



Snell  
Advanced  
Media

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# Operator's Manual

## **KudosPro MC1000**

Single-channel Motion Compensated Standards Converter

## **KudosPro MC1000-IQ**

Single-channel Motion Compensated Standards Converter with  
Two IQ Module Slots

## **KudosPro MC2000**

Dual-channel Motion Compensated Standards Converter

## **KudosPro MC2000-IQ**

Dual-channel Motion Compensated Standards Converter with  
Two IQ Module Slots

## Information and Notices

### About this Manual

This manual contains information for the installation and operation of the KudosPro MC1000/MC1000-IQ/MC2000/MC2000-IQ unit.

For information on the operation of any IQ modules fitted to the -IQ variants please see the relevant IQ module user manual(s).

### Software Version

Software version: 2.2.A.10

### QT Library

KudosPro products use modified Qt Library under GNU LGPL:

<http://doc.qt.io/qt-4.8/index.html>

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Customers with a support contract should call their personalized number, which can be found in their contract, and be ready to provide their contract number and details.

# Safety Information

## Explanation of Safety Symbols

### Explanation of Safety Symbols

(GB)

-  This symbol refers the user to important information contained in the accompanying literature. Refer to manual.
-  This symbol indicates that hazardous voltages are present inside. No user serviceable parts inside. This unit should only be serviced by trained personnel.

### Safety Warnings



"CAUTION: These servicing instructions are for use by qualified personnel only.

To reduce risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified personnel."

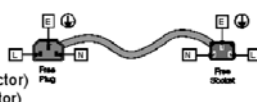
- To reduce the risk of electric shock, do not expose this appliance to rain or moisture.
- Always ensure that the unit is properly earthed and power connections correctly made.
- This equipment must be supplied from a power system providing a **PROTECTIVE EARTH** (⊕) connection and having a neutral connection which can be reliably identified.
- The power outlet supplying power to the unit should be close to the unit and easily accessible


### Power connection in countries other than the USA

The equipment is normally shipped with a power cable with a standard IEC moulded free socket on one end and a standard IEC moulded plug on the other. If you are required to remove the moulded mains supply plug, dispose of the plug immediately in a safe manner.

The colour code for the lead is as follows:



GREEN/YELLOW lead connected to E (Protective Earth Conductor)  
BLUE lead connected to N (Neutral Conductor)  
BROWN lead connected to L (Live Conductor)



-  Caution If the unit has two mains supply inputs ensure that both power cords are plugged into mains outlets operating from the same phase.

### Erklärung der Sicherheitssymbole


(D)

-  Dieses Symbol weist den Benutzer auf wichtige Informationen hin, die in der begleitenden Dokumentation enthalten sind.
-  Dieses Symbol zeigt an, dass gefährliche Spannung vorhanden ist. Es befinden sich keine vom Benutzer zu wartenden Teile im Geräteinneren. Dieses Gerät sollte nur von geschultem Personal gewartet werden

### Sicherheits-Warnhinweise




Die angeführten Service-/Reparatur-Anweisungen sind ausschließlich von qualifiziertem Service-Personal auszuführen. Um das Risiko eines Elektroschocks zu reduzieren, führen Sie ausschließlich die im Benutzerhandbuch beschriebenen Anweisungen aus, es sei denn, Sie haben die entsprechende Qualifikation. Wenden Sie sich in allen Service-Fragen an qualifiziertes Personal.

- Um das Risiko eines Elektroschocks zu reduzieren, setzen Sie das Gerät weder Regen noch Feuchtigkeit aus.
- Stellen Sie immer sicher, dass das Gerät ordnungsgemäß geerdet und verkabelt ist.
- Dieses Equipment muss an eine Netzsteckdose mit  Schutzleiter angeschlossen werden und einen zuverlässig identifizierten Nullleiter haben.
- Die Netzsteckdose sollte nahe beim Gerät und einfach zugänglich sein.

### Netzanschluss in anderen Ländern als der USA



Das Equipment wird im Normalfall mit einem Netzkabel mit Standard IEC Anschlussbuchse und einem Standard IEC Anschlussstecker geliefert. Sollten Sie den angeschweißten Stecker auswechseln müssen, entsorgen Sie diesen bitte umgehend. Die farbliche Belegung des Netzkabels ist wie folgt:



-  Achtung: Wenn das Gerät zwei Anschlussbuchsen hat, stellen Sie bitte sicher, dass beide Netzkabel mit der selben Phase in die Netzsteckdose gesteckt werden.

### Légende :

(F)

-  Ce symbole indique qu'il faut prêter attention et se référer au manuel.
-  Ce symbole indique qu'il peut y avoir des tensions électriques à l'intérieur de l'appareil. Ne pas intervenir sans l'agrément du service qualifié.

### Précaution d'emploi :



"ATTENTION: Les procédures de maintenance ne concernent que le service agréé. Afin de réduire le risque de choc électrique, il est recommandé de se limiter aux procédures d'utilisation, à moins d'en être qualifié. Pour toute maintenance, contacter le service compétent."

- Pour réduire le risque de choc électrique, ne pas exposer l'appareil dans un milieu humide.
- Toujours s'assurer que l'unité est correctement alimentée, en particuliers à la liaison à la terre.
- La source électrique de cet équipement doit posséder une connexion à la terre (⊕), ainsi qu'une liaison « neutre » identifiable.
- La prise électrique qui alimente l'appareil doit être proche de celle-ci et accessible.


### Câble secteur de pays autres que les Etats-Unis

L'équipement est livré avec un câble secteur au standard IEC, mûle/mâle.

Si vous souhaitez changer la prise mâle de votre cordon, voici les codes couleurs des fils :



Le fil VERT/JAUNE est connecté à T (Terre)  
Le fil BLEU est connecté à N (Neutre)  
Le fil MARRON est connecté à P (Phase)



-  Attention si l'appareil a 2 alimentations, s'assurer que les cordons soient branchés sur la même phase.

### Explicación de los Símbolos de Seguridad

(ESP)

-  Este símbolo refiere al usuario información importante contenida en la literatura incluida. Referirse al manual.
-  Este símbolo indica que voltajes peligrosos están presentes en el interior. No hay elementos accesibles al usuario dentro. Esta unidad sólo debería ser tratada por personal cualificado.

### Advertencias de Seguridad

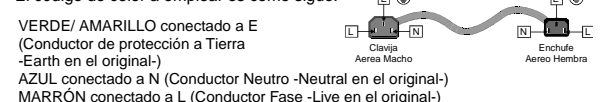



Las instrucciones de servicio cuando sean dadas, son sólo para uso de personal cualificado. Para reducir el riesgo de choque eléctrico no llevar a cabo ninguna operación de servicio aparte de las contenidas en las instrucciones de operación, a menos que se esté cualificado para realizarlas. Referir todo el trabajo de servicio a personal cualificado.

- Para reducir el riesgo de choque eléctrico, no exponer este equipo a la lluvia o humedad.
- Siempre asegurarse de que la unidad está propiamente conectada a tierra y que las conexiones de alimentación están hechas correctamente.
- Este equipo debe ser alimentado desde un sistema de alimentación con conexión a TIERRA (⊕) y teniendo una conexión neutra fácilmente identificable.
- La toma de alimentación para la unidad debe ser cercana y fácilmente accesible.

### Conexión de alimentación en otros países que no sean USA

El equipo es normalmente entregado con un cable de alimentación con un enchufe hembra estándar IEC en un extremo y con una clavija estándar IEC en el otro. Si se requiere eliminar la clavija para sustituirla por otra, disponer dicha clavija de una forma segura. El código de color a emplear es como sigue:



-  Advertencia Si la unidad tuviera dos tomas de alimentación, asegurarse de que ambos cables de alimentación están conectados a la misma fase.

