

# Data Sheet

## TouchMonitor TM9 Series



**RTW**  
EYES ON YOUR AUDIO

# TouchMonitor TM9 Series



product  
design  
award

2011

モジュラーソフトウェア・タッチスクリーン・I/O オプション: Analog, AES3, AES3id, 3G SDI, AoIP・柔軟な画面レイアウト・2-ch. PPM/ True Peak・Multichannel・Loudness・LRA・Logging・Chart・Timecode・SPL・RTA・SSA・ISA・Radar・Premium PPM・BLITS

TouchMonitor TM9シリーズは、精度、パフォーマンス、効率性、柔軟性の点で、新しいレベルのプロフェッショナル オーディオ メータリングを実現します。高品質の 9 インチ タッチ スクリーン、使いやすいグラフィカル ユーザー インターフェイス、およびいくつかのオーディオ インターフェイスが装備されています。

TouchMonitor は、アナログ、AES3、AES3id などのさまざまなフォーマットで最大16chの入力信号を処理します。ほとんどのユニットでは、さらに 3G SDI 信号を送受信できる I/F を装備できます。一部のモデルでは、AoIP ネットワークで最大32chのオーディオを測定できます。

## グラフィカルユーザーインターフェイス

TouchMonitorのグラフィカル ユーザー インターフェイスは、指で触れるだけで制御できます。利用可能な画面スペースを最適に利用するために、インストールを拡大縮小したり、ランダムに配置したり、組み合わせたりすることができます。異なる入力チャンネルと構成に割り当てられた同じタイプの複数のインストールメントを同時に表示できます。

包括的な画面上のヘルプ機能により、ユーザーはセットアップの変更を簡単に行うことができます。

## ライセンス

完全にモジュール化されたソフトウェアのコンセプトにより、実際に必要な機能のみを購入することができます。これにより、ニーズに最も適したそれぞれの TouchMonitor を構成できます。対応するライセンスを購入してアクティベートするだけで、いつでも新しい機器や機能を備えたソフトウェア モジュールを追加できます。

Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages

# Hardware

## 共通仕様

- 9" タッチスクリーン 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) -選択必須!
  - 3G SDI interface (option for 16-channel interfaces)
  - Connectors: イーサネット, VGA, 2 x USB 2.0, GPIO, (12) 24 V DC
  - 柔軟な構成とオンサイトでの追加が可能な表示サイズ変更可能でモジュール式のソフトウェアアプローチ
  - スケーラブルな機器を備えた非常に柔軟な画面レイアウト オプション
  - Basic 4-channel PPM software: Peak, True Peak, Phase Meter, Global Keyboard
- 追加可能ライセンス:
    - 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 Analyz

## メインユニット

### 20900

TouchMonitor TM9メインユニットは、可動スタンドと堅牢なアルミフレームのテーブルトップモデルです。パワーサプライ付属。



### 20900OEM

TouchMonitor TM9 OEMはアルミフレーム無しで、ミキシングコンソール等のフロントパネルへの取り付け用モデルです。パワーサプライ無し。

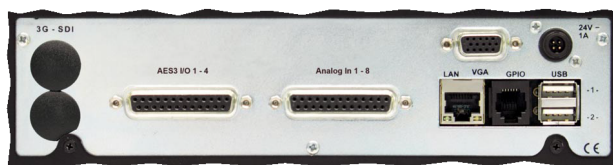


## オーディオインターフェイス (I/O オプション)

各メインユニットへは、工場出荷時にオーディオインターフェイスが取り付けられます。次のページでは、利用可能なオーディオインターフェイスが表示されます。メインユニットに、ニーズに合わせたインターフェイスをお選びいただき同時にオーダーしてください。

## ハードウェア

### 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, 4 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)

## その他のハードウェアオプション

TM9-MA4U (20900OEM用19"4Uラックマウントアダプター)  
20900OEMを19インチラックに取り付けるための取り付けキット。DIN41494/IEC60297 (19インチ/4U、483x177x91mm)に準拠。フロントパネルへのUSB延長ケーブル。

TM9-MADT (20900OEM用テーブルトップアダプター)  
テーブルトップ フレーム、堅牢なテーブル スタンド、ハウジングカバー、および 20900OEM をテーブルトップ ユニットに改造するための取り付けパーツを含むキット。



