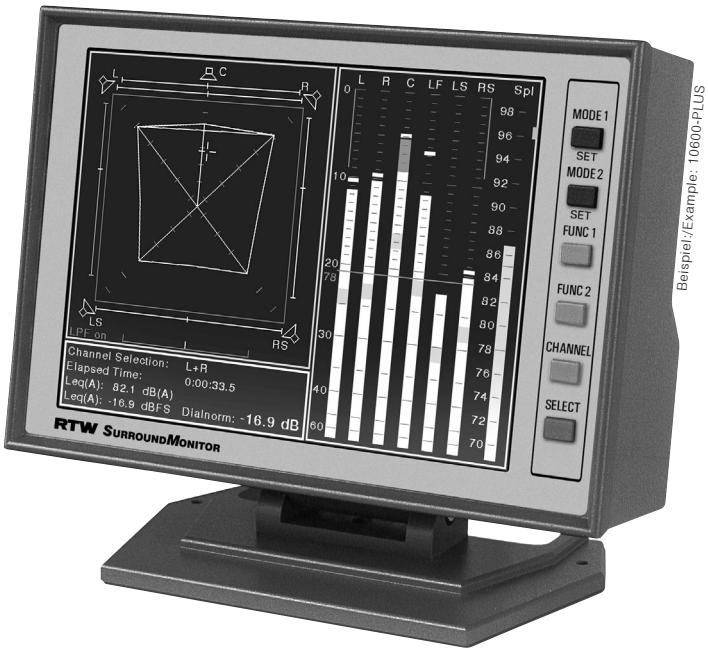


Beispiel:/Example: 10600-PLUS

Vorläufige Anleitung/
Preliminary Manual

Bedienungsanleitung/Operating Manual

SurroundMonitor 10600/10660-VID

RTW

Bedienungsanleitung für/Operating Manual for

RTW SurroundMonitor 10600/10600-PLUS
und/and
RTW SurroundMonitor 10660-VID



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WEEE-Reg.-Nr./Reg.-no.: DE 90666819
Kategorie/Category: 9
Geräteart/Device type: Diese Geräte erfüllen als Überwachungs- und Kontrollinstrumente in der Kategorie 9, Anhang 1B, die Vorschriften des Elektro- und Elektronikgesetzes vom 16. März 2005 und der RoHS-Directive 2002/95/EC.
These instruments comply with and fall under category 9 Monitoring and control equipment of Annex 1B of the RoHS-Directive 2002/95/EC.

Hinweis:
Die Abbildungen in dieser Bedienungsanleitung illustrieren die Beschreibung der Funktionen und Anzeigen dieses Instrumentes. Es können daher und aufgrund der ständigen Weiterentwicklung des Gerätes kleinere Abweichungen zwischen den Abbildungen und den tatsächlichen Gegebenheiten, insbesondere bei den Bildschirmanzeigen, vorkommen.

Note:
The photos and graphics in this manual are provided to illustrate the functions and displays of the instrument and make the descriptions and instructions more comprehensible. Ongoing product development may result in minor design changes, so that your version of the instrument may look slightly different from the illustrations. This applies in particular to the screen displays.

CE

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E 1 Before you begin

E 1.1 Preface



Fig. E 1-1: SurroundMonitor 10660-VID (left) and SurroundMonitor 10600-PLUS (right)

The SurroundMonitor 10600/10660-VID measures and visualizes digital audio signals from up to six channels with a bright color TFT display, providing extensive information about the characteristics of the checked signal source for sound engineers. Basic operations and concepts are presented in this manual in detail.

The multifunctional unit features the following display modes: Peak Program Meter (plus separate SPL/LEQU-Bargraph), Surround Sound Analyzer, Correlator, Vectorscope (Lissajous), RTA, Status Display for AES-3 signals and Dialnorm. The desktop unit comes with digital inputs for six channels and parallel outputs for daisy chaining.
Thus the SurroundMonitor 10600/10660-VID is the perfect choice for visualizing digital audio surround, stereo and multichannel formats in several professional audio applications like broadcast, pre and post production environments, music production, DVD mastering and cinema surround sound.

The measuring functions selected by the user are presented in three separate display sections on the built-in VGA color display. Using the VGA output they can as well be displayed on any external VGA computer display. The right display section always shows a PPM display with up to 7 high resolution bargraph instruments while the other two sections can be programmed to show individual instrument functions at the same time.

The internal menu system contains in-depth configuration options for all display functions. For example a choice of PPM standards, headroom, color schemes as well as over- and mute-displays can be chosen for the bargraph instruments.

Individual setups for different applications can be stored as user presets inside the unit and two of these are accessible directly from normal operation with a single button.

E 1.2 About this manual

This manual is the operating handbook for the SurroundMonitor 10600/ 10660-VID. Features and functionality of the instrument are described in 8 chapters containing the following topics:

- Chapter 1: Before you begin
  Safety information, package contents etc.
- Chapter 2: Key Features
  A short summary of basic instrument display modes and features
- Chapter 3: Quick Start
  Startup information on recalling and saving presets, accessing display modes, navigating the menu, etc.
- Chapter 4: Display Modes
  Explanation of all available display modes
- Chapter 5: Function Keys
  Using the 6 function keys of the instrument
- Chapter 6: Menu
  Menu structure overview and description of all menu options
- Chapter 7: Installation
  Information about connections and remote control and important additional information about safety
- Chapter 8: Drawings
  Mechanical Dimensions, accessory combination and spare parts
- Appendix A: Specifications
  A summary of the main technical data
- Appendix B: Declaration of Confirmity

Symbols used in this manual:

 This symbol draws your attention to related topics.

→ Press the button/key or select the menu file card …

 Warning! (see Safety Symbols description on the next page)

 Attention! (see the next page)

 Functional earth terminal (see the next page)

 Protective earth terminal (see the next page)

E 1.3 Safety symbols and terms

The following symbols may be marked on the panels or covers of equipment or modules and are used in this manual:



WARNING! - This symbol alerts you to a potentially hazardous condition, such as the presence of dangerous voltage that could pose a risk of electrical shock. Refer to the accompanying Warning Label or Tag, and exercise extreme caution.



ATTENTION! - This symbol allerts you to important operating considerations or a potential operating condition that could damage equipment. If you see this marked on equipment, consult the operating manual for precautionary instructions.