## Simboli di sicurezza:



- Questo simbolo indica l'informazione importante contenuta nei manuali appartenenti all'apparecchiatura. Consultare il manuale.
- Questo simbolo indica che all'interno dell'apparato sono presenti tensioni pericolose. Non cercare di smontare l'unità. Per qualsiasi tipo di intervento rivolgersi al personale qualificato.

## Attenzione:



Le istruzioni relative alla manutenzione sono ad uso esclusivo del personale qualificato. E' proibito all'utente eseguire qualsiasi operazione non esplicitamente consentita nelle istruzioni. Per qualsiasi informazione rivolgersi al personale qualificato.

- Per prevenire il pericolo di scosse elettriche è necessario non esporre mai l'apparecchiatura alla pioggia o a qualsiasi tipo di umidità.
- Assicurarsi sempre, che l'unità sia propriamente messa a terra e che le connessioni elettriche siano eseguite correttamente.
- Questo dispositivo deve essere collegato ad un impianto elettrico dotato di un sistema di messa a terra efficace.
- La presa di corrente deve essere vicina all'apparecchio e facilmente accessibile.

## Connessione elettrica nei paesi diversi dagli Stati Uniti

L'apparecchiatura normalmente è spedita con cavo pressofuso con la presa e spina standard IEC. Nel caso della rimozione della spina elettrica, gettarla via immediatamente osservando tutte le precauzioni del caso. La leggenda dei cavi è la seguente:

VERDE/GIALLO cavo connesso ad "E" (terra)  
BLU cavo connesso ad "N" (neutro)  
MARRONE cavo connesso ad "L" (fase)



- Attenzione! Nel caso in cui l'apparecchio abbia due prese di corrente, assicurarsi che i cavi non siano collegati a fasi diverse della rete elettrica.

## Förklaring av Säkerhetssymboler



- Denna symbol hänvisar användaren till viktig information som återfinns i litteraturen som medföljer. Se manualen.
- Denna symbol indikerar att livsfarlig spänning finns på insidan. Det finns inga servicevänliga delar inne i apparaten. Denna apparat får endast repareras av utbildad personal.

## Säkerhetsvarningar



Serviceinstruktioner som anges avser endast kvalificerad och utbildad servicepersonal. För att minska risken för elektrisk stöt, utför ingen annan service än den som återfinns i medföljande driftinstruktionerna, om du ej är behörig. Överlåt all service till kvalificerad personal.

- För att reducera risken för elektrisk stöt, utsätt inte apparaten för regn eller fukt.
- Se alltid till att apparaten är ordentligt jordad samt att strömtillförseln är korrekt utförd.
- Denna apparat måste bli försörd från ett strömsystem som är försedd med jordadanslutning (⏚) samt ha en neutral anslutning som lätt identifierbar.
- Vägguttaget som strömförsörjer apparaten bör finnas i närheten samt vara lättillgänglig.

## Strömkontakter i länder utanför USA

Apparaten utrustas normalt med en strömkabel med standard IEC gjuten honkontakt på ena änden samt en standard IEC gjuten hankontakt på den andra änden. Om man måste avlägsna den gjutna hankontakten, avyttra denna kontakt omedelbart på ett säkert sätt. Färgkoden för ledningen är följande:

GRÖN/GUL ledning ansluten till E (Skyddsjordad ledare)

BLÅ ledning ansluten till N (Neutral ledare)  
BRUN ledning ansluten till L (Fas ledare)



- Varning! Om enheten har två huvudsakliga elförsörjningar, säkerställ att båda strömkablarna som är inkopplade i enheten arbetar från samma fas.

## Forklaring på sikkerhedssymboler



- Dette symbol gør brugeren opmærksom på vigtig information i den medfølgende manual.
- Dette symbol indikerer farlig spænding inden i apparatet. Ingen bruger servicebare dele i apparatet på brugerniveau. Dette apparat må kun serviceres af faglærte personer..

## Sikkerhedsadvarsler



Serviceinstruktioner er kun til brug for faglærte servicefolk. For at reducere risikoen for elektrisk stød må bruger kun udføre anvisninger i betjeningsmanualen. Al service skal udføres af faglærte personer.

- For at reducere risikoen for elektrisk stød må apparatet ikke udsættes for regn eller fugt.
- Sørg altid for at apparatet er korrekt tilsluttet og jordnet.
- Dette apparat skal forbindes til en nettilslutning, der yder BESKYTTELSE JORD (⏚) og 0 forbindelse skal være tydeligt markeret.
- Stikkontakten, som forsyner apparatet, skal være tæt på apparatet og let tilgængelig.

## Nettilslutning i andre lande end USA

Udstyret leveres normalt med et strømkabel med et standard IEC støbt løst hunstik i den ene ende og et standard IEC støbt hanstik i den anden ende. Hvis et af de støbte stik på strømkablet er defekt, skal det straks kasseres på forsvarlig vis. Farvekoden for lederen er som følger:

GRØN/GUL leder forbundet til J (Jord)  
BLÅ leder forbundet til 0  
BRUN leder forbundet til F (Fase)



- Forsigtig! Hvis enheden har to lysnetindgange, skal der sørges for at begge ledninger tilsluttes lysnetudgange fra den samme fase.

## Turvamerkkien selitys



- Tämä merkki tarkoittaa, että laitteen mukana toimitettu kirjallinen materiaali sisältää tärkeitä tietoja. Lue käyttöohje.
- Tämä merkki ilmoittaa, että laitteen sisällä on vaarallisen voimakas jännite. Sisäpuolella ei ole mitään osia, joita käyttäjä voisi itse huoltaa. Huollon saa suorittaa vain alan ammattilainen.

## Turvaohjeita



Huolto-ohjeet on tarkoitettu ainoastaan alan ammattilaisille. Älä suorita laitteelle muita toimenpiteitä, kuin mitä käyttöohjeissa on neuvottu, ellei ole asiantuntija. Voit saada sähköiskun. Jätä kaikki huoltotoimet ammattilaiselle.

- Sähköiskujen välttämiseksi suojaa laite sateelta ja kosteudelta.
- Varmistu, että laite on asianmukaisesti maadoitettu ja että sähkökytkennät on tehty oikein.
- Laitteelle tehoa syöttävässä järjestelmässä tulee olla SUOJAMAALIITÄNTÄ (⏚) ja nollaliitännän on oltava luotettavasti tunnistettavissa.
- Sähköpistorasian tulee olla laitteen lähellä ja helposti tavoitettavissa.

## Sähkökytkentä

Laitteen vakiovarusteena on sähköjohto, jonka toisessa päässä on muotittin valettu, IEC-standardin mukainen liitäntärasia ja toisessa päässä muotittin valettu, IEC-standardin mukainen pistoliitin. Jos pistoliitin tarvitsee poistaa, se tulee hävittää heti turvallisella tavalla. Johtimet kytketään seuraavasti:

KELTA-VIHREÄ suojamaajohtoin E-napaan  
SININEN nollajohtoin N-napaan  
RUSKEA vaihejohtoin L-napaan



- Huom! Jos laitteessa on kaksi verkkojännitteen tuloliitäntää, niiden johdot on liitettävä verkkopistorasioihin, joissa on sama vaiheistus.

## Símbolos de Segurança



O símbolo triangular adverte para a necessidade de consultar o manual antes de utilizar o equipamento ou efectuar qualquer ajuste.

Este símbolo indica a presença de voltagens perigosas no interior do equipamento. As peças ou partes existentes no interior do equipamento não necessitam de intervenção, manutenção ou manuseamento por parte do utilizador. Reparações ou outras intervenções devem ser efectuadas apenas por técnicos devidamente habilitados.

## Avisos de Segurança



As instruções de manutenção fornecidas são para utilização de técnicos qualificados. Para reduzir o risco de choque eléctrico, não devem ser realizadas intervenções no equipamento não especificadas no manual de instalações a menos que seja efectuadas por técnicos habilitados.

