

**POCKET GUIDE**



**Integrated RF Solution for Signal Distribution**

**Broadcast and Satellite Communication**

**THE ART OF ENGINEERING**

## Place for Notes



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# About DEV Systemtechnik

## Partner of Choice

For more than 25 years, DEV Systemtechnik has developed and manufactured integrated systems for the entire RF signal distribution chain for major teleport and network operators worldwide. With its proven record in analog technology and engineering, DEV Systemtechnik provides flawless signal transmission over fiber and coax for satellite, broadcast & military purposes, as well as HFC (Hybrid Fiber Coax) feeds.

Originally founded in 1995, DEV has become the partner of choice when it comes to reliable signal transmission and distribution.

## Certified Quality Management

DEV's Quality Management for the development, production and sales of equipment and systems for signal transmission is certified according to ISO 9001:2015.



## The DEV Difference

DEV strives to provide solutions with outstanding performance at best cost using minimal space. Our portfolio supports a wide spectrum of high-availability optical and electrical RF systems such as:

- /// RF Signal Transmission over Optical Fiber (RFoF)
- /// Distribution and Combining Matrices
- /// Switching Systems
- /// Routing Products and Multiplexers
- /// Distribution Amplifiers, Splitters and Combiners
- /// Accessories

We can also configure custom combinations within the DC-40 GHz frequency range. Accessory products such as Lightning Protection, Bias Tees and Impedance Transformers help make your critical signal transmission easy and reliable.

# RF over Fiber with *Optribution*

## RF over Fiber Technology

“RF over Fiber” (RToF) refers to technology that modulates a specific laser with a radio frequency signal for transmission over optical fiber. Satellite ground stations and teleports must have an effective transmission method for RF signals linking antennas, signal management apparatus, and diverse equipment centers.

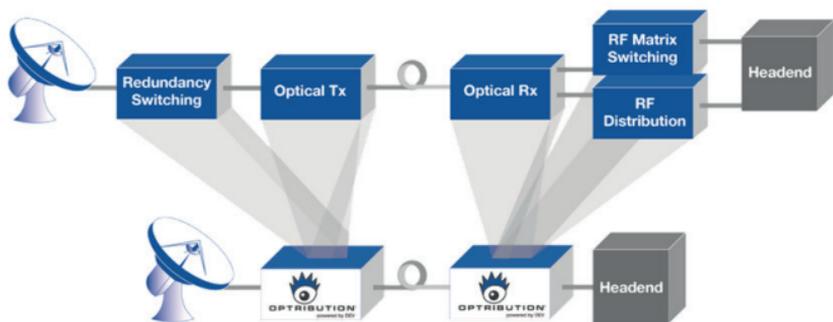
Overcoming the limitations of coax cable, fiber links are the best choice to assure optimal signal quality, especially over longer distances. RToF offers important advantages over coax: minimal losses, preserved signal quality, muted crosstalk, and multiple channels over one physical medium.

## *Optribution* – The All-in-One Solution

With *Optribution*, DEV offers a product line serving both electrical and optical functions in one system. All products are engineered, developed and manufactured in Germany. *Optribution* allows sophisticated switching, redundant configurations, and long-distance signal transport up to 200 km.

All of our RF-over-Fiber products feature modular flexibility and open paths scalable for future needs. DEV’s consistent solution architecture provides seamless interoperability with other DEV gear, including matrix switches, redundancy and antenna control systems, as well as lightning-protection equipment. When using standardized frequencies, protocols and connectors, DEV systems can also interface with third-party systems.

### Traditional Signal Transmission



With **OPTRIBUTION®**

# RF over Fiber - *Optribution*



## RF over Fiber Indoor Chassis

DEV 4111

### Intelligent Universal Optribution Chassis, 19", 1 RU, 2 Slots

- ▄ 50 Ω SMA (f) and/or 75 Ω F (f)
- ▄ Optical Tx, Rx Modules or RF Amplifiers
- ▄ L-Band Distribution 1:8 and 1:16
- ▄ IRD Controlled Switch 2x8 and 4x8
- ▄ 1+1 Redundancy



## RF over Fiber Indoor Chassis

DEV 7113

### Intelligent Optribution Chassis, 19", 3 RU, 20 Slots

- ▄ 50 Ω SMA (f) or 75 Ω F (f) or 75 Ω BNC (f)
- ▄ 1+1 and n+1 Redundancy Options
- ▄ CWDM for up to 16 Channels
- ▄ DWDM for up to 48 Channels
- ▄ Redundancy Path Gain Compensation (RGC)
- ▄ Ethernet to Optical Converter



## RF over Fiber Indoor Chassis

DEV 7114

### Intelligent Optribution Distribution Chassis, 19", 4 RU, 16 Slots

- ▄ 50 Ω SMA (f) and 75 Ω F (f)
- ▄ Distribution Amplifiers and Matrix Modules
- ▄ IRD controlled Switches from 4x16 to 4x64
- ▄ CWDM for up to 16 Channels
- ▄ Redundancy Path Gain Compensation (RGC)
- ▄ Ethernet to Optical Converter



## RF over Fiber Indoor Chassis

DEV 7134

### Compact Intelligent Optribution Chassis, 19" (Half Depth), 4 RU, 12 Slots

- ▄ 50 Ω SMA (f) and/or 75 Ω F (f)
- ▄ Front Accessible and Wall Mountable
- ▄ 1+1 or 4+1 Redundancy Option
- ▄ CWDM for up to 16 Channels
- ▄ Redundancy Path Gain Compensation (RGC)
- ▄ Ethernet to Optical Converter



## RF over Fiber Outdoor Chassis

DEV 7152

### Optribution Outdoor Chassis, 5 Slots

- ▄ Signal Conversion Directly at Antenna
- ▄ 50 Ω SMA (f) or N (f) and/or 75 Ω F (f)
- ▄ -30...+60 °C / -22...+140 °F
- ▄ 1+1 or 4+1 Redundancy Options
- ▄ Redundancy Path Gain Compensation (RGC)
- ▄ Ethernet to Optical Converter

