PT0800M | PT0760M
User Manual

PT0800M – WFM, Audio & Loudness Monitor

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Introduction

Before you begin…

Thank you for purchasing one of the DK Meter family members.

Your PT0800M is a very powerful unit with an integrated duality of covering both Audio and Video metering in the same tool.

The many metering functions combined with the modular hardware design and not least the extremely flexible and customizable user interface, makes the PT0800M a Swiss army knife that can be adapted to cover a very wide number of applications.

In order to get the most out of your unit, we suggest that you spend a little time familiarizing yourself with the many possibilities and functions of the your new unit.

About the PT0800M Modes and Use

The PT0800M can be adapted and tailored to countless applications. Here a few examples to give an idea of the range of this unit.

Audio Metering

The audio side of the PT0800M covers virtually any relevant angle of metering including standard bargraphs, over moving coil emulations and deep into the Loudness and logging requirements standardized in many broadcast applications today.

Furthermore, the PT0800M offers FFT spectrum analysis, SMPTE code readout and automation and many more details.

The audio sources may be put in through the many different optional cards including analogue, digital AES, de-embedded SDI, de-embedded Dolby E.

Video Metering – Waveform Monitor

The Video section of the PT0800M allows for detailed metering and quality check of all the waveform monitor relevant parameters i.e. RGB, Cb/Cr + Y, vectorscope, CRC errors, Picture preview etc.

The video section allows for switching between multiple HD/SD SDI input streams and offers a buffered output to continue the signal.

Combined Audio and Video meter

The combined mode of the PT0800M offers the view of both audio and video metering tools at the same time. Alternatively, the PT0800M offers the ability to switch between a full screen audio or video mode, essentially running both modes in parallel.

Monitoring and Switching

Further from the audio/video metering facilities, the PT0800M I/O matrix allows for advanced monitoring, switching and volume control of the incoming audio signals.

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Any incoming audio signal analogue, digital AES or de-embedded SDI may be routed to exactly the output desired with or without front panel volume and DIM control and easily controlled by the switch of a preset.

Dual Screen setup or External screen extension

Your setup may be expanded to include the PT0800R remote display adding an additional front panel and screen. This setup will allow you to view and operate both the Video and Audio section simultaneously.

Alternatively, the HDMI screen output may be used to monitor either a copy of the PT0800M screen or the alternating Video/Audio mode not on screen of the PT0800M itself.

Application examples

Camera Control Unit – CCU

PT0800M fits perfectly into this application allowing detailed waveform monitoring alongside monitoring and metering the incoming audio signals. Whether set up as a separate dedicated WFM unit, with Remote extension viewing both Audio and Video metering or simply in the combined and compact mode, the PT0800M slides right in.

Post Production – Waveform Monitoring & Loudness Control

With todays' demanding Loudness requirements and need to ensure quality of delivery, the PT0800 comes in as a handy tool offering to cover both Audio and Video quality metering in any post production application. Whether in need of a detailed Waveform monitor analysis or being able to document and log the loudness performance of the source material, the PT0800M will have you covered.

Master Control

Being able to constantly and quickly check and confirm quality of the Master control incoming video and audio sources is crucial in todays' TV production and transmission.

PT0800M allows not only metering and monitoring of all audio and video signals, but adds audio switching and volume control to the mix, allowing instant selection and check and metering of any incoming signal at the flick of a single preset button.

Engine Room Audio monitoring

With its many video and audio input and output slots. The PT0800M makes up for the ideal audio monitoring unit in the engine room, allowing switching and monitoring of multiple video streams as well as up to 64 audio inputs and 16 outputs.

About this manual

Valid for software update 2014-01-06
Products : PT0800, PT0760
This manual will provide you with a quick overview of the DK Meter operation, tools and options, as well as an in-depth look at the more advanced parameters and facilities of DK Meter.
Happy reading!

Please note: DK-Technologies reserve the rights to change the content of this manual at any time. The latest revision of this manual can be downloaded from: www.DK-Technologies.com

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Other Important Notes

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Purpose

Any fitness for purpose legislation or other determination that may be applied in the area where this equipment is installed must take due cognizance that it is designed for use in professional broadcast, audio and video systems by appropriately trained personnel. The equipment is not intended for use in a domestic environment and regulations designed for such situations are not applicable.

After sales modifications

Any modifications to the equipment not specifically authorised and approved by DK-Technologies A/S may invalidate the equipment warranty. This includes changes to cabling and variations to the recommended installation as detailed in the documentation issued by DK-Technologies A/S. Modifications can invalidate EMC and safety features designed into this equipment and the manufacturer cannot be liable for any legal proceedings or problems that may arise relating to such modifications. No sales agent or other person involved in the supply chain is permitted to authorise variations from the content of this documentation.

Important Safety Instructions

- Read these instructions. Study carefully and understand all safety and operating instructions before you install and operate the unit!
- Keep these instructions. Keep all safety and operating instructions for future reference!
- Heed all warnings on the unit and in the safety and operating instructions before you install and operate the unit!
- Follow all instructions to ensure against injury to yourself and damage to the unit or other objects connected to the unit.
- To prevent possible electrical shock, death, fire, injuries and malfunctions, use this product only as specified.
- Only use attachments and accessories specified by the manufacturer.
- The units of the DK Meter range are designed for indoor use only

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Three Operational Modes

The PT0800M has three operational modes that are distinctively different; the Audio mode, the Video mode and the Combined mode.

Each of the three modes has their own unique displays, tools and user interface structure.
The Audio mode allows for instant switching to the Video mode at the push a button and vice versa, while the Combined mode is a fixed mode.
With the Audio/Video switching ability, the PT0800 allows for detailed use and monitoring of both modes at the flick of a button.

Further to the three operational modes, the PT0800 offers the option of an additional Remote Panel, allowing for both Audio and Video modes to be viewed and accessed at the same time and completely independently.

The integrated HDMI output allows for additional large screen displays to view audio, video or the combined screens independent of the PT0800 screen view.
To get more information on how to set up the three modes, please refer to the respective section descriptions.

Manual Structure

This manual is structured to first give you a quick hardware overview of the Front and Rear panel and will then dive into the three operational modes respectively, going through each mode separately explaining the details of the Audio, Video and Combined screens, functions and features.

Front & Rear Panel

This section will give you a chance to familiarize yourself with the basic controls and hardware features of the PT0800 before diving into the different software modes.

Front Panel

The PT0800 has three main control sections;
- The Softkeys
- The Push Wheeler
- The Menu bar

All three areas come with default functionality, but may be altered to the exact functions that you require in your daily operation.
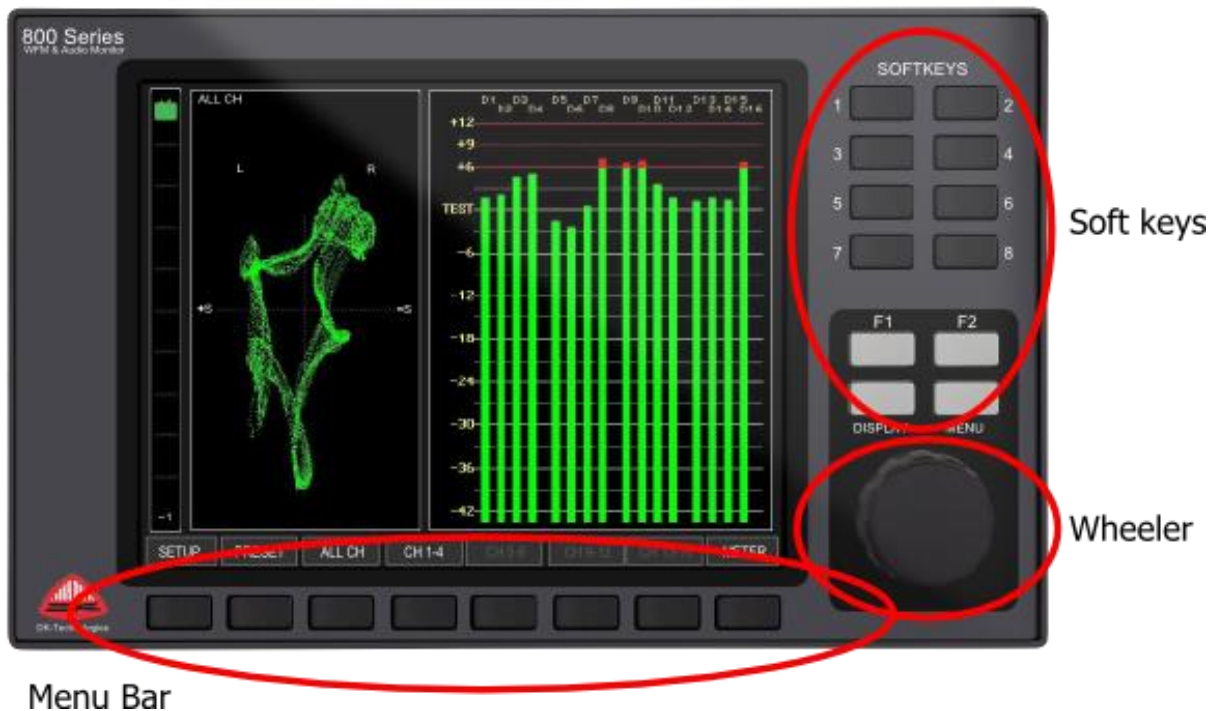
The Soft Keys

The Soft key section holds the keys 1-8, F1 + F2, as well as the 'Display' and 'Menu' keys.
Each of these keys may ultimately be custom programmed in multiple ways both when visible on screen and when not.
The default function of the Display key is to switch between the Audio and Video mode and display. This allows you to view both types of signal and quickly jump back and forth between the two different modes and setups.

The default function of the Menu key, is to enable access to the menu system of the current mode. Hitting 'Menu' will also reveal the functionality of the keys 1-8 and F1/F2, labelled on their on-screen dittos.

The Menu bar

Similarly to the Soft Keys, the Menu bar keys may be custom programmed to call up numerous different functions of the PT0800M, such as Preset recall, start/stop loudness readings, Peak hold etc.

The specific function of each key is labelled inside each corresponding on-screen key.

The Wheeler

The Wheeler is used for general scrolling and value changes of all parameters in the general PT0800 user interface, but also has option of controlling a lot of customized functions such as audio output volume, dim function, Waveform monitor intensity etc.

For more details on how to change the function of Soft keys and Menu Bar Keys, please refer to the Audio global/Power Settings section of this manual.

Rear Panel

The PT0800M is a modular unit with a variety of optional cards and accessories. Any given unit will be fitted with the items ordered for it and the representations shown in this documentation are designed to show the range of features that can be possible with these products. The version below shows the meter fitted with some of the optional input/output modules that can be added.

General Navigation

The PT0800 user interface navigation is extremely flexible in that it allows for a high level of customization of functions, buttons and tools in the respective displays.

Top Level Navigation

The top level navigation starts at the selection of the Audio or Video modes. The 'Display' button allows for instantly toggling back and forth between the Audio and Video mode.
If the Combined audio/video mode has been selected, the toggling ability will not be available.

In each of the Audio and Video mode, the 'Menu' button will open up an on screen menu in the hand side of the display area. The top level of the menu Navigation is called 'Manager' view. From here you can dive deeper into the background 'Setup' parameters or use some of the predefined shortcut buttons of the Manager view.
Diving into various sub menus, you will always be offered a 'Manager' button allowing you to exit back to manager view at all times.

