

“Hot Standby” Switching!



Products:

- DEV 1991/zz/m*n+1 - m*n+1 Redundancy Switch CATV-Band
- DEV 1993/zz/m*n+1 - m*n+1 Redundancy Switch L-Band

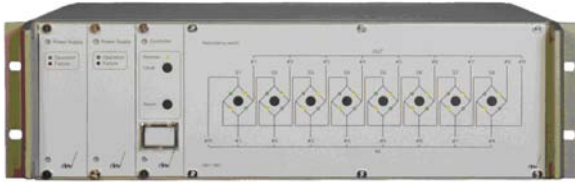
Features:

- Series of Redundancy Switches with n Signal Channels (2, 4, 6, 8, 10, 12, 14 or 16) and one Redundancy Channel which define a Redundancy Unit.
 m is the number (1, 2 or 4) of Redundancy Units to be switched in parallel
- Versions for CATV- and L-Band with 50 Ohm and 75 Ohm Impedance (zz) available
- 19" Chassis for Rack Integration (Height of the Housing depends on the Number of I/Os)
- Configuration, Surveillance and Control via comfortable Web Interface
- Remote Control Protocol Support, e.g. SNMP
- Optional:
Convenient Setup and Remote Control of a Redundant Motorised Antenna via a comprehensive and easy to use Web Interface and Automatic Positioning of a Redundant Motorised Antenna

Application Areas:

- Satellite Ground Stations
- Cable Head End Stations
- DAB-T with Satellite Input
- Digital TV

DEV 1991/zz/m*n+1 / DEV 1993/zz/m*n+1



Front DEV 1991/zz/m*8+1



Rear DEV 1991/75/1*6+1

The Situation

Ground stations usually require a high uptime. Therefore, spare instruments in “hot standby” are used to ensure the system’s uptime. Rarely, there is a 1:1 redundancy for each channel of the system, since in most cases it is sufficient, that several channels can use the same redundancy channel for a limited time. In such cases it is a special requirement to realise a high isolation between the different service channels and of the redundancy channel.

DEV worked out a Solution

To meet the application specific requirements, DEV Systemtechnik has developed a series of $m*n+1$ redundancy switches. This means, that a number n of signal channels is supplemented by an additional redundancy channel, which may take over the signal transport if one of the signal channels fails. In this context, the bundle $n+1$ is referred to as a “Redundancy Unit”. The number of signal channels n can be 2, 4, 6, 8, 10, 12, 14 or 16.

Since for instance satellite antennas usually deliver more than one single signal, but either 2 or 4 signals, the instruments of this series are available in $m*n+1$ configurations, i.e. with m Redundancy Units and m being either 1, 2 or 4. The height of the chassis of this series ranges from 3 RU up to 9 RU depending on the size and the number of Redundancy Units.

The Technical Concept

The DEV 1991 and DEV 1993 are similar in their functionality; the field of application varies due to their different frequency range. The DEV 1991 is applied for systems, which are in the range of the CATV-Band and the DEV 1993 can handle frequencies up to 2,3 GHz.

All instruments are available in 50 Ohm with SMA connectors or in 75 Ohm with precision F connectors.

