R&S® AVHE100
Headend Solution for Encoding and Multiplexing
Minimize complexity, maximize availability
R&S® AVHE100 Headend Solution for Encoding and Multiplexing

At a glance

The fully integrated and highly compact R&S® AVHE100 headend solution for encoding and multiplexing minimizes complexity for terrestrial and satellite DVB systems. The innovative R&S® CrossFlowIP technology enables optimum utilization of all system components for maximum availability. It provides significantly enhanced redundancy solutions compared with conventional systems.

The R&S® AVHE100 is a highly integrated, modular system that provides the entire functionality of a headend in an extremely compact size. It combines sophisticated developments from Rohde & Schwarz with state-of-the-art IT technologies. R&S® AVHE100 functionality is largely software-based, with only a few, standardized hardware modules. The headend can therefore be flexibly configured for a wide range of applications. Signal flow within the headend is fully IP-based.

The headend has an intuitive, easy-to-use headend management system (HMS) that lets users control and monitor the entire workflow via a single GUI. A fully integrated broadcast video wall (BVW) is also available for the HMS.

The R&S® AVHE100 takes a unique approach to headend architecture, combining best-in-class software modules with highly reliable and compact hardware solutions to provide the industry’s first all-IP broadcast headend.

Key facts
- HD and/or SD MPEG-2/H.264 encoders
- Statistical multiplex
- DVB-T/DVB-T2/DVB-S/DVB-S2 network adaptation
- SFN synchronization for DVB-T and DVB-T2 networks
- Seamless signal switching during redundancy operation
- Integrated smart video wall
Advantages of the R&S®AVHE100 over conventional systems

The Rohde & Schwarz encoding and multiplexing solution with all its bundled functions is shown in the upper part of the figure below. A conventional system architecture with many individual components is shown in the lower part. As can be seen by the color coding, the Rohde & Schwarz solution integrates all encoding/multiplexing features into just a few hardware components.
**R&S® AVHE100**
Headend Solution for Encoding and Multiplexing

**Benefits and key features**

- **All in one – integrated encoding and multiplexing solution**
  - Satellite feed and SDI, ASI, AES and IP input formats
  - Decoding/encoding of MPEG-2, H.264 video, MPEG-1 and AAC audio
  - Multiplexing and network adaptation for DVB-T, DVB-T2, DVB-S and DVB-S2
  - SFN synchronization for DVB-T and DVB-T2 networks
  - Smart ISDB-Tb solution
  - Smart video wall
  - Headend management system (HMS)
  - Automation controller
  > page 5

- **IP-based, powerful system solution**
  - Full functionality and flexibility, with only a few hardware components
    - R&S® AVS100 audio/video processing platform
    - R&S® AVG100 audio/video gateway
  - Easy installation and upgrades, low operating cost
  > page 8

- **Innovative R&S® CrossFlowIP technology**
  - Innovative redundancy system
  - Adaptive signal flow between components in main path and redundancy path
  - Enhanced error protection
  - Virtual crossbar: automatic signal switching and dynamic IP routing
  - Input switching
  - Output switching
  > page 10

---

**Core components of the R&S® AVHE100 system providing full headend functionality**

- A/V decoder
- (R)e)multiplexer
- SFN adapter
- A/V encoder
- PSI/SI signaling generator
- T2-MI output
- StatMux
- EPG
- Redundancy controller
- R&S® CrossFlowIP input
- Broadcast video wall
- Headend management system
- SNMP
- R&S® CrossFlowIP output
- ASI
- IP

---

**R&S® AVG100**

**R&S® AVS100**

**R&S® AVG100**
Satellite feed and SDI, ASI, AES and IP input formats
The R&S®AVHE100 converts conventional signals such as SDI, ASI or AES to IP at the system boundaries. Video and audio streams fed from the playout center to the headend via satellite are processed and, if necessary, decrypted. The signal flow within the system is fully IP-based, providing the high flexibility required to meet a wide range of customer needs.

Decoding/encoding of MPEG-2, H.264 video, MPEG-1 and AAC audio
The R&S®AVS100 decodes precompressed video and audio signals, which are delivered as TS over IP, ASI or DVB-S streams. Uncompressed A/V input signals such as SDI, HD-SDI, as well as decoded streams are encoded in standard-definition (SD), or high-definition (HD) MPEG-2 or MPEG-4/H.264 video format and MPEG-1 or AAC audio format. Precompressed A/V signals can also be routed on unchanged.