Each of the Softkey buttons in the Manager section may be completely customized to your liking. Please refer to the 'Audio/Video Global - Power Up Settings' section for detailed information.
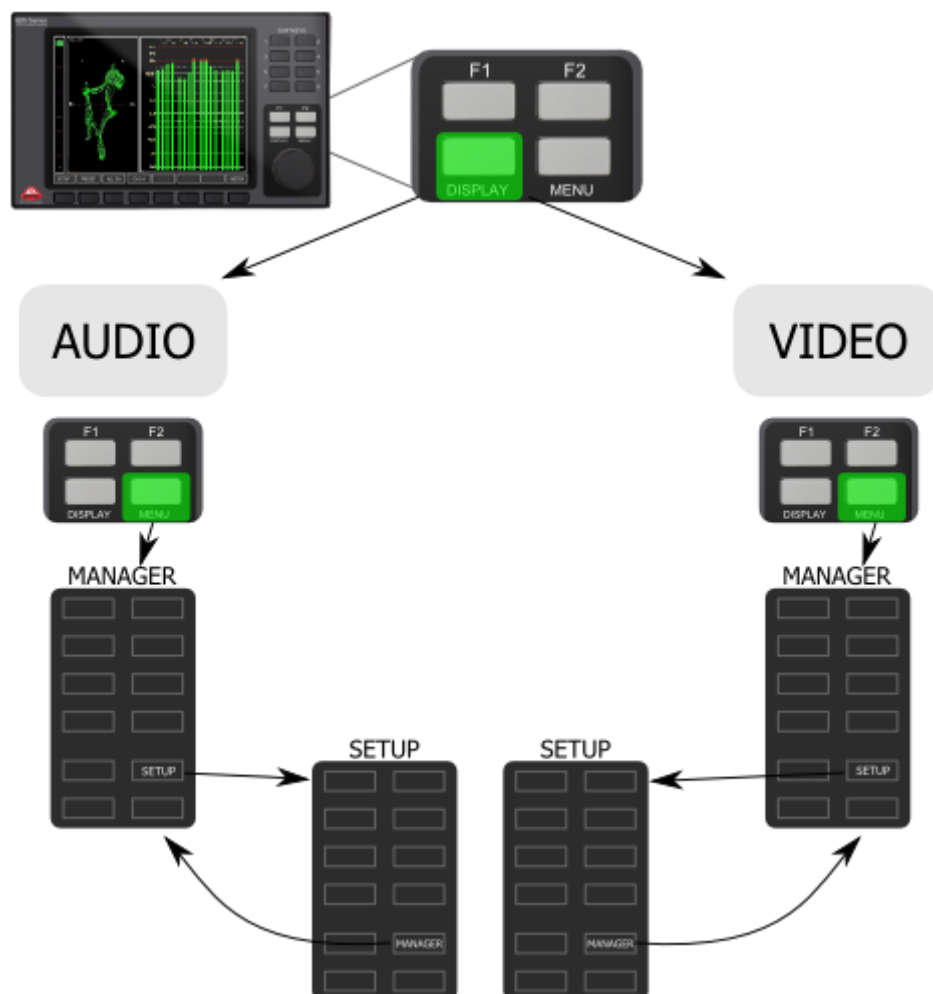
Audio Mode Section

The Audio mode section features all the audio measurement tools such as, bar graphs, Loudness, moving coil emulation, FFT spectrum analyzers and more.
This section will give you an overview of the tools and functions available in this mode.

The 'Manager' section

As mentioned the Manager section is the anchor point of the user interface in both Audio and Video mode.
The Manager mode can essentially be tailored to your exact liking allowing direct selection of various displays and applications, as well as specific functions, menu short cuts etc.
The default shortcuts and views are showed below, here is a quick explanation to the functions.

Shortcut	Function
MATRIX	Shortcut to Matrix menu
GENERATOR	Shortcut to Tone generator menu
PRESET	Shortcut to Preset menu
[PHS SRC]	Access to Phase Correlation input sources
GRAPH LEQ	Graphical Loudness View
FFT1024	FFT Spectrum Analyser View
STARFISH	StarFish View

Please refer to the Advanced Customization section for detailed information about this.
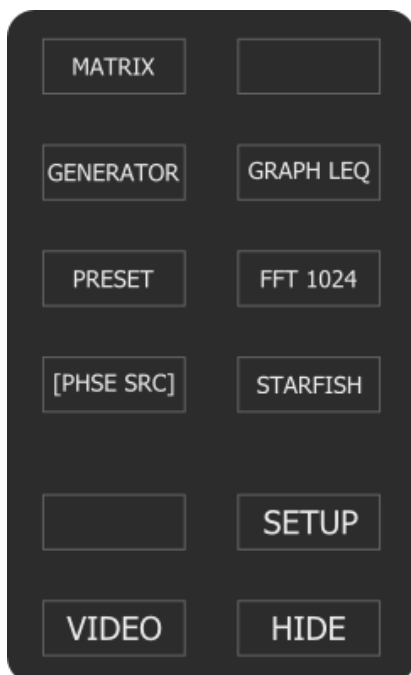
In the initial power up of your PT0800, the Manager section will allow you to select a number of different audio tools as well as offering shortcuts various sections and functions of the PT0800M e.g. Setup, Matrix, Presets etc.
All of these sections will be described later in this section.

First we will get an overview of the Metering views tools available:

Metering Views

There are three basic audio metering views of the PT0800; StarFish, Graph LEQ (Loudness) and FFT Spectrum analysis.
Each of the views may be customized on a number of different parameters which will be address later in this section.

StarFish View

The StarFish view features up to 16 peak bargraphs as well loudness bargraph indication.
The bargraphs may be changed into Moving Coil Emulations.
Additionally two different Surround displays are available: JellyFish and StarFish, both allowing an instant overview of surround channels phase and level interrelation.

Furthermore, four text lines may read out key Loudness parameters as well as a number of other parameters.

Finally, the Phase correlation meter on the far left hand side will constantly indicate the immediate phase of the incoming signals.

The specific buttons in both the lower menu bar and the softkey area, may be completely tailored to your liking.

Graphical Loudness (LEQ) View

The graphical loudness view, allows for several different simultaneous views.
On top of the four standard text readouts and phase meter, it features level bargraphs adhering to the defined scale, while the dual Loudness bars are referring to the defined loudness scale. In essence, this means that two independent scales are viewed at the same time.

Furthermore, the Loudness level is plotted against time as a graphical track on screen, allowing for a historical view.
Loudness may also be logged via the PC application against either internal time or external SMPTE time code.

FFT 1024 View

The FFT view, simply features a 1024 band FFT spectrum analyzer. Please check out the Instrument & Display tools section of this manual for further information specifically on this tool.

Instruments & Display Tools

Bar-graphs

The standard bar-graphs can be used to view numerous different representations of the incoming audio e.g. level according to the selected scale, various loudness parameters, sum/difference and more.
The maximum number of channels viewable depends on the specific DK Meter model and software feature package you have. Please refer to the DK Meter family section for further information.

Goniometer – Vectorscope

The Goniometer is automatically chosen when StarFish® or JellyFish® are enabled and only 2 channels are routed to the Bar-graph section (please the Matrix section for further details).
The Goniometer or Vectorscope, displays phase and amplitude information on the Left and Right input channels.

Phase correlation

When the Goniometer, StarFish® or JellyFish® are selected, the left most part of the display is a phase bar-graph with purple graticule lines. This displays information on the main left/right inputs, with the factory supplied default for this being the first AES input. Other signals can be chosen using the internal matrix.
Audio meters are rarely used to display pure sine waves and the term "in-phase" is applied here meaning a signal where the mono sum is equal to or greater than the higher of the left and right signals. "Out of phase" is a signal where the mono sum would be less than the higher of the left and right signals.
Signals which are predominantly "in phase" have a green marker in the upper half of the range. Fully correlated signals such as double mono read on the +1 mark. Signals which are "out of phase" are shown with a red marker in the lower half of the range.
With no input, with only the left or right driven or with correlated mono but with a 90 phase shift, the marker position is the halfway point with the upper section of the marker green and the lower part red.

StarFish®

The StarFish® is the development in the JellyFish® surround audio display, developed by DK-Technologies many years ago. It provides a picture of a 5.1 surround audio field. The display has the front center channel arranged towards the top with other directions as marked.

The image here shows the StarFish® display with equal audio on all legs. Typical sound fields have energy in a variety of directions and more complex shapes are created which give an indication of the directions having significant amplitudes. Unlike the earlier JellyFish® display which with the same signal would have shown a circle, the StarFish® takes into account the summation occurs when there is coherent (in-phase) content between legs such as left and centre.

Polarity inverted (out of phase) signals can cause the shape to be pulled inwards towards the centre point, reflecting the perceived cancellation that occurs.
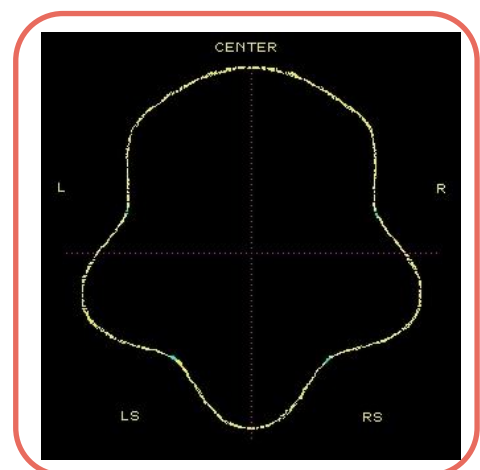
A yellow coloured trace indicates that there is a high degree of coherent signal content.
When the signals are largely un-correlated, the trace becomes blue.

When the predominant content is polarity inverted, a red section of trace shows highlights that might have produce a phasing problem. The randomness of typical surround signals means an occasional glimpse of red should not be a cause for concern, though red showing for extended periods should be investigated as it can be a sign of a signal that will not fold-down well into stereo and mono.

JellyFish™

DK Technologies' trademark 'JellyFish®' display was first launched on audio only meters. It was later developed to provide the alternative 'StarFish® display and both included in the DK Meter. Both modes provide a picture of the surround audio field in 5.1, 6.1 or 7.1 channel modes. The display has the front centre channel arranged towards the top with other directions are marked.
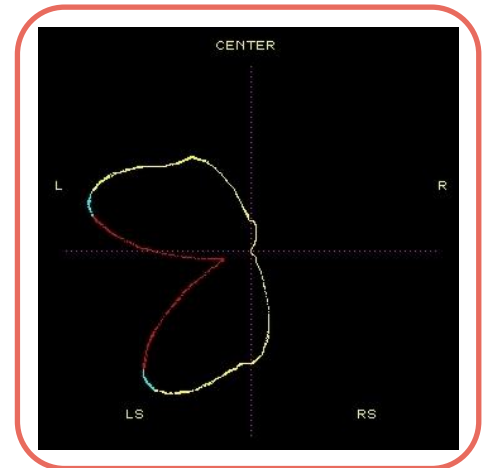
The image here shows the StarFish® mode with equal audio on all legs. In JellyFish® mode, the same signals would produce a circular display. Typical sound fields have energy in a variety of directions and more complex shapes are created which give an indication of the directions having significant amplitudes.
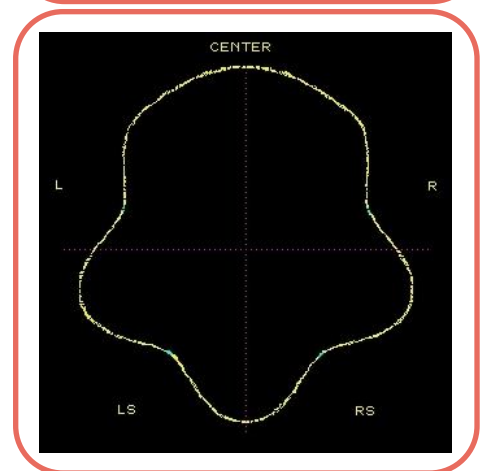
Surround display size

The default setting places an audio compressor in the drive to the surround display. This provides a relatively consistent display size from which phase indications can easily be read, which is the primary purpose of the surround display, amplitude being read from the bar-graphs.

Loudness Bar-graph(s)

The Loudness Bar-graph enables your loudness readings to be monitored side-by-side with the regular amplitude bar-graphs.
The specific loudness parameter displayed on the Loudness Bar-graph may be set in the Quick setup menu; Input and Channel order, or in the Advanced Menu; Meter Setup/Loudness Option.
In addition to the loudness reading, Start/Reset buttons for initiating and resetting the overall Loudness Capture are supplied as well. These are described in detail in the Loudness Setup - Capture section.

Meter Text Read-Outs

The four Meter Text read-outs allow for completely customized view of four parameters in addition the regular audio tools.
The custom setup of each of the four read-outs may be set in the Quick Setup menu; Window Text Read-out or the Advanced Menu; Meter Setup; Windows Text

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Reclaim Factor

The Reclaim factor indicates how much you can increase your signal while still staying within your loudness target.

The Reclaim Factor is essentially the difference between the absolute gated loudness and the dynamic gated loudness.

By making sure that your material is always above the dynamic gate threshold, the reclaim factor ensures optimal loudness within the given standards.

Graphical Loudness

Loudness values can be shown graphically against time using the Graph LEQ function.

The Graphical Loudness display allows for up to 3 minutes of loudness to be mapped against time.

The Graphical Loudness view is reached by sliding once to the left of the basic Bar graph display (view 2 Portrait, View 3 Horizontal).

After hiding the Analyzer panel, the left panel part of the screen shows the individual audio level bar-graphs for the elements that make up the surround (or stereo) signal.

The bar-graph in the right panel shows the instantaneous loudness value.

The Loudness Capture functions are described in detail in the Capture section.

The 'Integtr'/'Shorttrm' button allows for toggling between the two different Loudness measures.

In addition to the graphical loudness, the Peak and Peak hold functions are also made available in the Graphical Loudness display.

The Peak button, enables/disables the flying peak of the bar graphs across all meter views.

Similarly, the Hold button enables/disables the peak hold function across all meter views.

FFT Spectrum Analyzer

The FFT (Fast Fourier Transform) analyser function performs an audio spectrum analysis function. To enable it:
Enter the MANAGER mode by pressing the MENU button
Select ANALYSERS with Softkey 6

The present buttons now take on the role of function keys to select the source which is routed to the analyser.
The Softkeys provide a range of functions as shown in the display.