FUNCTIONAL EARTH TERMINAL - This symbol marks a terminal that is electrically connected to a reference point and is intended to be earthed for any functional purpose other than safety.



PROTECTIVE EARTH TERMINAL - This symbol marks a terminal that is bonded to conductive parts of the instrument. Confirm that this terminal is connected to an external protective earthing system.

Please note the General Safety Summary and the hints in the chapters.

E 1.4 General Safety Summary

Before installing and configuring the SurroundMonitor 10600/10660-VID please study the following safety information carefully and observe all the recommendations:



To prevent possible electrical shock, fire, injuries and malfunctions:

- Never open the housing.
- Never insert your fingers or any other objects into the housing.
- Never expose the unit to moisture and do not install it in a dusty environment.
- Never cover the unit or place any objects on it.
- Never operate the unit without adequate ventilation.
- Never place anything containing liquids on the unit.
- Turn off and disconnect the power supply immediately if the unit produces unusual smells, noises or smoke, or if foreign substances (e. g. liquids) or foreign objects enter the unit.



There are no user-serviceable parts in the SurroundMonitor 10600/10660-VID. Please always have any necessary servicing performed by a properly qualified technician. Never remove any parts from the unit and do not make any modifications to the unit without the express written consent of RTW. Modifications can cause both safety hazards and affect the unit's EMI-CE conformity.



The SurroundMonitor 10600/10660-VID is designed for indoor use only and may only be operated with a power supply unit provided for it.

E 1.5 Package Contents

Model 10600:
- SurroundMonitor (table-top unit)
- Counter plug for power supply
- This manual

Model 10600-PLUS:
- SurroundMonitor (table-top unit)
- Table stand
- Plug-in power supply
- This manual

Model 10660-VID:
- SurroundMonitor (rack-mountable module for standard 19“ installation racks for waveform monitors)
- Rack-mounting adapters for cases with 407 mm mounting depth
- Counter plug for power supply
- This manual

E 2 Key Features

The SurroundMonitor 10600/10660-VID features several display modes for analyzing surround, stereo or multichannel audio signals in various ways. The display is divided into three sections to show three different instruments in parallel.

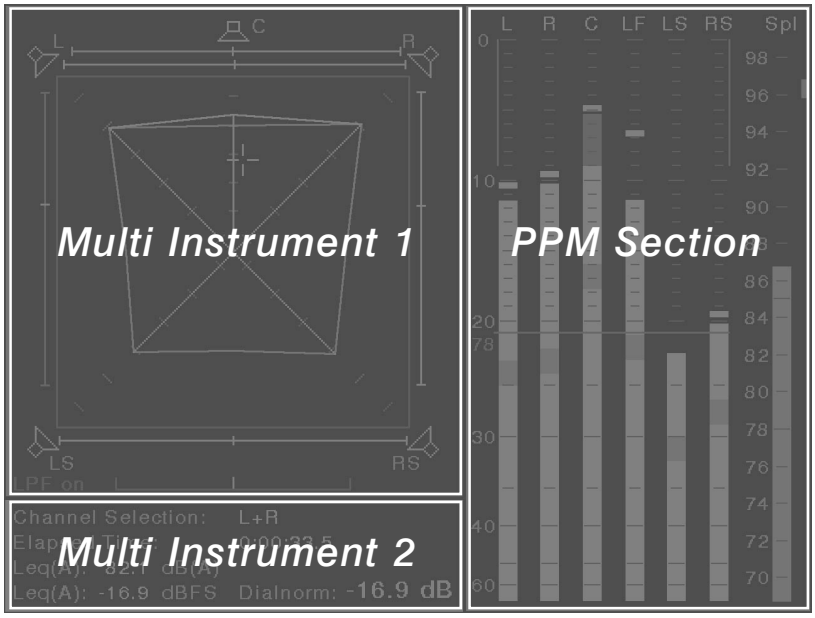


Fig. E 2-1: The display elements of the SurroundMonitor 10600/10660-VID

The topmost left display section (**Multi Instrument 1**, see Fig. E 2-1) is used for several graphical display modes like the Surround Sound Analyzer, RTA or vectorscope. It can as well show AES status data of the digital input signals in text format.

The smaller display section on the left (**Multi Instrument 2**, see Fig. E 2-1) is used for text-based information display like Dialnorm values, status summary or numerical display of the level, SPL and over values measured in the PPMs.

The right display section (**PPM section**, see Fig. E 2-1) is always used for PPM bargraphs showing the up to six input levels plus an additional SPL or Lequ bargraph.

Note:
A short description and examples for the displays of the instruments follow on the next pages. For more detailed information about the Display Modes of the SurroundMonitor 10600/10660-VID and how to get there please refer to Chapter 4: Display Modes.

See Chapter E 4 for details

Multi Instrument 1:

- **Surround Sound Analyzer**
  Powerful tool for visualizing several aspects of surround signals in 5.1 or 3/1 formats in parallel, e. g. balance between front and surround channels and between L-C-R channels, display of phantom sound sources, total volume indication, dominant sound events, phase relationships and many others.

- **Vectorscope (Lissajous)**
  High quality Lissajous display for stereo signals. This display mode also includes a phase meter (correlator).

- **Multi-Correlator**
  Display mode with up to ten phase meters for all possible channel pairs, graphically placed inside a 5.1 speaker setup. Special mode for easy identification of low frequency correlation that detracts from the sense of envelopment.

- **RTA**
  31 band 1/3rd octave real time analyzer (real filter type) for single channels or channel groups.

- **Channel Status Display**
  An integrated Status Monitor for AES-3 signals displays all channel status data for the digital input signals in AES-3 format.

Multi Instrument 2:

- **AES/EBU Status**
  A summary of the most relevant AES status data can be chosen for the Multi Instrument 2. The measured sample rate is displayed in this mode as well.

- **Dialnorm Display**
  The SurroundMonitor 10600/10660-VID can calculate and show Dialnorm values from its digital input signals. Dialnorm is used in film sound mixing and describes the normalization of the dialogue loudness level with respect to a certain reference monitoring level. This mode allows measurement of the dialnorm value, the Leq(A) value referred to 0 dB FS as well as the Leq(A) value with A weighting.

- **Numeric**
  Numerical display of the maximum level, overs count and maximum SPL values measured for all six input channels.

- **Stopwatch**
  The stopwatch shown in this display mode includes a hold function for reading out intermediate results.

