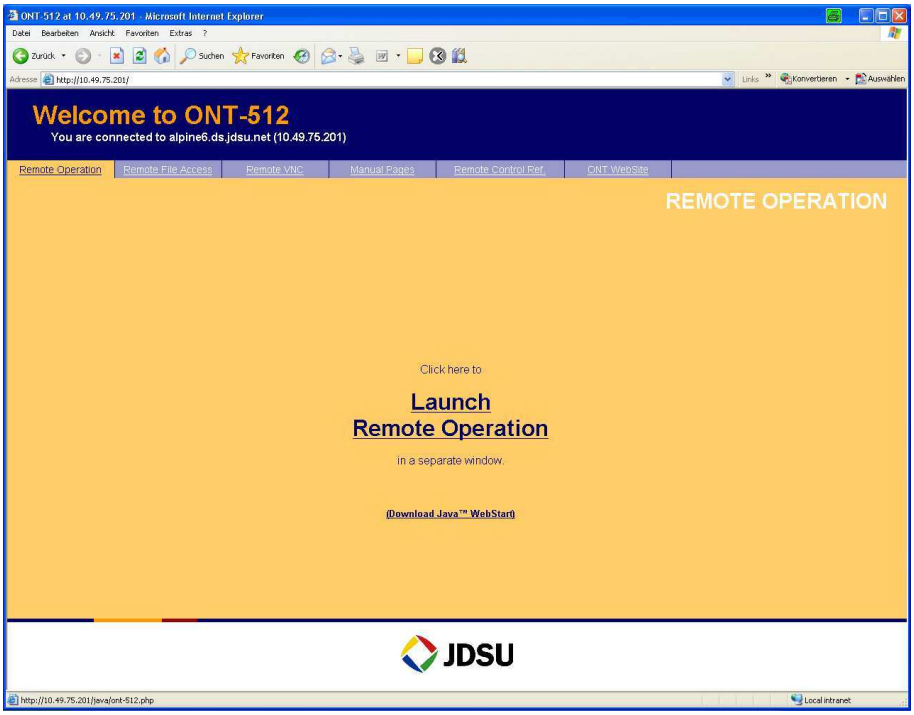
Included topics

- Installing JRE via the 'Welcome to the ONT-506' screen
- Installing JRE from the Sun homepage directly
- Setting up Java Web Start

7.3.5.3.1 Installing JRE via the 'Welcome to the ONT-506' screen

Use this procedure to install the Java Runtime Environment (JRE) via the 'Welcome to the ONT-506' screen.

Step	Action
1	⇨ Open your web browser.
2	⇨ Enter the IP address of the ONT-506. *The **Welcome to ONT-506** screen opens.*



3	⇨ Select **Download Java WebStart** *This will guide you directly to the JRE download link on the sun web page.*
4	⇨ Download and install JRE onto your system (follow the installation instructions).

7.3.5.3.2 Installing JRE from the Sun homepage directly

Use this procedure to install the Java Runtime Environment (JRE) from the Sun homepage directly.

Step	Action
1	⇨ Open your web browser.
2	⇨ Open the Sun homepage (http://java.sun.com) and navigate to the Java Runtime Environment, V 1.6.0 or 1.7.0 download.
3	⇨ Download and install JRE onto your system (follow the installation instructions).

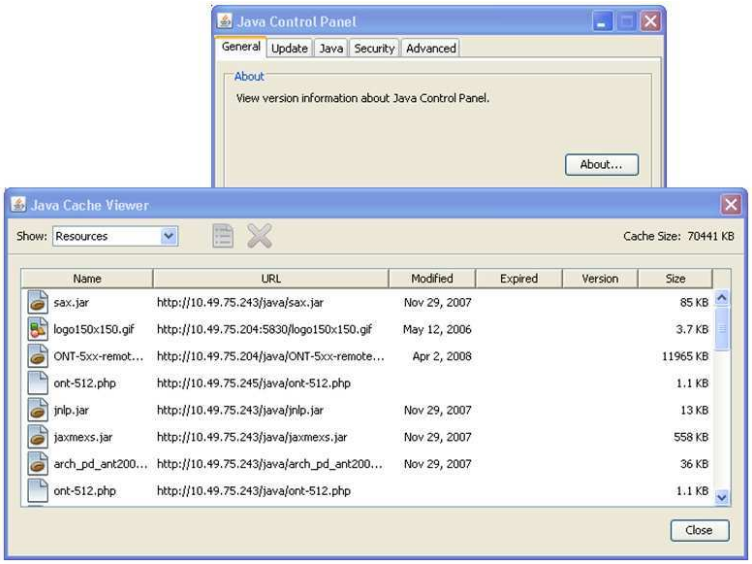
7.3.5.3.3 Setting up Java Web Start

Use this procedure to set up Java Web Start

Step	Action
1	⇨ Start Java Web Start ('javaws.exe -viewer').

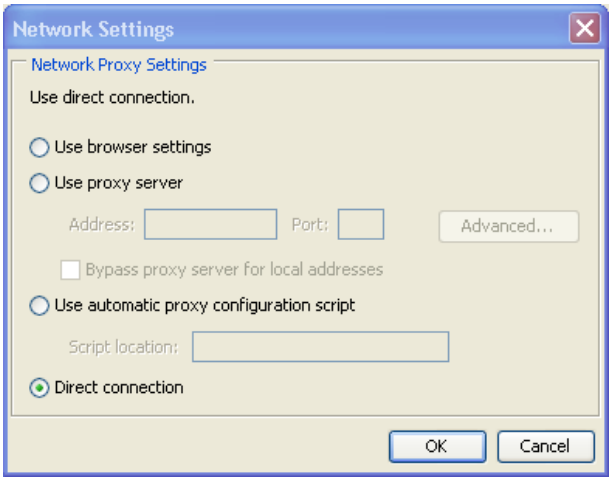
Note: Where to find 'javaws.exe' depends on the operating system and the Java installation. In a windows environment the standard location is C:\Program Files\Java\jre1.6.0_...\bin

*The **Java Cache Viewer** and the **Java Control Panel** dialogs open.*



2	⇨ Select button **Close** to close the **Java Cache Viewer** dialog.
3	⇨ Select button **Network Settings...**.

*The **Network Settings** dialog opens.*



4	⇨ Check **Direct connection**.
5	⇨ Close Java Web Start.

7.4 Mainframe & hardware

This section describes the hardware of the ONT-5xx mainframe family.

Included topics

- Mainframe handling
- Controller & clock module
- Test module handling

7.4.1 Mainframe handling

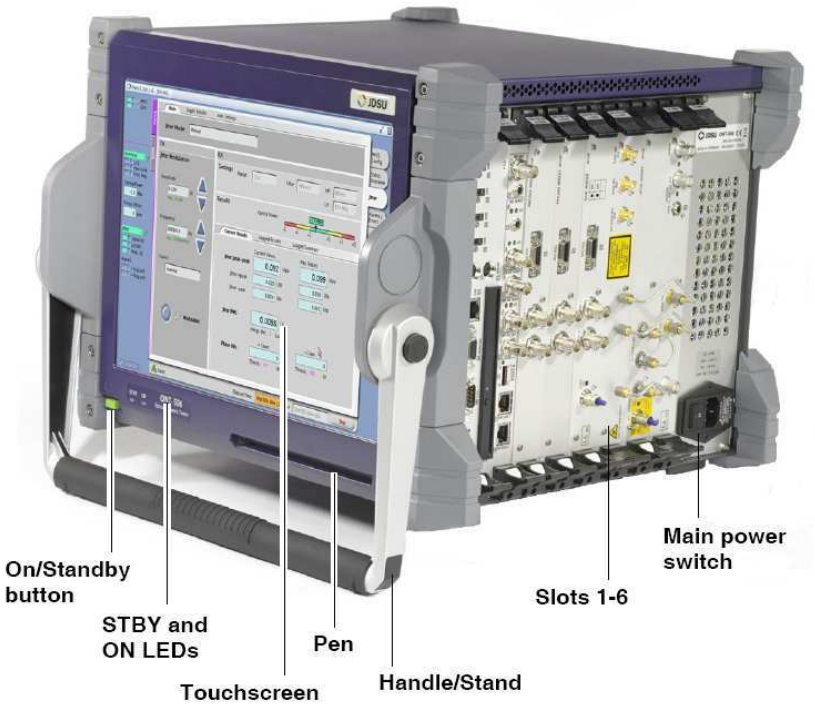
This section describes the mainframe handling.

Included topics

- ONT-506
- Unpacking the instrument
- Packing for storage/transport
- Checking safety properties after repair
- Positioning the instrument
- Connecting peripheral equipment
- Connecting the ONT-506 to the AC line
- Connecting to the LAN
- Switching the ONT-506 on
- Shutting down the ONT-506
- Switching the ONT-506 off
- Rebooting the ONT-506
- Touchscreen
- Calibrating touch screen
- Locking touch screen
- Cleaning the ONT-506

7.4.1.1 ONT-506

6-slot mainframe ONT-506.



7.4.1.2 Unpacking the instrument

Use this procedure to unpack the instrument.

Step	Action
1	⇨ Remove the packaging
2	⇨ Keep the packaging The packaging is designed to be re-used if it is not damaged during transport or when it is opened. The instrument is only protected reliably from damage during transport if the original packaging is used. ⇨ Store the packaging and the padding material and drying agent in a safe place.
3	⇨ Check for completeness The packaging should contain: • ONT-506 BN 3062/01 • Test modules (including accessories) according to configuration • 1 AC line cord • 1 Operating manual • 1 Remote control operating manual
4	⇨ Check the ONT-506 for transport damage After you have unpacked the ONT-506, check it for transport damage. Such damage is likely if the packaging itself has been clearly damaged. ! Do not try to use an instrument that is visibly damaged, as further damage may result.
5	⇨ Give time for recovery after storage and transport ! Condensation may form on an instrument that has been stored or transported at low temperatures when it is brought into a warmer environment. To prevent damage, wait until all the condensation on the instrument surfaces has evaporated before switching the unit on. The instrument is only ready to use when it has reached a temperature that is within the specified operating range (+5 °C to +40 °C).

7.4.1.3 Packing for storage/transport

Use this procedure to package and store the ONT-506 if it needs to be returned for repairs or stored for a long period.

A cool, dry place is sufficient for on-site storage. No packaging is necessary.

If a dry place is not available or if the instrument is to be shipped, e.g. to an JDSU Sales Organization for repairs, follow the instructions below to prevent damage occurring during storage or transport.

Step	Action
1	⇨ Place the pouch containing drying agent in the plastic bag provided with the packaging materials. We recommend that you use the drying agent provided in the original packing to protect the instrument against humidity. This is particularly necessary if • the ONT-506 is to be stored for long periods in a location where high humidity can occur • shipping is likely to take a very long time.

CAUTION **Damage caused by dampness during storage**

! Saturated drying agent within a seal box or bag can increase the humidity.

! Never use any saturated drying agent. The indicator label of the drying agent bag changes color from blue to pink when it is saturated.

! Do not store the instrument in a humid atmosphere.

2	⇨ Put the instrument into the plastic bag and seal the bag using strong adhesive tape.
3	⇨ If possible, use the original packaging if it has not been damaged. If the original packaging is no longer available, use a strong box made of double-layer corrugated cardboard that is at least 4 mm thick. The box should be large enough to allow room for sufficient padding around all sides of the instrument.
4	⇨ Make a check list of all the parts.
5	⇨ Put the check list into the box.
6	⇨ Add padding ! The padding must cover as much of the instrument as possible and hold it so that it cannot move around inside the box. Suitable materials for the padding are plastic padding or corrugated cardboard. Any spaces can be filled with polystyrene chips. The use of polystyrene chips without any other padding material is not sufficient.
7	⇨ Seal the box carefully.