- Para reduzir o risco de choque eléctrico, não expor este equipamento à chuva ou humidade.
- Assegurar que a unidade está sempre devidamente ligada à terra e que as ligações à alimentação estão correctas.
- O sistema de alimentação do equipamento deve, por razões de segurança, possuir ligação a terra de protecção (⏚) e ligação ao NEUTRO devidamente identificada.
- A tomada de energia à qual a unidade está ligada deve situar-se na sua proximidade e facilmente acessível.

### Ligação da alimentação noutros países que não os EUA

O equipamento é, normalmente, enviado com cabo de alimentação com ficha IEC fêmea standard num extremo e uma ficha IEC macho standard no extremo oposto. Se for necessário substituir ou alterar alguma destas fichas, deverá remove-la e eliminá-la imediatamente de maneira segura.

O código de cor para os condutores é o seguinte:

Condutor VERDE/AMARELO ligado a E (Terra)  
Condutor AZUL ligado a N (Neutro)  
Condutor CASTANHO ligado a L (Vivo).



Atenção: Se a unidade tem duas fontes de alimentação assegurar que os dois cabos de alimentação estão ligados a tomadas pertencentes à mesma fase.

## Επεξήγηση των Συμβόλων Ασφαλείας



Αυτό το σύμβολο παραπέμπει το χρήστη σε σημαντικές πληροφορίες που συμπεριλαμβάνονται στο συνοδευτικό εγχειρίδιο.



Αυτό το σύμβολο υποδεικνύει ότι στο εσωτερικό υφίστανται επικίνδυνες ηλεκτρικές τάσεις. Στο εσωτερικό δεν υπάρχουν επισκευάσιμα μέρη. Αυτή η μονάδα πρέπει να επισκευάζεται μόνο από ειδικά εκπαιδευμένο προσωπικό.

## Προειδοποίηση Ασφαλείας



Οδηγίες επισκευής, όπου παρέχονται, αναφέρονται αποκλειστικά και μόνο σε εξειδικευμένο προσωπικό. Για να μειωθεί ο κίνδυνος ηλεκτροπληξίας, μην εκτελείτε επισκευές παρά μόνο τις συμπεριλαμβανόμενες στο εγχειρίδιο των οδηγιών, εκτός και αν έχετε τα απαραίτητα προσόντα για να το κάνετε. Όλες οι επισκευές να εκτελούνται από ειδικά εκπαιδευμένο προσωπικό.

- Για να μειώσετε τον κίνδυνο ηλεκτροπληξίας μην εκθέτετε τη συσκευή σε βροχή ή υγρασία.
- Πάντα να εξασφαλίζετε τη σωστή γείωση της συσκευής και τη σωστή σύνδεση των συνδέσμων τροφοδοσίας.
- Ο εξοπλισμός πρέπει να τροφοδοτείται από ένα σύστημα τροφοδοσίας που να εξασφαλίζει ΠΡΟΣΤΑΤΕΥΤΙΚΗ ΓΕΙΩΣΗ (⏚) και να έχει καθορισμένες θέσεις ουδέτερου και φάσης.
- Ο εξοπλισμός που τροφοδοτεί τη συσκευή θα πρέπει να βρίσκεται κοντά στη συσκευή και να είναι εύκολα προσβάσιμος.

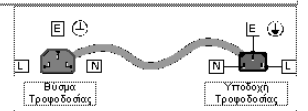
## Σύνδεση τροφοδοσίας σε χώρες εκτός των ΗΠΑ

Ο εξοπλισμός συνδέεται συνήθως από ένα καλώδιο τροφοδοσίας με ένα σταθερό βύσμα τροφοδοσίας βρέματος τύπου πυραμίδας στη μια άκρη του και μια σταθερή υποδοχή τροφοδοσίας βρέματος τύπου πυραμίδας στην άλλη άκρη του. Εάν χρειαστεί να αφαιρέσετε το σταθερό βύσμα τροφοδοσίας μην το επαναχρησιμοποιείτε, θεωρείται άχρηστο. Ο χρωματικός οδηγός για το καλώδιο τροφοδοσίας είναι ο παρακάτω:

ΠΡΑΣΙΝΟ/ΚΙΤΡΙΝΟ καλώδιο συνδέεται στο E (Προστατευτικός Αγωγός Γείωσης)

ΜΠΛΕ καλώδιο συνδέεται στο N (Ουδέτερο Αγωγό)

ΚΑΦΕ καλώδιο συνδέεται στο L (Αγωγό Φάσης)



ΠΡΟΣΟΧΗ! Αν η μονάδα έχει δύο τροφοδοτικά βεβαιωθείτε ότι και τα δύο καλώδια τροφοδοσίας είναι συνδεδεμένα σε εξόδους τροφοδοσίας που βρίσκονται στην ίδια φάση.

## Mains Power Supplies

This equipment has two 3-pin IEC power sockets, one for the main power supply unit and one for the redundant power supply unit.

The power supply is auto switching for input voltages in the ranges of 100 V to 240 V nominal. No voltage adjustment procedure is required.



- This equipment has more than one power supply. To reduce the risk of electric shock, plug each power supply into separate branch circuits employing separate service grounds.
- Before performing any servicing or maintenance, disconnect and isolate the unit from the mains input and from any product outputs.
- Do not operate this unit without an earth connection.

## Power Cord Supplied

The equipment is shipped with a power cord with a standard molded IEC female plug on one end and a standard mains plug on the other. If you are required to remove the molded mains supply plug, dispose of the plug immediately in a safe manner.

The color code for the cord is as follows:

- GREEN/YELLOW lead connected to E (Protective Earth Conductor)
- BROWN lead connected to L (Live Conductor)
- BLUE lead connected to N (Neutral Conductor)

## Laser Safety

This product operates with Class 1 laser products.



Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Ventilation

Although the unit is constructed to meet normal environmental requirements, ensure that there is a free flow of air at the front, rear, and sides of the unit to dissipate the heat produced during operation. Installations should be designed to allow for this.



Do not obstruct the ventilation holes on the right-side of the unit. Damage to the equipment may result.

## Safety Standards

This equipment conforms to the following standards:

### EN60950-1 2006

Safety of Information Technology Equipment  
Including Electrical Business Equipment.

### UL1419 (3rd Edition) - UL File E193966

Standard for Safety – Professional Video and Audio equipment.



## EMC Standards

This equipment conforms to the following standards:

### EN 55103-1: 1996 (Environment E4)

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1. Emission.

### EN 55103-2: 1996 (Environment E2)

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity.

### FCC/CFR 47:Part 15, Class A

Federal Communications Commission Rules Part 15, Subpart B, Class A.

## EMC Environment

The product(s) described in this manual conform to the EMC requirements for, and are intended for use in, the controlled EMC environment (for example, purpose-built broadcasting or recording studios), and the rural outdoor environment (far away from railways, transmitters, overhead power lines, etc.) E4.

## EMC Performance of Cables and Connectors

SAM products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

### Coaxial Cables

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 1694 or BBC type PSF1/2M.

### D-type Connectors

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having “dimples” which improve the contact between the plug and socket shells are recommended.

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# 1. Introduction

## 1.1 Description

The KudosPro MC1000/MC1000-IQ/MC2000/MC2000-IQ units are motion compensated standards converters for a range of applications including:

- International program distribution
- Content re purposing for Internet, TV, and Blu-ray distribution
- International TV and video production

These units are ideal for customers who wish to perform high-quality conversions from one frame rate to another, such as 50 Hz to 60 Hz.

### 1.1.1 MC1000-IQ/MC2000-IQ Only

KudosPro units with the IQ suffix can be fitted with up to two IQ modules and rear panels. When ordered with the KudosPro unit the IQ modules will be factory fitted before shipping. Any IQ modules fitted are controlled using RollCall and cannot be controlled from the front panel of the MC1000-IQ/MC2000-IQ unit.

