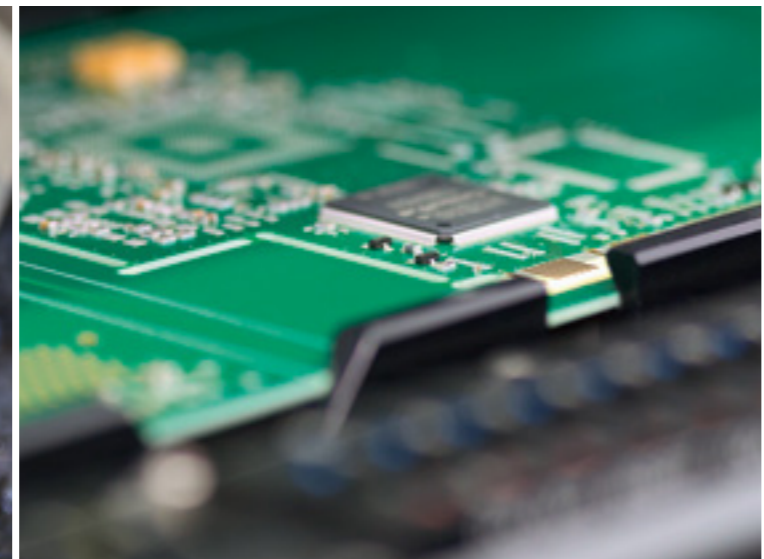
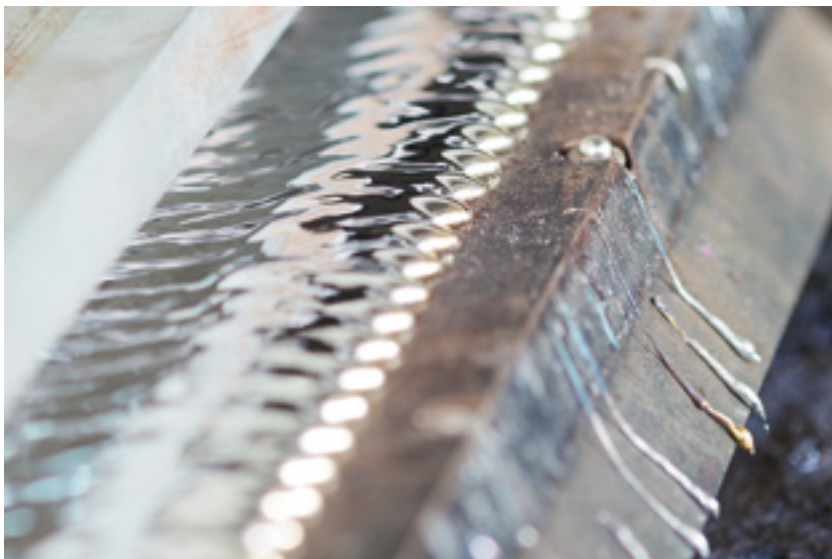
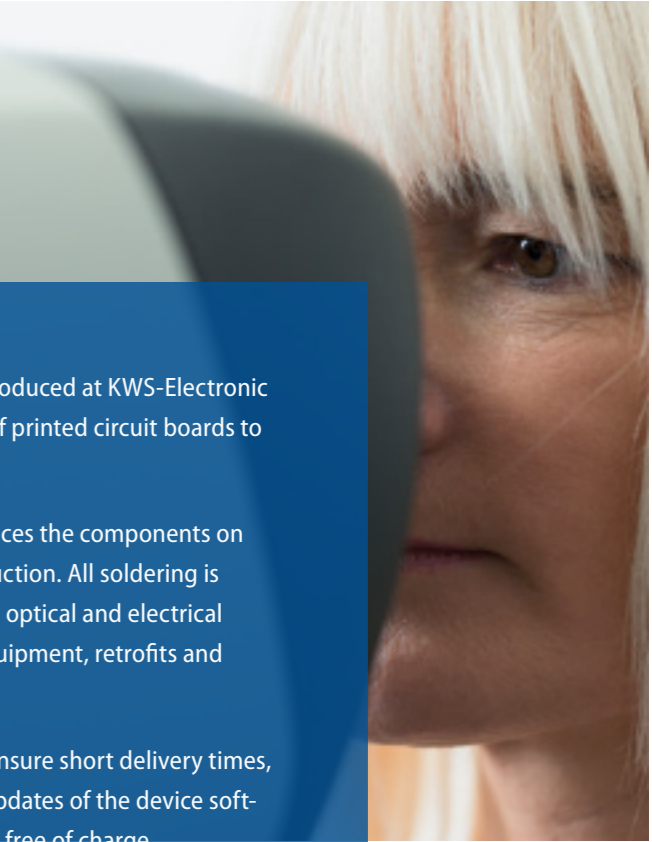


KWS ELECTRONIC
HIGH FREQUENCY TEST EQUIPMENT

ELPAS

PRODUCT LINE **H**





This is how the high-quality measuring receivers are produced at KWS-Electronic in Tattenhausen in Upper Bavaria: from the assembly of printed circuit boards to the secure packaging of the finished customer device.

A state-of-the-art SMT production line (MYCRONIC) places the components on the boards before they are completed in manual production. All soldering is made lead-free and environmentally friendly. After the optical and electrical module testing, only 100% tested modules for new equipment, retrofits and repairs are installed.

In order to optimize manufacturing processes and to ensure short delivery times, two equipment variants are offered per device type. Updates of the device software can be made by the customer independently and free of charge.

All measuring devices from KWS-Electronic are tested on site at the factory and calibrated with high-quality reference devices.

Product quality »Made in Germany«.



The new Alpha and Beta series by KWS

The Alpha series

The optimal and complete equipment for the measurement of RF signals in FM, TV and satellite distribution has a name: KWS measuring receiver Alpha series.

Newly developed and highly efficient measuring methods such as Noise Margin or Packet Error ratio will allow for a secure and time-saving assessment of all common standards.

Because the final check done by a technician on site often demands an ultra-high definition (UHD) video demodulation, this form of presentation is now a standard feature in almost all devices of the Alpha series.

Older devices, already in use, can at any time be retrofitted without big cost to the latest version.

The Beta series

Who knows the Alpha series ... must also know that there is a big brother: the Beta series. These devices are another step into a multimedia future and enable the measurement of the new, forward-looking distribution with fiber optic.

The devices of the Beta series are additionally equipped with an optical receiver which forwards a signal directly into the RF measuring range of the meter. Thus, not only the direct connection to optical fiber is possible, but with this method the demodulation of an optical signal is enabled.

Of course we also offer the retrofitting of an optical receiver for already delivered meters.