7.4.1.4 Checking safety properties after repair

Use this procedure to check safety properties after repair.

Repairs must be made in a professional manner. The creepage paths, air gaps and insulation spacing must not be reduced in any way.

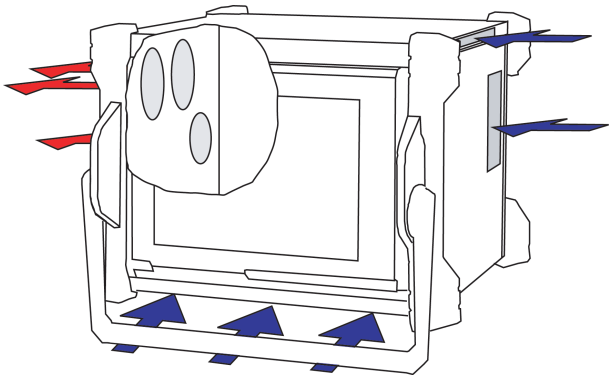
! When making repairs, make sure that the safety properties built in to the instrument are not degraded in any way.

Step	Action
1	⇨ Measure the resistance between the AC line connector and the casing. The protective earth conductor must have a resistance of < 0.1 Ohm.
2	⇨ Measure the insulation resistance. The insulation resistance must be > 5 MOhms.
3	⇨ Measure the leakage current in the protective earth conductor at 250 V AC line voltage. The leakage current must be < 1.5 mA.
4	⇨ Check the function of all 3 fans. All fans must run.

7.4.1.5 Positioning the instrument

Use this procedure to position the instrument.

Step	Action
1	⇨ Place the instrument on a desk or table.
2	⇨ Ensure proper ventilation requirements. The ONT-506 is equipped with several fans. These fans protect the ONT-506 from overheating during operation. The ventilation of the plug-in module area is from the bottom to the left hand side of the ONT-506 (referred to front view). Additional ventilation openings for input air are on the right hand side above the plug-in modules. The ventilation of the power supply area is from the right hand side to the left hand side (referred to front view).



Note: Take into account that the speed of the built-in fans increases with raising input air temperatures.

CAUTION **Insufficient cooling**

⇨ Keep all input and output openings free and do not block the ventilation openings.

⇨ Make sure that there is adequate space between the ONT-506 and other instruments or sources of heat.

⇨ Ensure that the warm output air is not directed by obstacles to the air input openings.

⇨ Position the ONT-506 so that warm air from adjacent instruments or other sources of heat is not sucked into the device.

- ⇨ Do not mount the ONT-506 on top of other equipment with cooling air output on top side.
- ⇨ Do not operate the ONT-506 in a dusty environment.
- ⇨ Do not operate the ONT-506 if you recognize that one or more built in fans do not operate.
- ⇨ Do not use the ONT-506 without its casing.
- ⇨ Always close not occupied slots with blind slot covers (see "Installing a blind slot cover" on page 208).

7.4.1.6 Connecting peripheral equipment

Use this procedure to connect peripheral equipment.

Step	Action
1	⇨ Connect peripheral equipment. If you are going to use the ONT-506 you can connect various peripheral equipment. The ONT-506 is equipped with standard connectors, e.g. for the following: • Mouse (PS/2 plug) • Keyboard (PS/2 plug) • External monitor (VGA or DVI) **Note:** The peripherals listed here are not included with the instrument.

7.4.1.7 Connecting the ONT-506 to the AC line

Use this procedure to connect the ONT-506 to the AC line.

Step	Action
1	AC line voltage and frequency The ONT-506 operates from AC power supplies having a nominal voltage between 100 V and 240 V, at a frequency of 50 or 60 Hz. Range switching is not necessary. **AC line connector socket** ! The AC line cord supplied has a protective ground conductor. The AC line plug must only be connected to AC power outlets equipped with a protective ground connection.

7.4.1.8 Connecting to the LAN

Use this procedure to connect the ONT-506 to the LAN.

Step	Action
1	⇨ Connect the LAN cable to socket [07] (see "Controller & clock module" on page 196)
2	⇨ Reboot the instrument (see "Rebooting the ONT-506 " on page 192) ! Reboot is unconditional essential in order to ensure proper operation of the ONT-506.

7.4.1.9 Switching the ONT-506 on

Use this procedure to switch the ONT-506 on.

Step	Action
1	⇨ Set the POWER I/O switch to 'I' (1).

2	⇨ Press the green Standby button on the lower left corner at the front side of the unit (2). *The fans start to operate, the system boots up.* *The ONT-506 software is started.* *An ONT-506 GUI is started in single-user mode.*

7.4.1.10 Shutting down the ONT-506

Shutting down causes the instrument to switch into standby mode.

! The instrument isn't switched off in standby mode (see "Switching the ONT-506 off " on page 190)

Included topics

- Shutting down the ONT-506 by logout
- Shutting down the ONT-506 by standby button
- Forcing emergency shutdown

7.4.1.10.1 Shutting down the ONT-506 by logout

Use this procedure to shutdown the instrument by logging out.

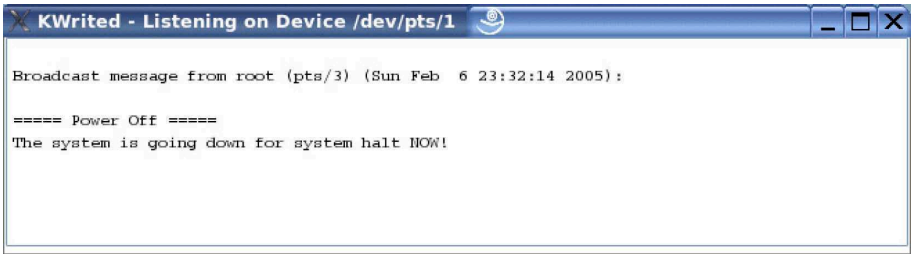
Step	Action
1	⇨ Select **Logout...** from the KDE menu. *The **End session for ...** dialog opens.*  
2	⇨ Select **Turn Off Computer**. *The system closes all open applications.* *The system is now shutdown and enters Standby mode.*

Step	Action
1	⇨ Select the **Applications, tasks and desktop sessions** menu. 
2	⇨ Select **Logout**.  *The **End session for "ont"** dialog opens.* 

Step	Action
3	⇨ Select **Turn Off Computer**. *The system closes all open applications.* *The system is now shutdown and enters Standby mode.*

7.4.1.10.2 Shutting down the ONT-506 by standby button

Use this procedure to shutdown the instrument by pressing the standby button.

Step	Action
1	⇨ Press On/Standby for 1 to 2 seconds. *System message window opens.*  *System is shutdown without further actions.*

7.4.1.10.3 Forcing emergency shutdown

Use this procedure to force the ONT-506 to shutdown immediately.

In the case that the ONT-506 can not be turned off properly, shutdown can be forced.

Step	Action
1	⇨ Press the On/Standby button for at least 4 seconds or disconnect the AC line cord. *System will shutdown immediately.*

CAUTION **Data loss during emergency shutdown**

If the ONT-506 is not turned off properly, then

- applications will not be closed properly and
- instrument settings and measurement results may not be saved to the mass storage.

7.4.1.11 Switching the ONT-506 off

Use this procedure to switch the ONT-506 off.

! Before switching off the mainframe, it is highly recommended to shutdown the instrument (see "Shutting down the ONT-506 " on page 188).

Step	Action
1	⇨ Set the POWER I/O switch to '0' (1).

7.4.1.12 Rebooting the ONT-506

Use this procedure to reboot the instrument.

Step	Action
1	⇨ Select **Logout...** from the KDE menu. *The **End session for ...** dialog opens.*  
2	⇨ Select **Restart Computer**. *The system closes all open applications.* *The system is now shutdown.* *The system boots again.*

Step	Action
1	⇨ Select the **Applications, tasks and desktop sessions** menu. 
2	⇨ Select **Logout**.  *The **End session for "ont"** dialog opens.*

Step	Action

3 ⇨ Select **Restart Computer**.

The system closes all open applications.

The system is now shutdown.

The system boots again.

7.4.1.13 Touchscreen

ONT-503 and ONT-506 offer a touchscreen.

The touchscreen was calibrated when leaving the JDSU production and should not need to be re-calibrated.

In the case you want to customize calibration to your own needs, the touchscreen can be re-calibrated manually.

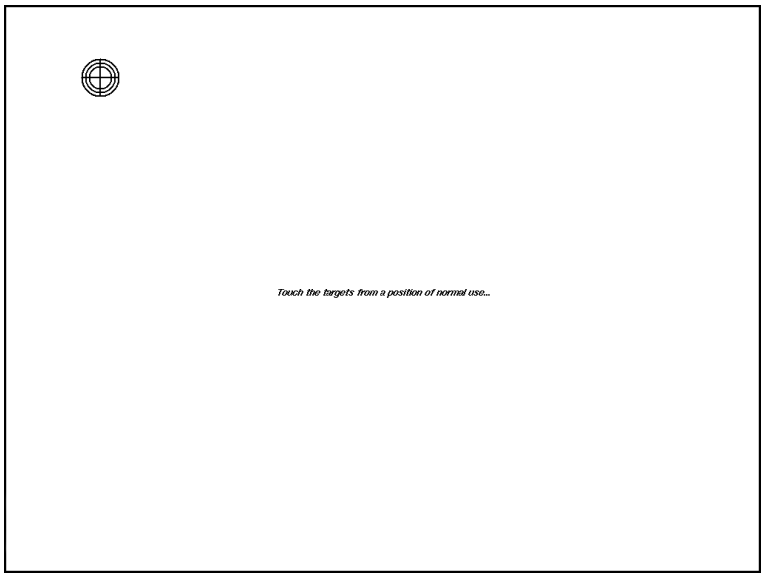
Note: You need root privileges to re-calibrate the touch screen.

7.4.1.14 Calibrating touch screen

Use this procedure to calibrate the touch screen of the ONT-506.

P7A

Step	Action
1	⇨ Select **Tools > Calibrate touch screen...** from the main menu. *The calibration window opens.*



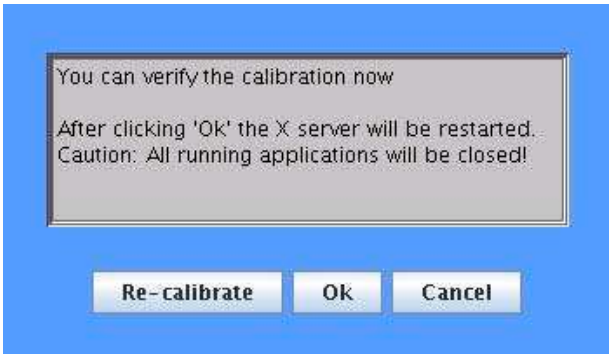
	⇨ Select the targets showing up on the display. *The touch screen is calibrated.*

P6A

Step	Action
1	⇨ Select **Tools > Calibrate touch screen...** from the main menu. *If not already logged in as user 'Administrator', the **Administrator password required** dialog opens.*

2	⇨ Type in administrator password (default: 'Administrator') and select the **OK** button. *A blue screen opens, showing a marker in the upper left corner.*
3	⇨ Follow the instructions to re-calibrate the touchscreen. *After calibration you are asked for further actions.*

Step	Action



4 ⇨ Point on the marker on the screen to test calibration.
The marker should keep staying at it's place.