For a full list of compatible IQ modules and rears see the *Recommended Modules for KudosPro-IQ Units Application Note* under the “Support” tab at:

<http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/>

## 1.2 Front Panel View

The front panel provides a user-friendly interface for complete control of the unit.



For information about front panel features, see page 27. For information about operating the front panel, see page 29.

## 1.3 Rear Panel View: MC1000 and MC2000

The rear panel accommodates a CVBS option with AES unbalanced audio and composite video connections.



## 1.4 Rear Panel View: MC1000-IQ and MC2000-IQ

The rear panel has space for up to two IQ module rear panels. CVBS and unbalanced AES inputs and outputs are not supported.



## 1.5 Features

- Motion compensated SD/HD/3G frame rate conversion.
- SD/HD/3G up, down, and cross conversion.
- Independent dual-channel conversion (MC2000/MC2000-IQ only).
- Optional Composite input and output (MC1000/MC2000 only).
- Flexible video and audio i/o configuration.
- 16-channel embedded audio processing for each video channel.
- Optional one channel (MC1000/MC1000-IQ) or two channels (MC2000/MC2000-IQ) of Dolby E decode/transcode.
- Dolby E guard-band alignment.
- Up to two IQ modules can be fitted within the unit (MC1000-IQ/MC2000-IQ only).
- Fiber input and output (option).
- HDMI monitor output.
- Dual PSU as standard.
- Relay bypass on primary SDI inputs.
- Automatic Aspect Ratio Conversion (AFD, VI, L23).
- Powerful picture enhancement tools.
- User-friendly front panel.
- RollCall and web interface remote control.
- Closed caption, teletext subtitle, and timecode handling.
- Insertion of SMPTE ST352 payload identification for psf standards

## 1.6 Block Diagrams

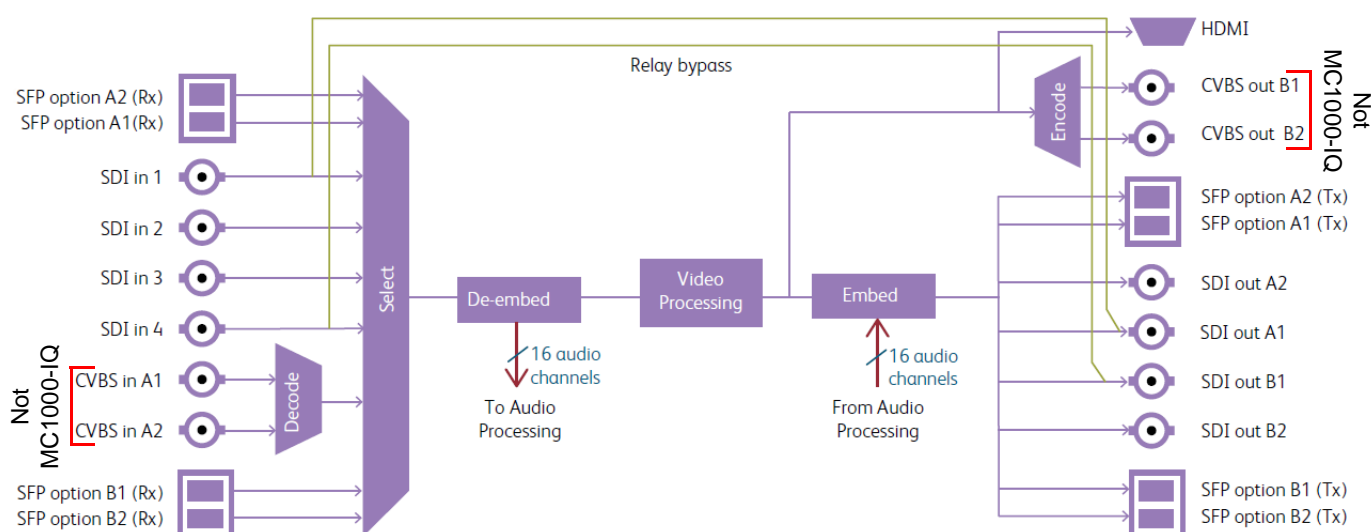
### 1.6.1 MC1000 & MC1000-IQ Video Processing

The MC1000 and MC1000-IQ offer one channel of frame rate or format conversion with a choice of four SDI inputs and four SDI outputs.

**MC1000 only:** The CVBS I/O is restricted by design, only CVBS A1 and A2 can be used as inputs to the MC1000, and only CVBS B1 and B2 can be used as outputs. Other connectors are present on the rear panel, such as CVBS C1 and C2, and CVBS D1 and D2, but these cannot be used.

**Note:**

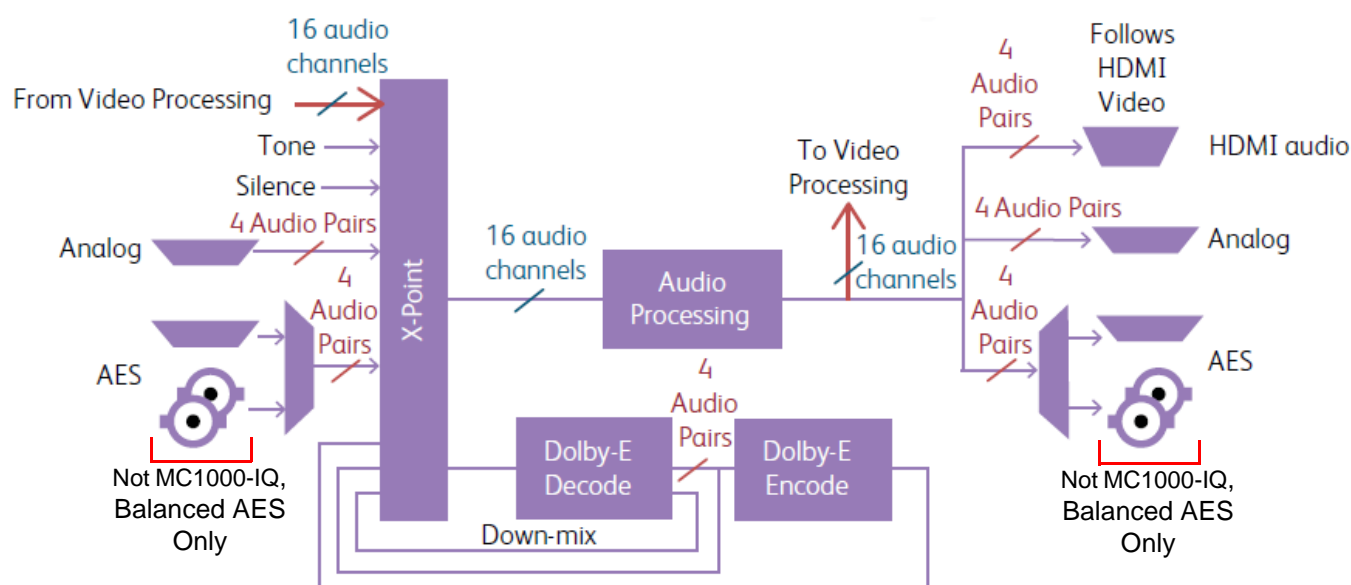
- The MC1000-IQ unit does not have CVBS inputs or outputs.
- If the optional SFP connectors are fitted as receivers, they will not be available as transmitters. Likewise, if fitted as transmitters, they will not be available as receivers.



### 1.6.2 MC1000 & MC1000-IQ Audio Processing

**Note:**

The MC1000-IQ unit does not have unbalanced AES inputs or outputs.



