

dms-post

digital mixing system

AMEK





Introduction

Introduction

Since its launch, the Amek Digital Mixing System has proved itself to be one of the world's most flexible and versatile audio products.

Uniquely configurable, each DMS is precisely shaped around a facility's requirements; it is a digital mixing console with absolute operational efficiency at every stage from audio format to buss structure to user-interface and all points in-between.

Embracing the fast pace of today's audio post-production demands and developments, the DMS can be instantly reset to handle any format from mono to 5.1 and effortlessly expanded to accommodate a facility's growth.

Not only is this console equipped to deal with the audio requirements of yesterday, today and tomorrow, the DMS also offers a range of control-surface options that are familiar and accessible for operators accustomed to analogue consoles.

24 hours a day, post-production facilities from Los Angeles to London to Tokyo are using their own unique Amek DMS consoles, in partnership with a wide variety of digital audio workstations, to deliver material in all formats to all sectors of the post-production market.

The Development Process

During the latter half of Amek's 25-year history, one technology has gathered more momentum with each passing year; digital audio.

To many observers, it had been somewhat surprising that a company with Amek's track record for producing some of the world's most comprehensively automated analogue consoles had not made the transition to producing a digital equivalent.

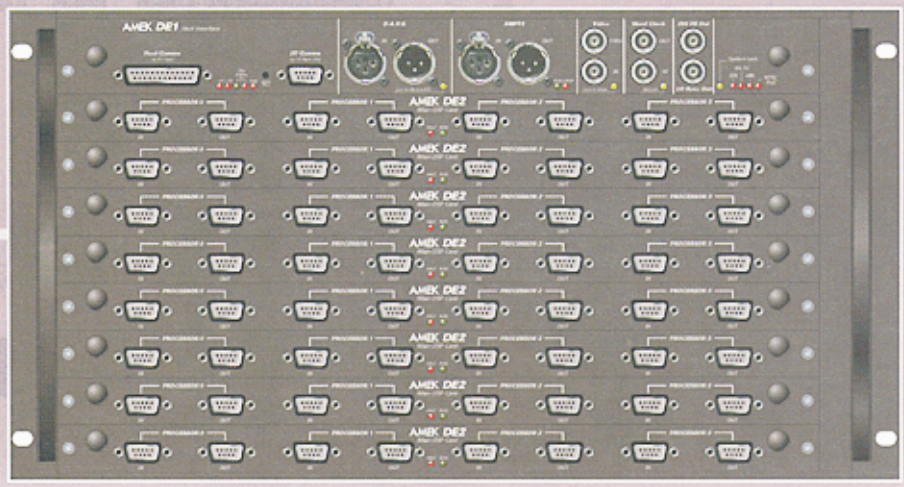
The reason for this was simple. Whilst others were producing their first digital mixing consoles, Amek was quietly designing not just a single digital mixing console, or even a range of digital mixing consoles, but a digital mixing System.

The philosophy behind the Digital Mixing System (DMS) was to produce mixing consoles that would satisfy the current requirements of a particular facility and its applications, but which could also be readily adapted as the facility's requirements changed.

In pursuit of this ideal, Amek developed a system that took the fundamental aspects of a mixing console, the input and output, processing and user controls, and separated them into three distinct and scaleable entities. By adopting this technique, consoles could be created where the audio capacity, capability, operation and cosmetics could each be independently changed at any time without the need to design a new console each time.







The Engine

The Engine

The DMS Engine is the main audio processing unit of the system, and is the key to the console's flexibility.

It is based around a proprietary 32 bit floating point parallel processing system, providing the power and precision required for the demands of 24 bit digital audio as well as an open architecture for future expansion.

The Engine comprises of a series of processor boards operating in parallel, each containing 4 Digital Signal Processing chips, which perform the various mixing, equalisation and dynamic control functions required from a mixing console.

By taking this approach, the Engine of a DMS console can be created by simply matching the amount of mix inputs, equalisation, dynamics and busses of a particular application to the number of DSPs required and be expanded at any time in the future by adding more processor boards of DSPs.

Crucially, however, instead of producing individual processor boards which specifically perform only one function such as equalisation, Amek has produced a generic processor board whose individual DSPs can each perform any of these fundamental functions.

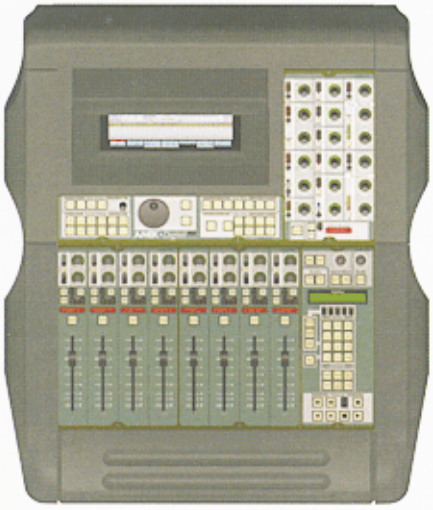
This means that DSPs that are usually used for equalisation, for instance, can be utilised to provide more busses instead, making it possible for the user to change the console's operation completely for one particular session, if required.

The Engine's main host interface unit is used to receive and process instructions from the Control Surface as well as providing the extensive range of audio synchronisation options required in a digital recording facility.





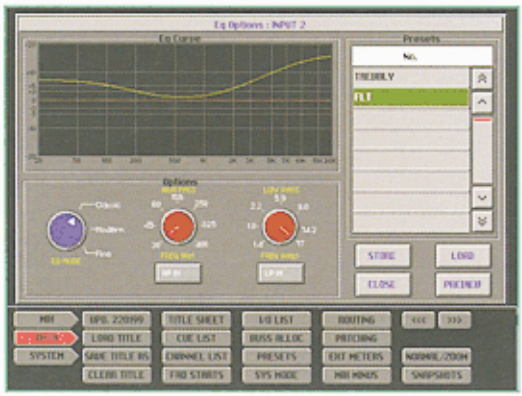
The Control Surface



The Control Surface

In devising a control surface for the DMS, Amek has drawn on its vast experience of designing some of the world's most ergonomically pleasing mixing consoles. This has been coupled with extensive research into operators' current preferences and future expectations.

Unlike an analogue console, a digital console does not need a pot and switch for every single one of its controls, as any of its pots and switches can be mapped to any control on any channel that is required at any time. As a result, there is a great temptation to equip a digital console with only a minimal amount of controls and switch them to change from controlling EQ parameters to auxiliary send levels, for instance.



The design challenge was to create an efficient balance between the traditional individual control per function approach of analogue consoles and the greater flexibility offered by the new digital opportunity.

The integration of a high resolution colour TFT screen in the centre of the console gives a clearer and more concise operating interface, and enables functions that are not in constant use to be moved from the control surface. The utilisation of a touch screen TFT allowed Amek to devise on-screen replicas of traditional hardware panels, such as aux master controls, that could be viewed and operated in exactly the same manner as their analogue equivalents.