5 ⇨ Select button **Re-calibrate** to repeat calibration.

6 ⇨ Select button **Cancel** to leave dialog without changes.

7 ⇨ Select button **OK** to accept calibration.

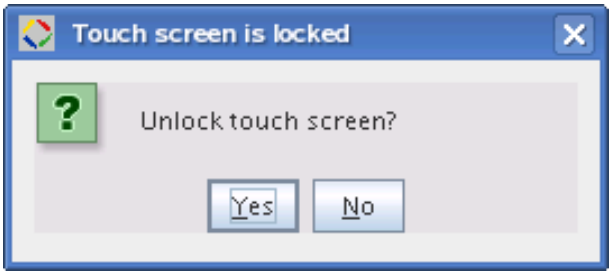
Note: All applications will be closed and the GUI will be restarted.

7.4.1.15 Locking touch screen

Use this procedure to lock the touch screen of the ONT-506.

Step	Action

1 ⇨ Select **Tools > Lock touch screen** from the main menu.
The touch screen is locked.
Any contact with the touch screen will open the **Touch screen is locked** dialog.



⇨ Select button **Yes** to unlock the touch screen.

7.4.1.16 Cleaning the ONT-506

Use this procedure to clean the ONT-506.

! Before cleaning, unplug the instrument from the AC line.

! If a damp cloth is used to clean the instrument, do not plug the instrument back in to the AC line until it is completely dry.

DANGER **Liquid entering the instrument**

! Make sure that no liquid gets into the instrument.

! If liquid entering the instrument, allow it to dry out thoroughly in a well-ventilated place. Water entered impairs the safety of the instrument.

! Liquid entering the instrument can cause corrosion.

Step	Action
1	⇨ To clean the ONT-506, moisten a cloth with warm water to which a little liquid detergent has been added. Make sure that no water get into the instrument when you are cleaning it.
2	⇨ Wipe off the still-damp instrument surfaces with a dry cloth to prevent streaks and smears. ! Never use solvent-based cleaners such as petroleum spirit or methylated spirits to clean the instrument. These cleaners can dissolve or damage the labeling. ! Cleaners designed for plastic surfaces and furniture should also never be used as they often contain polishing agents which could also damage the labeling and leave shiny spots on the covers.

7.4.2 Controller & clock module

This section describes the controller and the clock module.

Due to new features and permanent improvements configurations changed over time. The following combinations are valid at the moment:

- **ONT-503 equipped with controller P7B / P7C (clock module integrated)**
  The ONT-503 does not contain a separate clock module, but a one slot combination of controller and clock module.
- **ONT-506 / 512 equipped with controller P7A / P7B / P7C (clock module separated)**
  At the moment ONT-506/512 are shipped containing controller P7C and a separate clock module.
- **ONT-506 / 512 equipped with controller P6A (clock module separated)**
  Before November 2006 ONT-506/512 were shipped containing controller P6A and a separate clock module. P6A does not offer four USB ports.

Controller	USB ports	DVI	VGA	V.24	DVD
P7C	4	Yes	Yes	No	No
P7B	4	Yes	Yes	No	Yes
P7A	4	No	Yes	Yes	Yes
P6A	1	No	Yes	Yes	Yes

Included topics

- Front panel of clock module
- Front panel of controller P7C
- Front panel of controller P7B
- Front panel of controller P7A
- Front panel of controller P6A
- Standby LED

- Reference clock status LED
- Clock module

7.4.2.1 Front panel of clock module

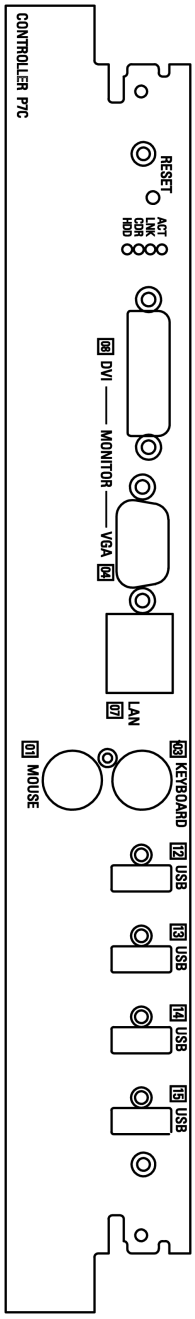
This section describes the front panel elements of the clock module shipped with the ONT-506.

Item	Description
[16]	Dip switches
[17]	CASC 2 (for future use)
[18]	CASC 1 (for future use)
[19]	REF OUT, BNC
[20]	REF OUT, Bantam
[21]	REF IN/OUT, Bantam (only input)
[22]	REF IN/OUT, BNC
[25]	CLK REF IN/OUT, BNC (for future use)
[26]	TIME REF IN/OUT, BNC (for future use)
[27]	TIME REF OUT, BNC (for future use)

7.4.2.2 Front panel of controller P7C

P7C

This section describes the front panel elements of the controller P7C shipped with the ONT-506.

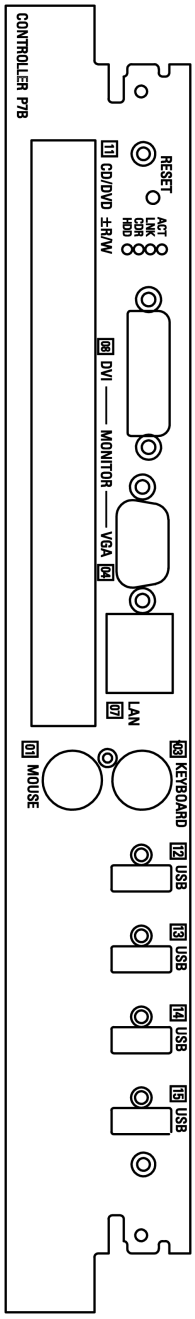


Item	Description
[01]	Mouse PS/2
[03]	Keyboard PS/2
[04]	VGA monitor
[06]	Serial V.24 / RS232
[07]	LAN (10/100Base-T; RJ45)
[12]	USB 2.0
[13]	USB 2.0
[14]	USB 2.0
[15]	USB 2.0
[19]	REF OUT [BNC]
[21]	REF IN [BANTAM]
[22]	REF IN [BNC]
Reset	Hardware reset button
ACT	LAN interface active
LNK	Link established to another computer
CDR	Unused
HDD	Hard disk drive active

7.4.2.3 Front panel of controller P7B

P7B

This section describes the front panel elements of the controller P7B shipped with the ONT-506.

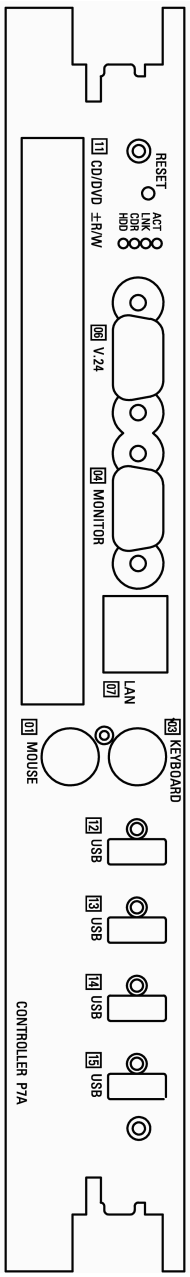


Item	Description
[01]	Mouse PS/2
[02]	PCMCIA A and B
[03]	Keyboard PS/2
[04]	VGA monitor
[05]	Centronics for printer
[06]	Serial V.24 / RS232
[07]	LAN (10/100Base-T; RJ45)
[09]	USB 1.1
[11]	CD/DVD ±RW drive
Reset	Hardware reset button
ACT	LAN interface active
LNK	Link established to another computer
HD1	Hard disk drive active
HD2	CD-RW drive active

7.4.2.4 Front panel of controller P7A

P7A

This section describes the front panel elements of the controller P7A shipped with the ONT-506.

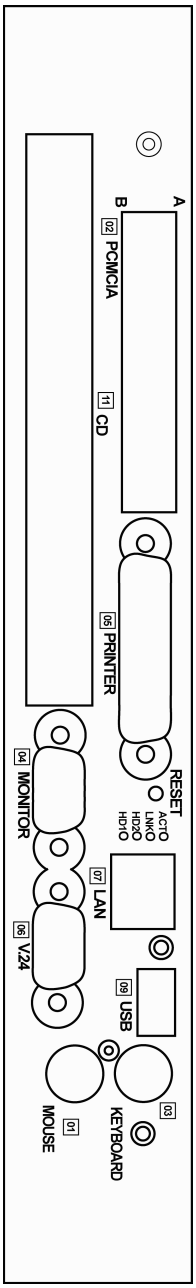


Item	Description
[01]	Mouse PS/2
[03]	Keyboard PS/2
[04]	VGA monitor
[06]	Serial V.24 / RS232
[07]	LAN (10/100Base-T; RJ45)
[11]	CD/DVD ±RW drive
[12]	USB 2.0
[13]	USB 2.0
[14]	USB 2.0
[15]	USB 2.0
[19]	REF OUT [BNC]
[21]	REF IN [BANTAM]
[22]	REF IN [BNC]
Reset	Hardware reset button
ACT	LAN interface active
LNK	Link established to another computer
CDR	CD/DVD drive active
HDD	Hard disk drive active

7.4.2.5 Front panel of controller P6A

P6A

This section describes the front panel elements of the controller P6A shipped with the ONT-506.



Item	Description
[01]	Mouse PS/2
[02]	PCMCIA A and B
[03]	Keyboard PS/2
[04]	VGA monitor
[05]	Centronics for printer
[06]	Serial V.24 / RS232
[07]	LAN (10/100Base-T; RJ45)
[09]	USB 1.1
[11]	CD/DVD ±RW drive
Reset	Hardware reset button
ACT	LAN interface active
LNK	Link established to another computer
HD1	Hard disk drive active
HD2	CD-RW drive active

7.4.2.6 Standby LED

The Status LED displays the power state of the mainframe.

LED	State
Continuously shining green	ON
Continuously shining yellow	Stand by

Flashing yellow	ONT-506 has been shutdown due to an internal alarm condition. Status can be cleared by switching the device off or disconnect mains for longer than 30 seconds.