# RF over Fiber - *Optribution*



## Optical L-Band Links

DEV 7232, DEV 7233  
DEV 7241, DEV 7251  
DEV 7332, DEV 7333  
DEV 7341

## Optribution Tx and Rx L-Band Link

- ▮ 950...2150 MHz, 700...2300 MHz and 850...2450 MHz
- ▮ SC/APC, FC/APC or E2000 HRL
- ▮ CWDM and DWDM Applications
- ▮ OMI Optimization
- ▮ Variable Gain and Variable Slope
- ▮ RF Sensing
- ▮ LNB Powering with Current Monitoring



## Optical 10 MHz Link

DEV 7238, DEV 7244  
DEV 7335, DEV 7344

## Optribution Tx and Rx 10 MHz Link

- ▮ 10 MHz and 700...2300 MHz
- ▮ SC/APC, FC/APC or E2000 HRL
- ▮ 9 Wavelengths for CWDM Applications
- ▮ Variable Gain and Variable Slope
- ▮ RF Sensing
- ▮ LNB Powering with Current Monitoring



## Optical CATV-Band Links

DEV 7238  
DEV 7337  
DEV 7338

## Optribution Tx and Rx CATV-Band Link

- ▮ 10 MHz, 47...862 MHz and 47...1006 MHz
- ▮ Advanced UHF/VHF Link 50...2000MHz
- ▮ SC/APC, FC/APC or E2000 HRL
- ▮ 9 Wavelengths for CWDM Applications
- ▮ RF Sensing
- ▮ RF Monitoring Port for Transmitter



## Optical Splitters

DEV 7512  
DEV 7514  
DEV 7518

## Optribution Splitters

- ▮ 1:2, 1:4, 1:8 Bidirectional Optical Splitters
- ▮ 1260...1610 nm
- ▮ Applicable in CWDM and DWDM Systems
- ▮ SC/APC, FC/APC or E2000 HRL



## Optical De-/Multiplexers

DEV 7612  
DEV 7614  
DEV 7618  
DEV 7616  
DEV 7658

## Optribution CWDM/DWDM De-/Multiplexers

- ▮ 2:1/1:2, 4:1/1:4, 8:1/1:8 or 1:16/16:1
- ▮ 1470...1610 nm
- ▮ Extension Port for up to 48 DWDM Channels
- ▮ SC/APC, FC/APC or E2000 HRL

# RF over Fiber - *Optribution*



## EDFA Modules

DEV 7415  
DEV 7425

## Optical EDFA Modules for Optribution

- ▄ Pre- and Boost-Amplifier
- ▄ High Gain, Low Noise Figure
- ▄ Automatic Output Power Control (APC)
- ▄ Manual Gain Control (MGC)
- ▄ Monitoring of Optical Power Level
- ▄ Optimized for DWDM Solutions



## RF over Fiber Desktop Modules

DEV 7285  
DEV 7286  
DEV 7287  
DEV 7385  
DEV 7387

## Stand-Alone Optribution Tx and Rx Modules

- ▄ 47...1006 MHz
- ▄ 400...900 MHz
- ▄ 700...2300 MHz
- ▄ LC/APC or LC/PC
- ▄ CWDM Option
- ▄ RF Monitoring Port
- ▄ LNB Power, Switchable 13/18 V & 0/22 kHz



## RF over Fiber Indoor Frame for Desktop Modules

DEV 7154

## Desktop Optribution Modul Rack, 19", 1 RU, 14 Slots

- ▄ External 12DC power inputs
- ▄ Primary and redundant power options
- ▄ Power failure GPO outputs
- ▄ Adjustable 19" mounting brackets to recess frame



## RF over Fiber Outdoor Chassis for Desktop Modules

DEV 7151

## Wall Mountable Chassis for Desktop Optribution Modules, 4 Slots

- ▄ Up to 4 Desktop Tx and/or Rx Modules
- ▄ -20...+65 °C / -4...+149 °F
- ▄ Easy Handling Character
- ▄ Wall Mountable
- ▄ Compact Size

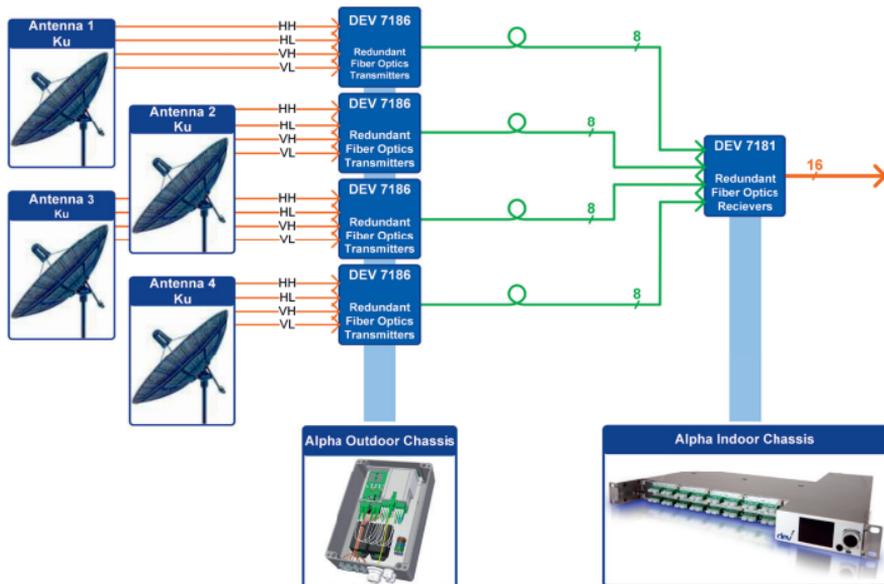
## Alpha – Highly Compact RF-over-Fiber System

The high-density RFoF solution *Alpha* within the *Optribution* family serves up to 32 fiber links in 1 RU – a benchmark figure for optical channels within a single rack unit. Splitting and switching modules are available for redundancy application on both the transmitting and receiving sides.

