



Master Stereo and Surround Sound Meter PT0660M, rack mount

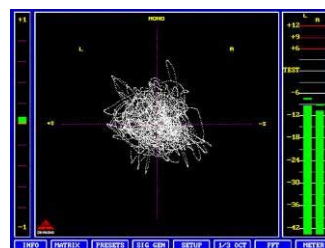
Solutions in Audio & Video

- The Peak Programme Meter measures level of up to 32 audio channels simultaneously.
- 7 scales are 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 Jelly-Fish[®] display supports aural impression at a glance.
- Multiple phase correlation meter indicates proper phasing to allow for downmix.
- Modular choice of input modules accepting analogue audio, AES3, SD-SDI with deembedder for SDI video.
- 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.
- Rotary knob controls output volume for direct connection to active monitor loudspeakers.
- 10 presets are directly accessible for fast recall of settings
- 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 PT660M Stereo and Surround Sound Meter from DK-Technologies offer PPM / VU level meter, audio vector oscilloscope, and phasemeter, 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.



Display of a stereo signal. The level meter to the right has selectable scales.

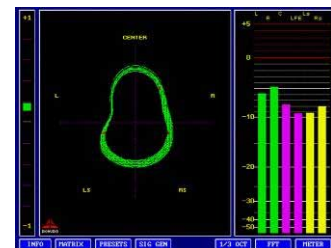
The oscilloscope shows the stereo image in the Lissajous-format, where a perfect stereo signal would be represented by a circular figure, or a 'ball', and mono would be a vertical line.

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.



The Jelly-Fish[®] in the middle intuitively displays the surround sound level.

DK-Technologies' exclusive Jelly-Fish[™] surround indicator has become the adopted standard, presenting the surround sound image in a logical and intuitive way.

The energy content of all channels is easily recognizable on the screen, and phase errors in individual vectors are immediately highlighted by a red colour.

All surround sound formats are supported: 4.0, 5.1, 6.1, and 7.1, and even future formats may be handled by the introduction of new software.

Volume Control

PT0660M is equipped with a rotary knob that may act as volume control for monitor loudspeakers or headphones. The volume of up to 8 audio channels can be controlled by the front plate rotary knob.

The rotary knob has further functionality. By clicking on it you enter into the matrix menu and selection of cross points is now done by turning and clicking the knob. Also in other menus the knob may be used to select parameters. The 10 preset buttons above the rotary knob

Deembedding Audio from Video

SDI, Serial Digital Interface, is a commonly used format to carry video and audio signals on a single cable in television environments. For Standard Definition video the data rate is 270 Mbits/sec and for High Definition video the data rate is increased to 1.485 Gbits/sec.

Full AES audio implementation to SDI is characterized by:

- 24-bit resolution audio words
- Sampling at 32, 44.1, or 48 kHz
- Four groups of four audio channels

The SDI/4 input module allows direct deembedding from SD-SDI. The audio signals can thus be analysed and displayed on the meter individually, as stereo signals, and as surround sound.

The audio signals may also be converted to digital AES3 signals and analogue audio signals at the output of the meter. The benefit of the internal matrix can be exploited to assign any audio input channel to any physical output.

recall already stored instrument settings with a single keystroke.

Compact & Modular

The instrument is a very compact unit. Everything has been fitted into a box not much bigger than the size of a pocket-book. The PT0660M mounts conveniently in the PM5639 rack cabinet or similar, eventually 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.

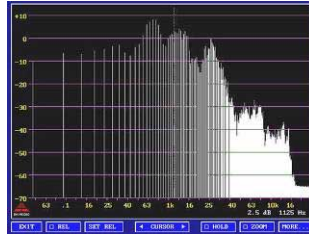
Signal Generator

One of the strong points of the instrument 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.

In addition 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 instrument into a powerful measurement tool for analysis of linearity and distortion.

Spectrum Analyser

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 identifica-



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

tion 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.



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

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 instrument 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.

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.



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

Audio Matrix

The instrument contains 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.

Related Products

MSD100C

Colour display. Pre-configured, analogue and AES3 stereo inputs and outputs. Basic functionality.