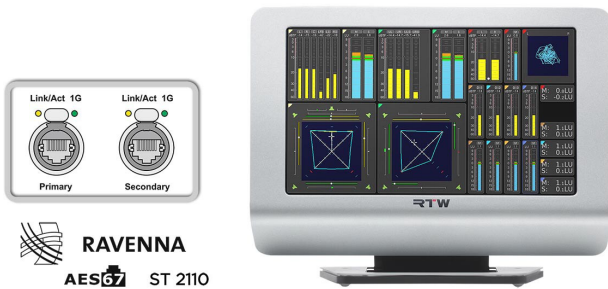


# ハードウェア

## テイラーメイドモデル

テイラーメイドモデルは、一般的なアプリケーションをあらかじめ設定されし、対応するオーディオインターフェイスが既に装備されています。前述メインユニットと同様に、ソフトウェア モジュール (ライセンス) を追加して拡張できます。マルチチャンネル操作 SW20001、ラウドネス測定と SPL 表示 SW20002、サラウンド サウンド アナライザー SW20004、最大 4 つのオーディオ ベクトルスコープ、マルチスタンダード PPM/VU ムービング コイル エミュレーション SW20006 のライセンスを、下記デバイスの基本構成として推奨します。その他のライセンスは「ソフトウェア」セクションを参照してください。

### TM9-RAV



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

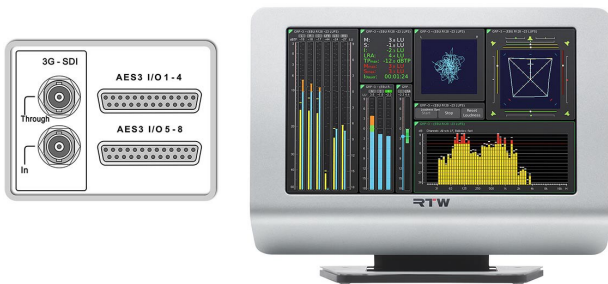
### TM9-Dante



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)

# ソフトウェア

## スタンダードソフトウェア

すべての TouchMonitor には、基本ソフトウェアパッケージが付属しています。制御機能に加えて、一度に最大 4 グループ、最大 4 つのルーティングチャンネルの信号を処理できます (最大 4 x モノラル、2 x 2 チャンネルステレオ、1 x 2 チャンネル) ステレオおよび最大 2 x モノラル、3.1 は無し)。表示可能なものは次のとおりです: アナログ スケール (DIN5、Nordic、British IIa、British IIb) およびデジタル スケール (0 ~ -60 dB、+3 ~ -60 dB TruePeak、DIN5、Nordic、British IIa、および IIb) を備えた 4 チャンネル PPM、ピークホールド、ピークメモリ、オーバーインジケータ、位相相関メーター、および複数の機器で定義された機能を同時に制御し、プリセットを呼び出すためのグローバルキーボード。統合された GP IO インターフェイスによる外部制御も可能です。マルチチャンネル オプションやその他のソフトウェア モジュールのオプションを追加して機能が拡張されます。

## ソフトウェアモジュール (ライセンス)

ソフトウェアモジュールは、メイン ユニットおよび選択したオーディオ インターフェイスの注文と同時、または後でライセンスとして注文できます。本体の注文と合わせて、納品時にライセンスがアクティベートされます。

後でライセンスが必要になった場合は、TM9ユニットの「License」メニューから注文プロセスを開始します。RTWに転送するためのデバイス固有のファイルがユニットによって作成され、このユニットに対してライセンスをアクティベートするためのファイルが返送されます。

### SW20001: Multichannel Mode

信号ルーティングを拡張して、4つ以上のチャンネルまたはチャンネルグループを同時に表示できます。

追加フォーマット: 3.1サラウンド、5.0サラウンド、5.1サラウンド、7.1シネマ サラウンド、7.1 DD+サラウンド、およびマルチチャンネル (1つのブロックに2~8チャンネル、3G SDI オプションで最大 4 ブロック)。

### SW20002: Loudness and SPL Display

ラウドネス機能を備えた基本的なステレオ PPM を拡張 (EBU R128、ITU-R BS.1770-4/1771-1、ATSC A/85、ARIB、OP-59、AGCOM、CALM、LEQ (M)、TASA、SAWA)、SPL 機能、およびラウドネスレンジ インストゥルメント (LRA)。4ch以上の表示の場合、SW20001ライセンスが必要で、Dialnorm が利用可能になります。



### SW20003: RTA - Real Time Analyzer

31、61、または 120 バンドで、単一チャンネル、チャンネルペア、またはグループの周波数範囲のスペクトル分布表示を提供します。追加の HP HF 帯域も利用可能。4 チャンネルを超える表示には --- SW20001が必須ライセンス ---

### SW20004: SSA - Surround Sound Analyzer

主観的なサラウンドサウンドパラメータの相互作用と聴感に対応するすべての関連するテクニカル情報をダイナミックに視覚化するインストゥルメント。 --- SW20001およびSW20002が必須ライセンス ---

