



Customer Documentation

DEV 2161 (1:4)
DEV 2162 (1:8)
DEV 2165 (1:16)

CFP Active L-Band Splitters

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DEV 91-0094-G

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1 **REVISION HISTORY**

Revision (Date)	Author	Short Description
A (11-Nov-2011)	WP	Initial version
B (01-Dec-2011)	WP	Minor corrections
C (11-Jan-2012)	WP	Minor corrections
D (07-Aug-2012)	WP	Integration of data sheet & minor corrections
E (09-Jul-2013)	WP	Integration of DEV 2165
F (11-Mar-2015)	WP	Documentation update
I (13-Dec-2017)	WP	Minor changes

2 **INTRODUCTION**

Thank you for purchasing a DEV 216x Active L-Band Splitter. This customer documentation is intended to familiarize you with the installation and operation of the device.

The DEV 216x is a series of active 1:4, 1:8, or 1:16 L-Band splitters, which are especially developed for digital television and broadcasting applications and which are designed for the use in ground stations and cable TV head end stations to distribute high frequency signals to satellite receivers or IRDs. All products of this series are delivered in a rack mountable 1 RU chassis and are equipped with one to four splitter units.

The DEV 216x are members of the DEV Core Function Products (CFP) line. Compared with DEV standard products the Core Function 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.

DEV Systemtechnik GmbH declares that this equipment meets all relevant standards and rules. The product carries a CE mark.

Please read all instructions before installation or usage of the product!

2.1 **WARRANTY**

The product has a warranty against defects in material and workmanship for a period of two years from the date of shipment. During the warranty period DEV Systemtechnik will, at its option, either repair or replace the product if it turns out to be defective.

For warranty, service, or repair, the product must be returned to DEV Systemtechnik. The customer has to pay shipping charges to DEV Systemtechnik and DEV Systemtechnik will pay shipping charges to return the product to the customer. However, the customer is obliged to pay all duties, all taxes, and all other additional costs arising from the shipment of the product.

2.2 LIMITATION OF WARRANTY

The preceding warranty does not apply to defects resulting from:

- improper site preparation or site maintenance;
- improper or inadequate interfacing of the product;
- unauthorized modification or misuse of the product;
- improper or inadequate maintenance of the product;
- operation beyond the environmental conditions specified for the product.

Warning:

Disconnect the device from any external power line before opening of the housing. In any case, the device is to be opened by especially trained people, only.

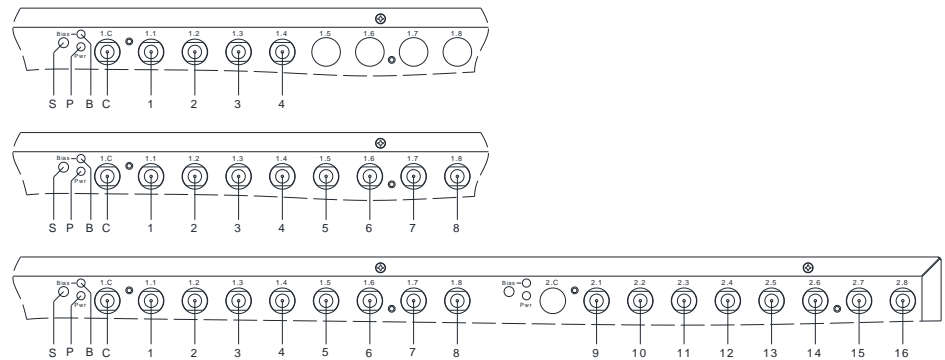
3 PRODUCT DESCRIPTION

The DEV 2161, the DEV 2162, and the DEV 2165 are active splitters for the frequency range 500...2300 MHz. By default, each product is equipped with a single splitter unit with either 4 output ports (DEV 2161), or 8 output ports (DEV 2162), or 16 output ports (DEV 2165). Optionally, the DEV 2165 can be ordered with one additional splitter unit; and the DEV 2161 and the DEV 2162 can be ordered with up to three additional splitter units.

The splitter units provide a switchable LNB power (or bias) supply; i.e. the DC supply of LNBS or of inline amplifiers can be realized through the RF input port of the splitter unit.