MSD200C

Colour display. Pre-configured, analogue and AES3 stereo inputs and outputs. Full functionality including spectrum analysis.

MSD600C-III

Colour display. Pre-configured, 2 analogue, 2 x AES3 inputs, 2 analogue outputs, and 2 x AES3 outputs.

MSD600C-5.1

Colour display. Preconfigured 5.1 surround sound model, 3 x AES3 inputs. Full functionality including spectrum analysis.

MSD600M++

Modular configuration of inputs in ana-

logue, AES3, SDI and outputs in analogue and AES3

PT0200C

Colour display. Pre-configured, analogue and AES3 stereo inputs and outputs. Full functionality including spectrum analysis.

PT0600C-III

Colour display. Pre-configured, 2 analogue, 2 x AES3 inputs, 2 analogue outputs, and 2 x AES3 outputs.

PT0600C-5.1

Colour display. Preconfigured 5.1 surround sound model, 3 x AES3 inputs. Full functionality including spectrum analysis.

PT0600M

Modular configuration of inputs in analogue, AES3, SDI and outputs in analogue and AES3.

PT0660M-LS

Modular configuration of inputs in analogue, AES3, SDI and outputs in analogue and AES3 Stereo loudspeakers and volume control.

Peak Programme Meters:

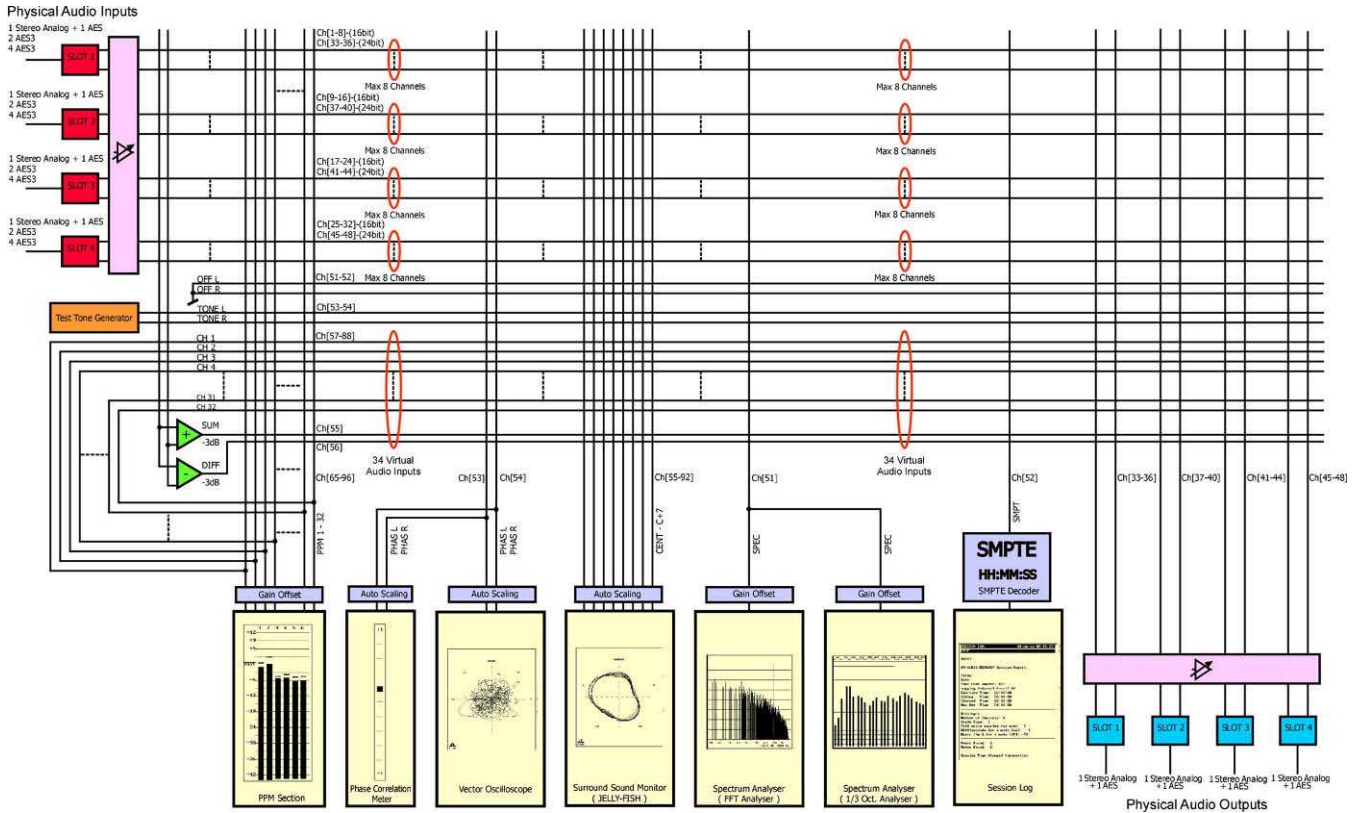
477-series

Stereo PPM with AES3 input. With or without phasemeter. Horizontal or vertical versions for rack mount and desktop. Choice of scales.

478-series

Stereo PPM with AES3 or analogue inputs. With or without phasemeter. Horizontal or vertical versions for rack mount and desktop. Choice of scales.

Audio Matrix Schematic



Hardware

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.

Audio & Video in One Box



The PT0660M fits into the standard rack mount cabinet next to a video waveform monitor. DK-Technologies also offers a

range waveform monitors such as the PM5664 for SDI and analogue video and the PM5661 for composite PAL video.



SDI Module

The SDI module plugs directly into the rear of PT0660M and is automatically recognised by the software in the base unit. It has an input for the SDI bit-stream and provides a relocked SDI output for connection to further downstream equipment. The audio signal is deembedded from the SDI signal and applied to the audio meter and synchronized to the internal clock.

Configuration

Input Modules	Priority	Input Slots			
		In1	In2	In3	In4
Input-4D/O 4 x AES3 input module	A	+	+	+	+
