

# ONT-503/506/512

## Optical Network Tester – Short Summary

August 2009



### Key features

- **Multi-Application support**  
SONET/SDH, NewGen, Ethernet, Fibre Channel, OTN, Jitter, DS<sub>n</sub>/PDH
- **Multi-Port testing**  
All interfaces run simultaneously and independently
- **Multi-Users** to share modules with log-in control
- **Multi-Channel test** checks SONET/SDH channels simultaneously
- Industry first **40/43G SDH/SONET/OTN and unframed BERT** testing with jitter/wander capability
- **High-accurate Jitter/Wander test** according to ITU-T O.172 Appendices VII (incl. Accuracy Map)+ VIII and according to ITU-T O.173
- **Module-E 10G**: all rates covered from 9.95 to 11.32 G
- **Automation made easy via** Linux OS, Tcl/Tk, C- and LabWindows driver libraries with Ethernet and GPIB connectivity
- Various mainframes ONT-503/506/512 with 3/6/12 slots

### 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 its robustness and long reach advantages becomes of interest for Network Equipment Manufacturers and Carriers as well.

The ONT-503/506/512 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 bitrates. With the optional jitter/wander testing capabilities the ONT-503/506/512 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.

### Remote Multi-User access – most efficient use of your test set

Individual log-ins for each user being local or accessing modules through a browser for remote operation allow to share the test set without impacting each others' measurements.

Drivers and test libraries support for Tcl/Tk and LabWindows and the Linux operation system help to minimize efforts to use ONT-503/506/512 in an automated environment.

Modules to test OTN, SDH, SONET, NewGen, Ethernet, Fibre Channel, DS<sub>n</sub>/PDH and Jitter complete the **broadest range of applications supported on one platform**. All modules are 'plug-ins'.

**40/100 GE**  
see separate  
datasheet!

# Design and conformance testing of NextGeneration transport networks

## Multi-application and multi-port configuration

### 40/43G Solution

- SDH/SONET, OTN (optional)
- Unframed testing
- 40/43G NRZ and 43G DPSK



### 40/43G jitter/Wander Solution

- SDH/SONET, OTN (optional)
- Highly accurate jitter evaluation according to new O.172 Appendices VII + VIII
- Wander (optional)



### OTN 2.5/2.7G-B Module

- OTN/SDH/SONET (PoS optional)
- Multi-Channel SDH/SONET (optional)
- Jitter/wander version -C (optional)



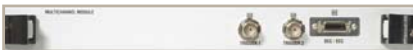
### OTN 10/10.7G (-B) Module

- OTN/SDH/SONET (PoS optional)
- Multi-Channel SDH/SONET (optional)



### Multi-Channel Extension Module

- Adds Multi-Channel SDH/SONET to 2.5/10G, OTN and NewGen modules



### Module-E 10G

- 9.9 to 11.3 Gb/s unframed
- 10G LAN/WAN/FC/SDH/SONET, OTN and overlocked (optional)
- Electrical interfaces 10G (optional)



### 10G-D Jitter Module

- High-accurate jitter evaluation according to O.172 Appendices VII + VIII
- Adds jitter to module-E 10G
- Adds jitter at 9.9G, 10.3G (optional) and 10.7G (optional)
- Adds wander (optional)



### 2.5G-B/10G (-B) Modules

- SDH/SONET (PoS optional)
- Multi-Channel SDH/SONET (optional)



### 2.5G-C, 2.5/2.7G-C Jitter Module (155 Mb/s to 2.7 Gb/s)

- Highly accurate jitter evaluation according to O.172 Appendices VII + VIII
- Adds jitter to 2.5G-B module
- Adds jitter to NewGen module 2.5G-B
- Adds jitter to OTN module 2.5/2.7G-B
- Wander (optional)



### DSn/PDH Modules

- Unframed, framed and muxed DSn and PDH signals
- Single and dual ports



### Ethernet Modules up to 1 Gb/s

- Optical and/or electrical interfaces
- Ethernet MAC
- Ethernet link



### NewGen Solution 2.5G-B/10G

- Ethernet over SDH/SONET (EoS)
- Ethernet MAC
- LCAS, GFP, differential delay
- SDH/SONET (PoS optional)
- Multi-Channel SDH/SONET (optional)
- GFP-T (optional)
- Jitter/wander for version 2.5G-B (optional)