With an unmatched cost-to-performance ratio, *Alpha* is the optimal solution for standard RF-over-Fiber transmission when it comes to limited rack spacing. Each *Alpha* module interfaces with all other *Optribution* products and can be housed in a 1 RU indoor chassis or inside a waterproof outdoor chassis mounted directly on the antenna mast. The Alpha Outdoor Chassis can serve up to 8 optical channels.



## Sample Application for Alpha



# RF over Fiber - *Alpha*



## Alpha Indoor Chassis

DEV 7181

### Intelligent Optribution Chassis Alpha, 19", 1 RU, 8 Slots

- Up to 32 RF over Fiber links
- Space for 8 optical and 8 electrical modules
- LNB Powering – 13 V, 18 V and 0 Hz, 22 kHz
- 2.2" Full Color Display
- Power Supply Redundancy



## Alpha Outdoor Chassis

DEV 7185

### Optribution Polycarbonate Outdoor Chassis Alpha, 2 Slots

- Up to 8 RF over Fiber links
- Space for 2 optical and 2 electrical modules
- Extra space for a CWDM multiplexer
- LNB Powering – 13 V, 18 V and 0 Hz, 22 kHz
- Option for redundant power supplies
- Waterproof to IP66 standards



## Alpha Outdoor Chassis

DEV 7186

### Optribution Aluminum Outdoor Chassis Alpha, 2 Slots

- Up to 8 RF over Fiber links
- Space for 2 optical and 2 electrical modules
- Extra space for a CWDM multiplexer
- LNB Powering – 13 V, 18 V and 0 Hz, 22 kHz
- Option for redundant power supplies
- Waterproof to IP66 standards



## Alpha Outdoor Chassis

DEV 7187

### Optribution Aluminum Outdoor Chassis Alpha, 4 Slots

- Up to 16 RF over Fiber links
- Space for 4 optical and 4 electrical modules
- Extra space for a CWDM multiplexer
- LNB Powering – 13 V, 18 V and 0 Hz, 22 kHz
- Optional CPU for monitoring and control
- Option for redundant power supplies
- Waterproof to IP66 standards

# RF over Fiber - *Alpha*



## Alpha Optical I/O Cards

Option 101  
Option 102  
Option 103  
Option 104  
Option 105  
Option 111

## Alpha Optical Transmitter/ Receiver

- ▮ 850...2450 MHz
- ▮ 4 I/O channels per module
- ▮ SC/APC connectors
- ▮ CWDM option (1270...1610 nm)
- ▮ RF Sensing
- ▮ Variable Gain



## Alpha RF I/O Cards

Option 151  
Option 152

## Alpha Input/Output RF Ports

- ▮ Connection to the related optical module
- ▮ 850...2450 MHz
- ▮ 4 I/O Ports per module
- ▮ 75 Ohm, F (f) connectors
- ▮ 50 Ohm, SMA (F) connectors



## Alpha RF Redundancy

Option 155 (Splitter)  
Option 156 (Switch)  
Option 157 (Splitter)  
Option 158 (Switch)

## Alpha 1+1 Redundancy RF Ports

- ▮ Connection to two optical modules
- ▮ 850...2450 MHz
- ▮ 4 RF Ports per module
- ▮ Tx or Rx Redundancy
- ▮ 75 Ohm, F (f) connectors
- ▮ 50 Ohm, SMA (F) connectors



## Alpha CWDM De-/Multiplexer

Option 161 (1:4)  
Option 162 (1:8)  
Option 163 (1:16)

## Alpha CWDM De-/Multiplexer

- ▮ 4 / 8 / 16 Optical Ports for CWDM Applications
- ▮ 4:1/1:4, 8:1/1:8 or 1:16/16:1
- ▮ 1470...1610 nm
- ▮ SC/APC and LC/APC Connectors

# RF Distributing and Combining Matrices

## Stronger, Smaller, Smarter

With the introduction of its matrix platform, DEV established a new benchmark in the RF matrix area. DEV's matrix platform offers more functionality, state-of-the-art technology, and easy-to-use software within its compact size.

## RF Matrix Switch ARCHIMEDES

The RF Distributing Matrix ARCHIMEDES (DEV 1986) is built in a high-density, 4 RU chassis. Its superior degree of reliability embodies the core of your system. Available in sizes starting at 8x8, it can be easily expanded to 64x64 in increments of 8 inputs or outputs within four rack units. Redundancy options for channels plus controller are set to maximum reliability. With the LNB Power Option, ARCHIMEDES is capable of powering LNBs through all input channels.



## Modular – Flexible – Manageable

- /// Best cost-performance ratio
- /// Rack space saving design
- /// Ultra low power consumption
- /// Unbeatable flexibility for future needs due to the modular design
- /// Optical Inputs available
- /// LNB powering through all input channels
- /// Full color multi-touch display
- /// Integrated spectrum analyzer, operable locally or via DEV Web Interface

# RF Distributing and Combining Matrices



**RF Fan-Out Matrix  
8<sup>2</sup>**

DEV 1982

## L-Band Distributing Matrix 8x8, 19", 1 RU

- ▮ 950...2150 MHz
- ▮ 75 Ω, F (f) / BNC (f) / 50 Ω SMA (f) / Optical
- ▮ 4x4, 4x8, 8x4, or 8x8 Field Upgradable
- ▮ Variable Gain and Slope
- ▮ LNB Powering, Switchable 13/18 V & 0/22 kHz
- ▮ Graphical Local User Interface



