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1 Introduction

This user guide has been developed for operators of Pro-Bel's TX 410 Master Control Switcher. Chapter 2 provides an overview of the comprehensive features provided by the TX 410, while subsequent chapters give details and step-by-step instructions for using the system.

Other documentation may be required, depending on how the TX 410 has been installed. For example, the technical manual provides information on the configuration screens which are not detailed in this guide.

1.1 Typographical conventions

Certain conventions are used in this guide to indicate different types of information.

Names of buttons and controls on the TX 410 are shown in this guide in bold capitals, within brackets, like this : **<VIDEO ONLY>**.

Procedures are shown as numbered steps, for example:

1 This is what to do first to perform this operation.

This states what happens or other related information.

2 Then do this.

This states what happens.

Pictures/diagrams are also provided to show screens and/or button locations relevant to the procedure.

1.2 Abbreviations

Within this document the following abbreviations and acronyms are used:

PST	Preset
PGM	Programme
RTC	Real Time Clock
TOD	Time Of Day
TC	Time Code
VU	Volume Meter
PPM	Peak Program Meter
dBFS	Decibels at Full Scale
dBu	Decibels
AUX	Auxiliary
DSK	Downstream Keyer
FTB	Fade to Black
PIN	Personal Identification Number

2 Overview of the TX 410

Pro-Bel's TX 410 Digital Master Control Switcher is a self-contained component digital video and multi-level AES/EBU audio transmission mixing system. It is manually operated from the control panel but can be remotely controlled by an automation system (see chapter 10).

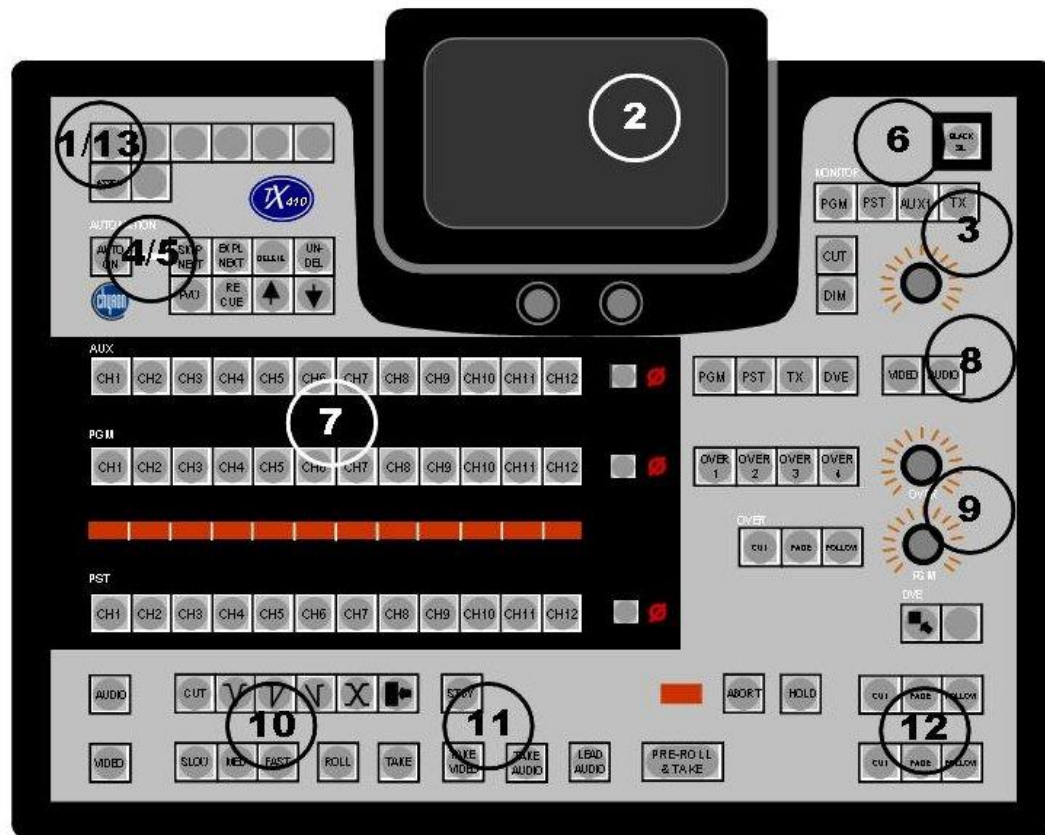
The TX 410 can be used to:

- Make transitions of sources to air using cuts, various fade/take combinations and wipes (see chapter 3).
- Add downstream keys (see chapter 4).
- Control an optional DVE, providing up to 24 pre-programmed moves (see chapter 5)
- Add audio-overs (see chapter 6).
- Monitor and preview audio and video sources (see chapters 7 and 8).
- Correct audio levels (see chapter 15).
- Modify audio routing in multi-level audio systems and monitor individual audio channels (see chapter 16).
- Control up to twelve remote VTR's (see chapter 9).
- Provide control for multiple master control systems (see chapter 17).

The LCD screen (see chapter 12) provides dynamic monitoring of audio levels and enables control of system parameters. In addition, the display is used for system setup and configuration, details of which can be found in the technical manual.

For fail safe operation, an external bypass switcher may be controlled from the TX 410 (see chapter 11).

2.1 Layout of the TX 410



The above diagram of the TX 410 shows the buttons and controls that are grouped for various operations. The numbers in the diagram correspond to those included in the following explanations.

The panel includes:

- (1) Bypass switcher control or (13) the buttons for multi-channel control.
- (2) The LCD touchscreen display,
- (3) Audio monitoring control.
- (4) Machine control or (5) Automation control.
- (6) The **<BLACK/SIL>** button, permitting the output to be faded or cut to black/silence.
- (7) Source selection busses - AUX, PGM, and PST - and 4 character source name displays for all the busses. At the end of each row of source selection buttons, a single small button is used for controlling unity audio gain for that bus.
- (8) Level select buttons for the auxiliary bus, either **<VIDEO>** or **<AUDIO>**.
- (9) Audio-over control.
- (10) Selecting a transition type,
- (11) Taking sources to air,
- (12) Downstream keyers (DSK1 and DSK2) and
- (14) DVE controls.

2.2 Source selection busses

There are three source selection busses located in the black background on the panel, PGM, PST and AUX. The TX 410 can have up to 12 primary sources accessible to each bus, with an additional four sources available to the auxiliary bus for monitoring independent sources, for example, DSK and DVE previews and return Air feeds.

The Keys are colour coded, allowing easy recognition of their function.

Auxiliary bus

The white keys (AUX) provide access to sixteen sources, the twelve prime sources and four additional sources. The auxiliary bus is typically used for monitoring applications (see chapter 7).

Programme bus

The red keys (PGM) are the selection buttons for programme, the sources that are either on air, or may be taken to air. Pressing a PGM button will take that source to air immediately.

Preset bus

The yellow keys (PST) are the source selection buttons for the preset. Preset indicates which sources will be on-air once a take has been made, lighting up the corresponding sources on the PGM bus (see chapter 3).

2.3 Source names

The 4-character alphanumeric name for each source is shown in the row of displays between the red programme (PGM) buttons and the yellow preset (PST) buttons.

The displayed source names can be assigned or changed by using the LCD screen (refer to the technical manual). Alternatively, they can be downloaded from:

- A central assignment routing system employing an Aurora controller,
- An external automation system via an Aurora controller.

2.4 Video/audio breakaway

Pressing a single source button on PST or PGM selects married video/audio for that source (provided the **< VIDEO ONLY >** and **< AUDIO ONLY >** buttons are not lit).

Video/audio breakaway is achieved by using the **<VIDEO ONLY>** or the **<AUDIO ONLY>** buttons respectively, these are located in the lower left hand corner of the panel.

First press the **<VIDEO ONLY>** or the **<AUDIO ONLY>** button followed by a source selection button.

A fully bright source button indicates the selected video source.

A half bright source button indicates the selected audio source.

On the AUX bus, married or separate video and audio sources are selected using the AUX LEVEL SELECT buttons (see chapter 7).

2.5 The unity gain buttons

At the right of each row of source selection buttons, a single button **<UNITY GAIN>** indicates the audio gain status for the selected source. If the unity gain button is lit, the source is not at unity gain.

The source can be temporarily set to unity audio gain by pressing the unity gain button. Once this has been over-ridden, the button will no longer be lit. To permanently return the source to Unity gain, it is necessary to use the Audio Setup page on the LCD screen (see chapter 14).

2.6 The LCD touchscreen

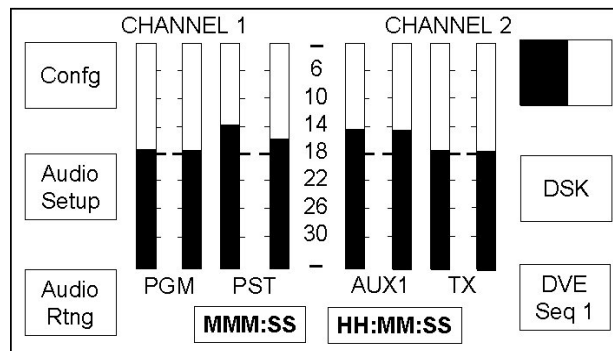
The LCD touchscreen is used to:

- Monitor and Adjust audio levels of the source selection busses.
- Define audio, DSK, wipe and DVE setups.
- Configure the TX 410 system.

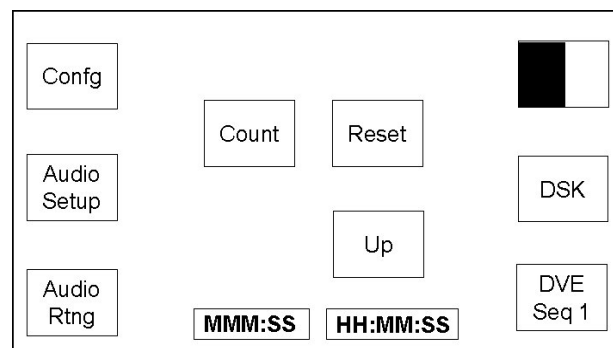
The home screen

There are two home screens (see chapter 12) available to the TX 410; these are the Audio Monitoring and Timer home pages.

The Audio Monitoring home page



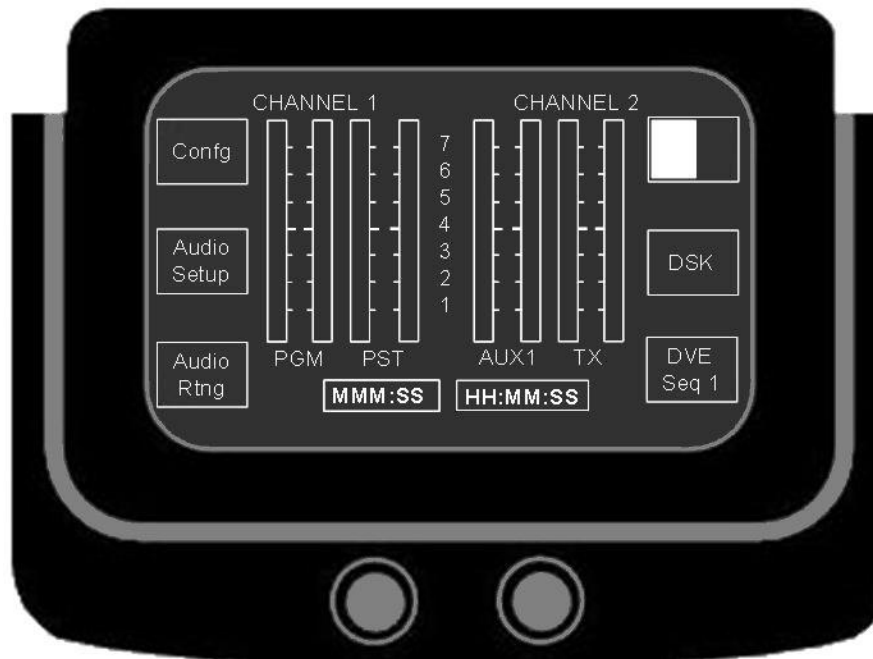
The Timer home page



Pressing the station clock display, shown as HH:MM:SS, on either home page will toggle the display to the other page.

Controls for the LCD touchscreen

Below the LCD touchscreen are two controls, used for selecting values in the various configuration screens. Turning a control clockwise increases the value, while turning it anti-clockwise decreases it.



After leaving either Home page, a **<HOME>** button is displayed on the screen. This will, when pressed, return the display to the Home page. In some cases, where other sub menus have been displayed or visited, pressing **<HOME>** causes the display to return to the previous screen.

On screens where multiple pages are available, a **<NEXT PAGE>** button is displayed.

2.7 Downstream keyers

The TX 410 provides up to two independent downstream keyers, DSK1 and DSK2 (see chapter 4). Keys can be cut or faded to air, while DSK transitions can be set to follow the next video or DVE transition.

All DSK's are fully linear and have separate control of clip and gain. These are set up via the LCD touchscreen.

2.8 DVE

An optional DVE is available for the TX 410 (see chapter 5). This provides up to 24 selectable, user configurable, DVE moves for on screen squeeze effects.