PPM section:

- **Multi-Standard digital Peak Meter**
  High resolution multi-standard peak level bargraphs with peak hold and loudness indicator for up to 6 channels plus separate SPL-/Lequ-bargraph. This mode is always available – independently from the display modes chosen for the two Multi Instruments on the left.

E 3 Quick Start

E 3.1 System Startup

At first, please connect the digital audio input signals, the external VGA display (if required) and the power supply to the unit. Please refer to Chapter E 7 (Installation) for details about connecting the unit and pinouts.



Note:
Please refer to Chapter E 3.7 for information about how to define the preset loaded at power on.

See Chapter E 3.7

E 3.2 Switching display modes with MODE 1 and MODE 2

All configuration data and display modes of the SurroundMonitor 10600/10660-VID are stored in 8 factory presets and 8 user presets (see Chapter E 3.4 and E 3.5). Using the buttons **MODE 1** and **MODE 2** it is easy to switch between two of these presets without having to use the menu. To do this it is necessary to define the two presets that should be called up with **MODE 1** and **MODE 2** buttons first (see Chapter E 3.4).

See Chapter E 3.4 and E 3.5

See Chapter E 3.4

A small **green spot** at the right edge of the display shows whether **MODE 1** or **MODE 2** is currently selected. To switch over to the other mode simply press the **MODE** button not marked. The preset defined for this mode will be loaded.

Toggle function
Besides using **MODE 1** and **MODE 2** there is a second option for easy switching between different display modes. Repeatedly pressing the same **MODE** key cycles the Multi Instrument 1 through all display modes defined in the preset used for this mode. Please refer to Chapter E 3.8 for details about how to define the display modes accessible through this toggle function for each preset.

See Chapter E 3.8



Note:
The toggle function is only available if there are display modes defined for toggle mode in the loaded preset. To keep it simple for first-time users the factory presets do not contain such toggle definitions – so repeatedly pressing the same **MODE** keys will have no effect as long as a factory preset (F1 - F8) is loaded.



Note:
Pressing the buttons **MODE 1** or **MODE 2** for longer than a second will call up the setup menu (refer to Chapter E 3.3 for details).

See Chapter E 3.3

Button functions and captions
Some of the buttons on the SurroundMonitor 10600/10660-VID have varying functions depending on the display mode. These functions can be used to modify certain parameters of the instruments, for example the gain switching of the PPMs. You can control the current instrument for which the buttons shall be used by simply pressing the red **SEL** (Select) button repeatedly. A white frame will mark the instrument (Multi Instrument 1, Multi Instrument 2 or PPM Section) currently selected button control.

Captions showing the current functions of the buttons can be inserted as a frame at the right edge of the display. In this case the PPMs will be shown in a narrow frame to free space for the captions. There is a menu parameter (**General** menu, **Show Keys** option) defining how the captions should show up (permanently, never or temporary). If temporary is chosen the captions will show up for some seconds after pressing any button. If you want to show the button functions for the currently selected instrument you can press and hold the **SEL** (Select) button.

E 3.3 Menu Access

Using the setup menu you can easily configure individual display modes as well as global system options to fit your personal needs. To do so you should first choose the display mode you want to modify by pressing the **MODE 1** or **MODE 2** key. A small **green spot** at the right edge of the display shows which mode is currently selected. In case you want to change global system parameters you are free to select any of the two modes.

Press and hold the **MODE** key marked with the green spot for more than 1 second to enter the setup menu for **MODE 1** or **MODE 2**. All menu pages are displayed in blue. The button functions in menu mode are defined by captions shown at the right edge of the display (Quit, Esc, Up, Dwn, Sel). In the main menu you will see the following four options which can be accessed using the **Up**/**Dwn** (Down) keys and entered with the **Sel** (Select) button:

- **Use Preset submenu**
  Use this option to load a factory or user preset for the **MODE** button that was used to enter the setup menu. Press the **Sel** (Select) button repeatedly to select the preset of your choice.



Note:
The Use Preset option only selects the preset for the **MODE** button previously chosen, not for the other one. In case you want to define the preset for the other mode please leave the setup menu with the **Quit** key and press the other **MODE** button. After this you can access the menu again by pressing the same **MODE** button for more than 1 second and select the preset for this mode.

- **Modify Preset submenu**
  Selecting Modify Preset enters a submenu with detailed configuration options for all three display sections (Multi Instrument 1, Multi Instrument 2 and PPM section). The configuration changes made here can be saved in one of the user presets U1 - U8 before leaving the menu (Chapter E 3.5).

See Chapter E 3.5

- **Remote submenu**
  Submenu for activating the remote interface to control the button functions.

- **General submenu**
  Selecting General enters a submenu with several global system options.

- **Esc(ape) key**
  This key is available on all setup menu pages except the main menu level. Using this key you can leave the current menu page and return to the previous page.

- **Quit key**
  This key is available on all setup menu pages. It is used to leave the menu and return you to normal display mode. If you have entered one of the options on the main menu before (regardless of whether you have actually changed any parameters or not) you will be asked to save the current configuration in one of the user presets by pressing the red **Sel** (Select) key. If you decide to discard any changes you can leave the menu by pressing the **Quit** key again. The unit will then return to normal display operation without storing.

Note:
In case the menu access was locked by the Menu-Lock function in the General submenu, the display will show a form to enter the previously stored access code. With Menu-Lock activated the menu can therefore only be accessed after entering the correct four-digit code.

E 3.4 Recalling Factory Presets

The SurroundMonitor 10600/10660-VID features different methods to individually monitor stereo and surround sound. The factory preset recall provides an easy and fast way to setup the unit. All setup configuration data is saved in 8 factory presets and 8 user presets. Among many other parameters these presets also define the actual input channel configuration the unit works with. By loading one of the factory presets F1 - F8 to each of the both **MODE 1** and **MODE 2** buttons you can access different channel configurations and display modes with only one keystroke. The factory settings can then be modified and stored in the user presets once the adoption to the application has been made.

One of the first things you might want to do while configuring the SurroundMonitor 10600/10660-VID is to load a preset that reflects your individual digital input signal setup. The factory preset names make it easy to recognize which channel setup they should be used for, e. g. 5.1 Surround or 2-Channel Stereo.