### SW20005: Radar Display

TC electronic®の高解像度円形ラウドネスレーダーメーター インストゥルメント。  
4 チャンネルを超える表示にはライセンス SW20001 が必要です。  
--- SW20001が必須ライセンス ---

### SW20006: RTW Premium PPM + Vectorscope

ムービングコイル インストゥルメント (PPM、VU、ラウドネス、BBC モード)、およびオーディオ ベクトルスコープ (4インスタンス) を備えた高解像度で最新スケールのマルチスタンダード PPM ディスプレイ。ライセンス SW20001がアクティブ化されている場合、Multi-Correlator を拡張します。ラウドネスの表示にはライセンス SW20002 が必要です。



## ソフトウェア

### SW20008: Timecode Reader

SDIエンベデッドまたは LTCタイムコードのデコードおよびタイムコード表示。ラウドネスを再計算するにはライセンス SW20002 が必要です。

### SW20013: BLITS

EBU3304、GLITSおよび BLITS定義に基づいた回線テスト信号を生成するツール。受信したBLITS 5.1テスト信号のチャンネル割り当て、レベル、位相と遅延、極性の自動かつ重要な分析。  
--- SW20001が必須ライセンス ---

### SW20014: Logging Data Server

IP接続またはUSBフラッシュドライブ経由で測定データをエクスポートします。閾値の2段階の定義。RTW LQL PCソフトウェアを使用した高度な画像提示。測定の経過をTouchMonitor上に直接表示するためのチャート インストールメント。

--- SW20002が必須ライセンス ---

### SW20015: ISA - Immersive Sound Analyzer

2つのレイヤーにわたるイマージブ サラウンド信号のすべての関連するテクニカルパラメーターと主観的パラメーターの動的作用と相互作用を視覚化します。空間バランスを一目で直感的に評価可能です。

--- SW20001, SW20002, SW20004が必須ライセンス ---

### SW20021: TC-RTW

TC electric® 社製のTouchMonitorをRTWユニットに変換して、新機能を備えた今後のライセンスをインストールできるようにするためのライセンス。

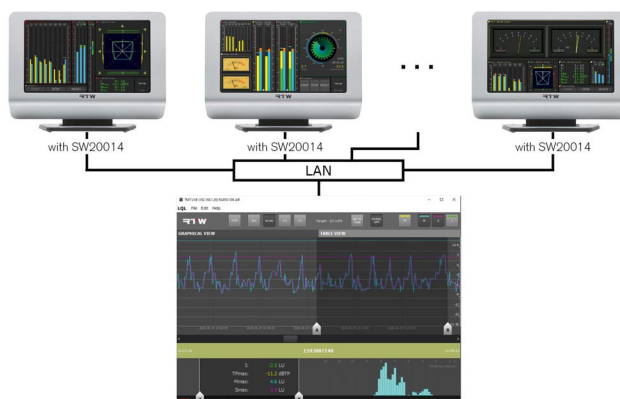
--- TC社製TouchMonitor所有のユーザー向け ---



## PC Software: LQL - Loudness Quality Logger

Windows® OS 用のロギングコンソール。LQL ライセンス SW20014 が有効になっている複数の TM7、TMR7、および TM9 の IP 接続 (LAN コネクタ) または USB スティックを介して、タイムコードまたはリアルタイム ベースのラウドネスおよびトゥルーピーク データを収集および保存します。さまざまなアラームを生成するための二段階のリミッター定義、ステータスの概要、レポート、およびデータのエクスポート。登録済みユーザーは基本バージョンを無料で利用できます。RTWのWebサイト (サポート/マニュアルおよびソフトウェア)にログインし、メンバーエリアにある「PC Software/LQL - Loudness Quality Logger」をご覧ください。

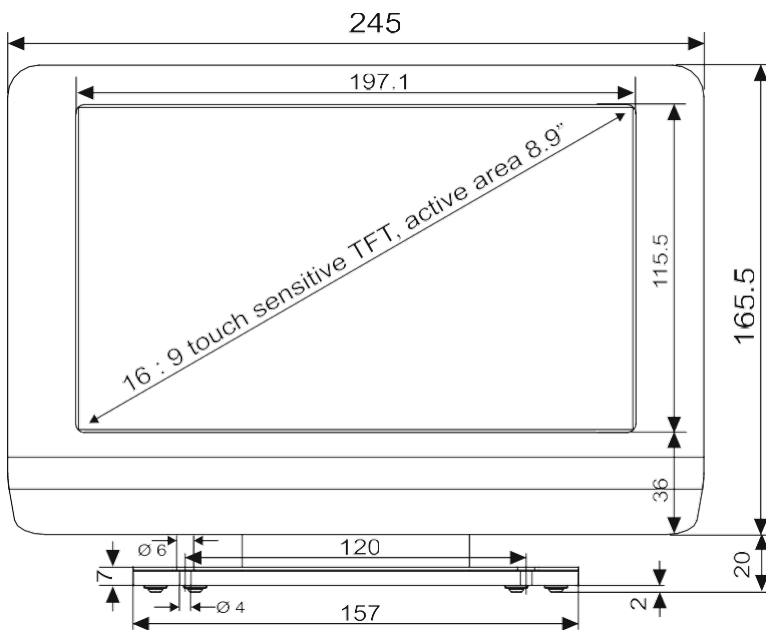
--- SW20014ライセンスがインストールされたTouchMonitorが必要 ---