2.9 Audio-over

The TX 410 provides powerful audio-over facilities (see chapter 6), using two controls to determine the programme and over levels when an over source is cut or faded to air:

- **<OVER>** controls the gain of the over source to be mixed with the programme audio.
- **<PGM>** sets the the main programme audio level.

Any one of four external over sources are available to the TX 410, with each source having its own independent settings for **<OVER>** and **<PGM>** level.

A single button press enables the required over source to be cut or faded to, or from, air with the fade rate being defined from the Audio Setup page on the LCD screen. Audio overs can also be set to follow the next PGM audio or DVE transition.

2.10 Video/audio monitoring

A separate auxiliary monitoring bus, AUX, on the router can be controlled directly from the TX 410 (see chapter 7) and provides the option for split or married video and audio selection.

For audio monitoring (see chapter 8), a single output, allows selection of PGM, PST, AUX or an off-air/external source and offers comprehensive audio monitoring facilities. The audio level can be cut or dimmed via dedicated buttons, with a variable control for the overall level.

Where the TX 410 has provides multi-level audio control, a 'soft' button on the Audio Setup page **<Mon Lvl X>** enables selection of the required audio level to the monitoring system output.

2.11 Machine control

The TX 410 allows control of connected machines (for example, VTRs) either directly, or via an external router through buttons on the control panel.

Operation is depends on how the TX 410 has been installed, with the buttons dedicated either to two directly connected machines or they can be connected to an external RS422 router, allowing control of up to 12 routed machines.

2.12 Bypass switcher control

Two configurable sets of pushbuttons in the top left corner of the panel can be set to provide control of an external, independent, 8 x 1 bypass switcher.

2.13 Automation control

If the installation has an automation system (for example, the Pro-Bel Compass System), the following features of the TX 410 can be controlled automatically:

PST source selection.

Transition type and rate.

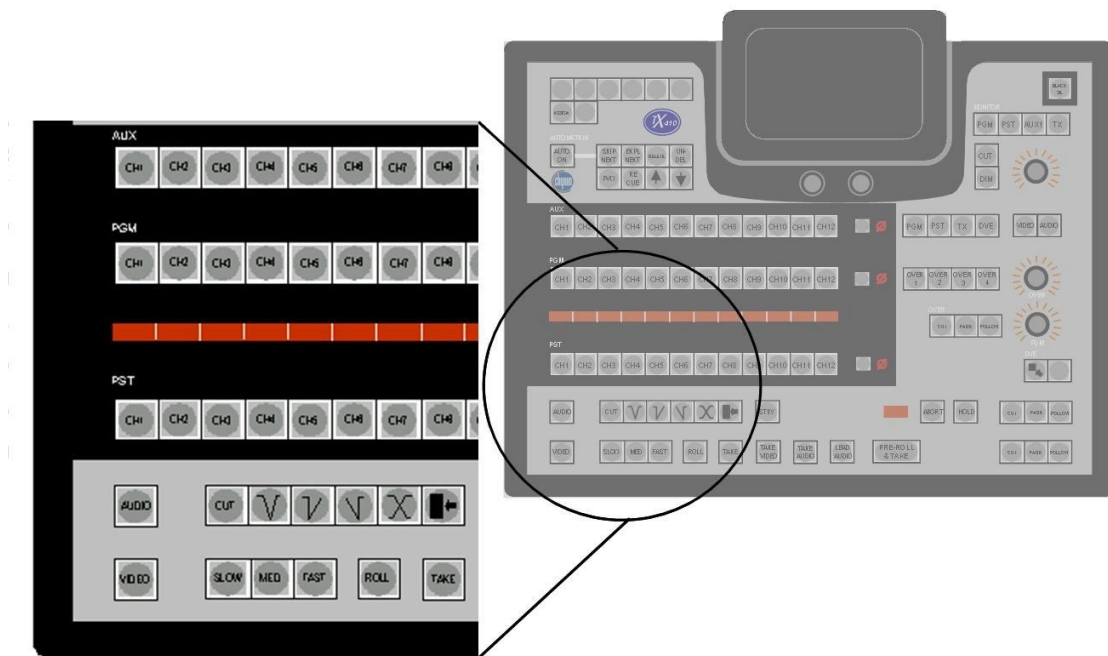
DSK and audio-over.

In addition, the panel can be configured to provide a Manual Intervention panel (MIP) providing basic control of the automation system.

3 Manual transitions

This chapter describes how to set up the next transition manually and take it to air.

If the TX 410 is connected to a presentation automation system, for example, Pro-Bel's Compass system, the programme can be setup and taken to air automatically.



In normal operation transitions are made by:

- 1 Selecting the video and audio sources (see chapter 2). These are first selected on the preset (PST) bus.
- 2 Selecting the transition type and speed by pressing white buttons in the bottom left hand corner of the panel.
- 3 If desired, selecting one or both DSKs (see chapter 4) and an audio-over (see chapter 6) to follow the transition.
- 4 Taking the transition by using the red Take buttons along the lower edge of the panel.

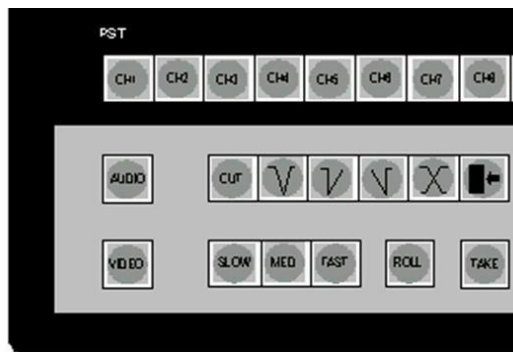
3.1 Selecting sources on preset (PST)

It is preferred practice to set up the transition on the preset (PST) bus. The selection can be either select married video/audio from the same source (see Step 1 below), or video and audio from different sources (see Steps 2 and 3).

At the bottom left of the panel, the **<VIDEO>** and **<AUDIO>** buttons are used for setting up video/audio breakaway.

- 1 To select married video/audio, first ensure that neither the **<VIDEO>** or **<AUDIO>** buttons are lit, and then select the required source button from the PST bus.

The PST source button is lit at full brightness.



- 2 To select only a new video preset, select the video by pressing **<VIDEO>** to light it, and then press the required source button on the PST bus.

The newly selected source button is lit at full brightness indicating video only selection. The original source button is lit at half brightness, indicating audio only.

- 3 To select only a new audio preset, press **<AUDIO>** to light it and then press the source button on PST from which you want the audio.

The newly selected source button is lit at half brightness indicating audio only selection. The original source button is lit at full brightness, indicating video only.

Note: The level select buttons, **<AUDIO>** and **<VIDEO>**, can be configured to either manually or automatically cancel after selection on the PST bus. Refer to the technical manual for details.

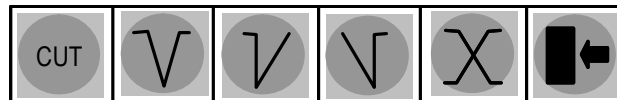
3.2 Selecting the transition type and rate

The type and rate of a transition are selected by pressing buttons in the lower left hand corner of the panel. The transition rate buttons are configured via the touchscreen. For details refer to the technical manual.

Setting up the transition

The type and speed of transition are selected by pressing the appropriate transition type white button in the bottom row of the lower console.

The available transition types are indicated by the buttons shown below (from left to right):



<CUT> Cut directly to the selected sources without fading or using a wipe.

<V FADE> Fade out the current programme to black and then fade in the new programme.

<TAKE/FADE UP> Cut the current programme and then fade in the new programme.

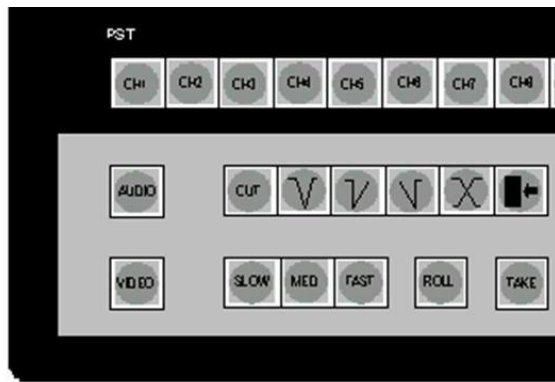
<FADE DOWN/TAKE> Fade out the current programme and then cut in the new programme.

<MIX> Fade out the current programme and at the same time fade in the new programme.

<WIPE> Use the currently set up wipe pattern, direction and softness to transition between the PGM and PST sources. The current wipe pattern is shown in the top right of the home screen (see chapter 13).

The audio transition will follow the selected transition type, with the exception of the **<WIPE>**, where the audio will perform a mix.

- 1 Select the type of transition by pressing **<CUT>**, one of the four fade patterns, or **<WIPE>**.



- 2 If **<WIPE>** was selected at step 1, the current wipe pattern shown in the top right-hand corner of the home screen will be used.

To change the wipe pattern, direction or softness, see chapter 13.

- 3 Select the transition rate for a fade or wipe by pressing one of **<SLOW>**, **<MED>** or **<FAST>** buttons.

The selected transition rate button is lit.

Note: The rates in frames per second are displayed on the DSK screen (see chapter 12). To change these rates refer to the technical manual.

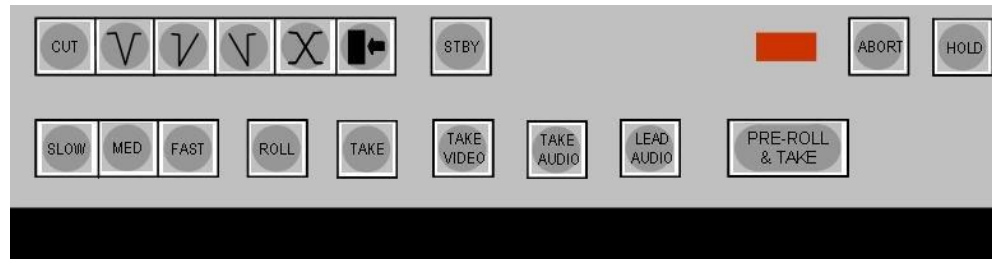
3.3 Taking a transition to air

A take replaces the programme on-air with the source(s) that have been selected on the PST bus. The take uses the selected transition type and speed.

DSKs (see chapter4) and an audio-over (see chapter 6) can be set to follow the transition.

Main transition buttons

The red buttons in the centre of the bottom row of the lower console are used to carry out a transition. They are as follows:



<PRE-ROLL & TAKE>

Used to start a machine (for example, a VTR) and take married video/audio to air after a pre-configured pre-roll time. The pre-roll countdown timer is displayed above this button.

When the switcher is automated by Pro-Bel automation, pressing the **<PRE-ROLL & TAKE>** button causes the next event to take.

<TAKE>

Used to take the PST video and audio (married) to air immediately.

<TAKE AUDIO>

Pressing the **<TAKE AUDIO>** button will perform an audio only transition.

<TAKE VIDEO>

Pressing the **<TAKE VIDEO>** button will perform a video only transition.

<LEAD AUDIO>

Used to mix the preset audio with the current programme audio, leaving the current video on air until **<TAKE>** is pressed.

Note:

1. When any of the above buttons are pressed, the preselected source button(s) light up on the PGM bus row (red buttons). If flip-flop mode is inactive, the PST source remains lit. If flip-flop mode is active the previous PGM source will be shown on the PST row after the transition. To configure flip-flop operation, refer to the technical manual.
2. When a fade transition is selected (either **<V FADE>**, **<TAKE/FADE UP>** or **<FADE DOWN/TAKE>**), and the **<TAKE>** or **<PRE-ROLL&TAKE>** button is pressed and held down, the transition will stay at the intermediate black/silence until the **<TAKE>** or **<PRE-ROLL&TAKE>** button is released, when the transition will be completed.

Additional transition buttons

In addition to the red transition buttons there are three white transition buttons along the bottom edge of the panel, these are as follows:

<ROLL>

Pressing the **<ROLL>** button rolls the machine currently selected on the PST bus.

When the switcher is automated by Pro-Bel automation, pressing the **<PRE-ROLL & TAKE>** button causes the next event to take. The automation system will roll the machine if necessary.

<ABORT>

Used for aborting a transition after the **<PRE-ROLL & TAKE>** button has been pressed. The pre-roll countdown timer will reset. (This facility is only active when manually controlling VTR's under direct control of the TX 410)

<HOLD>

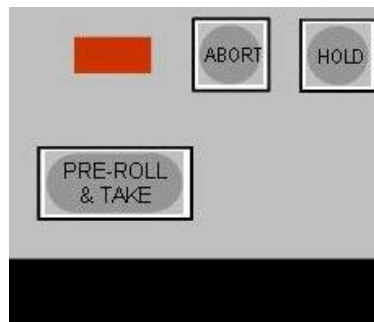
Pressing the **<HOLD>** button will suspend the next event transition set by an automation system. For example, if the current on-air programme overruns its scheduled duration it may be necessary to manually

control when the next transition will be made. Deselecting the **<HOLD>** button then pressing the **<PRE-ROLL/TAKE>** button re-starts the schedule.