The most important equipment features of our measuring receivers at a glance

	AMA 310 »Alpha«	AMA 310 »Beta«	VAROS 106 »Alpha«	VAROS 106 »Beta«	VAROS 107 »Alpha«	VAROS 107 »Beta«	VAROS 109 »Alpha«	VAROS 109 »Beta«
FM	✓	✓	✓	✓	✓	✓	✗	✗
TV analog incl. analoge S/N measurement according to CCIR 569	✓	✓	✓	✓	✓	✓	✗	✗
DVB-S/-S2	✓	✓	✓	✓	✗	✗	✓	✓
DVB-C	✓	✓	✓	✓	✓	✓	✗	✗
DVB-T/-T2 & DTMB	✓	✓	✓	✓	✓	✓	✗	✗
DAB/DAB+	✓	✓	✓	✓	✗	✗	✗	✗
DOCSIS- (J83B-)/EuroDOCSIS-DS	✓	✓	✓	✓	✓	✓	✗	✗
User editable TV channel table/grid and tuning memory	✓	✓	✓	✓	✓	✓	✗	✗
TILT function (TV range)	✓	✓	✓	✓	✓	✓	✗	✗
Common interface (CI)	✓ 2x	✓ 2x	✓ 1x	✓ 1x	✓ 1x	✓ 1x	✓ 1x	✓ 1x
Constellation diagram for all ranges	✓ Real-time (exc. DVB-T2)	✓ Real-time (exc. DVB-T2)	✓	✓	✓	✓	✓	✓
MPEG-2/MPEG-4 (AVC) video decoder	✓	✓	✓	✓	✓	✓	✓	✓
MPEG-H (HEVC) video decoder	✓	✓	✓	✓	✓	✓	✗	✗
DVI & USB	✓	✓	✓	✓	✓	✓	✓	✓
ASI IN/ASI OUT, Ethernet (LAN)	✓	✓	✗	✗	✗	✗	✗	✗
DiSEqC V1.0–2.0, UNICABLE (EN 50494), JESS (EN 50607)	✓	✓	✓	✓	✗	✗	✓	✓
Monitoring and data transfer SNMP and FTP incl. SNMP traps (option)	✓	✓	✗	✗	✗	✗	✗	✗
DOCSIS 1.0/1.1/2.0/3.0 analyzer	✓	✓	✗	✗	✓	✓	✗	✗
DOCSIS 3.1 analyzer (option)	✓	✓	✗	✗	✓	✓	✗	✗
DOCSIS 3.1 Real time downstream OFDM receiver (option)	✓	✓	✗	✗	✗	✗	✗	✗
DOCSIS 3.1 extended frequency range up to 1,800 MHz (option)	✓	✓	✗	✗	✗	✗	✗	✗
Extended CATV frequency range up to 1,214 MHz	✓	✓	✗	✓	✗	✓	✗	✗
Microscope function for inspection of fiber connectors	✗	✗	✗	✓	✗	✓	✗	✓
Optical receiver (SC/APC)	✗	✓	✗	✓	✗	✓	✗	✓

VAROS 106 »Alpha«

Combo measuring receiver/TV analyzer

Welcome to the world of digital broadcasting with the VAROS 106 »Alpha«, with groundbreaking design, easy operation and all necessary measurement options.

No other device allows such a simple and understandable signal evaluation or has implemented so many new and innovative measurement methods.

Many of the VAROS 106 »Alpha« functions and features support the technician on the spot ... It has never been so easy to have a full measurement protocol for the client or to install and pass error-free signal distribution.

VAROS 106 »Beta«

The future of modern measuring receivers: optical signal distribution is not only determined by low attenuation and proof against interference. In conjunction with classical RF measuring techniques it is also much more safe and accurate.

With the VAROS 106 »Beta« you get all measuring parameters well-known from the RF technique also for optical signals.

These optical signals are transmitted from an optical receiver to the RF part of the device. You will have a maximum of security with the built-in video demodulation.

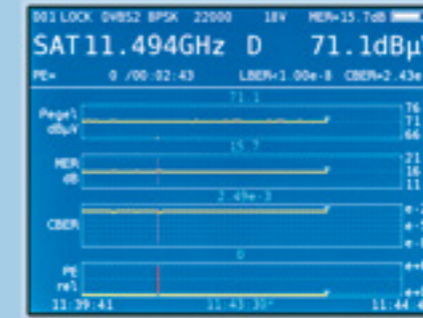
- High resolution luminous 5.7" colour TFT
- Frequency range from 5–2,150 MHz
- Analog: FM, TV, return channel (RF level measurement), EMI measurement (Rated S/N measurement for ATV)
- Digital: DVB-S/-S2, DVB-C, DVB-T/-T2 (RF level/BER/MER/Constellation diagram/ Packet errors/ Noise Margin)
- DAB/DAB+ measurement module
- MPEG-2/-4/HEVC/UHD decoder for image display with CI slot and DVI out
- NIT evaluation and LCN display
- Spectrum analyzer for all ranges, TILT function
- Echo measurement for DVB-T/-T2 (impulse response)
- DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
- USB for file import and export, firmware updates
- Monitoring and logging functions

Additional at VAROS 106 »Beta«

- Optical receiver with SC/APC input
- Extended frequency range up to 1,214 MHz

Accessory

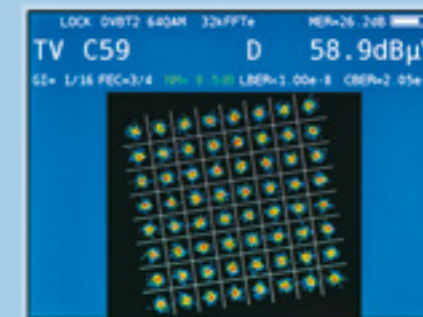
- Protective bag with 4-point carry strap



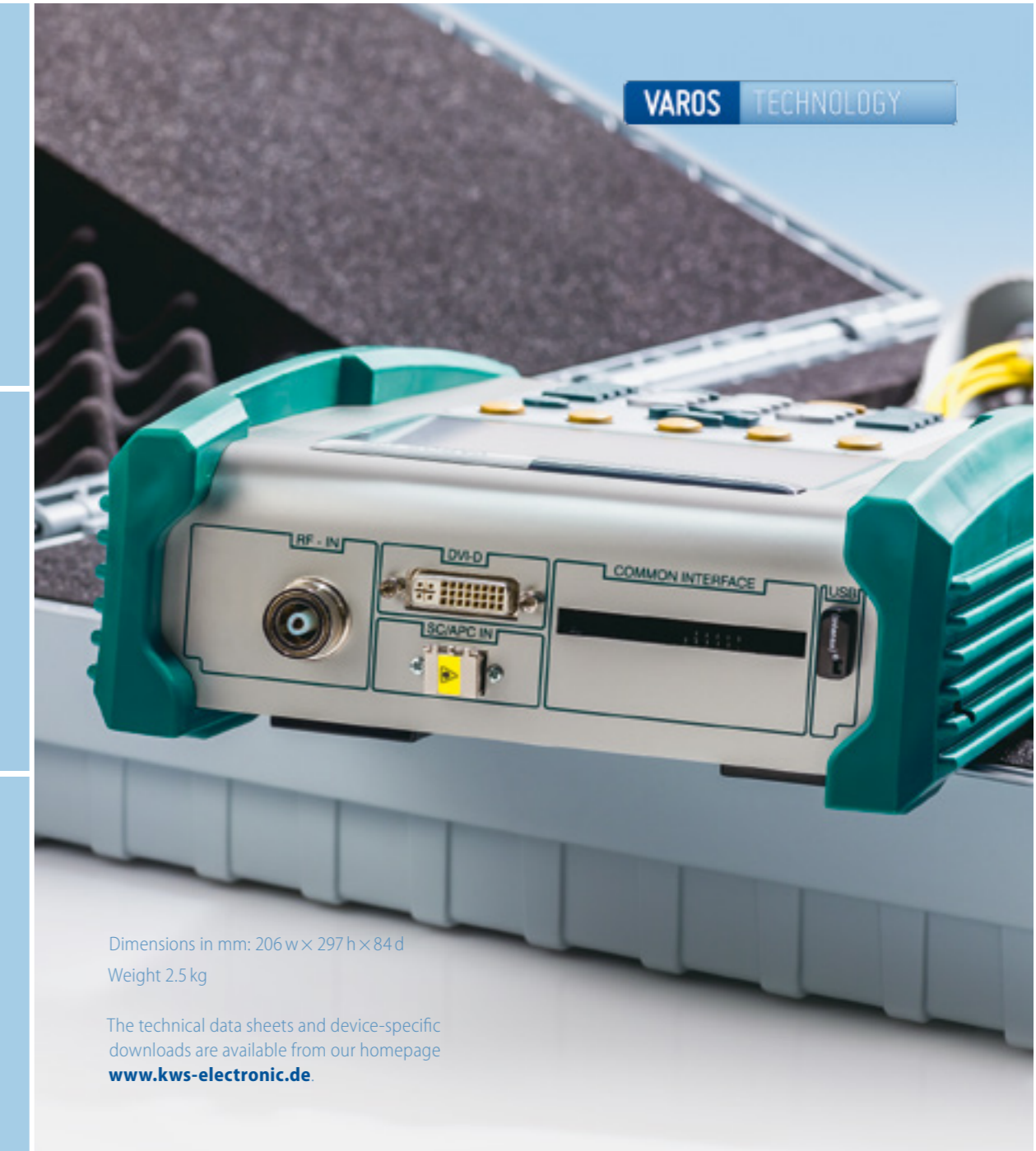
Function DataGrabber when monitoring an HD transponder on SAT.



