MPEG-2 Monitoring System R&S DVM 100/R&S DVM 120

- Monitoring of up to four transport streams in 1 HU
- Expandable up to 20 transport streams in 3 HU with the R&S DVM 120
- Data rates up to 216 Mbit/s
- Monitoring of TR 101 290 priorities 1, 2 and 3 (except buffer)
- Data rate monitoring
- Single frequency network (SFN) monitoring
- Comprehensive analysis tools
  - PCR jitter
  - Table/packet interpreter
  - Data rates
  - Table refresh rates
- 12 user-definable alarm relays
- Alarm & Event navigator
- Local control
  - Windows XP Embedded
  - XVGA (1024 × 786 pixel) output
  - USB
- Ethernet 100 Mbit/s
- System integration via SNMP
- Concise signalling overview on front panel via multicolour LEDs

ROHDE&SCHWARZ

R&S DVM 100

Introduction

Monitoring complex DTV transmission systems becomes child's play with the R&S DVM. Its scalability ensures optimum adaptation to the system to be monitored.

The R&S DVM 100 occupies only 1 HU (height unit) and allows parallel monitoring of either two, three or four transport streams. The R&S DVM 120, also just 1 HU, can be used to expand the R&S DVM 100 up to 12 or 20 (two R&S DVM 120) transport stream inputs. Expansion is in single-channel steps.

The user interface of the R&S DVM 100 provides a concise overview of signal monitoring. The user-defined hierarchical display of the transport stream inputs enables quick navigation. The individual elements of a transport stream are also hierarchically displayed in a tree structure and can thus be easily selected for more in-depth analyses, for example.

The displays described are also used to signal errors by means of coloured symbols, allowing easy and quick error source localization.

The user can classify measurement parameters separately to obtain a quick overview of signalling. Since individual components can be entirely excluded from monitoring and limit values individually set, the user is not inundated with messages, and the messages are prioritized according to user definitions.

The R&S DVM system provides a variety of tools for more detailed analyses, including PCR and data rate measurements with comprehensive graphic displays, tables and packet interpreters, and much more.

A quick Ethernet interface supports network integration. With SNMP support, the R&S DVM system can be easily integrated into a central network management system.

The R&S DVM system is therefore ideal for transport stream monitoring in diverse DTV distribution networks.

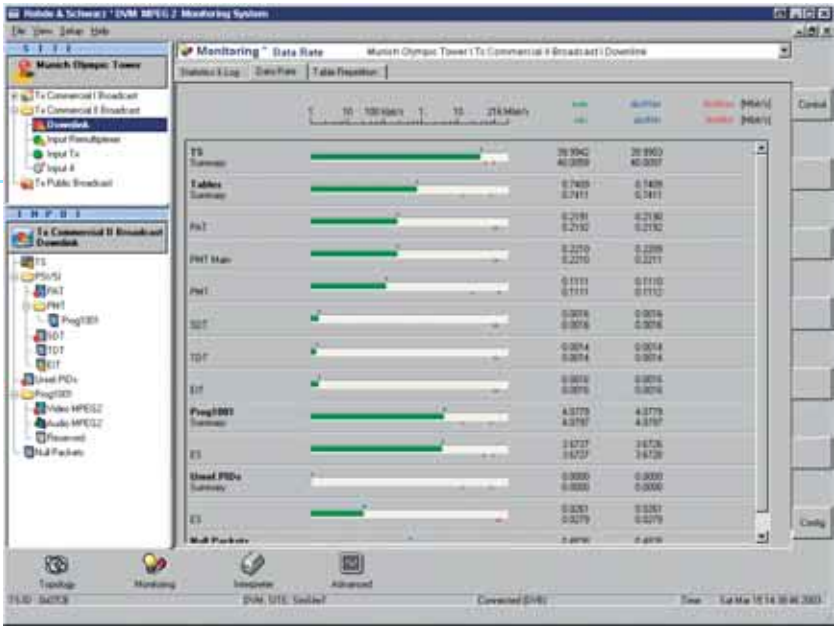
R&S DVM 100

The R&S DVM 100 consists of two functional units: a powerful controller and a fast analyzer board.

The controller is responsible for all communication with the environment, while the analyzer board analyzes the transport streams in realtime. The multicolour LEDs on the unit's front panel signal the most important status information, offering a snapshot of the current status directly on the unit without requiring an additional monitor.

In its basic version, the R&S DVM 100 can monitor two transport streams in parallel. For this purpose, two of the four transport stream inputs on the analyzer board are used as an input, and two as a loop-through output. The outputs can be optionally configured as inputs, permitting monitoring of four transport streams in parallel.

Interfaces and functional units of the R&S DVM 100 (left: analyzer board, right: controller), shown with monitor, keyboard and mouse for local operation.



R&S DVM GUI with data rate display.