3.4 Taking a 'pre-rolled' machine

- 1 Select the required source to the PST bus. To take the transition in one step, including pre-rolling the machine, press **<PRE-ROLL & TAKE>**.

*The machine is started. The red PGM source buttons light after the pre-configured ROLL time, corresponding to the sources pre-selected on PST. The pre-roll time is displayed in the window above the **<PRE-ROLL & TAKE>** button. The transition is made using the type and speed shown by the lit transition setup buttons.*



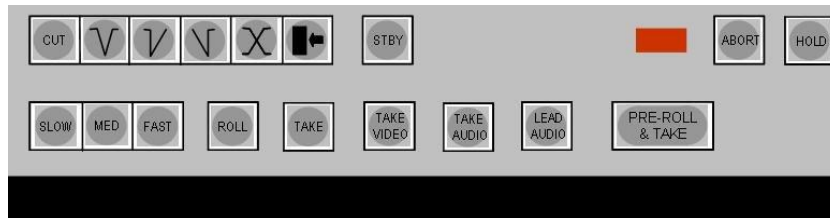
- 2 To abort the transition once a pre-roll has started, press the **<ABORT>** button next to the countdown timer.

The transition is aborted and the pre-roll countdown timer resets. The PGM and PST sources remain unchanged.

3.5 Taking a manually rolled machine

- 1 Select the required source to the PST bus. Roll the machine manually by pressing **<ROLL>**.

The machine is started, as shown on the PST monitor.



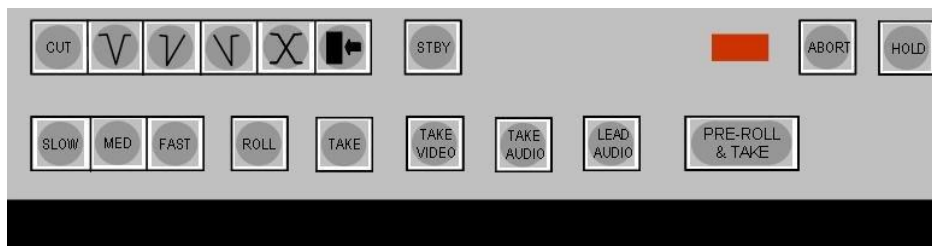
- 2 Press **<TAKE>** to take the married video/audio to air.

The red PGM source buttons light, corresponding to the sources pre-selected on PST. The transition is made using the type and speed shown by the lit transition setup buttons.

3.6 Leading in audio before video

- 1 Select the required source to the PST bus. If applicable, roll the machine (for example, a VTR) manually by pressing **<ROLL>**.

The machine is started, as shown on the PST monitor.



- 2 Press **<LEAD AUDIO>** to bring in the new audio source over the current video and audio.

*The new audio will mix with the current audio, instead of replacing it, until the video is taken. The **<LEAD AUDIO>** button will remain lit while it is active.*

- 3 When desired, press **<TAKE>** to take the pre-selected video to air.

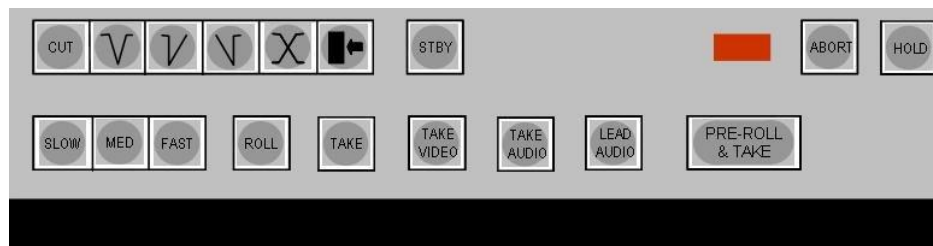
*The red PGM source button lights at full brightness, corresponding to the button pre-selected for video on PST. The transition is made using the type and speed shown by the lit transition setup buttons. The **<LEAD AUDIO>** button returns to its unlit state.*

Note: The lead audio can, at any time, be taken off air by pressing the **<LEAD AUDIO>** button again.

3.7 Holding an automated transition

- 1 If necessary, a transition that is scheduled and controlled by an automated presentation system can be delayed by pressing **<HOLD>**.

*The **<HOLD>** button lights. The on-air sources do not change (that is, the next transition is not taken) until **<HOLD>** is pressed again to release it and the Pre-Roll & Take button is pressed.*



3.8 Taking an automated transition

- 1 If necessary, a transition that is scheduled and controlled by an automated presentation system can be taken to air early by pressing **<PRE-ROLL & TAKE>**.

The preset source is taken to air.

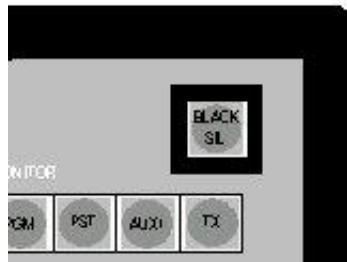
3.9 Switching on-air to black/silence

The TX 410 transmission on-air can be replaced with black/silence at any time by pressing a single key.

The black can be positioned before DSK 1, between DSK 1 & 2, or after DSK 2. The fade rate can be configured to be between 0 (cut) and 99 frames. Refer to the technical manual.

- 1 Press the **<BLACK/SIL>** button in the top right-hand corner of the panel.

*The **<BLACK/SIL>** button lights up as the on-air output from the TX 410 fades to black/silence. The **<BLACK/SIL>** button flashes when the fade to black/silence is complete.*



- 2 To return the sources currently selected on the TX 410 to air, press the **<BLACK/SIL>** button.

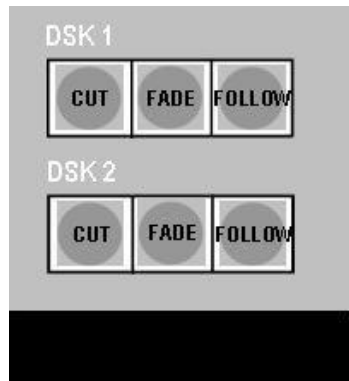
*The current sources on the PGM bus, the audio setting, and any DSKs and audio-over currently cut in, are faded back in again. The **<BLACK/SIL>** button lights while the transition is in progress and goes out when complete.*

Black/silence remains in effect until it is cancelled by pressing the button again. Black/silence is not cancelled by a transition or by hot cutting a programme to air.

Where the black/silence transition has been configured to fade to/ from black and silence, the transition can be completed early by pressing the button twice.

4 Using downstream keyers

A downstream keyer (DSK) enables images such as captions and logos to be displayed over the main programme output. The TX 410 provides control of up to two DSKs via pushbuttons located at the bottom right of the panel, enabling them to be cut or faded to/ from air.



4.1 Taking a DSK to air

Either one, or both, of the DSKs can be cut or faded to air independently of a PGM transition.

If the **<CUT>** button is lit, the DSK is already on-air.

If the yellow **<FOLLOW>** button is flashing, then the DSK is set to follow the next video or DVE transition (section 4.3).

- 1 To take a key to air, press the **<CUT>** button for the required DSK.

*The Key is cut to air and the **<CUT>** button lights, indicating the DSK is on-air.*

- 2 To fade a key to air, press the **<FADE>** button for the required DSK.

*The Key fades up until it is on-air. The **<FADE>** button is lit while a fade is in progress. If it is necessary to complete the fade early, press **<CUT>**.*

Once the fade is complete, the <CUT> button lights, indicating the DSK is on-air.

4.2 Taking a DSK from air

Either one, or both, of the DSKs can be cut or faded from air independently of a PGM transition.

If the <CUT> button is not lit, the DSK is already off-air.

If the yellow <FOLLOW> button is flashing, then the DSK is set to follow the next video or DVE transition (section 4.3). This is cancelled if the DSK is manually taken from air.

The method of taking a DSK from air is independent of the way it was taken to air.

- 1** To take a key off-air, press the <CUT> button for the required DSK.

The Key is cut from air and the <CUT> button lamp goes off.

- 2** To fade a key off-air, press the <FADE> button for the required DSK.

The Key fades down until it is off-air. The <FADE> button is lit while a fade is in progress. If it is necessary to complete the fade early, press <CUT>.

Once the fade is complete, the <CUT> button lamp goes off.

4.3 Setting the DSK to follow the next transition

Either or both DSKs can be set to 'Follow' the next video PST/PGM transition or DVE move. If a DSK has been manually taken to air, it can be 'followed' off. If it has been 'followed' on, it can be manually taken off. The follow function cancels once the key is off-air.

- 1** Press the **<FOLLOW>** button for the required DSK.

*The **<FOLLOW>** button will flash.*

*At the next PST/PGM video transition, the DSK will go on or off depending on its status before the **<FOLLOW>** button was activated. For a DVE transition, the DSK will only follow the DVE state, with the DSK going on when the DVE goes on and off when the DVE goes off.*

*The **<FOLLOW>** button will continue to flash until the DSK is off air.*

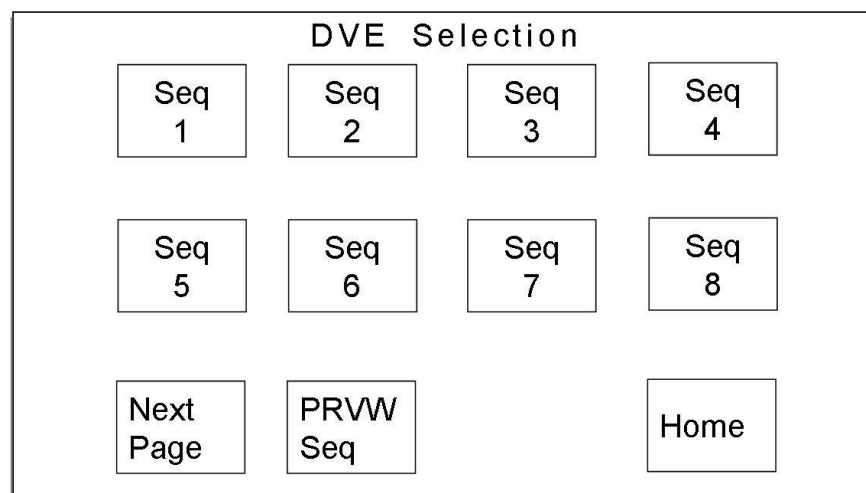
- 2** To cancel the DSK from following the next transition, press the **<FOLLOW>** button for the required DSK so that the lamp goes off.

5 Using the DVE

The optional DVE available with the TX 410 provides the ability to squeeze the PGM output, typically at the end of a programme, and run a trailer or teaser for the next programme at the same time. It is also possible to set the DSKs (see chapter 4) and an audio-over (see chapter 6) to follow on/off with the DVE move.

Up to 24 pre-programmed sequences are available and can be recalled from the control panel. A preview facility allows the selected sequence to be previewed prior to use.

The DVE button in the bottom right corner of the Home page on the touchscreen indicates the currently selected DVE sequence, and also provides access to the DVE Selection page.



Pressing the **<Next Page>** button selects the next available DVE selection page. There are three pages of eight sequences (24 available sequences); Page 1 shows sequences 1-8, page 2 sequences 9-16 and page 3 sequences 17-24.

The **<Home>** button returns the display to the home page.

5.1 Selecting a DVE sequence

Pressing the **<DVE SEQ n>** push button selects the corresponding sequence (numbered 'n') from the DVE. The selected sequence button remains highlighted.

It is not possible to select a new sequence if the DVE is either on air; indicated by the **<DVE>** button being lit, or being previewed; indicated by the **<PRVW SEQ>** 'soft' button being lit.

- 1** From the home screen, press the **<DVE SEQ n>** button

The first page of the DVE selection screen is displayed.

- 2** To select a sequence press the **<PAGE>** button until the required sequence number is visible. Select the sequence number.

*The selected sequence will be highlighted. To return to the home page, press **<HOME>**. The newly selected sequence will be shown in the **<DVE SEQ n>** button.*

5.2 Previewing a DVE sequence

Pressing the **<PRVW SEQ>** button previews the selected DVE sequence. While the sequence is being previewed the preview push button remains highlighted. It is not possible to preview a sequence whilst another move is activated or if the DVE is currently on air.

- 1** Select the sequence to preview (refer to section 5.1).

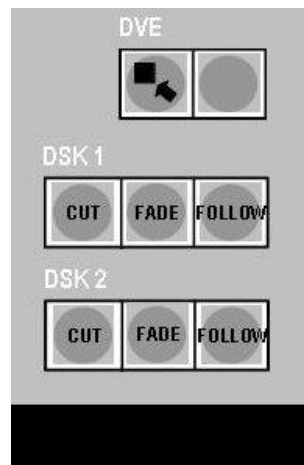
- 2** Press the **<PRVW SEQ>** button

*The **<PRVW SEQ>** button will light, and the DVE sequence is activated. This can be viewed at the DVE output, but does not appear on the system PGM output. The **<PRVW SEQ>** button will remain lit until pressed again to cancel the preview.*

5.3 Taking a DVE sequence to air

- 1 Select the sequence to take to air (refer to section 5.1).
- 2 Press the red <DVE> button.

