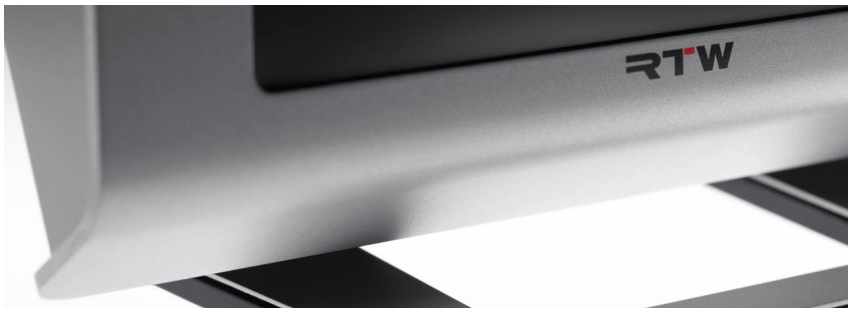
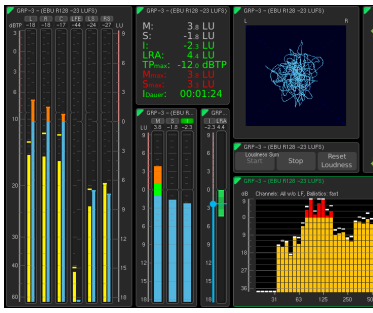
Data Sheet

TouchMonitor TM9 Series





EYES ON YOUR AUDIO

TouchMonitor TM9 Series

product design award 2011

Modular Software ▪ Touch Screen ▪ I/O Options: Analog, AES3, AES3id, 3G SDI, AoIP ▪ Highly Flexible Screen Layout ▪ 2-ch. PPM/ True Peak ▪ Multichannel ▪ Loudness ▪ LRA ▪ Logging ▪ Chart ▪ Timecode ▪ SPL ▪ RTA ▪ SSA ▪ ISA ▪ Radar ▪ Premium PPM ▪ BLITS

The TouchMonitor TM9 range enters a new level of professional audio metering in terms of precision, performance, efficiency and flexibility. The units are equipped with high-grade 9“ touch screens, an easy-to-use graphical user interface, and several audio interfaces.

TouchMonitor handles up to 16 input signals in various formats: analog, AES3, and AES3id. Most units can be equipped with an interface to additionally accept 3G SDI signals. And with some models, up to 32 audio channels can be measured in a corresponding AoIP network.

Graphical User Interface

The TouchMonitor‘s graphical user interface is controlled simply by the touch of your finger. Instruments can be scaled, randomly positioned and combined for optimum utilization of the available screen space. Multiple instruments of the same type, assigned to different input channels and configurations, can be displayed simultaneously. A comprehensive on-screen help feature lets the user configure setup changes with ease.

Licences

A totally modular software concept means that only those features have to be purchased that are actually required. This lets you define the functionality of an individual TouchMonitor that suits your needs best. At any time, software modules with new instruments and functions can be added simply by purchasing and activating the corresponding licences.

Gefördert durch:

Bundesministerium für Wirtschaft und Technologie

aufgrund eines Beschlusses des Deutschen Bundestages

Hardware

Common Configuration

- 9“ touch screen 16 : 9 TFT (1024 x 600 pixel)
- 16-channel audio interfaces (analog, AES3, AES3id) or 32-channel AoIP interface (for Dante™ or Ravenna/AES67/ ST 2110 networks) - selection required!
- 3G SDI interface (option for 16-channel interfaces)
- Connectors for Ethernet, VGA, 2 x USB 2.0, GPIO, (12) 24 V DC
- Fully scalable, modular software approach for flexible configuration and easy on-site upgrades
- Highly flexible screen layout options with scalable instruments
- Basic 4-channel PPM software: Peak, True Peak, Phase Meter, Global Keyboard
- Available software licences (see below):
  - Multichannel
  - Loudness (EBU R128, ITU, ATSC A/85, ARIB, OP-59, AGCOM, CALM, LEQ(M), TASA, SAWA) und SPL
  - RTA - Real Time Analyzer
  - SSA - Surround Sound Analyzer
  - Radar Display,
  - Premium PPM plus Vectorscope
  - Timecode Reader (reader and recalculation)
  - BLITS (analyzer and generator)
  - Logging Data Server (external logging or chart)
  - ISA - Immersive Sound Analyzer

Main Units

20900

TouchMonitor TM9 main unit in a sturdy table-top frame with movable table-stand and power supply.

20900OEM

TouchMonitor TM9 main unit without table-top frame, without table-stand and without power supply, for mounting into front panels, e. g. mixing consoles.

Audio Interfaces (I/O Options)

Each main unit comes with an audio interface, which will be fitted to a new unit by factory. On the next page you will find the available audio interfaces. Select the interface suited to your needs and tell us its additional order number when ordering a new main unit.

Hardware (continued)

HW20911

16-channel audio interface with:
- 8-channel analog inputs (electronically balanced, Sub-D)
- 8-channel digital inputs and outputs (transformer balanced, 110 Ohm, 4 x AES3 In/Out, Sub-D)

HW20912

16-channel audio interface with:
- 8-channel analog inputs (electronically balanced, Sub-D)
- 8-channel digital inputs and outputs (unbal., 75 Ohm, 4 x AES3id In, 4 x AES3id Out, 8 x BNC)

HW20913

16-channel audio interface with:
- 16-channel digital inputs and outputs (transformer balanced, 110 Ohm, 8 x AES3 In/Out, 2 x Sub-D)

HW20914

16-channel audio interface with:
- 16-channel digital inputs and outputs (unbal., 75 Ohm, 8 x AES3id In, 8 x AES3id Out, 16 x BNC)

HW20915

16-channel audio interface with:
- 16-channel analog inputs (electronically balanced, 2 x Sub-D)

Option: 3G-SDI-Interface HW20930

The 3G SDI audio interface expands the input options up to 32 channels and can be mounted into each audio interface HW2091n (when order is placed or at a later point of time)

HW20917

32-channel audio interface with:
- 32 Dante™ AoIP network channels (2 x RJ-45, Primary/Secondary)

HW20918

32-channel audio interface with:
- 32 Ravenna/AES67/ST 2110 AoIP network channels (2 x RJ-45, Primary/Secondary)

Additional Hardware Options

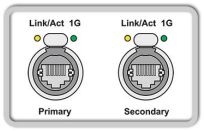
TM9-MA4U (19“/4U mounting adapter for 20900OEM)
Mounting kit for one 20900OEM to be mounted into 19“ racks acc. to DIN 41494/IEC 60297 (19“/4U, 483 x 177 x 91 mm). USB extension to front panel.

TM9-MADT (Table-top Mounting Adapter for 20900OEM)
Mounting kit including a table-top frame, robust swivel-mounted table-stand, housing cover, and mounting material for remodelling 20900OEM to a table-top unit.

Preconfigured Models

The models are already preconfigured for typical application fields and equipped with a corresponding audio interface. As the previously described devices, they can be expanded with software modules (licences). We recommend licences SW20001 for multi-channel operation, SW20002 for loudness measurements and SPL display, SW20004 for the use of the Surround Sound Analyzer, and SW20006 for up to four audio vectorscopes, Multistandard PPM/VU moving coil emulations as basic configuration for the following units. Further licences can be found in the **Software** section.

TM9-RAV

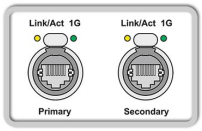


RAVENNA
AES67 ST 2110

9“ table-top unit for AoIP network-based post production, TV broadcast and video editing

- 32 Ravenna AoIP network channels (2 x RJ-45, Prim./Sec.)
- Power supply 12 - 24 V DC, 24 VA

TM9-Dante

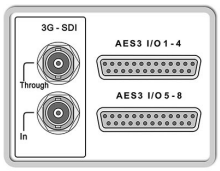


Dante

9“ table-top unit for AoIP network-based post production, TV broadcast and video editing

- 32 Dante™ AoIP network channels (2 x RJ-45, Prim./Sec.)
- Power supply 12 - 24 V DC, 24 VA

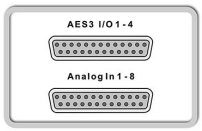
TM9-Video



9“ table-top unit for post production, TV broadcast, video editing

- 16-ch. digital inputs & outputs (2 x 4 AES3 In/Out, Sub-D)
- 3G-/HD-/SD-SDI In/Through (2 x BNC)

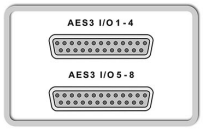
TM9-Studio

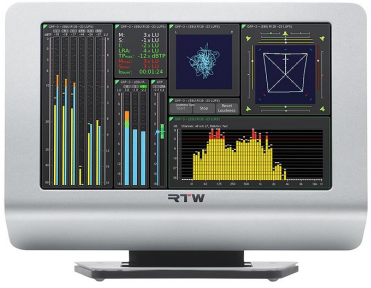


9“ table-top unit for audio production, post production

- 8-ch. analog inputs (Sub-D)
- 8-ch. digital inputs and outputs (4 x AES3 In/Out, Sub-D)

TM9-AES16

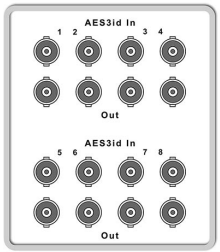


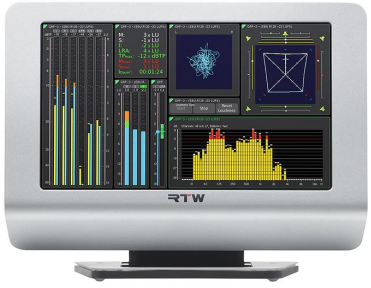


9“ table-top unit for digital audio production, post production

- 16-ch. digital inputs & outputs (2 x 4 AES3 In/Out, Sub-D)

TM9-BNC





9“ table-top unit for digital audio production, post production

- 16-ch. digital inputs & outputs (8 x AES3id In, 8 x AES3id Out, 16 x BNC)

Software

Standard Software

Every TouchMonitor comes with a basic software package. Beside the control functions, this software is able to process the signals of up to 4 routed channels in a maximum count of 4 groups at a time (up to 4 x Mono, 2 x 2-channel Stereo, 1 x 2-channel Stereo and up to 2 x Mono; no 3.1). Available for display are: 4-channel PPM with analog scales (DIN5, Nordic, British IIa, British IIb) and digital scales (0 to -60 dB, +3 to -60 dB TruePeak, DIN5, Nordic, British IIa and IIb), peak hold, peak memory, Over indicators, phase correlation meter and a global keyboard for simultaneous control of defined functions in multiple instruments and for preset recall. It also allows the external control with the integrated GP IO interface. Optional licences expand the feature set with a multichannel option and other software modules.