**RF Fan-Out Matrix  
8to4ty**

DEV 1984

## L-Band Distributing Matrix 8x40, 19", 2 RU

- ▮ 950...2150 MHz
- ▮ 75 Ω, F (f) / BNC (f) / 50 Ω SMA (f) / Optical
- ▮ 8x8 up to 8x40 in 2 RU
- ▮ Variable Gain and Slope
- ▮ LNB Powering, Switchable 13/18 V & 0/22 kHz
- ▮ Integrated Spectrum Analyzer
- ▮ Graphical Local User Interface

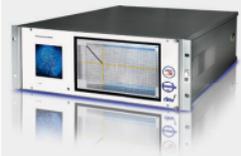


**RF Fan-Out Matrix  
16<sup>2</sup>**

DEV 1985

## L-Band Distributing Matrix 16x20, 19", 2 RU

- ▮ 850...2450 MHz
- ▮ 75 Ω, F (f) / BNC (f) / 50 Ω SMA (f) / Optical
- ▮ 16x20 in 2 RU
- ▮ Variable Gain and Slope
- ▮ LNB Powering, Switchable 13/18 V & 0/22 kHz
- ▮ Graphical Local User Interface



**RF Fan-Out Matrix  
ARCHIMEDES**

DEV 1986

## L-Band Distributing Matrix 64x64, 19", 4 RU

- ▮ 950...2150 MHz
- ▮ 75 Ω, F (f) / BNC (f) / 50 Ω SMA (f) / Optical
- ▮ 8x8 up to 64x64 in 4 RU
- ▮ LNB Powering, Switchable 13/18 V & 0/22 kHz
- ▮ Full Color 10" Multi-Touch Display
- ▮ Integrated Spectrum Analyzer
- ▮ Build in TV Receiver
- ▮ Prepared for ARCHIMEDES Cluster

# RF Distributing and Combining Matrices



**RF Fan-Out Matrix SIGMA**

DEV 19128

## L-Band Distributing Matrix 128x128, 19", 10RU

- // 850...2450 MHz
- // 75  $\Omega$ , F (f) / BNC (f) / 50  $\Omega$  SMA (f) / Optical
- // 8x8 up to 128x128 in 10 RU
- // Variable Gain and Slope
- // LNB Powering, Switchable 13/18V & 0/22 kHz
- // Full Color 15" Multi-Touch Display
- // Integrated Spectrum Analyzer
- // Redundant Controllers
- // Redundant Ethernet Interfaces
- // Embedded Clustering
- // Hot swappable Modules, access from the front

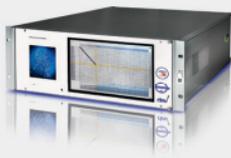


**RF Fan-In Matrix**

DEV 1975

## L-Band Combining Matrix 16x16, 19", 2RU

- // 850...2450 MHz
- // 75  $\Omega$ , F (f) / BNC (f) / 50  $\Omega$  SMA (f) / Optical
- // Up to 16x16 Channels in 1 RU
- // Variable Gain and Slope
- // LNB Powering, Switchable 13/18 V & 0/22 kHz
- // Graphical Local User Interface



**RF Fan-In Matrix  
ARCHIMEDES**

DEV 1976

## L-Band Combining Matrix 64x44, 19", 4 RU

- // 950...2150 MHz
- // 75  $\Omega$ , F (f) / BNC (f) / 50  $\Omega$  SMA (f) / Optical
- // 8x8 up to 64x44 in 4 RU
- // Full Color 10" Multi-Touch Display
- // Integrated Spectrum Analyzer
- // Build in TV Receiver
- // Prepared for ARCHIMEDES Cluster

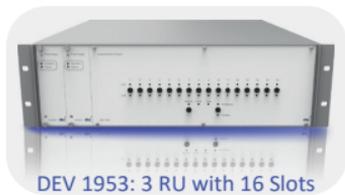
# Redundancy for Flawless Operation

## DEV's Bestseller – the Universal Switch Chassis

Satellite communications and broadcast networks must deliver fail-safe signals without interruption 24/7. DEV supports versatile systems enabling flawless service of mission critical networks.



DEV 1951: 1 RU with 2 slots



DEV 1953: 3 RU with 16 Slots

The DEV 1951 and 1953 Chassis have both been designed for ultra-demanding systems. They can be equipped with one or two Switch Modules (DEV 1951) or with up to 16 modules offering identical or varying functions (DEV 1953).

DEV's redundancy solutions are extremely flexible – virtually everything can be altered, combined or tailored to individual requirements.

## Benefits

- One chassis for various applications, such as modulator or antenna redundancy
- About 30 modules with different switching functionalities and frequency ranges
- Intelligent software functions for use in small or large redundancy applications
- Capable of being integrated into nearly any M&C system via SNMP
- Extremely flexible, functional configurations
- Several Control Options via Ethernet, Telnet, Serial and Digital Interface

## TRAC

The TRAC (Trap Receiver Action Controller) option is intended to expand automatic remote-switching capabilities of a device. With this functionality, the device performs switching actions based on SNMP traps linked with any external equipment without needing extra M&C software. In addition, the IP-Monitoring function continuously checks the availability of external equipment used in any TRAC setup. TRAC controls both itself and any other equipment via SNMP.