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## Mainframes

<b>ONT-503 mainframe, 3 slots, 15" TFT display</b>	<b>BN 3075/01</b>
<b>ONT-506 mainframe, 6 slots, 15" TFT display</b>	<b>BN 3062/01</b>
<b>ONT-512 mainframe, 12 slots, rack mount</b>	<b>BN 3061/01</b>

## Modules and options

## Slots required

## Module-E 10G LAN/WAN/FC/SDH/SONET/OTN

Module-E 10G LAN/WAN/FC/SDH/SONET/OTN	Slots required	BN
Module-E 10G XFP slot	2	BN 3061/92.10
Module-E 10G XFP slot (ONT-503)	1	BN 3075/92.10
Module-E 10G 1310 nm	2	BN 3061/92.11
Module-E 10G 1310 nm (ONT-503)	1	BN 3075/92.11
Module-E 10G 850/1310 nm	2	BN 3061/92.12
Module-E 10G 850/1310 nm (ONT-503)	1	BN 3075/92.12
Module-E 10G 1310/1550 nm	2	BN 3061/92.13
Module-E 10G 1310/1550 nm (ONT-503)	1	BN 3075/92.13
Module-E 10G 850/1310/1550 nm	2	BN 3061/92.14
Module-E 10G 850/1310/1550 nm (ONT-503)	1	BN 3075/92.14
Electrical interfaces 10G	–	BN 3061/92.19
OC-192c/STM-64c BERT	–	BN 3061/93.35
SDH/SONET Single Channel	–	BN 3061/93.36
Multi-Channel 10G High Order	–	BN 3061/93.37
10G VCAT High Order	–	BN 3061/93.39
10G GFP-F	–	BN 3061/93.45
10G Fibre 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
10G Transport Solution	–	BN 3061/93.75
10G VCAT High Order Solution	–	BN 3061/93.76
10G Ethernet Solution	–	BN 3061/93.77
10G OTN Multiplexing Solution	–	BN 3061/93.78
10G Multi-Channel High Order Upgrade	–	BN 3061/93.79
Jitter module 10G-D 1310 nm	+ 1	BN 3061/90.86
Jitter module 10G-D 1550 nm	+ 1	BN 3061/90.88
Jitter 10.3G	–	BN 3061/93.70
Jitter 10.7G	–	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

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**Modules and options****Slots required****40/43G solution**

40G SDH/SONET NRZ V2	3	BN 3061/91.81
40G SDH/SONET electrical V2	3	BN 3061/91.84
43G OTN with bulk client DPSK V2	3	BN 3061/91.85
40G SDH/SONET Jitter V2	5	BN 3061/91.91
43G Jitter V2	–	BN 3061/91.92
40/43G Wander	–	BN 3061/93.93
43G OTN V2	–	BN 3061/93.29
43G OTN with SDH/SONET client V2	–	BN 3061/93.28
43G OTN Multiplexing	–	BN 3061/93.14

**Jitter/Wander applications 155 up to 2.7 Gb/s**

Jitter module 2.5G-C	+ 1	BN 3061/90.90
Jitter module 2.5/2.7G-C	+ 1	BN 3061/90.89
Wander 2.5/ 2.7G	–	BN 3061/93.92

**Multi-Channel SDH/SONET application**

Multi-Channel extension module	1	BN 3061/90.82
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**Data over SDH/SONET applications**

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**

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

**SDH/SONET/PoS applications**

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/SDH/SONET applications**

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

## ONT-503 mainframe

### Highlights

- 3 slots to cover multiple ports/applications
- Portable
- Large 15" TFT touchscreen
- Interchangeable plug-in modules for most flexible use
- Linux operating system
- Easy test automation with full featured driver support



The ONT-503 is a 3-slot mainframe test solution with true multi-port operation for interactive and automated applications.

'Plug-in' modules allow for easy upgrade in the field and exchange of interfaces among ONT-503 mainframes as well as between ONT-506 and ONT-512 mainframes.

As part of the ONT-5xx family, the ONT-503 supports all modules available for the family and uses the same software concept as the ONT-506. Therefore, developed scripts can be used and training times for users are minimized.