Software Modules (Licences)

Software modules can be ordered as licences either together with the order of the main unit and the selected audio interface or at a later point in time. Together with the order of the main unit the licence will be activated at delivery.
When a licences is needed at a later point in time, the order process is started from the “Licences” menu of the TM9 unit. A device-specific file for forwarding to RTW is created by the unit. RTW will send back a corresponding file with the activated licence for exactly this unit.

SW20001: Multichannel Mode

Expands the signal routing to the simultaneous display of more than 4 channels or channel groups. Additional formats: 3.1 Surround, 5.0 Surround, 5.1 Surround, 7.1 Cinema Surround, 7.1 DD+ Surround, and Multichannel (2 to 8 channels in one block, up to 4 blocks with 3G SDI option).

SW20002: Loudness and SPL Display

Expands the basic Stereo-PPM with Loudness functions (EBU R128, ITU-R BS.1770-4/1771-1, ATSC A/85, ARIB, OP-59, AGCOM, CALM, LEQ (M), TASA, SAWA), SPL functions, and Loudness Range instrument (LRA). For the display of more than 4 ch. Licence SW20001 is required. Then, Dialnorm is available.

SW20003: RTA - Real Time Analyzer

Provides on 31, 61 or 120 bands a spectral distribution display of the frequency range of single channels, channel pairs or groups. Additional HP HF band available.
Licence SW20001 is required for the display of more than 4 channels.

SW20004: SSA - Surround Sound Analyzer

Dynamic display for visualizing the interaction of all relevant technical and subjective surround sound parameters corresponding to the subjective listening impression.
--- Precondition: Licences SW20001, SW20002! ---

SW20005: Radar Display

High resolution circular Loudness display corresponding to the Loudness Radar Meter of TC electronic®.
Licence SW20001 is required for the display of more than 4 channels.
--- Precondition: Licence SW20002! ---

SW20006: RTW Premium PPM + Vectorscope

High resolution Multistandard-PPM display with advanced scales, moving coil instruments (PPM, VU, Loudness, BBC mode), and with Audio Vectorscope (4 instances). Expands licence SW20001 with Multi-Correlator, if activated. Licence SW20002 is required for the display of Loudness.

Software (continued)

SW20008: Timecode Reader

Decoding of SDI embedded or LTC timecode. Timecode display. Licence SW20002 is required for the possibility of recalculating loudness.

SW20013: BLITS

Tool to generate line test signals according to EBU 3304, GLITS and BLITS definition. Automatic and significant analysis of channel allocation, level, phase and delay, and polarity of received BLITS 5.1 test signals.
--- Precondition: Licence SW20001! ---

SW20014: Logging Data Server

Export of measured data via IP connection or USB flash drive. Two-stage definition of thresholds. Advanced graphical presentation with RTW LQL PC software. Chart instrument for the display of the course of a measurement directly on the TM.
--- Precondition: Licence SW20002! ---

SW20015: ISA - Immersive Sound Analyzer

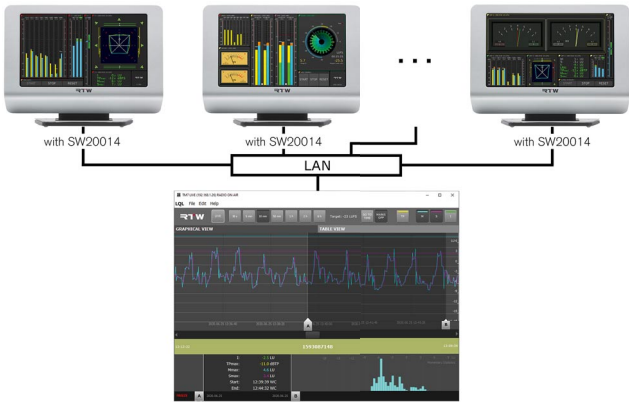
Visualisation of the dynamic behaviour and interaction of all relevant technical and subjective parameters of immersive surround signals across two layers. Intuitive evaluation of the spatial balance at a glance.
--- Precondition: Licences SW20001, SW20002, SW20004! ---

SW20021: TC-RTW

Licence to convert TouchMonitor devices of TC electronic® to RTW units to allow the installation of upcoming licences with new product functionalities.
--- Precondition: TouchMonitor devices of TC electronic®! ---

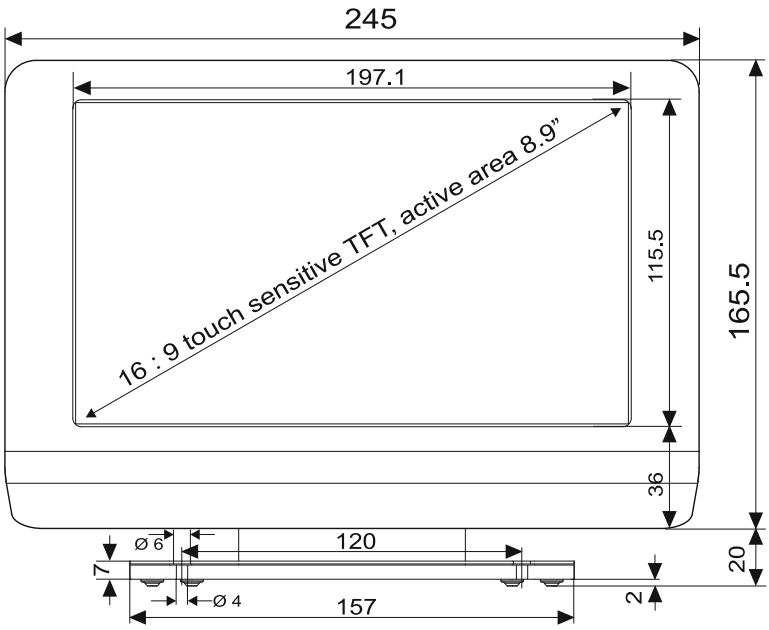
PC Software: LQL - Loudness Quality Logger

Logging console for Windows® OS to collect and store timecode or realtime based Loudness and True Peak data via IP connetion (LAN connector) or USB stick of multiple TM7, TMR7, and TM9 with LQL licence SW20014 activated. Two-stage definition of limits to generate various alarms, status overview, reports, and data export. The basic version is available for free to registered users. Please see members area of RTW's web site (Support/ Manuals & Software) under „PC Software/LQL - Loudness Quality Logger“.
--- Precondition: Licence SW20014 must be installed on each connected TouchMonitor ---

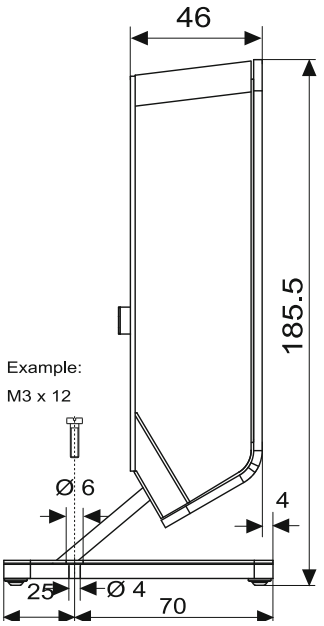


Dimensions

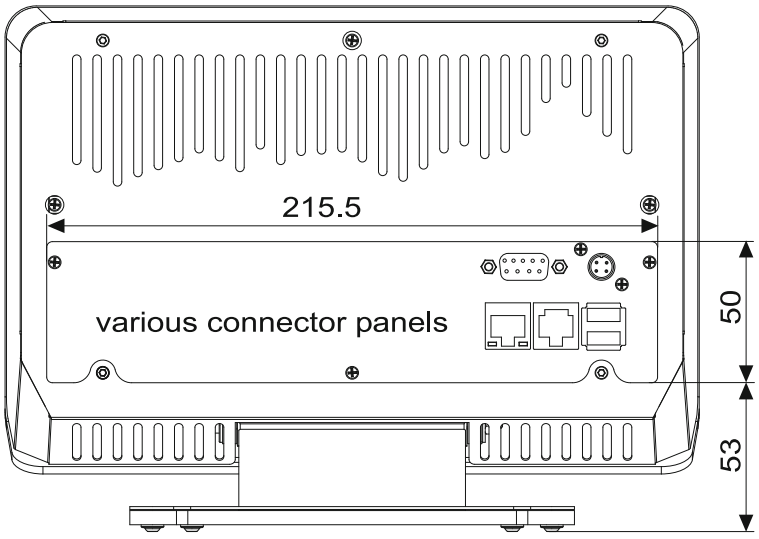
TouchMonitor TM9 20900 Table-Top Unit (20900 + HW2091n, also TM9-Dante, TM9-Video, TM9-Studio, TM9-AES16, TM9-BNC)



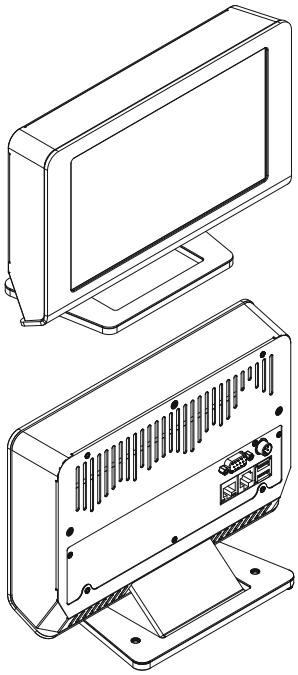
1 | Front view (dimensions in mm)