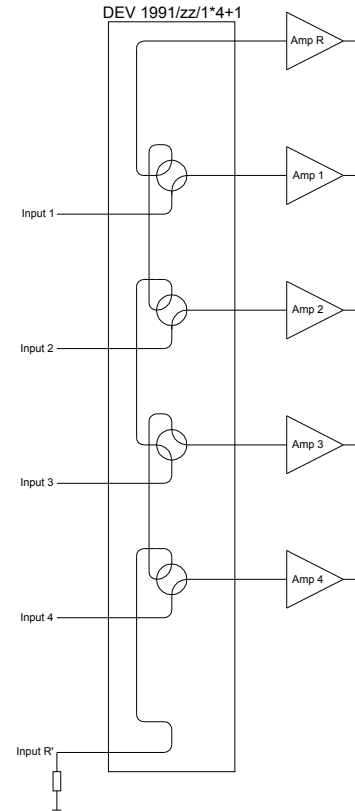
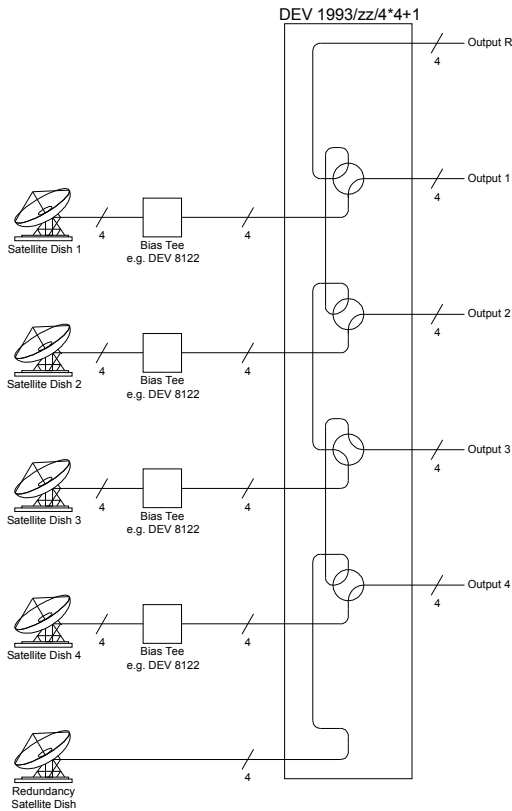
A further distinction is, whether the instrument is set up as Input Redundancy Configuration (default) or Output Redundancy Configuration (on request); please refer to the next page for the explanation and application examples for the different configurations.

The local user interface at the instrument is supplemented by a comfortable Web Interface, providing means for configuring, switching and monitoring the instrument.

The task of integrating the instrument within an M&C system is simplified, since the instrument provides communication interfaces and supports protocol standards, e.g. SNMP.

With Option 30, the instrument can be extended to setup and to control a motorised redundancy antenna via an antenna controller. Thus, a system is established to perform the automatic positioning of the motorised antenna and the redundancy switching.

Input Redundancy Configuration vs. Output Redundancy Configuration



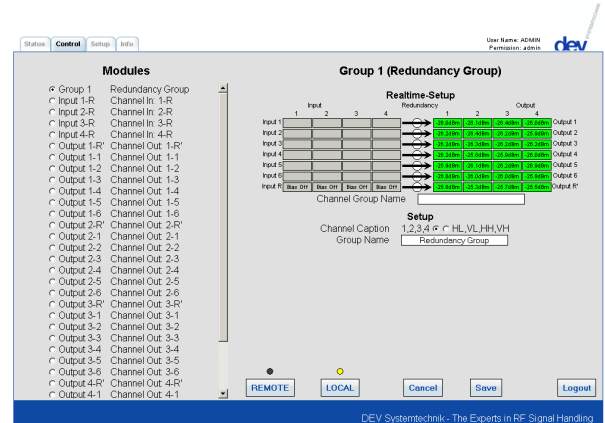
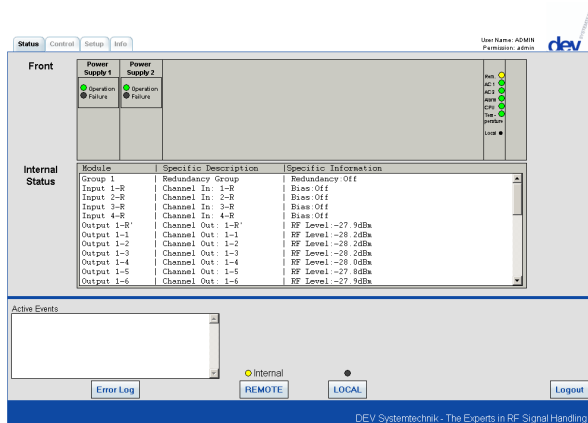
Input Redundancy Example

An antenna farm with one redundancy dish is a typical example for an input redundancy: In “normal” operation mode each of the signals (here 4 per antenna) is routed to the corresponding output. If an antenna fails, the redundancy dish takes over the task of this antenna, i.e. the redundancy antenna signals are routed to the outputs of the dish which is not active anymore. The figure above shows a 4+1 antenna system utilising a DEV 1993/zz/4*4+1 (the impedance zz may be chosen for the specific application). Note, that the bias supply for the redundancy antenna is provided by the DEV 1993 and that the figure shows Output 3 to be supplied by the redundancy satellite dish instead of satellite dish 3.