The optional statistical multiplex (StatMux) feature analyzes the video complexity of the A/V streams to be multiplexed and, based on the results, allocates appropriate bit rates to the encoders in a statistical multiplex pool. This efficient utilization of data rates makes it possible to achieve higher picture quality for the transmitted programs or to transmit more programs at a time (enhanced efficiency). Programs can be prioritized within a pool. Higher-priority programs are allocated higher data rates to achieve higher quality for complex video sequences.
**Multiplexing and network adaptation for DVB-T, DVB-T2, DVB-S and DVB-S2**

The R&S®AVS100 processing platform multiplexes the encoded A/V streams into a DVB transport stream, generates the transmission specific signaling and outputs this via TS over IP or ASI. Detailed program information (electronic program guide, EPG) contributed by external sources as well as other signaling tables and parameters are routed through the headend system and output with the transport stream.

**SFN synchronization for DVB-T and DVB-T2 networks**

An optional DVB-T SFN adapter can be integrated into the encoding/multiplexing system to provide the information (megaframe initialization packet, MIP) required for synchronized transmission of a transport stream to multiple DVB-T transmitters. For example, time stamps are inserted into the signal. Synchronization is IP-based using a GPS network time protocol (NTP) time server.

Configuration of an integrated DVB-T2 gateway.

**ISDB-Tb transmission chain**

The R&S®AVHE100 as central encoding and multiplexing center transmits the transport streams via satellite to the different transmitter sites. The R&S®AVG050 uses the satellite-fed and local programs to generate a new BTS for the transmitter.

The optional DVB-T2 gateway generates a DVB-T2 transport stream with T2-MI information from the multiplexed MPEG transport streams (single or multiple physical layer pipes). The DVB-T2 modulator can be configured, controlled and synchronized using in-band signaling provided by the DVB-T2 gateway.

**Smart ISDB-Tb solution**

Equipped with the appropriate options, the R&S®AVHE100 system makes it possible to encode and multiplex audio and video streams in line with the ISDB-Tb standard. The streams are fed into the R&S®AVG050 Remux Full via IP where a broadcast transport stream (BTS) is created and, if necessary, compressed for satellite transmission. Compressed BTS transmission in DVB-S format saves bandwidth on the satellite transponder. Households can also simultaneously receive the programs with DVB-S receivers (direct-to-home).
**Smart video wall**
All compressed or uncompressed input and output streams can be displayed and monitored on the video wall. The use of IP technology enables quality control on all critical interfaces of the signal path on a separate R&S®AVS100. Displayed A/V parameters include video loss, video freeze, audio loss, audio silence, teletext and subtitle errors.

**Headend management system (HMS)**
All R&S®AVHE100 functionality is controlled via a central headend management system. Via the intuitive, workflow-oriented GUI, users can configure, control and monitor the system. Entries are made using a mouse and keyboard or the optional touchscreen.

To improve clarity and simplify operation, the context-sensitive HMS only displays setting parameters in the GUI that are required for the selected configuration.

The HMS can also be used to configure and monitor redundant input signals. Users can preconfigure automatic switchover between the main signal and the redundancy signal. In the event of a fault, the HMS independently controls the switchover.

**Automation controller**
The optional automation controller function permits time-based switchover between different configurations. The switchover can be event-controlled via SNMP, TS and SDI (data stream characteristics: signaling, components, VPS signals).
IP-based, powerful system solution

Full functionality and flexibility, with only a few hardware components
The R&S®AVHE100 is a state-of-the-art headend based on a high-quality IT processing platform and an audio/video (A/V) gateway from Rohde & Schwarz.

All headend functions are software-based for quick and easy adaptation to modifications or expansions of the transmission standards. In its smallest version, the headend comprises two components – the R&S®AVS100 audio/video processing platform and the R&S®AVG100 audio/video gateway. These components provide all core functions, which are enabled via option keys.

R&S®AVS100 audio/video processing platform
The R&S®AVS100 audio/video processing platform is the core component in the headend system. Its integrated headend management system allows users to centrally configure, control and monitor the R&S®AVHE100.