2 | Side view (dimensions in mm)

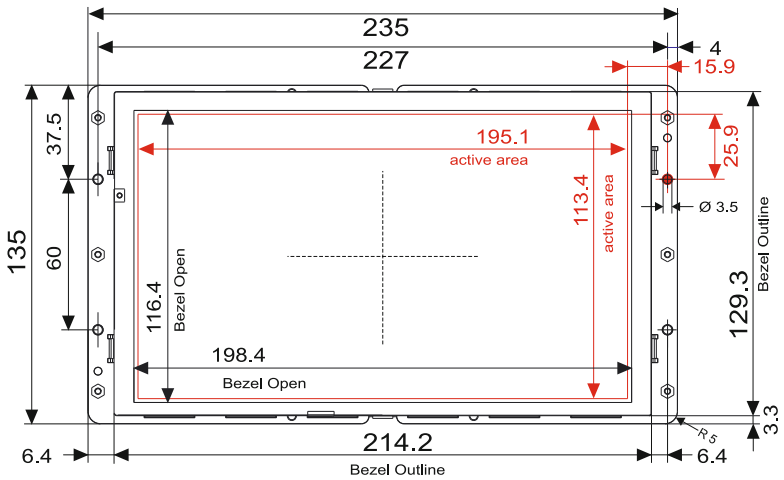


3 | Rear view (dimensions in mm)

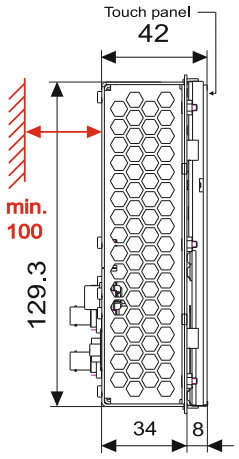


Dimensions (continued)

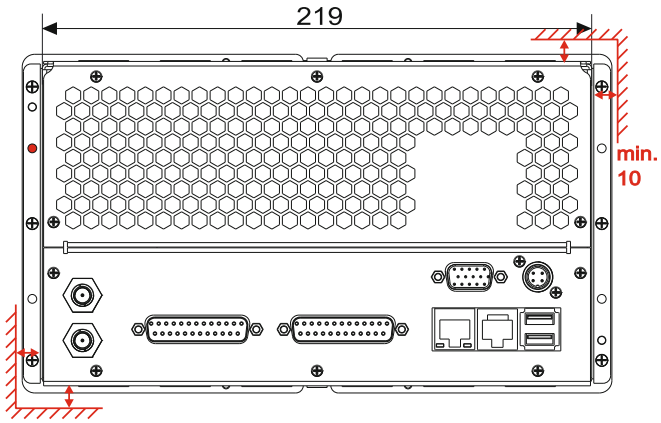
TouchMonitor TM9 20900OEM Version (20900OEM + HW2091n)



1 | Front view (dimensions in mm, tolerance: ±0.2 mm)

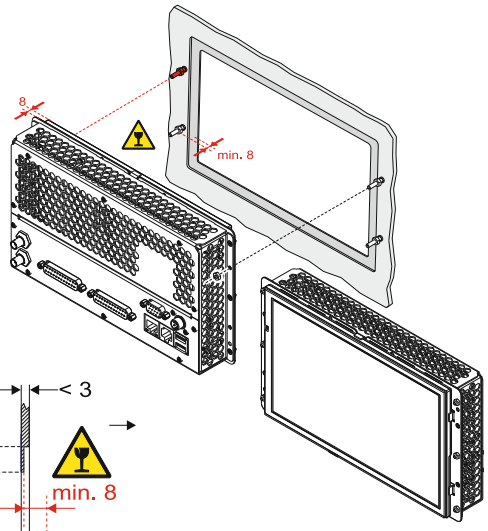


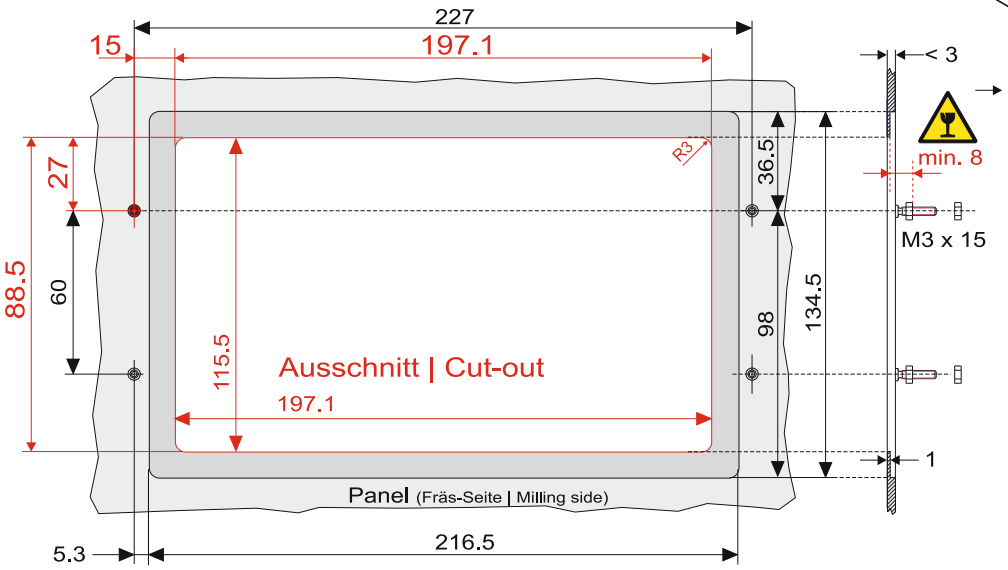
2 | Side view (dimensions in mm, tolerance: ±0.5 mm)



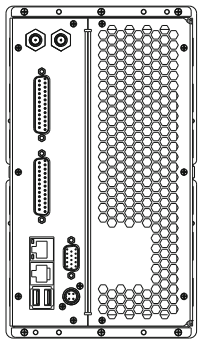
3 | Rear view (dimensions in mm, tolerance: ±0.5 mm)

For adequate ventilation a minimum space is required: min. 10 mm at all sides and min. 100 mm on the rear side!





4 | Front panel cut-out (dimensions in mm, tolerance: ±0.2 mm)



5 | Vertical mounting orientation

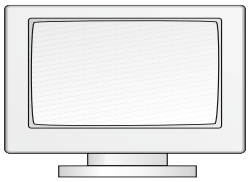
Connection

ATTENTION! - For operating the 20900OEM version an appropriate mains adapter is required. RTW recommends the use of the RTW wide voltage power supply 1178-R (100 - 240 V AC/24 V DC, 2.7 A) approved for TouchMonitor and available as an accessory. For 20900OEM and its combinations with mounting adapters TM9-MA4U, or TM9-MADT, it has to be ordered separately. This power supply is included in the 20900 table-top and the TM9-RAV, TM9-Dante, TM9-Video, TM9-Studio, TM9-AES16 and TM9-BNC packages.

NOTE - Some devices may have a DC input connector marked +12 V DC. These units may be operated with a nominal DC voltage in the range of +12 V to +24 V DC.

Optional:
3G-SDI hardware option HW20930 (for HW20911 to HW 20915 or TM9-Studio, -AES16, -BNC, included in TM9-Video)

External:
Standard VGA monitor 16 : 9

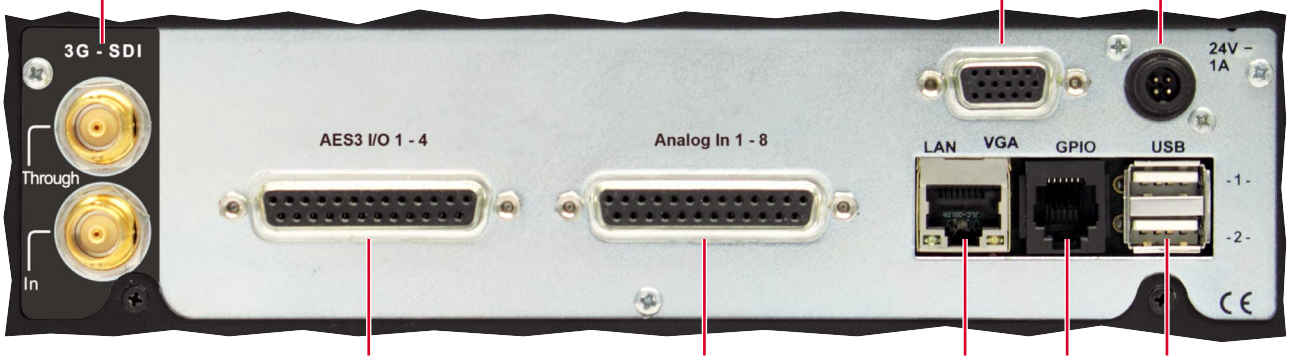


4-pin locking low voltage connector

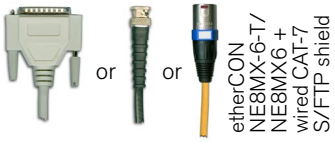
3G-SDI Through/In (not for AoIP panels)