Measurement of the DAB+ transponder 11D with level, MER and channel BER.



Measurement of a DVB-T2 transponder with constellation diagram and noise margin.



Dimensions in mm: 206 w × 297 h × 84 d
Weight 2.5 kg

The technical data sheets and device-specific downloads are available from our homepage www.kws-electronic.de.

VAROS 109 »Alpha«

Satellite meter/TV analyzer

The new VAROS 109 »Alpha« is not just in terms of features and ease of use the measure of things—it is solving a variety of technical challenges when installing modern satellite systems. This device is without doubt a developmental milestone and professional helper.

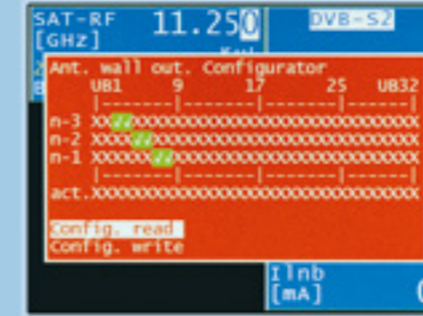
No matter how complex the error analysis in a satellite distribution, which does not meet the usual standard, may be ... the VAROS 109 »Alpha« is in any case a fully loadable, modern and safe device that every service technician can rely on.

VAROS 109 »Beta«

The SAT signal feed via optical fibers is a complex but more and more state-of-the-art technology. Using the VAROS 109 »Beta« you can compare the optical signal with known parameters from the coaxial world. For this purpose the signal of the optical receiver from the output is fed into the RF measuring branch.

During installation and troubleshooting, a final signal check with the image control (SD/HD) can be performed and guarantees unprecedented safety and precision—ready for the fibre optics future.

- High resolution luminous 5,7" colour TFT
- Frequency range from 910–2,150 MHz
- Digital: DVB-S/S2 (RF level/BER/MER/Constellation diagram/Packet errors/Noise Margin)
- MPEG-2/-4 decoder for image display with CI slot and DVI out
- NIT evaluation
- Spectrum analyzer for narrow/broadband modes
- Scan functions for reliable satellite detection
- DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
- Programming function for addressable antenna sockets
- Two wizards to set up a SAT system and for quick quality check at the subscriber box
- USB for file import and export, firmware updates
- Screenshot and logging functions
- Protective bag and carrying case
- Additional at VAROS 109 »Beta«
- Optical receiver with SC/APC input



Configuration menu for programmable UNICABLE/UNICABLE II/JESS antenna sockets.



One of the wizards: simple and guided check of the signal quality at the antenna socket.



VAROS TECHNOLOGY

Dimensions in mm: 164 w × 266 h × 70 d
Weight 1.3 kg

The technical data sheets and device-specific downloads are available from our homepage www.kws-electronic.de.

DOCSIS 3.1

Options for AMA 310 and VAROS 107

The successful way into gigabit internet via CATV with OFDM.

Constantly growing bandwidth requirements ensure that internet service providers have to make higher data rates available. Online gaming, full-HD and UHD content streaming, video calling and the migration of television consumers away from linear television and to streaming portals are just some of the reasons for the population's hunger for bandwidth.

Even in business applications, powerful broadband internet connections are becoming increasingly important and thus a decisive advantage of site. In providing broadband services over the (hybrid optical) coaxial television network DOCSIS 3.1 is therefore the logical consequence, setting the secure basics of ultra-broadband supply via CATV for the next years.

For the first time this standard comes with the fundamentally new type of OFDM modulation for the cable technician. Also new are the huge bandwidths of DOCSIS 3.1 signals: one downstream channel can operate up to 192 MHz bandwidth, an upstream channel up to 96 MHz bandwidth!

4,096 QAM with optional extensibility up to 16,384 QAM, data transfer on up to 7,600 subcarriers, a frequency range up to 1,214 MHz with the option up to 1,794 MHz and a new error correction (LDPC-BCH) are just some of the more than

DOCSIS 3.1 in VAROS 107:

DOCSIS 3.1 modem for communication with the CMTS

DOCSIS 3.1 in AMA 310:

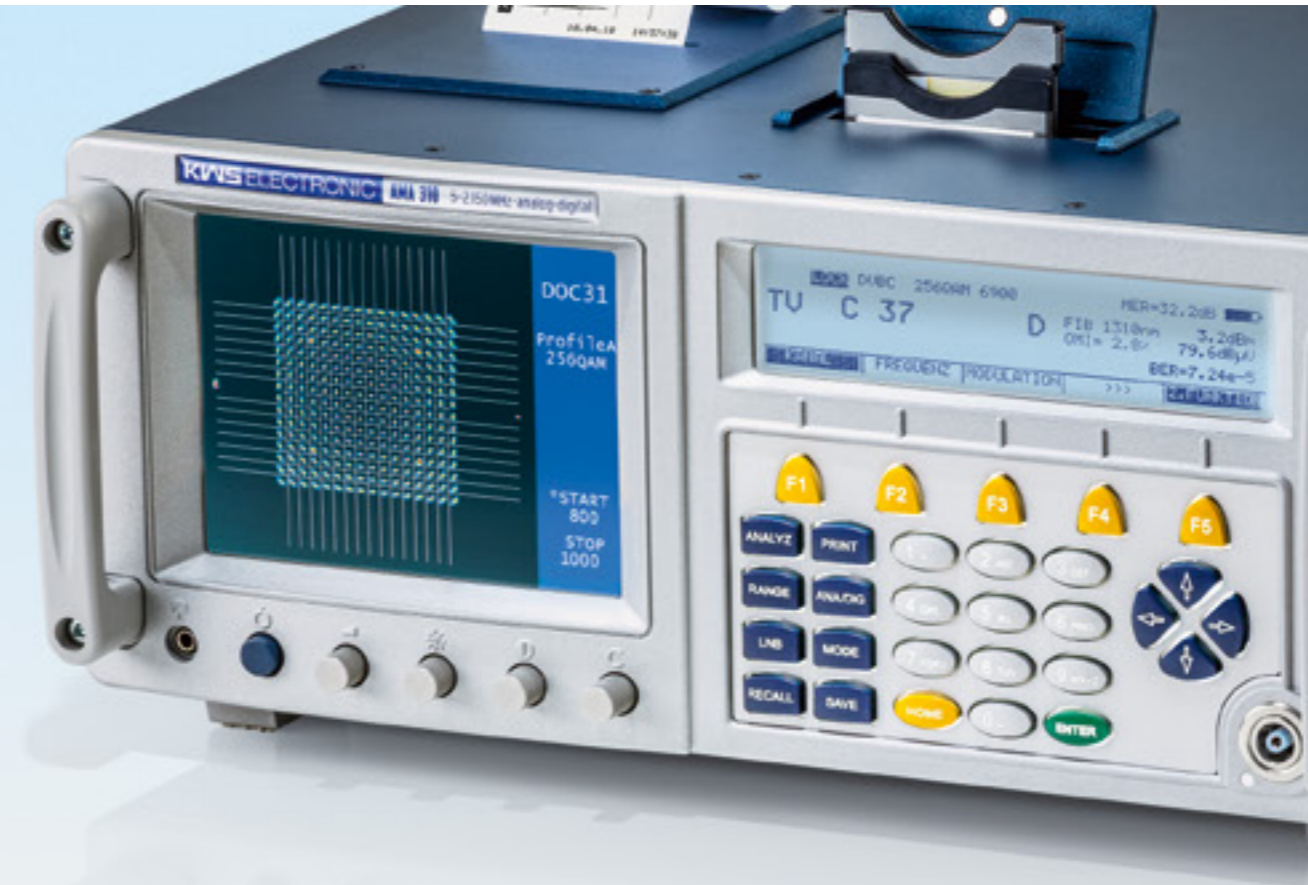
DOCSIS 3.1 modem for communication with the CMTS

