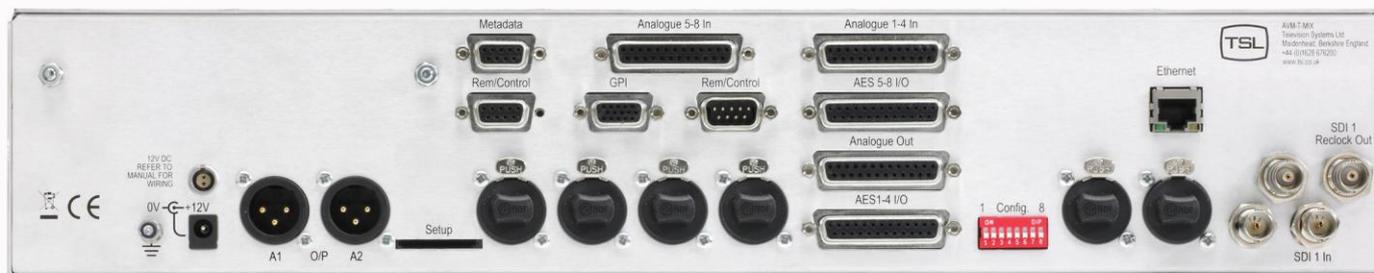


Operating Manual

Audio Monitoring



Touchmix (AVM-T-MIX)

SAFETY

Installation.

Unless otherwise stated TSL equipment may be installed at any angle or position within an operating temperature range of 5°C - 30°C.

All TSL equipment conforms to the EC Low Voltage Directive:

EC Low Voltage Directive (73/23/EEC)(OJ L76 26.3.73)(LVD). Amendment: (93/68/EEC) (OJ L220 30.8.93).

In all cases the frame of the equipment must be earthed on installation.

Where appropriate, the earth pin on the IEC mains inlet connector is connected to the metal frame of the equipment, to 0 volts on the internal DC PSU and to signal ground unless otherwise stated. All metal panels are bonded together.

Check that the voltage selector setting (if fitted) and the fuse rating is correct for the local mains supply.

Due consideration for cooling requirements must be given when mounting the equipment. It is recommended that a 1RU of rack space, or a vent panel, should be left above and below the unit.

WARRANTY, MAINTENANCE AND REPAIR

- All TSL products have a one year warranty period starting from the date it leaves the factory.
- A repair warranty is to apply. That is, the product is to be returned for repair with no replacement and an exchange shipping policy is also to apply.
- TSL offers a seven day DOA policy together with an exchange shipping policy. That is, if a product has been declared 'dead on arrival' within a seven day period a warranty replacement will be shipped.
- A temporary replacement may be available where, for operational reasons, it is imperative that service is continued. The customer will be asked to enter into a 'loan agreement' for the duration of repair.
- All faulty equipment returned to TSL for repair will, where possible, be returned to the customer within seven working days.

TSL Returns Procedure

Please telephone +44 (0)1628 676221 (Fax: +44 (0)1682 676299) and ask for Customer Support, detailing the model and serial number of the equipment, who will provide a Returns Number. This will enable us to track the unit effectively and will provide some information prior to the unit arriving.

For each item, this unique Returns Number must be included with the Fault Report sent with the unit.

A contact name and telephone number are also required with the Fault Report sent with the unit.

Fault report details required.

- Company:
- Name:
- Address:
- Contact Name:
- Telephone number:
- Fax number:
- Email address:
- Returns Number:
- Symptoms of the fault (to include switch setting positions, input signals etc):

Packing

Please ensure that the unit is well packed as all mechanical damage is chargeable. TSL recommends that you insure your equipment for transit damage.

The original packaging, when available, should always be used when returning equipment.

If returned equipment is received in a damaged condition, the damage should be reported both to TSL and the carrier immediately.

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1.0 Introduction

AVM-T-MIX is the world's first rackmount Touchscreen controlled audio monitor unit. The Touch-Mix system delivers a unique combination of audio monitoring and channel mixing capabilities designed to simplify operations and workflow throughout the Television broadcast environment.

The AVM-T-MIX is a 2RU x 320mm Audio Mixer/Monitoring Unit controlled via a touch screen interface and assignable hardware controls.

As with any new product which relies on complex software, it is possible that you may find minor bugs or perhaps think of enhancements which would improve the operation of AVM-T-MIX. In the event of either scenario, please feel free to contact TSL via your local reseller or directly on +44 1628-676221, asking for the TOUCH SERIES Product Manager.

TSL will be releasing upgrades and feature enhancements from time to time – as a purchaser of AVM-T-MIX you should receive these directly, free of charge, through your reseller or directly from TSL. Please refer to www.tslproducts.com for announcements.

The following features are standard:

- Single or Dual (SD Only) Auto-sensing, 1080p (60, 59, 94 and 50Hz), HD/SDI video input
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (SDI 1 only), and eight channels (SDI 2 Group 1 and 2 only)
- 8 AES (8 Pairs/16 Channel) and 4 AES (4 Pairs/8 Channel – SD Only) Inputs– 110Ohm Balanced or 75 Ohm unbalanced via optional CAB-D25-BNC cable
- 8 Analogue Stereo Inputs
- Identical twin audio mixers
- 10 stereo/ 20 dual mono assignable input channels per mixer
- 5.1 audio mixing and monitoring capability
- Full input / output XY routing function
- Surround Sound Speaker Output Support
- Downmix of discrete multichannel audio to stereo for compatibility monitoring
- Re-clocked HD/SDI video output.
- Choice of user selectable bargraph scales (BBC PPM, EBU PPM, EBU Digital, Nordic, VU and DIN)
- 18 User programmable presets.
- 'Home' button for instant recall of default operating condition
- Manage, recall and save favourite configurations via USB stick or SD card
- Fixed or variable analogue stereo outputs (mixer 1 and 2)
- Fixed or variable AES stereo outputs (mixer 1 and 2)
- Variable stereo analogue outputs (Monitor Buss)
- High quality internal full range loudspeaker system
- Dual 12V DC inputs
- Serial remote control
- Headphone output with LS muting
- Compact, lightweight (5.1Kg) 2RU case, 320mm deep

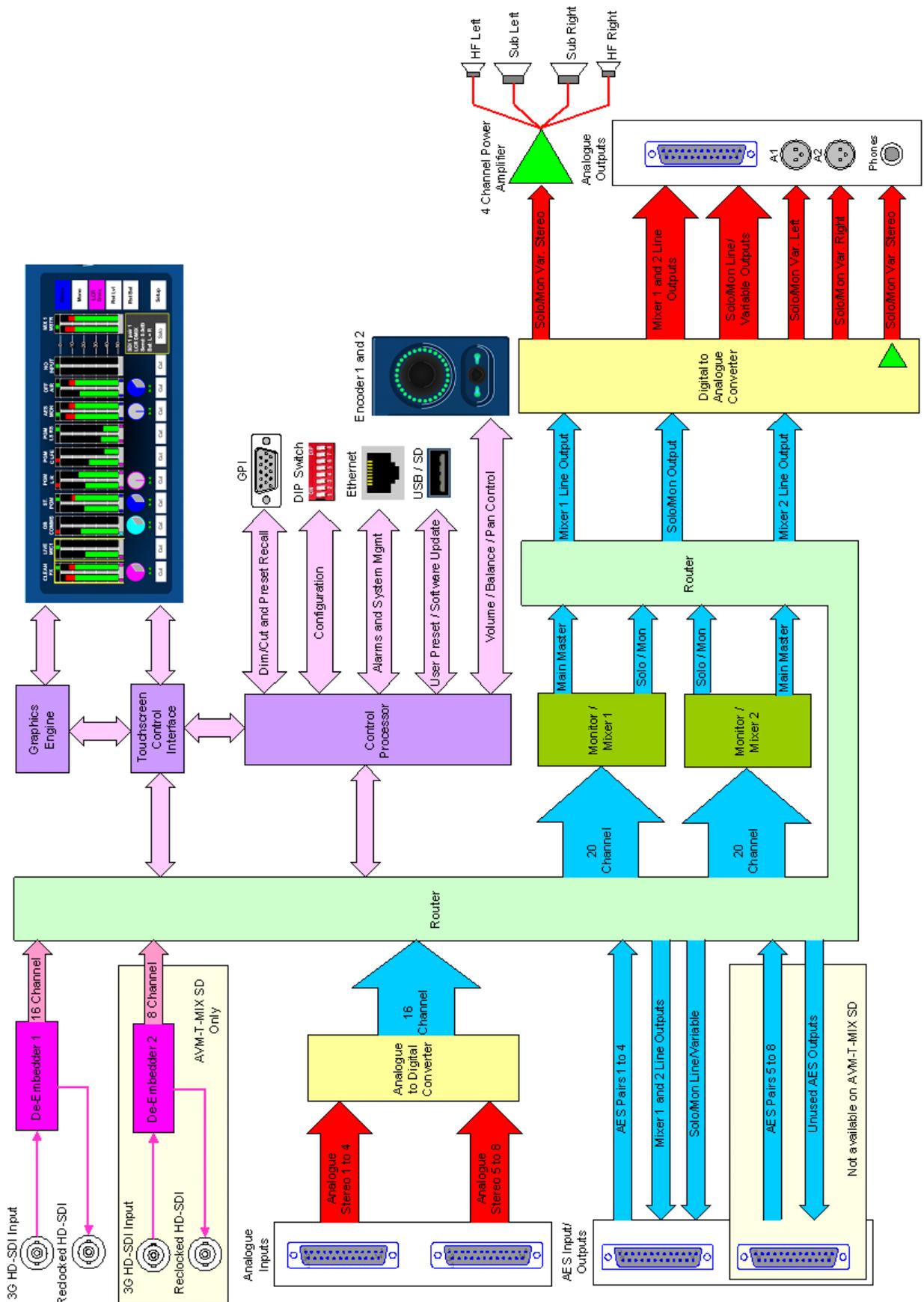


AVM-T-MIX



User Handbook Version Three

1.1 Block Diagram

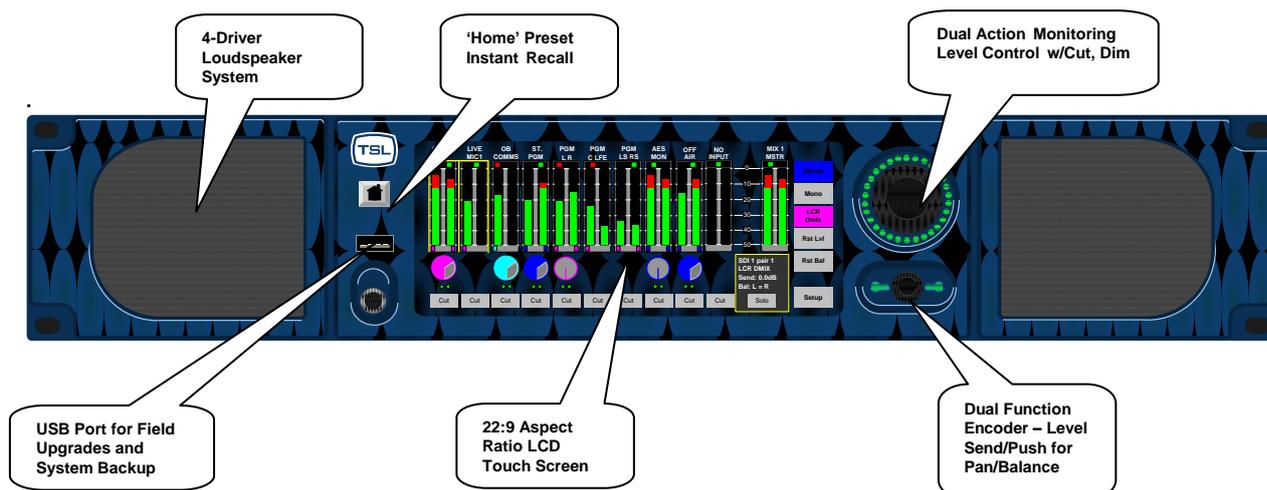


1.2 Operation

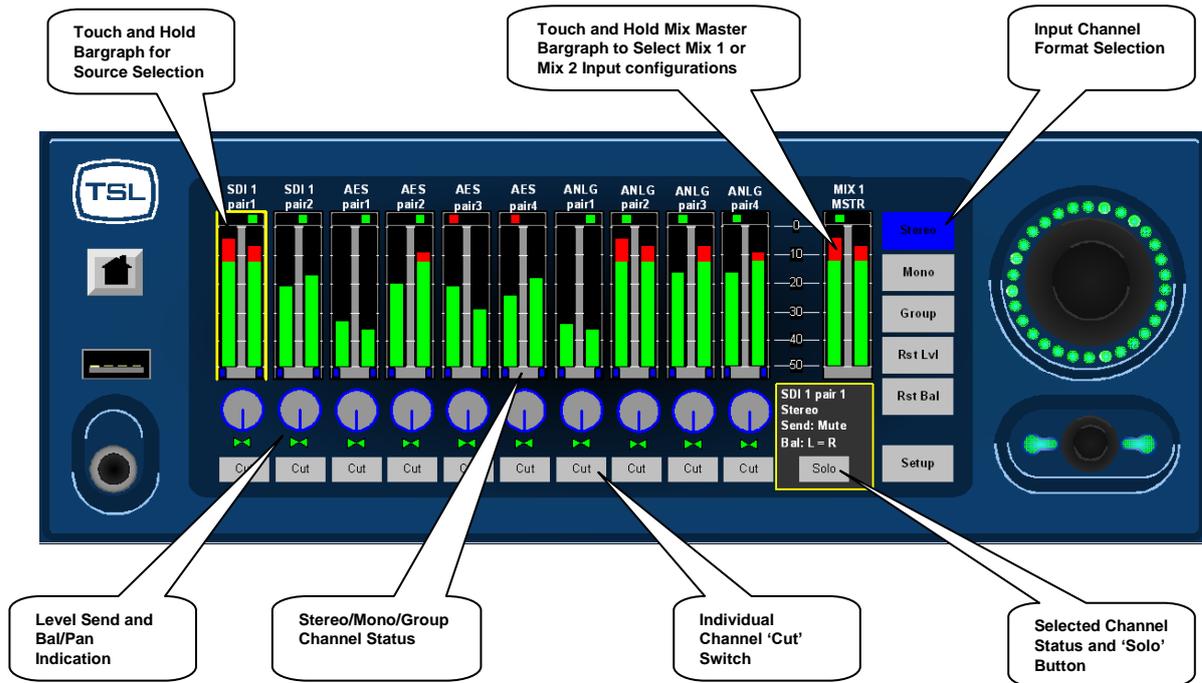
The AVM-T-MIX is designed to be user friendly and intuitive to operate. The menus and functions will feel familiar to both users of TSL multichannel audio monitoring products and those buying a TSL solution for the first time.