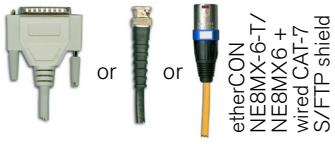
VGA

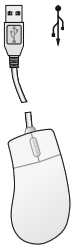
24 V 1 A/12 V 2 A



HW20911 (figured):	AES3 In/Out 1 - 4 (Sub-D)	Analog In 1 - 8 (Sub-D)	LAN (RJ-45)	GP IO (RJ-12)	USB A 2.0 (Full Speed)
HW20912:	Analog In 1 - 8 (Sub-D)	AES3id In/Out 1 - 4 (8 x BNC)			
HW20913:	AES3 In/Out 1 - 4 (Sub-D)	AES3 In/Out 5 - 8 (Sub-D)			
HW20914:	AES3id In/Out 1 - 4 (8 x BNC)	AES3id In/Out 5 - 8 (8 x BNC)			
HW20915:	Analog In 1 - 8 (Sub-D)	Analog In 9 - 16 (Sub-D)			
HW20917/18:	Dante™/Ravenna AoIP Link/Act 1G Primary (RJ-45)	Dante™/Ravenna AoIP Link/Act 1G Secondary (RJ-45)			
TM9-Dante: TM9-RAV	Dante™/Ravenna AoIP Link/Act 1G Primary (RJ-45)	Dante™/Ravenna AoIP Link/Act 1G Secondary (RJ-45)			
TM9-Video:	AES3 In/Out 1 - 4 (Sub-D)	AES3 In/Out 5 - 8 (Sub-D)			
TM9-Studio:	AES3 In/Out 1 - 4 (Sub-D)	Analog In 1 - 8 (Sub-D)			
TM9-AES16:	AES3 In/Out 1 - 4 (Sub-D)	AES3 In/Out 5 - 8 (Sub-D)			
TM9-BNC:	AES3id In/Out 1 - 4 (8 x BNC)	AES3id In/Out 5 - 8 (8 x BNC)			





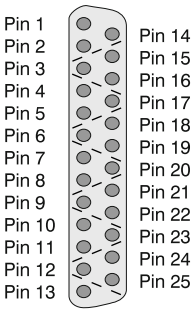


External:
USB flash drive
USB mouse
Wacom® graphics table

Pin Assignment

Analog In 1 -8, Analog In 9 - 16 (electr. bal., 25-pin Sub-D-F)

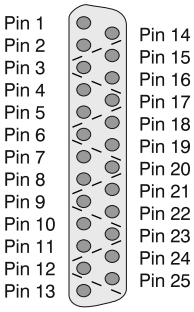
Pin:	Function:
1	Analog input 8 resp. 16 (+, hot)
14	Analog input 8 resp. 16 (–, cold)
2	Shield/chassis
15	Analog input 7 resp. 15 (+, hot)
3	Analog input 7 resp. 15 (–, cold)
16	Shield/chassis
4	Analog input 6 resp. 14 (+, hot)
17	Analog input 6 resp. 14 (–, cold)
5	Shield/chassis
18	Analog input 5 resp. 13 (+, hot)
6	Analog input 5 resp. 13 (–, cold)
19	Shield/chassis
7	Analog input 4 resp. 12 (+, hot)
20	Analog input 4 resp. 12 (–, cold)
8	Shield/chassis
21	Analog input 3 resp. 11 (+, hot)
9	Analog input 3 resp. 11 (–, cold)
22	Shield/chassis
10	Analog input 2 resp. 10 (+, hot)
23	Analog input 2 resp. 10 (–, cold)
11	Shield/chassis
24	Analog input 1 resp. 9 (+, hot)
12	Analog input 1 resp. 9 (–, cold)
25	Shield/chassis
13	not used



(External view of the connector)

AES3 I/O 1 - 4, AES3 I/O 5 - 8
(transf.-bal., 25-pin Sub-D-F)

Pin:	Function:
1	Digital output 4 resp. 8 (+, hot)
14	Digital output 4 resp. 8 (–, cold)
2	Shield/chassis
15	Digital output 3 resp. 7 (+, hot)
3	Digital output 3 resp. 7 (–, cold)
16	Shield/chassis
4	Digital output 2 resp. 6 (+, hot)
17	Digital output 2 resp. 6 (–, cold)
5	Shield/chassis
18	Digital output 1 resp. 5 (+, hot)
6	Digital output 1 resp. 5 (–, cold)
19	Shield/chassis
7	Digital input 4 resp. 8 (+, hot)
20	Digital input 4 resp. 8 (–, cold)
8	Shield/chassis
21	Digital input 3 resp. 7 (+, hot)
9	Digital input 3 resp. 7 (–, cold)
22	Shield/chassis
10	Digital input 2 resp. 6 (+, hot)
23	Digital input 2 resp. 6 (–, cold)
11	Shield/chassis
24	Digital input 1 resp. 5 (+, hot)
12	Digital input 1 resp. 5 (–, cold)
25	Shield/chassis
13	not used



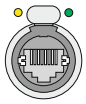
(External view of the connector)

⚠ **NOTE -** The AES3 inputs are permanently terminated with 110 Ω.

LAN

RJ-45 standard network connector (10/100 MBit)

Link/Act 1G (RJ-45 NE8FBV-C5-LED1-S connector)



RJ-45 AoIP network connection (Primary/Secondary)

⚠ **NOTE -** etherCON NE8MX-6-T/NE8MX6 connector with CAT-7-S/FTP cable and wired shield shall be used!

AES3id In/Out 1 - 4, AES3id In/Out 5 - 8, 3G-SDI
(unbal., BNC-F)

Pin:	Function:
Pin:	Signal
Ring:	Shield/chassis

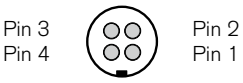
(External view of the AES3id connector)

(External view of the 3G-SDI connector)

⚠ **NOTE -** The AES3id inputs and the 3G-SDI inputs are permanently terminated with 75 Ω.

24 V - 1 A, 12 V - 2 A
(4-pin locking low voltage connector, Typ Binder 710)

Pin:	Function:
1 - 2	+24 V DC/+12 V DC
3 - 4	0 V



(External view of the connector)

⚠ **NOTE -** An external overcurrent protective device (2 A max.) shall be installed when using an external DC power supply!

USB-A

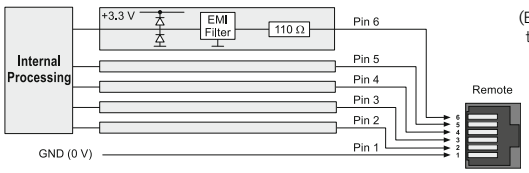
2 Full Speed USB 2.0 connectors for USB sticks (Licence handling, presets, updates) and external mouse or Wacom® tablet.

GP IO (RJ-12 6P6C socket)

External control of functions defined in the Global Keyboard menu. The inputs defined as „active low" have to be switched against 0 V (Pin 1).

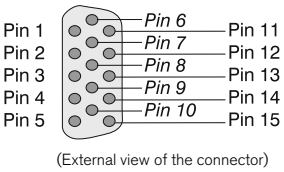
Pin:	Function:
1	GND (0 V)
2 - 6	Function acc. to definition in the menu

(External view of the connector)



VGA (15-pin Sub-D-F)

Pin:	Function:		
1	R | Video signal		
2	G |		
3	B |		
4 - 8	GND		
9	+5 V		
10 - 11	GND		
12	SDA	14	V-sync
13	H-sync	15	SCI



(External view of the connector)

⚠ **NOTE -** The VGA cable shall not exceed 15 m lenght!

Specifications

System

General

Power requirements:	+24 V DC (external 2 A max. overcurrent protective device shall be installed!) Some devices may have a DC input connector marked +12 V DC. These units may be operated with a nominal DC voltage in the range of +12 V to +24 V DC.
Current drain:	1 A nominal, 2.5 A power-up current (10 µsec.)
Power dissipation:	approx.: 12,5 W (w/o SDI), 15 W (with SDI)
Display:	9" TFT touch screen 16 : 9 (1024 x 600 pixel)
Connectors:	1 x 15-pin Sub-D-F; VGA output with 1024 x 600 pixel, 65.536 colors, 60 Hz, for connection of an optional external 16 : 9 VGA monitor, selectable 4 : 3 mode 1 x 4-pin locking low voltage connector type Binder 710 (DC) 2 x USB A; USB 2.0 Full Speed connectors for: ▪ USB flash drives (licence handling, preset export and import, software updates) ▪ external computer mouse for operating ▪ external Wacom® graphics tablet 1 x GPIO (RJ-12-6P6C) for defined functions or preset recall 1 x LAN (RJ-45)
with HW20911:	2 x 25-pin Sub-D-F (analog and digital)
with HW20912:	1 x 25-pin Sub-D-F (analog), 8 x BNC-F (digital)
with HW20913:	2 x 25-pin Sub-D-F (digital)
with HW20914:	16 x BNC-F (digital)
with HW20915:	2 x 25-pin Sub-D-F (analog)
with HW20917:	2 x RJ-45 (Dante™ AoIP)
with HW20918:	2 x RJ-45 (Ravenna/AES67/ST 2110 AoIP)
Dimensions (W x H x D):	▪ 20900: 245 x 185.5 x 46.5 mm ▪ 20900OEM: 235 x 135 x 45 mm
Weight:	▪ 20900: approx. 2.7 kg (w/o power supply) ▪ 20900OEM: approx. 1.2 kg
Operating temperature:	+5° to +40° C

Functions (with all licences activated)

- Operation with one finger (touch sensitive display) or a computer mouse
- Instruments can be scaled and freely positioned
- Multiformat Surround PPM (3.1, 5.0, 5.1, 7.1 Cinema, 7.1 DD+)
- 2-ch. and multichannel peakmeter
- Loudness-Meter: ITU-R BS.1770-4/1771, EBU R128, ATSC A/85, ARIB, OP-59, AGCOM, CALM Act, LEQ(M), TASA, SAWA, custom mode
- Loudness Test Time Control
- Loudness Range instrument (LRA)
- Logging Data Server
- Loudness Chart instrument
- Radar Loudness Meter (TC electronic®)
- SPL meter
- Timecode Reader, Loudness Recalculation
- Moving Coil (BR, VU, Loudness, BBC mode)
- Gain Reduction instrument
- Surround Sound Analyzer (up to 7.1 DD+)
- Stereo Correlator
- 10-fold Multi-Correlator with LFE mode
- 1/3-, 1/6-, 1/12-octave spectrum analyzer
- 2-channel Audio Vectorscope (4 instances)
- Dialnorm
- BLITS analyzer and generator
- AES3 status monitor
- Numerical displays
- Immersive Sound Analyzer (for 5.1.2, 5.1.4, 7.1.2, 7.1.4) and total Loudness