Core functions of the R&S®AVS100:
- Decoding of SD or HD, encoding of MPEG-2 or MPEG-4/H.264
- Statistical multiplexing
- Multiplexing of a DVB transport stream
- Insertion of signaling information
- DVB-S, DVB-S2, DVB-T, DVB-T2 signaling generation
- DVB-T or ISDB-T® SFN adapter
- DVB-T2 gateway with single or multiple physical layer pipes (SPLP/MPLP)
- ISDB-T® A/V encoding
- Broadcast video wall for displaying the content of all input streams (ASI, IP, SD-SDI, HD-SDI) and output streams (ASI or IP)
- Headend management system (HMS)
R&S®AVG100 audio/video gateway

The R&S®AVG100 audio/video gateway converts SDI, ASI and AES EBU input formats, which are still widely used in broadcasting, to IP format, and converts IP output signals from the headend back to ASI.

Various plug-in modules are available:

The R&S®AVG-B102 serial processing module offers two inputs for any combination of ASI, SD-SDI or HD-SDI signals. If required, this module can output the generated transport stream via ASI over both ports. Up to five of these modules can be accommodated in one base unit, providing a total of ten inputs.

The R&S®AVG-B103 AES input module extends the R&S®AVG-B102, providing eight additional, balanced AES/EBU inputs (stereo). When combined with the R&S®AVG-B102, up to two AES input modules can be used in one base unit.

The R&S®AVG-B104 serial splitting module can split an ASI or SDI signal into up to three signals in order to feed redundant paths and monitoring equipment. The R&S®AVG100 can be equipped with up to two of these modules.

The R&S®AVG-B111 satellite receiver module can receive up to two DVB-S/DVB-S2 signals and decrypts DVB-CA scrambled transport streams. The R&S®AVG100 can be equipped with two satellite receiver modules to receive a total of four satellite signals.

Easy installation and upgrades, low operating cost

Signal transmission for the various input signals such as ASI, SDI, AES or the 10 MHz reference clock is IP-based throughout the system. The R&S®AVHE100 uses robust standard components and Ethernet internal cabling, which simplifies installation and maintenance.

Since the core functionality of the R&S®AVHE100 headend is software-based, system upgrades and modifications can in many cases be implemented by acquiring additional option keys – without any hardware extensions. For example, DVB-T can be upgraded to DVB-T2 with a simple option key.

The integration of multiple functionality into a powerful IT processing platform also means lower power consumption. This results in lower dissipated heat, which further reduces operating costs, such as for air-conditioning. With its high level of integration, the R&S®AVHE100 saves valuable space in the equipment room, cutting down on infrastructure costs.

Location of modules and interfaces on the R&S®AVG100
**Innovative redundancy system**

The R&S®AVS100 A/V processing platform and the R&S®AVG100 A/V gateway can be used to set up simple headends. By adding high-quality IT switches, users can easily configure larger headends for numerous HD and SD programs with or without redundancy configurations.

The R&S®CrossFlowIP technology eliminates the need for crossbars for connecting redundant components, for example in headends using a 1+1 configuration. This makes system configurations considerably less complex and more robust.

**Adaptive signal flow between components in main path and redundancy path**

Using R&S®CrossFlowIP, the signal is adaptively routed through the components of both paths, as required for a specific operating situation. Point-to-multipoint (IP multicast) connections provide flexible and fast alternative signal routing in the event of a fault. Switchover between the main path and the redundancy path is seamless.
Enhanced error protection
Error protection in signal transmission within the R&S®AVHE100 system is enhanced compared with conventional error protection in IP networks. The use of forward error correction (FEC) in line with Pro-MPEG CoP#3 (SMPTE 2022) increases the robustness of the system as a whole.

Virtual crossbar: automatic signal switching and dynamic IP routing
In the R&S®AVHE100, input and output signals do not have to be manually switched via a matrix router (point-to-point), eliminating the need for router control via a network management system. The signals are automatically switched inside the headend using proprietary, IP-based R&S®CrossFlowIP technology. Point-to-multipoint connections enable extremely fast, dynamic switching of input signals, depending on their availability. Response times are minimized; analog switching operations and the associated signal interruptions and increased error potential are eliminated.