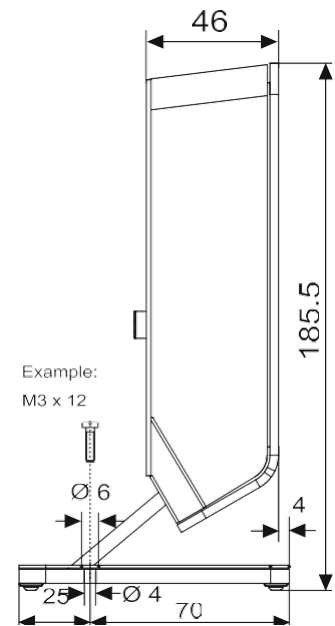
Loudness Radar Meter (ラウドネスレーダー メーター)は、TC Electronic®社の登録商標です。

# 寸法

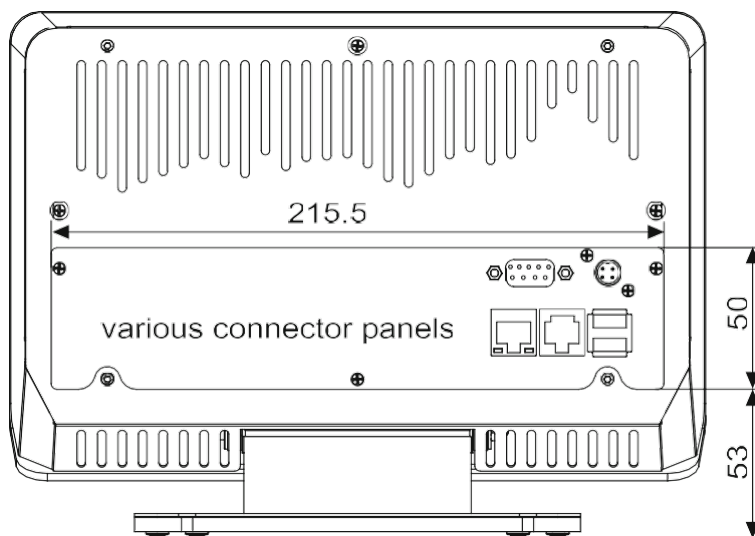
TouchMonitor TM9 20900デスクトップユニット (20900 + HW2091n, also TM9-Dante, TM9-Video, TM9-Studio, TM9- AES16, TM9-BNC)



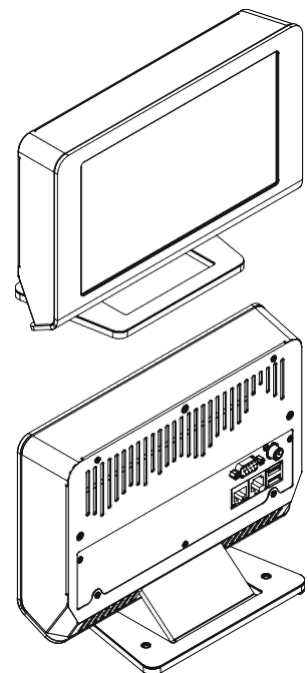
1 | 正面図(mm)



2 | 側面図 (mm)