Analog Inputs

HW20911:	8 analog inputs, Sub-D-F connector, 25-pin
HW20912:	8 analog inputs, Sub-D-F connector, 25-pin
HW20915:	16 analog inputs, 2 Sub-D-F connectors, 25-pin
Reference level:	adjustable in the range from 0 dBu to +10 dBu
Maximum input level:	+24 dBu
Impedance:	> 10 kΩ, electronically balanced
Frequence range:	20 Hz to 22 kHz @ 48 kHz

Digital Inputs

HW20911:	4 AES3 inputs (transformer balanced, 110 Ω), Sub-D-F connector, 25-pin, with 4 inputs and 4 outputs
HW20912:	4 AES3id inputs (unbalanced, 75 Ω), 8 BNC-F connectors, 4 inputs and 4 outputs
HW20913:	8 AES3 inputs (transformer balanced, 110 Ω), 2 Sub-D-F connectors, 25-pin, with 4 inputs and 4 outputs each
HW20914:	8 AES3id inputs (unbalanced, 75 Ω), 16 BNC-F connectors, 8 inputs and 8 outputs
Sampling rates:	44.1, 48, 96 kHz, synchronisation to digital input signal

Digital Outputs

HW20911:	4 AES3 outputs, Sub-D-F connector, 25-pin, with 4 inputs and 4 outputs
HW20912:	4 AES3id outputs, 8 BNC-F connectors, 4 inputs and 4 outputs
HW20913:	8 AES3 outputs, 2 Sub-D-F connectors, 25-pin, with 4 inputs and 4 outputs each
HW20914:	8 AES3id outputs, 16 BNC-F connectors, 8 inputs and 8 outputs
Sampling rates:	referenced to digital inputs or internal clock

AoIP

HW20717:	32 Dante® AoIP network channels, 2 x RJ-45 connectors (Primary, Secondary)
- Sampling rates:	▪ Dante® interface: 44.1, 48, 88.2, 96 kHz for all 32 channels ▪ AES67 implementation: 44.1, 48 kHz only
HW20718:	32 Ravenna/AES67/ST 2110 AoIP network channels, 2 x RJ-45 connectors (Primary, Secondary)
- Sampling rates:	44.1, 48, 88.2, 96 kHz for all 32 channels

Specifications (continued)

Basic 4-Channel PPM (Standard Software)

General

Input sources:	analog, digital, 3G-SDI, AoIP, depending on selected audio interface
4-channel Peakmeter:	up to 4 x Mono, 2 x Stereo, 1 x Stereo and up to 2 x Mono (no 3.1)
Display:	▪ max. of 4 ch. total in max. 4 groups ▪ Peak level ▪ Peak hold ▪ Numerical value of the display
Functions:	▪ Gain (+20 dB, +40 dB acc. to standard) ▪ Peak hold on/off ▪ Memory ▪ Reset

Analog Peakmeter

Analog scales:	▪ DIN5: +5 .. -50 dB, ▪ Nordic: +12 .. -42 dB, ▪ BR IIa: 7 .. 1, BRIIa ext, ▪ BR IIb: +12 .. –12 dB, BR IIb ext,
Integration time:	acc. to standard or 20 ms, 10 ms, 1 ms, 0,1 ms additional 150 ms for British scales
Peak hold indicator:	1, 2, 4, 10, 20, 30 s, manual reset or off

Digital Peakmeter

Word width:	24 bit
Digital scales:	▪ TP60: +3 .. –60 dB ▪ Dig60: 0 .. –60 dB ▪ DIN5: +5 .. -50 dB ▪ Nordic: +12 .. -42 dB ▪ BR IIa: 7 .. 1, BRIIa ext, ▪ BR IIb: +12 .. –12 dB, BR IIb ext,
Headroom/Headroom Ref:	adjustable from 0 to –20 dB in steps of 1 dB
Operation field:	adjustable from 0 to –20 dB in steps of 1 dB
Integration time (Attack):	acc. to corresponding standard or selectable: Sample, 20 ms, 10 ms, 1 ms, 0.1 ms, additional 150 ms for British scales
Gain:	+20 dB, +40 dB (acc. to standard)
High-pass filter:	Off, 5 Hz, 10 Hz, 20 Hz
Peak hold indicator:	1 s, 2 s, 4 s, 10 s, 20 s, 30 s, manual reset or off
Over indicator hold time:	1 s or manual
Over indicator PPM	
- Threshold:	Full Scale, Full Scale -1LSB, Full Scale -2LSB, –0.1 dBFS, –0.5 dBFS, –1 dBFS, –2 dBFS, –3 dBFS
- Attack time:	1 to 15 samples
- Word width:	16 to 24 bit, selectable
Over indicator True Peak	
- Threshold:	adjustable

Stereo Correlator

Display:	Bargraph, additional spot indicator between PPM bargraphs
Scale range:	-1 r to 0 to +1 r
Standard color setting:	▪ red: -1 r to -0.1 r ▪ white: 0 r (-0.1 r to +0.1 r) ▪ green: +0.1 r to +1 r
Attack/release time:	1.0 s/2.5 s

AES3 Status Monitor

Display:	▪ Channel data are displayed as plain text, hex or binary ▪ Channel selectable ▪ Audio bit activity ▪ Hardware status

Global Keyboard

The Global Keyboard is used for simultaneous control of defined functions in multiple instruments, and for preset recall. It also allows the external control with the integrated GP IO interface.

Gain Reduction

(Operation only with connection to Studer® Vista consoles)

Display:	1 bargraph for Stereo and Surround formats, up to 8 bargraphs in multi-channel mode
Input:	Data stream via TCP/IP and LAN (ethernet) interface
Input routing:	external featured streams selectable
Marker:	adjustable threshold for the definition of upper and lower display section
Colors:	32 colors for each bargraph section

Optional Licence SW20001: Multichannel Mode

Expands Basic 4-channel PPM to multichannel and surround functions and display. More than 4 channels and groups can be displayed simultaneously.

Input sources:	analog, digital, SDI and/or AoIP depending on selected audio interface
Surround Peakmeter:	for 3.1, 5.0, 5.1, 7.1 formats
Track layout :	selectable for 5.1 Surround: ▪ SMPTE.TV: L, R, C, LF, LS, RS ▪ SMPTE.Film: L, LS, C, RS, R, LF ▪ DTS: L, R, LS, RS, C, LF ▪ L, C, R, LF, LS, RS ▪ Film: L, C, R, LS, RS, LF preset for 7.1 Cinema Surround: ▪ SMPTE (L, LC, C, RC, R, LS, RS, LF) preset for 7.1 DD+ Surround: ▪ L, C, R, LS, RS, LSR, RSR, LFE
Multichannel Peakmeter:	2 to 8 single channels in one defined block (depending on the audio interface up to 4 blocks)
2-channel Peakmeter:	for different Stereo channel pairs
Single-channel Peakmeter:	for different Mono signals

Optional Licence SW20002: Loudness and SPL Display

Expands the Basic 4-channel PPM with functions for loudness measurement and for SPL display and summed SPL value calculation

For the display of more than 4 channels software licence SW20001 is required. Then, also the Dialnorm instrument is available.

EBU R128 Loudness Mode

ITU BS.1771 Loudness Mode

ATSC A/85 Loudness Mode

ARIB Loudness Mode

OP-59 Loudness Mode

AGCOM Loudness Mode

CALM Loudness Mode

LEQ(M) Loudness Mode

TASA Loudness Mode

SAWA Loudness Mode

Specifications (continued)

Customer Specific Loudness Mode

Display:
- Bargraphs for each single channel (can be combined with PPM bargraphs)
- M bargraph (Momentary - summation of momentary loudness values of all channels for a short span of time)
- S bargraph (Short - loudness summation value of an adjustable dynamic time frame)
- I-Bargraph (Integrated - long term loudness value infinite or manual control)
- adjustable tolerance range for M, S, I

Numerical display: for M, S, I values (labelling adjustable)
for LRA, TPmax, Mmax, Smax, I-time values

Scales: Loudness scale:
- EBU+9: +9 .. –18 LU
- EBU+3: +3 .. –18 LU
- EBU+18: +18 .. –36 LU
- EBU+9a: 14 .. –41 LUFS
- EBU+18a: –5 .. –59 LUFS
- EBU0: 0 .. –60 LUFS
- ITU+9: +9 .. –18 LU (Loudness Units)
- ITU0: 0 .. –30 LKFS
- ATSC0: 0 .. –60 LKFS
- ATSC0a: 0 .. –30 LKFS

Weighting filter: K filter acc. to ITU BS.1770

Target Level:
- –23 LUFS; adjustable in the range from –10 to –30 LUFS in steps of 1 LUFS
- –24 LKFS; adjustable in the range from –10 to –30 LKFS in steps of 1 LKFS

Time & Gate Momentary:
- Window Time: adjustable in the range from 200 ms to 1000 ms in steps of 100 ms
- Integration Time: IEC 125 ms Fast, 250 ms (IRT), 500 ms, 750 ms, IEC 1000 ms Slow, 1500 ms, 2000 ms selectable

Time & Gate Short:
- Integration Time: 3 s; time window adjustable in the range from 1 to 20 s in steps of 1 s

Time & Gate Integrated:
- Silence Gate:
  - –70,0 LUFS; adjustable in the range from –80,0 to –40,0 LUFS in steps of 0.5 LUFS, switchable
  - –70,0 LKFS; adjustable in the range from –80,0 to –40,0 LKFS in steps of 0.5 LKFS, switchable
- Relative Gate: –10,0 LU; adjustable in the range from –40,0 LU to 0 LU in steps of 0.5 LUFS, switchable

Level adjustment for the summation:
- 0.0 dB (L, R, C), adjustable between –3 and +3 dB in steps of 0.5 dB
- +1.5 dB (LS, RS, LSR, RSR), adjustable between –3 and +3 dB in steps of 0.5 dB
- Off (LFE), selectable: Off, 0 dB, 10 dB

Tolerance Levels:
- TP Headroom: –9.0 dB; adjustable from 0 to –20 dB in steps of 0.1 dB
- TP Over Sensitivity: 0.0 dB; adjustable from 0 to –20 dB in steps of 0.1 dB
- M High: +1.0 LU; M tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- M Low: –1.0 LU; M tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU
- S High: +1.0 LU; S tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- S Low: –1.0 LU; S tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU
- I High: +1.0 LU; I tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- I Low: –1.0 LU; I tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU

Loudness Test Time Control

Settings for operating automatic, semi-automatic or manual loudness measurements.