Input switching
The R&S®CrossFlowIP input option (R&S®AVS-K112) permits dynamic signal flow control of A/V and data signals at IP/network level. In case of malfunction, switching between the redundant input signals of the main and redundancy paths is performed without interrupting transmission. Switchover can take place manually (e.g. for maintenance) or automatically.

Output switching
The R&S®CrossFlowIP output option (R&S®AVS-K113) provides bit-identical ASI/IP signals at the outputs of both paths. Switchover between the main path and the redundancy path is seamless. Synchronization is maintained during SFN operation in DVB-T/DVB-T2 networks.
## Specifications in brief

### R&S® AVS100 A/V processing platform

#### Audio/video decoding

<table>
<thead>
<tr>
<th>Audio decoder</th>
<th>32 kbit/s to 448 kbit/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD video decoder</td>
<td></td>
</tr>
<tr>
<td>Frame size</td>
<td></td>
</tr>
<tr>
<td>Interlaced DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Video format</td>
<td></td>
</tr>
<tr>
<td>MPEG-2</td>
<td>up to main profile at main level</td>
</tr>
<tr>
<td>H.264 (MPEG-4 part 10 (AVC))</td>
<td>up to high profile at level 3.0</td>
</tr>
<tr>
<td>HD video decoder</td>
<td></td>
</tr>
<tr>
<td>Frame size</td>
<td></td>
</tr>
<tr>
<td>Interlaced DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Progressive DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Video format</td>
<td></td>
</tr>
<tr>
<td>MPEG-2</td>
<td>up to main profile at main level</td>
</tr>
<tr>
<td>H.264</td>
<td>up to main profile at level 4.0</td>
</tr>
</tbody>
</table>

#### Audio/video encoding

<table>
<thead>
<tr>
<th>Audio encoder</th>
<th>source material: uncompressed audio signal via SDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD video encoder</td>
<td></td>
</tr>
<tr>
<td>Frame size</td>
<td></td>
</tr>
<tr>
<td>Interlaced DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Video encoding format</td>
<td></td>
</tr>
<tr>
<td>H.264</td>
<td>up to high profile at level 3.0</td>
</tr>
<tr>
<td>MPEG-2</td>
<td>up to main profile at main level</td>
</tr>
<tr>
<td>StatMux manager (R&amp;S® AVS-K120)</td>
<td>maximum six encoded SD programs per multiplex</td>
</tr>
<tr>
<td>HD video encoder</td>
<td></td>
</tr>
<tr>
<td>Frame size</td>
<td></td>
</tr>
<tr>
<td>Interlaced DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Progressive DVB</td>
<td>horizontal (in pixel) x vertical (in pixel) (field rate (in fields/s))</td>
</tr>
<tr>
<td>Video encoding format</td>
<td></td>
</tr>
<tr>
<td>H.264</td>
<td>up to high profile at level 4.0</td>
</tr>
</tbody>
</table>

#### Transport stream generation

<table>
<thead>
<tr>
<th>DVB multiplexer (R&amp;S® AVS-K101)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation of a new multiplex from compressed (input) signals (services and components)</td>
</tr>
<tr>
<td>PID filtering/remapping</td>
</tr>
<tr>
<td>PSI/SI</td>
</tr>
<tr>
<td>Transport stream generation</td>
</tr>
<tr>
<td>CAT and other tables</td>
</tr>
<tr>
<td>maximum without recoding</td>
</tr>
</tbody>
</table>

AVHE100_bro_en_5214-6397-12_v0300.indd 12
03.04.2014 13:02:58
### R&S®AVS100 A/V processing platform