To load a preset proceed as following:

1. Press and hold the **MODE** button you want to assign a new preset to until the unit changes to main menu mode.

2. If necessary, use **Up** or **Dwn** (Down) key to set the menu focus on the **Use Preset** selection.

3. Select the factory preset F1: 5.1 Surround (or any another preset that fits your requirements) by pressing the red **Sel** (Select) key several times.

4. Exit the main menu mode by pressing the **Quit** key.



Note:
How to store modified setup data in a user preset will be explained in Chapter E 3.5.

See Chapter E 3.5



Note:
A list of the provided factory presets can be found in Chapter E 3.6.

See Chapter E 3.6

E 3.5 Saving and Renaming Presets

If you changed the configuration of the SurroundMonitor 10600/10660-VID with the **Modify Preset** option in the main menu and you want to use these changes in normal display operation you will have to store the modified setup to a user preset of your choice (U1 - U8) before leaving the menu and going back to the normal display modes.

After leaving the main menu or one of the submenus with the **Quit** key you will always see the **Save Preset** screen which prompts you to store the actual configuration into one of the user presets. However there is one exception to this rule: If you only entered the main menu page to select a new preset without accessing one of the submenus you can use **Quit** to return to normal display operation without seeing the save screen.

On the **Save Preset** screen you have two choices: Using **Quit** you can return to normal display operation without saving anything and therefore discarding any changes or save them into one of the user presets with the **SAVE** function.

Assuming you have already entered the **Save Preset** screen proceed as following if you like to store the modifications:

1. Use **Up** or **Dwn** (Down)key to set the red menu focus on the **Store to** selection.

2. By pressing the **Sel** (Select) key repeatedly you can toggle through all available user presets. Select the preset your setup should be saved in.



Note:
There is no copy protection for the presets. Be sure not to destroy a setup that might be used by another operator. You should therefore use a free preset number which is currently not in use.

3. If you like to name your preset individually use **Up** or **Dwn** (Down) key to set the red menu focus on the **Preset-Name** selection. The first character of the currently used preset name is marked with brackets. With the **Sel** (Select) button you can toggle through a bank of characters. Once you found the desired character use the **Rgt** (Right) key to move the focus to the next character of the preset name and select the second character again with the **Sel** (Select) button. Proceed until you created your desired preset name.

4. Use **Up** or **Dwn** (Down) key to set the menu focus on the **Press SEL to** selection and use the **Sel** (Select) button to store the preset. This returns you to the normal display operation with the new preset loaded.

E 3.6 Factory Presets list

F1: 5.1 Surround
F2: 3.1 Surround
F3: 2-Channel Stereo
F4: 2x2-Channel Stereo
F5: 3x2-Channel Stereo
F6: 2-Channel
F7: 4-Channel
F8: 6-Channel

E 3.7 Defining Power On Mode

You can define the display mode the SurroundMonitor 10600/10660-VID comes up with after applying power. The available options are **MODE 1**, **MODE 2** or the last mode used before power down.

Proceed as following:

1. From normal display operation, press and hold one of the **MODE** buttons until the unit changes to main menu mode.

2. Use **Up** or **Dwn** (Down) key to set the red menu focus on the **General** option and enter the selection by pressing the **Sel** (Select) button.

3. Use **Up** or **Dwn** (Down) key to set the menu focus on the **PowerOn Mode** selection.

4. By pressing the **Sel** (Select) key repeatedly you can choose the desired option. When chosing **MODE 1** or **MODE 2** the preset assigned to that mode will be loaded the next time the unit is powered on. If the option **Last** is chosen instead, the unit will load the last active preset used before power down.

5. Press **Quit** to leave the **General** menu and save the configuration change with **SAVE** before returning to the normal display mode.

E 3.8 Defining Toggle Options for Multi Instrument 1

Using the **Toggle** option you can cycle through different display modes for the Multi Instrument 1 by simply pressing the currently active **MODE** button repeatedly. In this way it is very easy to switch the instrument between e. g. the Surround Sound Analyzer, the RTA and the Multi-Correlator. Before using the Toggle function you will have to define which display modes are accessible for Multi Instrument 1 in this way and store your configuration in a user preset.
The Toggle settings are stored as part of a preset and therefore will change when you load a new preset.

To change the Toggle setup of a preset proceed as following:

1. From normal display operation, press and hold the currently marked **MODE** button until the unit changes to main menu mode.

2. Use **Up** or **Dwn** (Down) key to set the red menu focus on the **Modify Preset** option and enter this selection by pressing the **Sel** (Select) button.

3. Use **Up** or **Dwn** (Down) key to set the menu focus on the Toggle Selection option and enter this selection by pressing the **Sel** (Select) button.

4. Use **Up** or **Dwn** (Down) key to access all available display modes for Multi Instrument 1. On each selection use the **Sel** (Select) button to switch this display mode **On** or **Off**. All modes switched to **On** will be available for the Toggle function.

5. Press **Quit** to leave the menu and save the configuration change with **SAVE** before returning to the normal display mode.

6. Repeatedly press the **MODE** button for which the Toggle setup was changed to cycle through all available display modes.