Start:
- Functions: Autostart after preset load, autostart with gate, autostart with gate and autoreset, manually via keys or GPI. With Timecode Reader licence (SW20008) activated additional control via timecode resp. timecode with recalculation.
- Level for gate: –70,0 LUFS/LKFS; adjustable from –85 to –10 LUFS/LKFS in steps of 0.5 LUFS/LKFS

Stop:
- Functions: manually via keys or GPI, autostop with gate, autostop with gate and time. The stop function is automatically set and fixed to timecode, if the start function has been set to a timecode option.
- Level for gate: –70,0 LUFS/LKFS; adjustable from –85 to –10 LUFS/LKFS in steps of 0.5 LUFS/LKFS
- Time for gate: 1 s; adjustable from 1 to 15 s in steps of 1 s

Loudness Range Instrument (LRA)

Display: Graphical display of the Loudness Range
Mode: selectable: LRA Bar, MagicLRA, MagicLRA + I, MagicLRA + I + Num
Scale range: selectable: 6 LU, 10 LU, 20 LU, 30 LU
LRA low range: 2 LU; adjustable in the range from 1 to 20 LU in steps of 1 LU
Comfort zone: 4 LU; adjustable in the range from 1 to 20 LU in steps of 1 LU
LRA high range: depends on the selected scale range and the spread of the comfort zone
Colors: selectable for each range

SPL Meter Mode

Display:
- Bargraphs for each single channel (can be combined with PPM bargraphs)
- Summation bargraph

Reference point: adjustable in the range from 68 dB to 88 dB in steps of 1 dB
Weighting: Linear, A (Leq(A)), C, CCIR (Leq(M)), k
Integration time: Fast (125 ms), Slow (1 s)

Optional Licence SW20003: RTA - Real Time Analyzer

Spectral distribution display of the frequency range of single channels, channel pairs or groups. For the display of more than 4 channels software licence SW20001 is required.

Spectrum Analyzer (RTA)

Input sources: selectable: all channels without LF, all channels, Front, Rear, L/R, single channels, Stereo pairs, depending on selected mode
Frequency range:
- Norm: 20 Hz to 20 kHz, additional band > 20 kHz switchable
- LF: 5 Hz to 5 kHz

Number of bands:
- 1/3-octave: 31 bands, filter acc. to IEC 225 class 2
- 1/6-octave: 61 bands
- 1/12-octave: 120 bands

Weighting filter: Linear; Linear, A, C selectable
Peak hold indicator: 1 s, 2 s, 4 s, 10 s, 20 s, 30 s, manual reset or off

Specifications (continued)

Measuring range:	45 dB max.
Scaling:	3, 6, 9 dB
Functions:	▪ Input selection ▪ Peak hold on/off ▪ A, C, Linear weighting ▪ Integration time ▪ Set reference ▪ Scaling ▪ Frequency range ▪ Bargraph arrangement ▪ Display-Hold
Integration time (ballistics):	Impulse, Fast, Slow, Peak (10 ms)

Optional Licence SW20004: SSA - Surround Sound Analyzer

Dynamic display for visualizing the interaction of all surround parameter corresponding to the subjective listening impression
--- Precondition: Software licences SW20001, SW20002 are activated. ---

Surround-Sound-Analyzer

Display:	▪ Graphical display indicating the single channel and total program loudness acc. to selected weighting filter (Total Volume Indicator) acc. to selected weighting filters (e. g. SPL or Loudness) ▪ Position and width of phantom sound sources (PSI) ▪ Correlation of adjacent channels in PSI (color) resp. TVI (shape of line): red resp. funnel: negative range, yellow resp. straight line: "0" range, green resp. roof: positive range ▪ Separate correlators for the outer adjacent channels switchable: red: negative range, white: „0" range, green: positive range ▪ Dominance indicator (DMI) ▪ LFE Phase (warning display, if correlation between any channel and LFE is negative)

Optional Licence SW20005: Radar Display

High resolution circular Loudness display corresponding to the Loudness Radar Meter of TC electronic®.
--- Precondition: Software licence SW20002 is activated. ---
For the display of more than 4 channels software licence SW20001 is required.

Radar Loudness Meter

Display:	▪ Momentary Loudness values (circular) ▪ History (circular) ▪ Measuring time (numerical) ▪ 2 Loudness descriptors (numerical) ▪ Peak
Mode:	Radar or Statistics
Sliding Loudness:	3 s, 6 s, 10 s, 15 s, 30 s, 1 min, 2 min, 4 min, 8 min
Descriptors:	Off, Program Loudness, Loudness Max, Loudness Range, Sliding Loudness (max. 2 at a time)
Speed:	1, 4, 12, 30 min, 1, 2, 4, 12, 24 h
Resolution:	3 dB, 4 dB, 6 dB, 8 dB, 10 dB, 12 dB, selectable
Low Level:	-30 to -6 LU

Optional Licence SW20006: RTW Premium PPM plus Vectorscope

High resolution Multistandard-PPM display with advanced scales and with Audio Vectorscope (4 instances available), and Moving Coil instruments. Expands licence SW20001 with Multi-Correlator instrument in multi-channel mode, if activated.

General

Input sources:	analog, digital, SDI and/or AoIP depending on selected audio interface
Display:	▪ Peak level ▪ Peak hold ▪ Numerical value of the display ▪ Digital Over
Functions:	▪ Gain (+20 dB, +40 dB acc. to standard) ▪ Peak hold on/off ▪ Memory ▪ Reset

Analog Peakmeter Extension

Analog scales:	▪ Zoom10: +10 .. –10, ▪ Zoom1: +1 .. –1, ▪ SMPTE24: +24 .. –30 ▪ SMPTE20: +20 .. –40 ▪ NHK
Integration time:	acc. to standard or 20 ms, 10 ms, 1 ms, 0,1 ms
Peak hold indicator:	1, 2, 4, 10, 20, 30 s, manual reset or off

Digital Peakmeter Extension

Word width:	24 bit
Digital scales:	▪ TP20: +3 .. –20 dB ▪ Dig20: 0 .. –20 dB ▪ Dig0: +18 .. 0 dB ▪ Dig18: +18 .. –18 dB ▪ Dig40: +20 .. –40 dB ▪ ARD9: +9 .. –60 dB ▪ DIN10: +10 .. -50 dB, ▪ Zoom10: +10 .. –10, ▪ Zoom1: +1 .. –1,
Headroom/Headroom Ref:	adjustable from 0 to –20 dB in steps of 1 dB
Operation field:	adjustable from 0 to –20 dB in steps of 1 dB
Integration time (Attack):	acc. to corresponding standard or selectable: Sample, 20 ms, 10 ms, 1 ms, 0.1 ms
Gain:	+20 dB, +40 dB (acc. to standard)
High-pass filter:	Off, 5 Hz, 10 Hz, 20 Hz
Peak hold indicator:	1 s, 2 s, 4 s, 10 s, 20 s, 30 s, manual reset or off
Over indicator hold time:	1 s or manual
Over indicator PPM	
- Threshold:	Full Scale, Full Scale -1LSB, Full Scale -2LSB, –0.1 dBFS, –0.5 dBFS, –1 dBFS, –2 dBFS, –3 dBFS
- Attack time:	1 to 15 samples
- Word width:	16 to 24 bit, selectable
Over indicator True Peak	
- Threshold:	adjustable

Specifications (continued)

Moving Coil Instrument
(available in stereo mode only)

Type: PPM (L/R), PPM (M/S), VU, Loudness, PPM + Loudness (L/R; M, S, or I), selectable

PPM:
- Ch. arrangement: Dual, Dual + M/S horizontal, Dual + M/S vertical, Stereo horizontal, Stereo vertical
- Scales:
  - BR IIa: 7. .1, BR IIa ext: 7. .1
  - BR IIb: +12. .–12 dB, BR IIb ext: +12. .–12 dB
- Integration time: Sample (digital only), 0.1 ms, 1 ms, 10 ms, 20 ms, 150 ms
- Headroom Ref: available with digital sources only: –10 dB; adjustable from 0 to –20 dB in steps of 1 dB
- S mode: only available, if M/S type is selected: M3, M6
- Peak indicator: Off, Peak, True Peak, BR Peak
- BR Peak Threshold: 6 dB,
  - BR IIa: adjustable from 4 to 7 dB in steps of 1 dB
  - BR IIb: adjustable from 0 to 12 dB in steps of 1 dB

VU:
- Ch. arrangement: Stereo horizontal, Stereo vertical
- Scale analog: VU (–20 to +3 dB)
- Scale digital: VU Digital (–20 to + 3 dB)
- Lead: 0 dB, adjustable from 0 to 12 dB in steps of 1 dB
- Peak indicator: Off, Peak, True Peak

Loudness:
- Ch. arrangement: Dual, Stereo horizontal, Stereo vertical
- Scales: acc. to Loudness settings
- Integration time: acc. to standard
- Peak indicator: Off, no selectable option available

PPM + Loudness:
- Ch. arrangement: Dual-PPM (as described above) with additional Loudness display (BBC) for M, S, or I (selectable) in one instrument
- Scales:
  - PPM: see above
  - Loudness: +9 to –9 LU fixed (mid of scale corresponds to Target Level)

Numerical display: switchable

Audio Vectorscope (4 instances available)
in Surround mode (if available):
- Display modes:
  - 2-channel
  - 4-channel (fixed: L-R above, LS-RS below)
- Inputs: in 2-channel mode selectable, selection depends on selected format; e. g. for 5.1: L/R, LS/RS, L/C, C/R, L/LS, R/RS
- AGC: fast/slow

in 2-channel Stereo mode
- Inputs: L-R
- AGC: fast/slow
- Grid: L/R or M/S

Multi-Correlator
in Surround mode (if available):
- for each channel pair of 3.1, 5.0, 5.1, 7.1 formats
- LFE mode with 5.1, 7.1 formats to display the correlation between each single channel and LFE channel
- Display: red: negative range, white: “0” range, green: positive range
- Filter: low pass filter switchable (300 Hz)

SW20008: TCR - Timecode Reader (Software Licence)
Decoding of SDI embedded or LTC timecode. Timecode display. With an activated licence SW20002 the timecode can be used for loudness and logging applications.