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB-T SFN adapter (R&amp;S®AVS-K115)</td>
<td>in line with ETSI TS 101191</td>
</tr>
<tr>
<td>DVB-T2 gateway (R&amp;S®AVS-K106 and R&amp;S®AVS-K107)</td>
<td>in line with ETSI EN 302755 version 1.1.1, version 1.2.1</td>
</tr>
<tr>
<td>Extended PSI/SI signaling generator</td>
<td>SDT, PMT, TOT, NIT, CAT</td>
</tr>
<tr>
<td>Monitoring and controlling</td>
<td>Broadcast video wall (R&amp;S®AVS-K110)</td>
</tr>
<tr>
<td>Program decoding</td>
<td>maximum 36 services (TV or radio) simultaneously on separate tiles</td>
</tr>
<tr>
<td>SNMP interface (R&amp;S®AVS-K117)</td>
<td>IETF RFC 1441 to IETF RFC 1452</td>
</tr>
<tr>
<td>Automation controller (R&amp;S®AVS-K200)</td>
<td>service configuration changes once or recurring</td>
</tr>
<tr>
<td>Max. number of scheduled events</td>
<td>32</td>
</tr>
<tr>
<td>Redundancy</td>
<td>R&amp;S®AVS100 A/V processing platform</td>
</tr>
<tr>
<td>A/V and data signals</td>
<td>dynamic signal flow control at IP/network level</td>
</tr>
<tr>
<td>Types of switching</td>
<td>manual via HMS</td>
</tr>
<tr>
<td>Switching operation</td>
<td>automatic in case of signal loss</td>
</tr>
<tr>
<td>R&amp;S®AVS100 A/V processing platform</td>
<td>no errors according to TR 101290</td>
</tr>
<tr>
<td>R&amp;S®AVS100 A/V processing platform</td>
<td>for DVB-T, DVB-T2, DVB-S, DVB-S2</td>
</tr>
<tr>
<td>Synchronized outputs</td>
<td>bit identical outputs to maintain SFN timing in DVB-T and DVB-T2 networks</td>
</tr>
<tr>
<td>Types of switching</td>
<td>manual via HMS</td>
</tr>
<tr>
<td>Types of switching</td>
<td>automatic in case of downtime or interruptions due to maintenance and servicing</td>
</tr>
</tbody>
</table>

### R&S®AVG-BU105 A/V gateway base unit

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial processing module (R&amp;S®AVG-B102)</td>
<td>2 × SD-SDI; in line with SMPTE259M-C</td>
</tr>
<tr>
<td>Input 2 × HD-SDI; 1485 Gbit/s, 1485/1001 Gbit/s; in line with SMPTE292M</td>
<td>2 × ASI, BNC, 270 Mbit/s; in line with EN 50083-9</td>
</tr>
<tr>
<td>Output mirrored output for compressed video and audio in an MPEG-2 transport stream</td>
<td>2 × ASI; BNC, 75 Ω; 270 Mbit/s; in line with EN 50083-9</td>
</tr>
<tr>
<td>AES input module (R&amp;S®AVG-B103)</td>
<td>1 × AES-EBU; D-Sub 25-pin or 8 × XLR via XLR breakout cable</td>
</tr>
<tr>
<td>Serial splitting module (R&amp;S®AVG-B104)</td>
<td>for uncompressed audio</td>
</tr>
<tr>
<td>Input/output</td>
<td>SD-SDI, HD-SDI or ASI</td>
</tr>
<tr>
<td>Satellite reception module (R&amp;S®AVG-B111)</td>
<td>F-type, 75 Ω</td>
</tr>
<tr>
<td>Input</td>
<td>for monitoring purposes</td>
</tr>
<tr>
<td>Output</td>
<td>1 × ASI; BNC, 75 Ω; 270 Mbit/s; 800 mV (V_p-p); in line with EN 50083-9</td>
</tr>
<tr>
<td>Satellite frequency band</td>
<td>C and Ku band, selectable</td>
</tr>
<tr>
<td>Low-noise block (LNB) downconverter power supply</td>
<td>voltage +13/+14 V DC (vertical), +18/+19 V DC (horizontal), selectable</td>
</tr>
<tr>
<td></td>
<td>current 450 mA</td>
</tr>
<tr>
<td></td>
<td>tone 22 kHz or off</td>
</tr>
</tbody>
</table>
R&S®AVG-BU105 A/V gateway base unit

<table>
<thead>
<tr>
<th>Data</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constellation</td>
<td>QPSK</td>
</tr>
<tr>
<td>Symbol rate</td>
<td>1 Msymbol/s to 45 Msymbol/s</td>
</tr>
<tr>
<td>FEC</td>
<td>1/2, 2/3, 3/4, 5/6, 7/8</td>
</tr>
</tbody>
</table>