# Redundancy Switches



## Universal Switch Chassis

DEV 1951

### Universal Switch Chassis, 2 Slots, 19", 1 RU

- // 29 Different Modules Available
- // A/B-, Transfer-Switch, Splitter/Combiner
- // CATV or L-Band, Ethernet, ASI/SDI, or E1/T1
- // Optical Switching
- // Automatic Switching and Switch Back
- // TRAC - Trap Receiver Action Controller
- // Power Supply Redundancy



## Universal Switch Chassis

DEV 1953

### Universal Switch Chassis, 16 Slots, 19", 3 RU

- // 23 Different Modules Available
- // A/B-, Transfer-Switch, Splitter/Combiner
- // CATV or L-Band, Ethernet, ASI/SDI, or E1/T1
- // Optical Switching
- // Automatic Switching and Switch Back
- // TRAC - Trap Receiver Action Controller
- // Power Supply Redundancy



## Automatic Modulator Redundancy Switch

DEV 1992

### Modulator Redundancy Switch n+1, 19", 3 RU

- // Stand-Alone and Vendor Independent
- // 4+1, 6+1 or 8+1
- // Inputs ASI, BNC (f)
- // Output: 950...2150 MHz, F (f) or SMA (f)
- // Output: 47...862 MHz, BNC (f)
- // TRAC - Trap Receiver Action Controller
- // Power Supply Redundancy



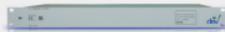
## Automatic n+1 Antenna Redundancy

DEV 1993

### Redundancy Switch $m \times n + 1$ , 19", 3 RU

- //  $m=1, 2$  or  $4$ ;  $n=2, 4, 6, 8, 10, 12, 14$  or  $16$
- // 950...2150 MHz
- // 50  $\Omega$  SMA (f) or 75  $\Omega$  F (f)
- // 4-Path Simultaneous Switching
- // Automatic Switching via RF Sensing
- // Integrated Motorized Antenna Controller
- // Automatic Antenna Redundancy System
- // Power Supply and Power Line Redundancy

# Bidirectional Switches



## Bidirectional Switch

DEV 1018 (CATV-Band)  
DEV 10116 (CATV-Band)  
DEV 1218 (L-Band)  
DEV 12116 (L-Band)

## De-/Multiplexer, 19", 1 RU

- ▄ 8:1 and 16:1
- ▄ 10...1006 MHz or 950...2150 MHz
- ▄ 50 Ω SMA (f) or 75 Ω F (f)
- ▄ Power Supply Redundancy



## Bidirectional Switch

DEV 1x124  
DEV 1x132  
DEV 1x148  
DEV 1x164

## L- or CATV-Band De-/Multiplexer, 19", 3 RU

- ▄ 24:1, 32:1, 48:1 and 64:1
- ▄ 47...862 MHz or 950...2150 MHz
- ▄ 50 Ω SMA (f) or 75 Ω F (f)
- ▄ Amplifier Module for Loss Compensation
- ▄ Power Supply Redundancy

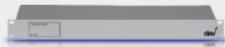


## RF Switching System;

DEV 1400

## RF-μW Switching System, 19", 3 RU

- ▄ DC...18 GHz, C-, X-, or Ku-Band
- ▄ Individual Switching/Distribution/Combining
- ▄ Customized Functional Modules
- ▄ For Example Redundancy or Matrix Switching
- ▄ Hot-Pluggable Modules
- ▄ Power Supply Redundancy
- ▄ DEV Web Interface and SNMP



## Bidirectional Switch (DEV Essentials)

DEV 1228  
DEV 1236

## DEV Essentials Bidirectional Switch, 19", 1 RU

- ▄ 1:8/8:1 and 1:16/16:1
- ▄ 10...2300 MHz
- ▄ 75 Ω F (f)
- ▄ High Isolation
- ▄ Good Flatness
- ▄ Low Ripple
- ▄ Data Backup Feature

# Splitters, Combiners and Amplifiers

## RF Distributing Amplifiers, Splitters and Combiners

DEV RF Splitters, Combiners and Distributing Amplifiers are built for various frequency ranges, for satellite, CATV and broadband applications. Active and passive devices for various applications and frequency ranges are available in different sizes.

DEV Distribution Amplifiers are capable of splitting an input up to 128 outputs without loss or additional gain, and offer additional features like LNB powering, tilt adjustment, or several redundancy functions. Most of our RF Distribution products come in 19" housings and differ by height, number of channels, distribution functionality, and the integrated software features.

## Managed L-Band Distribution Amplifier

The DEV 2190 is a versatile all-in-one 19" 4 RU Chassis for up to 16 active amplifiers and a variety of distribution options.

It comes with useful features like IRD controllable switches, RF sensing, continuous signal level monitoring, and combining functions. The amplifier modules can also be built in a 1+1 redundancy and power LNBs. These features make the DEV 2190 a powerful part of any transmission system.



## DEV Essentials

The DEV Essentials Active L-Band Splitters are cost-effective single distribution amplifiers in 0.5 RU providing LNB powering. They support the Frequency Range 500...2300 MHz. Each Product is equipped with a single Splitter with 4, 8 or 16 Output Ports and can optionally be ordered with one additional Splitter. Compared with DEV Standard Products, the DEV Essentials Products provide the same superior RF Transmission Quality without certain Features such as integrated redundant Power Supplies, Monitoring Ports, RF Sensing, and other Alarm Functionality.



# RF Combining and Distribution Systems



## Active Splitter

DEV 2132  
DEV 2133  
DEV 2135

### Active L-Band Splitter, 19", 1 RU

- 800...2450 MHz
- 1:8, 2\*1:8 or 1:16 Active Splitter
- 50  $\Omega$  SMA (f) or BNC (f)
- 75  $\Omega$  F (f) or BNC (f)
- RF Sensing
- LNB Powering incl. Current Monitoring



## Distribution Amplifier

DEV 2142  
DEV 2143  
DEV 2145  
DEV 2152  
DEV 2153  
DEV 2155

### Managed L-Band Distribution Amplifiers, 19", 1 RU

- 800...2450 MHz
- 1:8, 2\*1:8 or 1:16 Active Splitter
- 50  $\Omega$  SMA (f) or BNC (f)
- 75  $\Omega$  F (f) or BNC (f)
- Variable Gain and Slope
- LNB Powering incl. Current Monitoring
- CPU for Monitoring and Control
- RF Sensing
- Redundant Amplifiers