Timecode Reader (TCR)
Display: numerical display of
- LTC (from analog or digital sources)
- VITC (from SDI data stream)

Mode: “Timecode” selectable when creating an audio group (constitutes a separate audio group)
Input: one analog, digital or SDI channel selectable, depending on audio interface being mounted
Colors: selectable, 32 colors

Loud. Recal. (Loudness Recalculation)
Settings for operating automatic, semi-automatic or manual loudness measurements (Loudness Test Time Control).
Display: numerical display of
- current timecode
- start time < current timecode < stop time with recalculation

Start:
- Functions: Autostart after preset load, autostart with gate, autostart with gate and autoreset, manually via keys or GPI. With Timecode Reader licence (SW20008) activated additional control via timecode resp. timecode with recalculation.
- Level for gate: –70,0 LUFS/LKFS; adjustable from –85 to –10 LUFS/LKFS in steps of 0.5 LUFS/LKFS

Stop:
- Functions: manually via keys or GPI, autostop with gate, autostop with gate and time. The stop function is automatically set and fixed to timecode, if the start function has been set to a timecode option.
- Level for gate: –70,0 LUFS/LKFS; adjustable from –85 to –10 LUFS/LKFS in steps of 0.5 LUFS/LKFS
- Time for gate: 1 s; adjustable from 1 to 15 s in steps of 1 s

SW20013: BLITS (Software Licence)
Tool to generate line test signals according to EBU 3304, GLITS and BLITS definition. Automatic and significant analysis of channel allocation, level, phase and delay, and polarity of received BLITS 5.1 test signals.
--- Precondition: Software licence SW20001 is activated. ---

Generator
Functions:
- Line test signal generators for BLITS, GLITS, EBU 3304
- Optional intro from stored WAV file

Display: Channel related course of outgoing generator sequence
Signal level: -18 dBFS nominal
Level offset: 0 dB; adjustable from -12 to +12 dB in steps of 1 dB
Outputs: digital using the output routing

Specifications (continued)

Analyzer

Functions:
- Automatic detection and analysis of incoming BLITS test signals

Displays:
- Course: Channel related for incoming BLITS test signals
- State/Alarm: Bars for fast and easy recognition of
  - General signal state
  - Channel allocation
  - Level
  - Phase and Delay
  - Polarity

  In cases of error, the bars will be displayed in red
- Report: Schedule showing values for
  - incoming channels
  - channel allocation
  - measured level in dBFS
  - detected differences in dB
  - Phase and Delay in deg and ms
  - Polarity

  Values showing differences or errors will be displayed in red

Optional Licence SW20014: Logging Data Server

Export of measured data via IP connection or USB flash drive. Advanced graphical presentation and two-stage definition of thresholds. Communication with RTW LQL PC software.
--- Precondition: Licence SW20002! ---

Logging Instrument

Functions:
- Logging of Loudness and TruePeak data of two audio groups
- Storing of data on USB flash drive or via IP with LQL - Loudness Quality Logger PC software
- Definition of main and secondary limits (individual markers) for Mmax, Smax, I and TPmax to monitor the adherence of e. g. legal regulations, current standards or in-house regulations
- Data collection control automatically via LQL (IP mode) or manually via control key (USB mode)

Mode: selectable: off, USB, IP

Display: Status display in the top line of the instrument placed on the screen:
- in IP mode: LQL access
- in USB mode: Disk space, running processes, storing
- if logging functionality is turned off

Identification for network: Device name and password definable

Key function (USB):
- USB run: Start logging
- USB close: Stops logging and creates a logfile on the USB flash drive

Loudness Chart Instrument

Functions:
- Horizontal running bargraphs with individually definable colors evaluate the common quality of Loudness values TP, M, S, I
- Progress of a measurement (value over time) of up to four values can be drawn as graph(s) on a coordinate system
- Position of the Relative Gate switchable, color adjustable
- Adjustable time ranges
- Selectable time periods for evaluation
- Vertical Integrated bargraph switchable
- Tolerance levels and its display adjustable

Display:
- Bargraph:
  Color change of the running bargraph indicates the section the loudness value is moving in: normal, operation range, Headroom, Over, invalid (availability depending on selected value)
- Chart-Graph:
  Continuously drawn graph (value over time) either of one value as line or rectangle with colored filling corresponding to the color selection of the horzontal bargraphs or of up to four values as line, dots, or rectangles without filling with individual color selection; added with Tolerance Indicator or position of Relative Gate (if selected)

Color:
- Bargraph:
  Individual selectable colors (32) for Normal (bargraph color), Operation Range, Headroom (TP only), TP Over (TP only), Over (M, S, I only), Invalid (M, S, I only)
- Chart graph:
  For each value individual selectable colors (32) for display modes without filling, bei Darstellung ohne Füllung, otherwise adoption of corresponding bargraph colors, additional selectable colors for Tolerance Indicator and position of Relative Gate

Time Range: Time grid adjustment for the coordinate system and the horizontal bargraphs:
- Increase or decrease of the preset time period in steps of one unit or ten units
- Magnification of the measured course to the available width of the instrument's window

Time Range presets:
- Auto stretch: Automatic stretch of a stopped loudness measurement to the available width of the instrument's window, switchable (except when controlled via timecode)
- Hours: 0 h; adjustable from 0 to 3 h in steps of 1 h
- Minutes: 1 m; adjustable from 1 to 59 m in steps of 1 m

Time Select:
- Selection of current time period (marker)
- Increase or decrease of the marker in step sizes corresponding to the current time grid
- Shift of the marker and magnification of the content

Tolerance Levels:
- TP Headroom: –9.0 dB; adjustable from 0 to –20 dB in steps of 0.1 dB
- TP Operation Range: 0.0 dB; adjustable from 0 to –20 dB in steps of 0.1 dB
- M High: +1.0 LU; M tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- M Low: –1.0 LU; M tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU
- S High: +1.0 LU; S tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- S Low: –1.0 LU; S tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU
- I High: +1.0 LU; I tolerance above Target Level adjustable from 0 to 10 LU in steps of 0.1 LU
- I Low: –1.0 LU; I tolerance below Target Level adjustable from 0 to –12 LU in steps of 0.1 LU

Specifications (continued)

Optional Licence SW20015: ISA - Immersive Sound Analyzer

Dynamic display for visualizing the interaction of all signal parameters of spatial (immersive) surround formats like 5.1.2, 5.1.4, 7.1.2 or 7.1.4 corresponding to the subjective listening impression across two layers (beds)
--- Precondition: Software licences SW20001, SW20002, and SW20004 are activated. ---

Immersive Sound Analyzer

Display:
- Designed for Immersive audio formats based on 5.1 or 7.1 main beds and 2.0 or 4.0 upper beds
- Graphical display indicating single channel and total program loudness (Total Volume Indicator)
- Position and width of phantom sound sources (PSI) in Main- and Upper Beds
- Phase Correlation between adjacent channels
- Separate correlators for the outer adjacent channels
- Subjectively perceived acoustic focal point with the Dominance Indicator (DMI) for both Main- and Upper Beds
- Subjectively perceived acoustic focal point in the complete immersive area with the Immersive Dominance Indicator (IDI)
- LFE Phase warning (warns in case of negative correlation between any channel and LFE)
- Allows cross-group measurement of the total loudness of the spatial sound image
- Formats Supported: 5.1.2, 5.1.4, 7.1.2, 7.1.4

3G-SDI Deembedder Interface (Hardware Option HW20930/HW20930UPG)

Inputs: 1 x BNC In

Outputs: 1 x BNC Through, selected input signals are active looped through without processing

Functions:
- Detection of validity of the applied SDI signal
- Detection of frequency (SD/HD/3G)
- Detection of contained format
- Detection of validity of the contained and applied audio groups and deembedding
- Display of up to 32 channels

Deembedding:
- Single link (SD/HD/3G): max. 4 audio groups with 4 audio channels each
- Dual link (3G): max. 8 audio groups with 4 audio channels each

Items of Delivery

TouchMonitor TM9 20900:
- TM9 main unit in a table-top frame
- selected audio interface
- Basic software (system/Stereo-PPM)
- Table-stand, mains adapter, manual

Order no.: 20900 + HW-No. (s. page 4)

TouchMonitor TM9 20900OEM:
- TM9 main unit without table-top frame
- selected audio interface
- Basic software (system/Stereo-PPM)
- Manual

Order no.: 20900OEM + HW-No. (s. page 4)

TM9-RAV:
- TM9 in table-top frame with audio interface for 32 Ravenna/AES67/ST 2110 AoIP network channels (2 x RJ-45)
- Power supply: 12 - 24 V DC, 24 VA
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter 24 V, manual

Order no.: TM9-RAV

TM9-Dante:
- TM9 in table-top frame with audio interface for 32 Dante™ AoIP network channels (2 x RJ-45)
- Power supply: 12 - 24 V DC, 24 VA
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter 24 V, manual

Order no.: TM9-Dante

TM9-Video:
- TM9 in table-top frame with audio interface for 16-ch. digital inputs and outputs (2 x 4 AES3 In/Out, 2 x Sub-D) and 3G-/HD-/SD-SDI In/Through (2 x BNC)
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter, manual

Order no.: TM9-Video

TM9-Studio:
- TM9 in table-top frame with audio interface for 8-ch. analog inputs (Sub-D) and 8-ch. digital inputs and outputs (4 x AES3 In/Out, Sub-D)
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter, manual

Order no.: TM9-Studio

TM9-AES16:
- TM9 in table-top frame with audio interface for 16-ch. digital inputs and outputs (2 x 4 AES3 In/Out, 2 x Sub-D)
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter, manual

Order no.: TM9-AES16

TM9-BNC:
- TM9 in table-top frame with audio interface for 16-ch. digital inputs and outputs (8 x AES3id In, 8 x AES3id Out, 16 x BNC)
- Basic software (system/2 x Stereo-PPM)
- Table-stand, mains adapter, manual

Order no.: TM9-BNC

Specifications (continued)

Hardware Options

- 3G-SDI interface **HW20930** when placing a new order together with selected audio interface (HW20911 to 20915) or model (not for TM9-RAV or TM9-Dante)
- 3G-SDI interface **HW20930UPG** when retro-fitting the selected audio interface or model at a later point of time (not for TM9-RAV or TM9-Dante)

Additional Hardware Options

- Table-top Mounting Adapter **TM9-MADT**, Mounting kit including a table-top frame, robust swivel-mounted table-stand, housing cover, and mounting material for remodelling 20900OEM to a table-top unit.
- 4U Mounting Adapter **TM9-MA4U**, 19"/4U rack carrier/mounting kit for one 20900OEM to be mounted into 19" racks acc. to DIN 41494/IEC 60297 (19"/4U, 483 x 177 x 91 mm). USB extension to front panel.