DVB-S2

| Constellation | QPSK, 8PSK                                  |
| Symbol rate   | 1 Msymbol/s to 45 Msymbol/s                |
| FEC (QPSK mode) | 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 |
| FEC (8PSK mode) | 3/5, 2/3, 3/4, 5/6, 8/9, 9/10         |
| FEC blocks    | short (16200 bit) and normal (64800 bit) |

Number of different decryption methods per satellite feed: 2

DVB-Ci interface in line with EN50221

For data sheet, see PD 5214.6397.22 and www.rohde-schwarz.com

### Ordering information

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;S®AVS100 Audio/Video Processing Platform</td>
<td>R&amp;S®AVS-BU050</td>
<td>5303.9955.02</td>
</tr>
<tr>
<td>AVS Base Unit; standard-independent base unit, basic performance</td>
<td>R&amp;S®AVS-BU100</td>
<td>5303.6156.04</td>
</tr>
<tr>
<td>AVS Base Unit; standard-independent base unit, medium performance</td>
<td>R&amp;S®AVS-BU110</td>
<td>5303.9803.02</td>
</tr>
<tr>
<td>AVS Base Unit; standard-independent base unit, high performance</td>
<td>R&amp;S®AVS-BU110</td>
<td>5303.9803.02</td>
</tr>
</tbody>
</table>