Owing to the high performance of the analyzer board, transport streams of up to 216 Mbit/s can be analyzed, which is also the maximum data rate that can be transmitted via the ASI. If several transport streams are checked, the maximum cumulative data rate per analyzer board is 216 Mbit/s. Since the data rates for most transmission paths are below 54 Mbit/s, the R&S DVM 100 permits parallel monitoring of four transport streams in most applications.

The unit is configured and the measurement results are displayed via a graphical user interface (GUI) which becomes accessible by connecting a monitor, keyboard and mouse.

The USB interface of the R&S DVM 100 can be used to connect standard PC components such as CD burners. Thus, simple data exchange is available alongside network transmission.

A quick Ethernet interface supports network integration. With SNMP support, the R&S DVM system is optimally suited for integration into central network management systems.

Parallel to network signalling, the twelve alarm relays of the R&S DVM 100 can be used. The user can assign all limit violations or events to the relays; multiple assignments are possible.

R&S DVM 120

The R&S DVM 100 can be expanded by the R&S DVM 120 to monitor more than four transport streams. A local Ethernet network connects the units. The R&S DVM 100 user interface is utilized to perform configuration and display measurement results. Since the R&S DVM 120 does not require a controller of its own, there is sufficient space to accommodate a second optional analyzer board. In its basic version, the R&S DVM 120 can monitor one transport stream. Three other transport streams can be optionally monitored. The second optional analyzer board expands the R&S DVM 120, which can then handle up to four additional transport streams. The R&S DVM 120 thus allows monitoring of up to eight additional transport streams.

R&S DVM120

R&S DVM 100 (top; left: analyzer board, right: controller) expansion by R&S DVM 120 (below: 2 analyzer boards each), shown with monitor, keyboard and mouse for local operation.

Monitoring functions

The transport streams are monitored in accordance with the TR 101 290 measurement guidelines. All first, second and third priority parameters are checked (with the exception of 3.3, buffer). The data rates of all transport stream elements and, in single frequency networks, MIP presence and contents are also monitored.

The limit values of all measurement parameters are user-definable. It is also possible to exclude individual parameters from monitoring so that no unnecessary messages are generated for known or accepted errors.

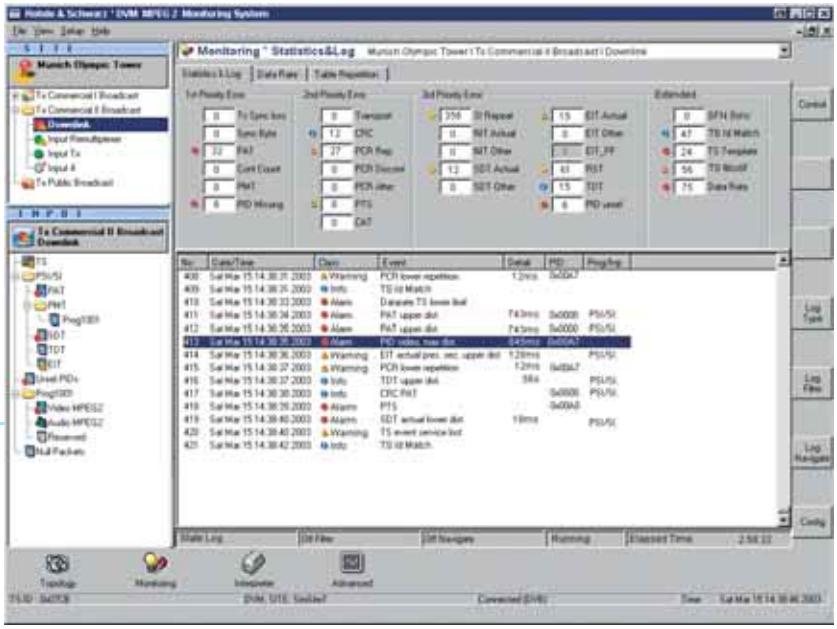
The user classifies each measurement parameter for clear-cut display of the monitoring results. Each parameter is assigned to one of the three classes below:

- Alarm
- Warning
- Information

If an error occurs, it is displayed along with its associated class.

All events are compiled in a report that can be fast and easily sorted and filtered according to diverse criteria. Moreover, there is an error counter for the individual parameters, providing a quick summary of the frequency of individual errors.

The data and table refresh rates are clearly presented by means of graphic displays. The use of symbols for error visualization supports rapid detection of the current status.



R&S DVM GUI with report and error counter display.