### General specifications

#### Power supply (nominal range of use)

AC line voltage	100 to 240 V
AC line frequency	50/60 Hz, $\pm 5\%$
Power consumption (fully equipped)	Max. 350 VA
Safety class to IEC 61010-1	Cass I

#### Ambient temperature

Nominal range of use	+5 to +40 °C/41 to 104 °F
Storage	-20 to +45 °C/-4 to +113 °F
Transport	-40 to +70 °C/-40 to 158 °F
Dimensions, including handle/ bumpers (w × h × d)	360 × 392 × 185 mm, 4.1 × 15.4 × 7.3 in
Weight (without modules)	approx. 10 kg/ 21.5 lb

#### Clock and synchronization

Internal master clock accuracy	$\pm 2.0$ ppm (exceeds T1.101 stratum 3/3E accuracy)
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#### External synchronization

Connector, unbalanced	75 $\Omega$ , BNC jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz, 8 kHz, 1 MHz, 5 MHz, 10 MHz
Connector, balanced	110 $\Omega$ , Bantam jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz

#### From RX

Each module may use its received signal clock information as reference for its transmitter.

#### Clock output

Connector, unbalanced	75 $\Omega$ , BNC jack
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### Instrument operation

The ONT-503, which uses the Linux operating system, supports three types of operation:

- Local GUI via built-in touchscreen
- Customer script controlled for test automation
- Remote control for test automation via LAN and GPIB
- Remote operation via LAN

#### Touchscreen display

Large color TFT	15"
Resolution	1024 × 768 (XGA)

#### Interfaces, storage, data transfer

The ONT-503 uses a Pentium PC as internal controller allowing to run Linux applications as well.

Interfaces	Ethernet (RJ45), 4 × USB, External keyboard, mouse, VGA, DVI
PC Pentium M	1.8 GHz, 1 GB RAM
Hard drive for data/ setup storage	$\geq 40$ GB

#### Remote control for test automation

The ONT-503 is controlled remotely via SCPI commands sent by the customer's program using an Ethernet TCP/IP or a GPIB connection. The GPIB connection is possible via USB-GPIB cable, provided by National Instruments.

Modules are addressed independently and in parallel and may be shared among multiple users. In case of GPIB only one module can be addressed.

Universal driver libraries facilitate automation with specific support for individual applications.

Scripting support via Tcl/Tk and C libraries and LabWindows drivers. The interactive GUI also works in parallel to remote control, so that it is very easy to develop automated scripts.

## ONT-506 mainframe

### Highlights

- 6 slots to cover multiple ports/applications
- Desktop
- Large 15" TFT screen
- Interchangeable plug-in modules for most flexible use
- Linux operating system
- Easy test automation with full featured driver support



The ONT-506 is a 6-slot mainframe test solution with true multi-port operation for local and remote controlled applications.

'Plug-in' modules allow for easy upgrades in the field and exchange of interfaces among ONT-506 mainframes as well as between the ONT-503 and ONT-512 mainframes.

All modules use the same software concept. Therefore, developed scripts can be used and training times for users are minimized.

### General specifications

#### Power supply (nominal range of use)

AC line voltage	100 to 240 V
AC line frequency	50/60 Hz, $\pm 5\%$
Power consumption (fully equipped)	Max. 650 VA
Safety class to IEC 61010-1	Cass I

#### Ambient temperature

Nominal range of use	+5 to +40 °C/41 to 104 °F
Storage	-20 to +45 °C/-4 to +113 °F
Transport	-40 to +70 °C/-40 to 158 °F
Dimensions, including handle/ bumpers (w x h x d)	450 x 335 x 435 mm, 17.7 x 13.2 x 17.1 in
Weight (without modules)	approx. 17 kg/37.5 lbs

#### Clock and synchronization

Internal master clock accuracy	$\pm 2.0$ ppm (exceeds T1.101 stratum 3/3E accuracy)
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#### External synchronization

Connector, unbalanced	75 $\Omega$ , BNC jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz, 8 kHz, 1 MHz, 5 MHz, 10 MHz
Connector, balanced	110 $\Omega$ , Bantam jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz

#### From RX

Each module may use its received signal clock information as reference for its transmitter.

#### Clock outputs

Connector, unbalanced	75 $\Omega$ , BNC jack
Connector, balanced	110 $\Omega$ , bantam jack

### Instrument operation

The ONT-506, which uses the Linux operating system, supports three types of operation:

- Local GUI via built-in touchscreen
- Customer script controlled for test automation
- Remote control for test automation via LAN and GPIB
- Remote operation via LAN

#### Touchscreen display

Large color TFT	15"
Resolution	1024 x 768 (XGA)

#### Interfaces, storage, data transfer

The ONT-506 uses a Pentium PC as internal controller allowing to run Linux applications as well.