The selected DVE move will be activated on air. The <DVE> button lights up as the DVE move is in action. Once the move is completed, the <DVE> button flashes until the DVE is taken off air.



5.4 Taking a DVE sequence from air

The DVE move can be taken off air by either:

- 1 Pressing the red <DVE> button whilst lit.

The selected DVE move will be taken off air by completing the reverse move. The <DVE> button lights up as the DVE move is in action and then is extinguished once the move is off air.

- 2 Activating a PST/PGM transition. See chapter 3.

Caution: *The selected DVE move will be cut off air.*

6 Using audio-overs

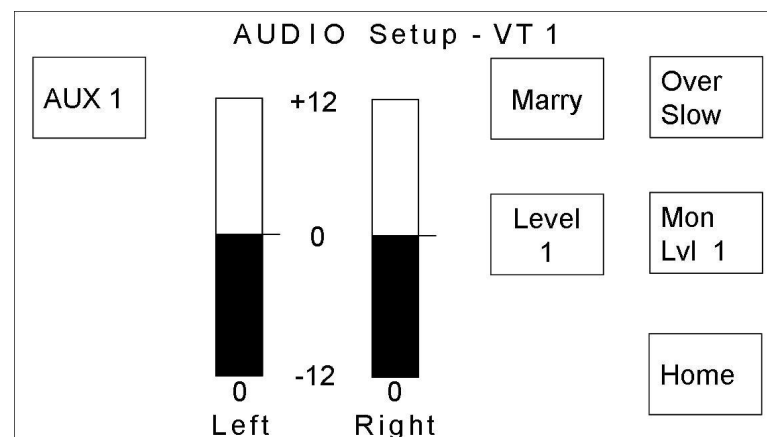
Four audio-overs are provided on the TX 410, enabling sound to be added over the on air programme audio. The audio-over control section is on the right hand side of the panel.

Audio-overs can be cut or faded to or from air and can be set to follow the next audio or DVE transition. Only one audio-over can be on-air at a time.

6.1 Setting the audio-over fade rate

- 1 From the home screen, press the **<AUDIO SETUP>** button (see chapter 12).

The audio setup screen is displayed.



- 2 To select the over fade rate, press the **<OVER rate>** button (shown as **<Over Slow>** above) until the required speed is displayed.

*The display toggles between **<SLOW>**, **<MED>**, and **<FAST>**.*

Note: The rates are the same as the main video and audio transition rates. The over adopts the same rate as the audio PST/PGM transition when set to follow.

6.2 Previewing an audio-over

It is possible to pre-listen to an audio-over before taking it to air, or when setting the PGM and OVER levels.

- 1 Select **<PST>** to the loudspeakers (see chapter 8).



- 2 Press and hold down the required audio-over source.



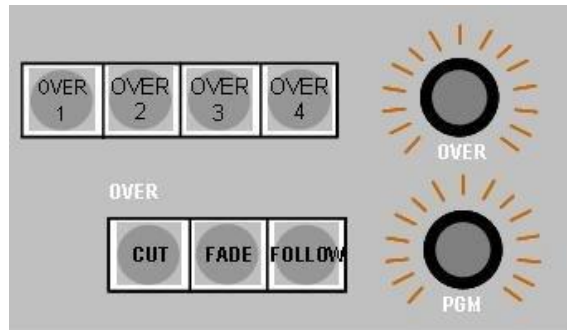
- 3 The PST audio monitor will switch to a mix of the audio-over and the source selected on the PST bus. The **<OVER>** control and the **<PGM>** control can be adjusted to the required setting which will be stored for each over source (section 6.3).

6.3 Adjusting the audio-over levels

Warning: If the <CUT> button is lit, an audio-over is on-air and the audio-over level controls will affect the programme audio output.

- 1 Select an audio-over source by pressing one of the four white buttons, <OVER 1> to <OVER 4>.

The selected over button will light and the indicators around the <OVER> and <PGM> controls will light to provide an indication of the preset levels for the selected input.



- 2 To adjust the level of audio-over, turn the <OVER> control to the required level (usually maximum, fully to the right). On maximum setting there is no level reduction of the audio-over level.

The indicator around the control provides a visual feedback of the level.

- 3 To adjust the programme level, turn the <PGM> control to the required level.

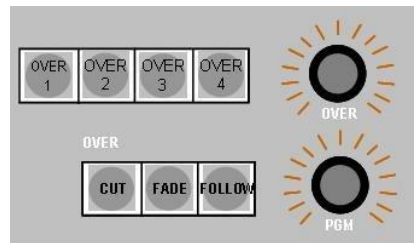
As with the Over control, the indicator around the control provides visual feedback of the new level.

6.4 Taking an audio-over to air

Any one of the four available Audio Overs can be cut or faded to air independently of a PGM Audio transition.

If the **<CUT>** button is lit, the currently selected Over input is already on-air.

If the yellow **<FOLLOW>** button is flashing, the selected Over input is set to follow the next audio or DVE transition (section 6.6).



To take an over to air

- 1 Select the required Over input and set the PGM and OVER levels if required (sections 6.1 to 6.3).
- 2 Press the **<CUT>** button.

*The input is cut to air and the **<CUT>** button lights, indicating the Over is on-air.*

To fade an over to air

- 1 Select the required Over input and set the PGM and OVER levels if required (sections 6.1 to 6.3).
- 2 Press the **<FADE>** button.

*The Over and PGM levels fade to the preset levels. The **<FADE>** button is lit while a fade is in progress. If it is necessary to complete the fade early, press **<CUT>**.*

Once the fade is complete, the <CUT> button lights, indicating the Over is on-air.

6.5 Taking an audio-over from air

It is possible to take an audio-over from air at any time.

If the <CUT> button is not lit, the currently selected Over input is already off-air.

If the yellow <FOLLOW> button is flashing, the selected Over input is set to follow the next audio or DVE transition (section 6.6). This is cancelled if the Over is manually taken from air.

The method of taking an Over from air is independent of the way it was taken to air.



To take an over off-air

- 1 Press the OVER <CUT> button.

The Over is cut from air and the <CUT> button lamp goes off.

To fade an over off-air

- 1 Press the OVER <FADE> button.

The Over fades off, and PGM fades back to full level. Once the Over is off-air the <CUT> button lamp goes off.

6.6 Setting the audio-over to follow the next transition

An audio-over can be set to follow the next audio PST/PGM transition or DVE move. If an audio-over has been manually taken to air, it can be 'followed' off. If it has been 'followed' on, it can be manually taken off. The follow function cancels after it has been taken off air.

- 1** Press the OVER **<FOLLOW>** button. When 'following' an over on, it is necessary to select an Over input then set the OVER and PGM levels if required.

*The **<FOLLOW>** button will flash.*

*At the next PST/PGM audio transition, the OVER will go on or off depending on its status before the **<FOLLOW>** button was activated. For a DVE transition, the OVER will only follow the DVE state, with the OVER going on when the DVE goes on and off when the DVE goes off.*

*The **<FOLLOW>** button will continue to flash until the OVER is off air.*

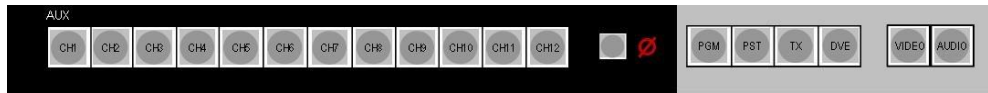
- 2** To cancel the OVER from following the next transition, press the OVER **<FOLLOW>** button so that the lamp goes off.

An audio-over can be set to follow the next audio PST/PGM transition or DVE move. If an audio-over has been manually taken to air, it can be 'followed' off. If it has been 'followed' on, it can be manually taken off. The follow function cancels after it has been taken off air.

7 Monitoring using the AUX bus

The TX 410 provides a single auxiliary bus for monitoring sources without affecting the on-air sources or those that are pre-selected for the next transition.

Sources for the auxiliary bus are selected from the top row of white buttons on the source selection panel. The AUX level buttons (to the right) permit the sources to be either married, or broken away.



7.1 Monitoring sources via the AUX bus

- 1 To monitor married sources on the AUX bus, ensure that both the **<VIDEO>** and **<AUDIO>** buttons to the right of the AUX source selection buttons are lit, then press the white button in the AUX row for the required source.

*The source button is lit at full brightness and the **<VIDEO>** and **<AUDIO>** buttons remain lit.*

- 2 To monitor video and audio from separate sources on the AUX bus:

- a) To select a video source, turn the **<AUDIO>** button OFF (unlit), and the **<VIDEO>** ON (lit), then select the new video source.

The new source button is lit at full brightness, indicating a video only selection. The original source button is lit at half brightness, indicating audio only.

- b) To select an audio source, turn the **<VIDEO>** button OFF (unlit), and the **<AUDIO>** ON (lit), then select the new audio source.

The newly selected source button is lit at half brightness indicating audio only selection. The original source button is lit at full brightness, indicating video only.

8 Using the audio monitoring

The Audio Monitoring home page (see chapter 12) on the LCD touchscreen dynamically shows the level for the audio source currently selected on PGM, PST, AUX and TX (off-air or external source).

In addition, the TX 410 provides a dual channel audio monitor output for monitoring sources selected on any of these busses or for listening to the off-air/external input. The audio monitoring buttons and controls are to the right of the LCD screen.

Any selections made on the audio monitor panel have no effect on the programme on-air. If the source is selected on the PGM, PST or AUX bus, the sound heard is modified by selections made on the audio (gain) setup screen of the display (see chapter 15).

The MONITOR output has a level control and two additional buttons providing **<CUT>** (no sound) and **<DIM>** (reduced volume) operation. These buttons can be configured to operate as **<CUT LEFT>** and **<CUT RIGHT>** respectively.

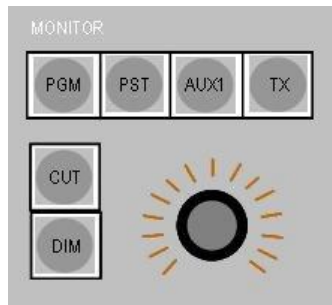
In multi-level systems, the audio level to be heard on the TX 410 monitor output can be selected from the LCD screen.

8.1 Monitoring an audio source

To monitor an audio source using either MONITOR 1 or MONITOR 2:

- 1** Press either **<PGM>**, **<PST>**, or **<AUX>** for monitoring a source, or press **<TX>** for return monitoring.
- 2** If the audio for a different source is to be monitored on the selected bus, press a different source button.

Caution: Pressing a PGM button changes the programme on-air.



- 3** Adjust the volume of the monitor output by using the level control and/or the **<CUT>** or **<DIM>** buttons.

Turning the control clockwise increases volume.

*Pressing **<CUT>** cuts the volume completely and lights the button. Pressing it again brings it back at full volume, as set by the control.*

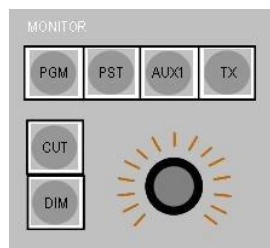
*Pressing **<DIM>** lowers the volume and lights the button. Pressing it again brings it back at full volume, as set by the control*

Note: *If the buttons are configured to be cut left and cut right then when **<CUT>** is lit, the left is cut and when **<DIM>** is lit the right is cut. These act independently and one or both can be on/off at any time.*

8.2 Monitoring in multi-level environment

In multi-level audio systems, it may be necessary to listen to other audio levels on the PGM, PST and AUX busses, or TX/ return Air feed. A 'soft' key is provided on the Audio setup page on the touchscreen to switch the required AES level to the Monitor output.

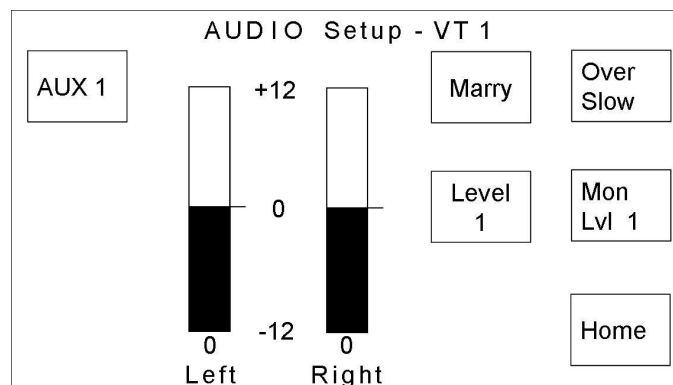
- 1 Select the required bus to be monitored using the MONITOR



controls

- 2 From the home screen, press the **<AUDIO SETUP>** button (chapter 12).

The audio setup screen is displayed.



- 3 To select the level for monitoring, press the **<Mon Lvl x>** (shown as **<Mon Lvl 1>** above) button until the required audio level is shown.