When CURSOR is enabled, precise measurement on the amplitude shown on screen can be carried out. The Wheeler has a X10 mode, enabled by clicking with it, to allow changes to the cursor position to be made quickly then more precisely by reverting to the normal mode with a second click.

To exit the FFT mode, press Softkey 10 (MANAGER) and then choose the required mode. STARFISH (Softkey 8) reverts to the normal level metering display with surround or stereo phase display.
The Window style of the FFT may be set under the Audio Global folder/FFT1024/Window.

Moving Coil Emulation

The DK Meter features Moving Coil emulation in two different modes replacing the standard Bar-graph indication.
The Moving Coil emulation is enabled in the Advanced Setup menu; Meter Setup/Display mode.
The Moving Coil mode allows for up to four moving coils simultaneously. The StarFish/JellyFish®, Goniometer and Phase correlation may still be displayed in addition to Moving Coils.

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The Dual mode allows a single moving coil arc to display two signals by using a dual Needle Concept.
The specific signals displayed depend on the signals routed in the Matrix Output Assign folder e.g. Left/Right or M/S.
Please refer to the Matrix Output Assign section for more information.

Other Audio Tools

Output Monitoring and Volume Control

The PT0800 also features the ability to monitor and volume control a selected group of audio channels via the front panel Wheeler control.
For more information please refer to the Audio Global / Volume Control section.

Tone Generator
PT0800 includes an advanced Tone Generator section with the following functions:

Signal
The PT0760M contains a generator that can provide a variety of test signals.
The signal type is selected by opening:
MENU \ GENERATOR (Softkey 3)
and then opening the SIGNAL folder and using the Wheeler to select the required signal.
SINE mode and OFF are self explanatory.
PULSE provides a fixed burst, followed by a silence. The PULSE folder allows the pulse and pause duration to be adjusted in 10 mS increments. Enabling FINE allows adjustment in 1 mS steps.
EBU is a system for use on the 6 legs of a 5.1 surround signal. Care should be taken to avoid the high level summation that can occur when coherent tones are added in a down-mix matrix.
WHITE generates an equal power level of random noise at all frequencies across the audio band.
PINK generates an entire audio band of noise but with the power level inversely proportional to frequency. This means the power within each octave is equal.
TEST is reserved for a future software release.

Level
The amplitude is set by opening the LEVEL folder then clicking on the present level with the Wheeler then rotating it to make changes in 1 dB increments. Clicking on the 0.1 dB option allows fine adjustment to the level. The digital level is shown in dBFS at the left. The analogue level that represents, taking into account the analogue reference level that has been set (see section 7.1), is shown in dBu to the right of the digital value.

Sine
The frequency of the sine generator is adjusted by opening the SINE folder then clicking on the present value with the Wheeler then rotating it to make changes. Clicking on the FINE option allows precise setting.

EBU and BLITS patterns
It should be noted that the EBU sequence goes around the channels in a clockwise direction, L-C-R-Rs-Ls and the amplitude is normally set to line-up level (e.g. -18 dBFS).
The BLITS tone (Black & Lane's Ident Tones for Surround) is not implemented in this present software release. It uses the sequence in which signals are commonly encoded onto SDI streams and displayed on bargraph meters with left and right placed adjacently as a stereo pair. BLITS also uses -18 dBFS as the normal level except for the 2 KHz final section where it is reduced by 6 dB.

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Saving Settings

The PT0800M automatically saves the relevant changes to either preset or global parameters, meaning that you do not have to go through a specific 'store' process to save your settings.
Preset parameter changes are automatically saved to the current preset, while global settings will be instantly stored and kept for next power up.

It is however, important to understand the User modes, Password protection and Default Power Up settings before engaging in designing your own setups and settings.

User modes

User modes allow restrictions on parameter access as well as the ability to save settings.
This allows you to determine whether the PT0800M should allow anyone to change and save setting or whether to return to a predefined state after power on. Please see the User mode and User Restrictions section in the 'About Section' for mode detailed info on the specific modes available.

Password Protection

The password protection allows you to password protect your settings via a 4 digit code.
This restriction helps avoid unexpected changes to vital setup parameters to happen. Please see the 'Security Settings' in the 'About Section' of this manual for more details on how to set up and operate the Password protection.

Default Power Up Settings

The PT0800M allows you to design the specific default parameters, modes, views and preset chosen during Power up. This ensures that your unit always 'wakes up' in a known and identical state.

Please see further details in 'Power Up settings' in the 'Audio Global' section.

Matrix - Audio Signal Routing

Semi-Automated Role Based Audio Routing

As you are probably aware by now, the PT800M is quite a complex piece of equipment.
In order to simplify and semi automate the many inputs and destinations of the PT0800M, the input sources are given a 'Role' rather than using direct audio routings. The PT0800M then interprets the roles and automatically routes the correct audio to the respective internal instruments.

For example: If you were to route a 5.1 mix from the SDI stream into 6 bargraphs, StarFish, Phase correlation and Loudness measurement manually, you would have to route numerous wires to the different instruments. Instead, you label your 6 SDI channels with the roles of Left, Right, Center, LFE, Left Surround, Right Surround and the PT0800M automatically routes the signals onto the other instruments including the extra precautions of e.g. not including the LFE in the loudness measurement etc.

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The Matrix – Routing Audio to Meter functions

(Setup/Preset/Matrix Output Assign/Meter)

In order to route audio sources to the correct positions and roles, you need to enter the Matrix folder.
This can be done either directly by hitting the 'Matrix' shortcut key in the 'Manager' mode or through the folder structure: Setup/Preset/Matrix Output Assign/Meter.

As you will see from the figure below, the PT0800M matrix consists of a Source list (left side) and a Channel Role (right side).
Selecting a specific source for a defined role will automatically route the source into the relevant instruments.
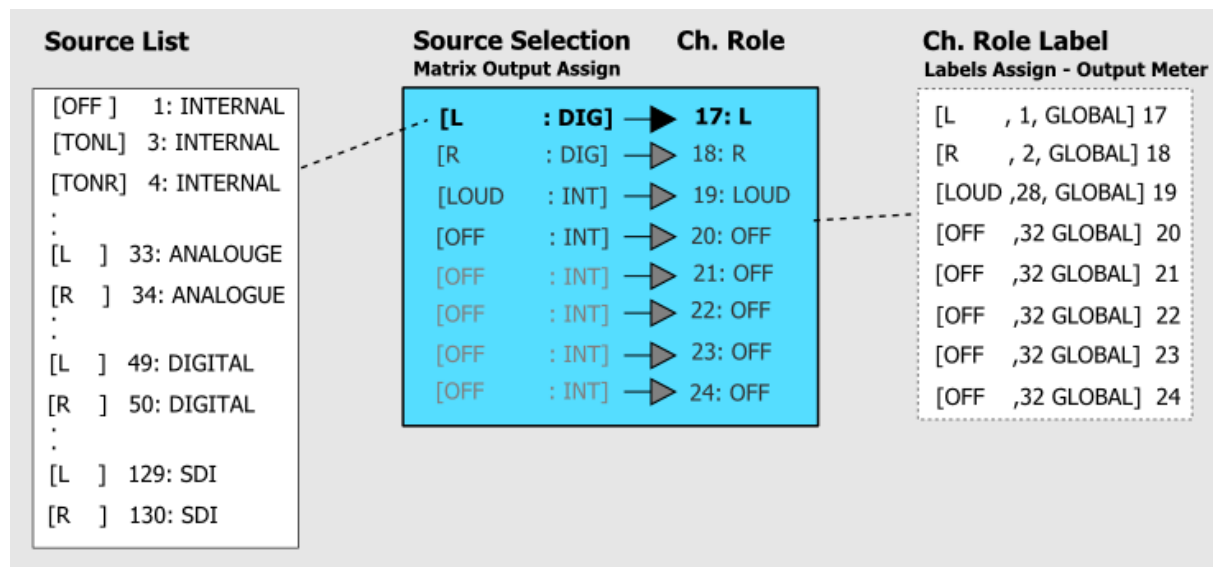
'Source' Selection' – Selecting the Source from Source list
(Setup/Preset/Matrix Output Assign/Meter)

Scroll to the relevant 'Source –Role' line that you want to alter. Push the Wheeler to select.
Once the 'Source-Role' line is selected, you may dial through the available Sources.
Alternatively, you can push the F1 button (soft key 9)'Show List' to pop-up the Source List, showing all available sources. You may scroll through to find the desired source.
Once you have found the relevant source, hit the Wheeler again and the Source-Role selecting is done.

A word on the 'Source List'

The Source list is a dynamic list changing with the respective input cards of your unit.
In addition to external inputs from various cards, the Source list holds a number of internal sources, such as; Loudness, Mix, Difference, Tone L/R etc.
This means that if your meter has de-embedded SDI channels, you will see these, just like digital and analogue sources will show if enabled on your meter.

Internal Sources
As mentioned, the Meter includes a number of internal sources that has specific functions like 'Off', Sum, Difference, Loudness etc.

These come handy for setting up special functionality like a Loudness Bar-graph, or adding MS viewing to the Moving Coil emulation. Here is a list of the internal sources function:

Internal Source	Function
Off	Off
Off	Off
TonL	Tone Generator left out
TonR	Tone Generator right out
Mix	Used for Sum (M) signal in MS viewings, or as Left ch. when in Downmix mode
Diff	Used for Diff (S) signal in MS viewings, or as Right ch. when in Downmix mode
Loud	For Loudness Bar

Setting up relevant Roles - Channel Role Label (Output)
(Setup/Preset/Labels Assign/Output/Meter)

The roles available in the Matrix may be changed to suite the setup that you are looking to create, whether that is multiple regular left/right mixes, a 5.1 + Stereo mix or any other combination.
The role is what defines the routing and behavior of the specific source, so make sure that you select the correct role.

In the Setup menu, select the Labels Assign folder, go to 'Output/Meter' and select the role you want to re-label.
Now choose the label you prefer by dialing through the list.

Ch. Role Label
Labels Assign - Output Meter

[L   , 1, GLOBAL] 17
[R   , 2, GLOBAL] 18
[LOUD ,28, GLOBAL] 19
[OFF   ,32 GLOBAL] 20
[OFF   ,32 GLOBAL] 21
[OFF   ,32 GLOBAL] 22
[OFF   ,32 GLOBAL] 23
[OFF   ,32 GLOBAL] 24

Loudness & StarFish/JellyFish Roles
The Loudness and StarFish routings will be automated based on the first set of channels starting with a 'Left' channel.
For example in a setup consisting of Left/Right/Center/LFE/Ls/Rs + Left/Right, the first set of channels starting with 'left' will be the surround mix and therefore these channels will automatically be routed to the Loudness and StarFish instruments.

Changing a Source Name – 'Source Labels'
(Setup/Preset/Labels Assign/Input/*relevant input card*)

The Meter includes a list of default names/labels for all the available sources. However, these may be changed completely to your liking.
This is the label that is indicated on screen above the relevant Bar-graph.

This comes in handy when you want to label your sources with more relevant names e.g. L OB Van or TV1 or what-ever is relevant for you. The Source Labels menu allows you to do exactly that.
In the Labels assign menu, go to Input and select the source you want to re-label. Now choose the label you prefer from the default label list (Global Label Master).
The default labels may be changed in the Global Label Master

Global Signal Label Master – Changing available labels
(Setup/Audio Global/Labels/Signal)

The Global Label Master is a default list of all the labels available for Source and Channel Role labeling.
Each of the Master labels may be altered to your liking, meaning that you can completely customize the labeling of both incoming sources and roles.

Routing Signals to Digital or Analogue Outputs

Similar to the routing of sources to metering roles, the PT0800M allows inputs signals to be routed directly to the relevant output cards installed (digital AES or Analogue).
Each of the output cards will automatically show up in the Matrix folder when installed and for each of the independent outputs you may select any given source from the metering inputs cards i.e. SDI, AES, Dolby decoded sources, Analogue or even the internal metering sources e.g. the Tone generator.

Simply follow the same procedure as above; scroll to the relevant output e.g. Analogue out #33, click the Wheeler and select the source you wish to be routed to this output.

Clock Setup – Selecting the Master Clock Source

The PT0800M is capable of locking to any of the incoming 48kHz digital channels.
It is important to note that, once the PT0800M master clock source has been chosen, the remaining incoming channels must be in sync with the source in order achieve correct metering. The PT0800M does not sample rate convert or in other ways alter the signal to adapt incoming signals to the master clock.

Selecting the Master Clock Source
In order to change the master clock source of the PT0800M, enter the Setup/Matrix and select any Source.
Once a source is selected, hit the 'Show list' button below (F1), this will take you to the source list.
You will see one of the sources marked with a small 'Clock' sign – this is the current master clock source.
If you want to alter the master clock source, scroll to the source that you want to become master and hit the 'Option' button below (F1). The clock source has now been changed.
Hit the 'Quit' button (F2) to exit the Source list.

