DK Technologies PT0760M
HD/SD Video and Stereo/Surround Audio Monitor

The Danish manufacturer DK-Technologies is probably best known for its range of multi-function stereo, surround and loudness meters, often seen built in to large format mixing consoles. However, since its 2001 acquisition of ProTelevision Technologies (PTV) the company has also been in the business of video monitoring, screen colour analysers, and video sync and test signal generators as well. Initially, the video waveform monitors retained traditional CRT displays and were relatively bulky as a result and had a fixed feature set. But DK's hardworking design team has now developed a much more powerful device, the PT0760M which provides state-of-the-art video monitoring as well as incorporating all the best facilities of the industry leading MSD range of audio meters, still using the a colour LCD display and software-based signal processing.

OVERVIEW

The monitor looks very similar to the current audio-only flagship PT0660M with its bright and sharp 6.5-inch colour display underscored with eight soft-function buttons, and with a further twelve preset and function buttons on the right hand side along with a rotary encoder knob (which DK-Technologies calls the 'Wheeler'). However, while the PT0760M can provide the same sophisticated audio monitoring functions of the PT0660M, it also incorporates a wealth of SD and HD video monitoring functions too, up to four video signals simultaneously. It can be used as a free-standing desktop display unit, or rack mounted if desired to occupy 3U and half rack width. The unit extends only 3.75 inches behind the front panel (not including connectors), making it ideal for OB trucks and compact technical areas.

The rear panel can accommodate up to seven I/O modules in addition to the fixed power supply and utility modules. The unit requires 12-36V DC to power it (consuming between 15 and 40 Watts) , normally provided by an external universal supply connected on a 4-pin XLR. The utility module provides a USB-A interface for advanced programming and firmware updates, and a DVI video connector to drive an external monitor at either 640x480p60 or 1280x720p60 resolutions (more on that in a moment), plus an RS232 serial port and an RJ45 network port for future remote control applications.

A variety of I/O modules is available and can be mixed and matched to meet specific interfacing requirements. SDI or HD-SDI video signals can be connected via an automatic format-sensing input module. The standard unit has four inputs, although a dual input version is also available (as is a single channel variant: the PT0710M) along with matching dual or quad SDI/HD-SDI output modules. An external analogue video reference input module (with loop-through) is also available. The audio side of the meter can extract signals embedded within the SDI/HD-SDI feeds, or accept external inputs via either an eight-channel analogue input module or a four-way (eight channel) AES3-id digital audio input module – and again, matching analogue and digital output modules are also available. There is even a Dolby decoder module option, capable of decoding a Dolby E/Dolby Digital (AC3) stream embedded within an SDI/HD-SDI signal. With eight slots available it is possible to fit all of these modules simultaneously, if required, providing an extraordinarily flexible monitoring hub. An internal audio signal routing matrix allows metering of any selected audio sources on bargraphs as well as in stereo (vectorscope) or surround (JellyFish/StarFish) imaging displays.

Uniquely, the PT0760M system can be configured to route either the audio or video monitoring display to an external screen. This enables both aspects of a signal to be checked simultaneously, so that an external display could reveal the video waveforms while the built-in LCD shows the associated audio levels, for example. Given the unit's compact size, it is very easy to mount a second LCD screen alongside the meter within a rack frame – which is very convenient in an equipment room or OB truck where space is at a premium. Alternatively, the external monitor output could be used to provide a feed to a more conventional monitor stack for a video engineer in a camera control position, and in this context the ability to display the waveforms for up to four video inputs simultaneously is a very powerful feature.

Returning to the front panel, the basic control is very intuitive and logical. Soft-keys below the screen access context-sensitive functions related to the current display, such as changing the current audio or video waveform display modes, while the buttons on the right hand side access pre-configured display modes or navigate the set-up menus when the System Manager screen is active. The button immediately above and to the left of the Wheeler switches the display between audio and video monitoring, while the button to the right accesses the System Manager set-up menus. The Wheeler itself is also context sensitive such that when the audio screen is displayed it controls the external audio monitoring volume (if desired), and when the video screen is displayed it adjusts the waveform intensity. This last point is interesting as the meter uses what DK-Technologies calls 'Smart Video Landscape Compressor' (SVLC) which helps to make information within the most complex and dynamic of waveform displays much easier to resolve and understand.

VIDEO MONITORING

The video monitoring facilities within the PT0760M are relatively basic but very competent, and form a strong foundation upon which extra functionality can be added in future firmware updates. Each of the four inputs is completely independent of the others and signal formats can be mixed without problems, allowing standard definition pictures to be analysed alongside high-definition pictures if required. The system supports high-definition 1080p resolutions at 23.98, 24, 25, 29.97 and 30 frames per second, 720p resolutions at the same frame rates plus 50, 59.94 and 60 fps, 1080i resolutions at 25, 29.97 and 30 fps, and standard definition formats at 576i/25 (PAL 625) and 487i/29.97 (NTSC 525).

Any combination of inputs can be monitored simultaneously, one above the other, allowing anything from a detailed view of a single channel's parameters up to a 'parade view' of all four channels. It is also possible to configure the display to show audio bargraph meters alongside the video waveform traces, if required.