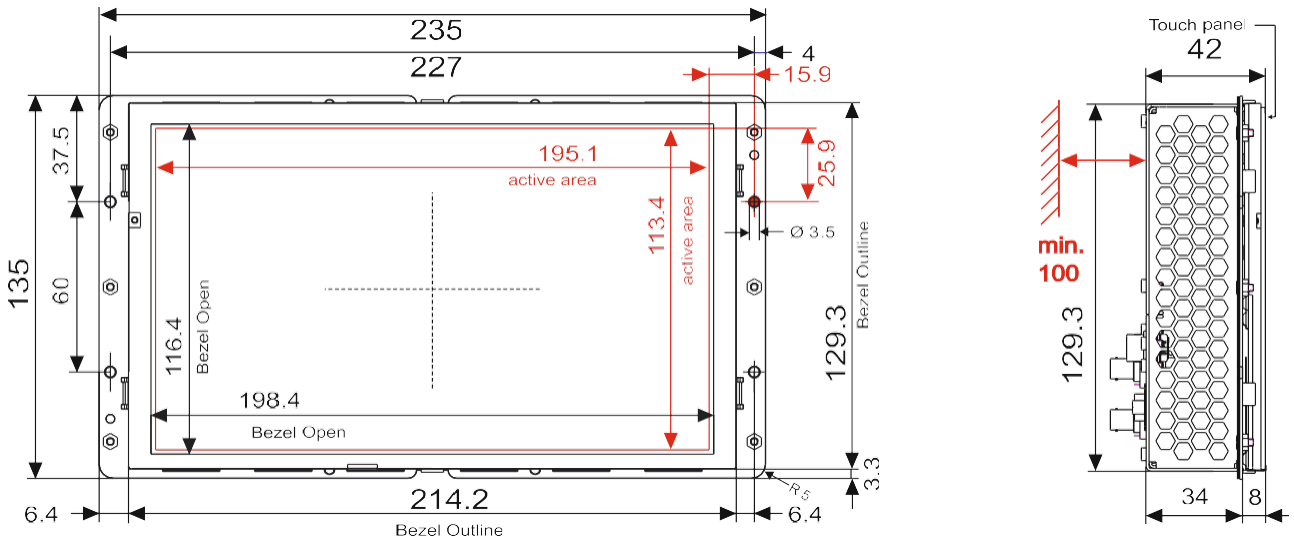


3 | 背面図(mm)



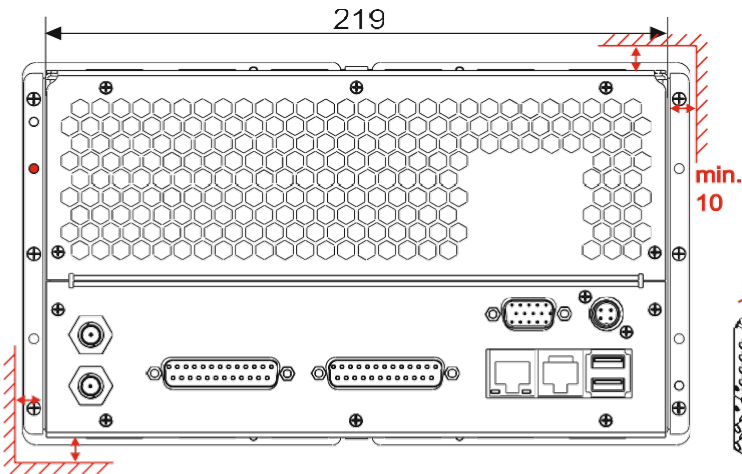
# 寸法

## TouchMonitor TM9 209000EEMバージョン (209000EEM + HW2091n)



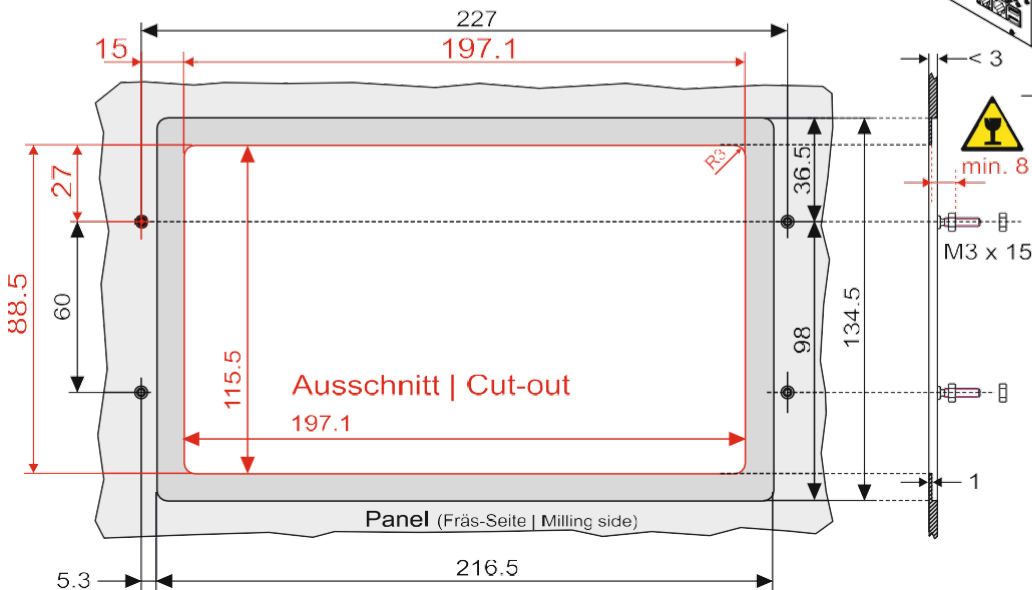
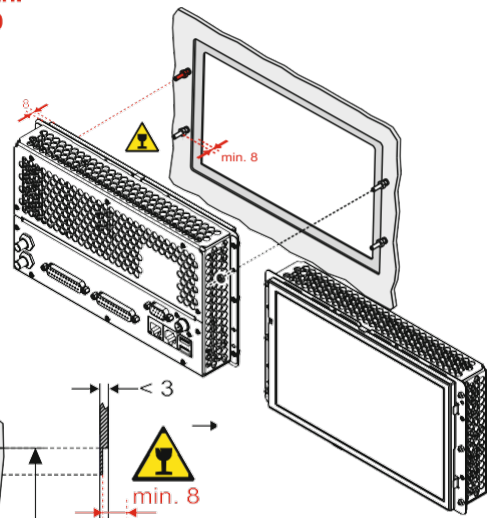
1 | 正面図 (mm, 誤差: ±0.2 mm)