E 4 Display Modes

4.2 Surround Sound Analyzer

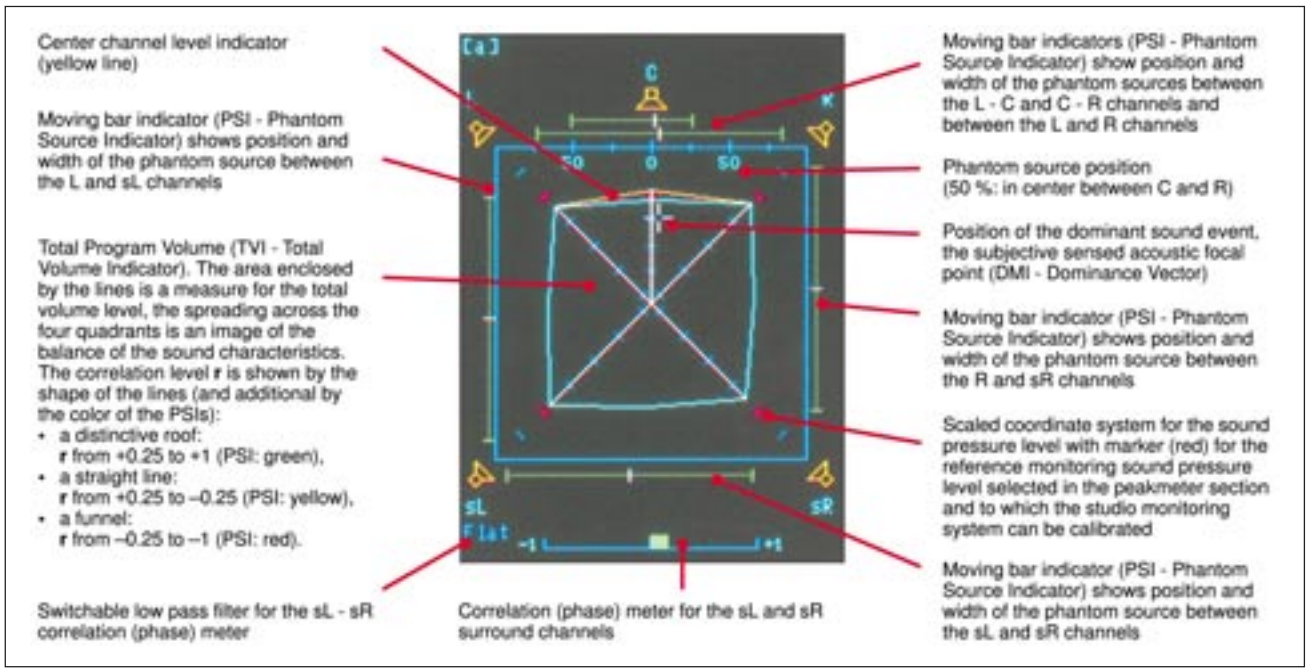


Fig. E 4-1: Surround Sound Analyzer instrument displays (SSA)

The SSA instrument is **only** available in Surround mode!

The Surround Sound Analyzer (SSA) is a display mode available in 3/1- and 3/2 (5.1)-based presets. The figure above shows the 3/2 (5.1)-Version of the display.

Usually the Surround Sound Analyzer display will show up in the **Multi Instrument 1** if you press a **MODE** button repeatedly. Otherwise it might be deactivated in the **Toggle** Setup.

Note:
Please refer to chapter 3.8 to learn about how to activate or deactivate certain display modes in the Toggle Setup.

See Chapter 3.8

When used with 3.1-based surround modes (LCRS), the Surround Sound Analyzer looks slightly different.

4.2.1 What is monitored in surround sound analyzer mode?

With the Surround Sound Analyzer signals in 3/1 and 3/2 surround-format can be displayed as:

- Balance between front and surround channels
- Balance of the front L-C-R channels
- Display of front, side and rear phantom sound sources
- Display of dominant sound events, with memory
- Adjustable coordinate system (SPL or loudness)
- Total sound volume indicator for the surround programme
- Surround channel phase meter for low frequencies
- 2- or 4-channel audio vectorscope (can be activated/deactivated)
- 10-fold phase correlation display for all channel pairs
- Peak level meters with additional loudness or SPL display
- Display of total loudness or SPL (sound pressure level) with separate bargraph

The Surround Sound Analyzer gives you an accurately-scaled visual representation of the relative volume relationships within the overall surround sound. The interactions of sound levels (loudness or sound pressure), phase correlation and level differences between all five channels contributing to the overall sound are converted into an immediately comprehensible visual image. In addition to this, the visual display of the Surround Sound Analyzer has been designed to ensure that the dynamic behavior of the displays corresponds to the subjective acoustic impression, making it possible to understand the balance of your surround programme immediately, at a single glance. The Surround Sound Analyzer display is based on the loudness (RTW method) or the reference sound pressure level, when the SurroundMonitor 10600/10660-VID and the studio monitoring system are properly calibrated. The axes of the 45° coordinate system use dB loudness or dB SPL scales, with a reference mark that is also shown in the loudness and SPL displays in the peak meters.

Graphical display of overall loudness

Multi-channel display devices often show the relationships between the individual sound levels that make up a surround signal with circular or pie-slice graphics. Despite the great popularity of round shapes we have chosen to use a combination of a polygon and bar graphs in the Surround Sound Analyzer, because this make it possible to display more parameters simultaneously and with greater clarity. The polygon is generated by combining the displayed level values on the scales of the 45° coordinate system. When all channels are set to the same level with a white noise signal the result is a square, the area of which is a measure of the total sound volume. The distribution of the four quadrants shows the volume distribution in the surround system. In addition to this the display also takes into account the phase correlation and the position of possible phantom sound sources.

See Fig. E 4-2, No. 1 (on next but one page)

See Fig. E 4-2, No. 1 - 3 (on next but one page)

The critical center channel

The balance between the center channel and the L and R channels is a critical factor in all types of surround sound productions. We have thus allocated a separate pair of display bars to this parameter to clearly show the volume differences between the center and the L and R channels. Another indicator makes it possible to identify the base width of the center sound source, which can be useful when there is crosstalk into the L or R channels.

See Fig. E 4-2, No. 4 - 5 (on next page)

Phase meter for low frequencies

The “enveloping effect” of the surround channels can be evaluated with the help of a special separate display that shows the phase correlation of the LS and RS surround channels at low frequencies. Ideally, the low-frequency signals (e. g. reverberation) should be decorrelated as much as possible. The SurroundMonitor 10600/10660-VID also features an additional 10-fold phase correlation display that enables you to check the correlation of all possible channel pairs.

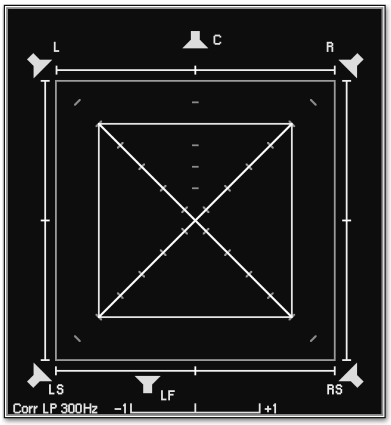
See Fig. E 4-2, No. 6 (on next page)

Loudness-based level control

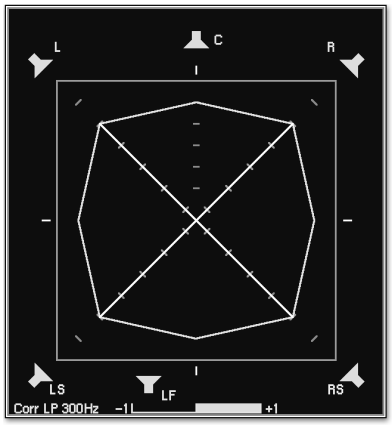
Loudness-based level control has been recommended for some time now for optimal adjustment of the volumes of several individual programmes. SurroundMonitor 10600/10660-VID supports loudness-based level control on the basis of a defined reference sound pressure level. To use this feature, the studio’s monitoring system must first be calibrated against a reference listening sound pressure level (e. g. 85 dB(A)) with a sound level meter. Loudness-based level control provides much more accurate and realistic monitoring of the balance between dialogue, effects and music.