Real-time OFDM downstream analyzer:

- PLC evaluation including PLC-BER
- Level measurement full channel and frequency dependent in 8 MHz sub-channels
- Microreflections/echo measurement/impulse response in real-time
- Real-time spectrum over full OFDM channel (later also over entire TV band)
- Channel frequency response
- Frequency offset
- Constellation diagram in real-time (single carriers and groups of carriers)
- PLC MER and MER (f) or MER (k) in real-time of the full channel
- Tuner up to 1,214 MHz

Tuner up to 1,800 MHz as option from Q1/2019

impressive key specs of DOCSIS 3.1 downstream. The upstream features are not less innovative.

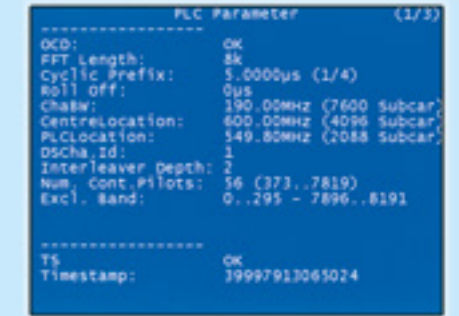


For communication with the CMTS in both device types an optional DOCSIS 3.1 modem is integrated. This modem supports OFDM in upstream as well as downstream, where it can bundle two OFDM channels each.

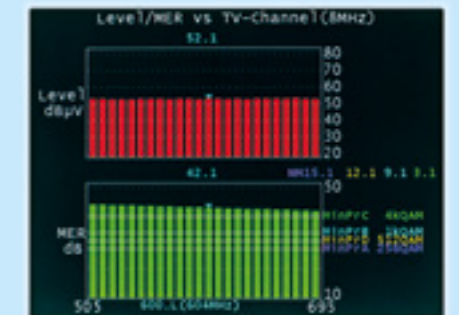
In addition and for reasons of backward compatibility DOCSIS 3.0 with 32 x 8 channel bonding (up to 32 downstream channels and 8 upstream channels) will be supported. The modem provides all important measurement and system parameters of the new, ultra-wide OFDM channels.

For AMA 310, a real-time OFDM downstream receiver can be implemented. Its extraordinary measuring performance enables to determine the cause of many sources of error.

Where a single MER or BER value or a packet or codeword error counter is not helpful enough the technician can also track and distinguish more complicated errors safely (examples: broadband noise, narrowband interferences, phase noise, amplitude hum, overdrive, laser clipping, etc.).



The most important OFDM DS parameters extracted from the PLC field on AMA 310.



All parameters at a glance: level, MER, system margin (frequency dependent) in the DS on AMA 310.



The frequency-dependent MER of an OFDM DS channel at VAROS 107.

VAROS 107 »Alpha«

Cable TV measuring receiver/TV analyzer

The new way: Interactive networks are the networks of the future. The VAROS 107 »Alpha« establishes contact with the headend of the network via an integrated DOCSIS 3.0 modem and, thanks to an optional DOCSIS 3.1 modem, can also play a leading role in future tasks.

Even old and large-scale cable networks are no problem for this device and for you as a technician who works with it. The documentation of errors in distribution networks is no longer a big challenge with the VAROS 107 »Alpha«.

VAROS 107 »Beta«

Optics in the surface, copper in the building—only handable with a modern device that works in addition to the classic RF network with optical transmission—the fiber makes the difference.

Even in so-called “stand-alone headends” which supply larger buildings and offer in their networks also often analogue TV, the VAROS 107 »Beta«, as one of the few devices on the market, delivers absolutely reliable measurement results.

Even with the required system documentation, this device impresses with utmost precision, regardless if it is an optical distribution or a classic RF network.

- High resolution luminous 5.7" colour TFT
- Frequency range from 5–867 MHz
- Analog: FM, TV, return channel (RF level measurement), EMI measurement (Rated S/N measurement for ATV)
- Digital: DVB-C, DOCSIS, DVB-T/T2 (RF level/BER/MER/Constellation diagram/Packet errors/Noise Margin)
- DOCSIS analyzer (DOCSIS 3.0)
- MPEG-2/-4/HEVC/UHD decoder for image display with CI slot and DVI out
- NIT evaluation and LCN display
- Spectrum analyzer for all ranges, TILT function
- Echo measurement for DVB-T/T2 (impulse response)
- Upstream generator 5–65 MHz (CW and PRBS)
- USB for file import and export, firmware updates
- Monitoring and logging functions

Additional at VAROS 107 »Beta«

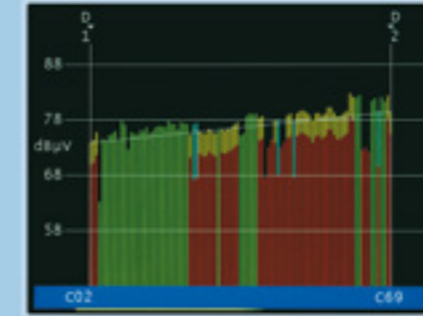
- Optical receiver with SC/APC input
- Extended CATV frequency range up to 1,214 MHz

Possible options

- Software module for upstream evaluations
- DOCSIS-Analyzer (DOCSIS 3.1 modem)

Accessory

- Protective bag with 4-point carry strap



TILT measurement: automatic detection of the QAM order and compensation of the level reduction.



Measurement of an optical CATV signal with evaluation of all familiar RF parameters.



Dimensions in mm: 206 w × 297 h × 84 d
Weight 2.5 kg

The technical data sheets and device-specific downloads are available from our homepage www.kws-electronic.de.

VAROS TECHNOLOGY



AMA 310 »Alpha«

Combo TV analyzer

The new AMA 310 »Alpha«: classic measurement technology with unmatched equipment and efficiency. No one is easier to use, no one makes work easier, even with very complex error analysis.