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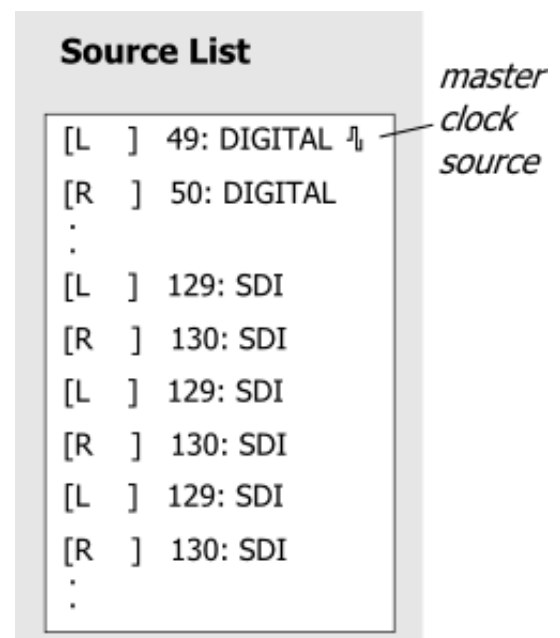
The Setup Menu

The Setup Menu

The Setup Menu holds the access to all of the background parameters of your PT0800M. In order to understand the functionality, it is important for you to read through the different sections.
This section of the manual will go through each of the folders and functions and describe their respective parameters.

Many of the parameters will alter preset parameters and hence are instantly stored. Therefor it might be relevant to select the desired preset to be edited <u>before</u> proceed with customizing your meter setting in the Setup Menu. Also, you may want to check that your User mode and Security settings are set correctly before altering parameters.

> NOTE: If you are looking to change a specific feature or function it might be relevant to look at some of the examples in the 'How to' section of this manual.

About Section

Holds a number of system related settings, suchs as Software and Hardware activation codes, as well as the security and User access mode system.

Security Settings

Whenever the meter is re-powered or rebooted password protection is automatically enabled. This prevents changes to meter settings from becoming new defaults when it is powered up next time. Once password protection is off, any changes made to presets and other settings will be saved.
To disable the factory set password protection:
1. Enable the MANAGER mode (MENU button)
2. Enter SETUP (Softkey 10)
3. Use the rotary Wheeler control to highlight ABOUT and press the Wheeler which will open a drop down menu. Scroll down to SECURITY SETTINGS and press the wheeler again which will show that the system status is LOCKED.
4. Scroll to the PASSWORD option and press the Wheeler. This can allowa new password to be defined using the ten Softkeys.If none are pressed, the default password of 0000 remains. Thisis regarded as having been entered if the EXIT button (a Wheeler press) is done for a second time.
5. The system status is now shown as UNLOCK(ed) and making changes to the meter configuration when it remains unlocked allows those changed settings to become the new power-up defaults. Deciding whether to have the meter locked or unlocked allows some changes to be made on a temporary basis and such modifications easily abandoned, and others can become new defaults.
6. Once the PASSWORD folder is closed, the Setup EXIT button (Softkey 10) takes the meter out of the setup mode and back to MANAGER mode.

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To allow the full screen to carry signal images, the HIDE function is enabled using the MENU button.

When drop down lists occupy a major part of the control display, Softkey 9 can be used to COLLAPSE the list.

7. Re-starting the meter will automatically re-lock the meter system. It can also be locked without re-booting if the password entry mode is selected (step 4 above) and the SAVE button (DISPLAY) is pressed.

When setting a new password, be sure to record it accurately as only by knowing it, or having help from the customer support team at DK-Technologies, can any further changes be made to the meter.

System

The Systems section contains a number of parameters relating to the very rudimentary state and setup of your device. The systems folders will be addressed in a separate chapter later in this manual.

User Mode & User Restrictions

PT0800M has four levels of user access, allowing for the meter to be protected against unintended use and changes to the setup.

The four levels are:

- Restricted
- Basic
- Full

Changing the User mode

The change of user mode takes immediate effect.

In order to change the User Mode, the security level must be set to 'Unlocked'.

Full Mode

The Administrator mode gives full access to all meter views, setup parameters and automatically stores all changes. Full mode is the default user mode of the PT0800M.

Basic Mode

The Basic mode allows for all meter views to be utilized, while some of the menu access are blocked.

In the 'Manager' mode, you are able to access any of the shortcut menu entries, while the 'Setup' menu is limited to access the 'About' folder.

Also, you are allowed to change preset settings, but the settings will not be stored permanently and the PT0800M will resume to the original settings upon power off.

Restricted Mode

Restricted mode requires an access code to open access into all background menus.

Upon entering the access code, the user will be allowed access to the 'Basic mode' level.

Preset Folder

The Preset folder in the Setup Menu holds every preset storable parameter.

Please note that you have to be in the correct User Mode and security settings mode to alter parameters for good.

The Preset Folder always shows the label of the preset currently active

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Matrix Output Assign – Selecting your Meter Source

Internal

The internal sources output assignment is only used in very advanced and specialized setups and should be disregarded in general use of the PT0800M.

Meter

The Matrix Output Assign/Meter folder lets you choose what source is routed to the respective roles and Bar-graph displays.
Please refer to the Meter Setup and Audio Routing section for further information.

Options Out folders

If your unit includes output cards, the relevant folders will be visible here and will allow you to route specific signals Internal or External to your respective outputs, e.g. allowing for de-embedded SDI signals to be routed to analog or digital AES outputs.

SMPTE Decoder

The SMPTE decoder folder allows you to decide from which input a possible external LTC timecode is taken.
Select the appropriate input in the same manner as the other matrix folders.

Meter Setup

The Meter Setup folder holds a number of parameters that allows you to customize the behavior and appearance of your Meter.

Scale

This menu allows you to define exactly what scale and specs your bar graphs should perform to.
Select the desired scale by moving the cursor in place and hit 'Select'.
The scale list includes:

IEC 268 I – PPM Nordic	BBC – IEC 268 II	IIB – IEC 268 II
DIN	SMPTE VU	FBTV – DIN
NBC – Ultra VU	LEQM – RMS LEQ	ITU – RMS LEQ
DMU1 – DMU1630	DMU2 – DMU1630	40A – Dorrough
40C – Dorrough	EBU – IEC 268-18	WEBP - Web Peak

Display mode

Allows you to select whether the Bar-graph width is auto scaled or if you want to manually ('Normal') define the individual Bar-graph appearances. The specific bar graph widths may be set manually in the Bargraph width folder.
Additionally, switch from Bar-graph to 'Moving Coil' or 'Moving Coil Dual' mode.

Please refer to the 'Moving Coil Emulation' section in the Instruments chapter for more info.

Bar-graph Width – Manual

The Bar-graph Width allows you to alter the width of each bar-graph being displayed.
In order for the Bar-graph Width to work, please ensure that you have selected 'Normal' under the Display Mode folder.

Colour Normal

Each scale includes a defined 'Peak' level where the scale turns red. The 'Peak' threshold may be altered under the 'Loudness Setup' by the parameter named 'Peak level'.
In addition to the Peak area, the DK Meter allows you to define colour of the 'Normal' area.
The 'Colour Normal' sets the color of each bar-graph below the 'Peak level' in the 'Normal' area.

Colour Under

A threshold defines when the input signal is considered 'under' the 'Normal' level.
The 'Colour Under' sets the color of each bar-graph when below the defined threshold.
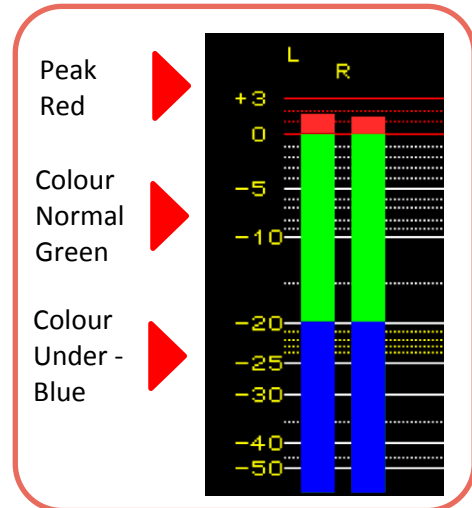
Under Level

Range: 0 to -25dB
The 'Under Level' determines when the signal is considered 'Under' the normal level.

Window Text

The Window Text Read Out allows you to customize what parameter each of the four Text read outs in the top the DK Meter screen displays.
The available text read outs may be chosen for each of the four display text lines:

Off	Loudness Select	Momentary Loudness (M)
Shortterm Loudness (S)	Integrated Loudness (I)	Loudness Range (LRA)
Reclaim Factor	Momentary Max	Shortterm Max
Gate Hold	Peak Level Max	SMPTE Time
Start Time	Stop Time	Resume Time
Shortterm Time (window)	Filter Type	Preset Audio (name)
Volume	Loudness Preset	*Reserved*

StarFish™ Setup

The StarFish™ setup gives you access to setting up and defining your StartFish™ and JellyFish™ appearance.

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Colour

Select the basic display colour of the StarFish™/JellyFish™.
Blue, Green, Light Blue, Red, Violet, Yellow.

Compressor

The compressor section allows for different performance parameters to be set up.
Fast / Slow parameters controls the Phase correlation responds time. In particular when reviewing phase relation of low frequency content, the 'slow' position might come in handy.

The Gain On/Off parameter allows the Goniometer and StarFish™/JellyFish™ to always in a relevant size, but adding gain to increase the visual appearance of each of the instruments.
The gain is evenly distributed meaning that the channel relationship is kept complete and can always be trusted to give a correct representation.

OP-Mode

The operating mode allows you to choose between running the StarFish™ or JellyFish™.
Please refer to the instrument section for further information on each of the two.

Timecode

The PT0800M allows you to view, align and log to an external incoming timecode.
In the timecode folder, you can select exactly what timecode source you want to use:

Off	No timecode is used
Internal	Arbitrary free running internal timecode
SMPTE	Incoming LTC code (see Matrix Output Assign/SMPTE decoder)
SDI 1VANC	Video embedded ancillary data time code from SDI input #1
SDI 2 VANC	Video embedded ancillary data time code from SDI input #2

Loudness Preset

The Loudness setup parameter allows you to select between a number of standardized or recommended Loudness settings including:

R128	ATSC A/85	LEQM
BCAP	TV2 DK	ABC-TV LA
HRTV-23FS	ARIB	AGCOM 219

If you select 'User' the loudness setup may be completely customized to exactly your specifications in the Loudness Setup Folder (please see next paragraph).

Loudness Setup

The Loudness Setup folder allows you to customize the loudness settings of your meter.
You may use one of the Loudness presets as a starting point, but in order for the customized loudness setting to be saved, the 'User' loudness preset has to be selected.

Tip: Select the Loudness Preset that comes closest to your desired loudness setting, then select the 'User'
Loudness Preset in order to customize the details.
Your changes will now automatically be saved to the current preset.

Filter

Range: K-FILTER or LEQM.
Two different scales have been adopted for displaying the loudness value. One of these is defined by the ITU in their document ITU BS1771 and that uses "Loudness Units" - LU. These have values ranging from -18 to +9 with the typical aiming point for signals being a specification close to the 0 point. The other commonly used scale has only negative values going down from a 0 LUFS mark at the very top of the scale.

Short-term Window

Range: 0, 3, 10 or 30 seconds.
The currently displayed loudness value is based on the averaged loudness values over a defined time window. Setting the window to 0 provides a display of values that are as instantaneous as the system permits. The window can be adjusted to be 0, 3, 10 or 30 seconds.

Reference

Range: -9 and -24 dBFS (1 dB steps).
A range of Reference levels can be chosen for the purpose of loudness measurement as part of the loudness measurement standard which your organization (or client) has adopted.

Peak Level

Range: -1 to -10 dBFS (1 dB steps).
The Peak level is a user defined reference point.
The peak level is dependent on the setting of 'Peak Mode'; True Peak or Digital (Sample Peak).
When the signal passes above the peak level, the Peak level readout will turn Red.

Gate Level (-a)

Range: -8 to -20 dB (1 dB steps).
It is often the high level parts of a program which are often of most interest for assessing compliance with broadcast criteria. To prevent an extended length of low level program content reducing the averaged loudness value to a degree that affects the measured value, the meter has an optional gating function. Once the signal drops below the gate threshold, the meter will continue to hold, display and use for averaging purposes, the previous value that was above the threshold. Setting it to -20 causes the gate to remain open and the unit displays the actual loudness for the vast majority of the time.

Gate Level (-b)

Range: Floating or Absolute.
The gate level can be an absolute value or a floating one. Absolute values offer a degree of simplicity but at the risk of a high setting causing gating of quieter sections which might sometime comprise a significant part of material such as a feature film soundtrack. Adopting a low absolute value can cause background noise that is at

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a relatively high level (for example a documentary by a waterfall) not to be gated out, even though it is not a significant contributor to the perceived loudness. Making the gate level relative may then offer results that more closely reflect perceived program loudness.