## Active Combiner

DEV 2232  
DEV 2233  
DEV 2235

### Active L-Band Combiner, 19", 1 RU

- 800...2450 MHz
- 1:8, 2\*1:8 or 1:16 Active Splitter
- 50  $\Omega$  SMA (f) or BNC (f)
- 75  $\Omega$  F (f) or BNC (f)
- RF Sensing



## Combining Amplifier

DEV 2242  
DEV 2243  
DEV 2245  
DEV 2252  
DEV 2253  
DEV 2255

### Managed L-Band Combining Amplifiers, 19", 1 RU

- 800...2450 MHz
- 1:8, 2\*1:8 or 1:16 Active Splitter
- 50  $\Omega$  SMA (f) or BNC (f)
- 75  $\Omega$  F (f) or BNC (f)
- Variable Gain and Slope
- CPU for Monitoring and Control
- RF Sensing
- Redundant Amplifiers

# RF Splitters and Combiners



## Managed Distribution Amplifier

DEV 2190

### L-Band Distribution System, 19", 4 RU

- // 50  $\Omega$  SMA (f) and 75  $\Omega$  F (f)
- // Distributed Amplifier up to 1:128
- // Active Combiner up to 8\*16:1
- // IRD Controlled Switches 4\*4x16 ... 1\*4x64
- // Variable Gain and Variable Slope
- // 1+1 Amplifier Redundancy
- // Switchable LNB Powering Feature
- // RF Sensing



## VSAT Distribution System

DEV 2544

DEV 2588

### Managed Bidirectional VSAT Distribution System, 19", 1 RU

- // 800...2450 MHz
- // Splitter and Combiner in one Chassis
- // 1:8/8:1 or 1:16/16:1
- // 50  $\Omega$  SMA (f) or BNC (f)
- // 75  $\Omega$  F (f) or BNC (f)
- // BUC Powering Option 24 V or 48 V
- // LNB Powering incl. Current Monitoring
- // 10 MHz Reference Source



## Active Splitter (DEV Essentials)

DEV 2161

DEV 2162

DEV 2165

### DEV Essentials Active L-Band Splitter, 19", 1/2 RU

- // 1:4, 1:8, 1:16 Active Splitters
- // 500...2300 MHz
- // 75  $\Omega$  F (f)
- // LNB Powering



## Distribution Amplifier

DEV 2194

### L-Band Distribution Amplifier, 19", 1 RU

- // 700...2450 MHz
- // 2\*1:8 or 1:16 Distribution Amplifiers
- // 75  $\Omega$  F (f) or BNC (f)
- // Variable Gain and Slope
- // LNB Powering incl. Current Monitoring
- // CPU for Monitoring and Control
- // RF Sensing

# RF Splitters and Combiners

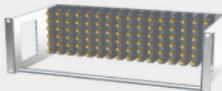


## Splitter / Combiner

DEV 13-0033  
DEV 13-0063  
DEV 13-0096

### Passive L-Band Splitter / Combiner

- ▮ 950...2150 MHz
- ▮ 1:2/2:1 or 1:4/4:1
- ▮ 50 Ω SMA (f) and 75 Ω F (f) or Mixed
- ▮ 1 RU, 19" Frame for up to two Modules
- ▮ 3 RU, 19" Frame for up to 21 Modules
- ▮ DC blocked and DC pass Input Ports



## Splitter / Combiner

DEV 2220/32  
DEV 2220/64

### Passive L-Band Splitter / Combiner, 19", 3 RU

- ▮ 800...2450 MHz
- ▮ 32\*1:2/32\*2:1 or 64\*1:2/64\*2:1
- ▮ 75 Ω F (f)
- ▮ Ports front and rear mountable
- ▮ Recess Modules for easy Cable Management



## CATV-Band Splitter / Combiner

DEV 244x Series

### Passive CATV-Band Splitter / Combiner, 19", 1 RU

- ▮ For 4, 8, 16, 24 or 32 Signals
- ▮ 10...1006 MHz
- ▮ Low Slope
- ▮ High Port-to-Port Isolation
- ▮ 75 Ω F (f)
- ▮ Monitoring Port



## Ultra Broadband Low Loss Splitter/Combiner

DEV 2644

### Passive Splitter/Combiner, Wall Mountable

- ▮ 1:4/4:1
- ▮ 500...2700 MHz, 50 Ω SMA (f) or 400...2850 MHz, 75 Ω F (f)
- ▮ Compact Wall Mountable Chassis
- ▮ DC Path Through
- ▮ Low Slope
- ▮ High Port-to-Port Isolation

# Accessories for RF Signal Transmission

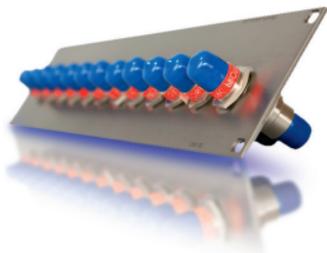
## Managed LNB Powering System

In satellite ground stations the bias current for LNBs has to be provided by special power supplies monitoring also the current supplied to the LNBs. DEV has developed a series of L-Band multichannel bias tees in different sizes for professional use. The Managed LNB Powering System (DEV 8120) provides up to 54 times LNB Power in 3 RU with maximum 320 mA each. Redundant power supplies, an integrated RF Monitoring system and the possibility to monitor and control via DEV Web Interface or SNMP protocol makes it a key part of a transmission system.



## Lightning Protection

Dangerous surge signals on coaxial lines may cause serious damage to signal processing equipment. To safeguard the equipment which is processing antenna signals, lightning protection needs to be installed between the antenna and the signal processing equipment. Very low difference in insertion loss between paths makes it a high quality tool in headend installations. DEV lightning protection panels provide 4, 8, 12 or 16 times lightning protection in 1 RU. They are available in 50 or 75 Ohm, N (f) or 75 Ohm, F (f) and come with DC path through for LNB Powering and exchangeable gas capsules.