3.1 FEATURES AND OPTIONS

3.1.1 Splitter Units



S	Splitter unit 1: Bias (or LNB power) push button
P	Splitter unit 1: Power LED
B	Splitter unit 1: Bias (or LNB power) LED
C	Splitter unit 1: Common input port; 75 Ohm, precision F(f)
1...4	Splitter unit 1: Output ports 1...4; 75 Ohm, precision F(f)
5...8	Splitter unit 1: Output ports 5...8; 75 Ohm, precision F(f) (DEV 2162 and DEV 2165 only)
9...16	Splitter unit 1: Output ports 9...16; 75 Ohm, precision F(f) (DEV 2165 only)



A splitter unit consists of the common input port (**C**) and for the DEV 2161 of four (**1...4**), for the DEV 2162 of eight (**1...8**), and for the DEV 2165 of sixteen (**1...16**) output ports. A green power LED (**P**) is provided to indicate that the splitter unit is supplied with power. A splitter unit is capable to deliver LNB power (or bias) to the common input port. The bias (or LNB power) push button (**S**) is used to turn on or off the LNB power (or bias) supply. A ballpoint pen is recommended to operate the push button. If the LNB power supply is turned off, the bias (or LNB power) LED (**B**) is off. If the LNB power supply is turned on the LED is green.

3.1.2 Additional Splitter Unit Options

By default a DEV 216x is equipped with a single splitter unit.

By ordering the corresponding number of Option 30 for the DEV 2161 or of Option 31 for the DEV 2162, the products are delivered with one to three additional splitter units.

By ordering Option 32 for the DEV 2165, the product is delivered with a second splitter unit.

3.2 PRODUCT DRAWINGS

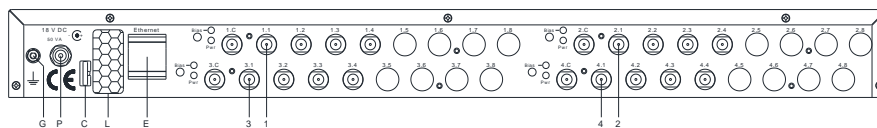
The layout of the different products is almost identical. In the following, the DEV 2161, the DEV 2162, and the DEV 2165 are shown in their maximum configuration, i.e. with four (or two) splitter units installed. The appearance of smaller configurations can be easily derived from these illustrations.

3.2.1 DEV 2161 with 3 * Option 30

Front View:



Rear View:



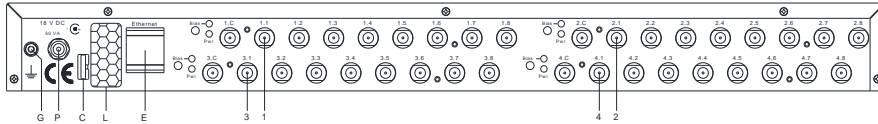
G	Grounding bolt
P	DC power inlet
C	Power cable support fixture
L	Serial number label
E	Fixture for Ethernet connector (not equipped for this type of product)
3	Splitter unit 3 (equipped only with 2 * (or more) Option 30)
1	Splitter unit 1 (always equipped)
4	Splitter unit 4 (equipped only with 3 * Option 30)
2	Splitter unit 2 (equipped only with 1 * (or more) Option 30)

3.2.2 DEV 2162 with 3 * Option 31

Front View:



Rear View:



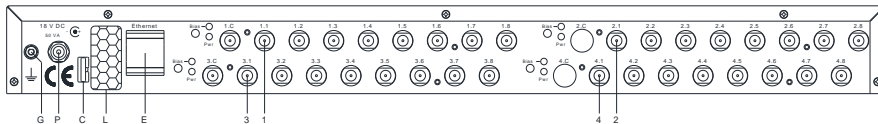
G	Grounding bolt
P	DC power inlet
C	Power cable support fixture
L	Serial number label
E	Fixture for Ethernet connector (not equipped for this type of product)
3	Splitter unit 3 (equipped only with 2 * (or more) Option 31)
1	Splitter unit 1 (always equipped)
4	Splitter unit 4 (equipped only with 3 * Option 31)
2	Splitter unit 2 (equipped only with 1 * (or more) Option 31)

3.2.3 DEV 2165 with Option 32

Front View:



Rear View:



P	DC power inlet
C	Power cable support fixture
L	Serial number label
E	Fixture for Ethernet connector (not equipped for this type of product)
3	Splitter unit 2, common port & output ports 1...8 (equipped only with Option 32)
1	Splitter unit 1, common port & output ports 1...8 (always equipped)
4	Splitter unit 2, output ports 9...16 (equipped only with Option 32)
2	Splitter unit 1, output ports 9...16 (always equipped)