Important Note: AVM-T-MIX ships with a default 0dBu reference level set to -18 dBFS, the default operating scale is EBU Digital. The operational reference level for the unit can easily be changed via the Setup menu (described elsewhere in this handbook).

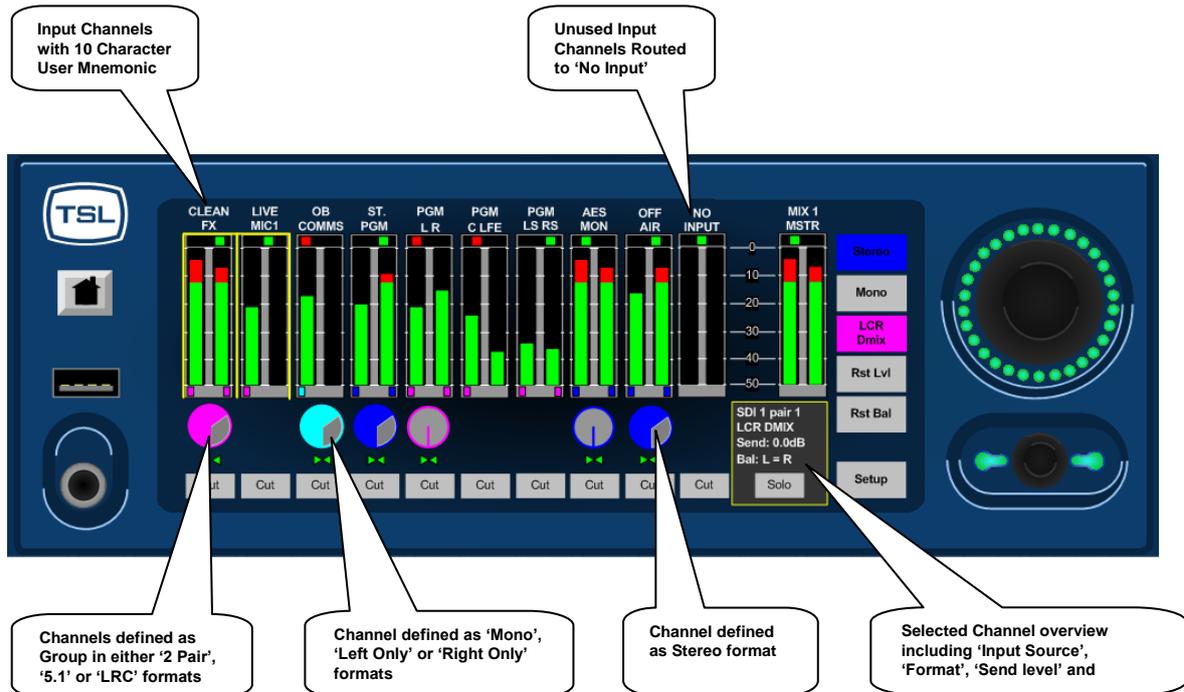
2.0 Controls and Displays - Overview



- **AVM-T-MIX** is equipped with a 4 driver loudspeaker system comprising left/right tweeter and dual subwoofer units.
- Menus and features are navigated via the 22:9 aspect ratio touch screen.
- The front panel **USB** connector is used for software upgrades; favourite user preset storage and preset recall.
- User presets can be recalled and stored locally using the 'Home' button.
- Loudspeaker and headphone volume is adjusted by the master level control. This dual action rotary encoder also features push to Cut/Dim functionality.
- The dual function rotary encoder is rotated to control channel level 'send' with pan/balance activated by push and turn.



- Touch and Hold channel bargraph to activate input selection menu.
- Upon selection of input, selected channel format is selected via the Stereo/Mono/Group buttons.
- Selected channel gain and Bal/Pan level indicated by icons below bargraph display.
- Stereo/Mono/Group channel format denoted by colour of level send control and 'pips' beneath bargraph pairs.
- Individual channels can be 'cut' from main mix buss.
- Individual channels can be 'soloed' to monitoring output buss.
- AVM-T-MIX features two entirely independent Audio Mixers. Touch and Hold Mix Master Bargraph to toggle between Mixer 1 and Mixer 2.
- Mixer 1 can be configured for stereo and 5.1 outputs



- Input sources named with a user defined 10 character mnemonic displayed above the channel bargraph.
- Unused input channels can be routed to 'Silence' displayed as 'No Input'.
- Channel Group format is denoted by use of **Magenta** or **Yellow** colouration.
- Channel Group formats include '2 Pair', '5.1 Downmix', 'LRC Downmix' (as shown above) and '5.1 ALL'.
- Channel Stereo format is denoted by use of **Electric Blue** or **Silver** colouration.
- Channel Mono format is denoted by use of **Cyan** colouration.
- Channel Mono formats include 'L+R', 'Left to both' and 'Right to both' (as shown above).
- Selected Channel status shown in information 'box' includes 'Source', 'Format', 'Send level' and 'Bal/Pan adjustment'.

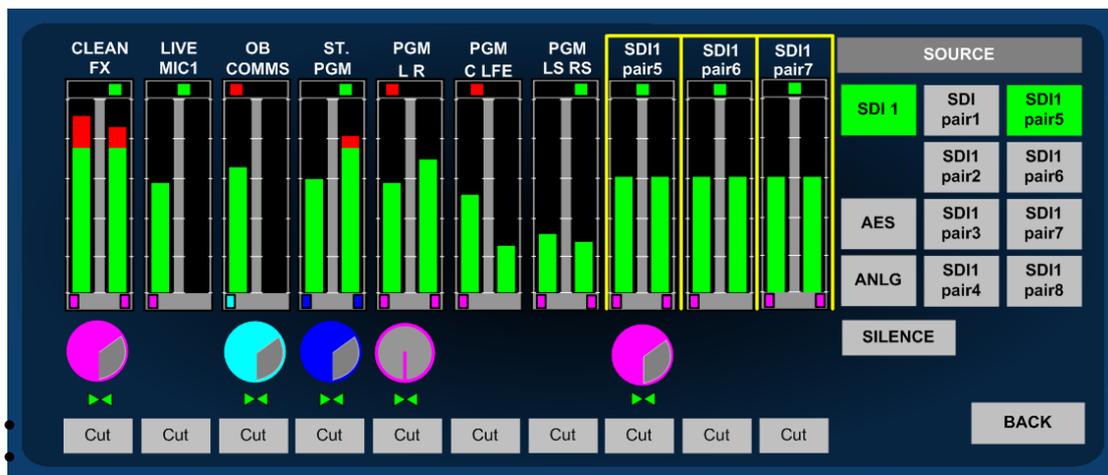
2.1 Source Selection

Key to the ease of operation of AVM-T-MIX is the simplicity by which audio may be monitored and/or mixed. As described previously, AVM-T-MIX is equipped with two completely independent mixer/monitor systems (Mixer 1 and Mixer 2). Each can be configured with its own setup and used in diverse applications.

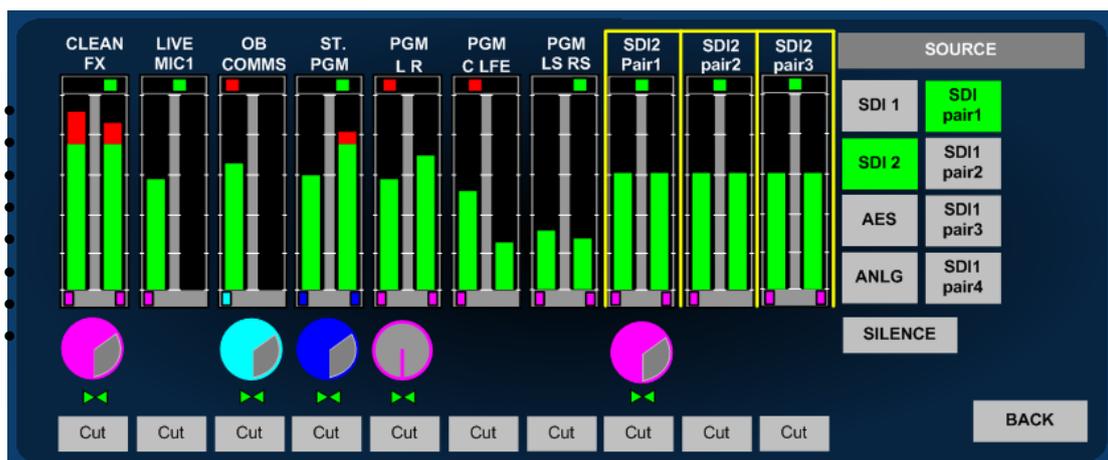
Mixer 1 may be used as primary audio monitor in any application whilst the secondary mixer might be used as a simple de-embedder to 'back-feed' another part of the system or even as a means to derive a headphone cue to a voice over artist or commentator.

Setting up the monitor for use is simple and intuitive yet incredibly powerful.

AVM-T-MIX Source Selection



AVM-T-MIX SD Source Selection



- By simply touching and holding the desired channel the 'SOURCE' menu selection is automatically activated. Select the signal type/pair or 'SILENCE' if no selection is required and the chosen audio will be routed to the channel pair.
- If the selected input has been configured with a **User Name** then the text string will be displayed above the bargraph pair.
- Audio is automatically routed to the selected channel from an active input and the signal activity displayed on the bargraph. To hear the incoming audio instantly, simply press **SOLO** and turn up the volume.

Touch '**BACK**' to exit the 'SOURCE' menu.

2.2 Analogue Audio Input Trim

AVM-T-MIX is designed to be used with balanced or unbalanced analogue audio inputs. If one of the analogue inputs has been wired to an unbalanced signal source then the user may need to compensate for signal loss (typically -6dB). If this is the case then gain can be added to the chosen analogue input in steps of 3dB by touching the button displayed below via the **Setup/Input** menu. Please note that the **AVM-T-MIX** does not have an analogue signal amplifier and that the gain is added in the digital domain. If gain is added to an unbalance analogue audio input in this way then the signal to noise ratio of that signal will be affected accordingly and low level 'hiss' may be heard in exceptional circumstances.



Press to access Input Trim for low level or unbalanced analogue audio

2.3 Channel Signal Format Selection – Stereo Mix/Mon Modes

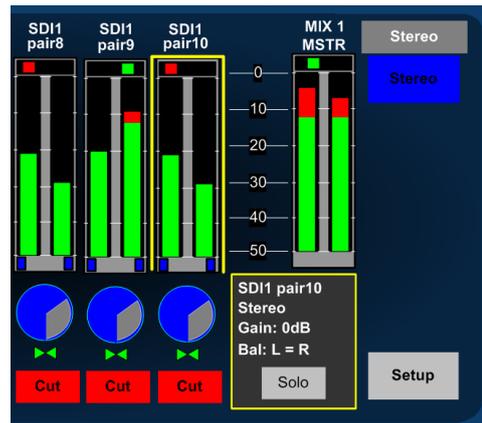
Applicable to Stereo Output Mixer Formats Only

Channel formats can be defined as Stereo, Mono or a Group of 2 or more pairs (including 5.1 and LRC Downmix configurations).

2.3.1 Stereo Channel Format:

To define a channel as **Stereo**, simply touch the desired bargraph pair followed by the 'STEREO' button from the Format menu (as shown).

The Level Send and format 'Pips' below the bargraphs denote Stereo selection by the use of **Electric Blue** colouration

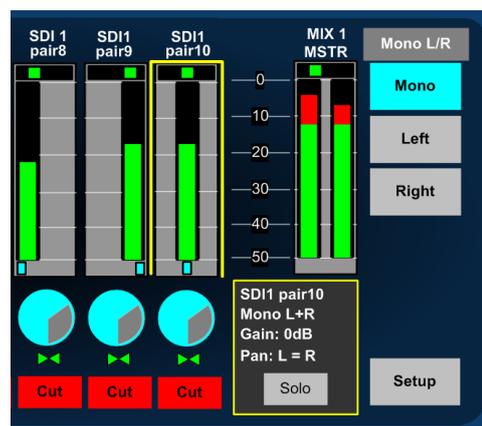


2.3.2 Mono Channel Format:

To define a channel as **Mono**, simply touch the desired bargraph pair followed by the 'MONO' button from the Format menu (as shown). The MONO L/R menu is then activated enabling the operator to choose between 'Mono (L+R)', 'Left (to Both)' and 'Right (to Both)' formats.