**Options (for the R&S®AVS100 audio/video processing platform)**

- 1 SD Encoder; recoding/encoding of 1 SD service; encoding of up to 8 radio services included
  - R&S®AVS-K121 | 5303.8220.02 |
- 2 SD Encoder; recoding/encoding of up to 2 SD services; encoding of up to 16 radio services included
  - R&S®AVS-K122 | 5303.6379.02 |
- 3 SD Encoder; recoding/encoding of up to 3 SD services; encoding of up to 24 radio services included
  - R&S®AVS-K123 | 5303.8236.02 |
- 4 SD Encoder; recoding/encoding of up to 4 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K124 | 5303.6385.02 |
- 5 SD Encoder; recoding/encoding of up to 5 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K125 | 5303.8242.02 |
- 6 SD Encoder; recoding/encoding of up to 6 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K126 | 5303.6391.02 |
- 7 SD Encoder; recoding/encoding of up to 7 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K127 | 5303.9678.02 |
- 8 SD Encoder; recoding/encoding of up to 8 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K128 | 5303.9684.02 |
- 9 SD Encoder; recoding/encoding of up to 9 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K129 | 5303.9690.02 |
- 10 SD Encoder; recoding/encoding of up to 10 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K130 | 5303.9703.02 |
- 1 HD Encoder; recoding/encoding of 1 HD service or up to 2 SD services; encoding of up to 16 radio services included
  - R&S®AVS-K141 | 5303.6427.02 |
- 2 HD Encoder; recoding/encoding of up to 2 HD services, or 1 HD and 2 SD, or 4 SD services; encoding of up to 32 radio services included
  - R&S®AVS-K142 | 5303.6433.02 |
Designation Type Order No.
3 HD Encoder; recoding/encoding of up to 3 HD services, or 2 HD and 2 SD, or 1 HD and 4 SD, or 6 SD services; encoding of up to 32 radio services included R&S®AVS-K143 5303.6440.02
4 HD Encoder; recoding/encoding of up to 4 HD services, or 3 HD and 2 SD, or 2 HD and 4 SD, or 1 HD and 6 SD, or 8 SD services; encoding of up to 32 radio services included R&S®AVS-K144 5303.9710.02
5 HD Encoder; recoding/encoding of up to 5 HD services, or 4 HD and 2 SD, or 3 HD and 4 SD, or 2 HD and 6 SD, or 1 HD and 8 SD, or 10 SD services; encoding of up to 32 radio services included R&S®AVS-K145 5303.9726.02
1 One-Seg Encoder; recoding/encoding of 1 one-seg service R&S®AVS-K161 5303.9761.02
DVB (Re)multiplexer; for multiplexing several transport streams into a DVB-S/DVB-T compliant transport stream; system can add, remove and recombine services R&S®AVS-K101 5303.6179.02
DVB-T SFN Adapter; for inserting control and timing information into the generated transport stream to synchronize the fed transmitters; for creating an SFN network R&S®AVS-K115 5303.6327.02
DVB-T2 SPLP Gateway; for generating a DVB-T2 single physical layer pipe (SPLP) MI transport stream (one DVB/MPEG-2 transport stream) R&S®AVS-K106 5303.6240.02
DVB-T2 MPLP Gateway; for generating a DVB-T2 multiple physical layer pipe (MPLP) MI transport stream (multiple DVB/MPEG-2 transport streams) R&S®AVS-K107 5303.6256.02
StatMux Manager; for controlling encoders in several statistical multiplex pools; requires an SD/HD encoder option R&S®AVS-K120 5303.6362.02
Extended PSI/SI Signaling Generator; for modifying and overwriting automatically generated PSI/SI tables and descriptors; the interface for editing is XML-based and in line with the DVB standard syntax R&S®AVS-K119 5303.9784.02
Broadcast Video Wall; for monitoring and controlling input signals (ASI, IP, SD-SDI, HD-SDI) and output signals (ASI or IP) R&S®AVS-K110 5303.6295.02
Automation Controller; for automated operation of the R&S®AVHE100 system; the events for configuration transition can be externally triggered or scheduled R&S®AVS-K200 5303.9749.02
SNMP Interface; for monitoring and controlling the R&S®AVHE100 via an umbrella network management system R&S®AVS-K117 5303.9778.02
R&S®CrossFlowIP Input; for dynamically routing AV and data signals between the system hardware components at IP network level R&S®AVS-K112 5303.6304.02
R&S®CrossFlowIP Output; for switching between main and backup inside the R&S®AVHE100 system for a seamless output signal R&S®AVS-K113 5303.6310.02
R&S®AVG100 Audio/Video Gateway
AV Gateway Base Unit; for max. five modules; for connecting SD-SDI/HD-SDI, ASI and AES sources to the R&S®AVS100 and outputting ASI signals R&S®AVG-BU105 5303.6482.02
Options (for the R&S®AVG100 audio/video gateway)
Serial Processing Module; input of up to two signals (any combination of ASI, SD-SDI, HD-SDI allowed) or output of generated transport stream via ASI over up to two ports R&S®AVG-B102 5303.6485.02
AES Input Module; extension for R&S®AVG-B102 module offering eight additional, balanced AES/EBU inputs; use of both modules requires one wide slot in the R&S®AVG-BU105 R&S®AVG-B103 5303.6527.02
Serial Splitting Module; for redundant distribution of an ASI/SDI signal to up to three sinks R&S®AVG-B104 5303.6504.02
Satellite Receiver Module; reception of up to two DVB-S/DVB-S2 satellite signals, decryption via two integrated CI slots R&S®AVG-B111 5303.6540.02
Accessories
GPS/NTP Server; for time synchronization in IP-based networks (OXCO-HQ oscillator) R&S®AVHE-B 5303.7717.02
GPS/NTP Server; for time synchronization in IP-based networks (TCXO oscillator) R&S®AVHE-B 5303.9990.02
Gigabit Ethernet Switch; for IP-based networks with 48 ports R&S®AVHE-B 5303.7723.03
BVW IP-to-HDTV Converter Box R&S®BVW-CONV 5303.7598.00

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements. To find your nearest Rohde & Schwarz representative, visit www.sales.rohde-schwarz.com
About Rohde & Schwarz
The Rohde & Schwarz electronics group is a leading supplier of solutions in the fields of test and measurement, broadcasting, secure communications, and radiomonitoring and radiolocation. Founded more than 80 years ago, this independent global company has an extensive sales network and is present in more than 70 countries. The company is headquartered in Munich, Germany.

Sustainable product design
- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Environmental Management
ISO 14001
Certified Quality Management
ISO 9001

Rohde & Schwarz GmbH & Co. KG
www.rohde-schwarz.com

Regional contact
- Europe, Africa, Middle East | +49 89 4129 12345 customersupport@rohde-schwarz.com
- North America | 1 888 TEST RSA (1 888 837 87 72) customer.support@rsa.rohde-schwarz.com
- Latin America | +1 410 910 79 88 customersupport.la@rohde-schwarz.com
- Asia/Pacific | +65 65 13 04 88 customersupport.asia@rohde-schwarz.com
- China | +86 800 810 8228/+86 400 650 5896 customersupport.china@rohde-schwarz.com