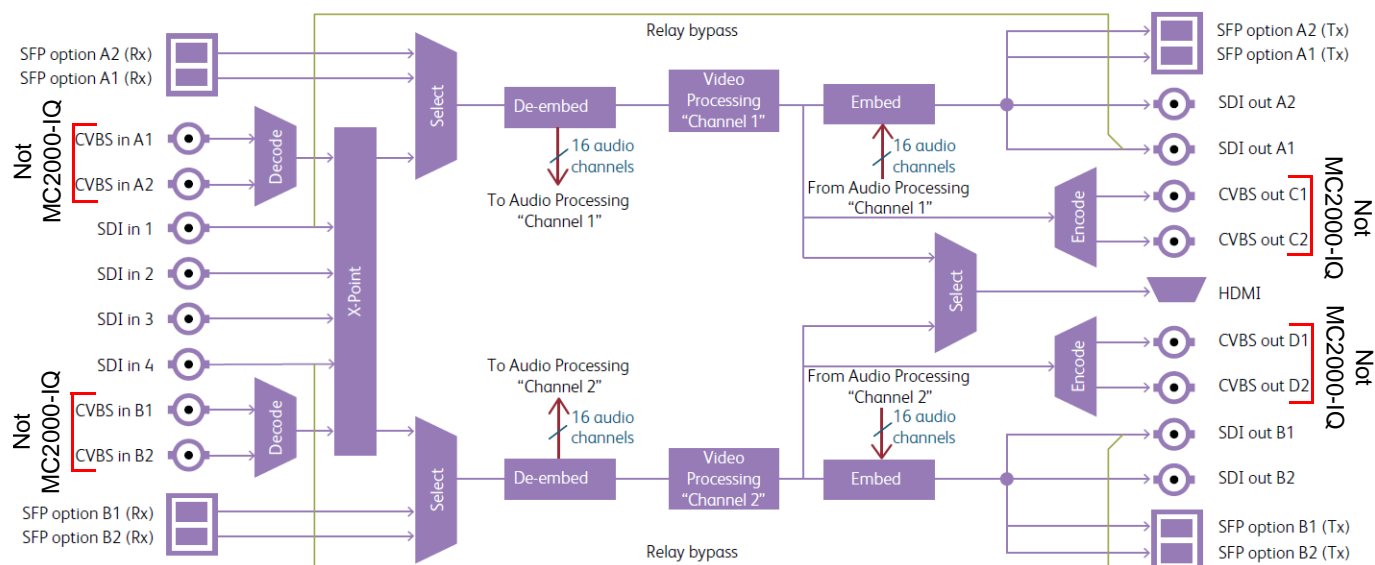
### 1.6.3 MC2000 & MC2000-IQ Video Processing

The MC2000 and MC2000-IQ offer two channels of frame rate or format conversion with a choice of four SDI inputs and four SDI outputs. SDI outputs A1 and A2 are used for video processing channel A, and SDI outputs B1 and B2 are used for video processing channel B.

**MC2000 only:** The CVBS I/O is restricted by design, only CVBS A1, A2, B1, and B2 can be used as inputs to the MC2000, and only CVBS C1, C2, D1, and D2 can be used as outputs.

**Note:**

- The MC2000-IQ unit does not have CVBS inputs or outputs.
- If the optional SFP connectors are fitted as receivers, they will not be available as transmitters. Likewise, if fitted as transmitters, they will not be available as receivers.

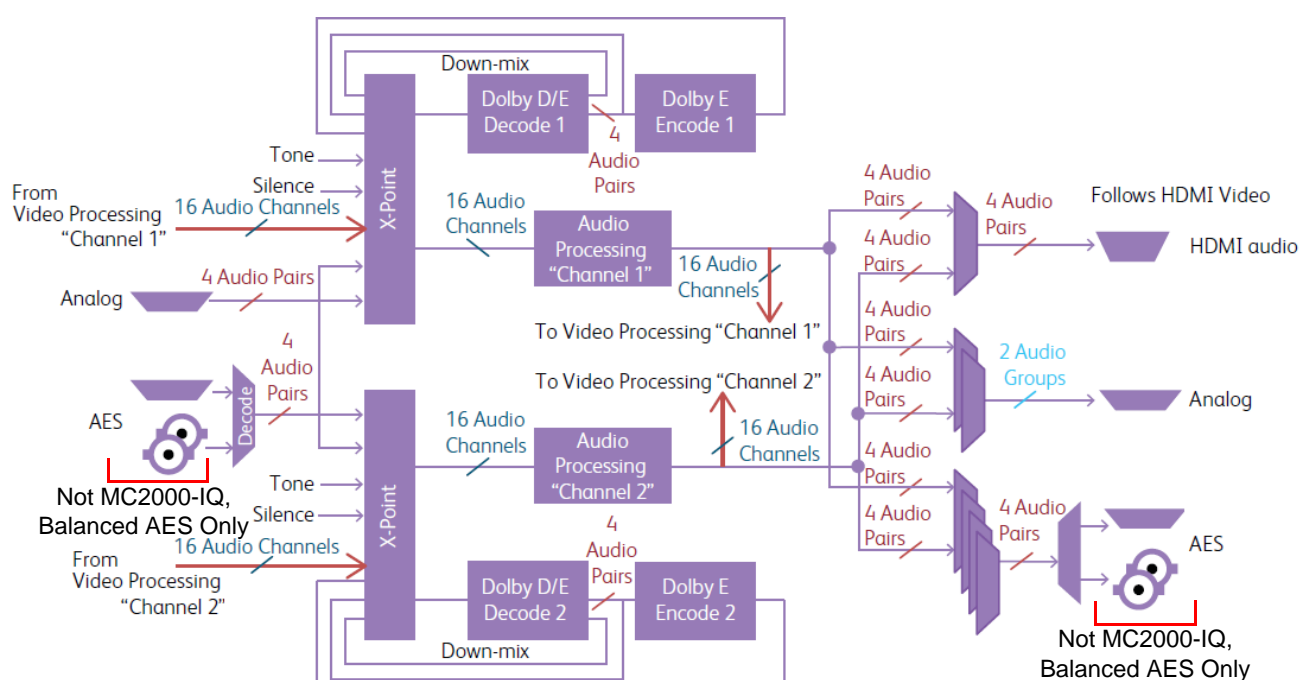


### 1.6.4 MC2000 & MC2000-IQ Audio Processing

Where two Dolby E options are fitted (MC2000/MC2000-IQ only), the first decode/transcode path (Decode 1/Encode 1 in the block diagram) is only available as embedded audio on SDI outputs A1 and A2, and can be routed to any AES or analog audio encoder. The second decode/transcode path (Decode 2/Encode 2 in the block diagram) is only available as embedded audio on SDI outputs B1 and B2, and can be routed to any AES or analog audio encoder.

It is not possible to cross-route the Dolby option outputs. For example, you cannot embed decoded Dolby D or E audio from the second decode/transcode path (Decode 2/Encode 2 in the block diagram) to embedded audio on SDI outputs A1 and A2.