Interfaces	Ethernet (RJ45), 4 x USB, External keyboard, mouse, VGA, DVI
PC Pentium M	1.8 GHz, 1 GB RAM
Hard drive for data/ setup storage	$\geq 40$ GB

#### Remote control for test automation

The ONT-506 is controlled remotely via SCPI commands sent by the customer's program using an Ethernet TCP/IP or a GPIB connection. The GPIB connection is possible via USB-GPIB cable, provided by National Instruments.

Modules are addressed independently and in parallel and may be shared among multiple users. In case of GPIB only one module can be addressed.

Universal driver libraries facilitate automation with specific support for individual applications.

Scripting support via Tcl/Tk and C libraries and LabWindows drivers. The interactive GUI also works in parallel to remote control, so that it is very easy to develop automated scripts.

# ONT-512 mainframe

### Highlights

- 12 slots to cover multiple ports/applications
- Rack-mount chassis
- Interchangeable plug-in modules for most flexible use
- Linux operating system
- Easy test automation with full featured driver support



'Plug-in' modules allow for easy upgrade in the field and exchange of interfaces among ONT-512 mainframes as well as between ONT-503 and ONT-506 mainframes.

All modules use the same software concept. Therefore, developed scripts can be used and training times for users are minimized.

### General specifications

#### Power supply (nominal range of use)

AC line voltage	100 to 240 V
AC line frequency	50/60 Hz, ± 5%
Power consumption (fully equipped)	Max. 1000 VA
Safety class to IEC 61010-1	Cass I

#### Ambient temperature

Nominal range of use	+5 to +40 °C/41 to 104 °F
Storage	-20 to +45 °C/-4 to +113 °F
Transport	-40 to +70 °C/-40 to 158 °F
Dimensions, including handle/ bumpers (w × h × d)	464 × 327 × 523 in mm 18.2 × 12.9 × 20.6 in
	7.5 rack unit height is required in a 19" rack for stacking
Weight (without modules)	approx. 17 kg/ 37.5 lbs

### Clock and synchronization

Internal master clock accuracy	± 2.0 ppm (exceeds T1.101 stratum 3/3E accuracy)
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#### External synchronization

Connector, unbalanced	75 Ω, BNC jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz, 8 kHz, 1 MHz, 5 MHz, 10 MHz
Connector, balanced	110 Ω, Bantam jack
Clock source	DS1, E1, 1544 kHz, 2048 kHz

#### From RX

Each module may use its received signal clock information as reference for its transmitter.

#### Clock outputs

Connector, unbalanced	75 Ω, BNC jack
Connector, balanced	110 Ω, bantam jack

### Instrument operation

The ONT-512, which uses the Linux operating system, supports three types of operation:

- Local by connecting screen/ mouse/ keyboard
- Customer script controlled for test automation
- Remote control for test automation via LAN and GPIB
- Remote operation via LAN

### Interfaces, storage, data transfer

The ONT-512 uses a Pentium PC as internal controller allowing to run Linux applications as well.

Interfaces	Ethernet (RJ45), 4 x USB, External keyboard, mouse, VGA, DVI
PC	Pentium M 1.8 GHz, 1 GB RAM
Hard drive for data/ setup storage	≥ 40 GB

### Remote control for test automation

The ONT-512 is controlled remotely via SCPI commands sent by the customer's program using an Ethernet TCP/IP or a GPIB connection. The GPIB connection is possible via USB-GPIB cable, provided by National Instruments.

Modules are addressed independently and in parallel and may be shared among multiple users. In case of GPIB only one module can be addressed.

Universal driver libraries facilitate automation with specific support for individual applications.

Scripting support via Tcl/Tk and C libraries and LabWindows drivers. The interactive GUI also works in parallel to remote control, so that it is very easy to develop automated scripts.

## Ordering Information

## Mainframes

### BN 3075/01      ONT-503 Optical Network Tester

3-slot mainframe with 15" TFT display to take any combination of modules.

Please check number of slots required per module.

BN 3075/92.45    Carrying case

BN 3075/94.01    Calibration report

### BN 3062/01      ONT-506 Optical Network Tester

6-slot mainframe with 15" TFT display to take any combination of modules.

Please check number of slots required per module.

BN 3062/92.45    Carrying case

BN 3062/94.01    Calibration report

### BN 3061/01      ONT-512 Optical Network Tester

12-slot rack mount mainframe to take any combination of modules.

Please check number of slots required per module.

BN 3061/94.01    Calibration Report

BN 3061/92.01    **Rack mount kit**

It is required to install a support bar in the rack when mounting the ONT-512 by using the rack mount kit.

Some modules are only available for the ONT-503. The BN starts in this case with BN 3075/...