2 | 側面図 (mm, 誤差: ±0.5 mm)



3 | 背面図 (mm, 誤差: ±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 | フロントパネル窓抜き穴 (mm, 誤差: ±0.2 mm)

5 | 縦置きイメージ図



# 接続

## コネクター



注意 - 20900OEMを使用する際はACアダプターが必要です。RTW認定のTouchMonitorアクセサリ 1178-R RTWパワーサプライ (100VAC / 24VDC, 2.7A) を使用することをお勧めします。20900OEMでは、TM9-MA4UマウンティングアダプターやTM9-MADTテーブルトップユニットは別オーダーとなります。  
1178-Rパワーサプライは、20900メインユニット、TM9-RAV、TM9-Dante、TM9-Video、TM9-Studio、TM9-AES16、AES-BNCには付属しています。



NOTE -一部のデバイスには、+12VDC とマークされたDC入力コネクターがある場合があります。これらのユニットは、+12V ~ +24VDC の範囲の公称DC電圧で動作できます。

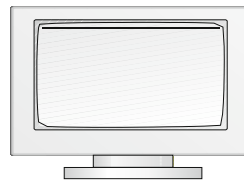


### オプション:

3G-SDI hardware option  
HW20930 (for HW20911 to HW20915 or TM9-Studio, -AES16, -BNC, included in TM9-Video)

### 外部機器:

Standard VGA  
monitor 16 : 9



4-pin ロック式  
電源コネクター



VGA

24 V 1 A / 12 V 2 A

3G-SDI Through/In (AoIPパネルへの取付不可)



HW20911 (上写真): AES3 In/Out 1 - 4 (Sub-D)  
HW20912: Analog In 1 - 8 (Sub-D)  
HW20913: AES3 In/Out 1 - 4 (Sub-D)  
HW20914: AES3id In/Out 1 - 4 (8 x BNC)  
HW20915: Analog In 1 - 8 (Sub-D)  
HW20917/18: Dante™/Ravenna AoIP  
Link/Act 1G Primary (RJ-45)

Analog In 1 - 8 (Sub-D)  
AES3id In/Out 1 - 4 (8 x BNC)  
AES3 In/Out 5 - 8 (Sub-D)  
AES3id In/Out 5 - 8 (8 x BNC)  
Analog In 9 - 16 (Sub-D)  
Dante™/Ravenna AoIP  
Link/Act 1G Secondary (RJ-45)

LAN (RJ-45) GP IO (RJ-12) USB A 2.0 (Full Speed)

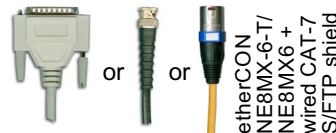
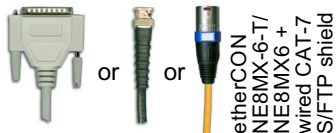


TM9-Dante: Dante™/Ravenna AoIP  
TM9-RAV: Link/Act 1G Primary (RJ-45)  
TM9-Video: AES3 In/Out 1 - 4 (Sub-D)  
TM9-Studio: AES3 In/Out 1 - 4 (Sub-D)  
TM9-AES16: AES3 In/Out 1 - 4 (Sub-D)  
TM9-BNC: AES3id In/Out 1 - 4 (8 x BNC)

Dante™/Ravenna AoIP  
Link/Act 1G Secondary (RJ-45)  
AES3 In/Out 5 - 8 (Sub-D)  
Analog In 1 - 8 (Sub-D)  
AES3 In/Out 5 - 8 (Sub-D)  
AES3id In/Out 5 - 8 (8 x BNC)

