

## Minimum Space – Maximum Performance!



### Product:

**DEV 2190 -** Managed L-Band Distribution System

### Features:

- Versatile 4 RU Chassis which can be equipped individually with up to 16 Amplifier Modules
- Various L-Band Distribution Amplifier (DA) Options and Matrix Switch Options are available
- 50 Ohm and 75 Ohm and mixed Impedances are available for Inputs and Outputs
- Variable Gain, Monitoring Output, RF Sensing, and LNB Bias Feeding with Current Monitoring for each Amplifier Module
- Variable Tilt Control is available as an Option for Amplifier Modules
- Redundancy Options for Amplifier Modules are available to realise “No single Point of Failure” Solutions
- Monitoring and Control via comfortable Web Interface and via SNMP support
- Redundant Power Supplies with Status Alarm Output

### Application Areas:

- Large Cable Head End Stations
- Large Satellite Ground Stations
- Teleports
- Play Out Centres

## DEV 2190

dev



*Front DEV 2190 (equipped with 16 Amplifier Modules)*



*Rear DEV 2190 (equipped with 16 \* Option 8/75)*

### The Situation

Large turn-around cable head-ends need to be capable of receiving L-Band feeds from many satellites. E.g. in an application, a large number of L-Band receivers are to be fed from a number of satellites, with each satellite providing four L-Band signals.

Some of the receivers require only one of the signals from a specific satellite; some require more flexibility and should be able to choose from all four L-Band signals of a specific satellite.

### DEV worked out a Solution

The DEV 2190 is the ideal unit for minimising space requirement, but providing maximum performance, by using multiple DA's and/or matrix switches in a compact chassis, tailored to the specific satellite and channel listing requirements.

One of the strong points of the DEV 2190 is the remote control & surveillance capability via the integrated Web Interface or via the SNMP protocol support.

There is a solution for each individual need!!!

### The Technical Concept

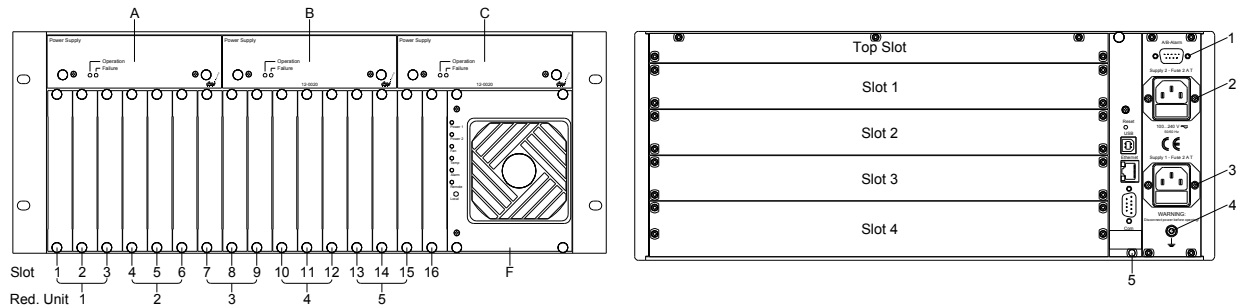
The DEV 2190 L-Band distribution system is extremely flexible to be equipped.

It is possible to install up to 16 exchangeable amplifier modules at the front side of the instrument, all modules provide a monitoring port, variable gain control, bias feeding with monitoring, and RF Sensing for monitoring the input signal. With Option 25, the amplifier module provides tilt control and can cover the range of the extended L-Band. The one or two outputs of the amplifier modules can be configured to be available directly at the rear side of the chassis, but will usually feed splitters (with 8...64 outputs) and/or matrix switches (with 16...64 outputs) located at the rear side of the chassis as well. Each output of a matrix switch can select any of the two or four input signals. Extension options are available for some matrix switch options for hard wiring 8 additional outputs to each of the four amplified inputs.

To extend the signal distribution to more than one chassis, pre-splitter modules can be installed. Also, there are offered redundant amplifiers for a "no single point of failure" solution (Option 23 and Option 24).

Different options for the impedance of inputs and outputs are available; please refer to the Order Information section.

## DEV 2190 System Configuration



### Front Slot Configuration DEV 2190

To configure your DEV 2190, count the required front side slots & rear side slots of your desired setup.