Using the latest available software for the AVM-T-MIX standard unit, only the chosen or resultant audio bargraph is represented

The Level Send and format 'Pips' below the bargraphs denote Mono format selection by the use of **Cyan** colouration

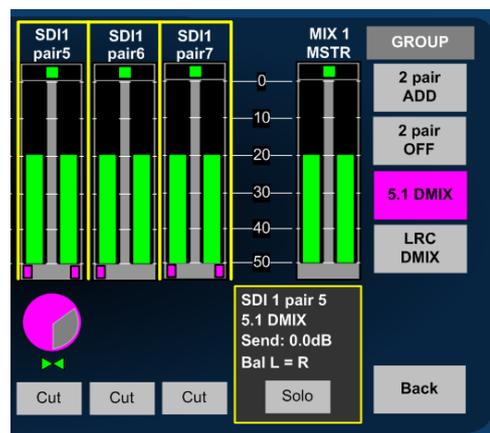


2.3.3 Group Channel Format:

There are four modes of selection within the **GROUP** menu designed to enable the user to mix and monitor sources delivered in more complex channel formats.

2.3.4 Group 2 PAIR ADD:

2 Pair Additive mode sums two adjacent stereo audio pairs together in the format L+L and R+R. The user can adjust the level of the left sum against right via the balance control.



2.3.5 Group 2 PAIR OFF:

2 Pair Offset mode sums two adjacent stereo audio pairs together in the format L+L and R+R however unlike the **2 PAIR ADD** mode, the balance control is used to adjust the relative mix of Pair One against Pair Two.

Pair Offset mode is particularly useful for adjusting the balance of monitored audio when source material comprises a clean FX track on pair one and a commentary on pair two as is often common in Sports Broadcasting.

2.3.6 Group 5.1 DMIX:

5.1 Downmix mode sums 3 adjacent pairs in an Lo Ro stereo format assuming that a standard 5.1 configuration track order has been adhered to (L/R/C/LFE/Ls/Rs) as shown in

the image above. In 5.1 Downmix mode the LFE channel does not form part of the stereo sum. The user can adjust the level of the left sum against right via the balance control.

The 5.1 Downmix algorithm follows the formula $L+(C-3dB) + (Ls-3dB)$, $R+(C-3dB) + (Rs-3dB)$.

A user selectable adjustment located within the menu Setup/Setup2/DMIX enables selection of the a 'Surround -6dB) coefficient with the resultant formula $L+(C-3dB) + (Ls-6dB)$, $R+(C-3dB) + (Rs-6dB)$ active depending on the selection.

2.3.7 Group LRC DMIX:

LRC Downmix mode sums 2 adjacent pairs together as a stereo signal with the first channel of the second pair summed equally to the Left/Right channels. The user can adjust the level of the left sum against right via the balance control.

The LRC Downmix algorithm follows the formula $L+(C-3dB)$, $R+(C-3dB)$

The Level Send and format 'Pips' below the bargraphs denote a Group format selection by the use of **Magenta** colouration

2.4 Channel Signal Format Selection – Surround Sound Mix/Mon Modes

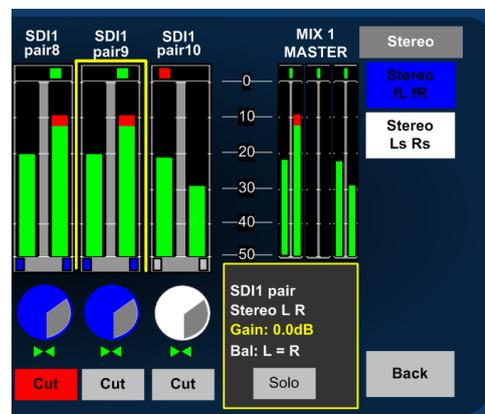
Applicable to 5.1 Output Mixer Formats (see section 2.7.1)

When Mixer One is set to 5.1, additional channel format selections can be made in order to route 5.1, stereo and mono signals to the appropriate surround sound output channels

2.4.1 Stereo Channel Format:

When operating with Mixer One set to 5.1, an extended format selection option appears within stereo channel format options. The operator can choose by touch to route a stereo pair to either the front or rear stereo left and right channels

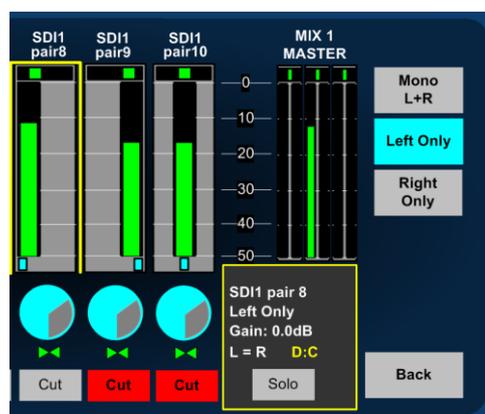
In the example shown you can see how SDI1 pair 9 is routed to the front left and right channels and SDI pair 10 to the surround left and right channels respectively. Front channel routing is denoted by the **Electric Blue** or colour and rear channel routing, by the **Silver** colour.



2.4.2 Mono Channel Format:

When working on a 5.1 project a mono channel selection enables the user to route mono audio to anywhere across the image of the front speakers (left, centre, right). This is achieved using a divergence control that appears within a mono mode adjacent to the left right panner.

In the example shown the mono channel selection routes a chosen signal to the centre mix channel only and the divergence (denoted D:C) is highlighted in yellow and set to zero. By pressing the encoder, the operator can toggle between gain, pan and divergence controls which can then be adjusted to vary the signal level sent to the centre, left and right channels respectively thus providing complete control over the mono image across all three channels.

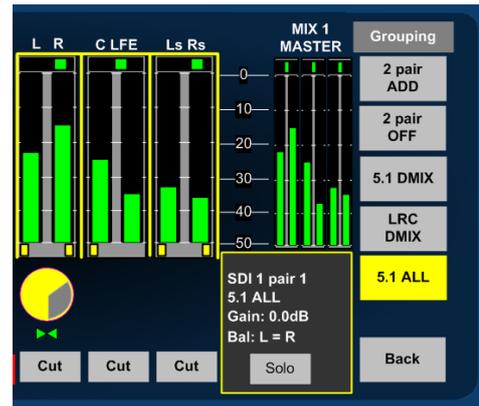


2.4.3 Group Channel Format:

The four modes previously described for stereo mixer use (2 pair ADD, 2 pair OFF, 5.1 DMIX and LRC DMIX) remain active when a 5.1 mixer mode is activated however an additional mode, **5.1 ALL**, now appears under the Grouping menu.

2.4.4 Group 5.1 ALL:

The 5.1 ALL mode is used to define a group of signals that represent a 5.1 programme and route them in order to the 5.1 mixer channel output as shown in the image adjacent. A 5.1 ALL group when selected is represented by the **Yellow** colour of the menu button and gain control icon.

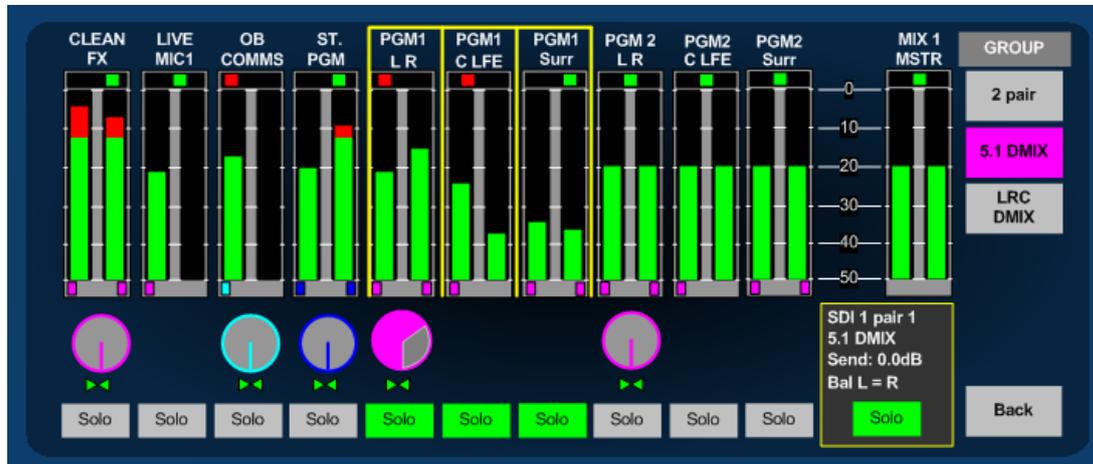


In this mode it is assumed that the audio channels are presented in the order Left, Right, Centre, LFE, Left Surround, and Right Surround and are routed to the mixer accordingly.

2.5 Monitoring Input Channels – Solo Function

Similar to a traditional rackmount audio monitoring unit, the **AVM-T-MIX** is used to listen to incoming signal sources – either exclusively or additively. The simplest way to achieve this is to touch the bargraph channel you wish to hear and then to select **SOLO**.

The selected signal will automatically be routed to the loudspeakers (internal or external) and to the headphone socket.

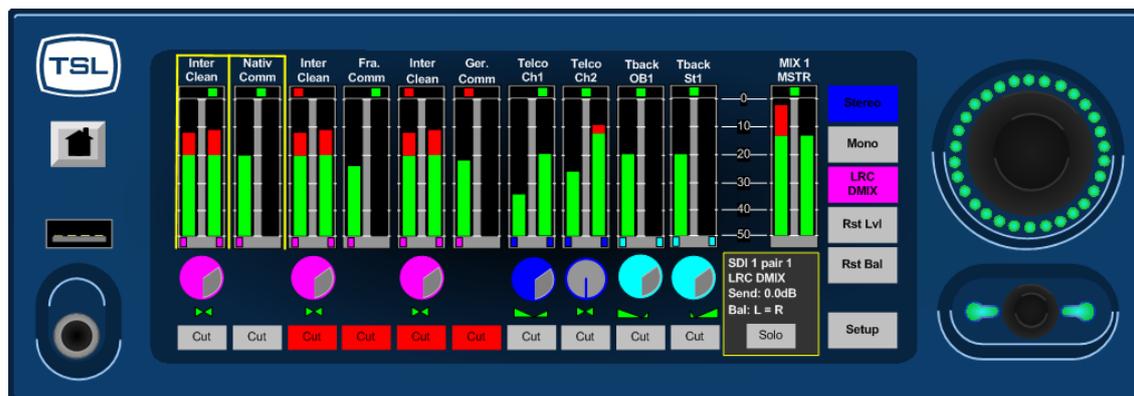


- The example above shows how an operator can quickly check an incoming Programme audio signal which has been Downmixed to stereo from 5.1. In **SOLO Mode**. He/she can now simply touch the adjacent 5.1 bargraph group labelled **PGM2** in order to compare the two signals or alternatively touch the **SOLO** buttons beneath another bargraph pair to add the signals to the monitoring output.
- The selected **SOLO** channels are automatically routed at unity gain to the output as denoted by the position of the rotary **SEND** icon.
- In **SOLO** mode, any **MIXER** routing configurations on either **MIXER 1** or **MIXER 2** are unaffected.
- When **MIXER 1** is configured as 5.1 the **SOLO** function will automatically downmix any selected channels to the internal stereo speakers or route a defined 5.1 channel group to the 5.1 external speaker if used.

2.6 Monitoring Input Channels – Mixer Function

One of the unique advantages of **AVM-T-MIX** over a more traditional Audio Monitoring Unit is the ability to mix sources together using the same methods found in assignable digital audio mixing consoles. **Mixer 1** and **Mixer 2** are both equipped with main outputs which are routed to the monitoring outputs (loudspeakers and headphones) and to fixed line level Analogue and AES connections.

Individual bargraph channels can be mixed onto Master Output bargraphs by adjusting the send level of the selected (highlighted by the yellow 'box') channel using the small rotary encoder simply by turning it clockwise. By pushing and turning the encoder it is possible to adjust the Balance (for Stereo and Downmixed sources) or Pan (Mono) of the selected output being sent to the **Mixer Master** output.

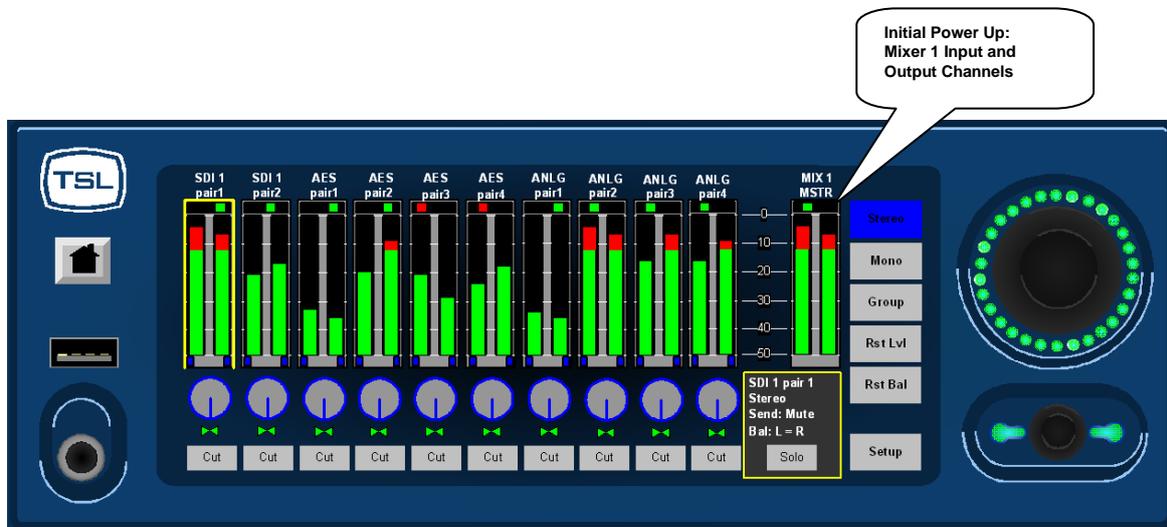


- The example above depicts a typical Lines Room application where the operator is monitoring 3 different incoming language feeds as LRC Downmixes embedded within the SDI infrastructure on channels 1 thru 6. He/She is simultaneously listening to audio traffic via an AES router (channels 7 and 8) of Stereo Telco feeds 1 and 2 from another location plus a mix of local and remote mono **Talkback** on channels 9 and 10.
- The **Talkback** inputs from the Outside Broadcast and local Studio are panned to the left and right channels respectively to give separation against the **Clean/Native Language** Downmix coming from the OB event.
- Channels 3 and 4 plus channels 5 and 6 contain **Clean/Alternative Language** Downmixes which are being generated locally from **Voice Over Booths** with French and German Commentators.
- **Mixer 2** line level outputs can be used in this application to provide a **Submix** of the Clean International Audio plus Local and OB Talkback to the Commentators via their local headphone amplifiers.
- **Mixer 1** can be configured to operate in 5.1 mode. When selected via the setup menu **Setup/Mixer/Surround** the main output of Mixer 1 comprises a full 5.1 buss structure of **Left/Right/Centre/LFE/Left Surround/Right Surround** that can be used for external monitoring (via externally connected surround sound speakers) and also delivers a fixed level 5.1 mixer output to both analogue and AES output connections
- Even when **Mixer 1** is configured for 5.1 use a parallel stereo version of the mixer runs as a background application and can be used as an alternative auto-downmixed output or for stereo monitoring (including internal and headphone outputs on the T-MIX itself).