The years of experience and the consistent further development of the AMA 310 concept by KWS Electronic has created a measuring device that is just as unbeatable in terms of features and precision on the market as it is unmatched: whether DOCSIS 3.0 or 3.1, whether DVB-C or Ultra-HD.

The AMA 310 »Alpha« is the standard against which other high-end devices have to benchmark themselves.

AMA 310 »Beta«

Measure lights easier: like all devices in the Beta series, the AMA 310 »Beta« can also measure and process optical signals in addition to the identical RF measurement branches ... regardless of whether the device is connected to a SAT system or a CATV network.

Everyone who works with this device has a perfect connection between conventional and well-known RF measurements and the added accuracy of error analysis, by feeding in optical signals.

- High resolution luminous 5.5" colour TFT
 - Frequency range from 5–2,150 MHz; TV to 1,214 MHz
 - Analog: FM, TV, return channel (RF level measurement), EMI measurement (Rated S/N measurement for ATV with SCOPE/HUM representation)
 - Digital: DVB-S/-S2, DVB-C, DOCSIS, DVB-T/T2, Return path (RF level/BER/MER/Constellation diagram in real-time—except with DVB-T2/Packet errors)
 - DAB/DAB+ measurement module
 - DOCSIS analyzer (DOCSIS 3.0)
 - MPEG-2/-4/HEVC/UHD decoder for image display with 2 CI slots and DVI out
 - NIT evaluation and LCN display, dynamic PMT
 - Spectrum analyzer for all ranges, TILT function
 - CATV: Hum and phase jitter verification
 - CATV: MER to 40 dB, S/N (analogous) to 55 dB
 - Echo measurement for DVB-T/T2
 - DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
 - Printer for measured values and screenshots
 - SCART in/out, ASI in/out, Ethernet (RJ 45)
 - USB for file import and export, firmware updates
 - Monitoring and logging functions
- Additional at AMA 310 »Beta«
- Optical receiver with SC/APC input



Possible options

- DOCSIS analyzer (DOCSIS 3.1 modem)
- DOCSIS 3.1 real-time downstream OFDM receiver
- DOCSIS 3.1 extended frequency range up to 1,800 MHz (available from Q1/2019)
- UMS module for return path monitoring in conjunction with VAROS 107
- SNMP activation for remote monitoring
- FTP activation for remote file transfer

Dimensions in mm: 360 x 160 x 300 d
Weight 6.1 kg

AMA 310

Combo TV analyzer

The DOCSIS analyzer in the AMA 310 was implemented in accordance with the DOCSIS 3.0 specification. Both Euro-DOCSIS and US-DOCSIS signals can be measured. Channel bonding, as available with DOCSIS 3.0, is presented in a highly visible graphical manner.

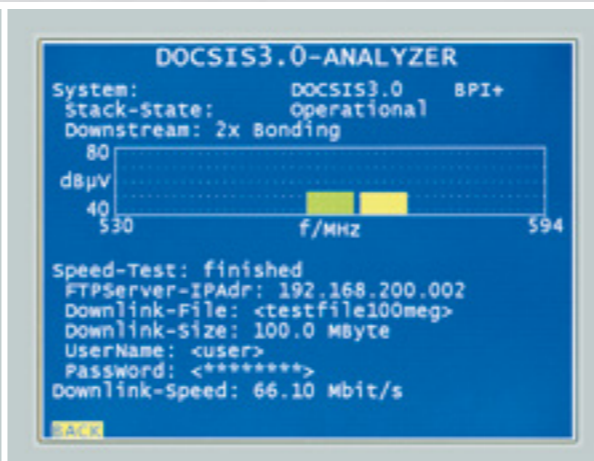
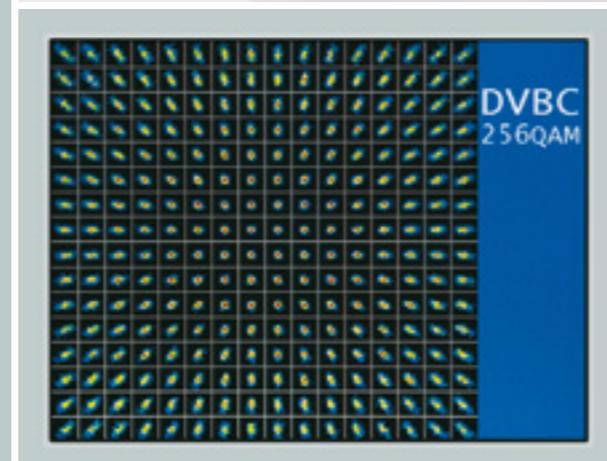
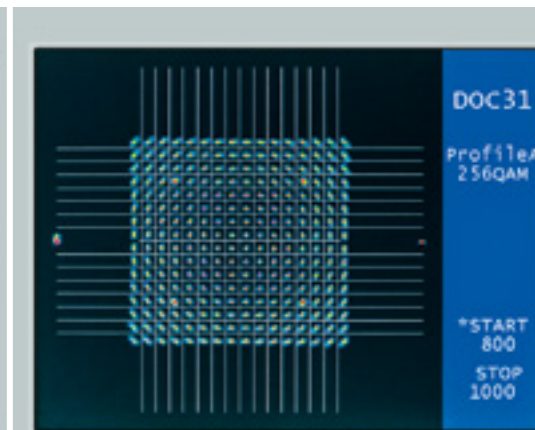
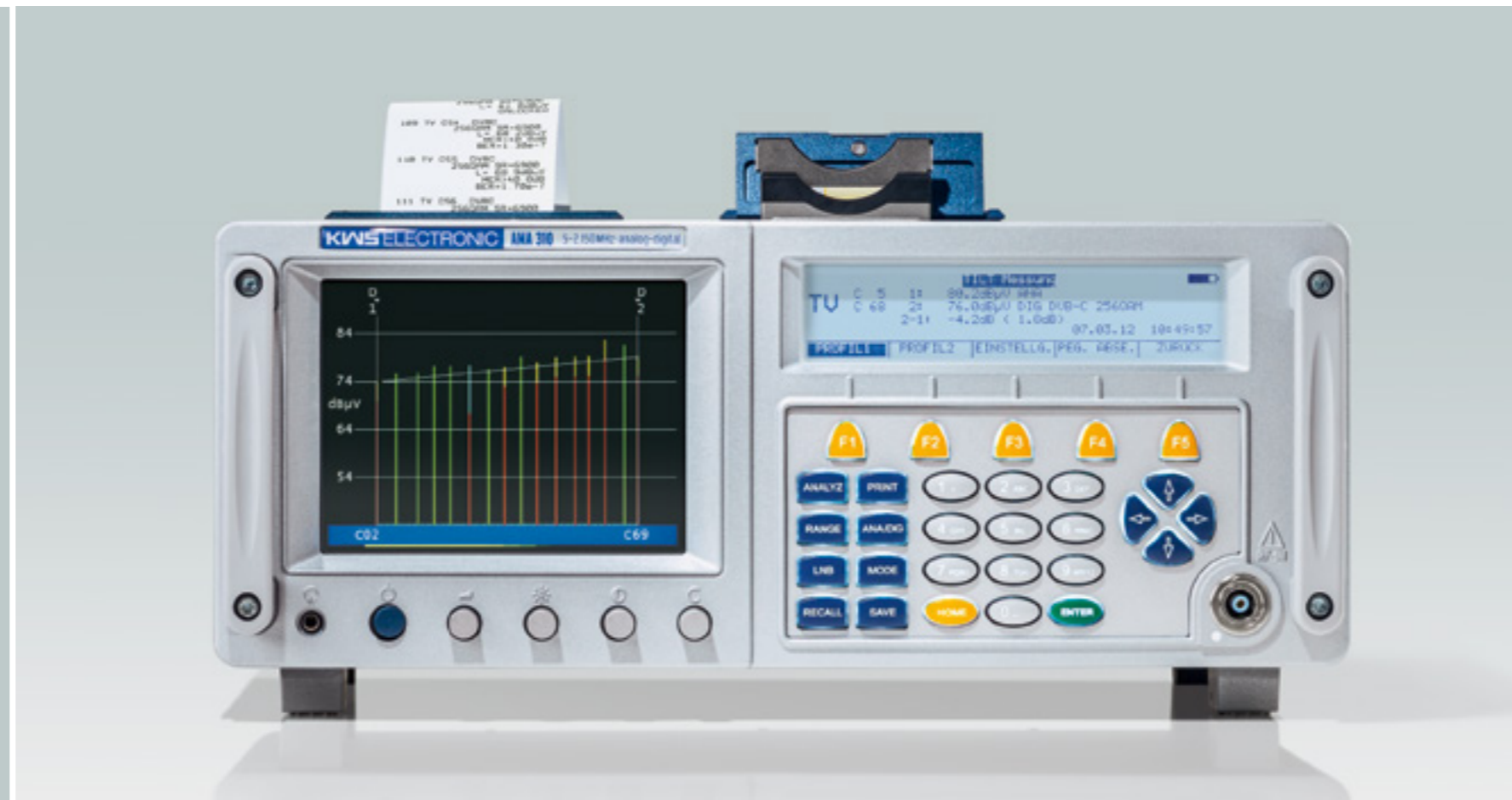
With the AMA 310 it is possible to assess the quality of the transmission in return path with greater confidence. With the VAROS 107 used as signal source (e. g. at the customer's antenna socket) the AMA 310 displays the RF level, BER, MER and constellation diagram for the received signal in the return path (e. g. in the headend or at the house amplifier).

