Master Stereo & Surround Sound Meter

PRODUCT CODE: MSD600M++ & PT0600M

DK - Technologies

The MSD600M++ and PT0600M, Stereo and Surround Sound Meters, from DK-Technologies offer phasemeter, audio vector oscilloscope and PPM / VU level meter as the primary tools.

The Level Meter has direct selection of 7 PPM/VU scales. All the standard scales are available including Nordic, EBU, BBC, ABC, NBC, DIN, VU, Digital and others. Each scale can be configured individually concerning overload level and reference level. Furthermore the colour and width of each PPM bar can be set by the user.

The **DK-Scale™** software program for Windows contains a large library of scales which easily can be downloaded to the meter. Modification of existing scales or designing new scales according to your own specifications are also possible with the software. For easy identification each channel can individually be named with up to 4 characters.

The oscilloscope shows the stereo image in the Lissajous-format, where a perfect stereo signal would be represented by a circular figure, or a 'ball', and mono would be a vertical line.

The phasemeter is of the "center-zero" type and immediately advises out-of-phase errors by pointing towards the [-1] area and changing to red colour.

SURROUND SOUND

As surround sound becomes more and more the standard in studios nowadays, accurate audio monitoring is becoming increasingly important. DK-Technologies' exclusive **Jelly-Fish™** and **StarFish™** surround indicators have become the adopted standard, presenting the surround sound image in a logical and intuitive way. The level and energy content of all channels is easily recognizable on the screen. Signal correlation and phase errors in individual vectors are immediately highlighted by different colours.

COMPACT & MODULAR

The instruments are very compact units. Everything has been fitted into a box not much bigger than the size of a pocketbook. The MSD600M++ will fit nicely into your console or work desk, and the PT0600M sits conveniently next to a video waveform monitor. The unit can be user-configured by deciding the number of input and output modules that easily fits into the rear of the unit. In total it will hold 4 input modules and 4 output modules.

A parallel I/O module is available for remote control of softkeys and direct selection of presets or other interface purposes and takes up one output slot, thus reducing the maximum output modules to 3. The I/O module controls up to 23 functions. The special utility module holds the power connection, the RS232 communication port, a sync input and the output for an external VGA-monitor.

Features...

- The Peak Programme Meter measures level of up to 32 audio channels simultaneously.
- 7 scales directly selectable to conform to standard used.
- PPM colours and headings are user programmable for easy identification.
- Vectorscope for stereo and surround sound with unique **JellyFish™** & **StarFish™** display supports aural impression at a glance.
- Multiple phase correlation meter indicates proper phasing to allow for downmix .
- Rotary knob controls output volume for direct connection to active monitor loudspeakers (PT0660)
- 10 presets are directly accessible for fast recall of settings (PT0660)
- Modular, choice of input modules accepting analogue audio, AES3 and SDI, with de-embedder for SDI video.
- Flexible, up to 8 analogue audio outputs and 4 AES3 outputs connect via the internal matrix to any input, internal audio generator, and sum and difference amplifiers.
- Choice of 1024-point FFT spectrum analyser and 1/3-octave analyser for display of frequency distribution of each channel over full audible range.
- AES3 bitstream status display indicates characteristics of the digital audio signal.
- Bright, VGA colour display with adjustable backlight allows adaptation to environmental light conditions
- VGA output connects directly to an external monitor for remote or larger display.

The Next Generation

Master Stereo & Surround Sound Meter

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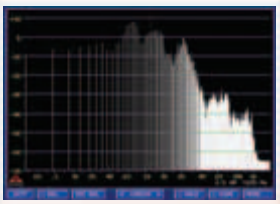
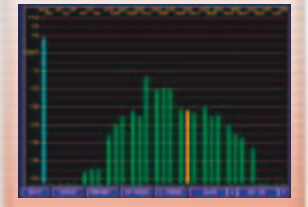
The MSD600M++ meters feature...

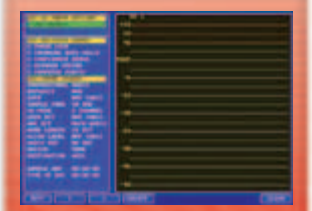
- 5.1/6.1/7.1 Surround Sound Metering
- DK-Technologies **JellyFish™**
- DK-Technologies **StarFish™**
- ITU Loudness
- 32 Analogue or digital audio Inputs
- 16 Analogue or digital audio Outputs
- 32x16 Audio Matrix
- SDI Audio De-embedding
- **BLITS** 5.1 Surround Sound Channel Identification
- Built-in Signal Generator for line up tones
- Multiple meter scale



The FFT spectrum of the input signal is calculated at 1024 discrete frequencies.