4 INSTALLATION INSTRUCTIONS

4.1 SCOPE OF DELIVERY

- 1 * DEV 2161 or DEV 2162 or DEV 2165
equipped with
additional splitter unit option(s)
as ordered
- 1 * DEV 79-0163 external power supply
- 1 * Customer documentation (this document)

4.2 INSTALLATION OF THE PRODUCT

4.2.1 Mechanical Integration of the Product in a 19" Rack

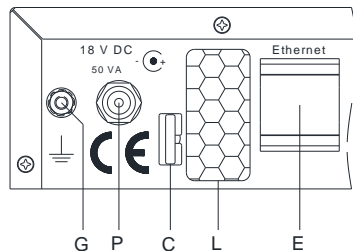
For the integration in a 19" rack, the rack slots must be prepared with rails for the 1 RU chassis. After inserting the chassis in the rack, fix the chassis with four screws to the rack at its rack mount flanges.

Warning:

- It is absolutely not permitted to fix the chassis on the rack mount flanges, only.

4.2.2 Grounding and Power Connection

The chassis needs to be connected to the 19" rack via a ground wire. The grounding bolt (**G**) is located on the left at the rear side of the product:



To connect the grounding cable, please take off the upper nut and the first washer of the grounding bolt (**G**). Then connect the grounding cable, which must have a ring tongue terminal matching for the M4 fastening bolt. The washer and the nut have to be tightened again.

The external power supply delivered with the product has to be suitably stowed away within the rack in a way, that it is firmly fixed, that the DC output cable of the external power supply is in reach of the chassis, and that the applied primary power cord is in reach of the external power supply and of the available electrical outlet. First connect the DC output cable of the external power supply to the DC power inlet (**P**) of the chassis; a cable fixture (**C**) is provided for this cable to avoid unintentional disconnection. Then connect a power cord on one side to the external power supply and on the other side to the available electrical outlet.

Note:

- It is **highly recommended** to power up the device after the installation of all RF signal cables (please refer to chapter 4.2.3).

4.2.3 Connection of RF Signal Cables

Please refer to chapter 3.1.1 for the functionality of the different RF signal connectors on a splitter unit and to chapter 3.2 for the location and naming of the single splitter units.

Apply strain relieves to the external RF cables which are to be connected in a way that the connectors of the device are not stressed mechanically.

If the DEV 216x is powered up already and before the RF cables are to be connected to the chassis, the LNB power (or bias) supply of all splitter units is to be turned off! Otherwise, there is a risk that a high impulse current degrades the RF performance of the corresponding input connector.

First, connect the RF input cable(s) (e.g. from the LNB) to the corresponding input port(s); then connect the RF output cables (to the signal receivers) to the output ports.

When connecting RF cables to the chassis, each connector is to be tightened with a torque wrench. The torque applied to 75 Ohm F connectors should not exceed 4.5 Nm (39.8 lbf-in).

Note:

- For the products of this series, female precision F connectors are applied. Make sure, that the applied connectors are male precision F connectors (with thin inner conductor).
- Each unused output port of a splitter unit has to be terminated with a 75 Ohm F load to achieve best amplitude frequency response.
- Recommendation for the output wiring of a splitter unit:
Best signal quality is achieved by connecting the signal receivers symmetrically to the outputs:
 - 1...4 of each 1:4 splitter unit;
 - 1...4 and 5...8 of each 1:8 splitter unit;
 - 1...4, 5...8, 9...12, and 13...16 of each 1:16 splitter unit;**and** by connecting impedance matched loads to the unused ports.
- If all cables are connected, the device can be powered up.
Now the LNB power (or bias) supply can be turned on for the splitter units that are required to feed power to an LNB.

4.3 MAINTENANCE OF THE PRODUCT

The product is maintenance-free.

Cleaning of the surface of the chassis should be done carefully with a dry lint-free cloth.



5 OPERATION OF THE PRODUCT

After going through the installation steps as described above, the device is ready to use.

5.1 OPERATION VIA THE DEVICE PANEL

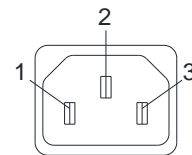
Beside the bias (or LNB power) push button(s) (please refer to chapter 3.1.1), there is (are) no element(s) to be operated. The operating status of each splitter unit and of each LNB power (or bias) supply is indicated via LEDs, which were already described in chapter 3.1.1 as well.