An overview of the various options as well as information about the »AMA.remote« software is available on our homepage www.kws-electronic.de.

You can comfortably generate and process the measuring receiver's memory lists with the PC software "AMA.remote". Via SNMP (Simple Network Management Protocol) the AMA.remote additionally allows for remote controlling and monitoring of the AMA 310.

You can also check cable networks for RF leakage using the EMI measurement in the AMA 310 in conjunction with additional equipment available from KWS-Electronic. Locating leaks, which are largely responsible for increased interference, is as a result greatly facilitated.

The functional bag not only offers protection for the device but also enables the smooth operation of the instrument. The large opening side flaps provide easy access to all the interfaces.



HE 310

Configurable headend monitoring system

AMA TECHNOLOGY

The headend device HE 310 is an absolutely individually configurable 19-inch unit (3.5 RU) combining the functionality of the AMA 310/UMS with the classic AMA 310.

On the one hand, the HE 310 can be equipped with UMS return path monitoring measuring modules. In this case, together with the VAROS 107 in the field (and optionally with the RF switch SW 024) a high-end monitoring system for the return path frequency range can be matched together. All features and measurement options as with the AMA 310/UMS & VAROS 107 are given.

On the other hand, the HE 310 offers all measuring possibilities of a classic RF measuring device (e.g. DVB-S/-S2, DVB-C, ATV, FM, DVB-T-T2 ...). All measured values can be read out via SNMP to the internet.

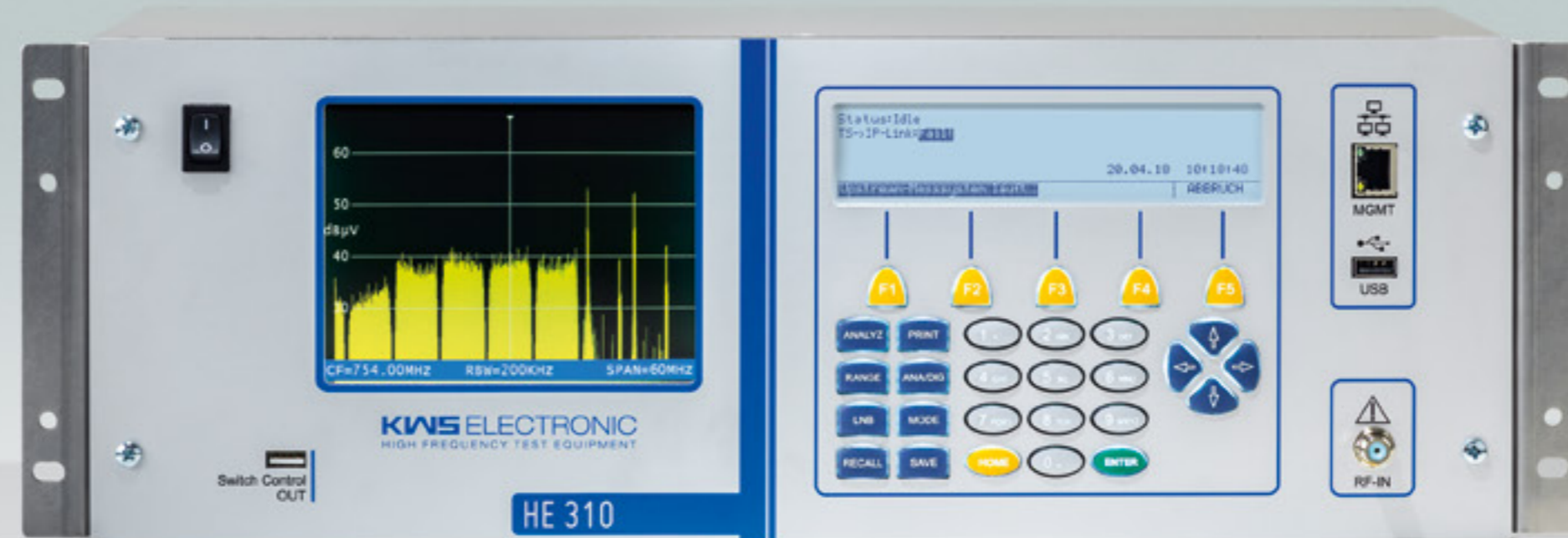
Downstream and return path measurements can be combined almost arbitrarily. So it's possible, for example, to measure, monitor and debug the DOCSIS upstream and, with the same equipment, measure the headend feed (SAT, DVB-T2, FM) and monitor the RF signal from the headend—all in one device and individually optimized and according to your needs.