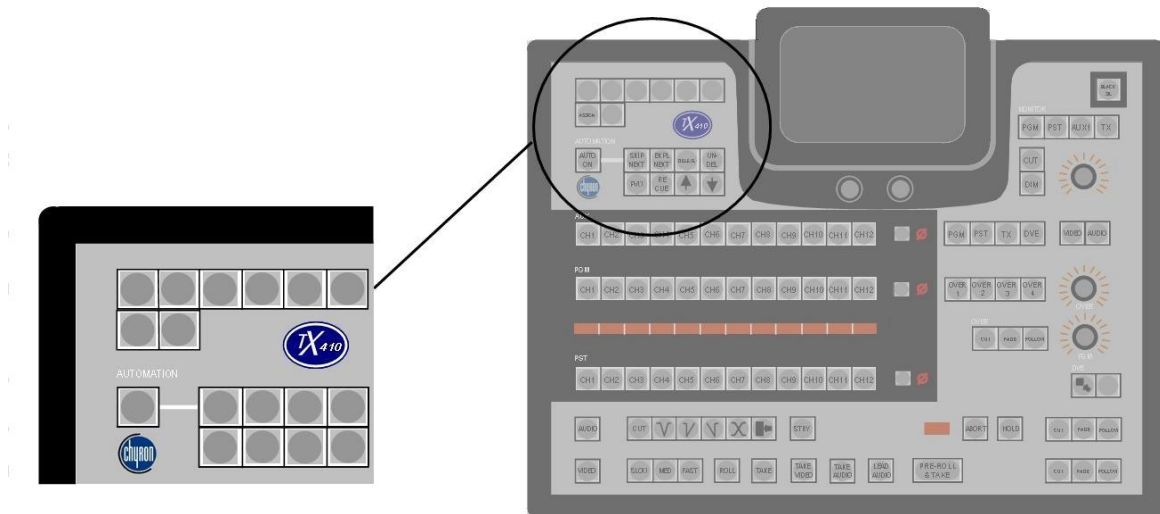
The selected level will be routed to the monitor output.

Note: In single level audio systems, this 'soft' button appears on the screen, however pressing it will have no effect on the monitor output.

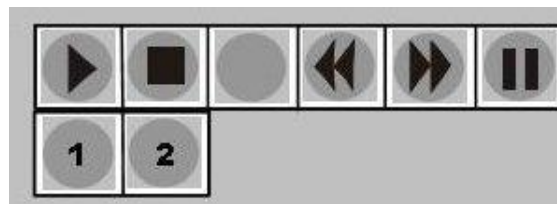
9 Using machine control

The TX 410 has a set of buttons for controlling devices, such as VTRs, directly from its console. The machine control panel can be used to preview material before it is taken to air.

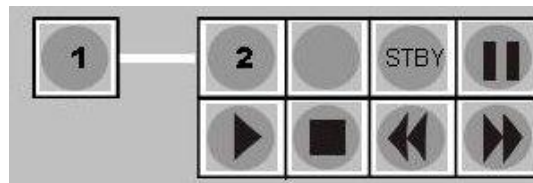
Machine control functions can be assigned to either of the two sets of pushbuttons located in the top left of the panel. The buttons used, and their operation will depend upon the installation.



For systems operating with either Sextant or Compass automation systems, the top row of buttons should be used to provide machine control functions if they are required, as the lower row is used to provide MIP (manual intervention panel) facilities. The operational button layout is as shown below.



Systems controlling more than one TX 410 system however will use the top row of buttons for channel select, therefore the lower row of buttons should be used to provide machine control. The operational button layout is as shown below.



Machine control functions available are; **<START>**, **<STOP>**, **<STBY>**, **<REW>**, **<FWD>**, **<PAUSE>**

Two additional buttons, **<1>** and **<2>** are used to select the device to be controlled. This varies according to the installation as the machine control panel can be connected to:

- two dedicated devices. In this case, the **<1>** and **<2>** buttons each correspond to a different machine (see section 9.1).
- or up to 12 devices, via a router. In this case, the machine to be controlled is connected through one of the source busses, and then the buttons are labelled **<PST>** and **<AUX>** (see section 9.2). This is only available when the system is NOT under automation control, or if the AUTO control is OFF.

9.1 Controlling dedicated machines

If the TX 410 is directly connected to devices, the machine to be controlled can be selected by pressing one button.

- 1** Press either **<1>** or **<2>** on the machine control panel to select the device to be controlled

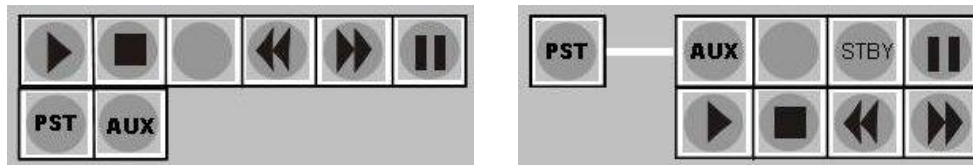
The button lights up to show which machine has been selected.

- 2** Use the six command buttons on the machine control panel, as required to control the device.

9.2 Controlling a routed machine

If the devices are connected via a router, first select an input bus then select the source on that bus corresponding to the machine to be controlled.

- 1 Select the input bus to control by pressing the **<PST>** or **<AUX>** button on the machine control panel.



- 2 Select the required source by pressing the button in the row corresponding to the bus selected in Step 1.
- 3 Use the six command buttons on the machine control panel, as required, to control the device.

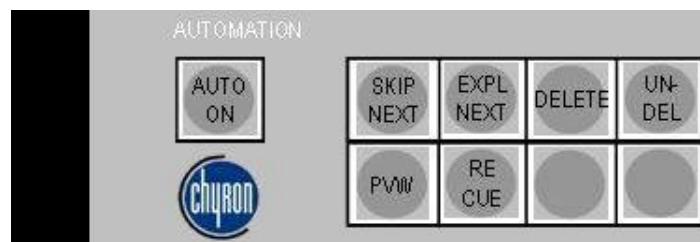
Note: Machines selected on the PST bus can be 'rolled' and 'taken' to air using either the **<PRE-ROLL/TAKE>** button, where they have been cued to the pre-roll time for the machine (shown in the display above the **<PRE-ROLL/TAKE>** button); or the **<ROLL>** then **<TAKE>** buttons.

10 Using the TX 410 with automation

The TX 410 is designed to facilitate simple integration with a wide range of station automation systems, like Pro-Bel's Sextant and Compass Systems.

A single button on the TX 410, **<AUTO ON>**, controls connection to the automation system. The automation control section is located in the top left of the panel and provides full manual intervention panel (MIP) control for the automation system (See Automation system handbook)

. The **<HOLD>** (see section 3.7) and **<STBY>** buttons (see section 2.12) are also part of this group of buttons.



If there is an automation system connected to the TX 410, it can control these functions:

PST source selection.

Transition type and rate.

DSK, DVE and audio-over.

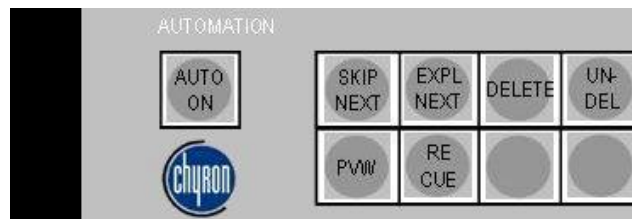
Note: The above functions are specific to Pro-Bel's Compass or Sextant systems and are not necessarily applicable if the TX 410 is under control from other automation systems.

These buttons are inoperative if not connected to an automation system.

10.1 Activating automated control

- 1 To turn on automation control of TX 410 functions, press the **<AUTO ON>** button in the automation panel.

*The **<AUTO ON>** button lights up and the automation system is now active, and will react to operational commands received from the automation system.*



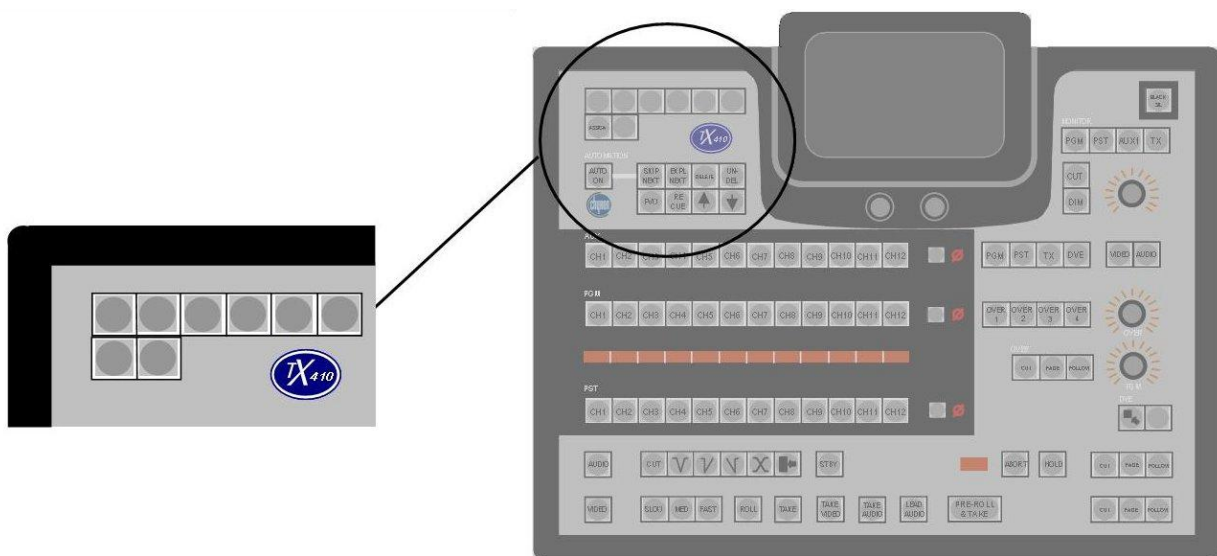
- 2 To turn off automation control of TX 410 functions, press the **<AUTO ON>** button in the automation panel when it is lit.

*Automation control of the TX 410 is turned off. This is verified by the **<AUTO ON>** lamp being turned off.*

1 1 Bypass switcher control

It is recommended that the TX 410 is connected to an external bypass switcher so that some sources have alternative routes to air that bypass the TX 410.

The bypass switcher control buttons are located in the top left of the



panel.

It should be noted that due to the limited space available on the TX 410 panel, the function of these buttons can be set, at the time of installation, for bypass, VTR or multi-channel control.

If a bypass switcher is connected to the bypass switcher control panel, then during normal use the router input fed with the TX 410 programme output should be selected. Pressing one of the other buttons selects an alternative source on the bypass switcher and thus the TX 410 is no longer on-air.

All inputs to the bypass switcher should be married video/audio.

When the TX 410 output is not selected on the bypass switcher, any transitions made by the TX 410 will not affect the output of the bypass switcher.

11.1 Using the bypass switcher panel

- 1** Press a button on the bypass switcher panel to take that source to air immediately.

If the old source was the TX 410 PGM output, the TX 410 is switched from air, so any current audio settings, DSKs, DVE effects and audio-overs on the TX 410 are no longer transmitted.

If the new source is the TX 410 output, then the sources on the PGM bus, the audio setting, any DSKs, DVE effects and audio-overs selected on the TX 410 are cut to air immediately.

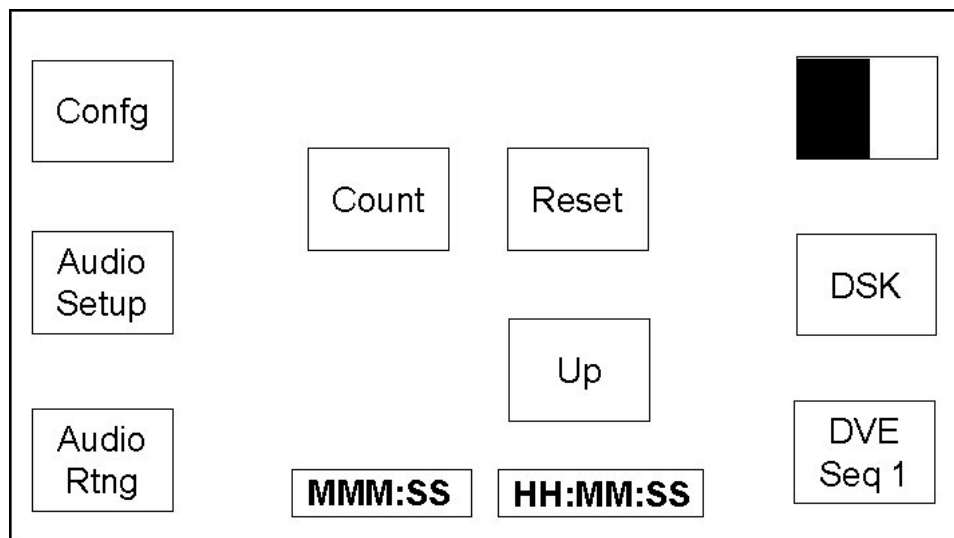
12 Using the LCD screen

12.1 The home page

The home page is the default page used by the system at start up. The TX 410 has two home screens available to the operator; these are the Audio Metering and Timer home pages. Pressing the station clock display, shown as HH:MM:SS in the screenshot below, switches the display between them.