2.7 Audio Mixers 1 and 2

The **AVM-T-MIX** is equipped with two identical but independent 20 channel (10 stereo bargraph) audio mixers designed to enable the operator to create their own custom monitoring setups.

On first power up, AVM-T-MIX displays the bargraphs associated with Mixer 1 as denoted by the mnemonic **MIX 1 MASTER** above the output bargraph pair as shown below.



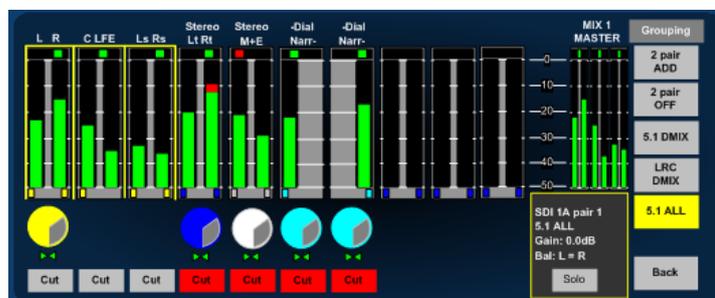
Simply touching the **Mix Master 1** bargraph for a few seconds will toggle the display between **Mixer 1** and **Mixer 2**; each mixer can be configured entirely independently as described in the following sections of this Handbook by simply touching and holding any of the 10 bargraph pairs.

2.7.1 Switching Audio Mixer 1 to 5.1 mode

Mixer 1 can be set to operate in surround 5.1 mode by entering **Setup** from the top level screen, chose **Mixer** and then **Surround**. The L/R/C/LFE/Ls/Rs channel bargraph view appears automatically in place of the stereo output bargraph.

- **Note:** If you configure the T-MIX for 5.1 operation when Mixer 1 is in surround mode and then switch to stereo, the 5.1 configuration will be remembered and recalled when you switch back. This feature can be useful when checking stereo compatibility of a 5.1 project mix.

- **Example:** The image represents a configuration used by a current T-MIX customer who uses the 5.1 monitoring capability in a Post Production facility working in conjunction with their Avid Edit platform



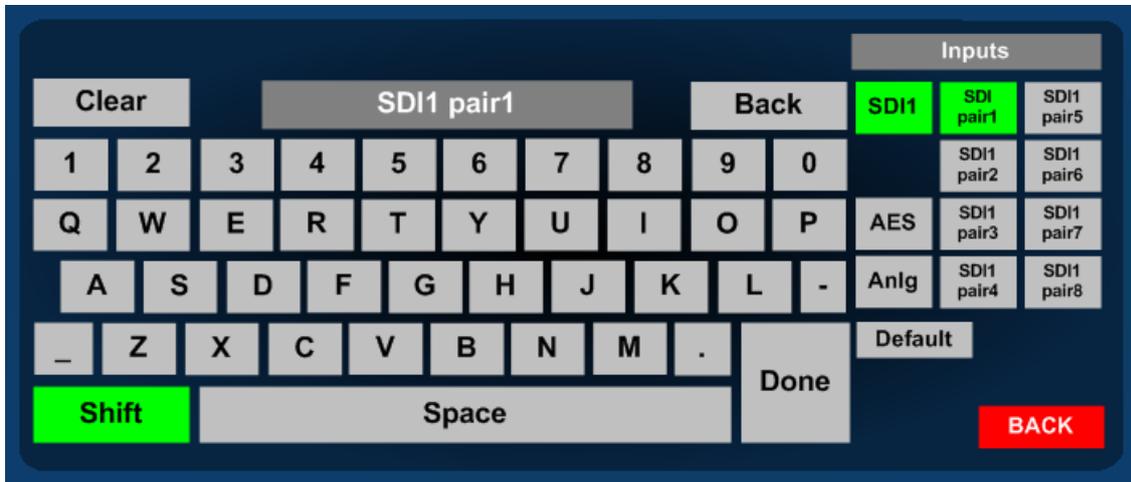
The timeline of their typical project comprises a compiled 5.1 programme audio stem (pairs 1, 2 and 3) plus the individual elements of the 5.1 mix (pairs 4, 5, 6 and 7) which includes stereo Lt Rt, mix and effects plus mono dialogue channels.

The T-MIX configuration enables the operator to listen to individual channel elements, adjust their gain within the mix and compare to the compiled 5.1 mix. Connectivity with the Avid system is via SDI from the edit break out box (BOB) but could equally be achieved using AES or analogue connections.

2.8 Configuring and Naming Input Channels

The physical audio connections into **AVM-T-MIX** comprise of 16 channels from HD-SDI (16 channels SDI 1, 8 channels SDI 2), 8 AES pairs and 16 (or 8 stereo) analogue audio inputs. Each pair can be routed to any of the 10 channel bargraphs available to either Mixer 1 or Mixer 2 and to simplify operation, each input pair can be given a **User Name**.

In order to simplify the naming of input sources the **AVM-T-MIX** is equipped with an onscreen QWERTY style keyboard which can be accessed via the **Setup/Input** menu page.



- To apply a name to an input source simply select the appropriate pair, press **CLEAR** to delete the default name and enter the chosen replacement in the dark grey field. Press **DONE** when complete.
- User names can be up to 10 characters long and can consist of upper/lower case letters, numbers and a very limited set of symbols ‘-’ ‘_’ and ‘.’
- When entering a text string **AVM-T-MIX** will automatically enter a space between the 5th and 6th characters unless the user inserts a space at any other point within the name.
- When a signal with an associated **User** name is routed to a channel bargraph, the name is displayed above the bargraph in two rows of text with up to 5 characters in each.

Routing selection must always be performed in the order **Select Output > Select Source > Take**. By default any routing assignment is made in stereo however it is possible to route left or right signals independently using the following sequence **Select Output > Select Out Left or Out Right > Select Source > Select Left Only or Right Only > Take**

The default routing is described below: It is repeated for each of the 18 user presets and also the **Home** setting. Any changes made to routing will be made from within a preset and must be saved in order to be recalled as they would within a large audio console.

- **D25 Connectors**

Anlg 1 Out = Mixer 1
Anlg 2 Out = Mixer 2
Anlg 3 Out = 2.0 Fixed Monitor
Anlg 4 Out = 2.0 Variable Monitor
AES 1 Out = Mixer 1
AES 2 Out = Mixer 2
AES 3 Out = 2.0 Fixed Monitor
AES 4 Out = 2.0 Variable Monitor
AES 5 Out = Silence
AES 6 Out = Silence
AES 7 Out = Silence
AES 8 Out = Silence

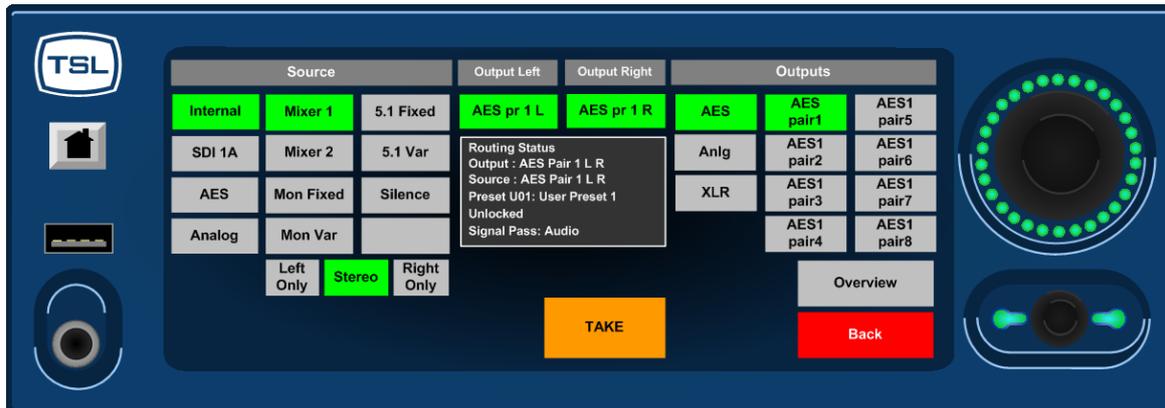
- **Analogue XLR Output Connectors**

Analogue Out = 2.0 Variable Monitor

If you choose to connect analogue input based surround sound speakers to the Touchmix it will be necessary to route 5.1 Variable sources to Analogue pair 1, 2 & 3 connections.

2.9.2 Internal Sources

An AVM-T-MIX Internal Source may be thought of as a type of router input that is derived within the mixer rather than a physical connection.



The Internal Source list within the Touchmix includes the following;

- Mixer 1** – Stereo Mixer One. When **5.1 ALL** is activated, Stereo Mixer One will always carry a downmixed version of the surround sound mix output.
 - Mixer 2** – Stereo Mixer Two
 - Mon Fixed** – The stereo fixed line level audio representation of what is heard by the operator when using the Touchmix. This could be either Mixer or Solo (when activated)
 - Mon Var** - The stereo variable, line level audio representation of what is heard by the operator when using the Touchmix. This could be either of the mixers or Solo (when activated) and is typically the signal heard in either the internal speakers or headphones or connected to external stereo speakers.
 - 5.1 Fixed** – The 5.1 fixed line level audio representation of what is heard by the operator when using the Touchmix with **5.1 ALL** activated.
 - 5.1 Var** - The 5.1 variable, line level audio representation of what is heard by the operator when using the Touchmix with **5.1 ALL** activated.
 - Silence** – Routes Silence to a chosen output
- Note: Internal Sources cannot be split into mono parts**

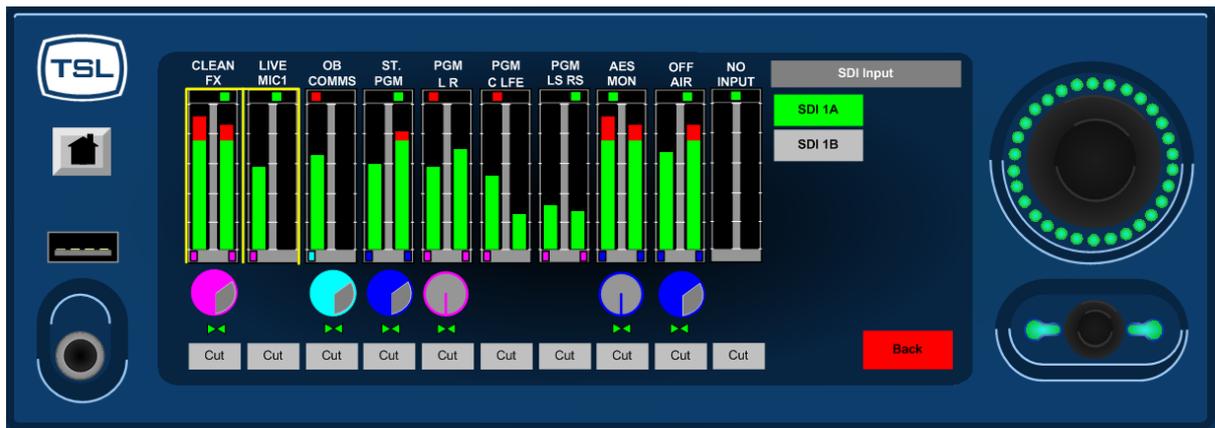
2.9.3 Physical Sources

Touchmix has a total of 64 available physical sources available taken from SDI, AES and Analog connections, of which 48 are available at any given time. Each pair can be selected as a stereo or left only, right only input and routed to any physical output using the routing procedure described later in this document.

2.9.4 Choosing the active SDI input

In previous versions of the Touchmix SD operating system the user could only access one of the physical SDI connectors and hence only a single video source could be wired to the box. In the latest release (from June 2014 onwards) the user is given access to an onboard 2x1 SDI switch and can choose to de-embed either of the physical SDI ports.

An additional menu has been added to the product to enable this exclusive selection and can be accessed via the following commands **Setup>SDI> SDI 1A or SDI 1B**



The selected SDI input chooses between physical BNC inputs labelled SDI 1 and SDI 2 however to avoid confusion with the AVM-T-MIX 2SD product, the menu refers to the inputs as SDI 1A and 1B. Which input is chosen will be routed to the de-embedder and therefore available to the routing system exclusively for any given User Preset.

2.9.5 Physical Outputs

As previously described in an earlier section regarding the default routing setup, the Touchmix comprises a total of 26 physical output ports. 16 AES channels (8 pairs) are presented on two D25 connectors, 8 analog channels are presented on a further D25 connector and an additional analog pair appears on two XLRs.