7.4.2.7 Reference clock status LED

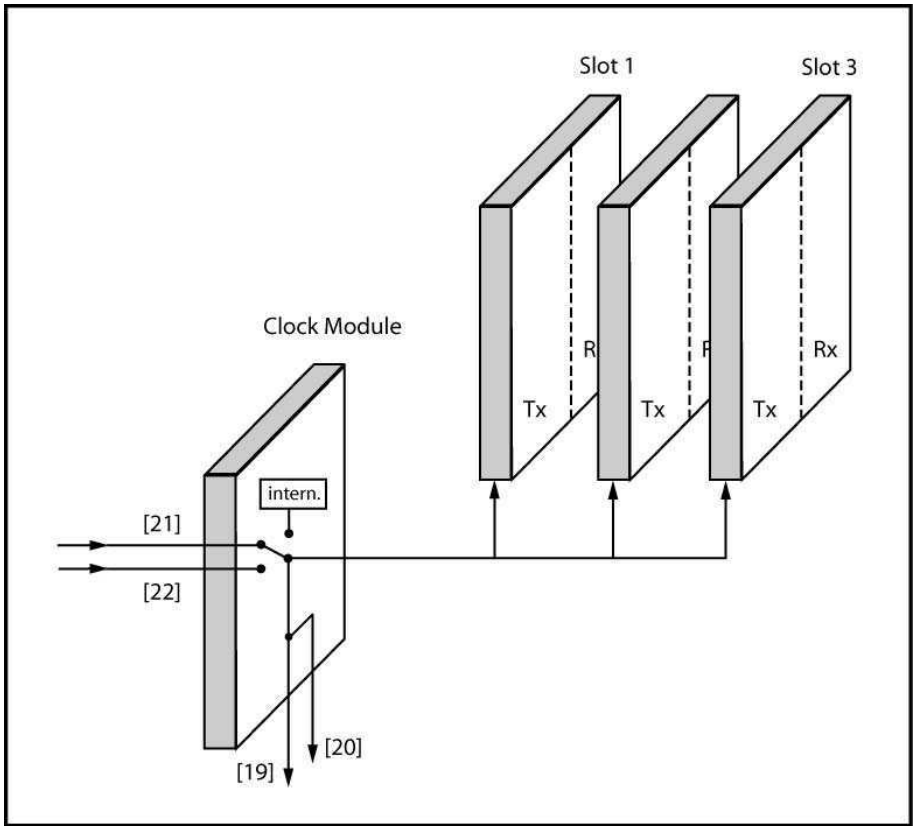
The Status LED displays the state of the reference clock input.

LED	State
Red	Input active, no signal
Yellow	Input active, signal present, frequency out of pulling range
Green	Input active, signal ok

7.4.2.8 Clock module

This section describes the clock module capabilities.

Function of clock module settings



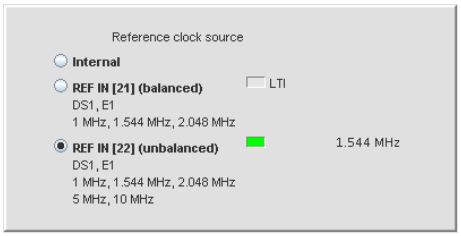
Included topics

- Reference Clock Source

- REF OUT [19][20]
- Display of a clock error
- Clock module reservation
- DIP switches [16]

7.4.2.8.1 Reference Clock Source

Reference Clock Source.

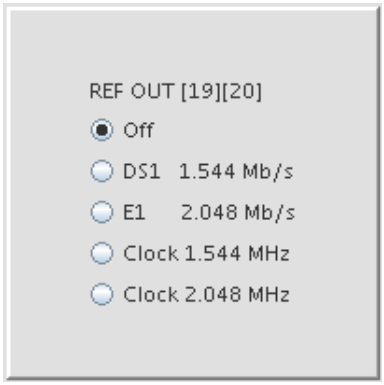


Value	Meaning
Internal	Internal Clock
Ref In bal. [21]	Balanced signal at input [21]: DS1, E1, 1544 kHz, 2048 kHz, 1 MHz optional: 64kHz, CC64kHz[1)]
Ref In unbal. [22]	Unbalanced signal at input [22]: DS1, E1, 1544 kHz, 2048 kHz, 1 MHz, 5 MHz, 10 MHz optional: 64kHz, CC64kHz[1)], 6.312MHz

[1)] Composite clock acc. to G.703 App. II

7.4.2.8.2 REF OUT [19][20]

REF OUT [19][20].



Value	Meaning
Off	No clock or data signal output

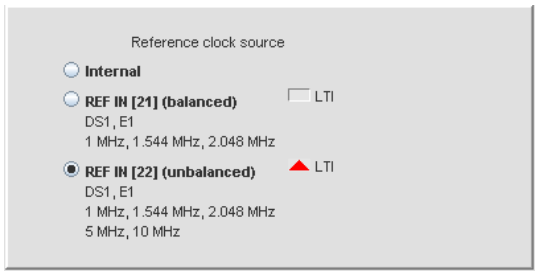
DS1 1.544 Mb/s, E1 2.048 Mb/s, Clock 1.544 MHz, Clock 2.048 MHz	Data/clock signal parallel at output [19] and [20]

7.4.2.8.3 Display of a clock error

Display of a clock error.

If there is an error detected on the clock source, e.g. if the setting for Reference Clock Source is 'Ref. In bal' and no reference clock is attached, a red LED at the **Main clock settings** tab indicates this error for all users connected to the ONT-506.

The error is also indicated on the **Main clock settings** page.



7.4.2.8.4 Clock module reservation

Clock module can be reserved (locked) by a user.

No other user will be able to change settings of the clock module until it is released / unlocked by the owner.

7.4.2.8.5 DIP switches [16]

The DIP switches might be used in the future in order to support enhanced addressing schemes.

! A0 to A4 always have to be in the 'OFF' / '0' position. The last switch might be used in the future to differentiate between master and slave. Only the 'M' position is valid at the moment.

7.4.3 Test module handling

This section defines the test module concept together with all the capabilities.

Included topics

- Test module concept
- Installing a test module
- Installing a blind slot cover
- Removing a test module
- Preparing the pluggable optical connectors
- Preparing the optical connectors
- Cleaning optical surfaces

7.4.3.1 Test module concept

A test module consists of measurement boards offering 0 to n ports.

The following characteristics are forming a test module:

- Normally it offers ports.
- Some test modules are enhancing measurement capabilities without offering additional ports (e.g. MultiChannel extension board).
- It requires one or more slot.

7.4.3.2 Installing a test module

Use this procedure to install a test module

Note: Only JDSU test modules dedicated for use in the ONT-506 are allowed to be installed in and operated with the mainframe.

DANGER **High voltage**

AC line voltage, nominal range	110 V~ to 240 V~
Frequency	50 Hz or 60 Hz

⇨ Check building installation for sufficient power and fusing before connecting AC line cord to mains outlet.

⇨ Before opening the instrument, shutdown the system, switch it off at the main power switch. Disconnect it from all power sources.

! Simply switching to standby is insufficient.

⇨ Take care of electrostatic discharging
(see "Electrostatic discharge" on page 17)

The ONT-506 follows the safety concept of the IEC/EN 61010-1 by connecting the chassis with the protective earthing (PE) system of the power supply network (safety class 1 equipment).

The AC line cord supplied with the instrument has a protective earth conductor.

! The AC line plug must only be connected to AC line connectors equipped with a protective earth connection.

! The protective earth connection must not be broken.

CAUTION **No "hot swap" supported**

! In any case and before installing or removing test modules the ONT-506 must be switched of.

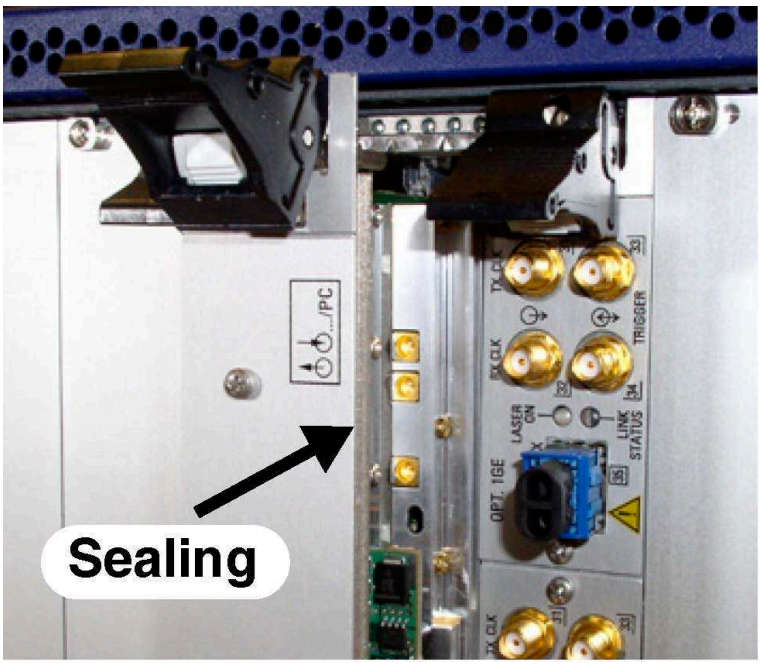
✓ The instrument is disconnected from all power sources.

✓ The latest software delivered with the module has been installed.

Step	Action
1	⇨ Determine a valid slot position For some test modules the position of the test module relative to the neighbored module(s) can be relevant, particularly if the neighbored modules are used within the same application.
2	⇨ Open the screws on top and bottom of the blind slot cover.
3	⇨ Screw until you hear a clicking noise.
4	⇨ Remove the cover by pulling it at the screws. **Note:** Hold cover tightly to avoid that it may fall inside the unit.
5	⇨ Take the new test module out of package, just holding it at the two holders.

Step	Action

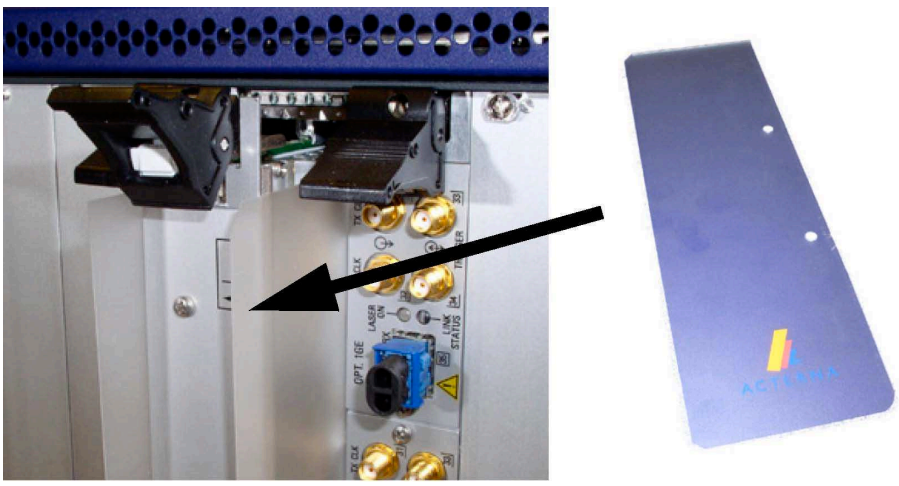
6 ⇨ First insert card at lower guide by tilting it a bit backwards, then insert it in upper guide. Push module into slot stopping appr. 5 cm before full insertion.



CAUTION **Damage of Module Sealings**

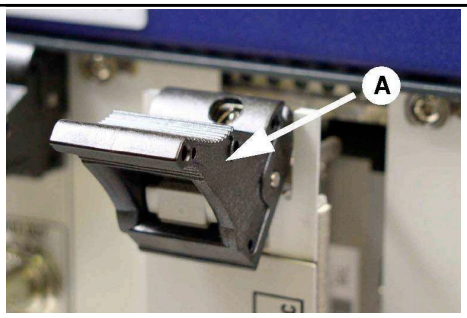
The modules are fitted with special sealings at the front edges to protect the module and other electronic equipment from electromagnetic influences. These sealings may be damaged when assembling the module without using the plastic strips delivered with the module.