Basic features

- High resolution luminous 5.5" colour TFT
- Frequency range from 5–2,150 MHz; TV up to 1,214 MHz; return channel 5–65 MHz
- USB, SCART in/out, ASI in/out, Ethernet (RJ 45)

Possible downstream measurements

- Analog: FM, TV (level measurement), EMI measurement (Rated S/N measurement for ATV with SCOPE/HUM representation)
- Digital: DVB-S/-S2, DVB-C, DOCSIS, DVB-T-T2, DTMB (RF level/BER/MER/Constellation diagram in real time/ packet errors)
- DAB/DAB+ measuring module
- DOCSIS analyzer (DOCSIS 3.0)
- MPEG-2/-4/HEVC/UHD decoder for image display
- NIT evaluation and LCN display, dynamic PMT
- Spectrum analyzer for all ranges, TILT measurement
- CATV: hum and phase jitter detection
- CATV: MER up to 40 dB, S/N (analog) up to 55 dB
- Teletext analogous/digital, DVB subtitling
- Echo measurement for DVB-T-T2, DTMB (impulse response)
- DiSEQC, UNICABLE, JESS (EN 50494 and 50607)
- SNMP for remote management and monitoring
- FTP functionality for file uploads and downloads



HE 310 (19"/3,5 HE), dimensions in mm:
440 w × 155,5 h × 275 d (without mounting bracket)
483 w × 155,5 h × 275 d (with mounting bracket)
Weight 7.9 kg

Possible upstream measurements

- Level, MER, BER, constellation diagram of modulated test channels up to 256 QAM and 6.4 MHz bandwidth
- Constellation diagram in real-time
- Real-time spectrum analyzer
- Max-hold function
- Sweep measurement (frequency response)

With the option FTP ("File Transfer Protocol") it is possible in combination with SNMP, to upload and download files to or from the 310 device:

- Upload and download of transponder memory files (.mem files)
- Upload and download of user defined channel tables (.cha files)
- Download of DataLogger result files (.xml files)
- Download screenshots (.bmp files)
- Upload of firmware updates remotely and trigger the update process (.bin files)

AMA and VAROS Seminars

at KWS-Electronic

In addition to providing on-site training at wholesalers, chambers of craft, and electrical guilds, KWS-Electronic also offers you the opportunity to participate in 2-day seminars directly at the company in Tattenhausen.

These intensive courses constitute a successful combination of theoretical knowledge and its application in daily usage. Via error simulation interferers are reproduced in line with actual practice. Each participant can detect and follow changes in the signal on his measurement device.

On request, the AMA and VAROS seminars can also be offered by KWS-Electronic as an in-house event directly at your location. These in-house seminars focus on your specific requirements and questions. That brings you the maximum benefit at a significantly lower cost.

In the picturesque foothills of the Alps we provide a seminar group of maximal 8 participants exactly the knowledge they need to successfully deploy their KWS measuring receiver

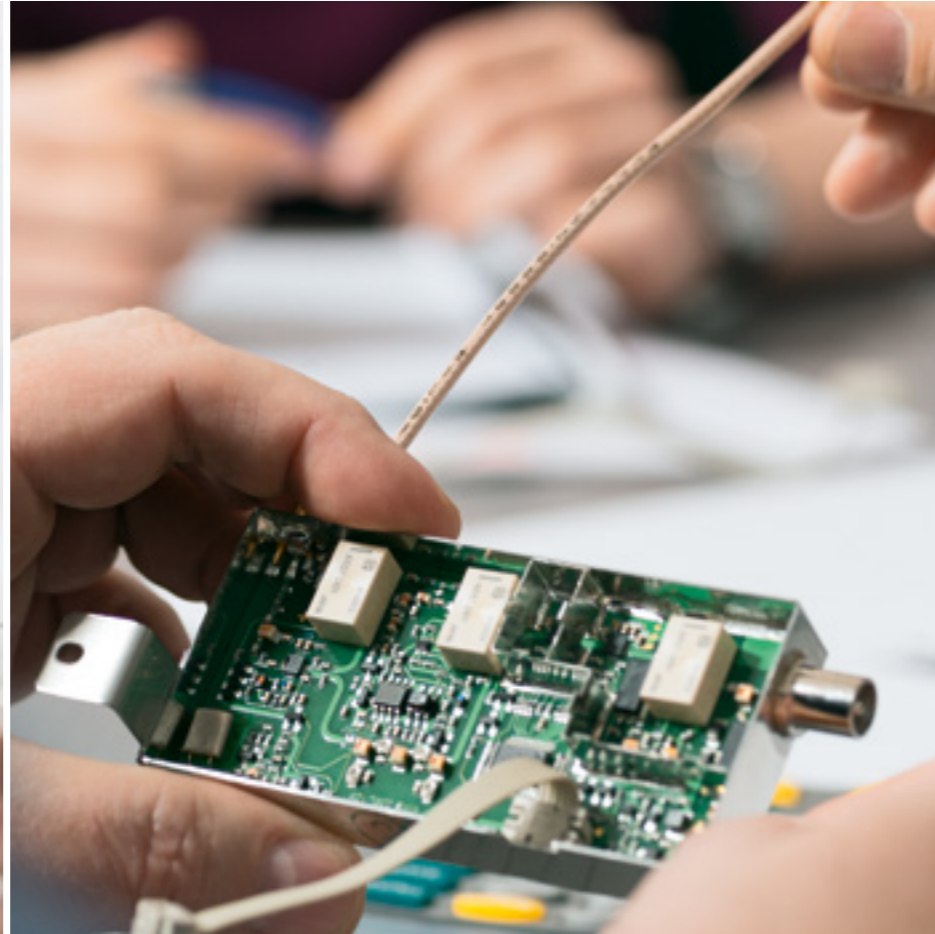
Knowledge as a competitive advantage—seminars from KWS-Electronic provide you with know-how that pays dividends.

The aim of the **AMA and VAROS seminars** is the recognition and documentation of errors of all kinds. In particular, topics such as the evaluation of constellation diagrams and NIT tables are explained. Distribution network basics are addressed marginally in the AMA seminars.

Goal of the **VAROS seminars** is to make the technicians fit for the simple and uncomplicated solving of problems on site. It comprehensively deals with the operation of the measuring instruments and the interpretation of measured values.

Please note: the seminars at KWS-Electronic are only held in German language.





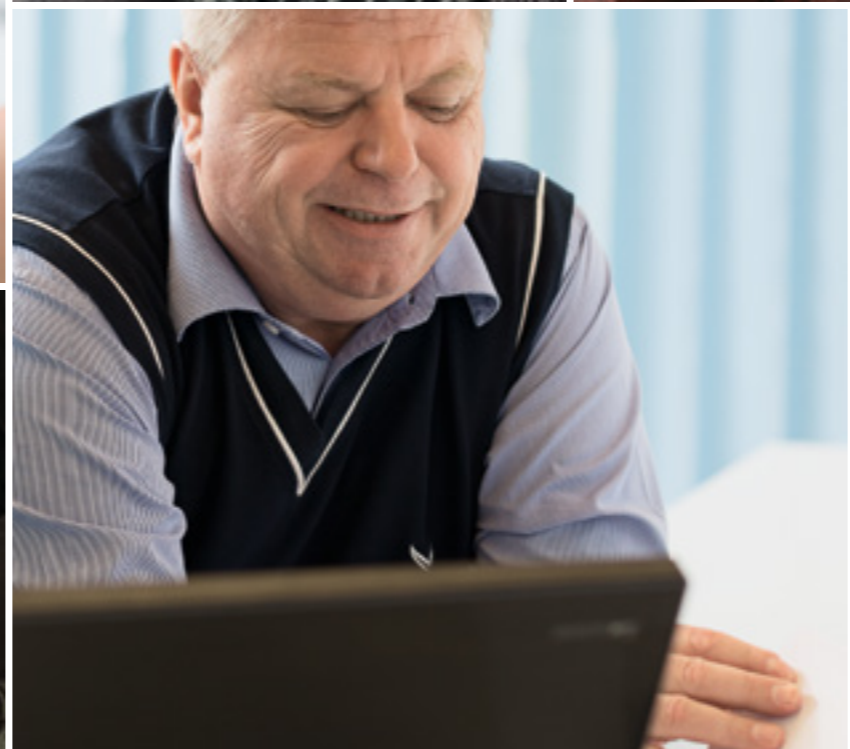
For almost 50 years KWS-Electronic has been developing and implementing solutions that point to the future. Based on very efficient hardware we offer retrofittable measuring receivers for professionals who emphasize long-term value retention as well as high investment security.