Peak Mode

Range: Digital or True Peak.
Selecting Digital will base the reading on individual sample values.
True Peak uses oversampling to create the maximum intersample peak possible taken from the maximum value of the interpolated waveshape.

Reference

This is the frequency chosen for the calibration alignment and is either 400 or 1000 Hz.

Capture

The Loudness capture functionality may be changed between two different modes; Start-Pause and Auto-Start.

Loudness measurement or Capture is essentially always done over a timespan - hence, it is necessary to define when the Loudness capture starts and stops.
As explained in the Loudness & Terminology section, several different Loudness measures are relevant i.e. Momentary Loudness, Short-term Loudness, Integrated Loudness and Loudness Range – all time dependent.

The Start-Pause Mode
Is in effect a manual mode that allows you to decide when the Loudness capture starts, pauses, restarts or is reset.
In all meter views, a 'Reset' and 'Start/Pause' button are supplied.
The button expresses the Loudness capture state the meter is in, e.g. 'Start' indicates that the Loudness Captured has been started.
Loudness Capture is dependent on the incoming signal being higher than -70dBFS.

When starting the Loudness Capture, the button name will switch from 'Pause' to 'Start' given that the incoming signal is above -70dBFS.
In case the signal is not above -70dBFS, this will be indicated by the 'Start' button being black.

During the Loudness capture, you may now toggle the capture between 'Start' and 'Pause'. The overall resulting loudness readings will express the summarized capture of all audio above -70dBFS from the last Reset.

Hitting 'Reset' will re-initiate the Loudness Capture and measures.

Overall, the Start-Pause mode allows you to manually start and stop the capture during breaks or audio that you do not wish to consider in the overall loudness readings.

> *Note: As per the BS1770 standards, audio below -70dBFS is not included in the overall loudness capture.*
> *This is to avoid that breaks or silence in the audio undermines the loudness readings.*

Auto-Start Mode

The Auto-Start mode, has controls and options similar to those of the Start-Pause Mode, with the addition of an automatic start/reset facility triggered by the audio level.

More specifically, if the audio is higher than -70dBFS, the Loudness Capture is automatically started, as well as being automatically stopped and Reset when the audio drops below -70dBFS again for more than 2 seconds.

This mode is particularly handy when working with smaller bits of audio, and frees you from having to manually reset the loudness capture every time you want a new reading.

Loudness Option

The Loudness option section allows you define what loudness parameter you wish displayed as the Loudness bar-graph.

> *Note: Enabling a Loudness Bar-graph requires audio to be routed to the relevant bar graph position. This may be done through the Quick Setup Menu; Input and Channel Order folder or the Advanced Menu; Matrix Output Assign folder.*

The Loudness parameters available for display are the following:

- Momntry – 'Momentary Loudness'
- Shorttrm– 'Short-term Loudness'
- Integrt – 'Integrated Loudness'
- None – Meaning no Loudness Bar graph displayed

Window Text

The Window Text Read Out allows you to customize what parameter each of the four additional Text read outs appearing on the Graphical Loudness view.

Labels Assign

The Labels Assign folder allows you to customize naming and labeling of both sources and channel roles.
Please refer to the Meter Setup and Audio Routing section for more information.

<p align="center">Input
Output
User Define</p>

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Audio Global

The Audio global section provides you with a number global parameters, not changed with the preset of the PT0800M, yet still restored after power up.

Power Up Settings

The Power Up Settings enables you a very high degree of tailoring and default settings on how your PT0800M behaves after power and in the respective menus and setups.
This is the section where custom button combinations may be design for a number of different views and situations.
NB: make sure the security settings are unlocked in order for the change to have effect after the re-boot

Preset

The 'Power up' Preset may be defined in this folder, making sure that your PT0800M boots from the same preset at every power. Select the desired default preset from the list.

Menu - StarFish

This parameter allows you determine what set of Menu buttons the StarFish view will default to.
The folder allows you to access a number of standard Menu button bars as well as three custom Menu button setups.
Please see the 'Menu Main', 'Menu Preset' and 'Menu Loudness' descriptions below for further information on custom Menu button setups.

Available Menu button bars:

Menu	#1	#2	#3	#4	#5	#6	#7	#8
Classic	Setup	Matrix	Preset	Sig Gen	Meter	FFT	Loudness	-
LEQ1	Peak	Hold	Clear	10 sec	30 sec	Start	Stop	Resume
LEQ2	ShortTm	Integrt	3 sec	10 sec	30 sec	Start	Stop	Resume
Loudness	custom	custom	custom	custom	custom	custom	custom	custom
Preset	custom	custom	custom	custom	custom	custom	custom	custom
Main	custom	custom	custom	custom	custom	custom	custom	custom

Utility – Graphical Loudness (LEQ)

This parameter allows you determine what set of Menu buttons the graphical loudness view will default to.
Please see the 'Menu Main', 'Menu Preset' and 'Menu Loudness' descriptions below for further information on custom Menu button setups.

Menu	#1	#2	#3	#4	#5	#6	#7	#8
LEQ1	Peak	Hold	Clear	10 sec	30 sec	Start	Stop	Resume

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LEQ2	ShortTm	Integrt	3 sec	10 sec	30 sec	Start	Stop	Resume
Loudness	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*
Preset	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*
Main	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*	*custom*

Application

The application folder allows you to determine specifically which of the three Audio views the PT0800M wakes up in after a power up.

Button Function Customization

The PT0800M has the option of adapting virtually any of the button menus in both the Soft key and Menu bar area.
Multiple sets of custom setup buttons are available depending on the specific view currently active as well as the combination of buttons that you choose.

The specific custom button menus and folders are described below, but before getting to these, here is the list of functions that may be chosen from when defining a custom button:

Group	Legend	Comment
	None	blank, no function
Presets	**-**	**Direct recall of PT0800M Presets**
	Pre #1	Preset 1, label by the name of preset
	Pre #2	-
	Pre #3	-
	Pre #4	-
	Pre #5	-
	Pre #6	-
	Pre #7	-
	Pre #8	-
Application	-	**Changes Metering View**
	StarFish	Will enter StarFish view
	Graph LEQ	Will enter Graphical Loudness view
	FFT 1024	Will enter FFT spectrum analyser view
	~~1/3 Oct.~~	*Not used*
Menu		**Calls up different Menu Bar Button sets**
	LEQ1	Will call up LEQ1 Menu bar button set
	LEQ2	Will call up LEQ2 Menu bar button set
	Loudness	Will call up Loudness custom Menu bar button set
	Preset	Will call up Preset custom Menu bar button set
	Main	Will call up Main custom Menu bar button set
	Phase SRC	Calls up the list of Phase meter sources 1-8
	Phase	Calls up the list of Phase meter sources 1-8

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	SRC+	
Soft		**Accesses Select Setup folders**
	Setup	Enters the Setup menu
	Manager	Enters the Manager levels
	Matrix	Enters the Matrix folder directly
	Generator	Enters the Signal Generator menu
	Preset	Enters the complete Preset list
	Security	Enters the Security folder directly
	StarFish	Calls up the StartFish Custom Soft key set
	FFT1024	Calls up the FFT Soft key button set
Meter		**Metering Functions**
	Peak	Turns on/off Peak indicators
	Hold	Turns on/off Peak permanent hold
	Clear	Clears Peak Hold
	+20dB	'Zoom' - adds 20dB to incoming signals
Loudness		
	Shorttrm	Chooses Loudness bargraph as Shorttrm Loudness
	Integrt	Chooses Loudness bargraph as Integrated Loudness
	Start	Starts Loudness reading
	Stop	Stops Loudness reading
	Resume	Resumes Loudness reading
	3 sec	Sets Shortterm Loudness window to 3 seconds
	10 sec	Sets Shortterm Loudness window to 10 seconds
	30 sec	Sets Shortterm Loudness window to 30 seconds
Func		
	Left	Allows you to select only 'Left' channel monitoring
	Right	Allows you to select only 'Right' channel monitoring
	Video	Allows for change between Video and Audio mode

Softkey – Hide

The Softkey section is functional even when they are not visible.
This folder allows you to define the specific functions for each of the 8 Softkeys, F1, F2 and Display buttons while the menu is hidden.

Softkey – Manager

The soft key functions of the 'Manager' mode.
This folder allows you to define the specific functions for each of the 8 Softkeys, F1, F2 and Display buttons while the 'Manager' mode is selected.

Softkey – StarFish

The soft key functions of the 'StarFish' mode.
This folder allows you to define the specific functions for each of the 8 Softkeys, F1, F2 and Display buttons while the 'StarFish' mode is selected.

Please note that you will have to specifically activate the StarFish mode via the 'Soft' group of buttons to enable this set of buttons.

Menu – 'Main'

The Menu bar button set of the 'Menu' mode.
This folder allows you to define the specific functions for each of the 8 Menu bar buttons.

Menu – 'Preset'

The Menu bar button set of the 'Preset' mode.
This folder allows you to define the specific functions for each of the 8 Menu bar buttons.

Menu – 'Loudness'

The Menu bar button set of the 'Loudness' mode.
This folder allows you to define the specific functions for each of the 8 Menu bar buttons.

Analogue References

The analogue reference sets the sensitivity of the analogue input.
In essence the sensitivity decides how many dBU it takes to fully reach maximum input or 0dBFS.

Downmix settings

The Downmix settings are used for allowing a stereo down-mix to be created and viewed from an incoming surround set of channels.
The 'Output gain' is the attenuation compensating for potential clips when joining the 6 channels together.
'Center to L/R' sets the that the Center channel is mixed by.
'Mode' decides whether the Downmix facility is on or off.

Volume Control

The Wheeler has the ability of controlling any output volume of the PT0800M when the Menus and folders are closed.
This section allows you to define exactly how you want the Wheeler to behave while working as a volume control including the specific volume currently active, the increments of the volume control and the DIM level (push the wheeler to activate/de-activate).

Output Assign
In this folder you will specify on exactly which outputs the volume control will work.
The outputs available depend on the specific card configuration of your PT0800M and will automatically show up on the list.
Simply scroll to the output that you desire to volume control and hit the wheeler to enable 'Volume'.

FFT 1024

The Window type used in the FFT may be altered in this folder.

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Labels

Allows for editing of several global labels and legends.

Preset

This folder allows for the legend of the 8 presets to be altered into exactly the name that you feel reflects the specific preset functionality best.

Signal Labels

The Labels section allows you to customize names of presets as well as signals, also to referred to as the Global Label Master.
Please see the Meter Setup and Audio Routing section for further information.

Colour

The Colour parameter defines the colour scheme of the meter, most notably on the Window Text Read outs.

Down-mix from Dolby E

When the Dolby E decoder module is installed, an automatic down-mix to stereo is available. This example assumes this down-mix is to be routed to a pair of analogue outputs.
If not already assigned, first select the signal to be routed to the Dolby decoder. Turn off password protection if the new routing is to be saved to the preset, then go to:

MENU \ SETUP \ PRESET [*name*] \ MATRIX OUTPUT ASSIGN \ DOLBY DECODER

Scroll first to select the left input of the Dolby decoder. Click with the Wheeler to allow the alternative sources to be scrolled through until the required input is shown then click again with the Wheeler. Repeat this to select the right input source, remembering that Dolby E encoded signals will normally always come from a pair of related sources. Routing left and right of Dolby E signals via different SDI groups or AES input ports is likely to result in damage to the data.

The stereo down-mix must now be routed to the required output port. Go to:

MENU \ SETUP \ PRESET [*name*] \ MATRIX OUTPUT ASSIGN \ ANALOGUE OUT

Scroll to the analogue output to be used and click on it with the Wheeler. The Wheeler can now be used to scroll through all the possible signals that could drive this output. Go to those with the Dolby double-D symbol which first show L, R, LFE etc. The stereo down-mix left output is 9 and the right is 10. Use the Wheeler to assign these to the required analogue output ports.
If this is to be used as a monitor speaker feed, it may be helpful to assign the Wheeler as a volume control on this output.

Selecting Phase Correlation Sources

The PT0800M allows you to freely define what two channels phase relationship is expressed by the Phase correlation meter.

In order to change the Phase sources, slide to the top set of vertical buttons and hit the 'PHSE SRC' button and the horizontal row of buttons turns into Phase correlation source selection of the first 8 incoming channels.

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In case you need to select sources from ch.9-16, you will need to enable the 'PHSE SRC+' function.
Press and hold an empty on screen button for about 3 seconds and then select 'PHSE SRC+' from the list. Now you have access to selecting ch. 9-16 as sources for the Phase correlation meter as well.

Surround down-mix

Surround signals can be carried on analogue, AES3 and SDI (non Dolby) input paths. When a StarFish mode display is enabled, the PT0800M creates a down-mix. This mix can be routed to any analogue or digital output by using the matrix. The left and right down-mixes are both labelled MIX. To route the required one, the more anti-clockwise one on the Wheeler is the left and the right is one click clockwise from it.