2.9.6 Routing Status 'Window'

The text box in the centre of the AVM-T-MIX is a Routing Status indicator which provides a brief information summary of the highlighted route. The Routing Status Window indicates five fields of useful data;

- **Output** – physical output pair
- **Input** – physical or internal source
- **Preset** – current active User Preset
- **Lock Status** – Route is locked or unlocked
- **Signal Pass** – Output will pass audio, data, Dolby or all formats

The image below shows the Routing Status Window in the centre of the output screen where the 5.1 Variable buss has been assigned to analogue output pairs 1, 2 and 3.

The User Preset in this example is called 'Saturday Sport'; the route is 'Locked' to prevent accidental re-assignment and the only signal format permissible is audio so that the surround speakers wired to the outputs are protected from data signals such as Dolby E.

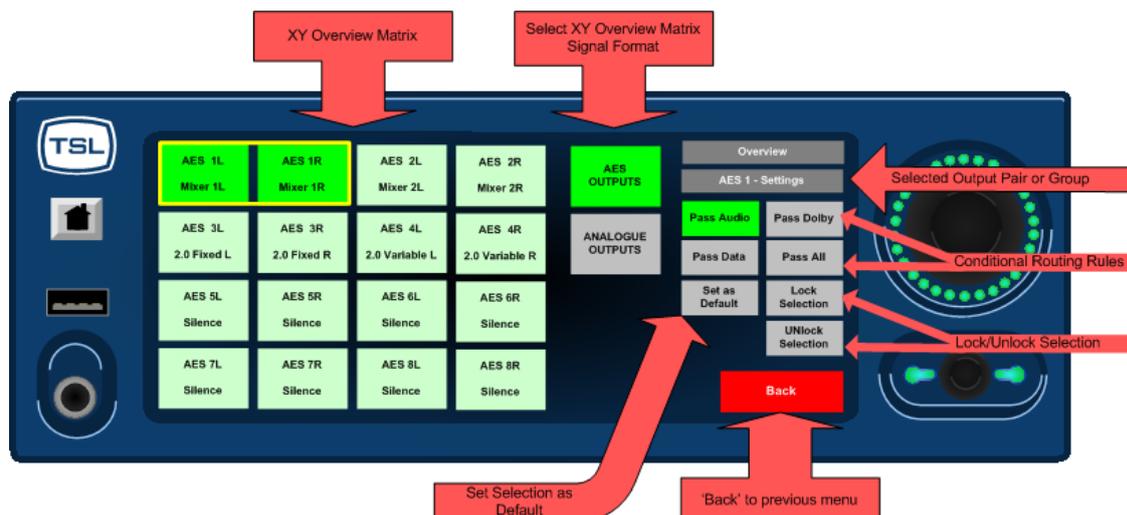


2.9.7 Overview Menu Page

The Overview Page is reached via the following path **Setup>Output>Overview**

It comprises an XY routing system overview matrix as well as several command buttons that are used to set routing rules, default conditions and to lock routing selections to prevent misuse.

Overview Table – The overview table gives the user a visual summary of the current routing status of either the AES or Analog output routing status.



By touching a pair or group of output channels on the overview table will display the system settings at the right hand side of the screen.

The upper line of text in each 'button' shows the physical output connection and the lower line shows the currently routed source.

2.9.8 Conditional Routing Rules

The user can choose from the Overview Page the way that the selected output manages particular types of audio. By default the Touchmix is designed to mute all non-PCM Audio signals to prevent data (such as non-decoded Dolby E) from being accidentally routed to a loudspeaker. Using the conditional routing rules, any type of signal can be passed from source to destination without being muted.

2.9.9 Lock and Unlock Selection

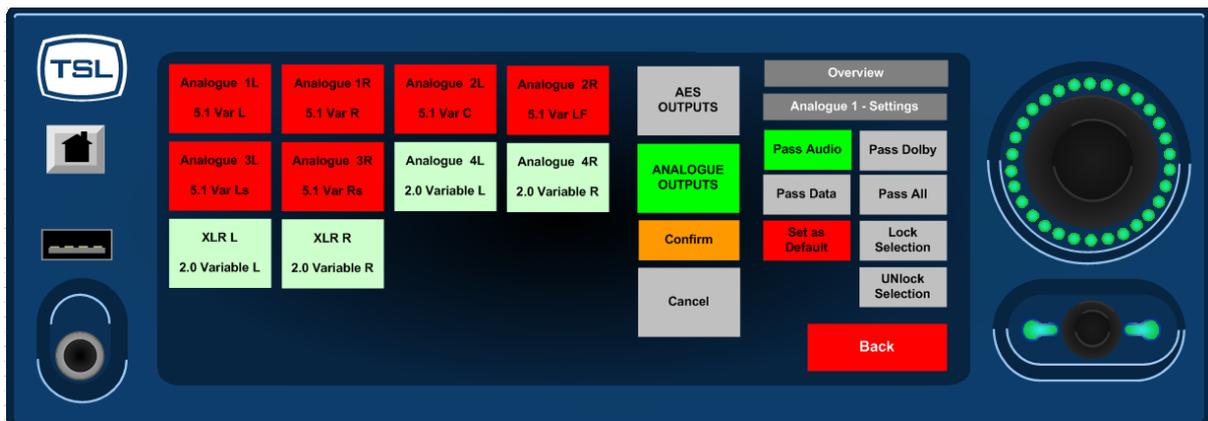
Once a critical routing selection has been made such as the assignment of 5.1 or Stereo variable monitoring to a pair of speakers via an analogue connection, the operator can lock the route to prevent accidental changes. The example shows a 5.1 Variable output that has been routed to analogue pairs 1,2,3 and locked to prevent re-assignment in error



2.9.10 Set as Default

Routing selections such as the assignment of 5.1 or Stereo Variable outputs to external loudspeakers are usually part of an installation and not changed once the Touchmix has been cabled. 'Set as Default' enables the operator or technician to configure any Analogue or AES routing assignment from a single preset and then automatically copy the highlighted settings to all other user presets.

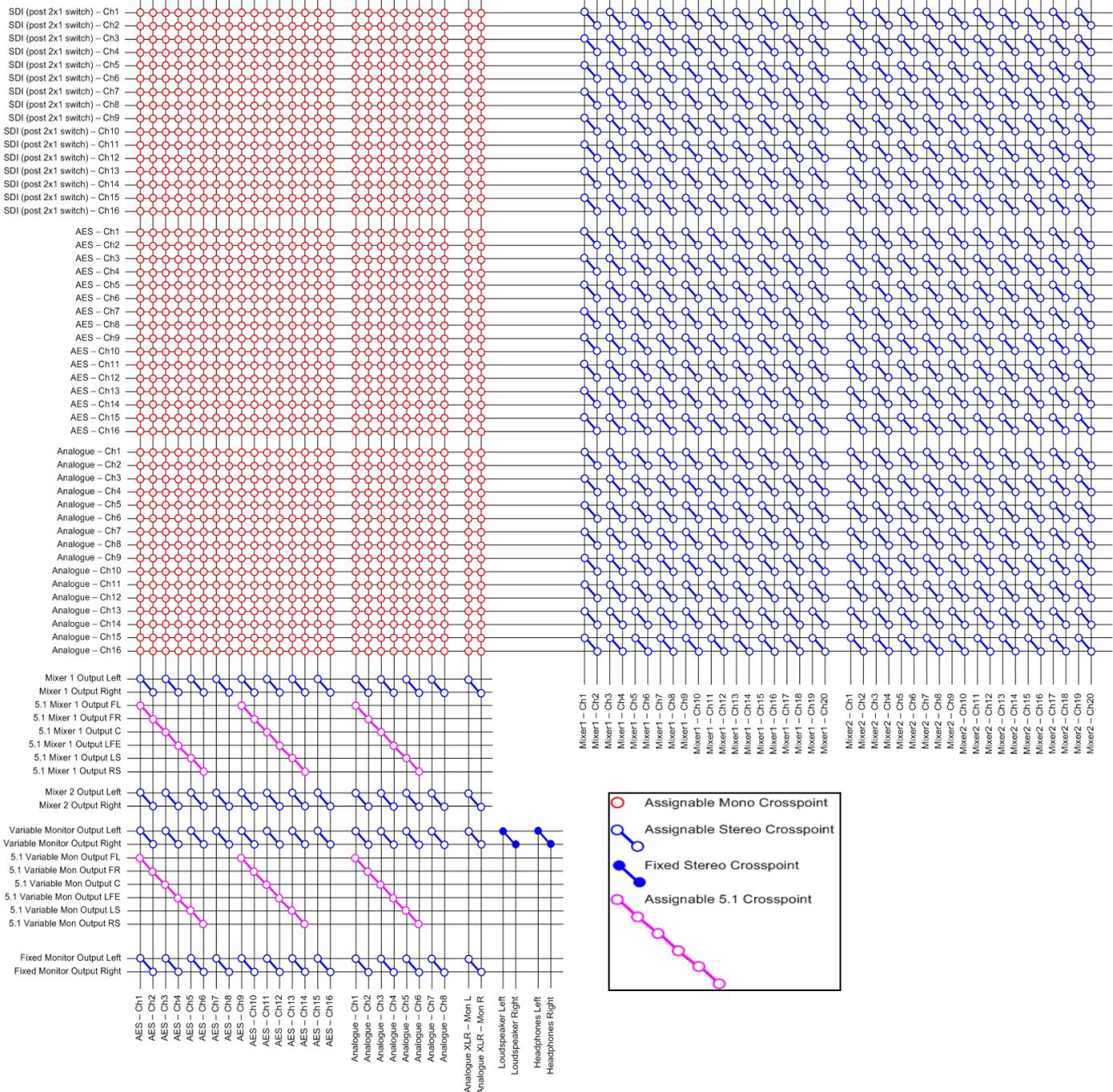
The example below shows a 5.1 Var speaker assignment being set as a default to all 18 user presets. The routing assignments to Analogue 4L/R and the XLR connectors would not be written to all other presets as they are not highlighted. To set further default settings each group or pair to be set must be actioned in turn.



2.10 Routing System XY Crosspoint Map

The matrix below describes the components of the XY routing system as a crosspoint map with the input sources to the Y Axis and the outputs to the X Axis. The right hand block of blue crosspoints denotes the bargraph routing selection to the mixers 1 and 2 and their resultant mix and monitor outputs can be seen towards the bottom left represented as routable sources.

Although the majority of the routing infrastructure is freely assignable, you can see from the way that the 5.1 Mixer and Monitor busses are grouped that these sources can only be assigned to the first three pairs of any output AES or Analog output connector. This is one of very few restrictions imposed by the XY router system along with the fixed assignment of the stereo monitoring busses to the headphones and internal speakers.



2.11 User Preset and Snapshot Management

2.11.1 Home Button and User Presets

AVM-T-MIX uses both internal and external **User Preset** memories to enhance usability, there are a total of 18 User Presets in local memory plus a Snapshot which is defined as **HOME** enabling operators to instantly revert to a default operational condition.

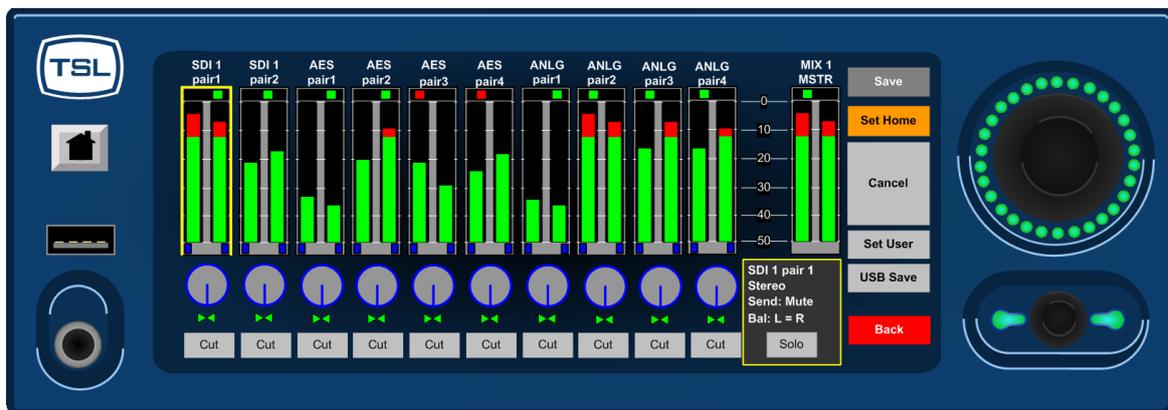
A **User Preset** is defined as a **Snapshot** of a state of operation and includes the following parameters;

- MIXER 1 and MIXER 2
- System XY Routing Configuration
- Channel Source Selection
- Channel Output 'Send' Levels
- Channel Pan/Balance
- Channel Format Selection
- Input User Names
- Bargraph Configuration (including Scale, Ref, Zero etc.)
- GPI Mode
- Internal LS Mute Status
- External LS Mute Status
- Surround Mix Coefficient
- User Preset Name

AVM-T-MIX total of 18 Internal Memories can be backed up to a **USB** memory stick (front panel port) or **SD Card** (rear panel slot). Access to the **USER PRESET/HOME** menus is via the front panel **HOME** button.