Output Redundancy Example

An example for an output redundancy system is a ground station with a number of line amplifiers plus one redundancy amplifier: In normal operation mode each of the amplifiers is supplied with the corresponding input signal. If an amplifier fails, the redundancy amplifier Amp R takes over the task of this amplifier, i.e. the redundancy amplifier is fed by the input of the defective amplifier. The figure above shows a 4+1 output redundancy system utilising a DEV 1991/zz/1*4+1. Note, that the figure shows the redundancy amplifier Amp R to be supplied by Input 3. In normal operation mode, the signal of Input R' is routed to Amp R. Here this means that the spare amplifier is terminated on its input if it is not in use.

The DEV 199x/zz/m*n+1 Web Interface



The figures above show two screen shots of the Web Interface of a DEV 1993/zz/4*6+1.

The Status Tab

The upper part of the Status Tab provides a symbolic view of the Power Supply Module section and the Monitoring Module section on the front side of the instrument which is done to visualise the physical indicators on the instrument.

In the middle the "Internal Status" table is displayed, providing specific information for the redundancy group and for each featured port in the radio button list of the Control Tab. The "Specific Information" in the third column of the table provides a quick access to the status information of the specific port. If a port is disabled this will be displayed here as well. In the lower part of the Status Tab new errors and pending errors are shown in a small "Active Events" window. To obtain more details, the **Error Log** button has to be operated. The **Remote** button and the **Local** button are installed to define whether the control of the instrument is performed via a remote M&C system (e.g. using SNMP protocol) or locally via the Web Interface. The current operation mode is indicated via the corresponding yellow indicator. A Web Interface session is finished by operating the **Logout** button.

The Control Tab

The Control Tab of the Web Interface provides means to access the switching functionality of the instrument and to change settings on the installed Redundancy Card(s) and the installed Signal Card(s) of the instrument.

Here, the Redundancy Switching Display is shown which provides a logical view on the present state of the instrument. Each of the rectangles represents an input port (in the left block) or an output port (in the right block); the colour and the contents of each rectangle depend on the functionality of the port. Between the two blocks, (fixed) arrows with (changing) circles in the middle indicate the switching state of the redundancy group. In the figure above, the instrument is displayed in normal operation mode, indicated by the arrows all pointing from the input side to the output side. Switching is performed by clicking on the circle of the channel which is supposed to be switched to the redundancy channel.

The labels of the input ports and output ports as well as the redundancy group can be renamed for better identification.

Technical Data

DEV 1991/zz/m*n+1 / DEV 1993/zz/m*n+1 Redundancy Switches

RF Specifications

Frequency range	47...862 MHz ¹ 950...2150 MHz ² 700...2300 MHz ²	(DEV 1991/zz/m*n+1); (DEV 1993/50/m*n+1); (DEV 1993/75/m*n+1)
No. of redundancy units (m)	1, 2 or 4	
No. of signal channels (n) per redundancy unit	2, 4, 6, 8, 10, 12, 14 or 16	
Impedance (zz), connectors	50 Ohm, SMA (f) 75 Ohm, BNC (f) 75 Ohm, Precision F (f)	(DEV 1991/50/m*n+1, DEV 1993/50/m*n+1); (DEV 1991/75/m*n+1); (DEV 1993/75/m*n+1)
Return loss (signal path)	>16 dB >14 dB	(DEV 1991/zz/m*n+1); (DEV 1993/zz/m*n+1)
Insertion loss (signal path)	<1,5 dB <2 dB <2,5 dB	(DEV 1991/50/m*n+1); (DEV 1993/50/m*n+1); (DEV 1991/75/m*n+1, DEV 1993/75/m*n+1)
Insertion loss (redundancy path)	<1,5 dB <4,5 dB <5 dB	(DEV 1991/50/m*n+1); (DEV 1991/75/m*n+1); (DEV 1993/zz/m*n+1)
Isolation between input ports	>70 dB >60 dB	(DEV 1991/zz/m*n+1); (DEV 1993/zz/m*n+1)
Group delay distortion	<7 ns	
Relay type	Latching	
Switching power	<30 dBm	
Switching cycles	>10E6	

RF Sensing

Adjustable threshold level	-10 dBm > threshold level > -50 dBm
DEV factory setting	-30 dBm
Alarm indication	via LED and via remote interface

Bias & Bias Current Monitoring (DEV 1993/zz/m*n+1 in Input Redundancy Configuration, only)

Bias	15 V DC, max. 0,5 A	(per Redundancy Card)
Adjustable lower alarm level	0...300 mA	
Adjustable upper alarm level	300...600 mA	
DEV factory settings:		
• Lower alarm level	150 mA	
• Upper alarm level	350 mA	
Alarm indication	via LED and via remote interface	

Technical Data (cont.)