The overall gain and the level of the centre contributions can be adjusted. The right down-mix is similar.
To adjust the centre contribution and the overall gain, ensure password protection is not enabled and go to:

MENU \ SETUP \ AUDIO GLOBAL \ DOWNMIX SETTINGS

Select either the OUTPUT GAIN or the CENTR TO L/R for adjustment using the Wheeler. Adjust the value as necessary and then click with the Wheeler to save that setting. The output gain can be varied from -16 dB to +3 dB. The centre contribution can be adjusted from -6 dB to 0 dB with both adjustments having 0.1 dB steps.

How to…..

Managing audio presets

An audio preset stores the routing of the audio matrix (including volume control
functions) and also the form of display on the screen. There are eleven presets
with eight normally accessible through the preset buttons beneath the screen and the full list visible and selectable by going to entering MANAGER mode, by pressing MENU and then choosing PRESET using Softkey 5. The active preset can be changed at any time but changes to the detailed settings within a preset can only be modified when the meter is not password locked

Changing preset names

Names can be up to 10 characters in length and when selected for use, the full name is displayed in the top left of the audio goniometer or StarFish/JellyFish display. The full name is also visible when presets are viewed as a list in the system manager window. The limited space above the preset buttons has space for only the first seven characters on the preset name so it can be helpful to avoid preset names with identical characters in the first seven.
To change a preset name, ensure that the meter is not password locked then go to:
MENU \ SETUP \ AUDIO GLOBAL \ LABELS \ PRESET
and use the Wheeler to select the one to be changed. A flashing cursor then appears beneath the first character and the Wheeler can move this cursor to other characters as required. Once it is beneath the character to be changed, select it using the SELECT button (the MENU button) and then rotate the Wheeler to scroll through all the 91 different characters that are available.
The sequence is:
SPACE ! " # $ % & ` ( ) * + , - . / 0 to 9 : ; < = > ? @ upper case A to Z [ \ ] ^ _ ` lower case a to z.

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When the required character is showing, press select to allow the Wheeler to then be used to reposition the cursor under a different character. Once the correct name is displayed, press the Wheeler to save that preset name.

The COPY and PASTE buttons (Softkeys 9 and 10) allow an entire preset name to be copied to an internal clipboard and then pasted onto a different preset number. The clipboard content remains in place, even when going to a different set of names - for example when moving between lists of presets and lists of signals. A character string used as a signal name (e.g. MIX) can be pasted to be used as a preset name, though string length limitations may sometimes cause truncations.

Storing audio presets

The delivery presets can be changed by taking the following steps:

1. If not already turned off, remove any password locking (section 5.3).
2. Select the audio mode using the DISPLAY button.
3. Choose the preset which is to be modified. This can be done either using one of the preset buttons or by choosing it from the list accessible in MANAGER mode and choosing PRESET using Softkey 5.
3. If the preset was chosen from the list in MANAGER mode, close that list by pressing MANAGER (Softkey 10).
4. Use all the required audio settings adjustments including matrix routing, meter scales etc. to create the required display.
5. Go back to the SETUP mode by pressing Softkey 10 once or twice (depending whether you have been selecting COMPONENTS or not).
7. Unless the preset label is not going to be changed, scroll to AUDIO GLOBAL and open the LABELS \ PRESET folder.
8. If not already done, update the name for the preset as described in 9.1.
9. Presets are saved automatically as soon as new settings are created.

How to Software update

DK-Technologies constantly develop new software features, facilities and adjustments to adhere to all relevant scale and Loudness recommendations.
It is therefore recommendable that you, once in a while, check for new updates for your Meter on:
www.DK-Technologies.com

Every DK Meter can easily be software updated via the inherent USB connector.
Please follow these instructions to software update:

- Go to www.DK-Technologies.com
- Go to the PT0800M product/Download page
- Locate the dkmeteronline.exe tool and download
- Connect the PT0800M to your computer
- Launch the DKupdate.exe application
- Select the appropriate COM port and hit 'Connect'
- Once connected, hit 'Next' and follow on-screen instructions.

Loudness & Terminology

About Loudness

Loudness measurements differ from conventional signal amplitude measurements in that they are also influenced by the frequency content of the signal and the duration of transient components. The way these various elements are handled to give a value for display has been defined by the International Telecommunications Union in their standard ITU BS1770 which is the only loudness standard to have achieve any degree of international acceptance.

The DK Meter allows a number of parameters to be adjusted to suit whatever options your organisation and perhaps regulatory body has decided to mandate.

Two organisations leading the way in the standardisation of loudness measurements are the Advanced Television Systems Committee (ATSC) in the USA and the European Broadcasting Union (EBU) in Europe. The background information to the measurement norms is contained in the ATSC document "Techniques for establishing and maintaining audio loudness for digital television", document A/85:2011. The EBU document R128 is supplemented by EBU Tech 3341, 3342, 3343 and 3344 between them they define a number of terms and set out the reasons behind many of the objectives of loudness measurements.

Terminology

The Loudness world includes a number of terms and abbreviations worth noting:

Loudness Range (LRA)
Loudness range is a statistic calculation of the material's dynamic range based on the short term (sliding) loudness (3 secs).
Loudness Range is abbreviated 'LRA'.

Momentary Loudness (M)

Momentary loudness is the sum of the RLB weighted audio channels and integrated over 400ms. Momentary loudness is used to calculate short term and integrated loudness
Momentary Loudness is abbreviated 'M'.

Short Term Loudness (S)

Short term loudness is a 3 seconds integration of the momentary loudness. (10 and 30 seconds are also used in some standards/regions).
Short Term Loudness is abbreviated 'S'

Absolute Gated Integrated Loudness

The absolute integrated loudness is a long term measurement (an integration over the entire material) based on the momentary loudness.
It uses an absolute gate at -70LUFS/LKFS (M) which means that if the momentary loudness is getting under -70LUFS/LKFS then the measurement holds until the momentary loudness goes above.

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The absolute loudness is not used directly by the user, but is used to calculate the dynamic gate. The dynamic gate is, according to ITU-R BS.1770-2, -10 LU below the absolute gated loudness.

Dynamic Gated Integrated Loudness (I)

The dynamic gated loudness is a long term measurement (an integration over the entire material) based on the momentary loudness.
It uses a dynamic gate at -10 LU under (dB relative to) the absolute gated loudness which means that the measurement is on hold if the momentary loudness gets under the dynamic gate.
It is always the last value of the dynamic gate which is used on the material. This means that it is necessary to include or exclude any material from the "past" if the dynamic gate is changing. This means that the dynamic gate is always -10 LU under (dB relative to) the end result of the dynamic gated loudness.
The dynamic gate level may vary with local requirements.
Dynamic Gated Integrated Loudness is abbreviated 'I'

True Peak (TP)

True peak measurements, not only looks at the actual samples, but also inter-sample peaks.
This means that True Peak metering will indicate peaks that would potentially cause distortion when converter in e.g. digital-analogue converters, sample rate converters and data compression codecs.
True peak is therefore a highly relevant tool when performing normalization of source material.
DK-Tech approach

LUFS, LKFS and LU

The three LU, LUFS and LKFS are essentially addressing the same issue, which sometimes cause some confusion.
LKFS is the K-weighted loudness scale and one unit on this scale is equal to one dB.
LUFS is identical to LKFS. ITU-R BS.1770-3 and ATSC are using the terms LKFS, while EBU R128 are using LUFS – both are expressing the identical scale.
0 LUFS/LKFS is equal to 0 dBFs @ 1KHz according to ITU-R BS.1770-3 and EBU R128 (some recommendations may use 400Hz).

LU stands for Loudness Unit, and is a scale relative to the chosen Reference level.
0 LU is equal to the reference level. The reference level will vary between the different Recommendations e.g. EBU R128 has 0 LU = -23 LUFS.
One LU is equal to one dB

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Video Mode Section

This section covers all the functionality and menus related to the video mode of the PT0800M.

Settings for video

Setting gamut warnings and adjusting the screen display is done by entering the MANAGER mode (using the MENU button) and then SETUP (Softkey 10). Any changes you make will become new defaults if the password mode is not enabled, but will not be retained upon re-starting, if the meter is locked.

Choosing the display

Input selection

The PT0760M can be supplied with one or two auto-switching HD/SD SDI inputs and both of them can be displayed simultaneously on the screen. When there is more than one input, those to be viewed are selected by enabling the MANAGER.

Press MENU and Softkey 1 has the function INPUT. Softkeys 1 and 3 can then be used to enable the input(s) required on the display. The OUTPUT function is not enabled.

LINES shows or hides the Window Lines function that gives a text display, configured by choosing up to nine lines of text to be shown by going to:

MENU \ SETUP \ PRESET [*name*] \ WINDOW LINES

The screen display is automatically re-sized to suit the images to be shown using vertical or horizontal splits to make best use of the screen area.

Display selection

The first five PRESET buttons offer pre-defined options of colour difference, derived RGB, luminance and vectorscope displays. If one of these meets your display needs, select it. If the stored preset does not use the required input(s), go back to Input Selection above and chose one or more alternative or additional inputs. Press MENU and Softkey 3 has the function COMPONT (Component). Softkeys 1 to 7 then allow selection of different components such as luminance, Cr&Cb, RGB, Vector etc.

The screen display is automatically adjusted to provide optimum display of the components which have been selected.

When displaying only waveforms and the Vectorscope is not enabled, Softkey 8 has the label OVERLAY. This changes the screen display so that all the components of each of the video signals are placed on top of one another, rather than being separately displayed. The display titles then no longer show the component names but the title OVERLAY. Whilst in OVERLAY mode, the Vectorscope cannot be enabled.
If a single component of multiple inputs is selected Overlay will superimpose that component of those inputs.

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Enabling the Vectorscope changes the function of Softkey 8 from to become a MAGNIFIED button, instead of OVERLAY. MAGNIFIED is a fixed scale zoom mode for the Vectorscope to enable precise alignment of the centre point.DK-Technologies A/S Page 35PT0760M

Picture thumbnail

As well as selecting the component parts of the signal to be viewed, a small thumbnail version of the picture can be shown on screen by going to the system MANAGER and using Softkey 5 to select PICTURE.

Y axis values

The amplitude of video signals are often displayed as percentages of the peak signal. An alternative meter scale can be used with the mV levels the signal would have in an analogue domain where 100% equals 700 mV. In addition the digital values can be shown with a decimal or hexadecimal scale.

To choose between the four scale modes enter the MANAGER mode by pressing the MENU button then SETUP buttons (Softkey 10) and go to:

SETUP \ PRESET [name] \ Y-LABEL

This will show the four alternative modes and the required one is chosen by clicking with the Wheeler.

Gamut warnings

The VIDEO GLOBAL folder is only visible when the system is not password locked. Opening this folder allows gamut warnings and the display settings to be adjusted. To set the gamut warning thresholds scroll to the VIDEO GLOBAL folder and select it by pressing the Wheeler. Scroll to GAMUT and again press the Wheeler to open the folder. The values of the parameters are changed by highlighting the line, pressing the Wheeler, then rotating it to change the value. Once the required value is shown, the value is entered by once more pressing the Wheeler.

ERROR COUNT is the number of successive samples that must be outside the thresholds before the gamut warning message is displayed.

MAX Y is the highest level of luminance signal that can be applied before the gamut alarm is displayed. The values are shown in either mV or as percentages depending on the Y axis labels selected.

MIN Y is the low level luminance threshold that can activate the gamut warning.

The maximum and minimum thresholds for the RGB and Cr and Cb colour difference values are adjusted similarly.

Video sync reference

Parameters such as numbers of lines, frame rates, timing shifts and CRCerrors can be measured numerically. Many of the possible measurements require that the meter has a timing reference and that source is selected by going to:
MENU \ SETUP \ VIDEO GLOBAL \ REFERENCE
and choosing either one of the SDI inputs or the analogue EXT REF signal.DK-Technologies A/S Page 36 PT0760M

System video parameters

To view basic data on the incoming signals:

1. Select the video mode (DISPLAY button)
2. Enable the MANAGER (MENU button)
3. Choose the MEASURE mode (Softkey 8).

Scroll to SYSTEM and open the folder for whichever input you want to measure. The EXT REF line confirms the format of the analogue reference signal and opening that folder shows the number of lines in the reference signal.

The folder line for each of the SDI inputs confirms whether it is HD or SD SDI and opening the folder gives details of the number of active lines, the active samples and a CRC error report. Time shifts between the selected signal and the reference input is shown as nano seconds and lines. There is a separate folder for each SDI input that is fitted.

Cursor measurements

The video meter has two horizontal and two vertical cursors. Placing these on significant parts of the video waveform provides a precise digital read out of the values at that point.

To enable the cursors, select video mode, press MENU and then TIMEBASE (Softkey 6). Softkeys 1, 2 and 4 allow ALL LINES, ALL FIELDS or FRAME to be selected.
Cursors can be used in a variety of modes, but are most useful when viewing fine detail on specific lines. It is therefore important to turn off features such as the picture thumbnail preview.