## Module 40/43G solution

### SDH/SONET Application

BN 3061/91.81    **40G SDH/SONET NRZ V2**  
STM-256, OC-768, unframed 40G  
3 slots

BN 3061/91.84    **40G SDH/SONET electrical V2**  
STM-256, OC-768, unframed 40G  
3 slots

### OTN Application

BN 3061/93.29    **43G OTN V2**  
OTM-0.3, unframed 43G,  
SDH/SONET and bulk-client  
Requires one of the following:  
40G SDH/SONET NRZ V2 BN 3061/91.81 or  
43G Jitter V2 BN 3061/91.92

BN 3061/93.14    **43G OTN Multiplexing**  
ODU2 and ODU1 in ODU3  
with bulk client or SDH/SONET client (optional)  
Requires BN 3061/93.29 or /91.85

### OTN Application with DPSK

BN 3061/91.85    **43G OTN with bulk client DPSK V2**  
OTM-0.3 with NRZ-DPSK  
Unframed 43G  
OTU3 with bulk client  
3 slots

BN 3061/93.28    **43G OTN with SDH/SONET client V2**  
Adds to OTU3 the capability to have a SDH/SONET client  
Requires BN 3061/91.85

### Jitter/Wander Application

BN 3061/91.91    **40G SDH/SONET Jitter V2**  
STM-256, OC-768, unframed 40G  
5 slots

BN 3061/91.92    **43G Jitter**  
Unframed jitter at 43G  
No additional slot required  
Requires the following:  
40G SDH/SONET Jitter V2 BN 3061/91.91  
OTN framed signals require:  
43G OTN V2 BN 3061/93.29

BN 3061/93.93    **Wander 40/43G**  
Software option  
Requires the following:  
40G SDH/SONET Jitter V2 BN 3061/91.91 and  
43G Jitter V2 BN 3061/91.92 (optional)

## Module-E 10G Solution

### LAN/WAN/FC/SDH/SONET/OTN

#### Module-E Hardware

Module-E supports a combination of built-in optics and pluggable XFPs.

The wavelength combinations 1310 and 1550 nm are built-in and switchable, 850 nm is always a pluggable XFP.

Modules for ONT-503/506/512 (BN 3061/92.xx) are 2-slot and modules for ONT-503 (BN 3075/92.xx) are 1-slot versions.

BN 3061/92.10    **Module-E 10G XFP slot**  
Optics via XFP slot

BN 3075/92.10    **Module-E 10G XFP slot**  
Optics via XFP slot

BN 3061/92.11    **Module-E 10G 1310 nm)**  
Optics built-in 1310 nm

BN 3075/92.11    **Module-E 10G 1310 nm**  
Optics built-in 1310 nm

## Ordering Information

BN 3061/92.12	<b>Module-E 10G 850/1310 nm</b> Optics XFP 850 nm, built-in 1310 nm
BN 3075/92.12	<b>Module-E 10G 850/1310 nm</b> Optics XFP 850 nm, built-in 1310 nm
BN 3061/92.13	<b>Module-E 10G 1310/1550 nm</b> Optics built-in 1310/1550 nm switchable
BN 3075/92.13	<b>Module-E 10G 1310/1550 nm</b> Optics built-in 1310/1550 nm switchable
BN 3061/92.14	<b>Module-E 10G 850/1310/1550 nm</b> Optics XFP 850 nm, built-in 1310/1550 nm switchable
BN 3075/92.14	<b>Module-E 10G 850/1310/1550 nm</b> Optics XFP 850 nm, built-in 1310/1550 nm switchable
BN 3061/92.19	<b>Electrical interfaces 10G</b> Differential interfaces to be combined with Module-E (2 slots)

The offered XFPs optics are qualified for all bit rates and applications

BN 3061/92.20	XFP Optics 850 nm
BN 3061/92.21	XFP Optics 1310 nm
BN 3061/92.22	XFP Optics 1550 nm
BN 3061/92.23	XFP Fast Trigger (spare for BN 3061/92.19)

## Module-E Hardware/Software Packages

BN 3061/92.30	<b>Module-E 10GE LAN XFP slot</b> Optics via XFP slot Includes BN 3061/93.47
BN 3061/92.31	<b>Module-E 10GE LAN 1310 nm</b> Optics built-in 1310 nm Includes BN 3061/93.47
BN 3061/92.32	<b>Module-E 10GE LAN 850/1310 nm</b> Optics XFP 850 nm, built-in 1310 nm Includes BN 3061/93.47
BN 3061/92.33	<b>Module-E 10GE LAN 1310/1550 nm</b> Optics built-in 1310/1550 nm switchable Includes BN 3061/93.47
BN 3061/92.34	<b>Module-E 10GE LAN 850/1310/1550 nm</b> Optics XFP 850 nm, built-in 1310/1550 nm switchable Includes BN 3061/93.47