On the next page you will find some examples of typical displays of the Surround Sound Analyzer.

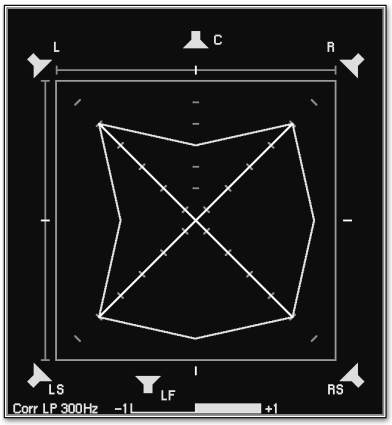
4.2.2 Examples for Surround Sound Analyzer Displays



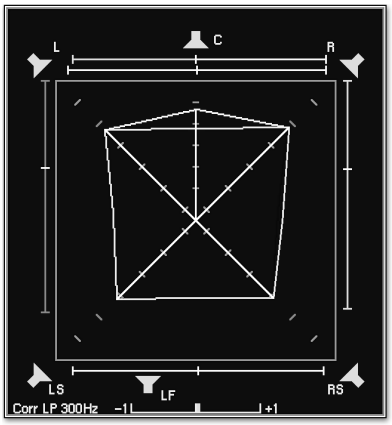
1. Incoherent noise with same levels in the channels L, R, LS and RS, set to the reference monitoring sound pressure level. In each case the correlation is r = 0, phantom sound sources are not locatable.



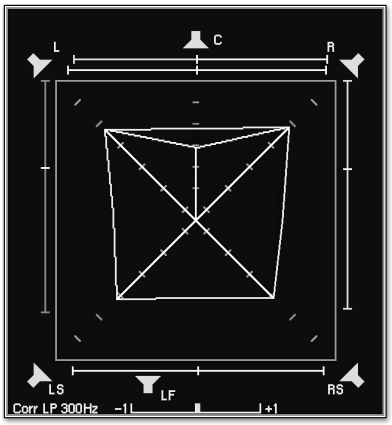
2. Identical sine wave signal with same level in the channels L, R, LS, RS. The correlation is r = +1 (outward broken TVI lines), the phantom sound sources (PSI) are in the middle, similar to a mono signal.



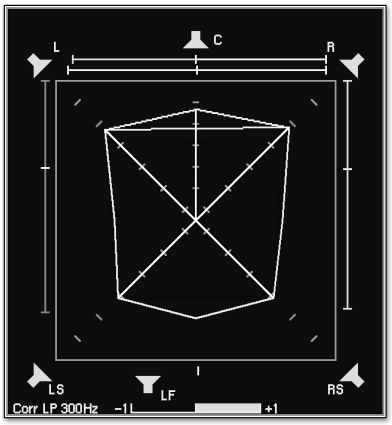
3. Same as on the left but with the phase of the left channel rotated through 180°. In the channel pairs L - R and L - LS each the correlation is r = –1, there are no phantom sound sources locatable.



4. Surround signal with some Center presence (roof). A support microphone would be too dominant. A dialog in relation to music would be too quiet. The width of the PSI lines of the C channel is a sign of coherent signal parts in L and/or R (crosstalk).



5. Surround signal with a low level Center presence (funnel). When recording music, the intermixture of a support microphone may enhance the perceptibility of the C channel in relation to the channel L and R.



6. The widely outward broken TVI line between LS and RS, no spreading of the PSI line and the correlation level r = +1 in the lower phase meter indicate that an identical mono signal is applied in both surround channels.

Fig. E 4-2: Examples of displays in the Surround Sound Analyzer instrument (SSA), also see: www.rtw.de/english/special/index.html

E 7 Installation

E 7.1 Safety information

Before installing and configuring the SurroundMonitor 10600/10660-VID please study the following safety information carefully and observe all the recommendations:



To prevent possible electrical shock, fire, injuries and malfunctions:

- Never open the housing.
- Never insert your fingers or any other objects into the housing.
- Never expose the unit to moisture and do not install it in a dusty environment.
- Never cover the unit or place any objects on it.
- Never operate the unit without adequate ventilation.
- Never place anything containing liquids on the unit.
- Turn off and disconnect the power supply immediately if the unit produces unusual smells, noises or smoke, or if foreign substances (e. g. liquids) or foreign objects enter the unit.



There are no user-serviceable parts in the SurroundMonitor 10600/10660-VID. Please always have any necessary servicing performed by a properly qualified technician. Never remove any parts from the unit and do not make any modifications to the unit without the express written consent of RTW. Modifications can cause both safety hazards and affect the unit's EMI-CE conformity.



The SurroundMonitor 10600/10660-VID is designed for indoor use and may only be operated with a power supply unit provided for it.

E 7.2 First time operation

The SurroundMonitor 10600 is designed for stand-alone operation. But it can be mounted into mixing consoles or other environments by using a mounting frame available as accessory (see Chapter 8.3). The SurroundMonitor 10660-VID is designed for operation with standard 19“ installation racks and can be mounted right next to waveform monitors. The necessary power supply voltage is supplied by an external wide voltage power supply unit (for 10600/ 10660-VID available as accessory, delivered with 10600-PLUS). The connection to your signal sources can be made by the use of suited 25-pin Sub-D couplers. Optional an external standard VGA monitor can be connected to the VGA output connector by using a VGA connection cable.