**Note:** The MC2000-IQ unit does not have unbalanced AES inputs or outputs.



## 2. Technical Specification

Signal Inputs	
Serial digital	4 x 75 Ohm SD/HD/3Gb/s serial digital with embedded audio  <i>Input standards:</i>  3Gb/s HD-SDI, SMPTE425 level A, dual-link level B  1.5 Gbit/s HD-SDI SMPTE292M/SMPTE299M  270 Mbit/s SD-SDI SMPTE259M
Composite	Not MC1000-IQ/MC2000-IQ: PAL, NTSC, NTSC-J, PAL-M, PAL-N, N4.4, SECAM 12-bit ADCs
Analog component	YC
Reference	1 x loop-through HDTV Tri-sync/SD Bi-sync (black & burst) SMPTE 240M/274M, with auto selection dependant on output standard
Audio AES	4 x balanced AES inputs via 25-way D-type  Not MC1000-IQ/MC2000-IQ: 4 x unbalanced AES inputs via 4 x BNC
Audio Analog	4 x stereo analog inputs via 25-way D-type
Signal Outputs	
Serial digital	4 x 75 Ohm SD/HD/3Gb/s serial digital with embedded audio  <i>Output standards:</i>  3Gb/s HD-SDI, SMPTE425 level A, dual-link level B  1.5 Gbit/s HD-SDI SMPTE292M/SMPTE299M  270 Mbit/s SD-SDI SMPTE259M
Payload Identification Codes	Insertion of SMPTE ST-352 payload identification codes for psf standards
Composite	Not MC1000-IQ/MC2000-IQ: PAL, NTSC, NTSC-J, PAL-M, PAL-N 12-bit ADCs
Analog component	YC
Audio AES	4 x balanced AES outputs via 25-way D-type  Not MC1000-IQ/MC2000-IQ: 4 x unbalanced AES outputs via 4 x BNC
Audio analog	2 x stereo analog outputs via 25-way D-type

## Standards

Input standard (auto detect)	525 59i 625 50i 720 23/24/25/29/30/50/59/60p 1080 50/59/60i 1080 23/24/25/29/30p 1080 50/59/60p level A, Dual Link Level B 1080 23/24/25/29psf, with film detection and processing
------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Output standard	525 59i 625 50i 720 23/24/25/29/30/50/59/60p 1080 50/59/60i 1080 23/24/25/29/30p 1080 50/59/60p level A, Dual Link Level B 1080 23/24/25/29psf, with film detection and processing
-----------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## Conversion Functions

Modes	SD/HD/3Gb/s motion compensated standards conversion  Up, down, and cross conversion
Conversion	Linear/motion compensated
Conversion processing	Still process: Detects still images and applies an aperture with full (progressive) vertical frequency response  Enhanced still: Adds field motion detection to still process. Prevents artifacts on moving repetitive patterns
Aspect ratio conversion (manual or auto)	AFD (SMPTE 2016), VI (RP186), WSS (L23)
SD input format	Normal 4:3, Anamorphic 16:9, Letterbox 14:9, Letterbox 16:9
SD output format	Normal 4:3, Anamorphic 16:9, Letterbox 14:9, Letterbox 16:9
Auto zoom	On/Off
Manual zoom	Zoom +/- 20%
Safe area marker	Off, 16:9, 4:3
Metadata	Closed caption CE608 <> CE708  Timecode conversions  Teletext subtitles WST/RDD8 conversion

## Audio Functions

Analog audio	Four pairs of analog inputs, individually available to any or all processing channels
	Two groups (two pairs) of analog outputs, separately assignable to any processing channel
	Headroom: +24 dBu, balanced connection
AES audio	Four AES audio inputs, individually available to any or all processing channels
	Four AES audio outputs (48 kHz), separately assignable to any processing channel
	AES input is auto-detected as PCM (32 to 96 kHz) or non-PCM (48 kHz locked to relevant video input)
Embedded audio	Each processing channel includes 16-channel embedded audio processing
	PCM audio processing includes channel-level gain and delay compensation, as well as pair level routing with L/R swap and phase invert feature
	Non-PCM processing features pair level routing and delay compensation. Dolby E data is passed with a delay to match the video and with co-timed audio frame drop or repeat
Dolby E	MC1000/MC1000-IQ: Optional single channel Dolby E decode/transcode
	MC2000/MC2000-IQ: Optional one or two channels of Dolby E decode/transcode

## Throughput delay

Video processing delay  field = 16.7 or 20 ms frame = 33.3 or 40 ms	<i>With scaling active in same frame rate:</i>
	Ref lock / Free run between 3 and 5 fields + ~200 us, Input lock (SDI) 3 fields + 1 ms
	<i>With same standard in &amp; out and Sync mode = Enabled:</i>
	Ref lock / Free run between ~200us and 1 frame + ~200 us, Input lock (SDI) ~1 ms
	<i>Frame rate conversion:</i> Any lock mode, 110 ms typical
Audio processing delay  (Audio delay = 0 ms)	<i>With scaling active in same frame rate:</i>
	Ref lock / Free run 1.5 frames, Input lock 1 frame + 1 ms
	<i>With same standard in &amp; out and Sync mode = Enabled:</i>
	Ref lock / Free run 0.5 frames, Input lock ~3ms
	<i>Frame rate conversion:</i> Any lock mode, 110 ms typical

<b>System Functions</b>	
Pattern	Off, Black, Ramp, Bars
Proc amp	Black Level: +100 to -100 mV (0) in 0.8 mV steps Contrast: -6 dB to +6 dB (0) in 0.2 dB steps Saturation: -6 dB to +6 dB (0) in 0.2 dB steps Y Gamma: 0.4 to 1.7 (1) in 0.1 steps <i>Note: Defaults shown in brackets</i>
Freeze	On/Off
Genlock	Reference lock, Input lock (same format), Follow input (same frame rate), Free run
Memories	16 user memories
<b>Enhancement</b>	
Advanced Horizontal	Frequency Band Selection: Low, Med, High Four preset enhancement levels: Low, Med, High, Super Custom H Gain and H Noise rejection levels
Advanced Vertical	Frequency Band Selection: Low, Med, High Five preset enhancement levels: Soft 2, Soft 1, Normal, Sharp 1, Sharp 2
Horizontal Aperture	Five preset H sharpness levels: Low 2, Low 1, Normal, High 1, High 2 Five preset H detail levels: Soft 2, Soft 1, Normal, Sharp 1, Sharp 2
<b>Communications</b>	
Remote control	Remote control RollCall network (IP)
Web browser	Web applet (Java required)
<b>Power</b>	
Input voltage range (primary & secondary)	100 to 240 VAC, 47 to 63 Hz 0.4A, via three-pin IEC power socket
<b>Mechanical</b>	
Temperature range	0 to 45°C operating
Cooling	Internal fan, side venting
Weight	4.25 kg approx
Case type	1U, rack mounting
Dimensions	44 mm x 430 mm x 400 mm (h, w, d)

## 3. Installation



Refer to “Safety Information” on page 3 before installing and connecting power to the unit.

### 3.1 Unpacking the Unit

The unit is packed in a single cardboard box. Unpack the box carefully and check for any shortages or shipping damage. Report any shortages or shipping damage to SAM immediately.

The box contains the following items:

- KudosPro MC1000/MC1000-IQ/MC2000/MC2000-IQ unit
- **Optional:** Up to two IQ modules and rears fitted in the KudosPro unit (MC1000-IQ/MC2000-IQ only)
- Two power cables
- Operator’s Manual CD

**Note:**

Retain any product packaging as it may be required if returning the unit to SAM.

### 3.2 Rack Mounting the Unit

Ensure that sufficient space is available for the unit.

When installing the unit, place on a suitably specified and installed rack shelf and secure the unit using the front rack ears.

### 3.3 Ventilation

Ensure that there is a free flow of air at the front, rear, and sides of the unit to dissipate the heat produced during operation. Installations should be designed to allow for this.



Do not obstruct the ventilation holes on the right-side of the unit. Damage to the equipment may result.

### 3.4 MC1000-IQ/MC2000-IQ Only

#### 3.4.1 Removing IQ modules/Rears

For details on removing IQ modules and a full list of compatible IQ modules and rears see the *Recommended Modules for KudosPro-IQ Units Application Note* under the “Support” tab at: <http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/>

## 4. Connections

### 4.1 Rear Panel View: MC1000 and MC2000

The rear panel accommodates a CVBS option with AES unbalanced audio and composite video connections.



**Note:** Connections labeled as i/o can be used as inputs or outputs.

### 4.2 Rear Panel View: MC1000-IQ and MC2000-IQ

The rear panel has space for up to two IQ module rear panels. CVBS and unbalanced AES inputs and outputs are not supported. For information for the operation of any IQ modules fitted to the MC1000-IQ/MC2000-IQ unit please see the relevant IQ module user manual(s).



