

PBN-AIMA3000 hlavní stanice pro CATV

Brno, 13.3.2015

Radek Kocian

the art of
optical
communication



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communication

AIMA3000 Platforma



Vysoká kapacita

Max. 64 opt. vysílačů Tx

Max. 64 opt. přijímačů zpětného směru Rx

Nízká energetická náročnost

2W na modul Rx

6W na modul Tx

Webový management

AIMA3000 Platforma



- Max. output power 460 W
- Load-share functions
- Field-replaceable supply, fuse & fan

Power Supply

64 Fitted RF connectors

- Supports hot-plug modules
- One back-panel for all types of modules

RF Panel



Fiber Management

- 1RU space for fiber management
- Specially designed fiber guide

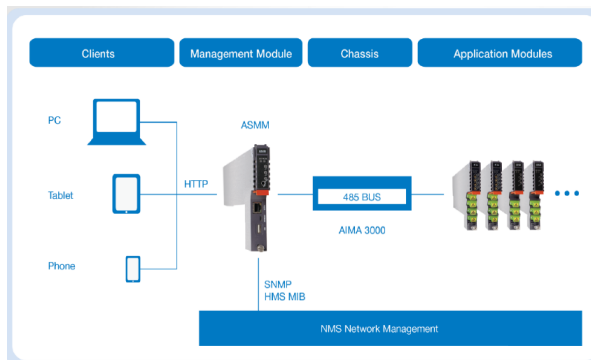
Fan Tray



- Hot plug fan tray
- CPU controlled fans based on temperature
- Fans Field-replaceable

AIMA3000 Platforma

ASMM Control Module



- Central control for all AIMA3000 modules within a chassis
 - Configuration
 - Status
 - Alarms
- Firmware Management
- Configuration Management with external backup
- Embedded HTTP web interface
- USB tethering port
- SNMP v1/2c/3

Integrace do lokálního dohledového systému VIVO CONNECTION, s.r.o.

AIMA3000 Platforma ASMM Management Pages

Web-based management

PBN AIMA3000 Configuration

System Modules Alarms Logs Upgrade

All Modules

- 0 ASMM
- 1
- 2
- 3
- 4 RTSS-D
- 5 RTSS-D
- 6
- 7
- 8
- 9 FTSS-D-10
 - Port 1
 - Port 2
- 10
- 11
- 12
- 13
- 14
- 15

Port Information
Slot: 9 Module Type: FTSS-D-10 Port: 1 Refresh

Status
Laser Type: Cooled DFB Laser Wave Length: 1550.03nm
Laser Output Status: On Laser TEC Current: 431mA AGC Point: 0.0dB
Broadcast Input Power: 8.9dBmV Narrowcast Input Power: 27.3dBmV

Configuration
Laser Output Control: On
Input AGC Mode: Off OMI Offset: 0.0 (-3.0-3.0)dB
Broadcast MGC: 0.0 (-10.0-5.0)dB Narrowcast MGC: 0.0 (-15.0-0.0)dB
Monitor BC or NC: BC On Submit

Alarm Settings
Laser Output Status Alarm: Enabled

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
BC Input Power(dBmV)	8.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.0

Informace o portu karty

Informace o vstupní úrovni RF signálu

AIMA3000 Platforma NMS3 Network Management

PBN NMS3 Enterprise II Manager

Inventory Topology Alarm Management Systems ODR Management

Device Panel

Name: 7-RN1-TELETRIS Headend: 无源光网络
Chassis IP: 192.168.16.191 Slot: 7
Vendor: PBN Serial Number: SN11644707.1.12
Status: ON LINE Alarm: ■ ■
Description:

Basic Configuration

ODN AC: ■ 22.8 Vdc Vdc Vdc
Switch Temperature: ■ 22.2 °C °C °C
Switch Mode: Auto
Switch Intel Status: Uninstall
DC Name: PS2