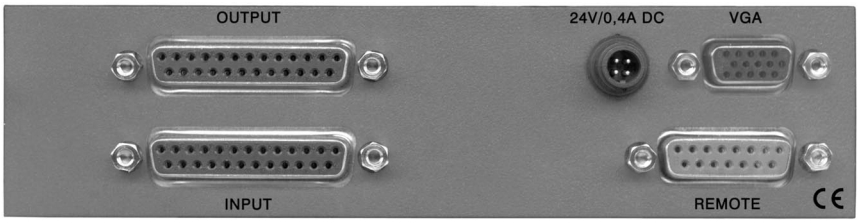


Fig. E 7-1: Connector panel on the rear side of the unit

Important information – please read before installing:

See Chapters E 7.2 and E 7.3.1 to E 7.3.4

- Before installing the unit please study the safety information in Chapter E 7.1 and the information on connections in Chapters E 7.3.1 to E 7.3.4.
- Make sure that there is no connection to the power supply unit.
- **Additional for 10660-VID:**
  - Screw the two attached mounting bars to the two top bolts on the rear side of the 10660-VID case (see Chapter 8.2).
  - Place the unit from the front into the 19'' sub rack. Make sure that the 10660-VID front panel groove fits precisely with its counterpart of the 19''sub rack.
  - Fix the mounting bars on the rear side of the 19'' sub rack with the two enclosed metric screws (see Chapter 8.2).

See Fig. E 7-1 and Chapter E 7.3.2

- Connect optional external function controls to the REMOTE marked Sub-D-F connector. The function controls have to be wired as described in Chapter E 7.3.2.

See Fig. E 7-1 and Chapter E 7.3.3

- Connect an optional external standard VGA monitor to the VGA marked Sub-D-F connector on the rear panel, using a standard VGA connection cable.

See Fig. E 7-1 and Chapter E 7.3.1

- Now connect your input signal sources to the INPUT marked Sub-D-F connector using a suited 25-pin Sub-D coupler.

See Fig. E 7-1 and Chapter E 7.3.1

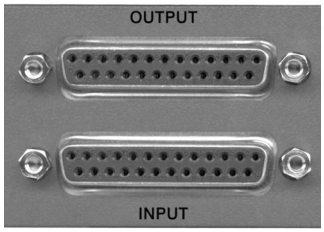
- Optional connect the Sub-D-F connector marked OUTPUT with a suited Sub-D coupler if you like to output the signals (passive looped through).

See Chapter E 7.3.4

- Then connect the unit with the external power supply unit.
- After a few seconds the SurroundMonitor is ready for operation.

E 7.3 Connection

The SurroundMonitor 10600/10660-VID features three digital inputs, three digital outputs, a connector for power supply and a connector for VGA output (see Fig. E 7-1). The audio I/O's are balanced.

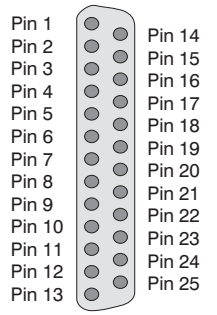


E 7.3.1 Connecting INPUT and OUTPUT:

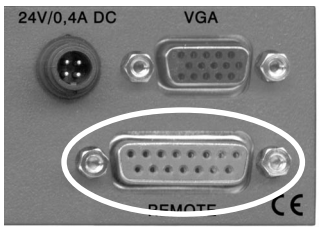
The incoming AES3 signals are passive looped through from the input connector to the output connector.

25-pin Sub-D-F connectors

Pin:	Function:
21	input resp. output digital (AES3) 3 (+, hot)
9	input resp. output digital (AES3) 3 (–, cold)
22	shield/case
10	input resp. output digital (AES3) 2 (+, hot)
23	input resp. output digital (AES3) 2 (–, cold)
11	shield/case
24	input resp. output digital (AES3) 1 (+, hot)
12	input resp. output digital (AES3) 1 (–, cold)
25	shield/case



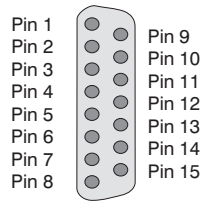
(External view of the connector)



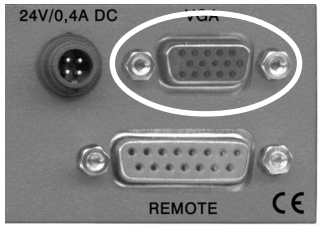
E 7.3.2 Connecting Remote: External function control connection

15-pin Sub-D-F connector

Pin:	Function:
1	common potential for external switches
9	external function control: Func 1
2	external function control: Func 2
3	external function control: Chan
6	external function control: Mode 1 (Set)
7	external function control: Mode 2 (Set)
8	external function control: Sel



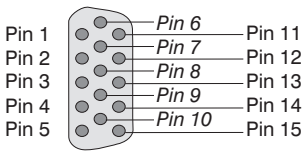
(External view of the connector)



E 7.3.3 Connecting VGA: VGA Monitor connection

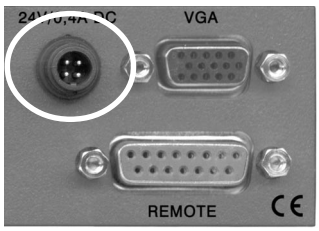
15-pin Sub-D-F connector

Pin:	Function:
1	R | Video signal
2	G |
3	B |
4	not used
5 - 8	GND
9	not used
10	GND
11	not used
12	not used
13	H-sync
14	V-sync
15	not used



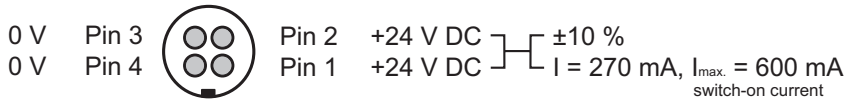
(External view of the connector)

The pins labelled "not used" in the table **must** remain unconnected!



E 7.3.4 Connecting 24 V DC: Power Supply

The SurroundMonitor requires +24 V DC power (±10 %, I_{max} 600 mA). We recommend the use of the RTW 1171-R or 1172-R. These wide voltage power supplies have been designed for use with the SurroundMonitor and provide the necessary locking 4-pin low voltage connector type Binder 710.
One of these power supplies is part of the 10600-PLUS delivery.