**Note:** Connections labeled as i/o can be used as inputs or outputs.

### 4.3 Input and Output Connections

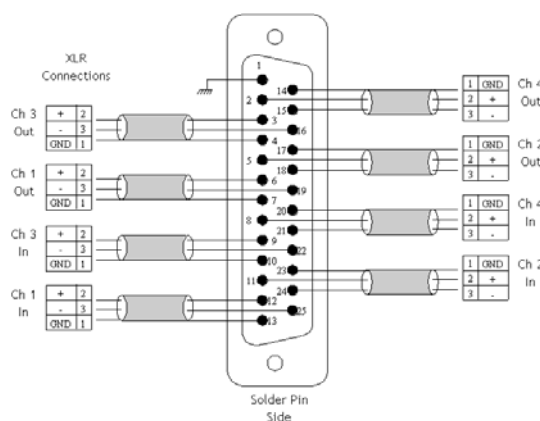
Label	Description	Connector
SDI In 1, 2, 3, 4	SDI inputs	4 x BNC
SDI Out A1, A2, B1, B2	SDI outputs	4 x BNC
Analog Audio In (option)	Analog audio inputs	1 x 25-way D-type
Analog Audio Out (option)	Analog audio outputs	1 x 25-way D-type
*AES Audio In (option)	AES audio inputs	4 x unbalanced BNC
*AES Audio Out (option)	AES audio outputs	4 x unbalanced BNC
<i>*Note: Unbalanced AES is not available for the MC1000-IQ or MC2000-IQ.</i>		
AES Audio i/o (option)	Balanced AES audio input/output	1 x 25-way D-type
Reference	Analog reference input with passive loop-through	2 x BNC
**CVBS i/o A1, A2 (option)	Composite input/output	2 x BNC
**CVBS i/o B1, B2 (option)	Composite input/output	2 x BNC
**CVBS i/o C1, C2	Composite input/output	2 x BNC
**CVBS i/o D1, D2	Composite input/output	2 x BNC
<i>**Note: The CVBS option is not available for the MC1000-IQ or MC2000-IQ.</i>		

Label	Description	Connector
Option A	Signal input/output	1 x dual SFP compatible
Option B	Signal input/output	1 x dual SFP compatible
Monitor	HDMI output	1 x HDMI
Power A	PSU inputs (primary)	1 x 3-pin IEC
Power B	PSU input (secondary)	1 x 3-pin IEC

**Note:** If one of the reference connectors is not in use it must be fitted with a 75 Ohm BNC terminating plug. If not terminated correctly, genlock performance may be degraded.

**Note:** The option sockets allow for up to two dual Small Form Factor Pluggable (SFP) transceiver modules. The SFP modules can be used to add optional fiber connectivity, or optional I/O using HD BNC connectors.

### 4.3.1 Audio Connection Pin Numbers (Option)



Analog Audio In

Channel	25-way D-type Pin
CHASSIS	1
GND1	14
Ch 8 in +	2
Ch 8 in -	15
Ch 7 in +	3
Ch 7 in -	16
GND2	4
GND3	17
Ch 6 in +	5
Ch 6 in -	18
Ch 5 in +	6
Ch 5 in -	19
GND4	7
GND5	20
Ch 4 in +	8
Ch 4 in -	21
Ch 3 in +	9
Ch 3 in -	22
GND6	10
GND7	23
Ch 2 in +	11
Ch 2 in -	24
Ch 1 in +	12
Ch 1 in -	25
GND8	13

Analog Audio Out

Channel	25-way D-type Pin
CHASSIS	1
GND1	14
Ch 8 out +	2
Ch 8 out -	15
Ch 7 out +	3
Ch 7 out -	16
GND2	4
GND3	17
Ch 6 out +	5
Ch 6 out -	18
Ch 5 out +	6
Ch 5 out -	19
GND4	7
GND5	20
Ch 4 out +	8
Ch 4 out -	21
Ch 3 out +	9
Ch 3 out -	22
GND6	10
GND7	23
Ch 2 out +	11
Ch 2 out -	24
Ch 1 out +	12
Ch 1 out -	25
GND8	13

AES Audio In/Out

Channel	25-way D-type Pin
CHASSIS	1
GND1	14
Ch 4 out +	2
Ch 4 out -	15
Ch 2 out +	3
Ch 3 out -	16
GND2	4
GND3	17
Ch 2 out +	5
Ch 2 out -	18
Ch 1 out +	6
Ch 1 out -	19
GND4	7
GND5	20
Ch 4 in +	8
Ch 4 in -	21
Ch 3 in +	9
Ch 3 in -	22
GND6	10
GND7	23
Ch 2 in +	11
Ch 2 in -	24
Ch 1 in +	12
Ch 1 in -	25
GND8	13

### 4.3.2 Fiber Connectivity



If no fiber option is fitted on the rear panel, do not remove the safety covers from the option slots.

Two dual fibre ports are available as an option. Each port can be configured as one of the following:

- Dual receivers
- Dual transmitters
- Transceiver (Tx + Rx)
- Not fitted

**Note:**

If all the optional SFP connectors A1, A2, B1, and B2 are fitted as receivers, they will not be available as transmitters. Likewise, if they are fitted as transmitters, they will not be available as receivers.

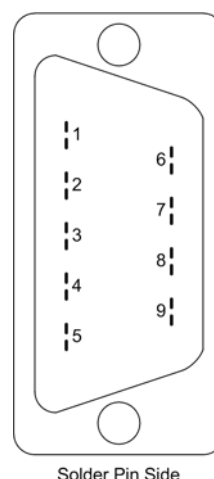
## 4.4 Control Connections

Label	Description	Connector
Network	10/100 BaseT Ethernet connection	1 x RJ45
GPI	General Purpose Inputs.	1 x 9-way D-type

### 4.4.1 GPI Pin Numbers

The GPIs are accessed via a 9-way D-type male connector. In the following table, GPI refers to inputs.

Function	9-way D-type Pin
Ground	1
GPI 0 Channel 1 Memory 1	6
GPI 1 Channel 1 Memory 2	2
GPI 2 Channel 2 Memory 3	7
GPI 3 Channel 2 Memory 4	3



**Note:**

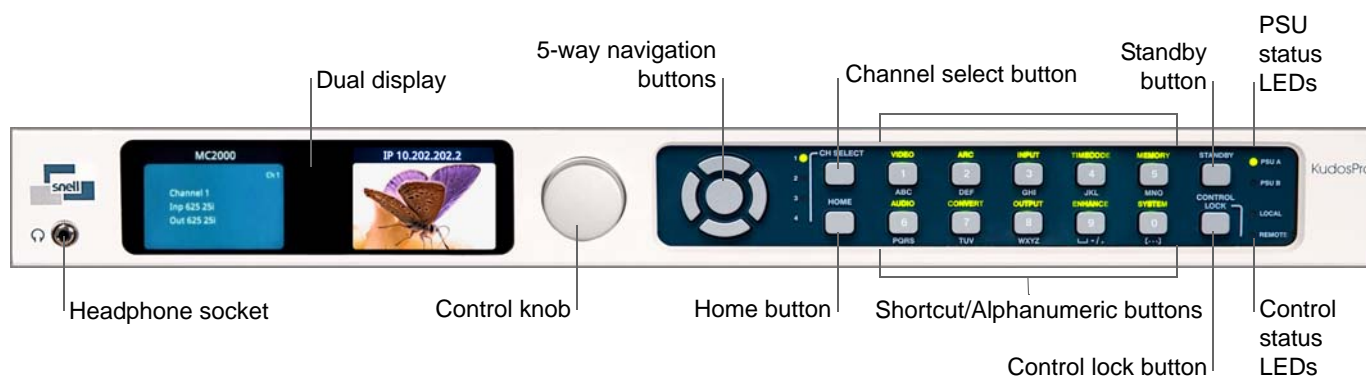
The MC1000/MC1000-IQ only uses GPI 0 and GPI 1.