The 1/3-Octave spectrum shows the energy distribution of the input signal.

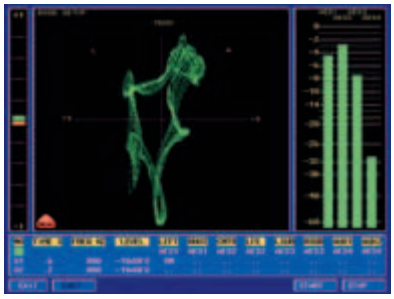


The bit status display supplies information about the content and the physical layer of the AES3 data signal.

Solutions in Audio & Video

SIGNAL GENERATOR & SPECTRUM ANALYSER

A key feature of the MSD600 is the built-in signal generator. It has a tone generator variable in frequency from 31 Hz to 20000 Hz, and the level in Steps of 0,1 dB.



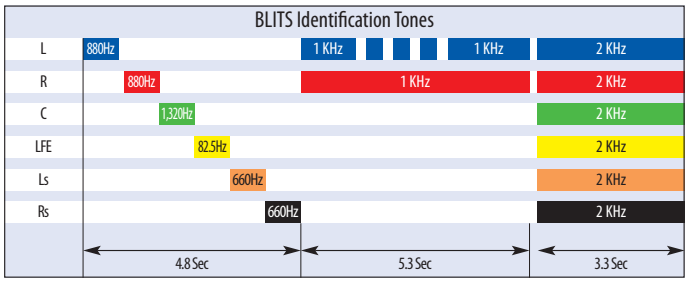
MSD600M Display - BLITS tones.

It can generate **BLITS (Black & Lane's Identification Tones for Surround)** which provides channel identification tones for all channels within a 5.1 Surround Sound signal. This also helps to provide information in a stereo downmix - channel presence/absence. The BLITS tones can be used at the start of a programme to help identify channels, in OB trucks for channel identification back to the studio and MCR as well as line-up for storage devices.

It can also generate the EBU test signal, pulse signals, and white and pink noise signals for use with the spectrum analysers. Use the generator to turn the instruments into a powerful measurement tools for analysis of linearity and distortion.

The spectrum analyser section has both an FFT-analyser and a 1/3 octave analyser. The FFT is primarily used for accurate measurements and exact identification of problem frequencies. To this end a cursor is available and level and frequency will be shown for each cursor position across the frequency range on the display.

The 1/3-octave analyser has 30 bars, grouped in full octaves from 20 Hz to 16000 Hz. This standard tool is primarily used during recording to check the energy distribution of the signal.



BLITS Tone Sequence.

MODULAR CONSTRUCTION

A compact, rugged metal casing houses the all-in-one audio metering unit. Easy access to the input/output modules are obtained from the rear side.

The Utility Module containing the power inlet, AES3 sync input, RS-232 communication port, and the VGA monitor output is standard built into the base unit. With a large variety of input and output modules optionally available, the audio meter can be configured to meet most requirements.

Even a later hardware upgrade to changed requirements are easily accomplished by simply plugging new modules into the rear and fasten it with 2 screws.

CONFIGURATION

A choice of different input modules is available for the Stereo and Surround Sound Meter. To accommodate these modules the base unit has 4 input slots and 4 output slots each providing space for one module.

The four input module slots are numbered In1 to In4 and modules must be inserted sequentially in these slots. The first input module must be inserted in slot In1, the next in slot In2 etc. The module priority, as listed in the table, must be taken into account by assigning modules sequentially to the input slot numbers with the highest priority module to the lowest slot number.

The four output module slots are numbered 01 to 04 and modules must be inserted sequentially in these slots. The first output module must be inserted in slot 01, the next in slot 02 etc.

INPUT MODULES	PRIORITY	INPUT SLOTS Input-1	Input-2	Input-3	Input-4
Input-4 D/0 4 x AESS Input Module	A	+	+	+	+
Input-8 A/0 8 Analogue Input Module	A	+	+	+	+
Input-SDI/4 4 ch. SD-SDI De-embedder	B	+	+	+	+
		max 2 x input modules			
Input-2D/0 2 x AESS Input Module	B	+	+	+	+
Input/1 1 x AESS + 2 x Analogue Input	C	+	+	+	+
Input/2 1 x AESS + 2 x Analogue Input	C	+	+	+	+
Modules with higher priority must be placed in an input slot with a lower number starting with the In-1 slot.					