Input-8A/O 8 analogue input module	A	+	+	+	+
Input-SDI/4 4 ch. SD-SDI deembedder module	B	+	+	+	+
<i>Max. 2 input modules</i>					
Input-2D/O 2 x AES3 input module	B	+	+	+	+
Input/1 1 x AES3 + 2 analogue input module	C	+	+	+	+

Modules with higher priority must be placed in an input slot with a lower number starting with the In1 slot.

Output Module	Priority	Output Slots			
		O1	O2	O3	O4
Output/1 1x AES3 + 2 analogue output module	A	+	+	+	+

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 O1 to O4 and modules must be inserted sequentially in these slots. The first output module must be inserted in slot O1, the next in slot O2 etc.

Product Data

Base Unit

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

PT0660M:

- Width: 214 mm
- Height: 134 mm
- Depth: 79 mm plus brackets and connectors.

Input Module 2A + D

MSD600M-Input/1

Analogue & AES3 Input Module

Input module with 2 analogue audio inputs and 1 AES3 input.

- Input connector: 25-pole D-Sub

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: larger 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: larger than 120 dB
- Nominal input impedance: 110 ohm

Input Module 8A

MSD600M-Input-8A/O

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: larger than 20 kohm

Input Module 2D

MSD600M-Input-2D/O Dual AES3 Input Module

Input module 2 AES3 input.

The inputs are equipped with sample rate converters to synchronize the inputs to the internal clock. The sample rate converters 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: 25-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: larger than 120 dB
- Nominal input impedance: 110 ohm

Input Module 4D

MSD600M-Input-4D/O Quad AES3 Input Module

Input module 4 AES3 input.

The inputs are equipped with sample rate converters to synchronize the inputs to the internal clock. The sample rate converters 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: 25-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: larger than 120 dB
- Nominal input impedance: 110 ohm

Input Module 4 Ch. SD-SDI

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
- Deembedding delay: 312 μ sec corr. to 26 audio samples

Output Module 2A + 1D

MSD600M-Output/1 Analogue & AES3 Output Module

Output module with 2 analogue audio outputs and 1 AES3 output.

