



# Technologie 100G / 40G v přístrojích VeEX

Měření v transportních sítích

# Multiservice platform – více technologií v jediném testeru

## 100/40 Gbps Ethernet - Are you ready?



### PMD LAYER

The Physical Medium Dependent sublayer or PMD defines the details of transmission and reception of individual bits on the physical medium. The PCS layer interfaces with the MAC layer and transmits the encoded data to and from signals suitable for the physical medium. The PMA continuously adapts parallel bit streams to the PMD, one per lane. The PMD converts these streams of bits into separate optical signals; the optical signals are then wavelength division multiplexed and delivered to the Medium Dependent Interface (MDI).

COP Rates							
Standard	IEEE 802.3ba	IEEE 802.3ba	IEEE 802.3ba	IEEE 802.3ba	IEEE 802.3ba	IEEE 802.3ba	IEEE 802.3ba
Wavelength	1310 nm	1550 nm	1550 nm	1550 nm	1550 nm	1550 nm	1550 nm
Reach	10 km	10 km	10 km	10 km	10 km	10 km	10 km
Optical rate	4 x 10 Gbps	10 x 10 Gbps	4 x 25 Gbps	10 x 25 Gbps	10 x 25 Gbps	10 x 25 Gbps	10 x 25 Gbps

Lane	Center Wavelength (nm)		Center Frequency (THz)	
	100GBase-LR4	100GBase-DR4	100GBase-LR4	100GBase-DR4
13	1310	1310	221.41	221.41
14	1330	1330	225.54	225.54
15	1350	1350	229.67	229.67
16	1370	1370	233.80	233.80
17	1390	1390	237.93	237.93
18	1410	1410	242.06	242.06
19	1430	1430	246.19	246.19
20	1450	1450	250.32	250.32
21	1470	1470	254.45	254.45
22	1490	1490	258.58	258.58
23	1510	1510	262.71	262.71
24	1530	1530	266.84	266.84
25	1550	1550	270.97	270.97
26	1570	1570	275.10	275.10
27	1590	1590	279.23	279.23
28	1610	1610	283.36	283.36
29	1630	1630	287.49	287.49
30	1650	1650	291.62	291.62

**CPD Operations**

100GBase-LR4 CPD: CPD, PMA, PMD, MDI

100GBase-DR4 CPD: CPD, PMA, PMD, MDI

100GBase-DR4 CPD: CPD, PMA, PMD, MDI

100GBase-DR4 CPD: CPD, PMA, PMD, MDI

### IEEE 802.3ba STANDARD Protocol Stack

MAC Media Access Control sublayer  
PMA Physical Medium Attachment sublayer  
PMD Physical Medium Dependent sublayer

### PCS LAYER

The Physical Coding Sublayer (PCS) selects upper layers (MAC) from the specific nature of the underlying channel. Both 40GBase-LR4 and 100GBase-DR4 are based on a 64B/66B code which supports synchronization of data and control characters, while maintaining robust error detection. When communicating with the lower layer (PMA), the PCS uses multiple serial streams or PCS lanes.

**PCS Layer Block Diagram**

**Encoding**

**Decoding**

**8B/10B Block Encoding**

**Alignment Marker Encoding**

**Multi-lane Distribution**

**PCS Receiver Encoder**

**PCS Receiver Decoder**

### THE BIG PICTURE

PCS Lanes, PMA Lanes, PMD Lanes

### PMA LAYER

The Physical Medium Attachment sublayer or PMA allows the PCS to connect to a media independent way with a range of physical media. It uses bit level multiplexing to adapt the PCS lanes to the appropriate number of physical lanes required by the PMD signaling.

**PCS to CSAP Lanes Bit Map**

100GBase-LR4, 100GBase-DR4

**VeEX**  
www.veexinc.com

# Modulární řada RxT-1200

Current Version 02.00.0044

## Improvements

- New Built-in VeExpress Request & Release functions and improved direct SW upgrade
- New off-line option activation via license key
- Direct results file launch for PCAP, OTDR, Wander,...
- New Sleep Mode with Holdover
- New Wi-Fi Access Point (AP) mode
- Improved Test Mode selection menu
- OPX BOX+ and V-Scout link mapper support
- Improved Fiber Scope auto focus detection

## Roadmap

- Improved Web Remote (without Java plug-in)



# Modul RxT- 6000

Current Version: 02.00.0042

## Improvements

Full OTN, EoOTN and SDH/SONET/PDH/SDH Mapping/Multiplexing

OTU4/OTU3 Channel and Port Detection and Configuration

OTU4/OTU3 Line and Payload Through transparency modes

STL256.4 STM-256/OC-768 support

No need for transceiver adapters, all formats supported. Smallest 10G – 100G tester



# Modul RxT- 3000

Current Version: 02.00.0022

## Improvements

All in one 64 kbit/s – 11.7 Gbit/s module

Advanced OTN sub-rate multiplexing (SDH/SONET and PDH/DSn)

Async, Byte and Bit Sync E1 mapping into SDH and non-test channel settings

Improved Wander Measurements and external reference clock lock

E1 Pulse Shape Analysis improvements

Added V-Test, V-FTP, V-PERF, VoIP

## Coming soon

Improved PDV measurements and calculation

G.703 64K Codirectional Interface Testing



# TX300S + 100G option jediný tester od 64 kbit/s do 100G

**HKE**  
elektronické měřicí přístroje

## Current Version:

CFP4 for 100G and QSFP+ for 40G

Ethernet testing only (for now)

Note: No Atomic Clock option, No RS232, No Sleep Mode

## Coming Soon

Expect similar functionality as in the UX400-100G CFP4, plus opt. TX320SM

Full OTN, EoOTN and SDH/SONET/PDH/SDH Mapping/Multiplexing

OTU4/OTU3 Channel and Port Detection and Configuration

OTU4/OTU3 Line and Payload Through transparency modes

STL256.4 STM-256/OC-768 support



# MTTplus - modul 320

Dual-port SFP+ with similar level of functionality as the TX320SM

Familiar VeEX GUI, Tools and Options

## Features

OTN, OTU1e, OTU2e, ODU0/ODUflex, SDH, SONET, PDH, DS<sub>n</sub>, ISDN, VF

Clock Wander & Phase Measurements

10/100M, 1G & 10G Ethernet

V-Route, V-PERF, V-Test, V-FTP,...