## Impedance Transformers

Impedance transformers are used to convert one impedance over a wide bandwidth to another in order to connect devices with different impedances. With low loss transformation and a solid metal housing they are ideal suited for all L-Band and CATV-Band applications.



# Accessories for RF Signal Transmission



## Remote Control Panel

DEV 8552

### Remote Control Panel 2 RU, 54 Keys

- ▄ Compact Control Panel for Remote Operation
- ▄ Compatible to DEV 1986 Archimedes Matrix
- ▄ Easy Switching of all Crosspoints
- ▄ 54 Brilliant High Resolution LCD-Keys
- ▄ Adaptable for other DEV Products



## Managed LNB Powering System

DEV 8120

### Managed LNB Powering System, 19", 3 RU

- ▄ 700...2300 MHz
- ▄ 50  $\Omega$  SMA (f) or 75  $\Omega$  F (f)
- ▄ LNB Powering for up to 54 Channels
- ▄ Integrated RF Monitoring for All Channels
- ▄ Power Supply Redundancy



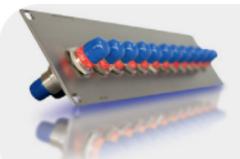
## LNB Powering Chassis

DEV 8122

DEV 8123

### LNB Powering with 1:2 Splitter, 19", 1 RU

- ▄ 950...2150 MHz
- ▄ 50  $\Omega$  SMA (f) and 75  $\Omega$  F (f)
- ▄ 2 or 4 Channels
- ▄ 1:2 Splitter at Each Path
- ▄ Power Supply Redundancy



## Lightning Protection

DEV 8601

DEV 8603

### Lightning Protection, 19", 2 RU

- ▄ 700...2300 MHz
- ▄ 50,  $\Omega$  N (f), 75  $\Omega$ , N (f) or F (f)
- ▄ 4, 8 or 12 LNB Feeds
- ▄ DC Path Through
- ▄ Exchangeable Gas Capsules



## Impedance Transformers

DEV 8131

DEV 8132

### Stand-Alone Impedance Transformers

- ▄ 900...2200 MHz and 47...862 MHz
- ▄ SMA, N, F or BNC Connectors Available
- ▄ Ultra Low Loss Impedance Transformation
- ▄ Solid Metal Housing in Two Sizes



## Managed Power Supply

DEV 5072

### Power Supply Chassis, 19", 1 RU

- ▄ 1...4 Hot-Pluggable Power Supply Modules
- ▄ 12 V, 24 V, or 48 V, Polarity Selectable
- ▄ Up to 10000 W Output Power
- ▄ Galvanic Isolation of the Output Terminals
- ▄ DEV Web Interface and SNMP

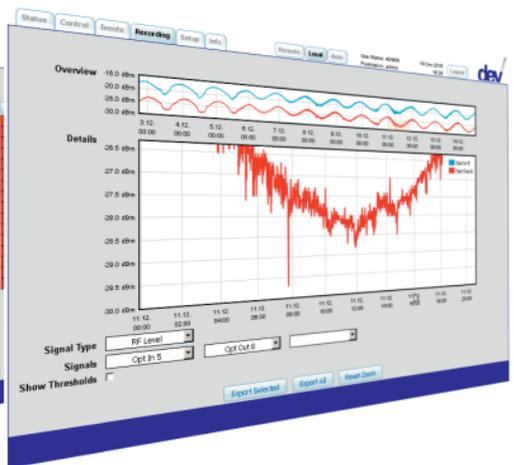
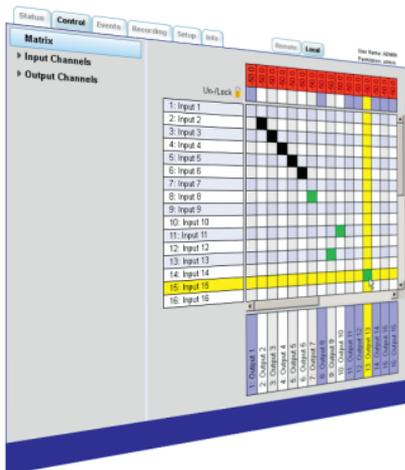
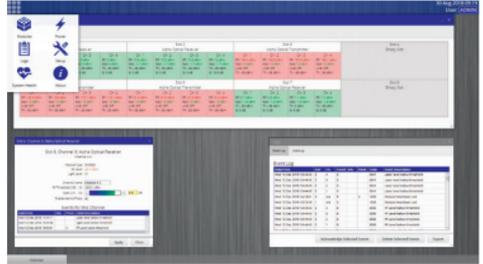
# DEV Web Interface

## Manageability at its Best

The DEV Web Interface is a powerful, easy-to-use tool for managing DEV devices. The start screen shows the status of the device and its modules at a glance. A list of errors, like signal failures or exceeded thresholds, keeps you in the picture anytime.

The intuitive DEV Web Interface enables you to record and export RF and Bias levels for all available channels. If a spectrum analyzer is installed in the device, you can also operate it via the interface for diagnostic purposes, even for external devices.

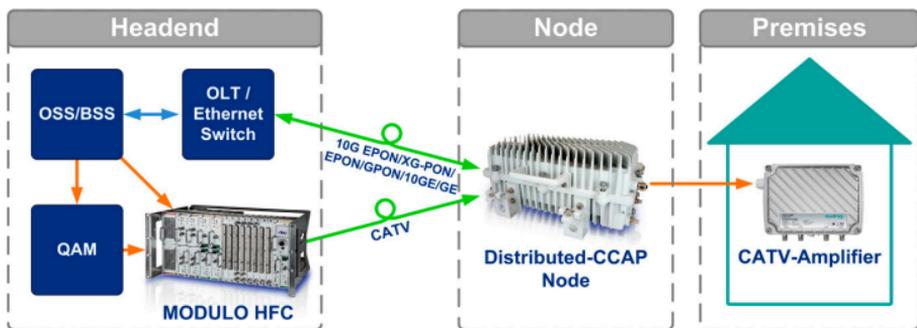
The setup area provides you with powerful settings, such as signal routing options, adjusting values like gain and slope, or defining threshold levels for monitoring and switching purposes. You can control the extensive user management, containing individual access permissions, or access the user manual for a detailed documentation of the device and its functions. DEV's Web Interface is accessible via your web browser and does not require the installation of any additional software.