The required line is selected by pressing Softkey 3 and then using the Wheeler to select the required line. The line currently being displayed is shown in the display area for Softkey 3 (e.g. LINE 317). If working with an SD signal, the line number may have been left selected to a value higher than the current video resolution provides so the Wheeler may need to be used to select an active part of the video signal.

To allow faster movement across large numbers of lines, the cursor has a X10 function which is available when scrolling through lines. Clicking with the Wheeler then causes the increments to be ten times greater than before. Clicking with the Wheeler a second time returns the system to the X1 mode for precise line selection.

The time axis (horizontal) cursors are vertical lines and their positions are adjusted using Softkeys 5 and 7. The current value in terms of video sample numbers is shown in the display area corresponding to that Softkey.
The delta value shown is the difference value between the two cursors and is helpful when making differential measurements. Depending on the previous measurement made, it is possible that a cursor may have been left in a part of the signal not currently displayed on the screen and extensive Wheeler rotation may be needed to bring it into view. This is particularly likely when the image has been zoomed but it does allow very precise differential measurements to be made by zooming to one part of the waveform, placing a cursor there, and then zooming for precise positioning of the second cursor in a different part of the waveform, leaving the first in its no longer visible position but facilitating a detailed difference measurement.

Signal amplitude measurements can be made using the two VERTICAL axis cursors which are horizontal lines. The Wheeler is assigned to adjust them using Softkeys 6 and 8. Larger cursor movements are made quicker with the X10 mode, engaged by clicking with the Wheeler.

The precise amplitude values are displayed in the screen areas for those Softkeys using the same Y axis units as selected for the screen display. When using Zoom modes, cursors can be left in places not visible on-screen to allow precise measurements between different parts of the waveform to which the screen may be positioned.

Zoom and view options

Enter the TIMEBASE mode by pressing MENU and then TIMEBASE (Softkey 6).

Softkeys 9 and 10 assign the Wheeler to perform horizontal (time) zoom and vertical (amplitude) zoom functions. In both cases they offer a zoom factor of up to 16 times. As with conventional engraved graticule waveform monitors, the Y axis calibrations show the levels only for a zoom factor of 1. Once the display is zoomed, amplitude values should be measured using the cursors controlled by Softkeys 6 and 8.

By clicking with the Wheeler, the zoom centre point can be chosen to be either of the two cursors. The selected centre point value is shown in the lower right corner.

Vectorscope magnification

During system alignment, it can be helpful to have an enlarged view of the centre of the vectorscope display. The degree of enlargement is changed by going to:

MENU \ SETUP \ VIDEO GLOBAL \ GENERAL

Clicking with the Wheeler allows it to be used to vary the enlargement factor between 2 and 8 times.

To enable vectorscope magnification, enter the MANAGER mode by pressing MENU.

Select COMPONENT. If the vectorscope is not already enabled, select it using Softkey 6.

Softkey 8 selects either the entire vectorscope area to be seen or an enlarged view of the central area.

Video filters

Some features of the video signal are more easily viewed when filters are inserted. The PT0760M provides options of ALL PASS, HIGH PASS, LOW PASS and SAMPLE DATA. The latter, displays only the specific sample values rather than a continuous trace between them. To insert a filter go to SETUP mode by pressing the MENU button then Softkey 10. If you are starting from the MANAGER mode, pressing Softkey 10 either once or twice (depending on the menu) will also bring you to the SETUP mode.

Scroll to the PRESET folder and open it by clicking with the Wheeler. The four different filter modes are shown and can be selected with the Wheeler.

Window lines

As well as waveform and vectorscope functions, presets can also contain up to nine lines of text displays. These can be elements such as video data format information, line 21 closed caption text, Dolby-E flag and status information.

To choose if and how many window lines are displayed and their content go to:

SETUP \ PRESET [name] \ WINDOW LINES

This will show the current settings for the nine lines and by scrolling to any of them and clicking with the Wheeler the required information can be chosen from the list:

OFF	LOUDNESS SELECT	MOMNTRY
SLIDING	INTEGRT	LOUDNESS LRA
MOMNTRY MAX	SLIDING MIN	SLIDING MAX
GATE HOLD	PEAK LEVEL MAX	SMPTE TIME
START TIME	STOP TIME	RESUME TIME
SLIDING TIME	FILTER TYPE	PRESET AUDIO

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VOLUME	RESERVED	RESERVED
SDI SYSTEM	SDI TIMING	SDI CRC ERRORS
GAMUT	CAPTIONING A1	CAPTIONING A2
CAPTIONING B1	CAPTIONING B2	CAPTIONING A3
CAPTIONING B3	CAPTIONING A4	CAPTIONING B4
DOLBY-E TEXT	DOLBY-E FORMAT	DOLBY-E RATE
DOLBY-E COUNT	DOLBY-E IDENT	DOLBY-E STREAM
DOLBY-E CODE	DOLBY-E OP-MODE	DOLBY-E STAMP
DOLBY-E DROP-FRAME	DOLBY-E DELAY	DOLBY-E ID
DOLBY-E MODE	DOLBY-E DIALNORM	DOLBY-E COMPRESS
DOLBY-E DYN RANG	DOLBY-E BEGN GAIN	DOLBY-E END GAIN
DOLBY-E SURRND MODE	DOLBY-E MIX LEVEL	DOLBY-E ROOM TYPE
DOLBY-E CENTER MX	DOLBY-E SURRND MX	DOLBY-E LFE LOWPASS
DOLBY-E RF PROTECTI	DOLBY-E DATA RATE	

Viewing closed captions

The closed caption information included on line 21 of the video data stream (most commonly found with signals for the US market), is one specific example of material that can be viewed through the Windows Lines system.
The closed caption format allows four separate text streams to be embedded in an SDI signal.
As many of the nine Windows Lines as necessary can be allocated for closed caption display as described in section 10.11.

Display colour

The factory default settings for the trace, scale markings and label colours can be changed. To adjust them, ensure the meter is not password locked and enter the SETUP mode by pressing MENU and SETUP (Softkey 10) then going to:

SETUP \ VIDEO GLOBAL \ COLOUR

Select each of the elements in turn using the Wheeler and then rotate the Wheeler to scroll through all the colour options which are:

BLUE	GREEN	LIGHT B(lue)	RED
VIOLET	YELLOW	WHITE	

Scale intensity

In many modes, a fast access to adjust the graticule line intensity is often available using one of the Preset keys. The default setting can be stored by pressing MENU and SETUP (Softkey 10) then going to:

SETUP \ VIDEO GLOBAL \ INTENSITY \ SCALE

The brightness values range from -700 and +60. Values between -60 and +60 will normally be found most useful. Press the Wheeler again to save the value and allow scrolling to other menus or reverting to MANAGER mode.

Viewing fine detail

The PT0700M range is capable of displaying a high degree of signal detail, some of which is commonly ignored by competitive units. The compressor function allows the level of detailed to be varied from the highest resolution all the way to the more limited but sometimes smoother looking display, seen on CRT units and others which emulate them.

The degree of detail compression is adjusted by entering the SETUP mode by pressing MENU and SETUP (Softkey 10) then going to:

SETUP \ VIDEO GLOBAL \ INTENSITY \ COMPRESSOR

Values be varied between 0 and 25. Press the Wheeler again to save the value and allow scrolling to other menus or reverting to MANAGER mode.

Managing video presets

Changing preset names

Names can be up to 10 characters in length. The full name is visible when presets are viewed as a list in the system manager window. The limited space above the preset buttons has space for only the first seven characters on the preset name so it is wise to avoid creating preset names in which the first seven characters are identical characters.
To change a preset name, ensure that the meter is not password locked then go to:

MENU \ SETUP \ VIDEO GLOBAL \ LABELS \ PRESET

and use the Wheeler to select the one to be changed. A flashing cursor then appears beneath the first character and the Wheeler can move this cursor to other characters as required. Once it is beneath the character to be changed, select it using the SELECT button (the MENU button) and then rotate the Wheeler to scroll through all the 91 different characters that are available.

The sequence is:

SPACE ! " # $ % & ' ( ) * + , - . / 0 to 9 : ; < = > ? @ upper case A to Z [\ ] ^ _ ` lower case a to z.

When the required character is showing, press select to allow the Wheeler to then be used to reposition the cursor under a different character. Once the correct name is displayed, press the Wheeler to save that preset name.

The COPY and PASTE buttons (Softkeys 9 and 10) allow an entire preset name to be copied to an internal clipboard and then pasted onto a different preset number.

Storing updated presets

The delivery presets can be changed by taking the following steps:
1 Select the video mode using the DISPLAY button.
2. Enable the system MANAGER (Softkey 10)
3. If not already disabled, remove password locking of the meter by going into SETUP (section 5.2) then return to the system MANAGER (Softkey 10)
4. Press the preset button which is to be changed.
5. Use the INPUT, COMPONENT and PICTURE buttons (Softkeys 1, 3 and 5) to create the required display.
6. Go back to the SETUP mode by pressing Softkey 10 once or twice (depending whether you have been selecting COMPONENTS or not).
7. Scroll to PRESET [current name] and open that folder by clicking with the Wheeler.DK-Technologies A/S Page 42 PT0760M
8. Make any necessary changes to the FILTER, Y-LABEL and other preferences.

9. Scroll to VIDEO GLOBAL and open the LABELS \ PRESET folder.

10. If not already done, update the name for the preset as described in 9.1.

11. Scroll back to ABOUT \ SECURITY SETTINGS \ PASSWORD and click the Wheeler to open that folder then click on PASSWORD.

12. Press the DISPLAY button which now has the SAVE function assigned to it.

13. Verify that the new preset has been saved by pressing RESTART (the MENU button).

If defining multiple preset changes, repeat steps 11 and 12 after each preset has been defined.

Additional displays

Server / client

The PTO700M range includes an option for the remote 'client' panel to PT0700R. This can provide a secondary display screen and control panel. To distinguish between the screen and controls of the PT0760M and the PT0700R, the term SERVER is used for the PT0760M screen and controls and the term CLIENT for the remote screen and panel on the PT0700R. When no PT0700R is connected, turn off password protection and go to:

ABOUT \ SYSTEM \ CLIENT

Select CLIENT DISABLE and CLIENT LOCK then reboot the unit. If a PT0700R is connected, follow the instructions provided with it.

To allow switching between audio and video modes, it is important that even when no client panel is in use, if the server is set to audio, the client should be set to video.

Server display

The PT0760M screen can display either audio or video information or both audio and video simultaneously. It this mode selection can be locked by turning off password protection then going to:

ABOUT \ SYSTEM \ SERVER

and selecting AUDIO, VIDEO or COMBINED. This determines the mode in which the unit starts when it is switched on. The DISPLAY button can allow changing between audio and video modes but such changes can are prevented when LOCK is selected. To allow switching between audio and video modes, it is important that even when no client panel is in use, if the server is set to audio, the client should be set to video.

After changing the principal display mode, the meter is automatically rebooted. Further changes may require password protection to be once more disabled.

External display

The monitor output port on the PT0760M is of the DVI-I type. This means there are both analogue (VGA) signals and also the necessary digital output for a DVI monitor. This same digital signal can also connect to an HDMI display using a suitable adapter cable. Use only standard cables designed for the purpose, and observe the cable length limitations. Suitable DVI extender units may be used and refer to the data and instructions provided by their makers to ensure the suitability for the purpose.

The information shown on the external display can be audio, video or both combined and the choice is made by going to:

ABOUT \ SYSTEM \ EXTERNAL MONITOR

Connections and modules

All connector wiring is seen from the wiring side of the mating connector, the same view as looking into the meter mounted connector.

Standard PT0760M

When no optional I/O modules are added to the PT0800M it has the following connections in addition to the HD/SD SDI input.

XLR4 - DC power input

This normally comes from the supplied mains power adapter which has a standard IEC 6032 C14 style AC inlet. If the DC connection to the meter needs to be re-wired or the meter powered in some other way the connections are as follows:

> Pin 1 0 volts
> Pin 4 +12 to +36 volts DC.

At least 24 volts is needed to obtain the maximum analogue audio headroom. 18 volts will allow handling of signals of +18 dBu. Use the lowest possible voltage to minimise the heat dissipation and therefore fan noise.

USB connector

The USB port is the primary I/O connection for management of the PT0760M. It is of the USB-B style, typically found on equipment such as printers and does not provide or receive power. It is intended to be connected to a Windows PC and the use of DK applications and methods for software updates are described in section 14.

9 pin D connector and RJ45 Ethernet port

The 9 pin D connector is for factory use only. Ethernet connectivity is prepared for but not currently implemented.

DVI-I connector

A secondary picture display can be connected. A digitally fed DVI monitor can be connected directly but the output from the PT0760M is a DVI-I type. This means the connector also carries a VGA signal so that a suitable adapter cable can allow an analogue VGA monitor to be used instead of a digital one.