## Module-E Software – Option valid for one module

BN 3061/93.35	<b>OC-192c/STM-64c BERT</b>
BN 3061/93.36	<b>SDH/SONET Single Channel</b> Includes BN 3061/93.35
BN 3061/93.37	<b>Multi-Channel 10G High Order</b>
BN 3061/93.39	<b>10G VCAT High Order</b>
BN 3061/93.45	<b>10G GFP</b> Requires OTN 10.7G BN 3061/93.48 or 10G VCAT High Order BN 3061/93.39) as transport technique and 10GigE LAN BN 3061/93.47 as service
BN 3061/93.46	<b>10G Fibre Channel</b>

BN 3061/93.47	<b>10GigE LAN</b> Included in BN 3061/92.30 to BN 3061/92.34
BN 3061/93.48	<b>10GigE WAN</b> Requires BN 3061/93.47
BN 3061/93.49	<b>OTN 10.7G</b>
BN 3061/93.50	<b>OTN 11.05/11.1G</b> Overclocked OTN for 10G LAN (optional)
BN 3061/93.51	<b>OTN 11.27/11.32G</b> Overclocked OTN for 10GFC (optional)
BN 3061/93.52	<b>OTN Data 11.05/11.1/11.27/11.32G</b> Consists of BN 3061/93.50 and BN 3061/93.51. See there for more information.
BN 3061/93.53	<b>OTN 10.7 to 11.32G</b> Consists of BN 3061/93.49 and BN 3061/93.50 and BN 3061/93.51. See there for more information.
BN 3061/93.54	<b>OTN Multiplexing OTU2</b> Requires BN 3061/93.49 as base option, SDH/SONET client is optional (BN 3061/93.36 or BN 3061/93.37)
BN 3061/93.60	<b>MAC-in-MAC 802.1ah</b> Requires BN 3061/93.47
BN 3061/93.62	<b>IPv6</b> Requires BN 3061/93.47
BN 3061/93.65	<b>Capture MAC/IP</b> Requires BN 3061/93.47

## Module-E Software Packages

BN 3061/93.75	<b>10G Transport Solution</b> Consists of SDH/SONET Single Channel BN 3061/93.36 10G VCAT High Order BN 3061/93.39 10G GFP-F BN 3061/93.45 10GigE LAN BN 3061/93.47 10GigE WAN BN 3061/93.48 OTN 10.7G BN 3061/93.49 OTN Multiplexing OTU2 BN 3061/93.54
BN 3061/93.76	<b>10G VCAT High Order Solution</b> Consists of 10GigE LAN BN 3061/93.47 10G VCAT High Order BN 3061/93.39 10G GFP-F BN 3061/93.45
BN 3061/93.77	<b>10G Ethernet Solution</b> Consists of 10GigE LAN BN 3061/93.47 10GigE WAN BN 3061/93.48 10G GFP-F BN 3061/93.45
BN 3061/93.78	<b>10G OTN Multiplexing Solution</b> Consists of SDH/SONET Single Channel BN 3061/93.36 OTN 10.7G BN 3061/93.49 OTN Multiplexing OTU2 BN 3061/93.54
BN 3061/93.79	<b>10G Multi-Channel High Order Upgrade</b> Requires BN 3061/93.36

## 10

## Ordering Information

## Jitter

BN 3061/90.86	<b>Jitter Module 10G-D 1310 nm</b> 1310 nm, high-accurate jitter 9.9G unframed Evaluated with O.172 Appendices VII + VIII Requires a Module-E BN 3061/92.10.../92.14 Requires SDH/SONET options for service measurements Adds 1 slot
BN 3061/90.88	<b>Jitter Module 10G-D 1550 nm</b> 1550 nm, high-accurate jitter 9.9G unframed Evaluated with O.172 Appendices VII + VIII Requires a Module-E BN 3061/92.10.../92.14 Requires SDH/SONET options for service measurements Adds 1 slot
BN 3061/93.70	<b>Jitter 10.3G</b> Enables jitter at 10.36G Requires BN 3061/90.86 or /90.88 Requires 10G LAN option for service-based measurements BN 3061/93.47
BN 3061/93.71	<b>Jitter 10.7G</b> Enables jitter at 10.7G Requires BN 3061/90.86 or /90.88 Requires OTN 10.7G option for service-based measurements BN 3061/93.49
BN 3061/93.95	<b>Wander 10/11G</b> Software option TIE, MTIE, TDEV Requires BN 3061/90.86 or /90.88 Requires optional BN 3061/93.70 and /93.71
BN 3061/93.96	<b>Wander DS1/E1 + BITS</b> Software option DS1/E1 + BITS Requires BN 3061/93.95
BN 3061/93.97	<b>Wander 10/11G Expert</b> Software option TDEV noise Requires BN 3061/93.95