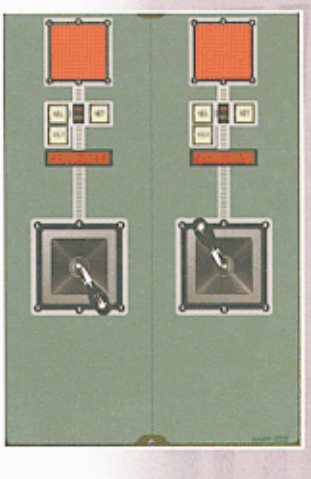
After addressing the issue of which controls should appear on the control surface, the next step was to decide the quantities of each control that different operators would require.

In keeping with the original philosophy of producing a scaleable console, Amek determined that each facility should be able to decide for themselves how many faders and controllers they would need.

This was achieved by designing a core basic control module supplemented by a range of additional control modules that could be attached to make a DMS look as much or as little like a traditional console as was required by each facility.









The basic DMS control surface, illustrated in the previous page, consists of 8 touch-sensitive motorised Faders, the TFT touch screen, transport and monitor controls and the Central Assignment Panel.

The Central Assignment Panel provides EQ, Auxiliary send and Dynamics controls for one channel at a time. The channel that is currently being controlled by the Central Assignment Panel can be selected by pressing the hardware Interrogate switch above the channel mute switch or, optionally, by using the touch sensor facility of the fader. The currently selected channel is indicated by the name in the electronic writing strip below the Central Assignment Panel.

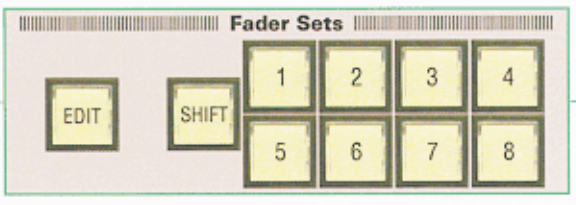
The 8 faders of the basic system can be assigned to control any channel input or buss output level. These are grouped into 16 Fader Sets by the user and simply pressing the required Fader Set switch on the control surface will result in the motorised faders assuming the position and control of the requested channels.

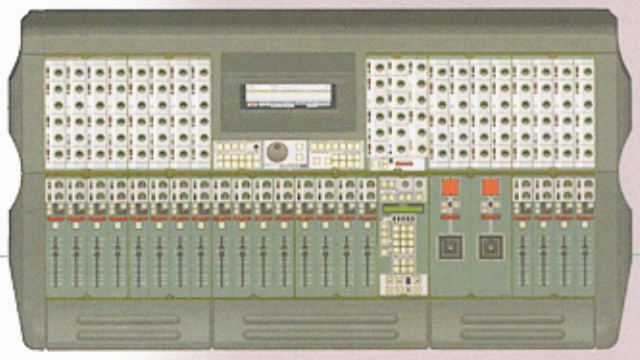
The use of the Central Assignment Panel and Fader Set system means that even the largest audio configuration of the DMS can be controlled easily with a minimum of controls.

Of course, whilst many operators embrace this fully assignable methodology, others prefer a more traditional method of operation.

To satisfy this requirement, Amek has designed additional control panels dedicated to EQ, Aux, Dynamics and Pan Control as well as, of course, additional fader panels.

The modular chassis design of the control surface allows these panels to be combined to create a traditional analogue looking console, with EQ and Aux controls above each fader, or simply a semi-assignable approach with more faders than the basic unit or any point in-between.





Channel Path

Channel Path

A DMS channel path encompasses over 80 controls, reflecting the amount of power and flexibility provided by the console, and all channels can be freely designated by the user to be mono or stereo format in any combination.

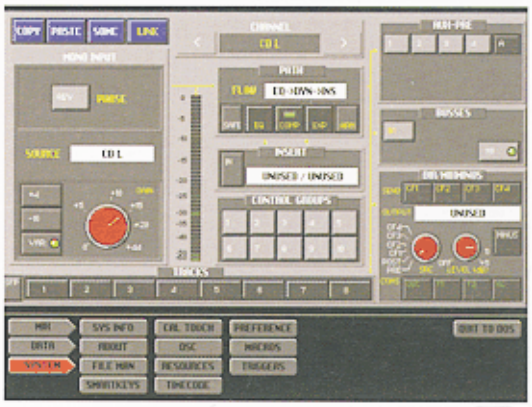
The control of channel parameters is shared between the dedicated control surface controllers, such as faders, pan, equalisation and dynamics controllers, whilst a dedicated key on the control surface provides access to the Channel Configuration screen for source selection and configuration controls, each of which are presented as visual equivalents of their analogue counterparts.

In addition, there are two dedicated software screens for visual representation, extra function control and library management of the EQ and Dynamics functions.

This combination of dedicated hardware controls and touch screen equivalents provides effortless and intuitive control of the huge array of controls on offer.

In the following section each stage of the DMS channel input path will be described.





Channel Path – Input Section



Source Selection Any channel can use any of the available physical input ports, which are selected by simply pressing the required port name on the screen. In addition, when a port is selected, the Electronic Writing Strip above the channel fader is automatically updated to display the source name.

Gain (Analogue Inputs Only) The gain stage of the analogue to digital converter can be controlled from the screen by a variable pot or two user definable preset level switches.

48V (Mic Inputs Only) An on-screen switch for 48 Volt phantom power selection.

AES/Optical (Digital Inputs Only) An on-screen switch for selection of AES-3 format or TOSLINK optical format signal from a digital input port.

SRC (Digital Inputs With SRC Only) An on-screen switch for selection of the optional Sample Rate Converter function for digital input ports.

M/S (Stereo Inputs Only) A fully featured, screen-controlled, decoder system for sources recorded in the Mid/Side format is available for stereo channels. These features include Left/Right Reverse, individual Left/Right Mute and variable Side Gain.

Phase Rev An on-screen switch to select the reversal of the phase of an input. For stereo channels, an individual phase reverse switch is provided for the left and right channels.

REV (stereo Inputs Only) An on-screen switch REVerses the signals, left feeds the right channel and vice versa.

Trim The control surface trim control is used to provide level control before the signal enters the main EQ/Dynamics/Insert path of the channel.

Path The route of the signal through the EQ/Dynamics/Insert path of the channel can be freely assigned from the screen.

Insert Send Any channel can use any of the available physical output ports as an insert send, which are selected by simply pressing the required port name on the screen.

Insert Return Any channel can use any of the available physical input ports as an insert return, which are selected by simply pressing the required port name on the screen.

Insert In An on-screen switch to place the insert send/return in or out of circuit.

Channel Path – Equaliser Section



HF Frequency The control surface HF Frequency control is used to set the variable High Frequency EQ between 1.4kHz and 18kHz.

HF Cut/Boost The control surface HF Cut/Boost control is used to cut or boost the selected High Frequency EQ between -16dB and + 16dB.

HMF Frequency The control surface HMF Frequency control is used to set the variable High Mid Frequency EQ between 450 Hz and 8kHz.

HMF Cut/Boost The control surface HMF Cut/Boost control is used to cut or boost the selected High Mid Frequency EQ between -16dB and +16dB.