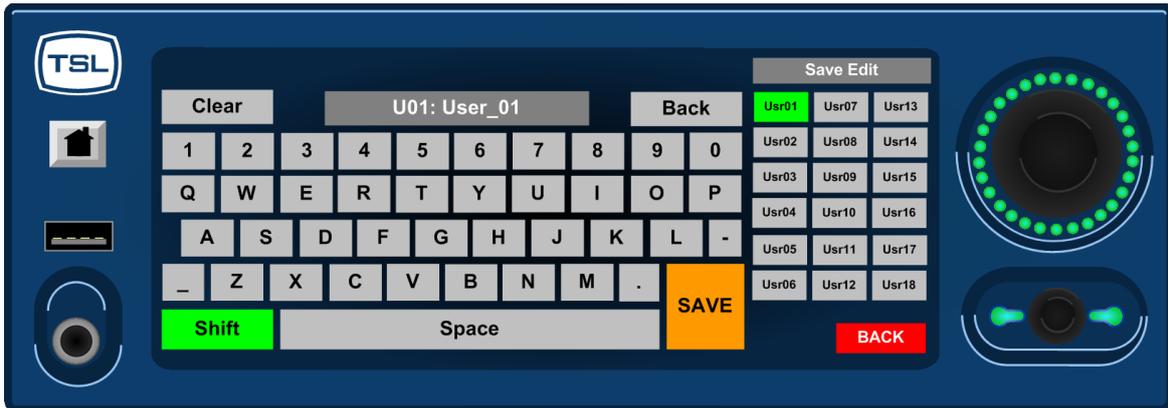
2.11.2 User Presets – SAVE Menu

Holding down the HOME button for approximately 3 seconds accesses the SAVE menu. This menu page allows the operator to create and save snapshot memories, to backup the onboard memories to an external device or to configure the HOME preset.



Set Home – Pressing the **Set Home** button will automatically store the current operational configuration to the **Home** snapshot location.

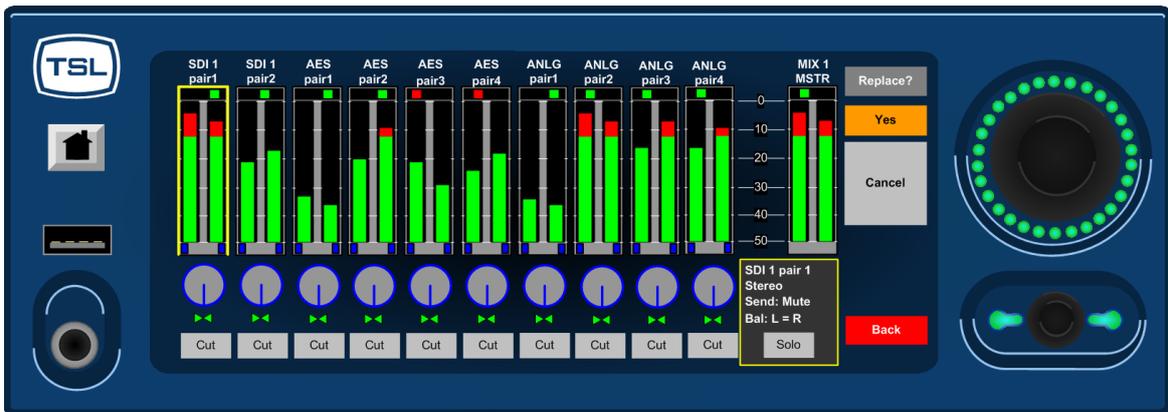
Set User – Pressing the **Set User** button enables the operator to store the current operational configuration to any of the 18 internal memory locations. The following menu will appear;



Simply select the desired internal memory location (User 1-18), enter a name using the QWERTY keyboard (press Clear to remove the default name) and **Save** to store.

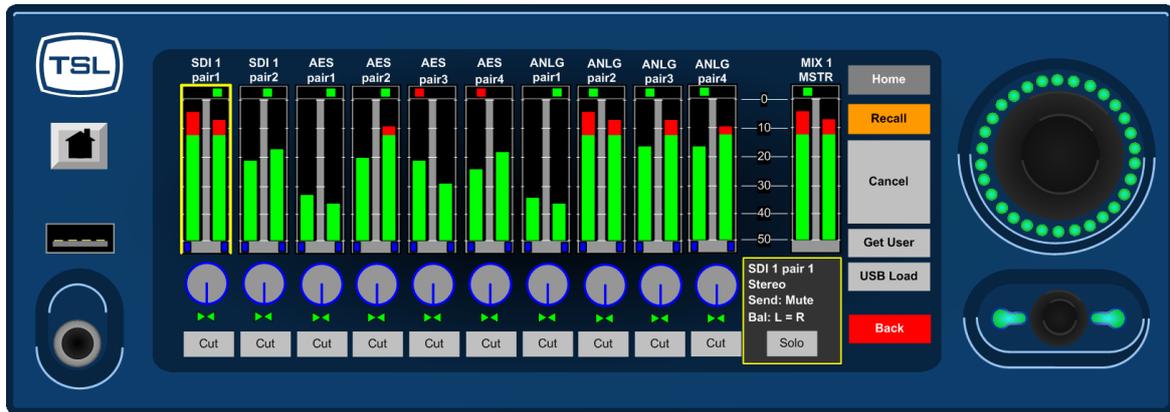
USB Save

Pressing the **USB Save** button (only active when a USB Stick is inserted) enables the operator to backup all 18 internal memories to an external memory device. If an SD card is used via the rear panel then the **AVM-T-MIX** will save to that device. If both a USB and an SD device are inserted simultaneously, the USB location will take precedence. The **USB Save** menu will ask the operator to confirm if they wish to replace an existing memory file before completing a backup.



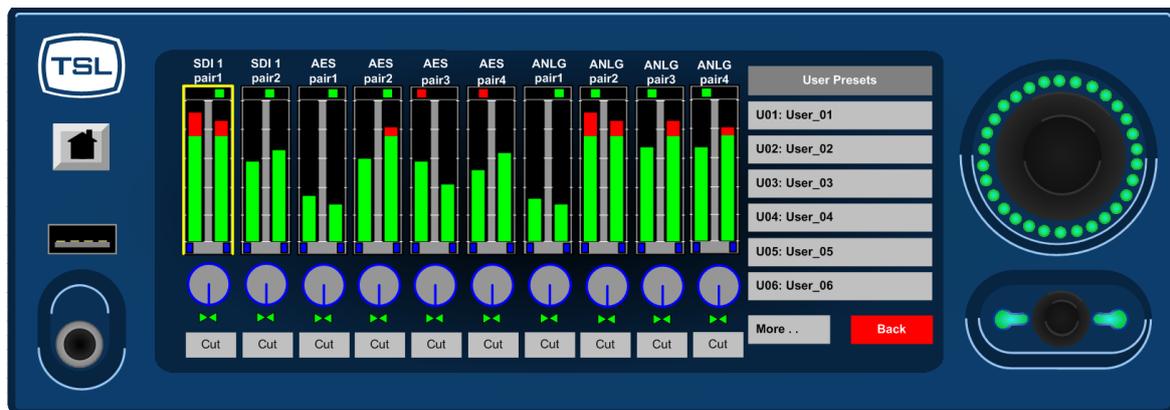
2.11.3 User Presets – Recall Menu

Pressing the **HOME** button momentarily accesses the **Recall** menu. This menu page allows the operator to recall saved snapshot memories, to recall memories from an external device and to instantly recall the **HOME** snapshot.



Recall Home – Pressing the **Recall** button will automatically load the stored **Home** snapshot from internal memory. If no **Home** snapshot has been stored, the default shipping condition will be reloaded.

Get User – Pressing the **Get User** button enables the operator to load any of the 18 internal user presets from memory. **User Presets** are displayed in groups of 6, pages 1 to 3 are recalled via the **More ...** button.



USB Load – Pressing the **USB Load** button (only active when a USB Stick is inserted) enables the operator to restore all 18 internal memories from an external memory device.

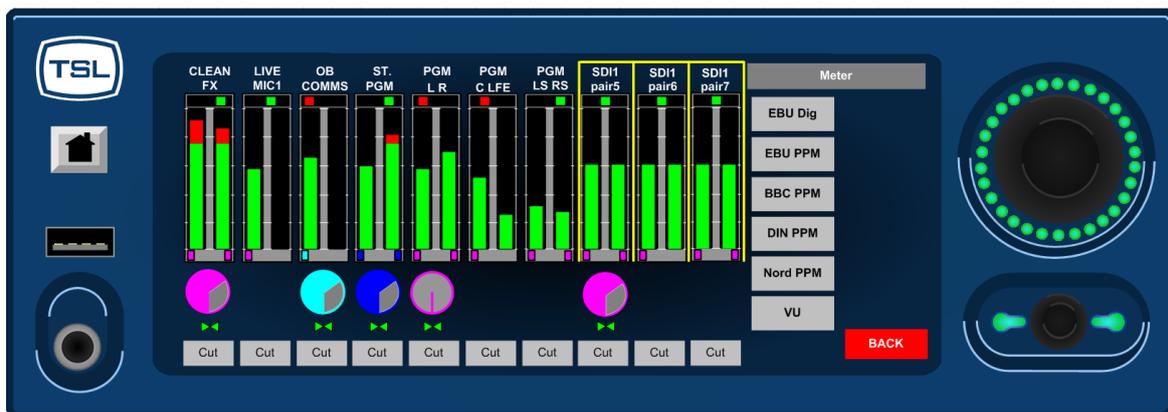
2.12 Setup Menu

Setup Menu includes options for different **Scales**, **Reference Levels**, **Peak Hold**, **Input Naming**, **Output Routing**, **SDI Input Select**, **Mixer 1 mode** and access to the **Setup 2 Menu**. By simply touching the appropriate button, individual sub menus are selected.



2.12.1 Meter Menu

Pressing the **Meter** button accesses the bargraph scale options. **AVM-T-MIX** is able to accurately replicate EBU Digital, EBU PPM, BBC PPM, DIN PPM, Nordic PPM and VU scales and ballistics. Please note that the selection of a scale type within the **Meter** screen will only be remembered by **AVM-T-MIX** as a preset once the selection has been saved to internal memory using the **User Preset** commands described previously. This restriction enables the user to save preset conditions which work using different bargraph scales.



2.12.2 dBFs Menu

The **dBfs** parameter selection can be used to alter the 0dBu reference level from between -12 and -24 dBfs.



2.12.3 Meter Peak Menu

The **Peak** parameter selects the offset level between the **Reference dBfs** setting and the onset of **Peak** indication (the point where the bargraph changes colour to red) from between +1dB and +18dB.



2.12.4 Meter Zero Menu

The **Meter Peak** selects between two modes of peak indication displayed on the channel bargraphs. The **Bar Mode** illuminates the bargraph as red once the audio level exceeds the peak value. In **Block Mode** the bargraph illuminates in yellow when the audio level exceeds the reference value and then red when it exceeds peak (as illustrated below).

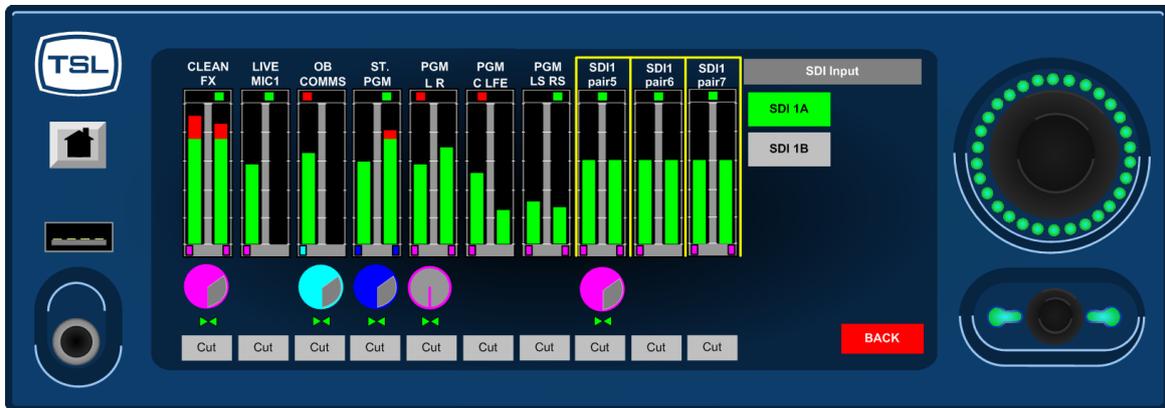


2.12.5 Meter Hold Menu

AVM-T-MIX features a simple **Peak Hold** indicator which may be turned on and off using the **Meter Hold Menu**.

2.12.6 SDI Input Select

A standard AVM-T-MIX has two SDI inputs that can be switched into a single de-embedder as illustrated by the block diagram towards the front of this handbook.



The screen printing on the rear of your AVM-T-MIX is likely to denote the two SDI inputs as SDI1 and SDI2 respectively however the menu refers to them as SDI1A and SDI1B in order to differentiate between single and dual de-embedder product versions.

2.12.7 Mixer 1 Mode



As previously described, Mixer 1 can operate in either Stereo or 5.1 modes. The mixer can be switched via the illustrated menu above.

2.12.8 Output Menu

The function of the Router Output menu is described elsewhere in this handbook

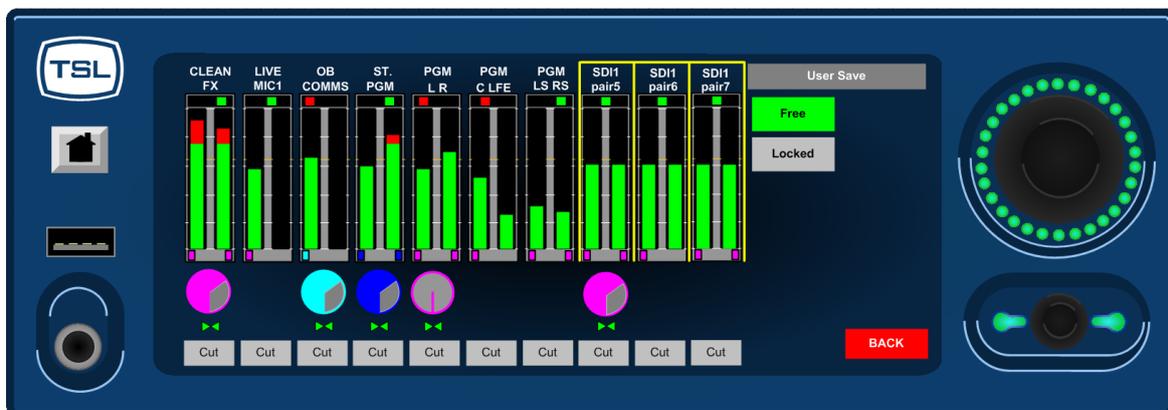
2.13 Setup 2 Menu

Setup 2 Menu includes options to protect **User Presets**, **GPI Action**, **External and Internal Loudspeaker Mute**, **Surround Downmix Coefficients**, **Monitor Mode** and to access the **Software Management Menu**.