Measurement and analysis functions

In addition to continuous monitoring, optional measurement functions are available (In-Depth Analysis option):

- **PCR jitter:** For comprehensive PCR jitter measurements; "overall" or "accuracy" measurements can be selected. As with monitoring, the filters used can be set (MGF1 to MGF3). Measurement and filter characteristic comply with the TR 101 290 definition. The measurement results are displayed as a trace
- **PCR distance:** Graphically displays the distances between the individual PCR values of a program
- **PTS/PCR difference:** Displays the difference between PTS and PCR in a diagram
- **SI/PSI table interpreter:** Lists all elements of a selected table and interprets the contents
- **TS packet interpreter:** Displays a transport stream packet in hex format and simultaneously as an interpreted list of contents for the header and the adaptation field
- **PES header interpreter:** Lists all elements of a selected PES header and interprets the contents
- **Header map:** Provides an overview of the packet distribution of individual elementary streams, the first four bytes of each transport stream packet being displayed in hex format

Specifications

R&S DVM100

Controller	
USB interfaces	2 × USB1.1
Ethernet Remote control Control of local analyzer board	 10/100 Mbit/s; RJ45 10/100 Mbit/s; RJ45 max. 5 analyzer boards
External monitor	up to 1600 × 1200 pixels min. 1024 × 768 pixels required 15-pin sub-D female connector for SVGA or TFT monitor
Alarm relays	12 with random event assignment; 15-pin sub-D male connector
Operating system	Windows XP Embedded Windows XP software only from Rohde&Schwarz for software licensed for R&S DVM100
Analyzer board	
Signal inputs MPEG-2 transport stream Standard	 2 ×; expandable to 3 or 4 asynchronous serial 270 Mbit/s 188/204/208 bytes (ASI according to DVB-A010) or synchronous serial 19.392658 Mbit/s 188 bytes (SSI, according to SMPTE 310)
Max. cable length	180 m
Loop-through output	inputs 2 and 4 selectable as loop-through output for inputs 1 and 3
Max. data rate across all inputs	216 Mbit/s[1)]

R&S DVM120

Optionally one or two analyzer boards.	
Analyzer board	
Signal inputs MPEG-2 transport stream Standard	 1 ×; expandable to 2, 3 or 4 asynchronous serial 270 Mbit/s 188/204/208 bytes (ASI according to DVB-A010) or synchronous serial 19.392658 Mbit/s 188 bytes (SSI, according to SMPTE 310)
Max. cable length	180 m
Loop-through output	inputs 2 and 4 selectable as loop-through output for inputs 1 and 3
Max. data rate across all inputs	216 Mbit/s[1)]

General data

Operating temperature range	+5°C to +40°C
Permissible temperature range	+5°C to +40°C
Storage temperature range	–40°C to +70°C
Mechanical resistance	
Vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g const., meets DIN EN 60068-2-6, DIN EN 61000-1 and MIL-T-28800 D class 5
Vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (rms)
Shock	40 g shock spectrum, meets MIL-STD-810 D and MIL-T-28800 D class 3 and 5
Climatic resistance	95% rel. humidity, cyclic test at +25°C/+40°C, meets DIN EN 60068-2-30
Electromagnetic compatibility	meets DIN EN 50081-1 and 50082-2 (EMC directive of EU)
Power supply	100 V to 240 V ±10% (AC), 50 Hz to 60 Hz ±5%
Power factor correction	meets DIN EN 61000-3-2
Power consumption R&S DVM100/120	max. 60 VA
Base unit R&S DVM100/120	40 W typ. (without options)
Weight R&S DVM100 R&S DVM120 1 analyzer board 2 analyzer boards	 5.2 kg, without hardware options 4.4 kg, without hardware options 5.2 kg, without hardware options
Dimensions (W × H × D)	427 mm × 44 mm × 450 mm

[1)] Content-dependent.

Ordering information

Designation	Type	Order No.
MPEG-2 Monitoring System	R&S DVM100	2085.1600.02
MPEG-2 Monitoring System	R&S DVM120	2085.1700.02
Hardware options		
Analyzer Board	R&S DVM-B1	2085.3283.02
Software options		
Additional TS Input In-Depth Analysis	R&S DVM-K1 R&S DVM-K10	2085.5211.02 2085.5228.02
Accessories		
19" Adapter (1 HU)	R&S ZZA-111	1096.3254.00

Abbreviations

ATSC	Advanced Television Systems Committee
BAT	Bouquet Association Table
CAT	Conditional Access Table
CETT	Channel Extended Text Table
CVCT	Cable Virtual Channel Table
DIT	Discontinuity Information Table
DTS	Decoding Time Stamp
DVB	Digital Video Broadcast
EIT	Event Information Table
EPG	Electronic Program Guide
ETT	Extended Text Table
MGT	Master Guide Table
MIP	Megaframe Initialization Packet
MPEG	Motion Picture Experts Group
NIT	Network Information Table
PAT	Program Association Table
PCR	Program Clock Reference
PES	Packetized Elementary Stream
PID	Packet Identification
PIT	Program Identification Table
PMT	Program Map Table
PSI	Program Specific Information
PSIP	Program and System Information Protocol
PT	Private Table
PTS	Presentation Time Stamp
RRT	Rating Region Table
RST	Running Status Table
SDT	Service Description Table
SI	Service Information
SIT	Selection Information Table
ST	Stuffing Table
STT	System Time Table
TDT	Time and Date Table
TOT	Time Offset Table
TS	Transport Stream
TVCT	Terrestrial Virtual Channel Table

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