HMF Q The control surface HMF Q control is used to vary the High Mid Frequency Q factor between high and low.

LMF Frequency The control surface LMF Frequency control is used to set the variable Low Mid Frequency EQ between 80Hz and 1.5kHz.

LMF Cut/Boost The control surface LMF Cut/Boost control is used to cut or boost the selected Low Mid Frequency EQ between -16dB and + 16dB.

LMF Q The control surface LMF Q control is used to vary the Low Mid Frequency Q factor between high and low.

LF Frequency The control surface LF Frequency control is used to set the variable Low Frequency EQ between 30Hz and 350Hz.

LF Cut/Boost The control surface LF Cut/Boost control is used to cut or boost the selected Low Frequency EQ between -16dB and + 16dB.

HPF An on-screen rotary pot is used to select the variable High Pass Filter frequency between 30Hz and 350 Hz.

LPF An on-screen rotary pot is used to select the variable Low Pass Filter frequency between 1.5kHz and 18kHz.

EQ In The control surface EQ In switch places the entire EQ path in or out of circuit.

Channel Path – Dynamics Section



Dynamics Type An on-screen menu is used to select the type of dynamic algorithm used for each channel. The options are Compressor 1, Compressor 2, Limiter, Compressor/Gate, Gate/Expander and Ducker.

Compressor Threshold Level The control surface Compressor Threshold control is used to set the variable threshold level of compressor activation between -40 and +10dB.

Compressor Side Chain An on-screen menu enables any input port to act as a Side Chain input to the compressor when the Compressor 2 algorithm is selected. When this feature is used, the Compressor Threshold Level control will be related to the level of the side-chain input signal.

Compressor Attack The control surface Compressor Attack switch is used to set the attack phase of compressor operation between slow, medium and fast.

Compressor LF Rejection An on-screen rotary pot is used to select the variable level of Low Frequency Rejection of the compressor between Off and Full to prevent the possible distortion during the compression of low frequency sounds.

Compressor Action An on-screen pot is used to set the variable level of compressor Action between Smooth and Precise. The definition of this action is determined as being the rate of transition into compression as a signal level approaches the Threshold level between gradual, the Smooth characteristic, and instantaneous, the Precise characteristic.

Compressor Soft-Knee
An on-screen switch is used to override the Action control and select a Soft Knee action characteristic where compression will gradually be applied as the signal level approaches within -3dB of the Threshold level.

Compressor Ratio
The control surface Compressor Ratio control is used to set the variable ratio of compressor gain reduction between 1:1 and 10:1. When the Limiter algorithm is selected, this control will be ineffective and a preset ratio of 100:1 will be applied.

Compressor Release
The control surface Compressor Release control is used to set the variable release phase of compressor operation between 0.05 and 4 seconds.

Compressor Make-Up Gain
An on-screen rotary controller is used to select variable amount of gain applied to the signal after compression between 0 and +15dB.

Compressor Auto Make-Up Gain
An on-screen switch is used to select the Auto Make-Up Gain feature which overrides the Make-Up Gain control and applies an automatic amount of gain to the signal after compression to match its pre-compression level.

Compressor In
The control surface Compressor In switch places the entire Compressor path in or out of circuit.

Channel Path

Dynamics Section continued



Gate/Expander Threshold Level
The control surface Gate/Expander Threshold control is used to set the variable threshold level of gate/expander activation between -40 and +10 dB.

Gate/Expander Side Chain
An on-screen menu enables any input port to act as a Side Chain input to the gate/expander when the Gate/Expander or Ducker algorithm is selected. When this feature is used, the Gate/Expander Threshold Level control will be related to the level of the side-chain input signal.

Gate/Expander Hysterisis
An on-screen rotary controller is used to set the variable Hysterisis level of gate/expander operation between 2 and 10dB.

Gate/Expander Attack
The control surface Gate/Expander Attack switch is used to set the attack phase of gate/expander operation between slow, medium and fast.

Gate/Expander Hold
An on-screen rotary controller is used to set the variable Hold time of gate/expander operation between 0.03 and 1 second.

Gate/Expander Auto-Hold
An on-screen switch is used to override the settings of the Gate/Expander Hold control by applying an appropriate preset hold time relative to the selected Gate/Expander Release time.

Gate/Expander Range
The control surface Gate/Expander Range control is used to set the variable range of gain reduction between 0 and 40dB when the gate/expander is set to Gate mode. When the gate/expander mode is set to Expander, this control is ineffective and a preset gain reduction ratio of 1:2 based on the input signal will be applied.

Gate/Expander x2
An on-screen switch enables the amount of gain reduction indicated by the Gate/Expander Range control when the gate/expander is in Gate mode to be increased by a factor of two. This enable the Gate/Expander range control to provide up to 80dB of gain reduction.

Gate/Expander Release
The control surface Gate/Expander Release control is used to set the variable release phase of gate/expander operation between 0.03 and 4 seconds.

Gate/Expander Gate
The control surface Gate switch enables the action of the gate/expander mode to be toggled between Gate and Expander modes.

Gate/Expander In
The control surface Gate/Expander In switch enables the entire expander/gate path to be placed in and out of circuit.

Channel Path – Aux/Routing Section



Aux 1-12 Pre On-screen switches are used to individually select mono auxes 1-12 to be fed pre or post fade.

Aux 1-12 Level The control surface aux level controls are used to set the aux send level of mono auxes 1-12.

Aux 1-12 Mute The control surface aux mute controls are used to select the mute status of mono auxes 1-12.

Aux A-C Pre On-screen switches are used to individually select stereo auxes A-C to be fed pre or post fade.

Aux A-C Level The control surface aux level controls are used to set the aux send level of stereo auxes A-C.

Aux A-C Pan The control surface aux pan controls are used to set the aux pan position of stereo auxes A-C.

Aux A-C Mute The control surface aux mute controls are used to select the mute status of stereo auxes A-C.

Channel Routing On-screen switches are used to individually select the channel to be routed to the multi-format busses B1-B4 and M1-M2 as well as multitrack busses 1-16.

Channel Width (Stereo Channels Only) The control surface width control is used to set the variable width control of stereo channels between wide (stereo) and narrow (mono).

Pan/Balance (Stereo Channels Only) An on-screen switch is used to switch the action of the control surface pan control between pan and balance functions.

Direct Output An on-screen selection area is used to select any output port to be fed as a direct output of the channel, either pre or post fade.

Direct Output Level An on-screen rotary pot controls the variable output level of the direct output signal.

Channel Path – Pan/Level Section



L-R Pan The control surface pan control is used to pan the channel between Left/Right, Front Left/Front Right or Odd/Even depending upon the type of buss that the signal is routed to. This function can also be performed by the optional control surface joystick panel.

F-S Pan The control surface front/surround control is used to position the channel variably between the front and rear positions of multi-format busses. This function can also be performed by the optional control surface joystick panel.

SL-SR Pan The control surface SL-SR control is used to pan the signal between the left and right surround positions of multi-format busses. This function can also be performed by the optional control surface joystick panel.