The display can be configured to show any selected combination of parameters as separate waveform traces (at line, field or frame rates) for Red, Green and Blue channels, Luminance (Y), and colour components (Cb, and Cr). A vector display mode is also available. Colour gamut errors are indicated with a very visible on-screen warning message, and the out-of-gamut parameters can be user-configured, if necessary. With a timing reference signal (composite SD black & burst or HD Tri-level syncs) connected to the appropriate module, any timing errors incurred on any input can also be measured and displayed using DK-Technologies' 'Smart Timing Analysis' feature with a resolution of 13 nanoseconds.

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AUDIO MONITORING

Two levels of audio monitoring functions are available: basic bargraph metering only, or the full audio metering suite complete with surround JellyFish/StarFish displays – this being essentially the same feature set as found on DK-Technologies' standard multichannel audio metering systems, offering multi-channel bargraphs, stereo phase correlation and Lissajous (vectorscope) metering, surround imaging displays, spectral analysis (1/3 octave and FFT), and loudness metering conforming with the new ITU 1770/1771 standard which is quickly being adopted by broadcasters all around the world.

In the majority of applications the audio signals would typically be derived from embedded audio associated with the video inputs, rather than from separate external inputs, although that option is available too if the appropriate audio input modules are installed. Up to 16 audio channels can be displayed on the audio bargraph screen – either all from embedded audio within a single video channel or from any combination of video channels as configured using the system's internal audio matrix.

For surround sound monitoring applications embedded channels can be routed through the matrix to the uniquely intuitive JellyFish or StarFish surround display which can be configured to illustrate the spatial imaging of LCRS, 5.1, 6.1 or 7.1 surround formats. An optional Dolby E/Dolby Digital (AC3) decoder module can be used to extract encoded audio, too, either from an external AES3-id signal, or from an embedded SDI/HD-SDI datastream. The internal matrix can also be used to derive a stereo downmix of a surround source, which can then be monitored and auditioned as necessary. This comprehensive audio matrix enables the PT 0760 M to be used as a professional quality audio monitoring controller in its own right, if required and provided an audio output module is installed. The front panel preset buttons provide quick access to pre-configured channel monitoring configurations and the Wheeler provides a convenient volume control.

IN USE

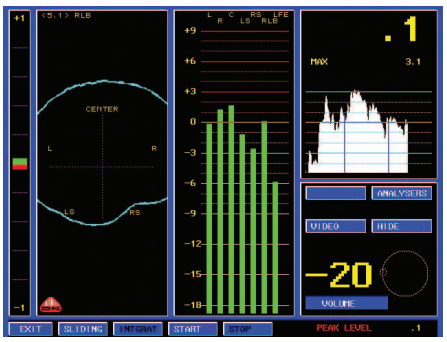
The PT0760M is very simple and intuitive to use, thanks to the use of context-sensitive soft-key functions along the bottom of the screen and a relatively simple and logical menu structure to select the lesser use functions and to configure the unit. In most applications the unit would be programmed to provide an appropriate sub-set of display configurations – typically with YCbCr or RGBY waveform displays for the appropriate number of channels and the user would probably only be required to switch to vector or audio display modes occasionally, which requires nothing more complicated than the press of a button. Ideally, an external screen could be attached to allow simultaneous displays of the video monitoring and audio metering.

The audio metering is clear and concise, and the bargraphs can be configured to suit any of the standard scaling and ballistics arrangements, including BBC-style PPM, VU metering, and DIN PPMs. The JellyFish (electrical levels) and StarFish (acoustic levels) surround displays make monitoring of multichannel audio formats very straightforward and unambiguous, and the internal matrix is immensely powerful, allowing any input audio source to be assigned to any meter channel and output port. It also allows user-configurable downmix balances to be auditioned and can even be used to generate stereo and surround test signals, including BLITS.

The video waveform displays are very crisp and detailed, and viewing can be optimised by adjusting the Wheeler to control the intensity and dynamic range. This is certainly one of the clearest and most detailed waveform displays I've had the pleasure to use. While it could be argued that the PT0760M lacks some of the increasingly popular and sophisticated video monitoring facilities associated with HD video, such as the 'Lightening' variant of the vector display and the 'Diamond' RGB waveform display, what it does provide is sufficient for most applications and with significant benefits over traditional CRT-based waveform and vectorscope monitoring... and I'm sure future firmware updates will quickly expand on the system's capabilities – if my previous long experience of the company's audio metering products is anything to go by.

Being able to monitor every aspect of a selected video input simultaneously – RGB, Y, Cb/Cr and vector in adjacent waveform displays is an immensely powerful way of spotting alignment errors, while being able to focus in on any one waveform parameter, or to compare selected parameters across up to four channels makes the PT0760M an extremely versatile tool and ideal for a wide range of technical and operational monitoring roles. The gamut warning displays are also very eye-catching with no risk of missing an error flag – and the ability to configure the warning thresholds to specific house standards is a useful feature too.

The PT0760M is highly configurable and upgradable both in terms of the numbers of input and output video and audio channels, as well as in the degree of audio metering sophistication. It is equally suited to SD, HD or mixed format applications, capable of accommodating both SDI embedded audio and Dolby-encoded audio, as well as external analogue or digital audio signals, incorporates professional audio monitoring control facilities, and can drive two display screens to allow simultaneous monitoring of both the video and related audio signals. It's also extremely compact, and very power-efficient, and is a quite remarkably capable unit.



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