2.13.1 User Save Menu

The **User Save Menu** enables an Engineer or Technician to **Lock** or **Unlock** the **User Preset** management system onboard **AVM-T-MIX**. In **Locked** mode a user is able to recall the **Home Preset** but unable to save or recall memories from internal or external (USB or SD Card) locations.



2.13.2 Monitor Mode

The **Monitor Mode Menu** is used to select the audio sent to the internal speakers and headphone socket when T-MIX is not in Solo listening mode.



In **Default** mode the operator would normally hear the output of whichever mixer is currently shown on the touchscreen. The user can choose to hear either **Mixer 1** or **Mixer 2** permanently regardless of the mixer under direct control.

2.13.3 GPI Menu

The **GPI Menu** enables an Engineer or Technician to select whether GPI inputs respond to Latching or Momentary closures from external devices. The GPI connector can be used to Cut/Dim the internal and external Loudspeakers, recall **Home** preset and to recall **User** presets 1 to 7. The pin-out is described in Section 3.5.

In **Momentary Mode**, **Dim** and **Cut** GPI's latch in a toggle manner, i.e. one closure to ground toggles the function ON; the next ground toggles it OFF. In an ON state; the GPI pin is driven low to allow an LED to be fed from the port. This LED drive is briefly pulsed high at about 100Hz to allow the port to be read whilst it is driving.

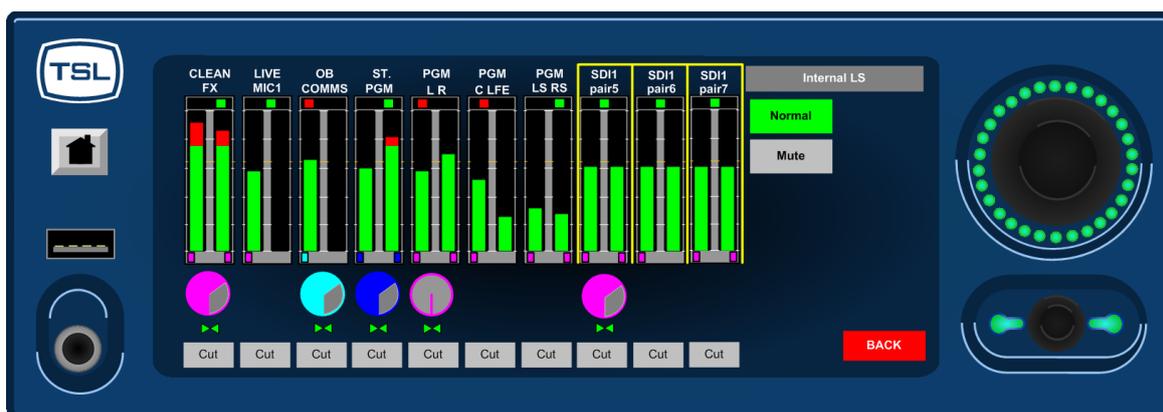
The preset recall GPI's in '**Latching**' mode are mutually exclusive.



2.13.4 Internal / External Loudspeaker Mute

The **AVM-T-MIX** is designed to be used with either **Internal** or **External Loudspeaker Systems**. Users may wish to define **User Preset** conditions which associate the operation of the unit with internal speakers for in one state and external speakers in another. To facilitate this kind of hybrid operation the **AVM-T-MIX** is equipped with individual **Loudspeaker Mute** buttons which can be configured with different functionality dependant upon their desired use and then saved to individual presets.

In the event that **AVM-T-MIX** is installed for use with external speakers only with the intention to mute the internal speakers, a **DIP** switch on the rear panel can be used to override the **Internal LS Mute** button in **Setup 2 Menu**.



2.13.5 Surround Mix Menu

The **S-MIX Menu** provides a means to select the Downmix coefficient by which the **Rear Surround Loudspeaker** audio channels are added to the **Front Left and Right** when a **Group/5.1 DMIX** mode is selected.

When **-3dB** is selected, the **5.1 DMIX** feature creates a stereo fold-down of the 5.1 channels using the following algorithm;

$$L = L + (Ls - 3dB) + (C - 3dB); R = R + (Rs - 3dB) + (C - 3dB)$$

When **-6dB** is selected, the **5.1 DMIX** feature creates a stereo fold-down of the 5.1 channels using the following algorithm;

$$L = L + (Ls - 6dB) + (C - 3dB); R = R + (Rs - 6dB) + (C - 3dB)$$

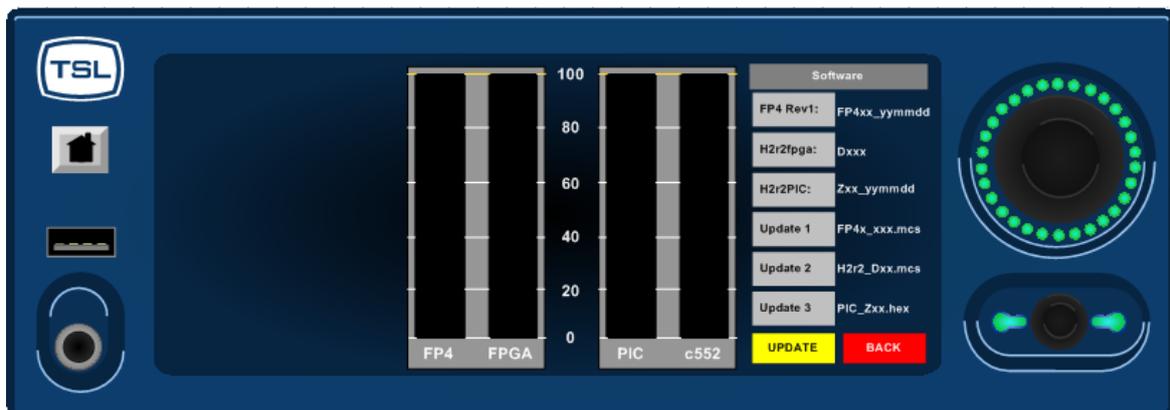


2.14 Software Menu

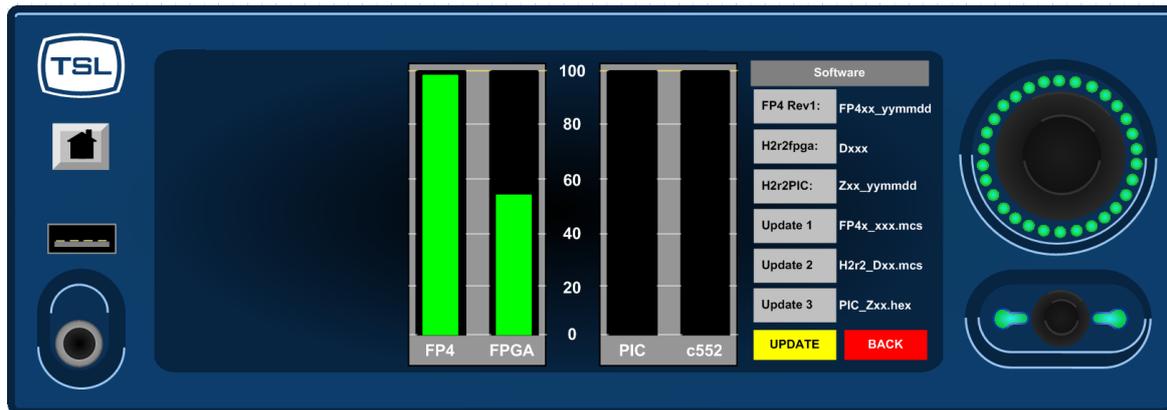
TSL is committed to providing customers with free life of product software updates as the features of **AVM-T-MIX** evolve and any bugs are addressed. New code is made available via our reseller distribution channels and as a download from the TSL website.

http://www.tsl.co.uk/support_updatedapps.aspx.

System Software may be updated by the owner via either the front panel **USB Port** (using a USB memory stick) or the rear panel **SD Slot**. Accessing the path **Setup/ Setup2/ Sware** the **AVM-T-MIX** will enter a menu page which reports the current software versions of the onboard Front Panel driver board (FP4), FPGA and PIC devices on the upper three information fields. If a memory device is inserted containing a software revision the three update fields will be displayed as illustrated below;



In order to commence the upload sequence, simply press the **UPDATE** button and the **FP4**, **FPGA**, and **PIC** code will be loaded in order. Progress is indicated via the 0-100% scale.



Once complete, **AVM-T-MIX** will display a message confirming that the process has been successfully concluded prompting the user to perform a factory reset. To perform a factory reset it is necessary to remove power from the unit and then re-apply power whilst pressing the **Home** button until a message appears to confirm that **Factory Default** has been reloaded. Press **Home** once more and you will be able to operate **AVM-T-MIX** with the new firmware active.

The action of restoring Factory Default status will remove any stored memories from the AVM-T-MIX. Please backup and restore memories from an external device if required.

Please note that the UPGRADE sequence may take several minutes and may appear to 'stall' – it is important not to interrupt the process or to remove power from the device during a software upload as this may render the AMU unusable.

3.0 Connectivity and pin-out details

AVM-T-MIX uses industry standard connectivity wherever possible. The D25 connectivity used for analogue and AES I/O adopts a pinning convention commonly used for Yamaha Commercial Audio equipment and breakout cables are readily available at low cost from companies such as www.cpc.farnell.com www.hosatech.com and many others.

For unbalanced AES I/O connectivity an optional BNC breakout cable, CAB-D25-BNC, is available from TSL or your local reseller. When used in conjunction with **AVM-T-MIX**, DIP switch 2 (AES Impedance) must be switched to the 75 ohm position.

PLEASE NOTE THAT THE CONNECTIVITY INFORMATION PERTAINING TO ANALOGUE AND AES IN/OUT REFERS TO 'AS SHIPPED' SYSTEM DEFAULTS. USING XY ROUTING FUNCTIONALITY IT IS POSSIBLE TO RECONFIGURE THE OUTPUT CONNECTIONS TO SUIT ANY USER PREFERENCE – ALL PINOUT INFORMATION REMAINS THE SAME

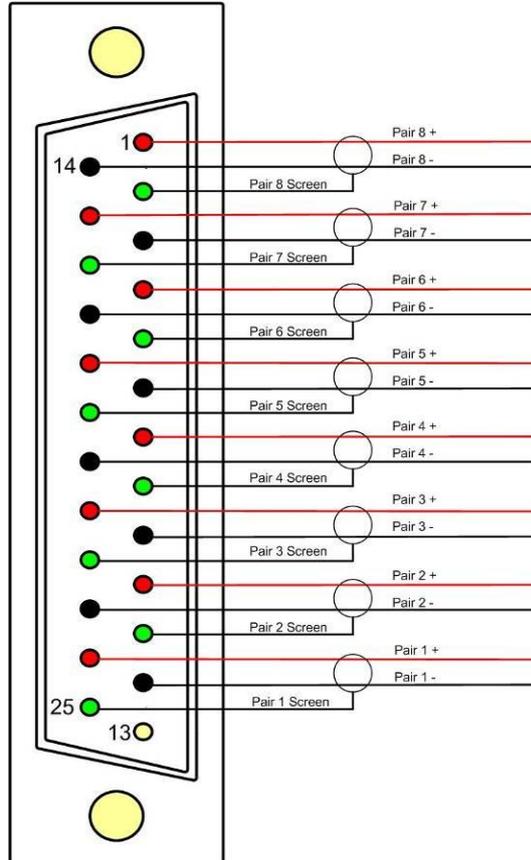
3.1 Analogue XLR Connectors – Stereo Variable Output (Monitor Buss)

CONN	PIN	FUNCTION
ANALOG 1	1	GND
ANALOG 1	2	1 IN+
ANALOG 1	3	1 IN-
ANALOG 2	1	GND
ANALOG 2	2	2 IN+
ANALOG 2	3	2 IN-

3.2 Analogue Output Connector

D25 Socket Pinout on unit, Plug (shown) on mating cable.