Mute The control surface mute control is used to mute the channel. The Mute control can also be configured and legended as an On control where the switch is illuminated when the channel is not muted.

Level The touch-sensitive120 mm linear motor fader on the control surface is used to control the channel mix level.

Faders To The control surface Faders To function enables the channel faders to be switched to control aux level control as well as sub-woofer level control for suitable multi-format busses for each channel.

EQ Screen The control surface EQ screen switch activates the EQ display screen for the graphical display of the current EQ settings as well as providing access to the EQ Library where favourite settings can be saved, loaded and previewed.

Dynamics Screen The control surface Dynamics screen switch activates the dynamics display screen for the graphical display and metering of the current dynamics settings as well as providing access to the Dynamics Library where favourite settings can be saved, loaded and previewed.

Pan/Divergence Screen The control surface Assign switch provides access to the Pan/Divergence editor where the characteristics of all pan controls can be viewed and edited for either each individual channel or globally for all channels.

Bussing

The bussing architecture of the DMS is an excellent illustration of the system's flexibility and adaptability. The DMS's 32 busses are divided into the following four categories:

- Aux Busses
- Multitrack Busses
- Sub Busses (B1-B4)
- Main Busses (M1-M2)

The format and capacity of these busses is as follows:

AUX BUSS

Aux Busses – The system can be configured to have up to 12 mono and 3 stereo aux busses. Each of these busses can be selected to be fed pre or post fade from each channel individually.

MULTI BUSS

Multitrack Busses – The system can be configured to have up to 16 multitrack busses. As with an analogue console, each channel can be selected to route to any number of multitrack busses simultaneously.

SUB BUSS

Sub Busses (B1-B4) – The system can be configured to have up to 4 Sub Busses, which are referred to as B busses. Each B buss can be individually configured to be mono, stereo, LCRS, LCR-SS or 5.1 format. Each channel can individually route to any number of B busses and the B busses themselves can also be individually selected to feed the Main mix busses.

MAIN BUSS

Main Busses (M1-M2) – The system can be configured to have either one or two Main busses, which are referred to as M busses. Each of the M busses can be individually configured to be mono, stereo, LCRS, LCR-SS or 5.1 format. Each channel can individually route to one or both of the M busses.

As with all other areas of the DMS, a dedicated software screen is provided for fast, intuitive, control of buss configuration and output selection.



Bussing

Bussing

This diversity of bussing options within the DMS means that the user can configure the console with the optimum bussing arrangement for a particular task. As with all other parts of the DMS signal path, the user can also allocate any of the system's outputs as the destination for these busses, allowing aux sends, for example, to be connected to a combination of analogue and digital effects devices. The provision for any number of parallel outputs to be assigned to a buss also means that a stereo mix buss, for example, could be configured to output to an analogue VTR and a Digital Audio Tape recorder simultaneously.

Aside from the choice of buss type and output format, the other major strength of the bussing features of the DMS is the ability to instantly reconfigure busses from one type to another without the need to exit the system. This means that during a session, if a situation arises where more aux sends are required, for example, the operator can change busses that had been assigned as multitrack busses to be aux busses simply by pressing the on-screen buttons in the Buss Allocation page of the software.

The possibilities provided by this methodology are illustrated in the following scenarios, where a total of 20 busses are used to create three separate console operational modes.

AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
MULTI BUSS	MULTI BUSS	MULTI BUSS	MULTI BUSS
MULTI BUSS	MULTI BUSS	MULTI BUSS	MULTI BUSS
MAIN BUSS	MAIN BUSS	MAIN BUSS	MAIN BUSS

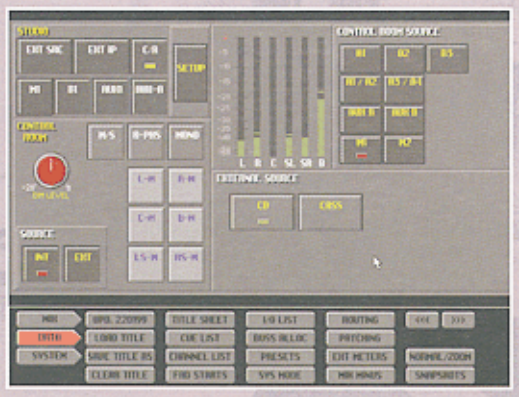
1 the console busses are used for a track laying session with 8 auxiliaries, 8 mono multitrack busses to feed a recorder and 2 stereo main busses for monitoring.

AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
SUB BUSS	SUB BUSS	SUB BUSS	SUB BUSS
SUB BUSS	SUB BUSS	MAIN BUSS	MAIN BUSS
MAIN BUSS	MAIN BUSS	MAIN BUSS	MAIN BUSS

2 the same 20 busses are configured for a pre mix session with 8 auxiliaries, one 5.1 sub-buss to feed a recorder and one 5.1 main buss for monitoring.

AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
AUX BUSS	AUX BUSS	AUX BUSS	AUX BUSS
MAIN BUSS	MAIN BUSS	MAIN BUSS	MAIN BUSS
MAIN BUSS	MAIN BUSS	MAIN BUSS	MAIN BUSS

3 the console is configured for a final mix with 12 auxiliaries, one 5.1 main mix buss and one stereo mix buss for producing a simultaneous stereo music and effects version of the main mix.



Monitoring



Monitoring

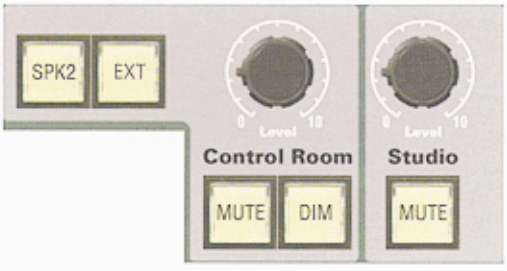
The DMS provides the extensive monitoring capabilities required to meet the demands of multi-format post-production applications.

A combination of dedicated control surface keys and the software Control Room and Studio monitoring page is used to provide an intuitive and comprehensive control interface for all monitoring requirements, including metering of the current source.

The control room monitoring can be instantly set by the user to be mono, stereo, LCRS, LCRSS or 5.1 formats with comprehensive facilities for incorporating surround sound encode and decode units, as required. Each speaker has individual mute and trim controls as well as the overall level, mute and definable dim level controls provided by the control surface.

The control surface SPK 2 switch can be used to direct the control room monitoring output to an alternative set of speakers. These speakers can also be configured to be of a different format to the main speakers to provide a stereo sum check facility for LCRS mixes, for instance.

In addition to being able to monitor any buss within the console, the EXT key on the control surface switches the monitoring to one of up to 16 user-definable external sources, which can be of any format from mono up to 5.1.