OUTPUT MODULES	PRIORITY	OUTPUT SLOTS Output-1	Output-2	Output-3	Output-4
Output/1 1 x AESS + 2 x Analogue Output	A	+	+	+	+
Output/2 1 x AESS + 2 x Analogue Output	A	+	+	+	+
I/O-23 Remote Control Module	B				+

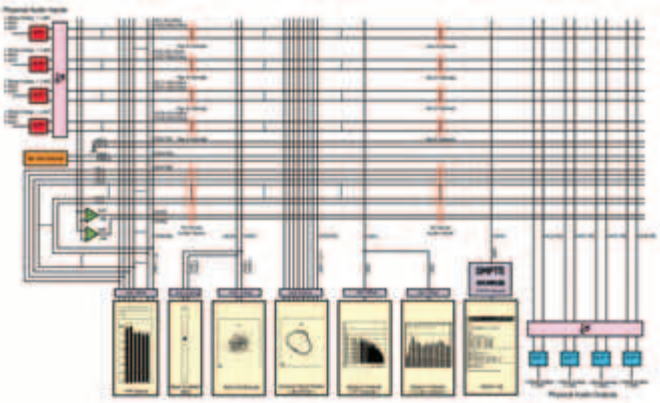
OTHER FUNCTIONS

In the digital mode the instruments will show a Bitstream Status Display. Other features are the time code input which will synchronize to SMPTE, and a Statistical Session Report showing highest true peak, number of clippings, and number of mutes over time.

PRODUCT CODE: MSD600M++, Desktop PT0600M, Rack Mount

DK - Technologies

AUDIO MATRIX



The instruments contain a complete 32 x 16 audio matrix. It can route, in broadcast program quality, any input to any output regardless of the number of channels installed. The x-points of the source and destination channels can be easily selected from the menu. The DK-Matrix™ software make the selection of x-points and several other parameters even easier. Specific instrument set-ups may be stored in any of the 11 presets for later recall.

A/D & D/A CONVERTERS

All analogue input modules have high quality stereo A/D converters, and the digital inputs have sample rate converters to ensure the ability to handle asynchronous signals. The output modules have D/A converters for the analogue outputs. The instruments can be used as separate A/D and D/A converters even while you are using the metering functions on the same or other signals.

ORDERING INFORMATION

MSD600M++
Stereo and Surround Sound Meter, desktop version. Base unit with utility module for DC supply, sync input, RS-232, and VGA output. Incl. mounting bracket.

PT0600M
Stereo and Surround Sound Meter, rack mount version. Base unit with utility module for DC supply, sync input, RS-232, and VGA output.

MSD600M-Input/1
Input Module, 2 analogue, transformer balanced + 1 AES3 inputs, D-Sub

MSD600M-Input/2
Input Module, 2 analogue + 1 AES3 inputs, BNC and D-Sub

MSD600M-Input-2D/0
Digital Input Module, 2 AES3 inputs, 96 kHz, 24-bit

MSD600M-Input-4D/0
Digital Input Module, 4 AES3 inputs, 96 kHz, 16-bit

MSD600M-Input-SDI/4
SDI De-embedding Module, 4-Channel

MSD600M-Input-8A/0
Analogue Input Module, 8 analogue inputs, electronically balanced, D-Sub

MSD600M-Output/1
Output Module, 2 analogue + 1 AES3 outputs, D-Sub

MSD600M-Output/2
Output Module, 2 analogue + 1 AES3 outputs, BNC and D-Sub

MSD600M-I/O-23
Interface Module, 23 function control

MSD600-PS/0
Power Supply Adapter, 100-240V AC to 15V DC, 3,5A, IEC connector.

MSD600M++ & PT0600M - HARDWARE SPECIFICATIONS

PPM Analogue References
- Indication: 0 dBu
- Input voltage: 1.55 V

PPM Scales
Dynamic response:
- Pflichtenheft 3/6: 3 ms / -3 dB
- IEC 268-10: 5 ms / -2 dB
- IEC 268-17: VU: 300 ms

Return (fallback) time:
- Pflichtenheft 3/6: 20 dB / 1.5 s
- IEC 268-10: 20 dB / 20 s

Division of scales:
- Type I: -42 dB to +12 dB
- Type IIA: +1 dB to +7 dB
- Type IIB: -12 dB to +12 dB
- Type DIN: -50 to +5 dB
- Type VU: -20 dB to +3 dB
- Type DMU-I: +60 dB to 0 dB
- Type DMU-2: -6.0 dB to 0 dB