- Output connector: 25-pole D-Sub

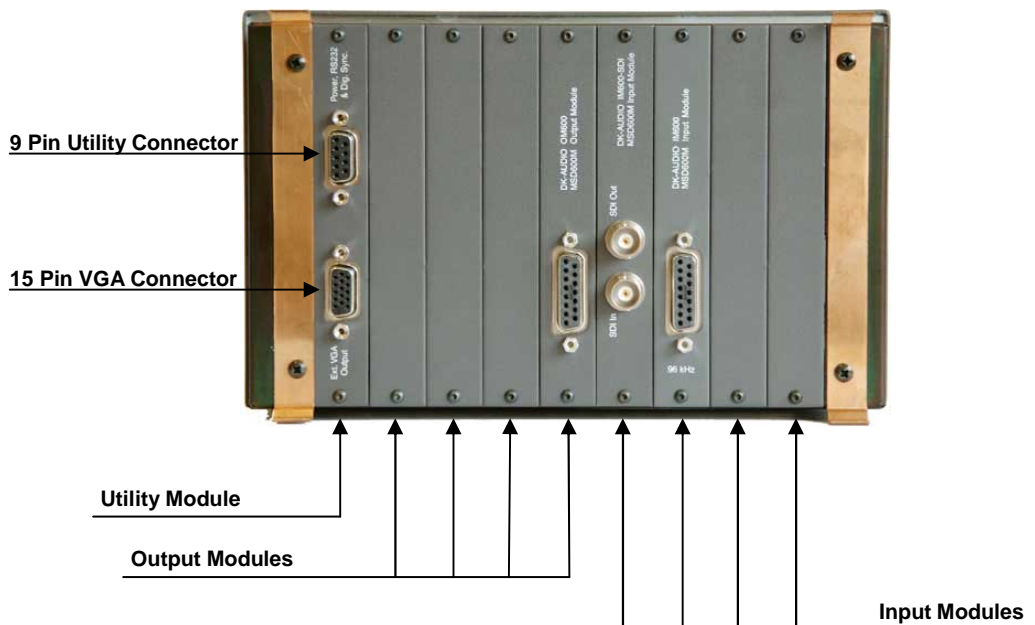
Analogue Outputs

- 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 Output

- Output impedance: 110 ohm $\pm 20\%$
- Amplitude: 3 V
- Rise and fall time: 10 - 30 ns
- Jitter: less than 20 ns
- Data rate: 3.072 Mbit/s
- Sampling frequency: 48 kHz

Rear Panel



Ordering Information

Base Units

PT0660M Master Stereo and Surround Sound Meter, rack mount version. Base unit with utility module for DC supply, sync input, RS-232, and VGA output.

Options

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/O Digital Input Module, 2 AES3 inputs, 96 kHz, 24-bit
MSD600M-Input-4D/O Digital Input Module, 4 AES3 inputs, 96 kHz, 16-bit
MSD600M-Input-SDI/4 SDI De-embedding Module, 4-Channel, BNC
MSD600M-Input-8A/O Analogue Input Module, 8 analogue inputs, D-Sub
MSD600M-Output/1 Output Module, 2 analogue + 1 AES3 outputs, D-Sub
MSD600M-Output/2 Output Module, 2 analogue + 1 AES3 inputs, BNC and D-Sub
MSD600-PS/O Power Supply Adapter, 100-240V AC to 15V DC, 3.5A, IEC Connector

Accessories

MSD600M-I-Cable/O Connector Cable for MSD600M-Input/1 module, D-Sub to XLR
600M-I-2D-Cable/O Connector Cable for MSD600M-Input-2D/O module, D-Sub to XLR
600M-I-4D-Cable/O Connector Cable for MSD600M-Input-4D/O module, D-Sub to XLR
600M-I-8A-Cable/O Connector Cable for MSD600M-Input-8A/O module, D-Sub to XLR
MSD600M-O-Cable/O Connector Cable for MSD600M-Output/1 module, D-Sub to XLR
PM8539 19" Rack Cabinet for PT0660M
PM8540 Blank Panel for PM8539

DK-Technologies



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