## Modules and Options

## DSn/PDH Applications

BN 3061/90.61	<b>DSn/PDH module single port</b> DS1, DS3, E1, E3, E4 1 slot
BN 3061/90.62	<b>DSn/PDH module dual port</b> Two times: DS1, DS3, E1, E3, E4 1 slot

## SDH/SONET Applications

BN 3061/90.26	<b>Module 2.5G-B, 1310/1550 nm</b> Electrical interfaces OC-1/3/12/48, STM-0/1/4/16 Prepared for jitter 1 slot
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BN 3061/90.15	<b>Module 10G, 1310 nm</b> OC-192, STM-64 1 slot
BN 3061/90.21	<b>Module 10G-B, 1310 nm</b> Electrical interfaces OC-192, STM-64 Prepared for jitter 2 slots
BN 3061/90.16	<b>Module 10G, 1550 nm</b> OC-192, STM-64 1 slot
BN 3061/90.19	<b>Module 10G-B, 1550 nm</b> Electrical interfaces OC-192, STM-64 Prepared for jitter 2 slots
BN 3061/93.03	<b>IP/PoS processing</b> Runs on all classical SDH/SONET capable modules. One option relates to one module. This option is not available for 10G Module-E and for the 40/43G solutions.

## Multi-Channel SDH/SONET Application

BN 3061/90.82	<b>Multi-Channel extension module</b> Parallel generation/analysis of up to 1344 VT1.5/1008 VC-12 channels with mixed signal structure 1 slot Requires one of the following modules: Modules 2.5G/10G: BN 3061/90.26, /90.16, /90.15, /90.21, /90.19 NewGen solution 2.5G/10G: BN 3061/90.43, /90.45 OTN modules 2.5/2.7 and 10/10.7G: BN 3061/90.27, /90.30, /90.32, /90.33
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## Data over SDH/SONET Applications

BN 3061/90.43	<b>NewGen solution 2.5G-B</b> 1310/1550 nm, electrical interfaces SDH/SONET/EoS: OC-3/12/48, STM-1/4/16 SDH/SONET additionally: OC-1/STM-0 VCat LO/HO, Differential Delay, GFP, LCAS, MAC Prepared for jitter 1 slot
BN 3061/90.45	<b>NewGen solution 10G</b> 1550 nm, electrical interfaces OC-192, STM-64 SDH/SONET/EoS VCat LO&HO, Differential Delay, GFP, LCAS, MAC 2 slots
BN 3061/93.08	<b>GFP-T processing</b> Software option Requires one of BN 3061/90.41, /90.43, /90.45 one option relates to one module.

## Ordering Information

BN 3061/90.71 **Ethernet module 10/100/1000M**  
4 ports 10/100/1000Base-T  
1 slot

BN 3061/90.72 **Mixed Ethernet module**  
2 ports 1000Base-SX/LX and  
2 ports 10/100/1000Base-T  
1 slot  
Please select number of SFPs (2 free of charge)  
SFP 1000Base-SX BN 3070/90.78  
SFP 1000Base-LX BN 3070/90.79

BN 3061/90.73 **Ethernet module 1G**  
4 ports 1000Base-SX/LX  
1 slot  
Please select number of SFPs (4 free of charge)

BN 3070/90.78 SFP 1000Base-SX

BN 3070/90.79 SFP 1000Base-LX

## OTN Applications

BN 3061/90.27 **OTN module 2.5/2.7G-B**  
1310/1550 nm, electrical interfaces  
OC-1/3/12/48, STM-0/1/4/16, OTU1  
Prepared for jitter  
1 slot

BN 3061/90.32 **OTN module 10/10.7G-B**  
1550 nm, electrical interfaces  
OC-192, STM-64, OTU2  
Prepared for jitter  
2 slots