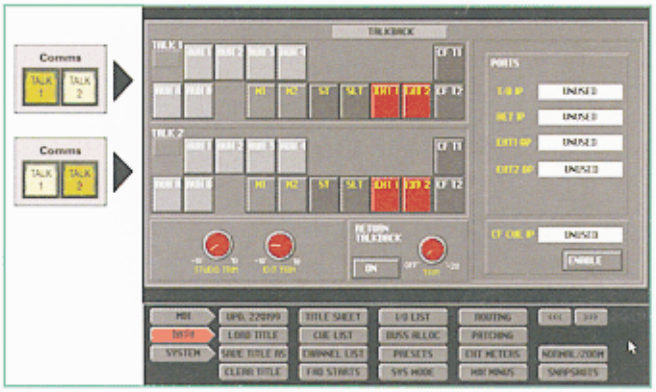
A separate Studio Monitoring section is also provided which allows a wide range of monitor sources to be directed to the studio monitors, which are controlled from the level and mute controls on the control surface. The studio monitors can be set to monitor the control room monitor source, a selection of busses such as auxes, for foldback, for example, or any of the 16 external sources.

In common with all other aspects of the DMS system, the control room and studio monitoring system parameters are saved with the Title file. This enables the user to configure monitoring environments which are instantly recalled when a Title is loaded, allowing effortless monitoring changes between projects of different formats.

Talkback

Talkback

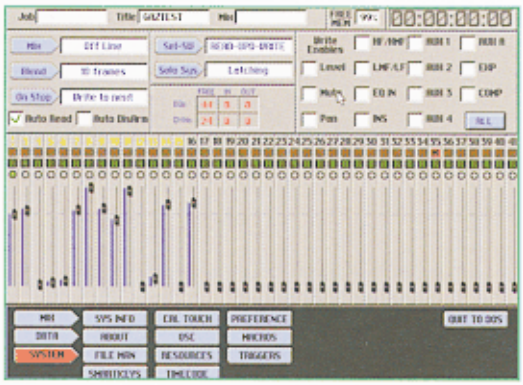
The DMS provides two separate talkback paths, Talk 1 and Talk 2, to enable the user to talk to two separate sets of destinations from the integrated talkback microphone in the control surface.



The Cues and Comms software screen provides the user with access to the selection of the destinations that will receive the talkback signal for Talk 1 and Talk 2. Both of the talkback paths can be directed to feed any combination of busses, studio speaker outputs or up to two external outputs. The external outputs can be used to feed a dedicated talkback speaker in the studio or for communications to a facility's machine room, for example. Provision is also made to accommodate a return talkback input with a selectable level control.

The dedicated control surface Talk 1 and Talk 2 keys, which have both momentary and latching actions, are used to activate the talkback system and can also be used in combination with the UVS-1 matrix to create a producer talkback facility for either path, if required.

Automation



The DMS features comprehensive automation facilities developed from Amek's Supertrue system, the most-widely used console automation package in the world. Over the past decade, Supertrue has developed into a system that combines powerful mix control and editing facilities with a simple user interface and has proven its reliability across a broad spectrum of audio applications.

With the DMS, these capabilities are taken to another level by being able to automate dynamically all console parameters from fader levels to dynamics thresholds and EQ levels against time-code. The four operating modes of the automation system are controlled from a dedicated selector switch above each fader on each channel or globally from the touch-screen.

READ — Where channels are replaying previously written mix data.

WRITE — Where new data is being written to the mix from the control surface.

UPDATE — Where a channel is replaying a previously written mix with the ability for the user to add additional data.

TOUCH-WRITE — Where channels are automatically placed into WRITE mode when the touch-sensitive faders are touched and placed into READ mode when the fader is not being touched.

At any time, the channels and elements that are being written to a mix can be selectively enabled and disabled, allowing the user to refine a mix by concentrating on just the EQ control of one channel, for example.

A VCA Group style of operation, called Control Groups, is also provided to enable related channels to be brought under overall mute and level control of a single master channel. Up to 10 Control Groups can be created and these can also be selected to assume Pan control of their respective slave channels, meaning that a group of related sound effects, for example, can all be panned together.

Further refinement can also be made using the powerful Mix Processor function which allows extensive off-line manipulation of the mix data.

COPY — Allows mix information to be copied from one channel to another.

SWAP — Allows mix information to be swapped from one channel to another.

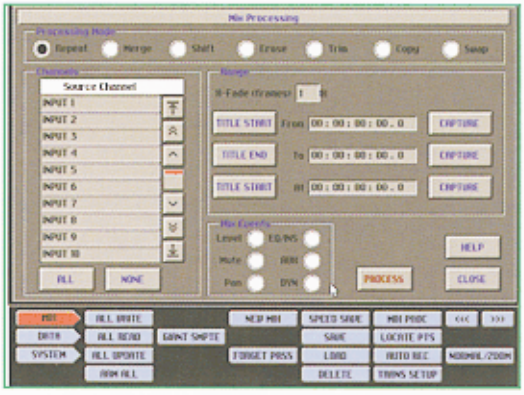
TRIM — Allows overall level trimming of channel level changes.

ERASE — Allows erasing of channel mix information.

SHIFT — Allows offsetting of channel mix information against timecode.

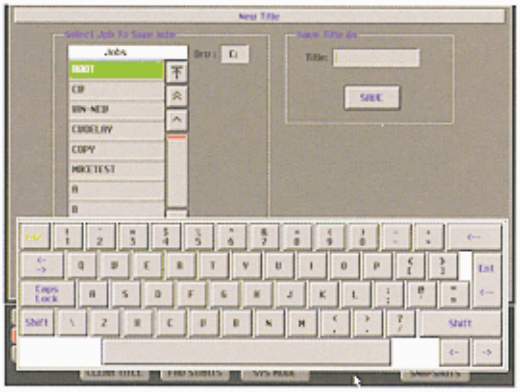
REPEAT — Allows channel mix information to be repeated at another timecode position.

MERGE — Allows merging of current mix information with that of a previously saved mix.



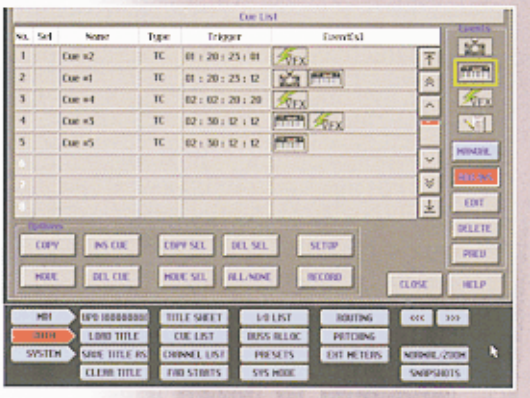
In all Mix-Processor functions, the user can specify the channels, elements and timecode regions that will be processed when a function is executed allowing the ERASE function, for example, to erase only Pan information from channels 1 to 4 over a period of 2 seconds and 4 frames or the MERGE function to combine the current mix with the level data of channel 9 from another mix.

This ability to selectively manipulate any aspect of the mix data finds another typical use when a mix has been completed, only for a new scene to be inserted into the programme. Using the SHIFT function of the mix processor, all mix data on all channels at the point of the insertion can be moved to the out-point of the new scene, enabling new mix data to be written for the new scene without having to recreate the data of the scenes that now follow.



When a mix has been completed to the operator's satisfaction, it can be saved for later recall to the computer hard-disk along with the main Title file, which stores all console configuration information, such as input/output patching, switch-matrix settings and buss structure.