6 CONNECTORS

AC Power Plug (at the external power supply)

Connector: IEC rubber connector (male) IEC 60320 C14
Connector screws: none

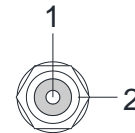
AC Power Plug	
Pin	Functionality
Pin 1	L (Live/Phase)
Pin 2	PE (Protective Earth)
Pin 3	N (Neutral)



DC Connector Plug (at the chassis)

Connector: DC coaxial connector plug for connector with
OD (Outer Diameter): 5.5 mm (0.22") &
ID (Inner Diameter): 2.1 mm (0.08")
Connector screws: none

DC Connector Plug	
Pin	Functionality
Pin 1 (inner)	positive DC-Voltage (+18 V nominal)
Pin 2 (outer)	GND



7 TECHNICAL DATA AND OPTIONS

The technical data and the options are stated in the data sheet; please refer to www.dev-systemtechnik.com.

8 SPARE PARTS

External power supply; 18 V DC, 60 W

DEV 79-0163

9 CONFORMANCE DECLARATIONS

This chapter comprises the Certificate of Conformance for the products which are subject of this customer documentation (chapter 9.1), the Certificate of Conformance for the external power supply (chapter 9.2), and the EU Declaration of Conformity (chapter 9.3).

9.1 CERTIFICATE OF CONFORMANCE

Since DEV Systemtechnik develops and produces in Germany, the Certificate of Conformance for each product or product series is to be issued in German (as stated on the next page).

For the ease of comprehension, the harmonized standards that were taken into consideration during development and production are listed here in English:

DIN EN 50083-2:2016-03	Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment; German version EN 50083-2:2012 + A1:2015
DIN EN 55022:2011-12	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 22:2008, modified); German version EN 55022:2010
DIN EN 55024:2016-05	Information technology equipment - Immunity characteristics - Limits and methods of measurement (CISPR 24:2010 + Cor.:2011 + A1:2015); German version EN 55024:2010 + A1:2015
DIN EN 61000-3-2:2015-03	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (IEC 61000-3-2:2014); German version EN 61000-3-2:2014
DIN EN 61000-3-3:2014-03	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations, and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection (IEC 61000-3-3:2013); German version EN 61000-3-3:2013
DIN EN 62368-1:2016-05	Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor.:2015); German version EN 62368-1:2014 + AC:2015



Konformitätserklärung nach
EMV-Richtlinie (2014/30/EU)
Niederspannungsrichtlinie (2014/35/EU)

Der Hersteller: DEV Systemtechnik GmbH
Grüner Weg 4A
61169 Friedberg

erklärt hiermit in alleiniger Verantwortung, dass nachfolgend bezeichnete Produkte in denen von uns in Verkehr gebrachten Ausführungen:

Bezeichnung der Produkte: Aktive L-Band Splitter 1...4 * 1:4, 1...4 * 1:8 oder 1...2 * 1:16
Produktnummern DEV 2161 (1:4), DEV 2162 (1:8), DEV 2165 (1:16)
Baujahr: ab 2011

auf die sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmen.



Bei der Konzipierung und beim Bau der Geräte wurden die folgenden harmonisierten Normen berücksichtigt:

- DIN EN 50083-2:2016-03 Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste - Teil 2: Elektromagnetische Verträglichkeit von Geräten; Deutsche Fassung EN 50083-2:2012 + A1:2015
- DIN EN 55022:2011-12 Einrichtungen der Informationstechnik - Funkstöreigenschaften - Grenzwerte und Messverfahren (CISPR 22:2008, modifiziert); Deutsche Fassung EN 55022:2010
- DIN EN 55024:2016-05 Einrichtungen der Informationstechnik - Störfestigkeitseigenschaften - Grenzwerte und Prüfverfahren (CISPR 24:2010 + Cor.:2011 + A1:2015); Deutsche Fassung EN 55024:2010 + A1:2015
- DIN EN 61000-3-2:2015-03 Elektromagnetische Verträglichkeit (EMV) - Teil 3-2: Grenzwerte - Grenzwerte für Oberschwingungsströme (Geräte-Eingangsstrom ≤ 16 A je Leiter) (IEC 61000-3-2:2014); Deutsche Fassung EN 61000-3-2:2014
- DIN EN 61000-3-3:2014-03 Elektromagnetische Verträglichkeit (EMV) - Teil 3-3: Grenzwerte - Begrenzung von Spannungsänderungen, Spannungsschwankungen und Flicker in öffentlichen Niederspannungs-Versorgungsnetzen für Geräte mit einem Bemessungsstrom ≤ 16 A je Leiter, die keiner Sonderanschlussbedingung unterliegen (IEC 61000-3-3:2013); Deutsche Fassung EN 61000-3-3:2013
- DIN EN 62368-1:2016-05 Einrichtungen für Audio/Video-, Informations- und Kommunikationstechnik - Teil 1: Sicherheitsanforderungen (IEC 62368-1:2014, modifiziert + Cor.:2015); Deutsche Fassung EN 62368-1:2014 + AC:2015