Analogue reference input

The range of optional modules includes an analogue external sync input to receive a tri-level or black burst sync signal. This is via a BNC connection and is a bridging input and a 75 ohm load must always be applied to the loop through output. This is the only option module that can be used without the software upgrade being installed.

Optional I/O modules and Accessories

The following option modules can be added to the PT0800M/PT0760:

> PT0760M-SDI-2I - 2 channel HD/SD input
> PT0760M-SDI-1O - 1 channel HD/SD video output
> PT0760M-I/P-8A - 8 channel analogue audio input
> PT0760M-I/P-8D - 4 AES digital audio input
> PT0760M-O/P-8A - 8 channel analogue audio output
> PT0760M-O/P-8D - 4 AES digital audio output
> PT0760M-DOLBYE - Dolby E/D (AC3) decoder
> PT0760-ADM-10s - 16 channel audio delay

The following accessories are available for the PT0800M/PT0760M:

        PT0700R – client terminal with independent control and display for remote operation

        PT0700RD – client terminal with remote display only

        PT0760M-DT/STAND – desktop stand

        PT0760M-RM/KIT – 19" 3RU rack cabinet fitting two PT0800M/PT0760

        PT0760-RM/BLANK – blank panel for RM/KIT

Additional HD/SD SDI input

When the PT0800M is fitted with multiple video inputs and the necessary software, it takes on many of the characteristics of the PT0800M. All SDI inputs auto-switch between SD and HD modes and provide 75 ohm terminating loads.

Video output

This is often provided as a standard part of meters. The video output is a buffered repeat of the HD/SD SDI signal on input 1.

8 channel analogue audio input

This provides 8 balanced inputs for line level analogue audio signals with each having an input impedance greater than 20K ohms. Connection is through a 25 pin D connector, requiring a male cable connector. The wiring connections are as shown below:

Signal		PIN	Signal		Pin
Chan 1	Hot	14	Chan 5	Hot	17
Chan 1	Cold	2	Chan 5	Cold	5
Chan 1	Ground	1	Chan 5	Ground	4
Chan 2	Hot	3	Chan 6	Hot	6
Chan 2	Cold	16	Chan 6	Cold	19
Chan 2	Ground	15	Chan 6	Ground	18
Chan 3	Hot	20	Chan 7	Hot	23
Chan 3	Cold	8	Chan 7	Cold	11
Chan 3	Ground	7	Chan 7	Ground	10
Chan 4	Hot	9	Chan 8	Hot	12
Chan 4	Cold	22	Chan 8	Cold	25
Chan 4	Ground	21	Chan 8	Ground	24
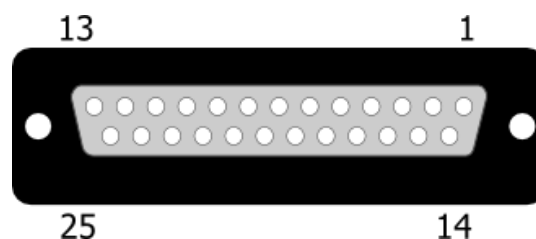
4 AES digital audio input

The four AES inputs allow up to 8 mono legs of audio to be connected. Connections are on balanced 110 ohm circuits going via a 15 pin D connector, requiring a male cable connector. Alternatively, the inputs can be through unbalanced 75 ohm circuits on BNC connections are provided. Do not attempt to use both connections simultaneously. The D connector wiring connections are as shown below:

Signal		PIN	Signal		Pin
AES 1	Hot	2	AES 3	Hot	15
AES 1	Cold	9	AES 3	Cold	8
AES 1	Ground	1	AES 3	Ground	7
AES 2	Hot	11	AES 4	Hot	14
AES 2	Cold	3	AES 4	Cold	6
AES 2	Ground	10	AES 4	Ground	13
Chassis	Ground	4	Chassis	Ground	12
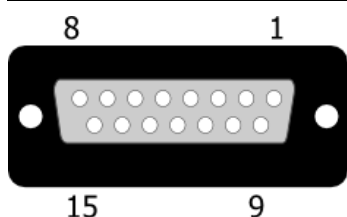
The BNC inputs have switchable 75 ohm terminations enabled by moving switches 1-4 towards the ON positions.

The balanced inputs have switchable 110 ohm terminations enabled by moving switches 5-8 towards the ON positions.

8 channel analogue audio output

This provides 8 balanced line level analogue outputs with each coming from a low impedance below 5 ohms. Connection is through a 25 pin D connector, requiring a male cable connector. The wiring connections are as shown below:

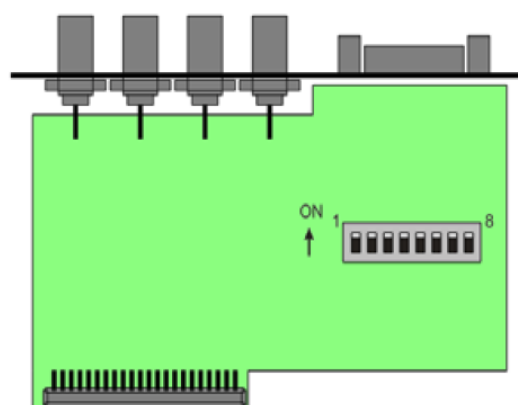| Signal		PIN	Signal		Pin
Chan 1	Hot	14	Chan 5	Hot	17
Chan 1	Cold	2	Chan 5	Cold	5
Chan 1	Ground	1	Chan 5	Ground	4
Chan 2	Hot	3	Chan 6	Hot	6
Chan 2	Cold	16	Chan 6	Cold	19
Chan 2	Ground	15	Chan 6	Ground	18
Chan 3	Hot	20	Chan 7	Hot	23
Chan 3	Cold	8	Chan 7	Cold	11

DK - Technologies

Chan 3	Ground	7	Chan 7	Ground	10
Chan 4	Hot	9	Chan 8	Hot	12
Chan 4	Cold	22	Chan 8	Cold	25
Chan 4	Ground	21	Chan 8	Ground	24

4 AES digital audio output

Up to 8 mono legs of audio can be carried by the four AES outputs. Connections are available simultaneously on 75 ohm BNC connections and for balanced 110 ohm circuits via a 15 pin D connector, requiring a male cable connector. The D connector wiring connections are as shown below:

Signal		PIN	Signal		Pin
AES 1	Hot	2	AES 3	Hot	15
AES 1	Cold	9	AES 3	Cold	8
AES 1	Ground	1	AES 3	Ground	7
AES 2	Hot	11	AES 4	Hot	14
AES 2	Cold	3	AES 4	Cold	6
AES 2	Ground	10	AES 4	Ground	13
Chassis	Ground	4	Chassis	Ground	12
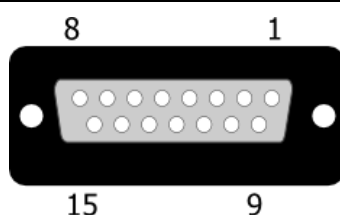
Dolby E/D (AC3) decoder

The Dolby decoder has no external connections and is assigned into signal paths via the audio matrix. See the audio matrix section of this manual for the routing options that can be created.

Dolby Metadata

If a Dolby-E module is installed, the folder accessed at:

MENU \ SETUP \ ABOUT \ SYSTEM \ HARDWARE \ I/O SLOTS \ DOLBY DECODER

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contains important information about the data which is encoded in the Dolby signal.

MENU \ SETUP \ ABOUT \ SYSTEM \ HARDWARE \ I/O SLOTS \ DECODER \ SYSTEM

shows whatever basic signal description has been written into the stream e.g. 5.1 + LtRt.

MENU \ SETUP \ ABOUT \ SYSTEM \ HARDWARE \ I/O SLOTS \ DECODER \ HH:MM:SS

displays hours, minutes, seconds and frames together with a drop frame flag (if set) and any delay that has been defined.

The 8 channels of mono audio that can be carried by a Dolby encoded signal are identified as Channels 9-16.

MENU \ SETUP \ ABOUT \ SYSTEM \ HARDWARE \ I/O SLOTS \ DECODER \ METADATA LIST

gives a display of the 69 Metadata words that are associated with that Dolby datastream.

Dolby status information can also be displayed selecting thev required information in the Window LINES system.

Adding I/O modules

Before adding or removing I/O modules, switch off the DC power to the meter and unplug the XLR4 power input connector.

Mechanical

Observe anti-static (ESD) precautions when handling plug in cards. Be sure to work in an anti-static environment and that your hands and any tools are not carrying a charge before opening the meter or removing cards from the anti-static packaging in which they are supplied.

Choose the location(s) for the card(s) to be added. Most cards can be put into any spare slot, though the analogue reference module must always be in slot M1 and there are mechanical issues restricting placement of the Dolby card.

Card slots are numbered with M0 being adjacent to the USB-DVI utility module and M1 to the right of that as viewed from the rear. The reference input module in M1 is therefore fixed using the third pair of screws from the left (as viewed from the rear).

It should be noted that the SDI input and output units are not plug-in modules but back panels linked to the main board by a coaxial cables. The position of the main board connectors, mean the SDI output should normally be located adjacent to the utility module and the SDI input(s), adjacent to the power module.
Remove the two fixing screws from the chosen blank panel and lift it out. As viewed from the rear, modules are inserted with the component side facing left. The printed circuit board should slide easily in the notches in the metal frame. It is often easier to load modules starting with the right-most one as it is then possible to view the alignment of the module and main board connectors. Do not force a module that is not smoothly sliding into place. This can result in damage and the need to have the units repaired.

Do not attempt to locate the Dolby decoder module in slots M5 or M6 because of the large size of the Dolby CAT522 sub module that is used. The size of this also means that at least four adjacent modules need to be

temporarily vacated to allow the card to be slipped diagonally between the metal fixing strips, before squaring it up to allow the edge connector to be located.

Re-fix all modules and any blank panels using the screws then reconnect the power and test the newly installed modules.

Testing

After all the mechanical changes are completed and the modules and any necessary blank panels are re-secured with fixing screws, re-connect power and switch on the meter. Changes to the modules which are fitted are automatically recognised by the system firmware. Using the system manager go to:

MENU \ SETUP \ ABOUT \ SYSTEM \ HARDWARE \ I/O SLOTS

and all the modules currently found by the meter firmware will be displayed in the order in which they are fitted.

Some of the folders contain information intended primarily for factory diagnostic purposes showing data which has been set elsewhere in the firmware or by a user setting such as a D/A .

System health

The development of abnormal operating conditions can be checked using the HEALTH MONITOR. This is accessed by having the meter unlocked and opening the SYSTEM folder and scrolling to HEALTH MONITOR. Four separate temperature indications are used to show the internal conditions. These are as shown below, together with typical values for a healthy system which has been switched on for some time.

TEMPERATURE SPLY 57C
TEMPERATURE FPGA 47C
TEMPERATURE FAN 23%
TEMPERATURE CALIBRAT (for factory use only)

Modest variation from these values is normal, but care must be taken to ensure the unit has adequate ventilation and that the air vent on the rear of the power module is not obstructed.

Appendix 1

Audio Setup Folder Structure

About			
About	Security Settings		
	System	Server	Serial port
		Client	
		Health Monitor	
		Task N	
		Profile	
		Wait sate	
		Software	Activation key
		Hardware	Activation key
			I/O Slots - Options
	User Mode		
Preset	Matrix Output Assign	Internal	
		Meter	
		XX option cards	
	Meter Setup	Scale	
		Display mode	
		Bargraph width	
		Color Normal	
		Color Under	
		Under Level	
		Window Text	
	StarFish Setup	Colour	
		Compressor	
		OP mode	
		Time code	
	Loudness Preset		
	Loudness Setup		
	Loudness Option	Window Text	
	Labels Assign	Inputs	Internal
			XX option cards
		Output	Internal
			Meter
			XX option cards
Audio Global			
	Power Settings	Preset	
		Menu	
		Utility	
		Softkeys Hide	
		Softkeys Manager	
		Softkeys StarFish	
		Menu Main	
		Menu Preset	
		Menu Loudness	
	Analogue References		
	Downmix Settings		
	Volume Control	Output Assign	
	FFT 1024 points	Window	
	Labels	Preset	
		Signal	
	Colour		

About Section

Preset Section

Audio Global

DK - Technologies

Appendix 2

Video Setup Folder Structure

About	Security Settings			
	System	Server	Serial port	
		Client		
		Health Monitor		
		Task N		
		Profile		
		Wait sate		
		Software	Activation key	
		Hardware	Activation key	
			I/O Slots - Options	
	User Mode			
Preset	Filter			
	Y-Label			
	X-Label			
	Time-Base	Horizontal		
		Vertical		
	Window Text			
	Audio Preset			
Video Global	Power Settings	Preset		
		Menu		
		Application		
		Softkey Hide		
		Softkey Manager		
		Menu Main		
		Menu Preset		
	General			
	Reference			
	Gamut			
	Labels	Preset		
	Colour			
	Intensity			

About Section

Preset Section

Video Global