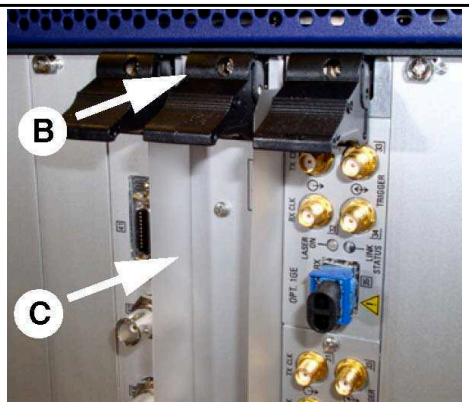
7 ⇨ Insert the two plastic strips (delivered with your module) to both sides of the module and allow the ends to overlap for appr. 2 cm.



8 ⇨ Take care that both holders are brought to their maximum upper and lower position (A). Insert module fully until holders lock (B). Pay attention to the strips still overlap the module for appr. 2 cm (C).

Step	Action





9 ⇨ Slowly pull both strips out of the slot. Due to the tight closing sealings this may need some force.

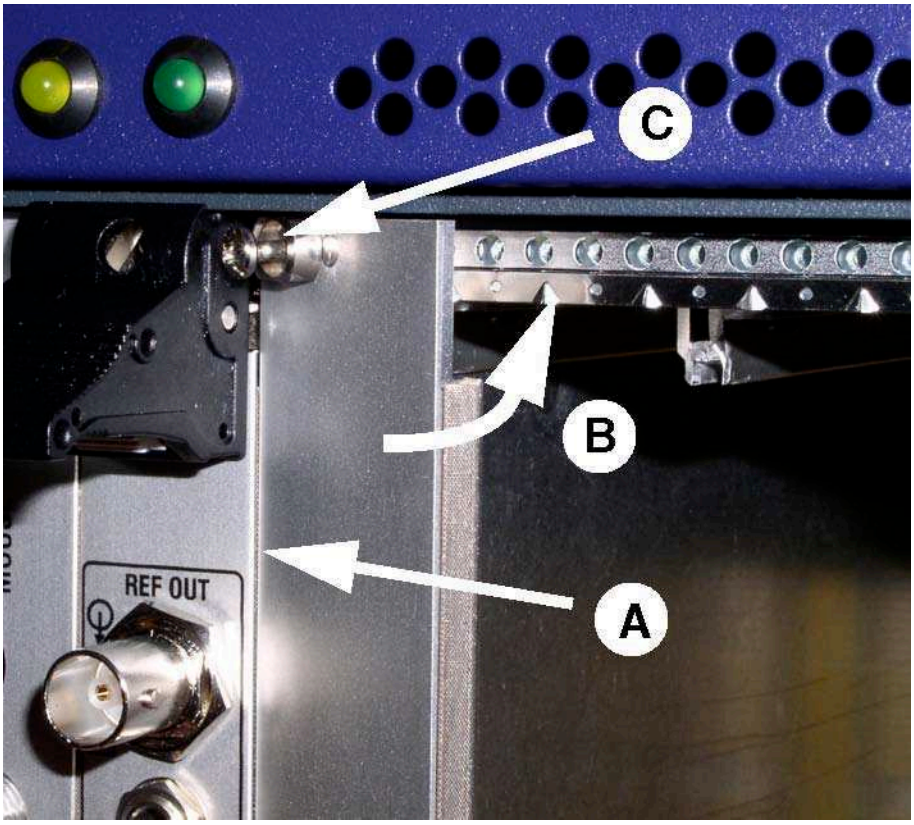
10 ⇨ Tighten screws of both holders.

7.4.3.3 Installing a blind slot cover

Use this procedure to install a blind slot cover

Step	Action
1	⇨ Angle the blind slot cover a few degrees to the front and press it against the sealing of the cover to the left (A).
2	⇨ Flap blind slot cover to the back (B) and tighten the two screws at top and bottom (C).

Step	Action



Note: Be careful not to damage the sealing on the right edge. If needed, slightly untighten the module to the right and tighten it again after installing the blind slot cover. Or preferably use the plastic strip as for installing a test module (see "Installing a test module" on page 206).

7.4.3.4 Removing a test module

Use this procedure to remove a test module.

✓ The instrument is disconnected from all power sources.

DANGER **High voltage**

AC line voltage, nominal range	110 V~ to 240 V~
Frequency	50 Hz or 60 Hz

⇨ Check building installation for sufficient power and fusing before connecting AC line cord to mains outlet.

⇨ Before opening the instrument, shutdown the system, switch it off at the main power switch. Disconnect it from all power sources.

! Simply switching to standby is insufficient.

⇨ Take care of electrostatic discharging
(see "Electrostatic discharge" on page 17)

The ONT-506 follows the safety concept of the IEC/EN 61010-1 by connecting the chassis with the protective earthing (PE) system of the power supply network (safety class 1 equipment).

The AC line cord supplied with the instrument has a protective earth conductor.

! The AC line plug must only be connected to AC line connectors equipped with a protective earth connection.

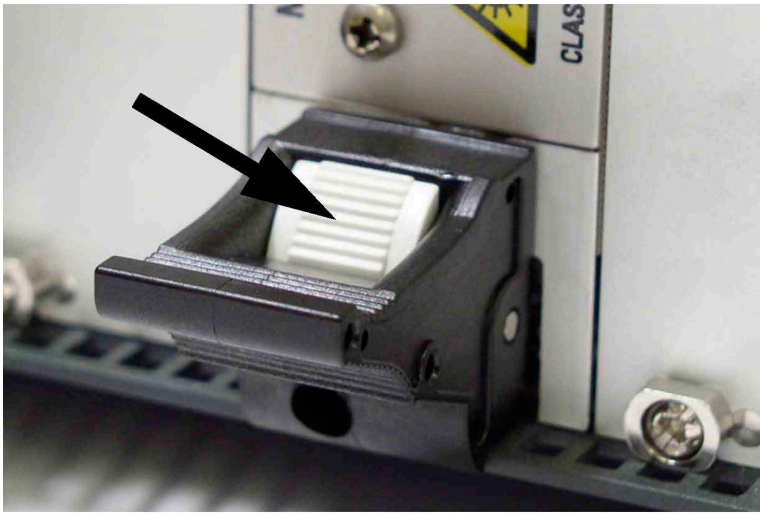
! The protective earth connection must not be broken.

CAUTION **No "hot swap" supported**

! In any case and before installing or removing test modules the ONT-506 must be switched of.

Step	Action
1	⇨ Open the screws on the left and on the right of the test module. Screw until you hear a clicking noise.
2	⇨ Push the white buttons inside the two module holders.

Step	Action



3 ⇨ Unlock the module by pressing the top holder up and the bottom holder down.

4 ⇨ Carefully pull out the module.

Note: Take care of electrostatic discharging and put the module immediately in a ESD protection package.

Note: For proper storage and transport we recommend using the ONT-506 Maintenance Kit (BN 3061/92.44).

5 ⇨ Cover the empty slot with a blind slot cover
(see "Installing a blind slot cover" on page 208).

7.4.3.5 Preparing the pluggable optical connectors

Use this procedure to prepare the pluggable optical connectors.

ONT-506 test modules permit XFP, QSFP, SFP, and CFP ports. JDSU supplies these components that have been tested with the ONT-506 to operate within the full range of line rates available.

Note: Carefully keep all of the protective covers supplied.

Step	Action

1 ⇨ Remove the protective plastic cover over the port casing, and keep it in a safe place for future use.

2 ⇨ Insert the applicable pluggable optical connector required for your test. The latch handle should be at the top and the "finger connectors" at the back should be on the bottom.

3 ⇨ To remove a pluggable optical connector, pull the latch at the top of the device, and the pluggable optical connector will be released from the housing.

4 ⇨ Replace the protective plastic cover on any unused ports to prevent dust from entering, and to ensure proper cooling of the unit.

7.4.3.6 Preparing the optical connectors

Use this procedure to prepare the optical connectors.

Series BN 2060/00.xx test adapters with sprung housings (from our range of accessories for SDH, SONET and OTN) are used to match the test modules to the test interfaces (plug connectors or bare fibers). At least one test adapter is included with the instrument. All common types of plug connector can be connected to the standard sockets on the optical inputs and outputs of the test modules.

Note: Carefully keep all of the protective covers supplied.

Step	Action
1	⇨ Unscrew the metal protective cover and keep it in a safe place.
2	⇨ Remove any plastic sleeving from the plug pin.
3	⇨ Dab the end surface of the fiber in the optical connector with cleaning tape.
4	⇨ Remove the test adapter from its packing. Store any protective covers in a safe place.
5	⇨ If necessary, blow out the test adapter using clean compressed air.
6	⇨ Fit the test adapter and turn the inner part until the anti-twist lock clicks into place.
7	⇨ Screw down the outer part (sleeve).
8	⇨ Fit the protective cover to the test adapter.

CAUTION **Damage to optical inputs and outputs**

! Make sure that the connectors are not angled by more than 10°.

! Make sure that the lug on the connector is located precisely in the notch in the test adapter before screwing up the cable fastening.

9	⇨ Loosen the sleeve nut and remove the test adapter.
10	⇨ Pack the test adapter away (with its protective covers if possible) in a clean place, if it is no longer required.
11	⇨ Screw the metal protective covers over the optical connectors, if the ONT-506 is to be transported or stored without its test adapters.

7.4.3.7 Cleaning optical surfaces

Use this procedure to clean optical surfaces.

Dust and fingerprints can damage the optical surfaces, particularly if they are pressed together. To protect the instrument and the connecting cables, every cable should be cleaned before connecting it to the instrument. The optical connectors on the instrument should also be cleaned at regular intervals.

Danger of Blinding Due to Invisible Laser Radiation

! Follow carefully the safety instructions (see "Invisible laser radiation" on page 19)

Step	Action
1	⇨ To clean the cable, dab the end surfaces with cleaning tape.

Step	Action
2	⇨ To clean the optical connectors, remove the test adapters, dab the end surface of the plug pin with cleaning tape and use clean compressed air to blow out the test adapter. ! Always replace the protective covers on optical connectors that are not in use.

7.5 ONT-5xx General Information and Test Tool

This section describes the ONT-5xx General Information and Test Tool capabilities.

Included topics

- ONT-5xx General Information and Test Tool
- Function overview
- Checking hardware issues

7.5.1 ONT-5xx General Information and Test Tool

The 'ONT-5xx General Information and Test Tool' allows to gather and display all relevant information about the ONT-506.

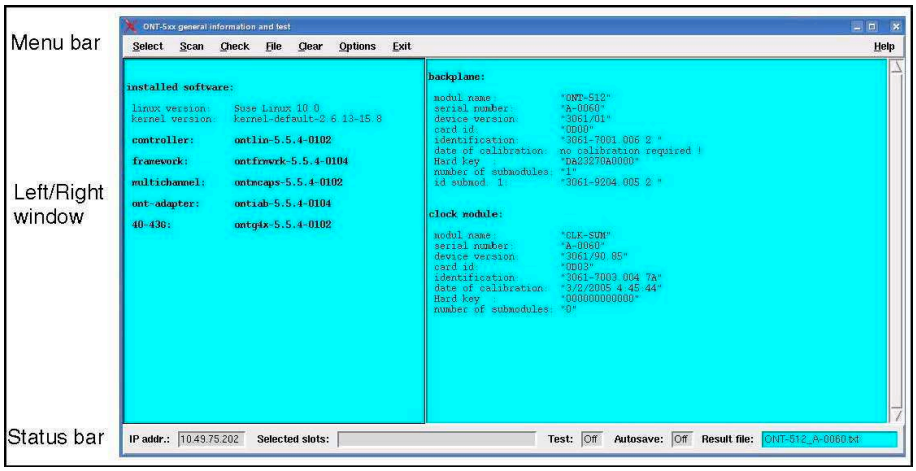
Main topics:

- Display mainframe configuration.
- Display detailed module information.
- Test and verify hardware and interfaces.
- Set options to allow the adding of new features also in the field
- Generate all relevant information, which helps you in case of any service issue.