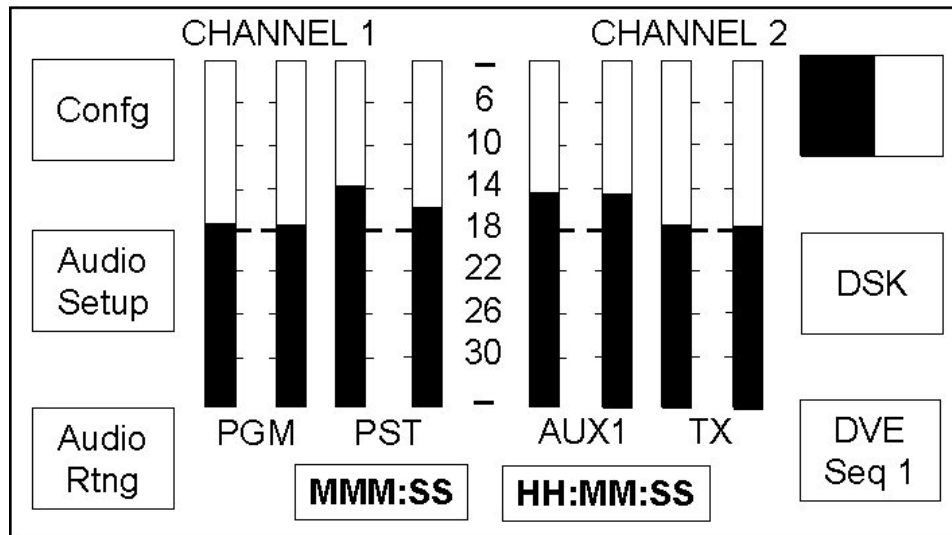
The timer home page

In addition to the 'soft' buttons permitting the operator to access other control screens, the timer home page provides a stopwatch/ timer display, their associated controls and a station clock.



The audio monitoring home page

The audio monitoring home screen displays a set of dual channel audio meters for the PGM, PST, AUX busses and return TX/ On Air feed, a stopwatch/ timer display, station clock and 'soft' buttons permitting the operator to access other control screens.



Four stereo meters are displayed for the PGM, PST, AUX and TX audio channels. Double width markers on each bar indicate the line-up level for the meter.

Display features for the Audio Monitoring home page, such as meter type (PPM or VU), scale and the peak bar duration are determined by the system configuration. Refer to the technical manual for details.

Page title

In a single level system, the page is titled with the first two channel names specified, for example; 'CHANNEL1 CHANNEL2' as shown in the previous diagram.

While the page title in a multi-level system takes the following format; page (level) number, level names, the channel routed and any other page (level) numbers where these levels are also routed.

In the diagram below, the title is

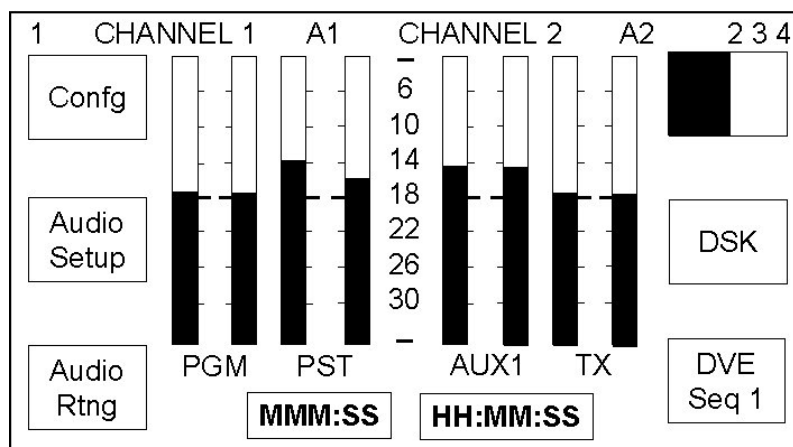
'1 CHANNEL1 A1 CHANNEL2 A2 234', where;

'1' is the page number,

'CHANNEL1' is the first level name and 'A1' is the channel routed to it,

'CHANNEL2' is the second level and 'A2' is the channel routed to it,

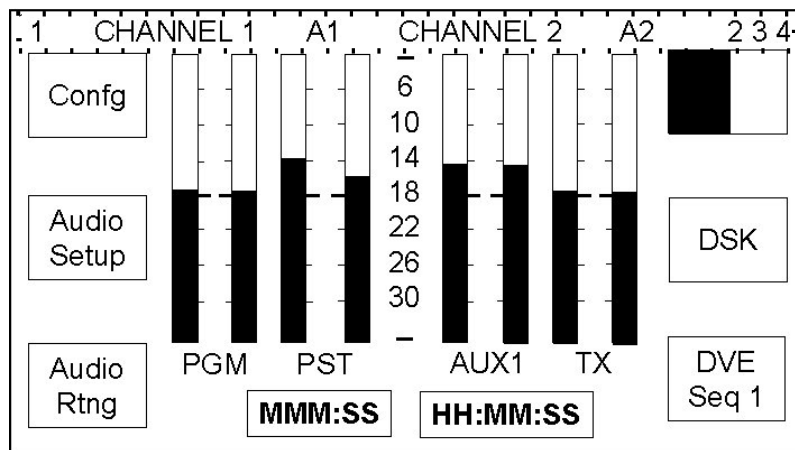
'234' indicates that either A1 or A2 is also on routed to either of the levels on pages 2, 3 and 4.



If there is no communication with the routing system then the page title is displayed as '1 CHANNEL1 A? CHANNEL2 A? ???'

Viewing multi-level audio metering

In a multi-level system, the metering for each audio level can be viewed on individual pages. These pages can be cycled through by pressing the title bar on the touchscreen (shown with a dotted outline).



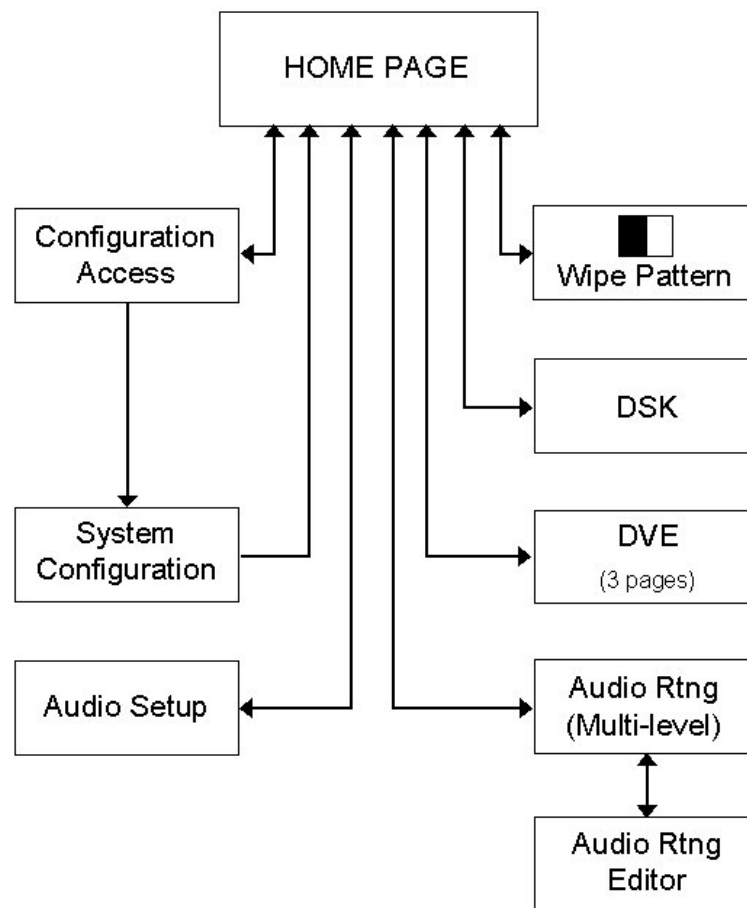
On each press, the screen changes to show the next audio level and the title bar updates to show the details for the new audio level being monitored.

12.2 Screens accessible from the home page

The 'soft' buttons at the left and right hand side of the display permit the operator to access the system and configuration pages. Each of these pages has a **<HOME>** 'soft' button in the lower right corner, and pressing it will return the display to the home page.

Where multiple pages are available on a screen, a **<Next Page>** 'soft' button, allowing them to be selected, will be available.

The following diagram shows the home page menu tree structure, detailing the screens which are directly, and indirectly, accessible from the main home page.



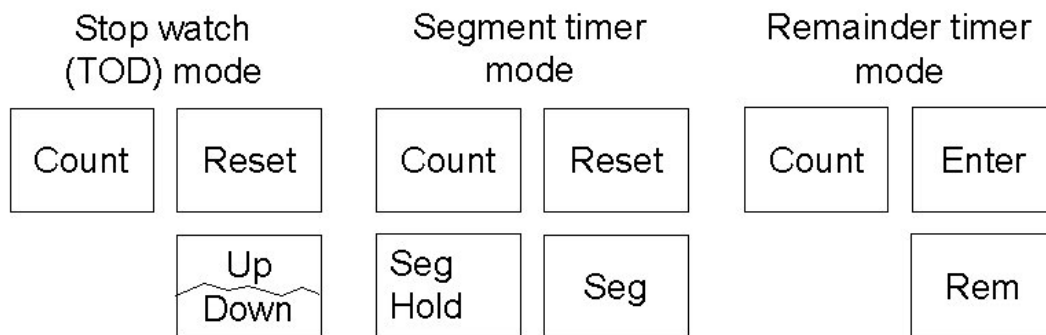
Home Page Menu Tree structure

- The **<WIPE PATTERN>** button shows the currently selected wipe pattern graphic and allows entry to the wipe pattern selection page. When control is from an automation system (e.g. Pro-Bel Compass) the displayed wipe pattern changes to reflect the current setting defined by the automation system.
- **<DSK>** allows entry to the downstream keyer (DSK) setup page, from here the clip and gain settings for both of the downstream keyers can be adjusted.
- **<AUDIO SETUP>** allows entry to the audio gain setup page, from here the levels for each of the audio sources, and the over fade rate can be set.
- **<DVE SEQ n>** allows entry to the DVE selection page, allowing the DVE sequence to be selected and previewed.
- **<AUDIO RTG>** this page is only available for multi-level audio systems and allows entry to the audio channel routing viewing and editing pages.
- **<CONFIG>** allows entry to the system configuration menu pages. To access the configuration pages. Entry to these pages requires a PIN code. For details refer to the technical manual.

12.3 Stop watch and timer modes

The timer modes shown on the display are configurable. For details of how to configure them please refer to the technical manual. The subsequently available modes are either stop watch (TOD) or timer mode.

Each timer mode has a dedicated set of control pushbuttons, available on the timer home page, these are shown below.



Stop watch mode controls

Stop watch mode (TOD)

In stop watch mode the time of day display (HH:MM:SS) is provided in 24 hour format, as illustrated. This time is derived by the station TC input. If no input is present, the clock will free run.

The stop watch is locked to the station TC input. Due to this feature a count started half way through a second will count that half second as a second to keep in step with the station TC.

When stop watch mode is selected, the current count is displayed along with three push button controls for the stop watch, as illustrated. The stop watch can count up or down (from a preset value) and can be reset. The count down preset value is selected using the left hand shaft encoder to set the minute (MMM) value, and the right hand shaft encoder to set the second (SS) value.

The stop watch once started counts continually until terminal count, and is not affected by display pages being changed.

- A toggle push button provides **<COUNT>** indication. On system startup the stop watch is shown as stopped, after which it always displays the current operational state as set by the operator. The button is highlighted when running. When the stop watch reaches terminal count (999:59 or 000:00) the count state is changed from start to stop. The timer can also be started and stopped from the audio monitoring home page by pressing the timer indicator MMM:SS
- A toggle push button provides **<UP>** and **<DOWN>** indication. On system startup the stop watch is shown as **<UP>**, after which it always displays the current operational state as set by the operator. When the stop watch reaches terminal count (999:59 or 000:00) the count direction indication remains unchanged.
- A push button provides stop watch **<RESET>**. If selected while counting up the count is reset to zero and the count continues. If selected while counting down, the preset count down time reset to zero and the count stops.

Timer mode

If timer mode has been configured, the display can be switched between segment and remaining mode. In either mode, the TOD display is replaced with a display showing the time the last transition was made. This is updated after every PST/PGM transition.

The timer is locked to the station TC input. Due to this feature a count started by a transition half way through a second will count that half second as a second to keep in step with the station TC.

Segment timer

In segment mode the timer value is displayed along with four push button controls. The segment timer counts independently of the stop watch and remaining count and it is always active, even if timer mode is never selected.

After each transition the timer automatically starts, counting up each second, and can only be stopped either manually or when the terminal count of 999:59 is reached.

The **<SEG HOLD>** push button overrides the auto start by preventing the count from being zeroed at the start of each transition.

The **<RESET>** push button resets the count to zero. If the count is running when this is pressed, it will reset to zero then continue counting.