#### Front Side

The horizontally placed power supply modules slots (A...C) are equipped with two power supply modules by default, it is recommended to equip the instrument with a third power supply, if eight or more amplifier modules are installed. Either the additional power supply module is included (thus installed) in the initial order, or it can be acquired as an upgrade at any time. The upgrade can be easily performed onsite by the customer.

Left to the fan & monitoring module (F), the sixteen available slots (1)...(16) for amplifier modules are located, counted and installed from left to right. If redundancy options (Option 23 or Option 24) are to be installed, the redundancy units (consisting of two amplifier modules plus a redundancy switching module, each) will be installed with the redundancy switching cards being located between the two corresponding amplifier modules, i.e. they can occupy the slots 2, 5, 8, 11, and 14.

### Rear Slot Configuration DEV 2190

#### Rear Side

On the right side, the alarm connector (1), the power plugs (2 & 3), the grounding screw (4), and the CPU module (5) are installed.

Five horizontal slots are available; the Top Slot is reserved for the inputs of the instrument. Slots 1...4 are equipped with the outputs of the instrument; i.e. (distribution) amplifier outputs, or matrix switch outputs. If used for the outputs of a distribution amplifier option, a slot can be used for up to four 1:8, two 1:16 splitters, or one 1:32 splitter. A matrix switch with 16 outputs requires one slot; larger matrix switch options need the corresponding number of slots.

If ordered with redundancy options, the number of redundant 1:8 or 1:16 splitters is restricted to five per chassis due to the number of available slots at the front side.

The assembly of inputs in the Top Slot will start from left to right, following the sequence of the amplifier module (or the redundancy unit) assembly at the front side.

The assembly of outputs will start in Slot 1 with the output scheme covered by the matrix switch option with the maximum number of output ports, down to the (distribution) amplifier option with the lowest number of output ports.

## Technical Data

### DEV 2190 Managed L-Band Distribution System – Common Technical Data

#### Capacity

Front side	Up to 16 vertical slots
Rear side	Up to 4 horizontal Slots plus Top Slot for the inputs

#### RF Specifications

Frequency range	950...2150 MHz 700...2300 MHz	(only with Option 25)
Impedance, connectors	50 Ohm, SMA (f) 75 Ohm, Precision F (f)	(for 50 Ohm inputs/outputs) (for 75 Ohm inputs/outputs)
Damage level	+10 dBm @ 50 Ohm / 120 dB $\mu$ V @ 75 Ohm	
Nominal input level	-10 dBm @ 50 Ohm / 85 dB $\mu$ V @ 75 Ohm	
Return loss	>14 dB	
Amplifier gain variation	-5...+20 dB	
Variable tilt	0...9 dB	(only with Option 25)
Isolation between output ports	>25 dB	
Group delay	<5 ns	(within any 36 MHz interval)
Noise figure	<10 dB	

#### Monitoring Port

Impedance, connector	50 Ohm, SMA (f)
Return loss	>18 dB

#### RF-Sensing

Adjustable threshold level	-20 dBm > threshold level > -60 dBm
DEV factory setting	-40 dBm
Alarm indication	Via LED on the front panel and via microcontroller

#### Bias & Bias Current Alarm

Bias	15+3/-0 V, max. 0,5 A per input; total max. 1,4 A (if equipped with 2 power supply modules) or total max. 2,8 A (if equipped with 3 power supply modules)
Adjustable alarm level setting:	
• Upper alarm level	• max. 500 mA (DEV factory setting: 350 mA)
• Lower alarm level	• min. 0 mA (DEV factory setting: 150 mA)
Alarm indication	Via LED on the front panel and via microcontroller

#### Remote Communication

Interfaces, connectors	Ethernet, RJ-45; serial interface RS 232, Sub-D-9 (f)
Remote control & surveillance, interface	• via Web Interface, Ethernet; • via SNMP protocol, Ethernet

## Technical Data (cont.)

### Redundant Power Supply

Number of power supplies, power supply module slots	equipped with 2 power supply modules, 3 power supply slots available, for more than 8 amplifier modules a 3 <sup>rd</sup> power supply module is recommended.
Power line redundancy	100...240 V AC supplied by two different lines
Power consumption	<120 VA