ODN DC: ■ 12.5 Vdc Vdc Vdc
Primary Power Instal: Installed
Switch Status: Primary
DC Name: PS1

Forward Path Configuration

Module Number	ISAPN	Source Lim	Primary Receiver Power (-2.0-2.0)	Output Level Per Channel (16.0-40.0)	Cable C
1	Yes	Select	-1.0 dBm	40.7080 dBm	
2	No	Select	-1.0 dBm	40.7080 dBm	

RF Parameters

Name	RF Input Power (15.0-56.0)	RF Output Per Channel (20.0-36.0)	Laser Output Power

AIMA3000 Platforma

AIMA versus OCMR

BOM Node	PBN	PBN
512 Home/node	AIMA3000	OCMR
Required rack space		
Total chassis	1	3
Total RU	4	12
TX 7dBm	10	20
RRX	5	5
Required power consumption per year (Per unit)		
Chassis + Controller	24.0 W	24.3 W
TX 7dBm	140.0 W	388.0 W
RRX	32.9 W	25.6 W
Total Watt	196.9 W	437.9 W
Total cost of operation		
KWH / Year	1724 KWh	3836 KWh
Forced Cooling	431 KWh	959 KWh
total KWH / Year	2156 KWh	4795 KWh
Cost / Year	\$754	\$1,678

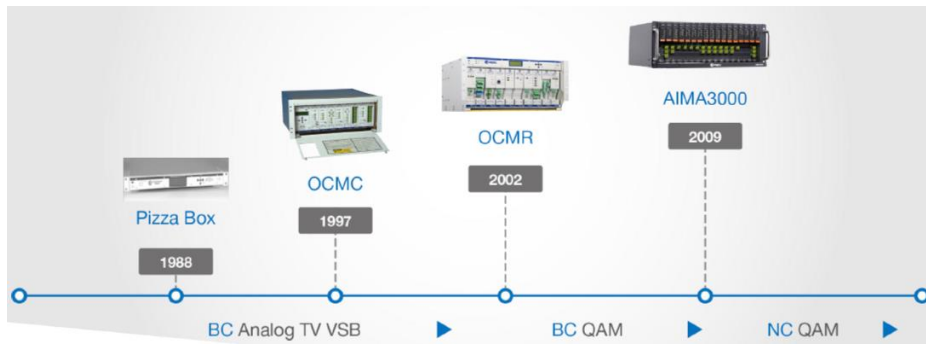


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Peking – připojeno 4.5 M domácností, realizováno koncem roku 2013, migrace z OCMR