Appendix A: Specifications

General

Supply voltage:	24 V DC ±10 %
Current drain permanent:	max. 270 mA
Switch on current:	max. 600 mA
Operating temperature range:	0° to +45° celsius
Digital inputs:	3 (Stereo), AES3, transformer balanced
Input impedance:	110 Ω or Hi-Z
Sampling frequency range:	32 kHz to 96 kHz
Digital output:	3 (Stereo), AES3, input signal looped through, unbuffered
Weight:	approx. 750 g net
Connectors:	2 x 25-pin Sub-D-F 1 x 15-pin Sub-D (Remote) 1 x 15-pin Sub-D (VGA) 1 x flange connector type Binder 710 (DC)
Dimensions/weight:	176,5 x 125,5 x 61,5 mm/approx. 750 g (10600/10600-PLUS without table-stand) 213,8 x 132,6 x 242,5 mm/approx. 1200 g (10660-VID without mounting adapter)

Display

Display:	VGA color TFT, 640 x 480 pixel, 132 x 99 mm
Colors:	8
Reversal direction:	12 o'clock
Viewing angle:	horizontal 60° typ., vertical 60° typ.
Contrast:	250 at reversal direction

Note:
The built-in display has a high resolution (640 x 480 pixel). Even with the most advanced techniques, a small number of pixel defects is inevitable. The manufacturer of the display specifies a maximum of 6 active or passive pixel defects. RTW guarantees these specifications to be met by their products.

Digital Peakmeter

Level display:	up to 6 channels, peak hold indicator switchable, vertical display orientation
Viewing area:	50 x 98 mm (W x H)
Bargraph length:	90 mm
Display modes:	2-channel Stereo, 2 x 2-channel Stereo, 3 x 2-channel Stereo, 2-channel, 4-channel, 6-channel, 3.1 surround, 5.1 surround
Peak value memory:	maximum peak level, peak hold
Numeric level display:	selectable, shown on the lower left side of the display
Correlator spot indicator:	switchable, in 6-channel mode for up to 3 channel pairs (at the bottom of each bargraph pair on the left)
Loudness meter:	additional spot indicator displayed on the bargraphs of the level display, RTW mode

	or A-, C-, CCIR-2k weighting, RMS
Scales digital:	Digital 1 (–60 to 0 dB FS), Digital 2 (–20 to 0 dB FS), Digital 3 (–2 to +18 dB), Digital 4 (–18 to +18 dB), Digital 5 (–40 to +20 dB), Digital 6 (ARD –60 to 0 to +9 dB)
Scales quasi analog:	qDIN+5, qDIN+10, qNordic, qBR IIa, qBR IIb, qZoom 20 (±10 dB), qZoom 2 (±1 dB)
Headroom:	–5 to –20 dB, adjustable in steps of 1 dB
Integration time (Attack):	Digital 1 - 6: Sample, 0.1 ms, 1 ms, 10 ms; quasi analog scales: according to standard or sample, 0.1 ms, 1 ms
Fall back time:	according to selected standard (1.5 s/20 dB for DIN)
Gain:	Digital 1 - 6: +40 dB; quasi analog scales: +20 dB (DIN, Zoom 2, Zoom 20), +40 dB (British, Nordic)
High pass filter:	OFF, 5 Hz, 10 Hz, 20 Hz
Peak hold indicator:	integration time same as level display or 1 sample (selectable)
Digital Over indicator:	red spot indicators above each bargraph
Threshold:	FS, FS-1LSB, FS-2LSB, –0.1, –0.5, –1.0, –2.0 or –3.0 dB FS
Attack time:	1 to 15 samples
Word width:	16 to 24 bit
Mute indicator:	red spot indicators below each bargraph
Threshold:	all bits digital „0“
Attack time:	50, 100, 200, 300 ms
Threshold level:	5 to 80 samples, adjustable in steps of 5 samples

Total Loudness Meter

Display:	in surround mode for channels 1 to 6
Calibration:	SPL reference 72 to 80 dB (single channel)
Total loudness/SPL:	70 to 98 dB (without LF channel)
Weighting filters:	linear, A, C, CCIR-2k, RTW loudness (fast or slow), all RMS
Lequ:	range 70 to 98 dB (with weighting as selected above)

Surround Sound Analyzer

Surround mode:	3/1, 3/2 or 5.1, display of LF channel in peakmeters only
Function:	weighted loudness display (A-, C-, CCIR-2k, RTW loudness)
Indicators:	• graphics display indicating the single channel and total program loudness (Total Volume Indicator - TVI), • display of correlation of adjacent channels, • position of dominant sound event (Dominance Vector - DMI) • position and width of phantom sources (Phantom Source Indicator - PSI)

Multifold Phase Meter

in surround mode:	10 phase meters for all channel pairs
in 6-channel mode:	up to 3 phase meters for up to 3 ch. pairs
Display mode:	spot indicator or bargraph
Display length:	50 mm width
Scale range:	–1 r to +1 r
Standard color setting:	red: –1 r to –0.1 r yellow: 0 r green: 0.1 r to +1 r
Colors:	selectable
Attack time:	fast: 1.0 s, slow 2.5 s
Negative peak correlation memory:	included in Peak Memory
Memory accuracy:	better 0.1 r
Weighting filter:	300 Hz first order low pass (switchable) for LS/RS phase meter in 5.1 surround mode

Audio Vectorscope

Viewing area:	45 x 45 mm (W x H)
Display colors:	8
AGC:	auto
Modes:	x/y or M/S
Time of persistence:	fast, medium, slow

Real Time Analyzer

Bands:	31, 1/3 octave
Frequency range:	20 Hz to 20 kHz (IEC-225 ANSI class 2)
Measuring/display range:	selectable: 15 dB, 30 dB, 45 dB
Integration time:	fast/medium/slow, RMS or Peak
Peak hold indicator:	switchable

AES/EBU status display

Visible area:	72 x 18 mm or 72 x 80 (W x H)
Status information:	locked, decoded AES/EBU status, parity, validity

Controls and Display Elements

Keys:	Mode 1 (Set), Mode 2 (Set), Func 1, Func 2, Chan, Sel

Items delivered

SurroundMonitor 10600:	• SurroundMonitor RAL 7024 graphite grey • Counter plug for power supply • Operating manual
SurroundMonitor 10600-PLUS:	• SurroundMonitor RAL 7024 graphite grey • Table stand RAL 7024 graphite grey • Plug-in power supply • Operating manual
SurroundMonitor 10660-VID:	• SurroundMonitor RAL 7024 graphite grey, half-19''/3U rack-mountable module for standard 19“ installation racks for waveform monitors • Rack-mounting adapters for cases with 407 mm mounting depth • Counter plug for power supply • Operating manual

Subject to changes without prior notice

Anhang C:/Appendix C: Index

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