Note: Before using this tool, please assure that no other user is working with the ONT-506, because the test results can be misleading.

7.5.2 Function overview

This section lists the available functions.



Status bar

Status	Description
IP Addr.	Shows the IP address of the ONT-506.
Slot	Shows the slot currently under investigation. (Slot #0 is the mainframe and the backplane).

Status	Description
Test	**Off** Only internal tests are performed (default). **On** Internal and interface tests are performed.
Store	**Off** The information output is only displayed in the right window (default). **On** The information output is displayed in the right window and stored in addition.
Result File	Shows the filename on which the results are stored (if Store = On). The default filename is: mainframe type plus serial number. This allows a simple identification. The file is stored on the desktop for easy handling. The name can be edited!

Menu	Description
Scan	Scans and displays the hardware and Linux configuration.
Set Store Info to File	**OFF** The information of all actions are only displayed in the right window (default). **ON** All information from the executed activities are displayed and stored in a file. File name see status bar.
Info Controller	Retrieves all relevant information from the controller.
Info Backplane & Clock Module	Retrieves all relevant information from the backplane and the controller.
Info All Slots	Retrieves all relevant information from the different slots e.g. Serial number, Hardware revision, Software revision etc.
Info Slot Number	Selects first a slot number and then retrieves the relevant information. The selected slot number is displayed in the status bar.
Check	Tests and verifies the hardware functionality.
Controller	Verifies the features of the controller by execution.
Set Test depth	**OFF** Only internal test are executed. No external connection are required. Status is displayed in the information bar (default). **ON** Tests are performed not only internal, but also the external interfaces are verified. For this purpose please connect also the interfaces as described in the pop-up window!
All Slots	Executes the test on all modules. **Note:** This test takes time!
Slot Number	Selects first a slot number and then executes the tests on the selected module. The selected slot number is displayed in the information bar. **Note:** This test takes time!

Menu	Description
File	This menu allows to control the content of the result file in a manual way. If the Store switch is off the command feedback is only displayed in the right screen, then a explicit store is required.
Copy stored file to right window	Recalls currently stored information.
Copy Controller check to right window	Stores the result from the controller in a special file and access it via this function.
Store left window to file	Stores the visible information of the left window to the result file. This overwrites the content of the current file.
Store right window to file	Stores the visible information of the right window to the result file. This overwrites the content of the current file.
Append right window to file	Adds the relevant information to the result file.
Delete actual Result file	Removes the actual result file.
Set file to default	The default filename is: mainframe type plus serial number. This allows a simple identification. The file is stored on the desktop for easy handling.
Clear	Clear windows
All windows	
Left window	
Right window	
Print	Print out windows. Not yet supported.
Left window	Not yet supported
Right window	Not yet supported
Options	
Set new Option for Slot Number	Selects the slot number for the new option and opens a window to insert the option code. The option code consists of a order number and a verification code. Errors are not displayed!
Get Options from All Slot	Displays all enabled options on all modules plugged to the mainframe.
Get Option from Slot Number	Displays all enabled options in the selected module.
Exit	Closes the application and the stored file.
Help	Displays the version number.

7.5.3 Checking hardware issues

Use this procedure to check the hardware of the device.

Note: This test takes up to 30 minutes depending on amount and type of test modules installed.

Step	Action
1	⇨ Select **ONT-5xx Gen. Info** from the Linux desktop  *The 'ONT-5xx General Information and Test Tool' starts.*
2	⇨ Select **File > Delete actual result file** from the main menu.
3	⇨ Select **Scan > Set store info to file** from the main menu.
4	⇨ Select **Scan > Info controller** from the main menu.
5	⇨ Select **Scan > Info backplane & clock module** from the main menu.
6	⇨ Select **Scan > Info all slots** from the main menu.
7	⇨ Select **Check > Controller** from the main menu.
8	⇨ Select **Check > Set test depth to ON** from the main menu. Install the connection as proposed on the pop-up window to perform a useful function testing.
9	⇨ Select **Check > All slots** from the main menu.
10	⇨ Select **Exit** from the main menu.
11	⇨ Send the file 'ONT-5xx_<SerialNumber> to the JDSU Service Center for further help.

8 Appendix

This section contains information concerning trouble shooting, the specifications and contact information.

Included topics

- Trouble shooting
- Specifications
- Contact information

8.1 Trouble shooting

This section helps in case of having trouble with the ONT-506.

Included topics

- Recovery
- Recovery tools
- Result recovery
- Checking power
- Checking network connectivity
- Providing required information to the JDSU Customer Service Center

8.1.1 Recovery

This section describes a recovery procedure.

In case of any unexpected behavior of ports or system controller, please be sure to follow the recovery strategy described here to minimize the potential influences to other users/sessions sharing the same test set:

- Please try to close and reopen the GUI (be sure not to close the entire session, but only the GUI).
- In case Step 1 does not solve the problem, please try to reload the application by closing and reloading the running application.
- In case Step 2 does not solve the problem, please reset the test module showing the problem:
  - ⇨ Select page **Session configuration**.
  - ⇨ Select field **Slot <number>** on top of the module.

    A confirmation dialog opens
  - ⇨ Select **Yes**

    Re-boot is started.
  - ⇨ Wait until module is re-booted.

  ! Resetting a test module is only recommended in connection with recovery. It is not recommended to reset a properly running module.

  Note: You can only reset test modules of your own user and session! If you need to reset test modules belonging to other users, please login as user 'Administrator'.
- In case Step 3 does not solve the problem, please restart the ONT-506 software (see "Restarting the ONT-506 software" on page 107).

  Note: This will reset all ports of any user and session running on this mainframe! Collected measurement data of running measurements may be lost!
- In case Step 4 does not solve the problem, please shutdown and power off the complete test set (see "Shutting down the ONT-506 " on page 188).

  Note: This will shutdown all ports of any user and all sessions running on this test set! Collected measurement data of running measurements may be lost!

8.1.2 Recovery tools

The tools described in this section should help to recover system configuration.

Note: During normal operation all the tools described in this section are accessible via the ONT-506 GUI.

Note: All the the tools are started from the Linux desktop.

Note: Using the tools normally requires Linux root permissions.

Included topics

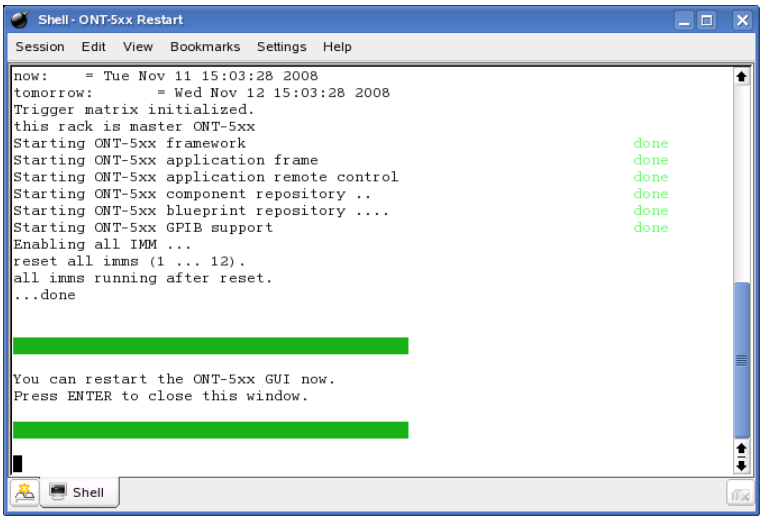
- Restarting the ONT-506 software
- Checking device configuration
- Provisioning LAN access
- Calibrating the touchscreen

8.1.2.1 Restarting the ONT-506 software

Use this procedure to restart the ONT-506 software.

! When restarting the framework all measurements are stopped and have to be restarted again. Do not use this function if other users are working with the ONT-506.

Step	Action
1	⇨ Select icon **ONT-506 Restart** on the desktop. *The **ONT-506 Restart** window opens.*
2	⇨ Type in 'Yes' and hit the 'Enter' key.
3	⇨ Type in Linux root password (default: 'acterna') and hit the 'Enter' key. *The restart is executed.*
4	⇨ Wait for the restart to be successfully finished and hit the 'Enter' key to close the window.



5	⇨ Restart the GUI.

8.1.2.2 Checking device configuration

Use this procedure to check the configuration of an ONT-506.

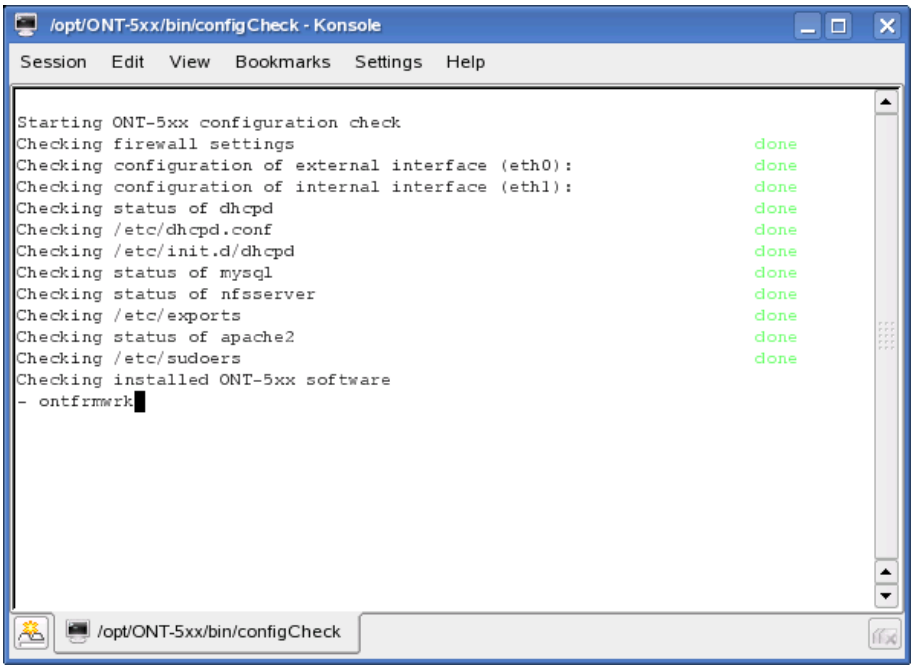
Step	Action
1	⇨ Select icon **ONT-506 Config Check** on the desktop.  *The 'Run as root' dialog opens*
2	⇨ Select field **Password** and enter the root password (default: 'acterna').

Step	Action

3 ⇨ Select button **OK**.