In combination with dynamically automated mixes, the DMS automation system also allows up to 64 Snapshots to be saved with each Title. Each Snapshot stores a static setting of all console parameters for all channels. Snapshots can be loaded manually or triggered automatically at defined timecode positions by the Cue List function, which also allows other events such as MIDI messages and VFX Presets to be triggered.



A comprehensive management system is also incorporated within the DMS automation system to accommodate all aspects of file handling. The File Manager function provides file creation, copying and deleting support for the DMS system's own internal hard-disk as well as optional additional fixed and removable drives. The File Manager is also used to provide an archived version of a Title onto a single floppy disk.

Visual Effects

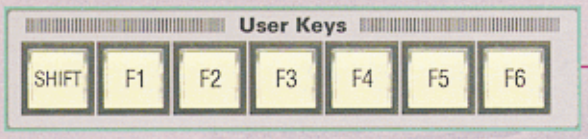
The Visual Effects System enables control of parameters within external effects units directly from the DMS Control Surface. Each device is represented graphically and parameters are controlled by the user from virtual pots and switches on the touch-screen.

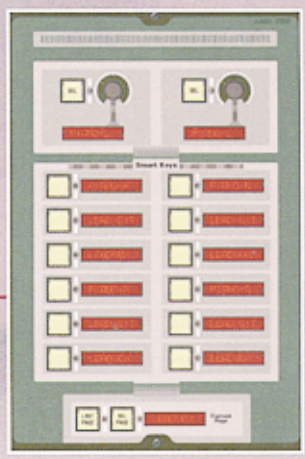
The Visual Effects system supports a wide range of popular effects devices from manufacturers such as Lexicon, T. C. Electronics, Roland and Yamaha, and up to 10 devices can be active simultaneously.

An extensive library system is included within the Visual Effects system for loading and saving favourite effects settings which also includes a search facility to locate effects of a particular type such as reverbs or delays.

Not only are all of the parameters saved with the title, so that the effects devices settings will be recalled when a title is loaded, but also the operator does not have to move from the optimum listening position at the console to adjust effects settings.







Custom Conditional Macros

Custom Conditional Macros

The DMS Custom Conditional Macro system enables any number of functions of the console to be chained together and instantly executed.

Using a simple on-screen programming system, the user can easily create powerful and unique custom functions to automate often-repeated operations, such as source selection and routing of multiple channels, from the touch of a single user-key on the control surface.

In addition to executing macros from the user-keys, the user can also define other console functions, such as a channel mute or a fader being at a certain level, to be the trigger for a macro. An example of this would be to automatically mute the studio speakers when a microphone channel is open to prevent feedback and then un-mute them again when the channel is closed.

The range of operations that can be contained within a macro also extends to controlling the UVS-1 switch matrix, allowing single key execution of multiple source and destination patching. This can be particularly useful in monitoring control, for example when performing an encoded LCRS mix when the user wants to instantly switch between monitoring the main mix from the console and the recorded mix from the master recorder.

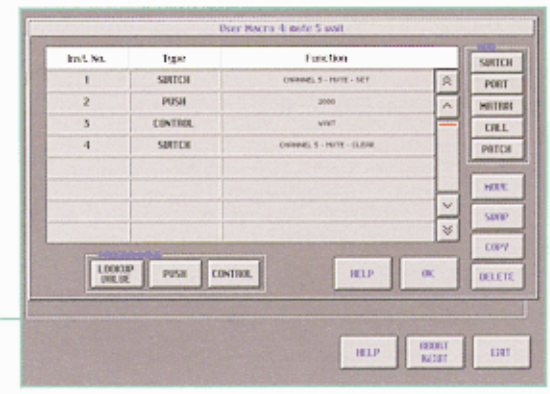
In this example, macros can be created to automatically perform all of the appropriate patching between sources, encoder, decoder and speakers to monitor the decoded main mix, the decoded recorded mix and a stereo check of the encoded recorded mix when the specific monitor sources were selected.

Optional smart-key panels can also be installed in the control surface which each allow up to 144 macros to be activated, with the name of each macro appearing in the writing strip next to the switch.

The smart-key panel arranges the macros into up to 12 named pages to enable grouping of particular types of macros, such as those for monitoring, to be logically arranged. The smart key panel switches also contain lamps which can be illuminated by their respective assigned macros to provide tally indication of any console functions.

Macros can also control and be triggered by external events via the optional 144 line GPI/O card. Using this card, macros can be created to integrate the console with the rest of the facility to, for example, control red-lights when microphone channels are opened. Another example would be to provide a 'cough switch' in the studio to enable a voice-over artist to control remotely the microphone channel mute switch.

The macro system is one of the most powerful features of the DMS and provides the user with the opportunity to create functions that are absolutely tailored to their application and facility.