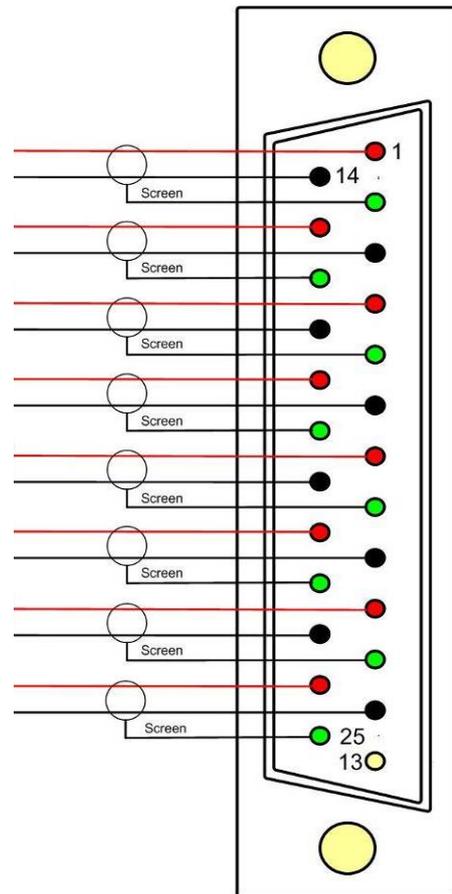
D 25 SOCKET ON AMU	AUDIO OUT
PIN NO	FUNCTION
1	A8+ (Var. Mon R)
14	A8- (Var. Mon R)
2	Ground
15	A7+ (Var. Mon L)
3	A7- (Var. Mon L)
16	Ground
4	A6+ (Fixed Mon R)
17	A6- (Fixed Mon R)
5	Ground
18	A5+ (Fixed Mon L)
6	A5- (Fixed Mon L)
19	Ground
7	A4+ (Fixed Mix 2R)
20	A4- (Fixed Mix 2R)
8	Ground
21	A3+ (Fixed Mix 2L)
9	A3- (Fixed Mix 2L)
22	Ground
10	A2+ (Fixed Mix 1R)
23	A2- (Fixed Mix 1R)
11	Ground
24	A1+ (Fixed Mix 1L)
12	A1- (Fixed Mix 1L)
25	Ground
13	N/C



3.3 Analogue Input Connectors 1-4 and 5-8 –

D25 Socket Pinout on unit, Plug on mating cable.

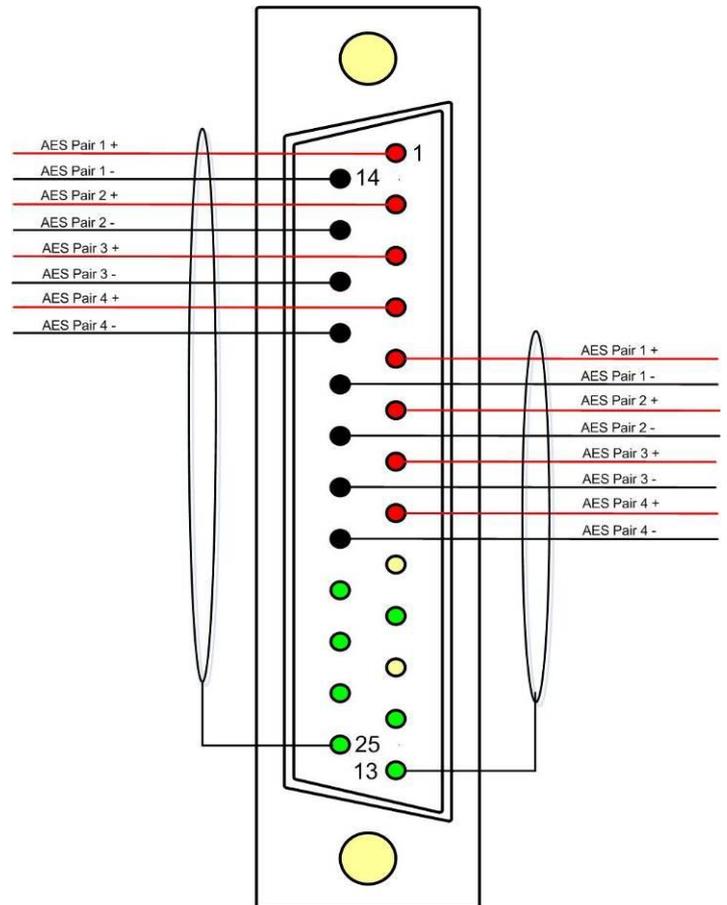
D 25 SOCKET ON AMU	AUDIO IN
PIN NO	FUNCTION
1	A4 (A8) R+
14	A4 (A8) R+
2	Ground
15	A4 (A8) L-
3	A4 (A8) L-
16	Ground
4	A3 (A7) R+
17	A3 (A7) R-
5	Ground
18	A3 (A7) L+
6	A3 (A7) L-
19	Ground
7	A2 (A6) R+
20	A2 (A6) R-
8	Ground
21	A2 (A6) L+
9	A2 (A6) L-
22	Ground
10	A1 (A5) R+
23	A1 (A5) R-
11	Ground
24	A1 (A5) L+
12	A1 (A5) L-
25	Ground
13	N/C



3.4 AES Input/Output Connectors 1-4 and 5-8

D25 Socket Pinout, Plug (shown) on mating cable.

D 25 SOCKET ON AMU	AES INPUTS/OUTPUTS
PIN NO	FUNCTION
1	Ch1&2 / 9&10 In 1+
14	Ch1&2 / 9&10 In 1-
2	Ch3&4 / 11&12 In 2+
15	Ch3&4 / 11&12 In 2-
3	Ch5&6 / 13&14 In 3+
16	Ch5&6 / 13&14 In 3-
4	Ch7&8 / 15&16 In 4+
17	Ch7&8 / 15&16 In 4-
5	Ch1&2 Fixed Mix 1 / 9&10 Out 1+
18	Ch1&2 Fixed Mix 1 / 9&10 Out 1-
6	Ch3&4 Fixed Mix 2 / 11&12 Out 2+
19	Ch3&4 Fixed Mix 2 / 11&12 Out 2-
7	Ch5&6 Fixed Mon / 13&14 Out 3+
20	Ch5&6 Fixed Mon / 13&14 Out 3-
8	Ch7&8 Var. Mon. / 15&16 Out 4+
21	Ch7&8 Var. Mon. / 15&16 Out 4-
9	N/C
22	Ground
10	Ground
23	Ground
11	N/C
24	Ground
12	Ground
25	Ground
13	Ground



AES connectors may be wired using unbalanced terminations for SPDIF and 75R coaxial systems.

Optional AES breakout cable CAB-D25-BNC-2 is available from TSL Sales (+44 1628 676200) and provides BNC Socket to D25 connectivity.

Please note that when using AVM-T-MIX with unbalanced AES audio connections that the 75/110 ohm DIP Switch must be selected prior to use.

When using the D25 for unbalanced AES, AES XLR connectors 1 and 2 may not be used for balanced AES connectivity.

3.5 GPI Connector – HD15 Socket.

GPI pins are as follows:

- Dim - pin 6
- Cut - pin1
- Home - pin 11
- User Preset 1 - pin 7
- User Preset 2 - pin 2
- User Preset 3 - pin 12
- User Preset 4 - pin 8
- User Preset 5 - pin 3
- User Preset 6 - pin 13
- User Preset 7 - pin 9
- +5V - pin 5
- 0V – pin 15
- pins 4, 14, 10 unused at this time

3.6 Remote Control Connector/ RS 422 - D9 Socket

This is wired for RS422 slave operation.

D9	CONTROL
1	0V
6	0V
2	TX-
7	TX+
3	RX+
8	RX-
4	0V
9	0V
5	N/C

3.7 DIP switch configuration functions – To be confirmed

SWITCH	FUNCTION
1	tbc
2	AES Impedance (75R Up/110R Dn)
3	Internal LS Mute (Mute Up/On Dn)
4	tbc
5	tbc
6	Analogue (XLR) Output (Fixed/Variable)
7	tbc
8	tbc

4.0 Notes

There are no user adjustable assemblies/components within this unit.

This unit requires rear support when rack mounted.

In order to affect status changes of the unit using the rear DIP switch, the unit will require re powering before the changes take effect.

Output analogue levels are adjustable over the following range:

0dBm = 0.775V into 600Ω i.e. 1mW power dissipation.

0dBu = 0.775V RMS = PPM 4.

Shipping condition, -18 dB ref 0FS = 0dBu output.

Typical European line up: -18 dBu

Typical American line: -20 dBu

4.1 General Notes

Please note that some American equipment has the function of the XLR pins 2 & 3 reversed.

TSL product is wired to the European standard

The screw locks on the D25 connectors use UNC 4-40 standard threads.

5.0 AVM TOUCH SERIES - Technical Specifications

Power Supply

Supply Voltage	12V DC
Power Consumption	tbc.

Physical Dimensions

Height	88mm (2RU)
Width	483mm (19")
Depth	320mm
Weight	5100g

Inputs AES 1 to 8 AES I/O, 25 way D type (See elsewhere for details)

Input, HD/SDV 1 & 2 (where fitted)

Connector Type	BNC.
Standard	4:2:2 component with embedded 48Khz audio. (SMPTE 259M, 292M and 424M)
Impedance	75ohm

Line Output.

Connector	XLR 3 pin Male
Impedance	50Ω
Output Levels	Through level control with 0dB gain.
Fixed Line O/P	Available on D25 (If selected on front panel)

Headphone Output.

Connector	Stereo Jack socket type A
Impedance	50Ω
Output Levels	Through level control with 0dB gain.

Video Output

Connector	BNC
Impedance	75 Ohm
Output	Composite video or SDI (selectable)

Re-clocked Output

Connector	BNC
Impedance	75 Ohm
Output	Re-clocked serial output of the SELECTED input HD/SDV

AES Output

Connector	AES I/O, 25 way D type (See elsewhere for details)
Impedance	110/75 Ohm

5.1 HD Standards Supported

1080i/50	1080p/23.98	1035i/30
1080i/59.94	1080p/24	1035i/29.94
1080i/60	1080p/25	1080sf/30
1080P/50	1080p/29.97	1080sf/29.97
1080P/59.94	1080p/30	1080sf/25
1080P/60	1080i/25	1080sf/24
720p/50	1080i/24.94	1080sf/23.98
720p/59.94	1080i/30	
720p/60		
480i/30.00 (SD - NTSC)		
576i/25.00 (SD - PAL)		

5.2 Performance

Response	70Hz to 20KHz
Electrical Distortion	Better than 0.1%
Hum and noise	Better than -80dB
SPL	>98dB at 0.6 m
Amplifier Output	40 watts total power output
Digital Sample Rate	32 to 48KHz auto select

6.0 Installed HDC-2T Audio Monitor Module Specification

6.1.1 Overview

This specification describes the HDC-2T Audio Monitor Module.

This module has been designed to monitor a combination of analogue audio, AES3 digital audio and AES or Dolby E digital audio embedded in SMPTE 259M or SMPTE 292M video data streams, together with the video content which is output as composite and/or SDI. HD formats are passed through a simple down-conversion process to the monitoring output.

6.1.2 Mechanical

PCB: 4 layer, 120mm x 376mm with integral BNC and XLR connectors
 Component Height: <30mm above pcb surface, <2mm below
 <65mm above pcb surface with Dolby E fitted

6.1.3 Power

The module assumes the supply of regulated power will be made available via the power input connector. Poorly regulated or noisy supply rails may affect the quality of the analogue outputs. The HDC-2T will accept two feeds of +12V to +24V DC power, approximately 60W typical when using loudspeaker outputs. This allows dual redundant or external battery operation.

6.1.4 Inputs

HD/SDI

Connector Type: BNC
 Receiver type: AC coupled, auto equalising with clock regeneration
 Impedance: 75Ω, return loss ≥15dB to 1.5GHz
 Standards: SMPTE 259M-C with embedded 48kHz audio per SMPTE 272M-A
 SMPTE 292M with embedded 48kHz audio per SMPTE 299M
 Performance: ≥300m of high quality cable at 270Mbit (eg Belden 1694)
 ≥100m of high quality cable at 1.5Gbit

AES 3 or AES 3id

Connector type: Inputs 1 & 2, XLR 3 pin. (can be built for unbalanced BNC input)
 Inputs 1, 2, 3 & 4. 25way D-type 4 stereo pairs, pin-out as per Yamaha
 Impedance: 75Ω unbalanced or 110Ω balanced. Impedance is switch selected via DIP
 Switch 2. To obtain an unbalanced connection one line of the input needs to be grounded at an electrically convenient point.
 Input Sensitivity: < 200mV p-p per AES3.
 Standards: AES3-1992 at 96 kHz, 48kHz, 44.1kHz or 32kHz

Analogue Inputs

Connector type: 4 x XLR 3 pin, (Two stereo pairs)
 Board header Further 4 stereo pairs (8 channels)

Remote control

Connector type: Header, 10way to connect to 9pin D-type (RS422)

6.1.5 Outputs

Video

Connector Type: BNC
 Output 1 Equalised active loop-through
 Impedance: 75Ω
 Amplitude: 800mV p-p ±10%

Output 2 Composite SD (Down-converted when input is HD)
 Format: PAL or NTSC according to standard on SDI input
 Impedance: 75Ω
 Amplitude: 1V p-p ±5%

Output 3 - Optional SDI version of image on composite output
 Impedance: 75Ω
 Amplitude: 800mV p-p ±10%

AES

Eight AES (16 channels) may be output from analogue audio, embedded audio.

Connector type: 25way D-type 4 AES pairs (In and Out), pin-out as per Yamaha Standard
Impedance: 75 Ω unbalanced or 110 Ω balanced. Impedance is switch selected with on-board transformer balancing. To obtain an unbalanced connection one line of the output needs to be grounded at an electrically convenient point.
Amplitude: 1V into 75 Ω or >2V into 110 Ω

Analogue Audio

Eight analogue channels (4 stereo pairs) that may be output from AES, embedded audio or from decoded Dolby E/D when the option is fitted

Connector Type: XLR one pair fixed or variable
25 way D type 4 stereo pairs, pin-out as per Yamaha/Tascam
Format: Electronically balanced, centre ground.
D/A Conversion: 24 bit resolution.
THD+N: >80dB referred to 0dBFS

6.1.6 Loudspeakers

Connector Type: 0.156" board header
Format: Two active cross-over or 4 broad-band loudspeaker outputs
10 to 40W (4 Ω) per channel into depending on input power supply

6.1.7 GPI inputs

Connector type: Header to 9-way D-type plug

6.1.8 Control

Connector type: Header for current AMU-1 operator control board
Connector type: Header, serial bus for future operator control/display panels