DEV Systemtechnik GmbH
Friedberg, 13.12.2017

Jörg Schmidt
Managing Director

9.2 CERTIFICATE OF CONFORMANCE EXTERNAL POWER SUPPLY

EC declaration of conformity

For the following equipment :

Product Name: AC/DC Switching Adaptor

Model Designation: GSXAY (X=40 or 60)(Y=05,07,09,12,15,18,24,48)

is herewith confirmed to comply with the requirements set out in the Council Directive, the following standards were applied :

RoHS Directive (2011/65/EU)

Low Voltage Directive (2006/95/EC) :
 EN60950-1:2006+A11+A1+A12 TUV certificate No : S50249612

Electromagnetic Compatibility Directive (2004/108/EC) :

EMI (Electro-Magnetic Interference)

Conducted emission / Radiated emission	EN55022:2006+A1:2007	Class B
	EN55011:2007+A2:2007 (Group 1)	Class B
	EN61000-6-3:2007	
	EN61204-3:2000	

Harmonic current EN61000-3-2:2006

Voltage flicker EN61000-3-3:1995+A1+:2001+A2:2005

EMS (Electro-Magnetic Susceptibility)

EN55024:1998+A1:2001+A2:2003 EN61204-3:2000 EN61000-6-1:2007

ESD air	EN61000-4-2:1995+A1:1998+A2:2001	Level 3	8KV
ESD contact	EN61000-4-2:1995+A1:1998+A2:2001	Level 2	4KV
RF field susceptibility	EN61000-4-3:2006	Level 2	3V/m
EFT bursts	EN61000-4-4:2004	Level 2	1KV/5KHz
Surge susceptibility	EN61000-4-5:2006	Level 3	1KV/Line-Line 2KV/Line-Earth
Conducted susceptibility	EN61000-4-6:2007	Level 2	3V
Magnetic field immunity	EN61000-4-8:1993+A1:2001	Level 2	3A/m

Voltage dip, interruption EN61000-4-11:2004 >95% dip 0.5 periods 30% dip 25 periods >95% interruptions 250 periods

Note:
 The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete system, the final equipment manufacturers must re-qualify EMC Directive on the complete system again.
 For guidance on how to perform these EMC tests, please refer to TDF (Technical Documentation File).

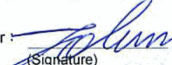

Energy-Related Products Directive (2009/125/EC) :
 Ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies EC No.278/2009

This Declaration is effective from serial number EB3xxxxxx

Person responsible for marking this declaration :

Mean Well Enterprises Co., Ltd.
 (Manufacturer Name)

No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan (R.O.C.)
 (Manufacturer Address)

Johnny Huang/Senior Verification Engineer :  Ted Cheng/Product Manager : 
 (Name / Position) (Signature) (Name / Position) (Signature)

Taiwan Feb. 21, 2013
 (Place) (Date)

Version : 4



9.3 EU DECLARATION OF CONFORMITY

As original manufacturer of Electrical & Electronic Equipment (EEE)

DEV Systemtechnik GmbH
Grüner Weg 4A
61169 Friedberg
GERMANY

declares under sole responsibility that the

Products:

DEV 2161 CFP 1:4 Active Splitter; 500...2300 MHz; 75 Ohm, F (f)

DEV 2162 CFP 1:8 Active Splitter; 500...2300 MHz; 75 Ohm, F (f)

DEV 2165 CFP 1:16 Active Splitter; 500...2300 MHz; 75 Ohm, F (f)

Options:

- 30 (for DEV 2161);
- 31 (for DEV 2162);
- 32 (for DEV 2165);
- and future options

to which this declaration refers to, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8-Jun-2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

Signed for and on behalf of DEV Systemtechnik GmbH

Name: Jörg Schmidt

Position: Managing Director

Place and date of issue: Friedberg, 13-Dec-2017

Signature:

A handwritten signature in black ink, appearing to be "J. Schmidt", written in a cursive style.