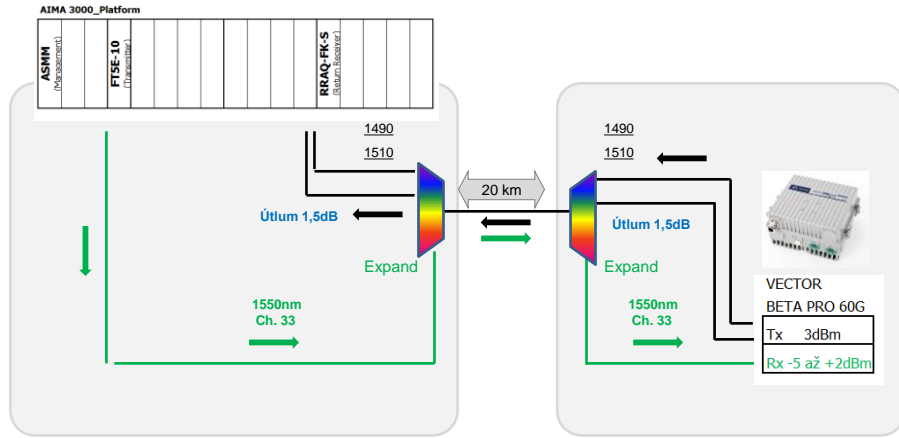
AIMA3000 Platforma



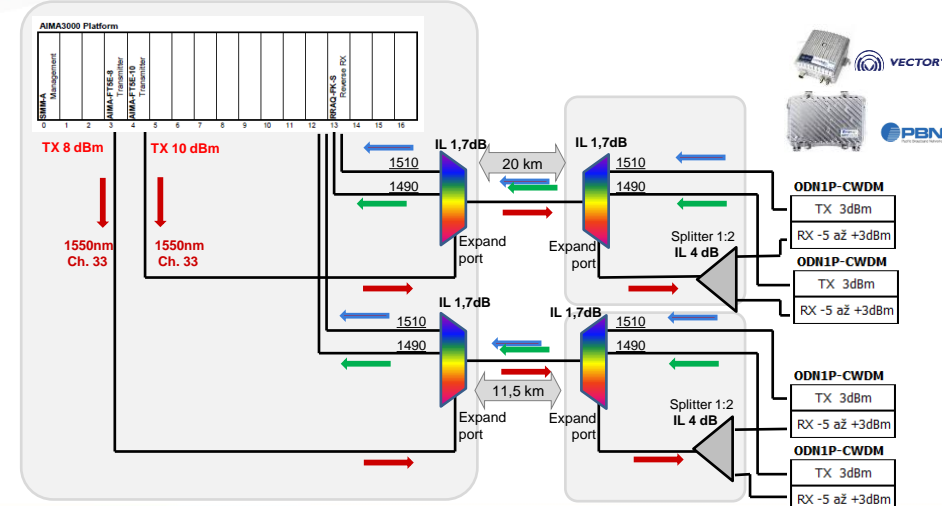
Optické sítě v CATV – HFC/RFoG



Optické síť v CATV – HFC/RFoG



Optické síť v CATV – HFC/RFoG



Application Modules

Optické sítě v CATV – HFC/RFoG

AIMA-FT5E

1550 nm Forward Transmitter - Enhanced



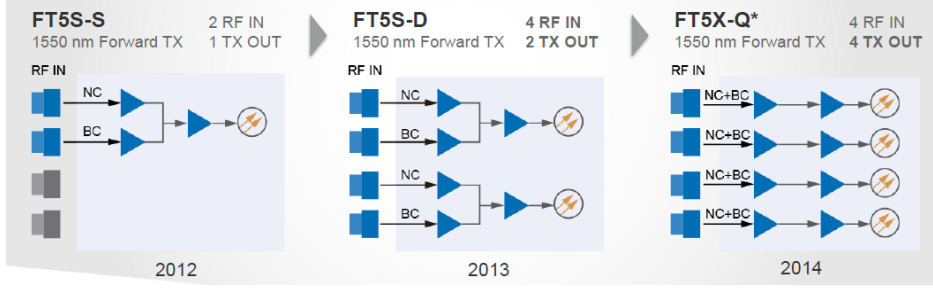
Optical Performance	
Optical wavelength	ITU standard wavelength
Optical outputs	1
Output power	8 dBm, 9 dBm, 10 dBm
Optical connector	SC/APC [®] , FC/APC, LC/APC, E2000/APC
Laser RIN	< -155 dB/Hz
RF Performance	
RF bandwidth	45 MHz to 1000 MHz
RF flatness	± 0.75 dB
RF input return loss	> 16 dB
RF input level, NC nominal [®]	25-35 dBmV per channel
RF input level, BC nominal [®]	15-25 dBmV per channel
AGC range	±3 dB
RF Impedance	75 Ω

- EDFA Erbium Doped Fiber Amplifier
- FPAS RF Forward Path Amplifier - Standard
- RFSW RF AB Protection Switch
- Optical AVB Protection Switch
- 1310 nm Return Transmitter - Standard
- 1550 nm Return Transmitter - Standard
- FPAS RF Return Path Amplifier - Standard

Optické sítě v CATV – HFC/RFoG

FT5 Forward transmitter

- Maximum 4x transmitters per slot
- Minimum cabling changes required when upgrading to higher density