### Alarms

Two stage alarm signalisation for power line failure	Potential free contacts
Alarm connector	Sub-D-9 (m)
Contact rating	60 V; 0,3 A
B-Alarm	one power supply unit does not deliver any secondary power.
A-Alarm	all power supply units do not deliver any secondary power.
Summary Alarm	via remote interface and via potential free contacts

### General Specifications

Housing	19" (483 mm), 4 RU (178 mm), ~490 mm depth
Weight	~16 kg
Environmental conditions	ETS 300019 Part 1-3 Class 3.1

## Technical Data (cont.)

### DEV 2190 Managed L-Band Distribution System – Amplifier / Distribution Amplifier (DA) Options

#### RF Specifications

Number of outputs	1, 2 per amplifier option / 8, 16, 32, or 64 per DA option	
Frequency response full band	±1,0 dB	(for up to 16 outputs)
	±1,5 dB	(for 1:32 DA options)
	±2,0 dB	(for 1:64 DA options)
	(with Option 23 or Option 24: add 0,5 dB to the tolerance)	
Frequency response in any 36 MHz interval	±0,3 dB	(for up to 16 outputs)
	±0,5 dB	(for 1:32 DA options)
	±0,6 dB	(for 1:64 DA options)
	(with Option 23 or Option 24: add 0,5 dB to the tolerance)	
Intermodulation distortion	<-40 dBc @ -10 dBm	

**Unused output ports need to be terminated!**

### DEV 2190 Managed L-Band Distribution System – Matrix Switch Options

#### RF Specifications

Number of inputs	2 or 4 per matrix switch option	
Number of outputs	16, 32, 48, or 64 per matrix switch option (Note, that matrix switch options with 4 inputs and with 16 or 32 outputs can be extended optionally with 4 * 8 outputs hard wired to the four amplified inputs.)	
Frequency response in any 36 MHz interval	±0,6 dB	(950...1100 MHz)
	±0,3 dB	(1100...2150 MHz)
Isolation between input ports	>25 dB	
Intermodulation distortion	<-35 dBc @ 85 dB $\mu$ V	
IMA <sub>3</sub> output level	<89 dB $\mu$ V	
IMA <sub>2</sub> output level	<87 dB $\mu$ V	

#### Input Selection

Switch control	14 V, 18 V and 0 Hz, 22 kHz at the output
----------------	---

**Unused output ports need to be terminated!**

## Order Information

DEV 2190	Chassis for Managed L-Band Distribution System
----------	--

Please select number and type of options to be installed in the chassis from the following table.  
Please consider the slot requirements on the front side and at the rear side of the chassis,  
please feel free to contact DEV Systemtechnik if you need assistance!

Options	Inputs			Outputs			Slot Requirements	
	#	Impedance	Connector	#	Impedance	Connector	Front	Rear

### Amplifier Options

Option 1/50	1	50 Ohm	SMA (f)	1	50 Ohm	SMA (f)	1	1 / 1/32
Option 1/75	1	75 Ohm	F (f)	1	75 Ohm	F (f)	1	1 / 1/32
Option 2/50	1	50 Ohm	SMA (f)	2	50 Ohm	SMA (f)	1	1 / 1/16
Option 2/75	1	75 Ohm	F (f)	2	75 Ohm	F (f)	1	1 / 1/16

### Distribution Amplifier Options

Option 8/50	1	50 Ohm	SMA (f)	8	50 Ohm	SMA (f)	1	1 / ¼
Option 8/75	1	75 Ohm	F (f)	8	75 Ohm	F (f)	1	1 / ¼
Option 8/50-75	1	50 Ohm	SMA (f)	8	75 Ohm	F (f)	1	1 / ¼
Option 16/50	1	50 Ohm	SMA (f)	16	50 Ohm	SMA (f)	1	1 / ½
Option 16/75	1	75 Ohm	F (f)	16	75 Ohm	F (f)	1	1 / ½
Option 16/50-75	1	50 Ohm	SMA (f)	16	75 Ohm	F (f)	1	1 / ½
Option 32/50	1	50 Ohm	SMA (f)	32	50 Ohm	SMA (f)	1	1
Option 32/75	1	75 Ohm	F (f)	32	75 Ohm	F (f)	1	1
Option 32/50-75	1	50 Ohm	SMA (f)	32	75 Ohm	F (f)	1	1
Option 64/50	1	50 Ohm	SMA (f)	64	50 Ohm	SMA (f)	1	2
Option 64/75	1	75 Ohm	F (f)	64	75 Ohm	F (f)	1	2
Option 64/50-75	1	50 Ohm	SMA (f)	64	75 Ohm	F (f)	1	2