UVS1 Switch Matrix

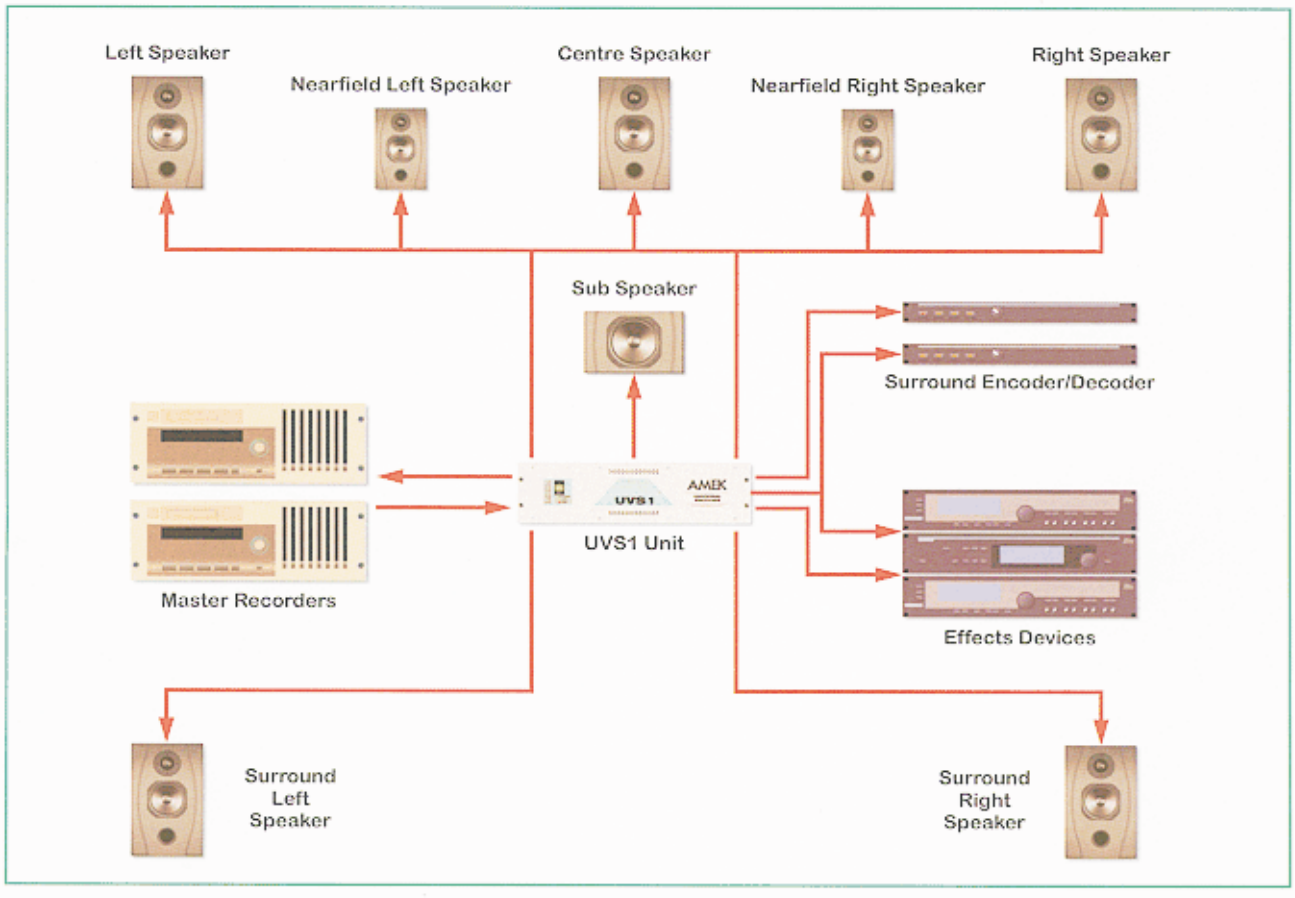
UVS-1 Switch Matrix

The optional UVS-1 switch matrix unit is connected to the DMS to provide automated patching of external signal sources and destinations directly from the control surface.

Available in various configurations such as 16 x 16, 32 x 8 and 24 x 8, multiple UVS-1s can be interconnected to provide an extensive virtual patchbay which can be installed up to 100 meters from the control surface. A UVS-1 can also be configured as an A/B selection device, allowing 40 inputs or outputs to each have an alternative signal source or destination.

All patching is controlled from the software Matrix page which provides simple touch-driven control of source and destination linking. This page enables the viewing and control of up to eight virtual patchbays, each of which may be made up of multiple UVS-1s, to allow separate grouping of patchbay areas such as input and output device selection, for example.

All of the UVS-1 patching configurations created during a session are saved with the Title file, enabling even the most complex patching to be instantly recalled at a later date.



Metering

Metering

A range of metering options are provided by the DMS to ensure accurate metering of signals at all points of the signal chain.

As well as external hardware metering options, complete with electronic writing strips below each meter to indicate the meter source, the integral TFT screen is used to provide metering of signals at every input and output of the console.

A dedicated Meter page on the control surface provides access to six sets of meters which are user-definable to show combinations of channel inputs or buss outputs. A range of scaling options is also provided to show the signals in the form of Digital, BBC, PPM, Nordic and VU scales, each of which have definable display properties such as Plasma or LED emulation.

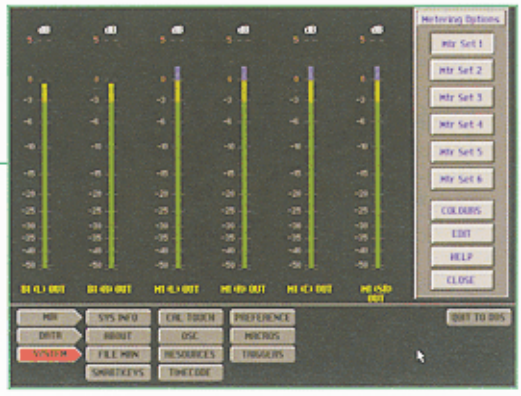
The Meter Sets can also be linked to Fader Sets, meaning that, for example, when the Fader Set containing master buss output faders is selected, the Meter Set containing the meters for these busses is automatically selected.

A dedicated external Meter option is also available which allows constant metering of up to 72 signals per set to be displayed on an external VGA screen, or additional control-surface mounted TFT screen, irrespective of the currently selected screen on the control surface.

In addition, when a channel is Solo'd, a solo meter appears in the centre of the main TFT screen to provide Solo metering of the channel in the currently selected Solo mode type. Tri-colour signal present LED emulation can also be activated above the channel display of all channels on the main automation screen.

The Central Assignment Panel, and optional hardware dynamics panels, also contain hardware LED bar meters to display the gain reduction levels of both Compressor and Gate/Expander for the selected channel.

Metering



The Input/Output Rack





DR40 – *Digital Input card*
DR41 – *Digital Input card with Sample Rate Converter option*



DR50 – *Digital Output card*



DR51 – *Digital Onput card with Sample Rate Converter option*

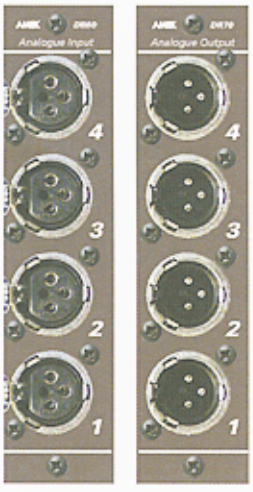
The Input/Output Rack

The flexible and expandable I/O rack is used to interface audio input and output signals to the DMS engine.

Each I/O rack can contain a combination of up to 10 input or output cards, each of which carries 4 channels of audio. This means that a single I/O rack could be used to provide 40 inputs, 40 outputs or combinations such as 24 inputs and 16 outputs. A DMS system can be specified with between 1 and 6 I/O racks.

The contents of each I/O rack are determined by the user and their specific application requirements and a range of different types of input and output cards, both digital and analogue, are offered.

The provision of Sample Rate Converter options on both digital inputs and outputs offers the user maximum flexibility both in terms of connecting fixed sample-rate digital sources, such as CD players, but also enables simultaneous output of material at different sample rates.



ANALOGUE

DR60 – *Analogue Line Input card*

DR61 – *Analogue Line Input card with Mic option*

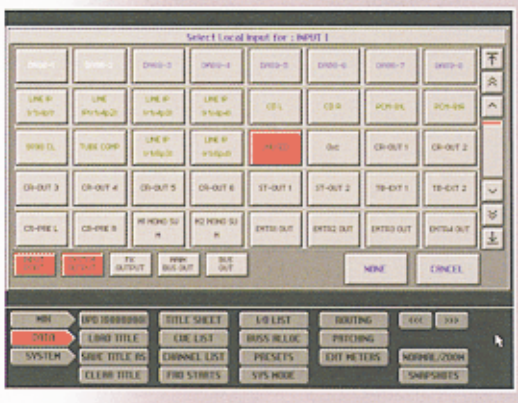
DR70 – *Analogue Output card*

The range of analogue input options can also be extended by incorporating the Amek 9098 RCMA remote-controlled microphone amplifier, designed by Mr Rupert Neve. Each RCMA offers 4 channels of the legendary designer's mic-amps controlled directly from the DMS control surface and up to 16 RCMAs can be connected to the system.