### 外部機器:

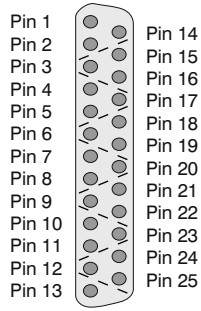
USB flash drive  
USB mouse  
Wacom® graphics table



# 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

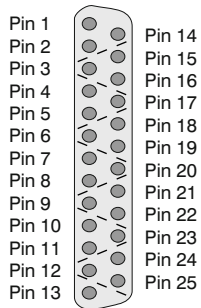


(External view of the connector)

## 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.

## 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)

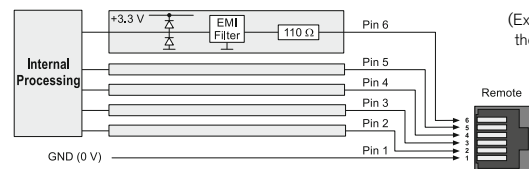
External control of functions defined in the Global Keyboard menu. The inputs defined as „active low“ have to be switched against 0 V (Pin 1).

Pin: Function:

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



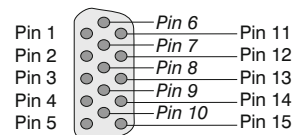
(External view of the connector)



## 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 length!

## LAN

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

# 仕様

## システム

### 一般

電源仕様 :	+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.
電流 :	1 A nominal, 2.5 A power-up current (10 µsec.)
消費電力 :	approx.: 12,5 W (w/o SDI), 15 W (with SDI)
ディスプレイ :	9" TFT touch screen 16 : 9 (1024 x 600 pixel)
コネクター :	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, pre-set export and import, software updates)
	• external computer mouse for operating
	• external Wacom® graphic 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)

サイズ (W x H x D) :	• 20900: 245 x 185.5 x 46.5 mm • 20900OEM: 235 x 135 x 45 mm
質量 :	• 20900: approx. 2.7 kg (w/o powersupply) • 20900OEM: approx. 1.2 kg
動作温度 :	+5° to +40° C

### 機能 (ライセンス全て有効の場合) :

- 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-RBS.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

### アナログ入力 :

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
Frequency range:	20 Hz to 22 kHz @ 48 kHz

### デジタル入力

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

### デジタル出力 :

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

HW20917:	32 Dante™ AoIP network channels, 2 x RJ-45 connectors (Primary, Secondary)
HW20918:	32 Ravenna/AES67/ST 2110 AoIP network channels, 2 x RJ-45 connectors (Primary, Secondary)



# 仕様

## ベーシック 4-Channel PPM (基本ソフトウェア)

### 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:	<ul style="list-style-type: none"><li>• max. of 4 ch. total in max. 4 groups</li><li>• Peak level</li><li>• Peak hold</li><li>• Numerical value of the display</li></ul>
Functions:	<ul style="list-style-type: none"><li>• Gain (+20 dB, +40 dB acc. to standard)</li><li>• Peak hold on/off</li><li>• Memory</li><li>• Reset</li></ul>

### Analog Peakmeter

Analog scales:	<ul style="list-style-type: none"><li>• DIN5: +5 .. -50 dB,</li><li>• Nordic: +12 .. -42 dB,</li><li>• BR IIa: 7 .. 1, BR IIa ext,</li><li>• BR IIb: +12 .. -12 dB, BR IIb ext,</li></ul>
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:	<ul style="list-style-type: none"><li>• TP60: +3 .. -60 dB</li><li>• Dig60: 0 .. -60 dB</li><li>• DIN5: +5 .. -50 dB</li><li>• Nordic: +12 .. -42 dB</li><li>• BR IIa: 7 .. 1, BR IIa ext,</li><li>• BR IIb: +12 .. -12 dB, BR IIb ext,</li></ul>
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:	<ul style="list-style-type: none"><li>• red: -1 r to -0.1 r</li><li>• white: 0 r (-0.1 r to +0.1 r)</li><li>• green: +0.1 r to +1 r</li></ul>
Attack/release time:	1.0 s/2.5 s

### AES3 Status Monitor

Display:	<ul style="list-style-type: none"><li>• Channel data are displayed as plain text, hex or binary</li><li>• Channel selectable</li><li>• Audio bit activity</li><li>• Hardware status</li></ul>
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### 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