Phase Correlation Meter
- Indication range: +1 to –1

Audio Vectorscope
- Automatic gain offset range: 30 dB
- Phase error between channels: none

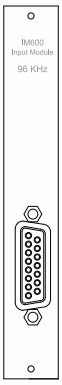
LCD Display
- Resolution in dots: 640 x 480
- Pixel size: 0.2 mm
- Lifetime: 50.000 hours
- Contrast ratio: 100:1
- Viewing area: 135 x 100 mm
- Luminance: 300 cd/m2

Power Supply
- Supply voltage range: 12 V to 24 V DC
- DC power consumption: approx. 18 W at 12 V DC nominal supply
- Safety: according to IEC 65

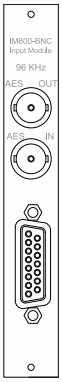
Environmental Conditions
- Temperature range: 0˚C to 45˚C

Cabinet Dimensions
MSD600M++, desktop version:
- Width: 186 mm plus mounting nuts 4 mm
- Height: 144 mm without mounting bracket
- Depth: 50 mm without connectors

MSD600M-Input/1
Analogue & AES3 Input Module
Input module with 2 analogue audio inputs and 1 AES3 input.
- Input connector: 15-pole D-Sub
- 2 x 75ΩBNC (Input/2 only)



Analogue inputs
- Maximum input level: +24 dBu
- Sample rate with internal sync: 48 kHz
- Sample rate range with external sync: 32 kHz to 50 kHz
- Bit resolution: 24 bits
- Frequency range within ±0.3 dB: 30 Hz to 20 kHz
- Passband ripple: ±0,002 dB
- Group delay: less than 0.82 msec
- Dynamic range, A-weighted: more than 103 dB
- Crosstalk at 1 kHz: less than –96 dB
- Signal-to-noise ratio: typical 93 dB
- Nominal input impedance: greater than 20 kohm



Digital input
The digital input is equipped with a sample rate converter to synchronize the input to the internal clock. The sample rate converter may be by-passed. In this case the base unit should be synchronized externally by an AES3 signal applied to the sync input on the utility connector.

- Sample rate range: 30 Hz to 100 kHz
- Internal sample rate: 48 kHz
- Bit resolution: 24 bits
- Group delay: maximum 1.75 msec
- Passband ripple: ±0.008 dB
- Total harmonic distortion and noise: typical –103 dB at 1 kHz
- Dynamic range: more than 120 dB
- Nominal input impedance: 110 ohm

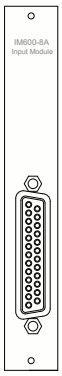
Continued over...

REAR PANEL

Master Stereo & Surround Sound Meter

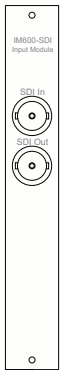
MSD600M++ & PT0600M - HARDWARE SPECIFICATIONS (continued...)

DK - Technologies



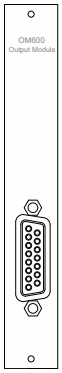
MSD600M-Input-8A/0
8-Channel Analogue Input Module

- Input connector: 25-pole D-Sub
- Maximum input level: +24 dBm
- Sample rate with internal sync: 48 kHz
- Sample rate range with external sync: 32 kHz to 50 kHz
- Bit resolution: 24 bits
- Frequency range within ±0.3 dB: 30 Hz to 20 kHz
- Passband ripple: ±0,002 dB
- Group delay: less than 0.82 msec
- Dynamic range, A-weighted: more than 103 dB
- Crosstalk at 1 kHz: less than –96 dB
- Signal-to-noise ratio: typical 93 dB
- Nominal input impedance: greater than 20 kohm



MSD600M-Input-SDI/4
4-Channel SDI Input Module

- SDI video input with re-clocked loop-through output. Each module de-embeds one of the four audio groups with each 4 audio channels. The actual group is selected via the instrument menu.
- Format: 270 Mbps SDI component video. Complies with CCIR656 and SMPTE 259M
- Input type: 75 ohm input with re-clocked loop-through
- Input and output connectors: BNC
- Return loss: larger than 25 dB from 1 to 270 MHz
- De-embedding delay: 312 µsec corr. to 26 audio samples

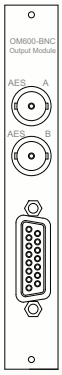


MSD600M-Ouput/1
MSD600M-Output/2
Analogue & AES3 Output Module

Output module with 2 analogue audio outputs and 1 AES3 output. & AES3 available via 2 x 75Ω BNC Output/2 only)