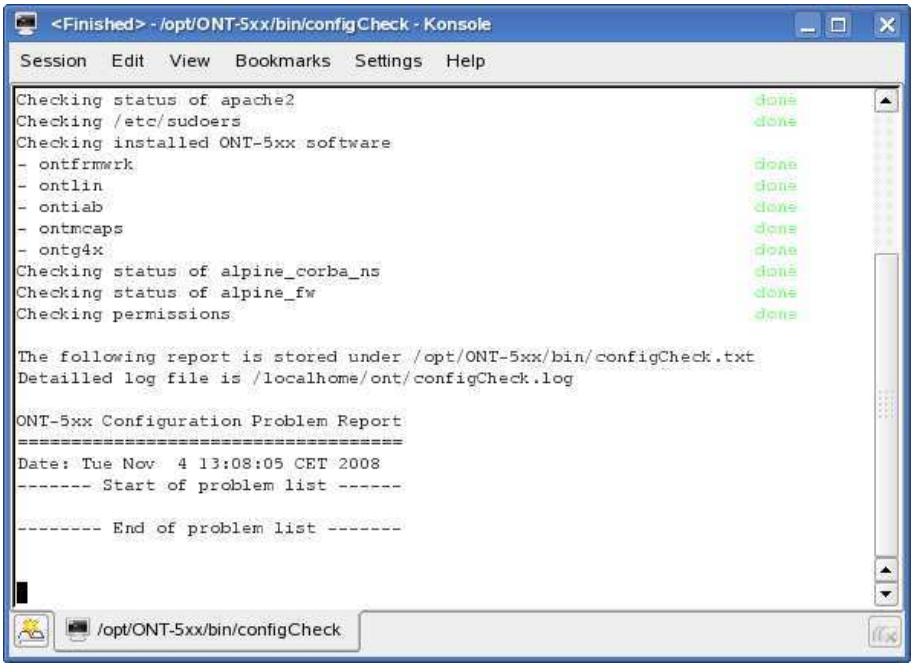
*The **Check configuration** window opens.*

The configuration check starts.



4 *The configuration check stops.*

Step	Action



⇨ Check the problem list which should be empty.

⇨ React according to the detected problems.

8.1.2.3 Provisioning LAN access

Use this procedure to configure the IP addressing.

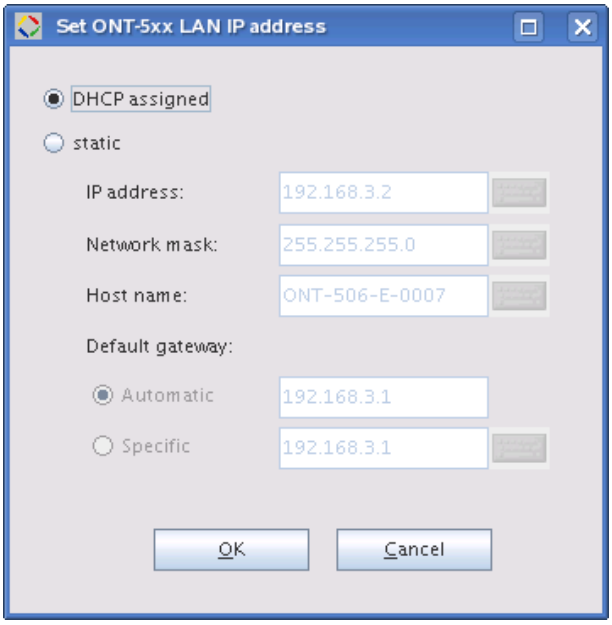
Step	Action
1	⇨ Select icon **LAN IP Address** on the desktop.

The 'Run as root' dialog opens

2 ⇨ Select field **Password** and enter the root password (default: 'acterna').

3 ⇨ Select button **OK**.

*The **Set ONT-506 LAN IP Address** dialog opens.*

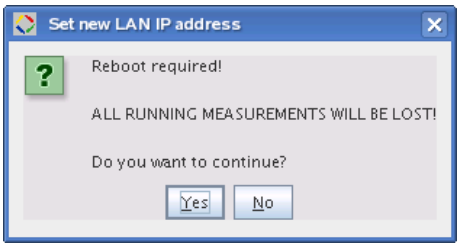


4
- ⇨ Check box **DHCP assigned**.
  The IP address is requested from a DHCP server located in the network. All parameters are set automatically.
- ⇨ Check box **static**.

Step	Action
	The IP address is set manually on the ONT-506 together with the other required parameters. (see "Provisioning LAN access using a static IP address" on page 128)

5 ⇨ Select button **OK**.

6 ⇨ A confirmation dialog opens.



7 ⇨ Select button **Yes**.

The ONT-506 will now be rebooted and configured according to your settings.

! All measurements will be stopped and all results will be lost!

8.1.2.4 Calibrating the touchscreen

Use this procedure to calibrate the touchscreen.

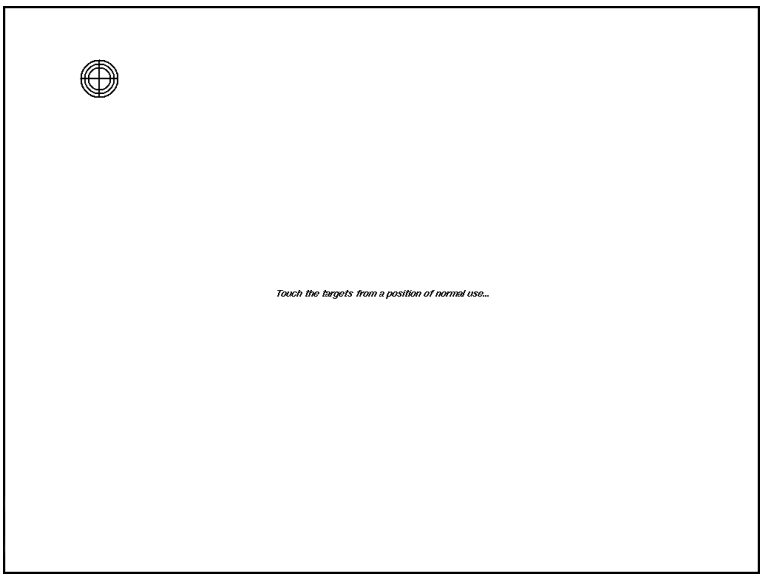
P6A

Step	Action
1	⇨ Select icon **Touch calibration** on the desktop. *The 'Run as root' dialog opens*
2	⇨ Select field **Password** and enter the root password (default: 'acterna'). 
3	⇨ Select button **OK**. *A blue screen opens, showing a marker in the upper left corner.*
4	⇨ Follow the instructions to re-calibrate the touchscreen. *After calibration you are asked for further actions.* 
5	⇨ Point on the marker on the screen to test calibration. *The marker should keep staying at it's place.*
6	⇨ Select button **Re-calibrate** to repeat calibration.
7	⇨ Select button **Cancel** to leave dialog without changes.
8	⇨ Select button **OK** to accept calibration. **Note:** All applications will be closed and the GUI will be restarted.

P7A

Step	Action
1	⇨ Select icon **Touch calibration** on the desktop. *The calibration window opens.*

Step	Action



⇨ Select the targets showing up on the display.

The touch screen is calibrated.

Note: Although you passed the re-calibration successfully, you might not be able to open the navigation bar on the screen bottom line by moving down with the mouse pointer. Repeat calibration and point slightly above the lower right calibration marker.

8.1.3 Result recovery

Use this procedure to recover results of a long term measurement after a power failure

A power failure during a long term measurement leads to a loss of all results gathered so far. In some cases it might be possible for JDSU to recover at least parts of the results.

Note: This procedure may also help in case of a system crash.

Step	Action
1	⇨ Do not switch on the system again.
2	⇨ Contact a JDSU Sales Company.

8.1.4 Checking power

Use this procedure to check the power.

Step	Action
1	⇨ Check the green (ON) LED and the yellow (On/Standby) LED.

Step	Action
2	⇨ In case of both being dark • ⇨ check the power supply • ⇨ replace the AC line cord if necessary ⇨ If the fault persists, contact a JDSU Customer Service Center.

8.1.5 Checking network connectivity

Use this procedure to check network connectivity.

Step	Action
1	⇨ Check the LNK LED on the controller board. • **LED = yellow** Indicates network connectivity. • **LED = dark** No connection. ⇨ Verify cabling.

8.1.6 Providing required information to the JDSU Customer Service Center

This section describes how to gather the information needed when getting in contact with a JDSU Sales Company.

In case of problems gather information like

- serial number of your ONT-506
- hardware configuration of your ONT-506
- software release of your ONT-506
- possible license and release code(s)
- information from any error logs that may have popped up

A summary of the device configuration (see "Getting information regarding device configuration" on page 130) is always helpful.

In case of hardware problems performing a hardware check (see "Checking hardware issues" on page 217) is advised.

Additionally prepare a short description about your issue.

A list of the addresses and telephone numbers of the JDSU Sales Companies can be found on the Internet at http://www.jdsu.com.

8.2 Specifications

This section lists the specifications for the ONT-506 mainframe.

These specifications apply regardless of which test modules are fitted to the Mainframe. The specifications provided with each test module apply to the function of the test module when it is fitted in the ONT-506.

Included topics

- Power supply
- Device safety and electromagnetic compatibility
- Environmental conditions
- External interfaces
- Display
- Noise emission
- Dimensions and weight
- Clock and synchronization

8.2.1 Power supply

Specifications concerning the power supply of the ONT-506.

AC line voltage

Attribute	Value
Nominal range	100 V to 240 V
Operating range	90 V to 264 V
AC line frequency, Operating range	50 or 60 Hz, ± 5%
AC line fuse	12.5 A T, Time-Lag (Slo-Blo), 5 x 20 mm

Maximum power consumption

Attribute	Value
Mainframe	< 120 W
Test modules	typ. 60 W per slot (depends significantly on kind of test modules and running applications)

Battery for data memory

Attribute	Value
Type	1/2 AA 3.6V lithium battery
Life	> 5 years

8.2.2 Device safety and electromagnetic compatibility

Specifications concerning EMC.

The device meets the requirements for CE mark certification respecting:

Attribute	Value
Safety	Low Voltage Directive 2006/95/EC
EMC	EMC Directive 2004/108/EEC
Device safety	IEC/EN 61010-1
Laser classification	Class 1 Laser Product according to IEC 60825-1:2001

Electromagnetic compatibility

Attribute	Value
Emission	IEC/EN 61326:1997
Immunity	IEC/EN 61326:1997

8.2.3 Environmental conditions

Specifications concerning the environmental conditions.

Note: Supplementary information on environmental conditions is given in the specifications for the individual test modules.

Attribute	Value
Nominal range of use	+5 to +40 °C
Storage	-20 to +65 °C
Transport	-20 to +65 °C

Environment classes

Class	Storage (at partially temperature controlled locations)	Transport (using public transport vehicles)	Operation (stationary use at temperature controlled locations)
IEC 721-3	Class IE 12[1)]	Class IE 23 with 2M3[2)]	Class IE 72
ETS 300019-1	Class 1.1[1)]	Class 2.3 with 2M3[2)]	Class 7.1 with 7M2

1) Extended to -20 °C to +65 °C

2) Restricted to -20 °C to +65 °C; restriction: no splash protection

Major parameters for environmental classes

Environmental parameter	Test standard IEC/EN	Storage	Transport	Operation
Temperature	60068-2-1, 60068-2-2	extended to -20? to +65 °C	restricted to -20? to +65 °C	+5 to +40 °C
Humidity < 30 °C ≥ 30 °C	60068-2-56	- 5 to 95% ≤ 29 g/m^3	- 5 to 95% ≤ 29 g/m^3	- 5 to 85% ≤ 25 g/m^3
Vibration 9 to 200 Hz 200 to 500 Hz	60068-2-6	- 5m/s^2	- 20 m/s^2	- 10 m/s^2 15 m/s^2
Shock duration 6 ms duration 11 ms duration 22 ms	60068-2-27	- - - -	- 1000 m/s^2 300 m/s^2	- 300 m/s^2 100 m/s^2 40 m/s^2
Continuous shocks duration 6 ms	60068-2-29	-	400 m/s^2	150 m/s^2
Drop test	60068-2-31	-	0.8 m	0.05 m

Attribute	Value
Operating height	maximum 3000m
Transport height	maximum 12000m

8.2.4 External interfaces

Specifications concerning the external interfaces of the ONT-506.