### Matrix Switch Options

Option 2x16/75	2	75 Ohm	F (f)	16	75 Ohm	F (f)	2	1
Option 4x16/75	4	75 Ohm	F (f)	16	75 Ohm	F (f)	4	1
Option 4x16/50-75	4	50 Ohm	SMA (f)	16	75 Ohm	F (f)	4	1
Option 2x32/75	2	75 Ohm	F (f)	32	75 Ohm	F (f)	2	2
Option 4x32/75	4	75 Ohm	F (f)	32	75 Ohm	F (f)	4	2
Option 4x32/50-75	4	50 Ohm	SMA (f)	32	75 Ohm	F (f)	4	2
Option 2x48/75	2	75 Ohm	F (f)	48	75 Ohm	F (f)	2	3
Option 4x48/75	4	75 Ohm	F (f)	48	75 Ohm	F (f)	4	3
Option 4x48/50-75	4	50 Ohm	SMA (f)	48	75 Ohm	F (f)	4	3
Option 2x64/75	2	75 Ohm	F (f)	64	75 Ohm	F (f)	2	4
Option 4x64/75	4	75 Ohm	F (f)	64	75 Ohm	F (f)	4	4
Option 4x64/50-75	4	50 Ohm	SMA (f)	64	75 Ohm	F (f)	4	4

### Matrix Switch Option Extensions

(only in combination with Option 4x16/75, Option 4x16/50-75, Option 4x32/75, and Option 4x32/50-75)

Option 4x8/50				4 * 8	50 Ohm	SMA (f)		1
Option 4x8/75				4 * 8	75 Ohm	F (f)		1

## Order Information (cont.)

### Other Options

Options	Inputs			Outputs			Slot Requirements	
	#	Impedance	Connector	#	Impedance	Connector	Front	Rear

#### Option 4x1:2/50 and Option 4x1:2/75

This quadruple passive 1:2 pre-splitter option is necessary, if the 50 Ohm or 75 Ohm distribution system is to be cascaded, i.e. if more than one 4 RU chassis is required.

The option requires a half horizontal slot on the rear side of the instrument. The remaining ½ horizontal slot can be used for applying a second passive pre-splitter option, but not for (distribution) amplifier option outputs!

Option 4x1:2/50	4 * 1	50 Ohm	SMA (f)	4 * 2	50 Ohm	SMA (f)		1 / ½
Option 4x1:2/75	4 * 1	75 Ohm	F (f)	4 * 2	75 Ohm	F (f)		1 / ½

#### Option 23 and Option 24

Per redundant amplifier option, one amplifier module is supplemented by a second amplifier module and a redundancy switching module to form a redundancy unit. With Option 23 two input signals feed directly the inputs of the two amplifier modules and with Option 24 a single input signal is split via an internal 1:2 splitter to feed the inputs of the two amplifier modules. A redundant amplifier option requires two additional slots on the front side per channel, i.e. three vertical slots per redundancy unit.

With the application of redundant amplifier option(s) "no single point of failure" solutions can be established, please contact DEV Systemtechnik to discuss your special requirements!

Option 23 (per amplifier module, two inputs per redundancy unit)		2	
Option 24 (per amplifier module, one input per redundancy unit)		2	

#### Option 25

This option replaces one (!) L-Band Amplifier Module with a module for the frequency range of the extended L Band (700...2300 MHz) which additionally comprises tilt control functionality. No additional slot requirements.

Option 25 (per amplifier module)		
----------------------------------	--	--

#### DEV 12-0020

Additional power supply module, no additional slot requirements, since the 3<sup>rd</sup> power supply slot is already provided.

DEV 12-0020 (3 <sup>rd</sup> AC power supply for instruments with 8 or more amplifier modules)		
--	--	--

## Contact

DEV Systemtechnik GmbH & Co. KG  
 Grüner Weg 4A  
 D-61169 Friedberg  
 Tel.: +49 (0) 6031 18999-0  
 Fax: +49 (0) 6031 18999-15  
 E-Mail: [info@dev-systemtechnik.com](mailto:info@dev-systemtechnik.com)  
 URL: <http://www.dev-systemtechnik.com>

Rev. 27-JUL-2010