We offer concepts to match your requirements: antenna measuring technology from KWS-Electronic should facilitate your professional task as far as possible.

All device types are available in the two equipment variants »Alpha« and »Beta«: Select the right measuring receiver according to your needs.

New standards are set in terms of innovation, precision and handling—something all KWS-Electronic products have in common. Count on innovation that pays off and place your trust in KWS-Electronic's extensive know-how and many years of experience ... today, tomorrow and beyond.

We practice real »Made in Germany«.



AMA 310/UMS & VAROS 107

Upstream Measurement System

- Frequency range from 5–65 MHz
- Real-time spectrum analyzer
- Max-hold function
- Frequency sweep (frequency response measurement)
- Measurement of level, MER, BER and constellation diagram
- Real-time constellation diagram
- Modulated test channels up to 256 QAM and 6.4 MHz bandwidth

This system combines the KWS devices AMA 310/UMS and VAROS 107 to a high-end monitoring system for the return path frequency range. An AMA 310 in a 19-inch version (3.5 RU) with UMS module is used in the headend, in the field the CATV hand-held VAROS 107 is the counterpart. Both devices communicate bi-directionally through the cable or HFC network to be measured. Thus no internet connection is necessary.

An optionally available 24-fold RF switch (model type SW 024) and the handover of the measuring results to the headend equipment either in ASI format or as an IP data stream (UDP or RTP/UDP) lead to great flexibility when measuring as well as when connecting the entire monitoring system to the headend equipment.

Acquisition of qualitative and quantitative parameters:

The heart of the AMA 310/UMS is a real-time spectrum analyzer. Typical errors are reliably detected like e.g. an increased noise floor, short-term ingress interferers or a TILT in the upstream frequency range.

In addition standard (and well know from the downstream) RF measurement parameters such as MER and BER or constellation diagram can be gathered and transmitted back to the field devices VAROS 107. For this purpose test signals transmitted by the field devices are highly precisely measured by the AMA 310.



AMA 310/UMS (19"/3.5 RU), dimensions in mm:
 440 w × 155,5 h × 275 d (without mounting bracket)
 483 w × 155,5 h × 275 d (with mounting bracket)
 Weight 7.9 kg

SW 024 (19"/1 RU), dimensions in mm:
 440 w × 44,45 h × 275 d (without mounting bracket)
 483 w × 44,45 h × 275 d (with mounting bracket)
 Weight 3.5 kg

AMA 310/UMS & VAROS 107

Cluster selective measurement
with 24-fold switch SW 024

The RF switch SW 024 (19-inch, 1 RU), which is available as a separate option to the AMA 310/UMS in the headend, allows for measuring up to 24 clusters or CMTS upstream inputs separately.

Thus e. g. a measured ingress can be assigned precisely to the cluster from where it comes. This significantly facilitates the search for the source of an interferer.

The UMS system automatically ensures that a field device VAROS 107 displays the spectrum or the measurement results of exactly the one switch input where it is physically connected to.

In addition to the selective mode, the sum signal of all 24 RF inputs can be generated and monitored from a spectrum point of view.

Main measurements and display on the field device determined by the headend device (sum signal and / or cluster-selective):

- Frequency response of the return channel (wobble curve)
- Representation of MER, BER, signal margin and constellation diagram of modulated test channels (generated by the VAROS 107 in the field)
- Real-time representation of the spectrum measured in the headend
- Max-hold function and waterfall diagram supporting ingress measurement

Additional functions and methods:

- Comfortable level adjustment support for return path amplifier at house or line installations
- Automated measurements with protocols
- RANGING at modem reference level enables measurements of correct and comparable S/N ratios
- Identification of the field devices in the headend via their unique serial number avoids faults and measurements due to "third-party devices"
- Automatic cluster detection by the system when using the SW 024 switch



KWS UPSTREAM

Communication

- Telemetry carriers in the range 5 to 65 MHz from field device to headend
- MPEG-2 data stream from AMA 310/UMS to headend equipment (optionally via ASI or IP)
- DVB-C signal from the headend into the field

Kronback X16/KWS & VAROS 107

Upstream Monitoring System

KWS UPSTREAM

Fast internet services, VoIP, online gaming ... an interference-free return path is essential for a high-quality broadband DOCSIS connection.

The combination of a special KWS version of the real-time spectrum analyzer X16 by the Danish company "Kronback Tracers" in the headend and the successful cable handheld VAROS 107 as a field device provides a system that ensures high signal quality in the upstream frequency range.

Communication between the field device and headend unit is bi-directional and uses the coaxial or HFC network currently being measured. As such, no internet connection is required.

All real-time spectral measurement parameters in the headend are displayed on the field device. The 16 inputs of the headend device, its small size (19"/1 RU), the option to cascade up to 16 units, and the possibility of measuring with multiple handheld devices simultaneously in the field, provide for sufficient flexibility even in large networks.

Numerous measurement and adjustment aids complete this powerful system.

Main measurements and displays on the field device:

- Frequency response of the return channel (wobble curve)
- Real-time representation of the spectrum measured in the headend
- Waterfall diagram supporting the ingress measurement

Additional functions and methods:

- Comfortable level adjustment support for return path amplifier installation at house and in line
- RANGING at modem reference level enables measurements of correct and comparable values
- Automatic cluster/input detection by the measuring system



Communication

- Telemetric carrier in the range 5 to 65 MHz from field device to headend
- MPEG-2 data stream from Kronback X16/KWS to headend equipment via Ethernet
- DVB-C signal from the headend into the field

Web interface

- Access to all measured data of the X16/KWS
- Full configuration of the X16/KWS
- Spectrum data of each return channel
- Long-term monitoring and spectral quality assessment of every single return channel

CATV Seminars

and technology seminars
at KWS-Electronic

KWS offers special technical seminars for all users and technicians with the corresponding prior knowledge. Alongside practical training this 2-day event at the company headquarters in Tattenhausen also provides comprehensive theoretical content.

Issues such as DOCSIS, optical transmission, or the very extensive area of return path measurements belong to the program just as much as the theoretical foundations of RF transmission and common modulation types. Our instructors are in a position to respond precisely to your expectations and requirements.

A selection from an extensive portfolio of prepared topics is discussed with the participants at the beginning of the first seminar day.

Each participant should learn exactly what they want to know and what they need for their work as on-site technicians.

As well as the AMA and VAROS seminars, we also offer the CATV seminars as an in-house event at your location. This makes sense especially if several technicians are to take part in the CATV seminar at the same time. Already in advance, the desired topics can be fixed, so that the maximum learning effect is guaranteed for you and your technicians.

A selection of possible topics:

- Usable signals in the broadband cable network
- Frequency bands and channel tables
- Calculating in dB sizes
- Level relationships in the broadband cable network
- CATV modulations and transmission standards
- Source and channel coding for digital transmissions
- Spectral analysis
- MPEG transport stream and MPEG decoder
- DOCSIS
- Basics of fibre optical technology and measurements
- Electro Magnetic Interference Measurement (EMI)
- Return path monitoring
- SNMP & AMA.remote

Please note: the seminars at KWS-Electronic are only held in German language.





KWS ELECTRONIC

HIGH FREQUENCY TEST EQUIPMENT

ELPAS

You are interested in obtaining further information about our products, solutions and services?

KWS-Electronic is at your disposal with expert advice. Call us or send us an e-mail.

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