Optické sítě v CATV – HFC/RFoG



AIMA-RRAF Analog Return Receiver - FSK

Optical Performance

Optical wavelength	1260 nm to 1620 nm
Optical inputs	-18 dBm to +2 dBm
Optical return loss	> 50 dB
Optical connectors	4 x SC/APC [®] , FC/APC, LC/APC, E2000/APC

RF Performance

RF bandwidth	5 MHz to 200 MHz
RF output level [®]	48 dBmV
RF flatness	± 0.75 dB (5 MHz to 200 MHz, no 4.5 MHz pilot tone option)
Gain adjustment	up to 52 dB in 0.5 dB increments (default 42 dB)
RF impedance	75 Ω

Optické sítě v CATV – HFC/RFoG

ODN4P

Optical Distribution Node with Four Amplified RF Ports



Forward Path Optical Performance

Operating wavelength	1200 nm ~ 1600 nm
Input range	-5 dBm ~ +3 dBm
Nominal design input	-1 dBm
Optical return loss	> 60 dB
Optical connectors	SC/APC [®] E2000/APC FC/APC

Forward Path RF Performance

ODN4P-[TUW]-3045-[Y]-[Z]	Bandwidth 45 ~ 1000 MHz
ODN4P-[TUW]-4254-[Y]-[Z]	Bandwidth 54 ~ 1000 MHz
ODN4P-[TUW]-4670-[Y]-[Z]	Bandwidth 70 ~ 1000 MHz
ODN4P-[TUW]-6666-[Y]-[Z]	Bandwidth 85 ~ 1000 MHz
RF amplifier	Dual GaAs FET
Output level	> 55 dBmV @ 1000 MHz
RF flatness	± 0.75 dB
Return loss	> 16 dB
Impedance	75 Ω

Optické sítě v CATV – HFC/RFoG

ODN2000/LE2000

Optical Distribution Node with
two amplified RF ports



Forward Path Optical Performance

Operating wavelength	1200 nm ~ 1610 nm
Input range	-5 dBm ~ +3 dBm
OAGC (optical input)	-4 dBm ~ +2 dBm
Nominal design input	-1 dBm
Optical return loss	> 50 dB

Forward Path RF Performance

Bandwidth	54 / 70 / 85 ~ 1000 MHz
Output level	> 50 dBmV @ 1000 MHz ⁽¹⁾ (ODN2xxx-A) > 55 dBmV @ 1000 MHz ⁽¹⁾ (ODN2xxx-B)
RF flatness	± 0.75 dB
Return loss	> 16 dB
Impedance	75 Ω

Optické sítě v CATV – HFC/RFoG



CON



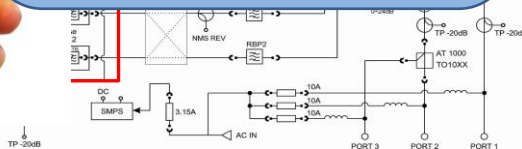
Basic
Terminal (BHHT)



Nastavení

- 1) Segmenty RF portů
- 2) Redundantní RF port 1, 2, 3 - opt. vysílač č.1
- 3) Redundantní RF port 1, 2, 3 - opt. vysílač č.1 i 2

Možnost místního nastavení pomocí terminálu BHHT, PC nebo možnosti vzdáleného monitoringu a nastavení



Optické sítě v CATV – HFC/RFoG

BOOSTER

Jednovláknové nebo dvouvláknové provedení
Vysílač zpětného směru –
vlnové délky CWDM

Optické sítě v CATV – HFC/RFoG

RFoG Node , Micro Node

CP-HFC-45-1000
CATV – optický přijímač
Pro FTTH aplikace
Šířka pásma 45 – 1000MHz
Nízká spotřeba 2W

Optické sítě v CATV – HFC/RFoG (Návrh, proměření, osazení technologie)



FITEL

MaxTester 715B



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