Remainder timer

In remainder mode the timer value is displayed along with three push button controls, and counts independently to the stop watch. The segment count is always active, automatically starting after each transition, counting from the preset value, or zero if none has been specified. and can be manually started and stopped once counting.

Once active the timer counts down each second and only can only be stopped manually or when the terminal count of -999:59 is reached.

The time preset is set using the left hand shaft encoder to set the minute (MMM) value, and the right hand shaft encoder is to set the second (SS) value.

The **<ENTER>** push button only appears if the remaining count has been stopped and a positive remaining time is visible on the display. Selecting this push button calculates the duration of the programme remaining from the last transition by performing the calculation shown. The push button is then removed from the display and the duration is displayed as the remaining count which is automatically started (the **<COUNT>** push button automatically toggles from stop to start).

Duration = currently remaining count - (time of day - time of transition).

13 Selecting wipe patterns

There are ten wipe patterns available to the TX 410 which can be selected from the wipe pattern page. In addition, the edge softness and direction of the wipe can also be set.

The default setting for the wipe pattern is:

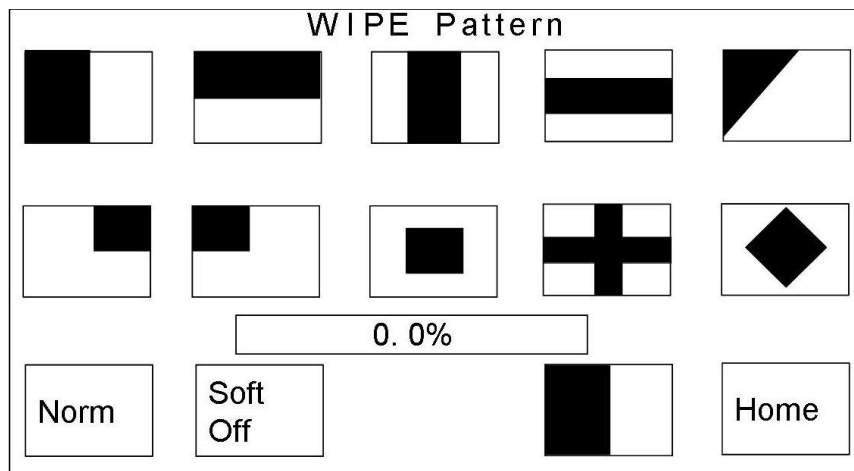
- wipe pattern selection = left to right horizontal wipe
- wipe softness = 0%
- wipe softness = OFF
- wipe direction = normal (forward)

When control is by an automation system (e.g. Pro-Bel Compass) the displayed wipe pattern changes to reflect the pattern currently selected by the automation system.

13.1 Setting wipe pattern, direction and softness

- 1 From the home screen (see chapter 12), press the **<WIPE PATTERN>** button.

The wipe screen is displayed with the current wipe pattern shown in the lower right corner of the screen.



- 2** To select a different wipe pattern, press the 'soft' button that corresponds to the wipe pattern required.

The new wipe pattern selected is shown in the lower right corner of the screen.

- 3** To set the direction of wipe, press the 'soft' button to toggle between NORM (normal – Forward) and REV (reverse).

- 4** To set softness state, press the 'soft' button to toggle between SOFT ON, to turn softness ON, or SOFT OFF to turn it OFF.

*If OFF is selected the wipe setup is complete. Press **<HOME>** to display the home screen.*

- 5** To modify the edge softness, turn either of the shaft encoders below the display. Turning it clockwise increases the softness, while anti-clockwise decreases it.

*Softness of 0% has the same effect as turning the softness state to OFF. Press **<HOME>** to display the home screen.*

14 Setting up the DSKs

The individual setup of the DSKs may be modified using the DSK page(s) on the LCD touchscreen. To access this from the home page, press the **<DSK>** button. The screen displays the current settings for each DSK.

The screenshot shows a touchscreen interface for setting up two DSKs. The top half is for DSK 1, and the bottom half is for DSK 2. Each section has buttons for 'Fast 12' and 'Self' (for DSK 1) or 'Ext' (for DSK 2), and two percentage bars for 'Clip' and 'Gain'. At the bottom, there are buttons for 'DSK 1 Lin'r', 'DSK 2 Lin'r', and 'Home'.

DSK	Mode	Clip (%)	Gain (%)
DSK 1	Self	75%	15.0%
DSK 2	Ext	100%	30.0%

Buttons at the bottom: DSK 1 Lin'r, DSK 2 Lin'r, Home

Percentage bars and buttons for setting DSK1 are shown in the top half of the screen, while those for DSK2 are shown below. The options are as follows (one set for each DSK):

- **<SELF/EXT>** - Sets the keyers operational mode between self or external keying.
- **<SLOW>**, **<MED>** or **<FAST>** - Used to set the fade rate for manual DSKs in numbers of frames.
- **Clip** - the bar displays the current clip value as a percentage. This can be changed using the left hand shaft encoder.
- **Gain** - the bar displays the current gain value as a percentage. This can be changed using the right hand shaft encoder.
- **<DSK X Lin'r>** - Forces the DSK Clip and Gain settings to the correct values for Linear keying.

DSK keying mode

The **<SELF/EXT>** push buttons toggle between self or external keying.

Note: 'EXT' gives better quality therefore it is best to use this whenever possible. The keyer must however be fed with an external key signal

DSK rate

The DSK rate selection is set by pressing the 'soft' button to toggle round the three fade rates, **<SLOW>**, **<MED>** or **<FAST>**. The value displayed on the key is the transition rate, in frames. This is set from the transition rates screen (refer to the technical manual).

Clip rate

The left hand shaft encoder is used to set the DSK clip value. Percentage bars for each keyer gives a visual indication of the currently selected clip value.

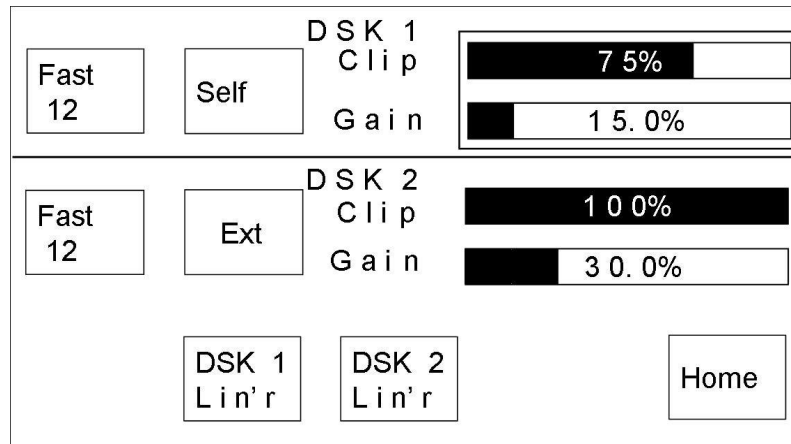
Gain rate

The right hand shaft encoder is used to set the DSK gain value. Percentage bars for each keyer give a visual indication of the currently selected gain value.

DSK setup

- 1 From the plasma display home screen, press the **<DSK>** button (see chapter 12).

The DSK screen is displayed.



- 2 Select the DSK to be setup by touching the top half of the screen for DSK 1, or the bottom half for DSK 2.

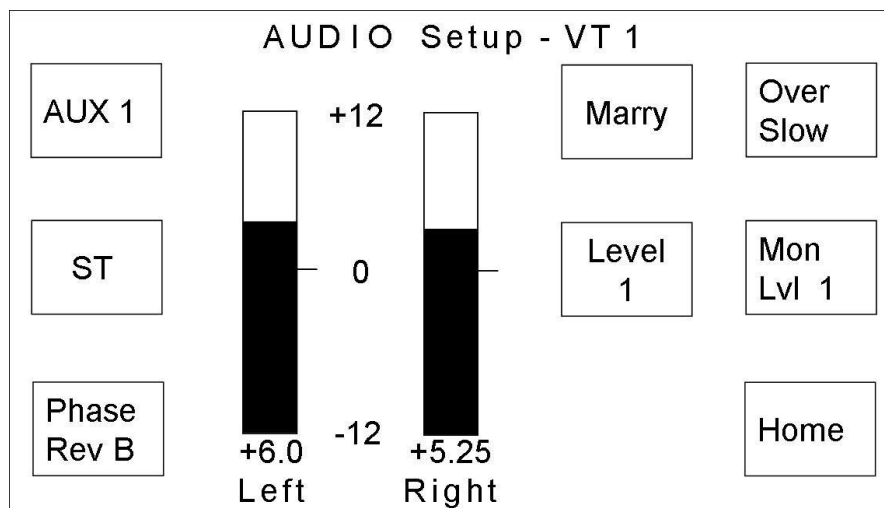
The Clip and Gain percentage bars are bound by a rectangle indicating the active keyer.

- 3 Check that EXT is highlighted in the label for the **<SELF/EXT>** button. If no external key for the DSK is available, press **<SELF/EXT>** to highlight SELF.
- 4 While viewing the DSK preview monitor, adjust the Clip and Gain values for the DSK until you obtain the desired effect. Alternately press the **<DSK X Lin'r>** button to default to linear key settings.
- 5 If the DSK is to be controlled manually, press the rate 'soft' button to toggle between the **<SLOW>**, **<MED>**, or **<FAST>** fade rates.

If the <FOLLOW> function has been selected on the panel (see chapter 4), the TX 410 ignores the DSK fade rate and uses the main transition rate.

15 Adjusting audio levels

The audio (gain) setup screen is used to specify the audio parameters for each source available to the PGM, PST, and AUX busses. The gain can be set for each source; either as a married signal – where both channels are set to the same gain value, or split – providing individual gain adjustment for each channel. For single level audio setups, mono or stereo source selection can be specified, with phase reversal on channel B. In systems where the TX 410 is set up for multi-level audio operation, similar adjustments can be made for each level.



The audio (gain) setup screen is accessed from the home screen (see chapter 12) by pressing the **<AUDIO SETUP>** button on the right. It displays the following:

- Bus selection button.
- The name of the source currently selected on the active bus.
- Audio gain display showing the audio gain setting for the currently selected source.

To return to the home screen, press **<HOME>**. The Level select button, shown as **<Level 1>** above, changes the display between levels within a multi-level system.

15.1 Buttons and controls

Buttons on the audio setup screen associated with source audio parameters provide 'toggle' operation to select the required settings and include:

<AUX/PGM/PST> - used to select the bus to be adjusted.

<MARRY/SPLIT> - used to select either married or individual control of the gain for each channel.

<0> - Sets the audio gain for the currently selected source to unity. This button is only active if the source selected is not at unity gain.

<ST/MONO/A/B/PHASE REV B> - used to select either stereo, mono, channel A to both, channel B to both, or phase reversal on channel B. **<A>** and **** are only available for single level audio systems as multi level systems use audio routing. (see chapter 16).

Note: If a phase reversal has been performed on a source, the red indicator will light at the end of bus that the source is selected on.

Shaft encoders – These are used to adjust the gain for the selected source. The effect of turning these controls can be seen on the screen.

15.2 Setting up the source audio gain

When using the audio (gain) setup screen, select a bus by pressing one of the bus select buttons to the left of the screen. To select a source on that bus, press the source button in that bus row on the lower console.

- 1 From the home screen, press the **<AUDIO SETUP>** button.

The audio setup screen is displayed, with AUX selected by default. The name of the current AUX source is shown at the top of the page.

- 2 To set audio gain for a source on a different bus, press the **<AUX>** button to toggle between AUX, PST and PGM. until the correct bus is indicated.

The current source for each bus, when selected, is shown at the top of the page.

- 3** To set the audio for a source other than the one shown, press the appropriate source selection button in the selected row.

Caution: *It is not recommended that sources are changed on the PGM bus as this will affect the main system output.*

- 4** To select the type of control for adjusting audio gain, press the **<MARRY>** button until the type wanted is highlighted.

*The button toggles between **<MARRY>** and **<SPLIT>**. When set to **<MARRY>** use either shaft encoder to adjust the gain. When set to **<SPLIT>**, the left and right shaft encoders set the gain for the left and right channels respectively.*

- 5** To adjust the gain for the selected source, turn the third shaft encoder(s) to increase/ decrease gain, or press the **<UNITY GAIN>** button to set the source to unity gain.

Caution: *If the source you are adjusting is also selected on the PGM bus, the level will be altered on-air.*

- 6** To change the stereo/mono selection for the source, press the **<ST>** (stereo), button until the type wanted is highlighted. The button toggles between **<ST>**, **<MONO>** (mono), **<A>** and ****.

<ST>** routes the left and right channels as a stereo pair to the bus output, **<MONO>** derives a mono output of the left and right channels and routes it to the bus output, **<A>** routes audio channel A (left) to both outputs, * routes audio channel B (right) to both outputs.*

- 7** If either **<ST>** (stereo) or **<MONO>** (mono) have been selected, **<PHASE REV B >** can also be added to reverse the phase of audio channel B.

Once all channels have been set, press **<HOME>** to display the home screen.