BN 3061/90.33 **OTN module 10/10.7G-B**  
1310 nm, electrical interfaces  
OC-192, STM-64, OTU2  
Prepared for jitter  
2 slots

## Jitter/Wander Applications

BN 3061/90.90 **Jitter module 2.5G-C**  
High-accurate jitter 155M, 622M, 2.5G  
Evaluated with O.172 Appendices VII + VIII  
Requires BN 3061/90.26, /90.43  
1 slot

BN 3061/90.89 **Jitter module 2.5/2.7G-C**  
High-accurate jitter 155, 622M, 2.5G, 2.7G  
Evaluated with O.172 Appendices VII + VIII  
Requires BN 3061/90.27  
1 slot

BN 3061/93.92 **Wander 2.5/2.7G**  
Software option, TIE, MTIE, TDEV  
Requires BN 3061/90.89, /90.90  
1 slot

## Optical Connectors

For built-in optics, the following adapter types are available. One adapter per interface is included in the initial order and is user selectable.

### Measuring adapter

BN 2060/00.51 FC, FC-PC, FC-APC

BN 2060/00.58 SC, SC-PC, SC-APC

BN 2060/00.32 ST type (AT&T)

BN 2060/00.51 DIN 47256

BN 2060/00.53 E 2000 (Diamond)

BN 2060/00.59 LC, F-3000 (PC-APC)

### Optical attenuators

BN 2239/90.30 FC-PC, 10 dB, 1310/1550 nm

BN 2239/90.38 SC, 10 dB, 1310/1550 nm

JDSU offers a wide range of optical power meters, sources and attenuators. Contact your local sales representative for details.

## Related products

### TestPoint Family



TestPoint offers a flexible and cost effective telecom and datacom test solution for Production and Service Verification Testing (SVT). It consists of a modular platform that provides versatility in configuring interface types, transmission rates, protocols, and port density. One of the TestPoint's key attributes is support for multiple rates on single modules.

It is available in three chassis formats: a lightweight, fixed interface TS-10, a 3-slot TS-30, and a 17-slot TS-170. TestPoint provides 1G/2G/4G/10G Fibre Channel support and Ethernet features from 10 Mb/s up to 10 Gigabit Ethernet.

Transport protocol coverage includes SDH/SONET up to 40G, and Optical Transport Network (G.709) including overlocked rates.

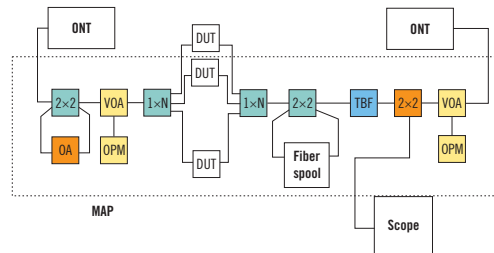
### Multiple Application Platform (MAP)



With over 20 unique modules, MAP enables users to manipulate and control optical transmission signals (independent of rate or format) and enables testing of transmission quality as a function of parameters such as Average Power, OSNR and Polarization state. Optical switches and optical splitter modules may be added to enable automation interfaces for multiple devices and/or multiple signal sources.

The modular platform is available in 3 or 8 slot chassis with GPIB or RS-232 interfaces. ActiveX and LabView drivers are also provided. Rack mount kits and a reverse mount system enable clean factory test integration and rear fiber exit when needed.

- 2x2: optical switch (cross)
- OA: optical amplifier
- OPM: optical power meter
- VOA: variable optical attenuator
- 1xN: 1:N switch
- TBF: tunable bandpass filter



### OLA-55M Optical Level Controller

The OLA-55M contains both attenuator and power level function making test set-up simple and eliminating the need to connect several instruments, cables and couplers.

See OLA-55M data sheet for details.



### Handheld Fiber Inspection Microscope

Many light transmission problems occur as a result of improper fiber connectors. The Fiber Microscope reflects details of scratches and any contamination of connector end surfaces. The light weight microscope is equipped with universal push-pull adapter.

## Test & Measurement Regional Sales

<b>NORTH AMERICA</b> TEL: 866 228 3762 FAX: 301 353 9216	<b>LATIN AMERICA</b> TEL: +1 954 688-5660 FAX: +1 954 3454668	<b>ASIA PACIFIC</b> TEL: +852 2892 0990 FAX: +852 2892 0770	<b>EMEA</b> TEL: +49 7121 86 2222 FAX: +49 7121 86 1222	<a href="http://www.jdsu.com/ont">www.jdsu.com/ont</a>
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