Optional Software Licences

- Software licence **SW20001: Multichannel Mode** for the display of multi-channel modes
- Software licence **SW20002: Loudness and SPL Display** for Loudness, SPL and LRA measurements. ***)**
- Software licence **SW20003: RTA - Real Time Analyzer** for the display of the spectral frequency distribution. ***)**
- Software licence **SW20004: SSA - Surround Sound Analyzer** to understand the balance of surround programmes intuitively. ***)**
  --- Precondition: Licences SW20001 and SW20002! ---
- Software licence **SW20005: Radar Display** for the display of the Loudness-Radar-Meter of TC electronic®. ***)**
  --- Precondition: Licence SW20002! ---
- Software licence **SW20006: RTW Premium PPM + Vektorskop** for the display of further PPM-scales, Moving Coil instruments and audio vectorscope. Expands licence SW20001 with Multi-Correlator.
- Software licence **SW20008: Timecode Reader** for the display of SDI embedded or LTC timecodes, recalculation
  --- Precondition: Licence SW20002! ---
- Software licence **SW20013: BLITS** to use BLITS analyzer and BLITS, GLITS, EBU 3304 line test signals.
  --- Precondition: Licence SW20001! ---
- Software licence **SW20014: Logging Data Server** for the export of measured data via IP or USB flash drive, two-stage definition of thresholds, advanced graphical presentation with RTW LQL PC software, Loudness Chart instrument ***)**
  --- Precondition: Licence SW20002! ---
- Software licence **SW20015: ISA - Immersive Sound Analyzer** to understand the balance of immersive surround programmes intuitively and for cross-group Loudness measurement.
  --- Precondition: Licences SW20001, SW20002, and SW20004! ---
- Software licence **SW20021: TC-RTW** for the conversion of TC electronic® TouchMonitor devices to RTW units. Allows the installation of upcoming licences with new product functionalities on these devices.
  --- Precondition: TouchMonitor devices of TC electronic®! ---

***)** Licence SW20001 is required for the display of more than 4 channels.

Optional accessory

- Wide voltage power supply **1178-R** (100 - 240 V AC/24 V DC 2,7 A, table-top unit with corresponding mains cable for different power systems)
- Snake cable **1167** (4 m, 25-pin Sub-D-M connector to 4 x XLR-M and 4 x XLR-F connectors, for digital inputs and outputs)
- Snake cable **1186** (4 m, 25-pin Sub-D-M connector to 8 x XLR-F connectors, for analog inputs)

Product Line-up

TouchMonitor TM9 table-top unit
9" touch screen 16 : 9 TFT, table-top unit with table-stand, power supply.
Order number: **20900 +**
Additional audio interface required:

TouchMonitor TM9 OEM unit
9" touch screen 16 : 9 TFT, main unit w/o housing, w/o power supply, for panel-mounting. Order number: **20900OEM +**
Additional audio interface required:

19"/4U Mounting Adapter **TM9-MA4U** for mounting 20900OEM into standard 19" environments. With fastening material and USB extension to front panel

Mounting Adapter **TM9-MADT** with table-top frame, table-stand, housing cover, and material for remodelling 20900OEM to a table-top unit

Audio Interface Selection (I/O)	**Max. Channel Count (Hardware)**	**Inputs Analog (Balanced)**	**Inputs Digital/Outputs Digital**	**Audio via Network (AoIP)**	**Option:** 3G-SDI interface HW20930/HW20930UPG
additional Order Number: **HW20911**	8-channel analog In, 8-channel digital In, 8-channel digital Out	1 x 25-pinSub-D	1 x 25-pin Sub-D (4 AES3 in, 4 x AES3 Out)	---	add. order/can be retrofitted
additional Order Number: **HW20912**	8-channel analog In, 8-channel digital In, 8-channel digital Out	1 x 25-pin Sub-D	8 x BNC (4 AES3id In, 4 x AES3id Out)	---	add. order/can be retrofitted
additional Order Number: **HW20913**	16-channel digital In, 16-channel digital Out	---	2 x 25-pin Sub-D (2 x 4 AES3 in, 2 x 4 x AES3 Out)	---	add. order/can be retrofitted
additional Order Number: **HW20914**	16-channel digital In, 16-channel digital Out	---	16 x BNC (8 x AES3id In, 8 x AES3id Out)	---	add. order/can be retrofitted
additional Order Number: **HW20915**	16-channel analog In	2 x 25-pin Sub-D	---	---	add. order/can be retrofitted
additional Order Number: **HW20917**	32-channel Dante™ AoIP	---	---	2 x RJ-45 (Dante™ network) Link/Act 1G, Primary/Secondary	---
additional Order Number: **HW20918**	32-ch. Ravenna/AES67/ST 2110 AoIP	---	---	2 x RJ-45 (Ravenna network) Link/Act 1G, Primary/Secondary	---

Standard Hardware: Table-top unit with easy-to-use graphical interface, Ethernet, 2 x USB, GPIO, VGA Out, table-stand, mains adapter. Audio Interface Selection required!
OEM unit with easy-to-use graphical interface, Ethernet, 2 x USB, GPIO, VGA-Out. Audio Interface selection is required!

Standard Software: Basic 4-channel PPM with analog scales (DIN +5, Nordic, British IIa, British IIb) and digital scales (0 to -60 dB, +3 to -60 dB True Peak, DIN, Nordic, British IIa and IIb), stereo correlator, gain reduction, global keyboard. Other software modules available as licences.

Preconfigured Models (Table-top unit with specific audio interface for typical applications. We recommend licences SW20001, SW20002, SW20004 und SW20006 as basic configuration.)

TM9-RAV	32-ch. Ravenna/AES67/ST 2110 AoIP	---	---	2 x RJ-45 (Ravenna network) Link/Act 1G, Primary/Secondary	---
TM9-Dante	32-channel Dante™ AoIP	---	---	2 x RJ-45 (Dante™ network) Link/Act 1G, Primary/Secondary	---
TM9-Video	16-channel digital In, 16-channel digital Out	---	2 x 25-pin Sub-D (2 x 4 AES3 in, 2 x 4 AES3 Out)	---	3G-SDI interface mounted: 3G-SDI In/Through
TM9-Studio	8-channel analog In, 8-channel digital In, 8-channel digital Out	1 x 25-pin Sub-D	1 x 25-pin Sub-D (4 AES3 in, 4 AES3 Out)	---	can be retrofitted
TM9-AES16	16-channel digital In, 16-channel digital Out	---	2 x 25-pin Sub-D (2 x 4 AES3 in, 2 x 4 x AES3 Out)	---	can be retrofitted
TM9-BNC	16-channel digital In, 16-channel digital Out	---	16 x BNC (8 x AES3id In, 8 x AES3id Out)	---	can be retrofitted

Licences (Software Modules) Further informationen on https://www.rtw.com/en/product-list/audio-monitors/licenses-for-touchmonitor.html

Multichannel Mode Order Number: **SW20001**	Loudness and SPL Display Order Number: **SW20002 *)**	RTA - Real Time Analyzer Order Number: **SW20003 *)**	SSA - Surround Sound Analyzer Order Number: **SW20004 *)** Precondition: installed SW20001, SW20002!	Radar Display Order Number: **SW20005 *)** Precondition: installed SW20002!	Premium PPM plus Vectorscope Order Number: **SW20006**. Expands SW20001 with Multi-Correlator
Timecode Reader Order Number: **SW20008 *)** Precondition: installed SW20002!	BLITS (Analyzer and Generator) Order Number: **SW20013 *)** Precondition: installed SW20001!	Logging Data Server Order Number: **SW20014 *)** Precondition: installed SW20002!	ISA - Immersive Sound Analyzer Order Number:: **SW20015** Precondition: SW20001, SW20002 and SW20004 installed!	TC-RTW (Conversion Kit) Order Number: **SW20021** Precondition: TM of TC electronic®!	

***)** Licence SW20001 is required for the display of more than 2 channels.

Dimensions:	W x H x D in mm (approx.)
TM9 Table-top units (20900, Models)	245 x 185.5 x 46.5
TM9 OEM version 20900OEM:	235 x 135 x 45

"Gefördert vom Bundesministerium für Wirtschaft und Technologie aufgrund eines Beschlusses des Deutschen Bundestages."
Translation: Due to a resolution of the German Parliament this project is supported by the German Federal Ministry of Economy and Technology.

RTW US Corp.
160 Varick St | 3rd Floor | New York NY 10013
Phone: +1 (646) 458 1423
ussales@rtw.com | www.rtw.com

RTW
EYES ON YOUR AUDIO