Unlike an analogue console, the inputs and outputs do not each have a fixed function, so the user is free to assign each one to any function required at any time. An analogue output, for instance, could be used as an insert-send in one session, as an effects send in another session, a direct output in another session or a master output in another session. As a result of this, the DMS can be quickly and effortlessly adapted by the user to cope with the different demands that may occur during a project.

Due to the modular nature of the I/O rack, the DMS can not only expand as the facility and its productions grow but also provide a safeguard in cases of changes in equipment, as inputs and outputs of one format can easily be changed to those of another.

An example of this could be a facility that has a 16-track digital recorder, several analogue outboard effects devices and primarily produces stereo commercials who now want to upgrade their facility to 32 tracks and produce 5.1 programs. With the DMS, this would be achieved with the simple addition of another I/O rack for the extra disk recorder and monitoring outputs whilst the analogue input cards used for the effects devices could be replaced with digital cards for their new devices.



The DMS in action



Angell Sound – London

When Angell Sound opened its new 5-room post-production facility in Wardour Street, they decided to equip each room with an Amek DMS console.

Each room uses an identically-specified DMS engine, I/O rack and UVS-1 switch matrix configuration, but there are subtle differences in each Control Surface to reflect the requirements of each of their primary operators.

With uniform audio capacity, and the use of the Stargate system to integrate with the facility's networked Augan disk recorder system, a project can be seamlessly transferred to any room, greatly increasing the efficiency of scheduling sessions.

The integration of the Augan units extends, in several rooms, to the mounting of its hardware controller and screen in the DMS Control Surface itself.

The flexibility of the DMS was crucial in providing a solution for an unusual project, the production of a weekly radio program complete with a phone-in portion of the show. With the DMS, this was simply achieved by creating a console set-up which, when selected, transforms one of the post-production consoles into a radio console, complete with the requisite clean-feed and mix-minus facilities for the phone-ins. These clean-feed and mix-minus facilities are also used extensively in the other studios when sessions involve remote connections of other facilities via ISDN links.

The ability of the DMS to reset all aspects of a session, from type of console operation to source selection and monitoring environments, enables Angell Sound to accommodate a great diversity of projects with the minimum of transition time between sessions.



The Bakery – Los Angeles

Situated in Burbank, The Bakery is a multi-room music and post-production facility.

Already long-time users of Amek consoles, notably the first Mozart console in the USA, The Bakery naturally turned to Amek to provide the console for its new all-digital recording and mixdown room.
The Bakery's latest studio was designed to cope with a wide range of projects from music to post-production. The ability of the DMS to provide rapid, automated changes of console configuration, source selection and monitoring set-ups was a critical factor in The Bakery's choice of this console.

The Bakery's DMS makes extensive use of the UVS-1 switch matrix unit to provide both source and destination selection, including monitoring configurations. The use of Smart-Key panels and Custom Screen pages enables complex source selection and monitoring configurations to be simply, and instantly, selected from the control surface and touch screen.

The most important feature of the console, however, is its ability to be used by either single or multiple operators. This achieved by providing two sets of Central Assignment Panels, Touch Screens, Smart Key Panels and Joysticks which enables two operators to use the console for larger post-production sessions. For music sessions, the use of Fader Set switching enables the console to be used comfortably by a single operator. The integration of an additional TFT screen in the centre of the console also allows constant metering of all signals by both engineers.

Express Corporation – Osaka

One of the leading image creation and information service programme makers in Japan, Express Corporation chose the DMS for its MA studio, a facility also featuring a DSP hard disk recorder.

This is a perfect example of how the DMS's Control Surface can be styled to fit precisely the operational requirements of a facility. The MA studio has a three-tier system with dedicated EQ and Dynamics controllers above 24 of its 28 faders, as well as the standard Central Assignment Panel.



As many of the console's 64 mix inputs are stereo, and hence require only one fader, two Fader Sets were required to provide a method for all channels with the ability to have direct EQ and Dynamics controls, with the central four faders used for master buss control. Used in this way, the DMS closely replicates a traditional analogue-equivalent console both cosmetically and operationally, a concept which is extended to include the incorporation of VU meters above the TFT screen.

As voice-over recording is a primary operation of the MA studio, the macro system and GPI/O card were used to provide extensive custom control features for this requirement. These included a prioritised producer and operator talkback and slate system, reverse talkback function complete with program dim control, remote channel control from the voice booth and record indication lamps.

A UVS-1 is used to provide instant setting of the monitoring configurations required for both stereo and 5.1 projects and the monitoring capabilities were also extended to include independent main, near-field, studio and headphone monitor level controls.

The Soundhouse – Manchester

Located less than a mile from Amek's headquarters in Manchester, The Soundhouse has its post-production credits on many prestigious nationwide television programmes.

The centrepiece of the facility is Studio 1, a fully digital dubbing theatre equipped with an Amek DMS and served by a range of hard disk recorders including Avid Audiovision, DAR Sabre and AMS Audiofile. The range of disk recorders used by The Soundhouse reflects the diversity of their clients and enables the facility to not only accept material in its native format, eliminating costly transfer time, but also to provide extensive extra track capacity as required during the final mix stage of a project.



The control and reset possibilities of the DMS system are central to this philosophy, enabling the operator to select automatically the appropriate disk recorder, or combination of recorders, to be patched into the system via the UVS-1 switch matrix system at the touch of a macro button on the Control Surface. The UVS-1 is also used to provide instant setting of the monitoring configurations required for both stereo and Dolby Surround projects.

The flexibility of the DMS bussing structure is exploited by The Soundhouse for both creative and practical purposes, configuring the busses to provide a multi-stem operational mode as well as the time-saving ability to perform a simultaneous international language version of the main mix.

The concept of centralised control from the DMS Control Surface even extends to the use of a GPI/O card to remotely operate climate control equipment in the voice booth.

Wildtracks – London



After many successful years of using Amek analogue consoles, the DMS was the logical choice for the transition of both of Wildtracks' main two studios to a digital environment.

The range of integration possibilities offered by the DMS for the facility's DAR hard-disk recorders formed a central part of the development plan for the two rooms. To this end, each Control Surface features a 45 degree section incorporating the DAR controllers whilst the Stargate protocol is used to provide the control communications between console and recorder.

A UVS-1 switch matrix is used to provide source selection and monitoring configuration including the replication of the custom monitoring facilities that the facility had incorporated into their Amek analogue consoles. The implementation of these features, along with many more new ones made possible by the DMS is achieved by the macro system and controlled by Macro Panels in the Control Surface as well as hardware switches interfaced by a GPI/O card.

In such a busy facility, with a large number of operators, it is essential that a good file management strategy is employed and this has been addressed by supplementing the DMS's internal hard disk with removable disk drives. In addition to the removable hard disk, a ZIP drive is used to back up console configuration files, Titles and Mix data.

The shaping of the DMS to their precise operational requirements, its integration to their other equipment and its future expansion possibilities has provided Wildtracks with Amek consoles that are equipped to provide them with as many years' service as their previous ones.

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