Remote Control

Interfaces, connectors	-Ethernet, RJ-45; -serial interface RS 232 (optional RS 422/RS 485), Sub-D-9 (f); -Option 30: additional serial interface for antenna controller RS 422 or RS 485, Sub-D-9 (f)..
Remote control & surveillance, interface	-via Web Interface, Ethernet; -via SNMP protocol, Ethernet; -via Sandar Prosan protocol, serial interface

Alarms

Two stage alarm signalisation for power line failure	Potential free contacts
Alarm connector	Sub-D-9 (m)
Contact load	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

Redundant Power Supply

Redundant power supplies	184...240 V AC (standard) or 100...121 V AC (Option 18) supplied by two different lines or -36...-75 V DC supplied by two different lines (Option 14)
Power consumption	<100...200 VA (depending on configuration)

General Specifications

Housing	19" (483 mm), 495 mm depth, height (depending on configuration): 1 chassis: 3 RU (133 mm), 2 chassis: 6 RU (266 mm), 3 chassis: 9 RU (400 mm)
Weight	~8...25 kg (depending on configuration)
Environmental conditions	ETS 300019 Part 1-3 Class 3.1

Remarks

- ¹ All signal and redundancy paths are capable to pass a DC voltage through.
- ² All signal paths are capable to pass a DC voltage through in normal operation mode.

Order Information

All redundancy switches DEV 199x/zz/m*n+1 are available for the CATV-Band and for the L-Band; furthermore the impedances (50 Ohm with SMA connectors or 75 Ohm with precision F connectors) can be selected. Finally the size of the instruments is to be specified, i.e. how many redundancy groups (1...4) are to be installed and how many channels (2...16) per redundancy group are desired.

For your order, please specify:

x: 1 = CATV-Band OR 3 = L-Band
 zz: 50 = 50 Ohm Inputs & Outputs OR 75 = 75 Ohm Inputs & Outputs

m: number of redundancy groups: 1, 2 or 4

n: number of signal channels per redundancy group: 2, 4, 6, 8, 10, 12, 14 or 16

e.g. DEV 1993/50/4*10+1 = 4*10+1 L-Band Redundancy Switch 50 Ohm Inputs & Outputs [9 RU]

The size of the instrument (i.e. 1*, 2* or 3* 3 RU chassis) depends on the size of m and n:

DEV 199x/zz/1*n+1 1*n+1 Redundancy Switch **3 RU** [m = 1, n = 2...16]

DEV 199x/zz/2*n+1 2*n+1 Redundancy Switch **3 RU** [m = 2, n = 2...8]

DEV 199x/zz/4*n+1 4*n+1 Redundancy Switch **3 RU** [m = 4, n = 2 or 4]

DEV 199x/zz/2*n+1 2*n+1 Redundancy Switch **6 RU** [m = 2, n = 10...16]

DEV 199x/zz/4*n+1 4*n+1 Redundancy Switch **6 RU** [m = 4, n = 6 or 8]

DEV 199x/zz/4*n+1 4*n+1 Redundancy Switch **9 RU** [m = 4, n = 10...16]

By default, all redundancy switches are delivered in Input Redundancy Configuration. If your application requires a redundancy switch in Output Redundancy Configuration, this is possible as well.

Please contact DEV Systemtechnik to discuss your special requirements!

Option 14	-36...-60V DC supply voltage
Option 18	Input Voltage 100...121 V AC instead of 184...240 V AC (standard)
Option 30	Monitoring & Control of a motorised antenna (when ordering Option 30, please choose the appropriate cable:)
DEV 78-0128	Antenna Controller Interface Cable for Andrew Corporation ACS 100-100 Antenna Programmable Controller
DEV 78-0129	Antenna Controller Interface Cable for Research Concepts Inc. RC2000 Dual Axis Antenna Controller
Option 52	RS 422 instead of RS 232
Option 53	RS 485 instead of RS 232

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