# Distributed CCAP Solutions

## Distributed Access Architecture (DAA) Networks

Leapfrogging Remote PHY topology, which moves the signal generation layer (PHY) to the remote access node, the Remote MAC-PHY approach transfers both the PHY and the DOCSIS processing (MAC) layers to the remote access node. As a result CMTS becomes redundant as its functions are integrated into the remote MAC-PHY node. The use of Distributed CCAP technology offers not only great savings in costs, but also limits space requirements and lowers energy consumption in the headend. Furthermore, any potential timing and latency issues caused by the physical separation of the two layers are avoided because the MAC and PHY layers are located in the same device. Remote MAC-PHY based DAA networks offers also great flexibility as the network can be simply scaled on demand.



## For All Kinds of FTTx Applications

The Distributed CCAP technology is not only suitable for new network infrastructures; they can also be integrated bit by bit into existing networks. With the Remote MAC-PHY topology, Distributed CCAP nodes can be used without changing the existing infrastructure by only replacing the existing HFC optical nodes. Distributed CCAP nodes support all common DOCSIS standards and also work in conjunction with Remote PHY devices or conventional CMTS systems.

DEV offers systems that are ideally suited for all kind of FTTx applications. Distributed CCAP nodes come in different sizes and housings for deployments in-field or in-house. With the user friendly management software NM3000 all Nodes can be managed as one big CCAP.



# Credentials



**vodafone**  
Kabel Deutschland

"For more than ten years DEV Systemtechnik supplies RF Transmission products for the HFC (Hybrid Fiber Coax) Plant of Kabel Deutschland. The active and passive components for our broadband network run absolutely stable. For our future needs and competitiveness, we will have to focus even more on savings in rack space and power consumption as well as an increased level of flexibility and modularity. The DEV Team understands our requirements and adapts to our needs with new innovative developments."

Frank Hellemlink  
Chief Technology Officer, Vodafone Kabel Deutschland GmbH



"We enjoy cooperating with the DEV Team so much because they find solutions for such a wide range of signal transmission tasks. Their order processing system is also very effective and they have always met their promised lead times."

Allen Quinn  
Sales and Marketing Manager, MDS America Inc.



世纪睿科集团

[www.css-group.net](http://www.css-group.net)

"As a DEV local partner in China, we strongly recommend DEV products to China Central Television, which is the most important customer for us. We designed the best technical and commercial solution for the project. It is always a pleasure to work with the DEV staff members as they are friendly, supportive and always reliable in terms of delivery time and performance of products. We at Times Sage have relied on DEV solutions for many years. They never disappointed us."

Mr. Zhang Hongying  
Deputy General Manager of  
Wireless Communications Division, Times Sage (CSS)



broadcasting center europe

"As we moved the teleport to Junglinster (Luxembourg) we needed to expand and upgrade our infrastructure with the latest connectivity technology to operate a modern antenna park. DEV's RF transmission portfolio was exactly what we needed to realize our plans. They supported us to design the electro-optical RF Signal Management end to end. It was a real pleasure to cooperate with the DEV team. They are professionals working supportive and timely."

Eugene Muller  
Head of TV & Radio Transmission,  
Broadcasting Center Europe (BCE)

# List of Abbreviations

<b>AC</b>	Alternating Current
<b>APC</b>	Automatic Output Power Control
<b>ASI</b>	Asynchronous Serial Interface
<b>CATV</b>	Community Antenna Television
<b>CCAP</b>	Converged Cable Access Platform
<b>CMTS</b>	Cable Modem Termination System
<b>CWDM</b>	Coarse Wavelength Division Multiplexing
<b>DC</b>	Direct Current
<b>DOCSIS</b>	Data Over Cable Service Interface Specification
<b>DWDM</b>	Dense Wavelength Division Multiplexing
<b>EDFA</b>	Erbium-Doped Fiber Amplifier
<b>HFC</b>	Hybrid Fiber-Coaxial
<b>IRD</b>	Integrated Receiver Decoder
<b>LNB</b>	Low-Noise Block Down Converter
<b>MAC</b>	Media Access Control
<b>MGC</b>	Manual Gain Control
<b>OMI</b>	Optical Modulation Index
<b>RF</b>	Radio Frequency
<b>RG</b>	Redundancy Path Gain Compensation
<b>RU</b>	Rack Unit
<b>Rx</b>	Receiving
<b>SMA</b>	Sub Miniature Version A
<b>SNMP</b>	Simple Network Management Protocol
<b>TRAC</b>	Trap Receiver Action Controller
<b>Tx</b>	Transmitting

# POCKET GUIDE

DEV Systemtechnik, part of the AXING Group, develops and manufactures a complete range of products and systems for optical and electrical transmission of Radio Frequency (RF) signals via coaxial cable or fiber. For over 25 years DEV has designed, engineered, and manufactured RF transmission equipment for satellite, broadcast, and cable applications. All products are built to meet the highest standards of system availability, reliability and manageability.

## In the DEV Pocket Guide you will find...

- /// RF Signal Transmission over Optical Fiber (RFoF)
- /// Distribution and Combining Matrices
- /// Switching Systems
- /// Routing Products and Multiplexers
- /// Distribution Amplifiers, Splitters and Combiners
- /// Accessories



Part of the **axing** Group

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