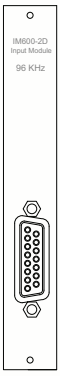
Analogue Outputs

- Output connector: 25-pole D-Sub
- Maximum output level: more than +18 dBm at 600 ohm
- Sample rate with internal sync: 48 kHz
- Sample rate range with external sync: 32 kHz to 50 kHz
- Bit resolution: 24 bits
- Frequency range within ±0.3 dB: 30 Hz to 20 kHz
- Passband ripple: ±0,007 dB
- Group delay: less than 0.21 msec
- Dynamic range, A-weighted: more than 101 dB
- Crosstalk at 1 kHz: less than –96 dB
- Signal-to-noise ratio: typical 93 dB
- Nominal output impedance: less than 5 ohm



Digital Outputs

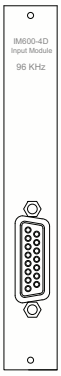
- Single channel AES3
- Buffered output to 2 x 75ΩBNC



MSD600M-Input-2D/0
2 Channel AES3 Input Module

The digital input is equipped with a sample rate converter to synchronize the input to the internal clock. The sample rate converter may be by-passed. In this case the base unit should be synchronized externally by an AES3 signal applied to the sync input on the utility connector.

- Input connector: 15-pole D-Sub
- Sample rate range: 30 Hz to 100 kHz
- Internal sample rate: 48 kHz
- Bit resolution: 24 bits
- Group delay: maximum 1.75 msec
- Passband ripple: ±0.008 dB
- Total harmonic distortion and noise: typical –103 dB at 1 kHz
- Dynamic range: greater than 120 dB
- Nominal input impedance: 110 ohm



MSD600M-Input-4D/0
4 Channel AES3 Input Module

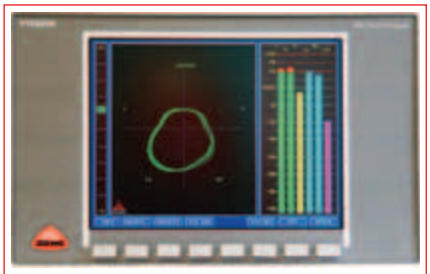
The digital input is equipped with a sample rate converter to synchronize the input to the internal clock. The sample rate converter may be by-passed. In this case the base unit should be synchronized externally by an AES3 signal applied to the sync input on the utility connector.

- Input connector: 15-pole D-Sub
- Sample rate range: 30 Hz to 100 kHz
- Internal sample rate: 48 kHz
- Bit resolution: 16 bits
- Group delay: maximum 1.75 msec
- Passband ripple: ±0.008 dB
- Total harmonic distortion and noise: typical –103 dB at 1 kHz
- Dynamic range: greater than 120 dB
- Nominal input impedance: 110 ohm

AVAILABLE VERSIONS

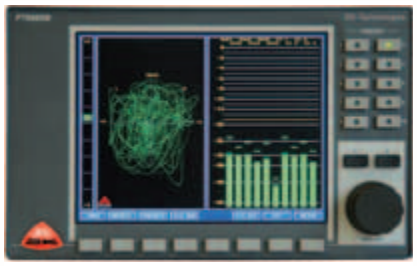
MSD600M++

Master Stereo and Surround Sound Meter, desktop version, base unit with utility module for DC supply, sync input, RS-232, and VGA output. Includes mounting bracket and utility cable.



PT0600M

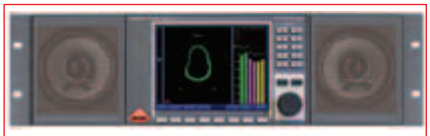
Master Stereo and Surround Sound Meter, desktop version, base unit with utility module for DC supply, sync input, RS-232, and VGA output. Includes mounting bracket and utility cable.



See separate DK Datasheet

PT0660M

Master Stereo and Surround Sound Meter, rack mount version including rotary knob control for output volume enabling direct connection to active monitor loudspeakers & 10 presets are directly accessible for fast recall of settings. Base unit with utility module for DC supply, sync input, RS-232, and VGA output. Includes utility cable.



See separate DK Datasheet

PT0660M-LS

Audio Monitor with Master Stereo Display, base unit including rotary knob control for output volume enabling direct connection to active monitor loudspeakers & 10 presets are directly accessible for fast recall of settingswith built-in loudspeakers, VGA output, RS-232, and utility module. Includes utility cable.

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