15.3 Temporarily restoring unity gain

If the gain of a source has previously been set and is not unity, then the level setting is stored and recalled when the source is selected again on any of the busses. If a selected source is not at unity gain then the small, unmarked, button at the right-hand end of the row the source is selected on will be illuminated.

- 1 Press the small button at the right hand end of the bus row on which the source is selected.

The button light goes out and the source is at unity gain.



NOTE: Once a source has been temporarily restored to unity gain, it remains at unity until the source is reselected. After being reselected it will be restored to the saved gain value. Any changes made on the audio (gain) setup screen will not affect the source once it has been temporarily set to unity until it is reselected.

Performing this action on a source via the preset row will carry the temporary unity selection to the PGM bus after a PST/PGM transition.

16 Multi-level audio routing

If the TX 410 system has been set up for multi-level audio, the **<AUDIO RTG>** button appears on the home screen. This button provides access to screens which allow viewing and editing of the audio (level) routing for each source on the panel.

16.1 Viewing the current audio routing

The view audio routing screen is accessed from the home screen (see chapter 12) by pressing the **<AUDIO RTG>** button. It displays the following:

- Bus selection 'soft' buttons.
- A diagram of the current routing for the selected bus/source, showing inputs (tracks) on the left, routed to outputs (channels) on the right. Each channel can receive only one input at a time, however a single input can be routed to multiple channels.
- The name of the input currently selected on the bus (shown above the routing diagram).

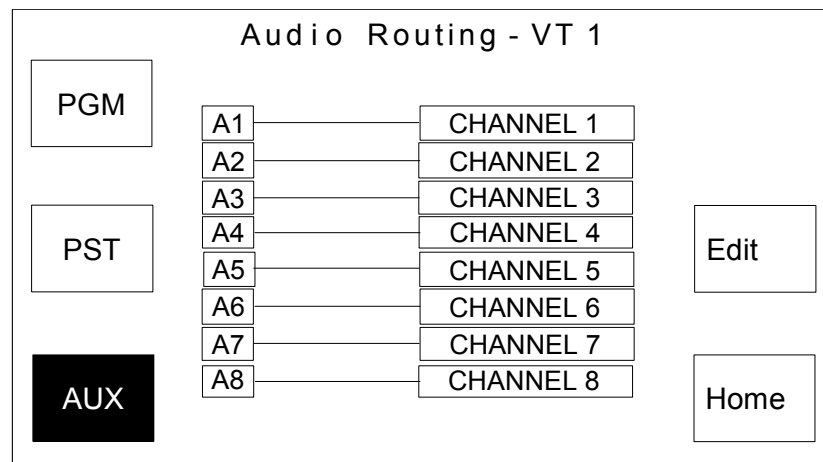
Buttons on the view audio routing screen include:

<PGM>, **<PST>**, **<AUX1>** - used to select the bus.

<EDIT> - used to display the edit audio routing screen (see chapter 16).

- 1 From the home screen, press the **<AUDIO RTG>** button.

The view audio routing screen is displayed, with the AUX bus selected. The name of the currently selected source is shown above the routing diagram.



- 2 To view audio routing for a source on a different bus, press either **<PST>** or **<PGM>**, as required.

The source name for the bus is shown in the box.

- 3 To view the audio routing for a source other than the one shown, press the appropriate source button in the selected row.

The source name above the routing diagram will reflect the new selection.

Caution: Selecting sources on the PGM bus will affect the programme output.

- 4 To modify the audio routing for the selected source, press **<EDIT>** to move to the edit audio routing screen (see section 15.2).

If the audio routing does not need to be modified, press **<HOME>** to display the home screen.

16.2 Editing the audio routing

The edit audio routing screen is accessed from the view audio routing screen (see section 16.1) by pressing the **<EDIT>** button. It displays the following:

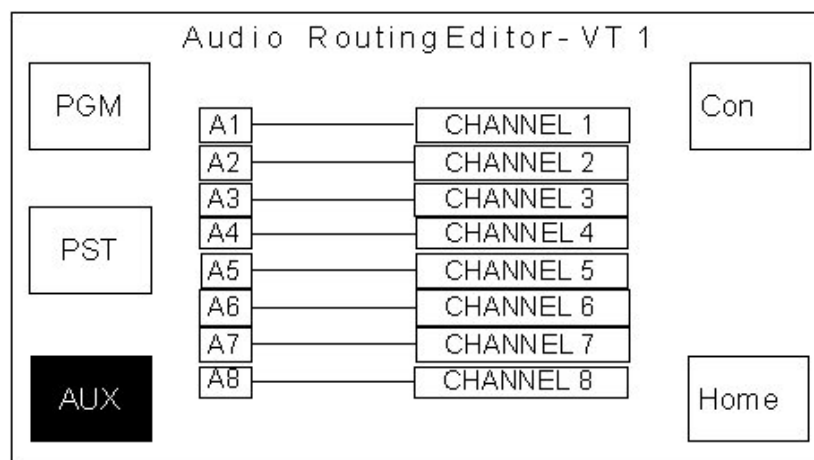
- Bus selection buttons.
- A diagram of the current routing for the selected bus and source. Inputs (tracks), listed on the left, are routed to outputs (channels), shown on the right. Each channel can receive only one input at a time, although a given input can be routed to several channels.
- The name of the source currently selected on the bus is shown above the routing diagram.

Buttons on the edit audio routing screen include:

<PGM>, **<PST>**, **<AUX>** - used to select the bus.

<CON> - used to connect a new source/channel combination, replacing the previous routing. The diagram then shows the new connection.

<UNDO> - used to reverse the last connection, returning the routing to the previous one updating the display accordingly.



- 1 From the view audio routing screen, press the **<EDIT>** button (see section 16.1).

The edit audio routing screen is displayed with the AUX1 bus selected. The name of the currently selected source is shown in a box beneath the routing diagram.

- 2 To view and change the audio routing for a different bus, press either **<PST>** or **<PGM>**, as required.

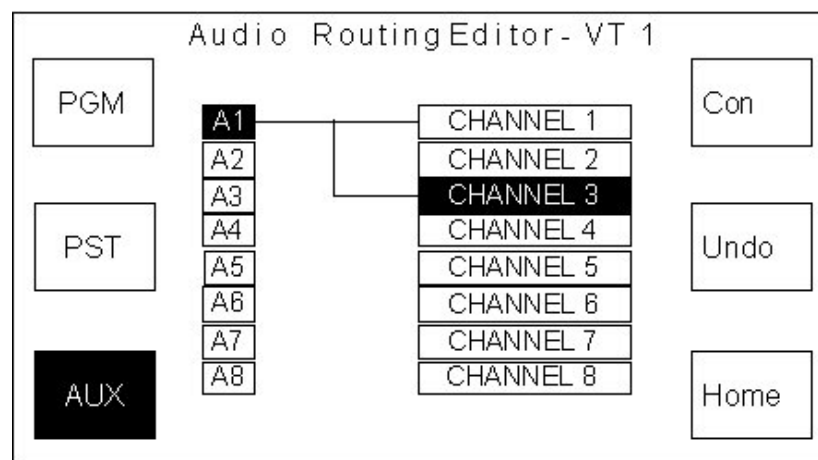
The source name for the bus shows in the box.

- 3 To view and edit the audio routing for a source other than the one shown, press the appropriate source selection button in the row on the lower console.

Caution: Selecting sources on the PGM bus will affect the programme output.

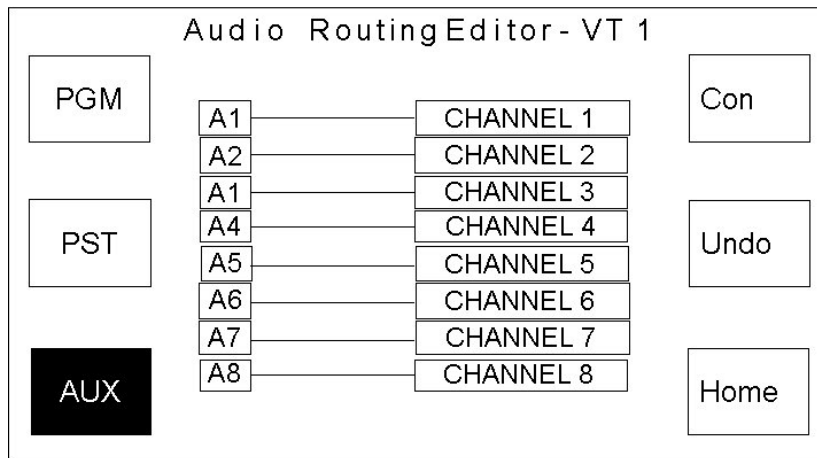
- 4 To change the selected inputs and channels, use the left and right shaft encoders respectively.

The highlighted inputs and channels show the selected input/channel combination.



- 5** Pressing the **<CON>** button connects the selected input/channel combination.

The diagram updates to show the new connection. The example shows A1 is now routed to CHANNEL 1 and CHANNEL 3.

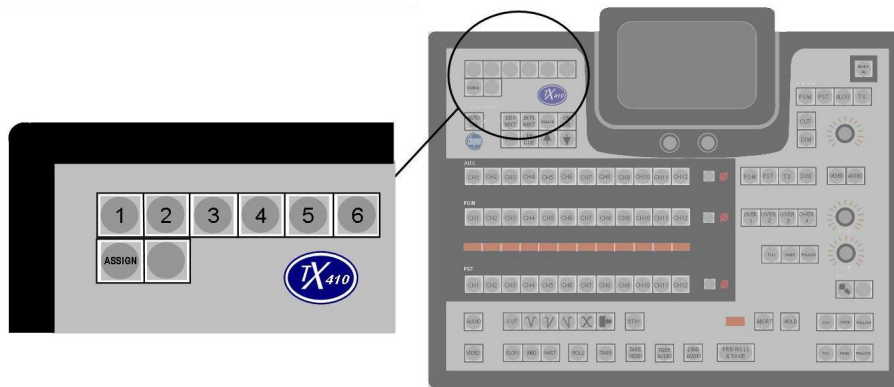


- 6** To reverse the last connection made in this editing session, press **<UNDO>** immediately after pressing **<CON>**.

***<UNDO>** will only work if the last button pressed was the **<CON>** button. Press **<HOME>** once to display the view audio routing screen. Press **<HOME>** again to return to the home screen.*

17 Using multi-channel control

The TX 410 has the ability to control up to six channels from a single panel if required. This is achieved by using the row of buttons in the top left of the panel.



The **<ASSIGN>** button is used to enable/disable channel selection buttons 1 to 6 and is lit when active.

Channel push buttons are only active when the **<ASSIGN>** button is active. Pressing any channel button will assign the panel to control the corresponding channel; if it is not already being controlled then the channel button will light. If however the panel is already controlling the selected channel, then it will stop controlling it and the channel button will be extinguished.

Pressing a channel button while the **<ASSIGN>** button is has no effect on channel assignment.

Note: Once selected, the channel button will remain lit if communications with the mainframe is valid; otherwise it will flash indicating that communications have been lost. If only one channel is being controlled, the panel will go into reset mode until communications are restored or the channel deselected.

CAUTION: *If the flashing channel button is pressed, the light will be extinguished even if communications with the controller have not been restored. It will not be possible to select this channel again until communications have been restored.*

17.1 Selecting multiple channels

- 1** Press **<ASSIGN>** to activate the selection controls.

*The **<ASSIGN>** button lights. Channel buttons **<1>** to **<6>** are now active.*

- 2** Press required channel button **<1>** to **<6>**.

*Pressing an unlit channel button, **<1>** to **<6>** causes the button to light and connects the panel to the corresponding TX Series system (chassis).*

*Pressing an illuminated channel button, **<1>** to **<6>** causes the button to be extinguished and disconnects the panel to the corresponding TX Series system (chassis).*

- 3** Repeat step 2 until the channel buttons lit correspond to those to be controlled.

- 4** Press **<ASSIGN>** to de-activate the selection controls.

*Pressing the **<ASSIGN>** button after chassis selection extinguishes the button and prevents further selection or deselection of buttons **<1>** to **<6>**.*

Note: It is possible to have the panel connected to all sets of electronics (i.e. All buttons **<1>** to **<6>** are lit).

The LCD touchscreen, source assign displays and all lamp tallies reflect the settings for the leftmost selected system (i.e. the lowest number channel button lit).

17.2 Controlling multiple channels

Linked operation of any number of systems from 2 to 6 is possible from the panel.

After selecting multiple chassis (see section 17.1), it is possible to select crosspoints on the PST, PGM and AUX busses, audio-overs, turn keyers on and off, operate the DVE and fade to black. These are all functions available in normal operation and are detailed in the previous chapters.

Selecting the wipe pattern and DVE sequence via the touchscreen is only operational on the first 'active' chassis connected to the panel (i.e. the lowest number channel button lit).

To select wipe patterns or DVE sequences for other channels, it is necessary to do this on each system before linking the channels together.

It is possible to set all panels with different sources on PST bus, different follows for DSKs and audio-overs, link them together and then use **<TAKE>** or **<PRE-ROLL & TAKE>** to activate all transitions simultaneously.