### オプションライセンス 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 and/or digital, depending on selected audio interface
Surround Peakmeter:	for 3.1, 5.0, 5.1, 7.1 formats
Track layout:	selectable for 5.1 Surround: <ul style="list-style-type: none"><li>• SMPTE.TV: L, R, C, LF, LS, RS</li><li>• SMPTE.Film: L, LS, C, RS, R, LF</li><li>• DTS: L, R, LS, RS, C, LF</li><li>• L, C, R, LF, LS, RS</li><li>• Film: L, C, R, LS, RS, LF</li></ul> preset for 7.1 Cinema Surround: <ul style="list-style-type: none"><li>• SMPTE (L, LC, C, RC, R, LS, RS, LF)</li></ul> preset for 7.1 DD+ Surround: <ul style="list-style-type: none"><li>• L, C, R, LS, RS, LSR, RSR, LFE</li></ul>
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

### オプションライセンス 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



## 仕様

### 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 for M, S, I values (labelling adjustable)

Numerical display:

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:

Target Level:

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

Mode:

Scale range:

LRA low range:

Comfort zone:

LRA high range:

Colors:

Graphical display of the Loudness Range selectable: LRA Bar, MagicLRA, MagicLRA + I, MagicLRA + I + Num selectable: 6 LU, 10 LU, 20 LU, 30 LU

2 LU; adjustable in the range from 1 to 20 LU in steps of 1 LU

4 LU; adjustable in the range from 1 to 20 LU in steps of 1 LU

depends on the selected scale range and the spread of the comfort zone

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:

Integration time:

Linear, A (Leq(A)), C, CCIR (Leq(M)), k  
Fast (125 ms), Slow (1 s)

### オプションライセンス 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





## 仕様

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)

### オプションライセンス 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)

### オプションライセンス 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

### オプションライセンス 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 and/or digital, 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



## 仕様

### 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 only available, if M/S type is selected: M3, M6
- S mode:
- 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 TargetLevel)

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 fast/slow
- AGC:

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 (300Hz)

### オプションライセンス SW20008: TCR - Timecode Reader

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

### オプションライセンス 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: 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



## 仕様

### 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

- Report: In cases of error, the bars will be displayed in red 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

### オプションライセンス 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

#### Display:

- Vertical Integrated bargraph switchable
- Tolerance levels and its display adjustable
- 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 horizontal 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
- 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 TargetLevel adjustable from 0 to 10 LU in steps of 0.1 LU
- M Low: -1.0 LU; M tolerance below TargetLevel adjustable from 0 to -12 LU in steps of 0.1 LU
- S High: +1.0 LU; S tolerance above TargetLevel adjustable from 0 to 10 LU in steps of 0.1 LU
- S Low: -1.0 LU; S tolerance below TargetLevel adjustable from 0 to -12 LU in steps of 0.1 LU
- I High: +1.0 LU; I tolerance above TargetLevel adjustable from 0 to 10 LU in steps of 0.1 LU
- I Low: -1.0 LU; I tolerance below TargetLevel adjustable from 0 to -12 LU in steps of 0.1 LU



## 仕様

### オプションライセンス 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 (ハードウェアオプション 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

### 製品構成

- 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



## 仕様

### ハードウェアオプション

- 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 retrofitting the selected audio interface or model at a later point of time (not for TM9-RAV or TM9-Dante)

### ラックマウントおよびケーシングオプション

- 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.

### オプションソフトウェアライセンス

- 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 RTWLQLPC 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.

### アクセサリ

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: <b>HW20911</b>	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 x AES3 Out)	---	add. order/can be retrofitted
additional Order Number: <b>HW20912</b>	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: <b>HW20913</b>	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: <b>HW20914</b>	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: <b>HW20915</b>	16-channel analog In	2 x 25-pin Sub-D	---	---	add. order/can be retrofitted
additional Order Number: <b>HW20917</b>	32-channel Dante™ AoIP	---	---	2 x RJ-45 (Dante™ network) Link/Act 1G, Primary/Secondary	---
additional Order Number: <b>HW20918</b>	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 Ila, British Ilib) and digital scales (0 to -60 dB, +3 to -60 dB TruePeak, DIN, Nordic, British Ila and Ilib), 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. )

<b>TM9-RAV</b>	32-ch. Ravenna/AES67/ST 2110 AoIP	---	---	2 x RJ-45 (Ravenna network) Link/Act 1G, Primary/Secondary	---
<b>TM9-Dante</b>	32-channel Dante™ AoIP	---	---	2 x RJ-45 (Dante™ network) Link/Act 1G, Primary/Secondary	---
<b>TM9-Video</b>	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
<b>TM9-Studio</b>	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
<b>TM9-AES16</b>	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
<b>TM9-BNC</b>	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 information on <https://www.rtw.com/en/product-list/audio-monitors/licenses-for-touchmonitor.html>

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

Precondition: installed SW20002! Precondition: installed SW20001! Precondition: installed SW20002! Precondition: SW20001, SW20002 Precondition: TM of TC electronic® and SW20004 installed!

\*) 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



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