1/2/4/8/10G Fibre Channel

CPRI/OBSAI

G.703 64k Codirectional and IEEE C37.94

VeExpress integration

Ambient light sensor ready (Auto-dim and dark/light GUI color schemes)

## Roadmap

Continue to follow TX320SM steps, in terms of new features and improvements

Bidirectional pass-through PTP monitor with PDV performance measurements



# ITU-T C37.94 - Teleprotection

C37.94 Defines a “high-speed” multimode optical link for power line telemetry

850nm MM Fiber – Not prone to interference or shocks

Nx64k data rates (N = 1 to 12). Line rate is always 2.048 Mbit/s

Test option available in TX320sm and MTTplus-320 Multi-service test modules

Basic BER Testing for basic (PDH-like) point-to-point links

Feature	VeEX 320 Modules		Sunrise MTT-45	
64k to 768k (N = 1 to 12)	Yes		Yes	
BERT & G.821	Yes	Bit, FAS	Yes	
Error Generation	Yes	Bit, FAS	No	
Alarm Detection	Yes	LOS, AIS, RDI, LSS	Yes	AIS, Doesn't work
Alarm Generation	Yes	LOS, AIS, RDI	No	
Round Trip Delay	Yes	Res 0.001 ms (100m)	Yes	1 ms, Doesn't work
Terminal Mode	Yes	TX1/RX1	Yes	TX/RX
Bidirectional Pass-Through	Yes	RX1→TX2, RX2→TX1	No	
1310nm MMF or SMF	Yes	Via SFP	No	



# Ucelená nabídka 100G řešení

*How do you want your 100G, sir?*

## The Complete Solution

UX400-100G CFP

UX400-100G CFP2 (40G QSFP+)

UX400-100G CFP4 (40G QSFP+)

UX400-100G QSFP28 (40G QSFP+)

RXT-6000 100G CFP2 (40G QSFP+, SFP+, RJ45)

TX300s-100G CFP4 (40G QSFP+)

## Common feature set and user interface

### Advanced OTN, EoOTN and Flexible Payload multiplexing features

Test Payloads: 1, 10, 40, 100G Ethernet; SDH/SONET, PDH/DSn, Bulk (PRBS)

40G SDH with STL256.4 support (single wavelength and 4x10G)



# Vzdálený přístup bez Java plug-ins

Good News! The annoying Java Plug-in is no longer required

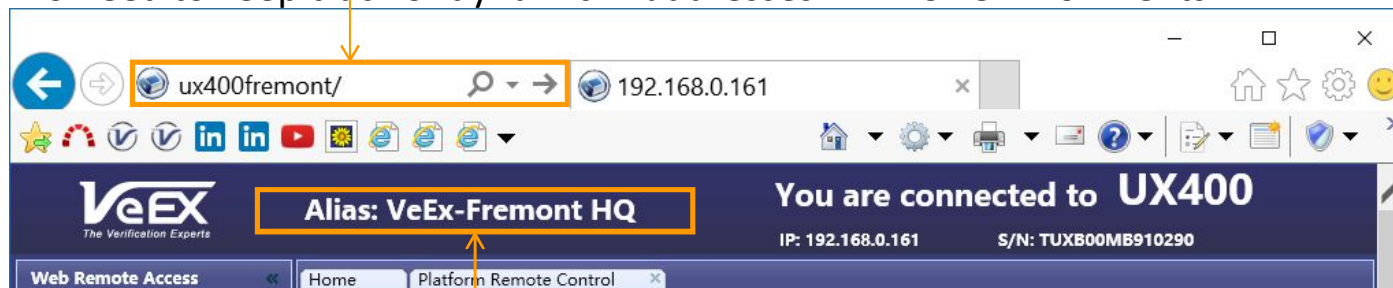
Better network security compatibility

Add support for newer browsers (plug-ins no longer supported), tablets and phones

All applicable ports are listed in the >Remote Access menu

Network Host Name

No need to keep track of dynamic IP addresses in DHCP environments



Test Platform Name

Identify test platforms by location, group, application, etc.

VNC Clients now require to add Port 6900 to the target IP address

# 100G modul – nové vlastnosti

**Current version** 3.10.7

## Improvements and new features

New Local One Way Delay feature; measurements can be done between any two ports of different 100G modules (same chassis).

Loopback control

Loopback statistics; total frame count

Test pattern compatibility between 1GE and 10GE interface products. NOTE: if testing against a RXT6000 use the latest version as well for compatibility.

New OWD with GPS

Increased maximum frame size from 10K to 16K bytes.

OTU4 and OTU3 with SDH/SONET/PDH/DSn Multi-Step Sub-rate Map/Mux test mode options.

STL256.4 SDH/SONET with PDH/DSn sub-rate multiplexing option.



# 10G, 2,5G, 1G, Combo, 16G FC, OSA