Device	Socket	Interface	Connection
Mouse	[01]	IBM/PS/2 mouse	6-pin mini DIN socket
Keyboard	[03]	IBM/PS/2	6-pin mini DIN socket
VGA (Analog Video Graphic Adapter)	[04]	VGA	15-pin sub D
DVI	[08]		

LAN	[07]	Ethernet (10Base-T, 100Base-T)	RJ45
DVI	[08]		
USB (Universal Serial Bus)	[12], [13], [14], [15]	USB	USB 2.0

Note: Front panel elements may vary due to new features and permanent improvements.

8.2.5 Display

Specifications concerning the display of the ONT-506.

Attribute	Value
Resolution	1024 x 768 pixels (XGA standard)

8.2.6 Noise emission

Specifications concerning noise emission of the ONT-506.

Attribute	Value
Noise pressure level (A-weighted) at 1 m distance	<52 dB(A)

8.2.7 Dimensions and weight

Specifications concerning dimensions and weight of the ONT-506.

Attribute	Value
Dimensions (width x height x depth)	450 x 335 x 435 mm
Weight without test modules	approx. 17 kg

Warm-up time for full validity of specifications: See specifications for the individual test modules.

Attribute	Value
Operating position	standing on mounted rubber feet
Carrying handle	one front side handle

8.2.8 Clock and synchronization

Specifications concerning clock and synchronization of the ONT-506.

Clock generation

Attribute	Value
Internal accuracy	±2 ppm, ±1ppm/year
Synchronization to external signal	see specification below
Synchronization from receiver	all receiver bit rates

Reference IN/OUT

All output levels are given with nominal termination.

REF OUT [19] (Unbalanced Output)

Attribute	Value
Data Signal	DS1, E1 (AIS, "All Ones")
Codes	B8ZS, HDB3
Level (Data Signal)	±2.37 V ±20%
Clock Signal	1544 kHz, 2048 kHz
Level (Clock Signal)	±2.37 V ±20%
Termination	BNC, 75 Ω, AC coupled

REF OUT [20] (Balanced Output)

Mode coupled to [19].

Attribute	Value
Data Signal	DS1, E1 (AIS, "All Ones")
Codes	B8ZS, HDB3
Level (Data Signal)	±3 V ±20%
Clock Signal	1544 kHz, 2048 kHz
Level (Clock Signal)	±3 V ±20%
Termination	Bantam, 110 Ω, transformer coupled

REF IN [21] (Balanced Input)

Attribute	Value
Data Signal	DS1, E1
Codes	B8ZS, HDB3
Level (data signal)	nom.: ±3V, min: ±1.5 V, max: ±6V
Clock Signal	1544 kHz, 2048 kHz, 1 MHz optional: 64kHz, CC64kHz[1)]
Level (clock signal)	min: 600 mV_{pp}, max: 6 V_{pp}
Max. tolerable frequency offset (data/clock signal)	±15 ppm
Termination	Bantam, 110 Ω, transformer coupled
LED "LTI" (Loss of Timing Information)	green ==> valid signal present yellow ==> signal present, not locked red ==> no signal present
Synchronization time	< 30 seconds

[1)] Composite clock acc. to G.703 App. II

REF IN [22] (Unbalanced Input)

Attribute	Value
Data Signal	DS1, E1
Codes	B8ZS, HDB3
Level (data signal)	nom.: ±2.37 V, min: ±1 V, max: ±5 V
Clock Signal	1544 kHz, 2048 kHz, 1 MHz, 5MHz, 10 MHz optional: 64kHz, CC64kHz[1)], 6.312MHz
Level (clock signal)	min: 500 mV_{pp}, max: 5 V_{pp}
Max. tolerable frequency offset (data/clock signal)	±15 ppm
Termination	BNC, 75 Ω, AC coupled
LED "LTI" (Loss of Timing Information)	green ==> valid signal present yellow ==> signal present, not locked red ==> no signal present

Synchronization time	< 30 seconds

[1)] Composite clock acc. to G.703 App. II

CLK REF IN/OUT [25] (Unbalanced Input)
For internal use (mainframe cascading) only.

Attribute	Value
Clock Signal	1544 kHz, 2048 kHz, 1 MHz, 5MHz, 10 MHz
Max. tolerable frequency offset	±15 ppm
Level	min: 500 mV_{pp}, max: 5 V_{pp}
Termination	BNC, 75 Ω, AC coupled

CLK REF IN/OUT [25] (Unbalanced Output)
For internal use (mainframe cascading) only.

Attribute	Value
Clock Signal	1544 kHz, 2048 kHz, 1 MHz, 5MHz, 10 MHz
Max. tolerable frequency offset	±15 ppm
Level	1.5 V_{pp} ±20%
Termination	BNC, 75 Ω, AC coupled

TIME REF IN/OUT [26] (Unbalanced Input)
For internal use (mainframe cascading) only.

Attribute	Value
Clock Signal	1544 kHz, 2048 kHz, 1 pps (pulse per second) 1 MHz, 5 MHz, 10 MHz 10 MHz, trailing edge coded with date & timing information
Max. tolerable frequency offset (data/clock signal)	±2 ppm
Level	min: 500 mV_{pp}, max: 5 V_{pp}
Termination	BNC, 75 Ω, AC coupled
LED "LTI" (Loss of Timing Information)	green ==> valid signal present yellow ==> signal present, not locked

	red ==> no signal present
Synchronization time	< 2 minutes

TIME REF IN/OUT [26] (Unbalanced Output)
For internal use (mainframe cascading) only.

Attribute	Value
Clock Signal	10 MHz, trailing edge coded with date & timing information
Level	1.5 V_{pp} ±20%
Termination	BNC, 75 Ω, AC coupled

TIME REF OUT [27] (Unbalanced Output)

Attribute	Value
Clock Signal	10 MHz, trailing edge coded with date & timing information
Level	1.5 V_{pp} ±20%
Termination	BNC, 75 Ω, AC coupled

8.3 Contact information

This section contains contact information.

North America	
TEL	866 228 3762
FAX	301 353 9216
WEBSITE	www.jdsu.com

Latin America	
TEL	+55 11 5503 3800
FAX	+55 11 5505 1598
WEBSITE	www.jdsu.com

Asia Pacific	
TEL	+852 2892 0990

FAX	+852 2892 0770
WEBSITE	www.jdsu.com

EMEA	
TEL	+49 7121 86 2222
FAX	+49 7121 86 1222
WEBSITE	www.jdsu.com

Index

L

M

N

O

P

JDSU Environmental Management Program

Superb performance and high quality have always characterized JDSU datacom and telecom measurement technology products. In this same world-class tradition, JDSU has an established, proactive program of environmental management.

Environmental management is an integral part of JDSU's business philosophy and strategy requiring the development of long-term, productive solutions to problems in the key areas of economics, technology, and ecology.

A systematic environmental management program at JDSU is essential in regard to environmental policy and enhances cooperation between ourselves and our business partners.

The JDSU Environmental Management Program considers:

Product design and manufacture

Environmental restrictions and requirements are taken into account during planning and manufacture of JDSU products. This attention ranges form the raw materials and finished components selected for use and the manufacturing processes employed, through to the use of energy in the factory, and right on up to the final stages in the life of a product, including dismantling.

Hazardous materials

JDSU avoids or uses with care any hazardous or dangerous material in the manufacturing process or the end product. If the use of a dangerous material cannot be avoided, it is identified in product documentation and clearly labeled on the product itself.

Packaging materials

Preference is given to reusable or biodegradable single-substance packaging materials whenever possible.

Environmental management partnerships

JDSU encourages our customers and suppliers who take this responsibility seriously to join JDSU in establishing their own environmental management programs.

Recycling used products

This product is subjected to the European Union Waste Electrical and Electronic Equipment directive (WEEE), 2002/96/EC. This product should not be disposed of as unsorted municipal waste and should be collected separately and disposed according to your national regulations.

In the European Union, all equipment purchased from JDSU after 2005-08-13 can be returned for disposal at the end of its useful life. Measuring systems affected by this can be recognized by the symbol on the right of a crossed-out wheeled bin and a black bar. This symbol can be found either on the device or in the accompanying documents.

Contact your local Technical Assistance Center (TAC) for return and collection services available to you.

If you would like specific information about the JDSU Environmental Management Program, please visit **www.jdsu.com/test**.

JDSU

The following pages provide with respect to Chinese Requirements information with regard to the location of restricted hazardous substances within this equipment. As measuring equipment this equipment is excluded from the European regulations for the restriction of hazardous substances (RoHS).

“中国 RoHS”

《电子信息产品污染控制管理办法》（信息产业部，第 39 号）

附录 (Additional Information required for the Chinese Market only)

本附录按照“中国 RoHS”的要求说明了有关电子信息产品环保使用期限的情况，并列出了产品中含有的有毒、有害物质的种类和所在部件。本附录适用于产品主体和所有配件。

产品系列: ONT-5xx
(Product Family)

环保使用期限：

本标识标注于产品主体之上，表明该产品或其配件含有有毒、有害物质（详情见下表）。
其中的数字代表在正常操作条件下至少在产品生产日期之后数年内该产品或其配件内含有的有毒、有害物质不会变异或泄漏。该期限不适用于诸如电池等易耗品。
有关正常操作条件，请参见产品用户手册。
产品生产日期请参见产品的原始校准证书。

有毒、有害物质的类型和所在部件

	有毒、有害物质和元素					
元器件 (Component)	铅(Pb)	汞 (Hg)	镉(Cd)	六价铬(CR^{6+})	多溴联苯(PBB)	多溴二苯醚 (PBDE)
产品主体 (Main Product)						
印刷电路板组件 (PCB Assemblies)	X	O	O	O	O	O
内部配线 (Internal wiring)	X	O	O	O	O	O
键盘 (Keyboard)	O	O	O	O	O	O
电池 (Batteries)	O	O	O	O	O	O
电源 (Power Supply)	X	O	O	O	O	O
电工零件 (Electro-mechanical parts)	X	O	O	O	O	O
硬盘 (Hard Drive)	X	O	O	O	O	O
光模块 / 辅助模块 (Optical modules) / (Auxiliary modules)	X	O	O	X	O	O
金属外壳零件和紧扣件 (Metal case parts and fixings)	O	O	O	X	O	O
塑料外壳零件 (Plastic case parts)	O	O	O	O	O	O
标签和胶带 (Labels and tapes)	O	O	O	O	O	O
配件 (Accessories)						
外接电缆和适配器 (External cables and adapters)	X	O	O	X	O	O
光盘 (CD-ROMS)	O	O	O	O	O	O
手册和其它印刷材料 (Handbooks and other printed material)	O	O	O	O	O	O
包装箱和缚带 (Carrying case and strap)	O	O	O	O	O	O

O：代表该部分中所有均质材料含有的该有毒、有害物质含量低于 SJ/T11363-2006 标准的限值。
X：代表该部分中所有均质材料含有的该有毒、有害物质含量高于 SJ/T11363-2006 标准的限值。