## 5. Front Panel Features

The front panel provides a user-friendly interface for complete control of the unit. A dual display shows the menu options and output signal, and various buttons provide easy access to the unit's features.

**Note:** The display screens shown in this section are for reference and guidance only, and may be slightly different to those on your unit.

### 5.1 Front Panel Layout



### 5.2 Front Panel Dual Display

The dual display changes depending on what is selected. Some examples are as follows:

- On the Home screen, the display shows status information for each processing channel:



**Note:** On an MC1000/MC1000-IQ Home screen, the display shows a blank screen instead of a second channel.

- On a menu list, the display shows the menu options and a thumbnail image of the current output signal:



- On a menu list with a menu option selected, for example, Proc Amp, the display shows the menu list and menu option:



### 5.3 Front Panel Controls

Item	Description
	Provides status and control information.
Dual display	<ul style="list-style-type: none"> <li>The left-side of the display shows the menu list.</li> <li>The right-side of the display shows either the output video or the menu options.</li> </ul>
Control knob	<p>Scrolls through the menu lists, selects menu options, and adjusts values.</p> <ul style="list-style-type: none"> <li>Rotate clockwise or counter-clockwise to scroll down or up through a menu list or to adjust values on a menu option.</li> <li>Press to select a menu option or confirm changes.</li> </ul>
5-way navigation buttons: Up, Down, Left/Back, Right, and Select	<p>Moves through the menu lists, selects menu options, and adjusts values.</p> <ul style="list-style-type: none"> <li>Up and Down: Press to move up or down through a menu list.</li> <li>Left/Back and Right: Press to move forward or back through a menu list or to adjust values on a menu option.</li> <li>Select: Press to select a menu option or confirm changes.</li> </ul>
Channel selection button (CH SELECT)	<p>Selects from processing channels 1–2 (where applicable).</p> <ul style="list-style-type: none"> <li>Press to select a channel. The LED of the corresponding channel is illuminated green when selected.</li> </ul>
Home button (HOME)	<ul style="list-style-type: none"> <li>Press to return to the default Home screen at any time.</li> </ul>
Shortcut/Alphanumeric buttons	<p>The Shortcut buttons provide direct access to the corresponding menus. The Alphanumeric buttons allow manual number and text entry in a text box, and manual number entry for slider values.</p> <ul style="list-style-type: none"> <li>Buttons illuminated: You can press the Shortcut buttons to access the corresponding menus.</li> <li>Buttons not illuminated: Indicates that a manual adjustment or manual selection is available – for example, a slider value, check box, or text box.</li> </ul>
Standby button (STANDBY)	<p>Turns the unit on or puts the unit into standby mode.</p> <ul style="list-style-type: none"> <li>Press once to turn the unit on, or press and hold to put the unit into standby mode. When the unit is in standby mode, the corresponding PSU LED is illuminated red.</li> </ul>
Control lock button (CONTROL LOCK)	<ul style="list-style-type: none"> <li>Press to lock or unlock the front panel controls.</li> </ul>
PSU status LEDs (PSU A, PSU B)	<p>Shows the status of the dual PSUs.</p> <ul style="list-style-type: none"> <li>PSU A illuminated green: PSU A (primary) in use.</li> <li>PSU B illuminated green: PSU B (secondary) in use.</li> <li>PSU illuminated red: Unit in standby (power saving) mode.</li> </ul>
Control status LEDs (LOCAL, REMOTE)	<p>Shows the monitoring status.</p> <ul style="list-style-type: none"> <li>LOCAL illuminated: Local control present.</li> <li>REMOTE illuminated: RollCall Control Panel in use.</li> </ul>
Headphone socket	3.5 mm headphone socket for audio monitoring.

## 6. Operation Using the Front Panel

The front panel provides easy access to the unit's menu structure. From the Home screen, a main menu list provides access to various sub-menus. Each sub-menu option from the main menu list has various screens and controls associated with it.

For detailed information of the options and controls available from each menu, see “Channel Operation Menus” on page 47.

**Note:** You can use either the Control knob or the 5-way navigation buttons to move through menus and select menu options. For consistency, we will use the Control knob in the following examples.

### 6.1 Turning the Unit On or Off

To turn the unit on:

- Press the STANDBY button. The PSU LED turns green and the SAM splash screen appears on the dual display. After a few minutes, the Home screen appears.

To turn the unit off:

- Press and hold the STANDBY button until the dual display turns off. After a few moments, the unit enters standby mode.

### 6.2 Home Screen

The Home screen shows the following status information for each processing channel:

- Unit name
- IP address
- Input and output status
- Audio status



You can return to the Home screen at any time by pressing the HOME button.

**Note:** The unit automatically defaults to the Home screen after a few minutes if no controls are used.

### 6.3 Selecting Processing Channels (MC2000/MC2000-IQ only)

You can select between processing channel 1 and channel 2 at any time and from any menu. To select a different channel:

- Press the CH SELECT button. The LED of the channel selected is illuminated.

You can also use the Control knob to select a channel from the Home screen. To do this:

- From the Home screen, rotate the Control knob clockwise to the next position until the required channel is selected. The LED of the channel selected is illuminated.

**Note:** When you select a new channel, the menu screen you were on previously is displayed on the new channel. This is useful for quickly changing the same setting on different channels.

## 6.4 Accessing the Main Menu List

1. From the Home screen, press the Control knob. The selected channel and channel status are displayed.
2. Press the Control knob again to access the main menu list. The main menu list is displayed.



## 6.5 Moving Through a Menu List

- Rotate the Control knob clockwise to scroll down through a menu list, or counter-clockwise to scroll up through a menu list.

## 6.6 Selecting Menu Options

- When on a required menu, press the Control knob to select it.

## 6.7 Adjusting Values

When you select a menu option that requires adjustment, such as Noise Rejection, you can adjust the values by using the Control knob or the Alphanumeric buttons. The Control knob provides control for fine-tuning values in small increments. The Alphanumeric buttons are useful for quick entry of a specific value.

### 6.7.1 Adjusting Values with the Control Knob

1. Navigate to the menu option slider that requires adjustment.
2. Rotate the Control knob clockwise to increase the value or counter-clockwise to decrease the value.
3. Press the Control knob to set the value, then press it on Done (✔) to confirm. The menu option closes and returns to the menu list.

**Note:** To reset any menu back to its preset value, from the menu option selected, press and hold the Control/Select knob for a few seconds.

### 6.7.2 Adjusting Values with the Alphanumeric Buttons

1. Navigate to the menu option that requires adjustment.
2. Enter the required value on the Alphanumeric buttons.
3. Press the Control knob to set the value, then press it on Done (✔) to confirm. The menu option closes and returns to the menu list.

For more information about alphanumeric functions, see “Entering Alphanumeric Characters” on page 31.

## 6.8 Entering Alphanumeric Characters

Occasionally you may need to enter alphanumeric characters manually. This could be when setting an IP address or entering a memory name, for example.

To enter values manually:

1. Navigate to a menu option that requires manual text input, for example, Memory Name.
2. On the text box, press the Control knob. The text entry cursor appears.
3. Press the relevant Alphanumeric buttons, 1 to 8, repeatedly until the desired character appears. If the next character you want is on the same button as the present one, wait until the cursor blinks once before pressing the button again.
  - To enter a space between characters, press button 0.
  - To enter a special character, such as the @ symbol, press button 9.
  - To delete a character, press the Back button.
4. When you have finished entering the name, press the Control knob to set it, then press it on Done (✓) to confirm.

## 6.9 Resetting Menu Options to Preset Values

If you need to reset a menu option, such as a slider value, to its preset default value, do the following:

- From the menu option selected, press and hold the Control knob for a few seconds until the values are reset.

## 6.10 Using Shortcuts

The Shortcut buttons provide access to the more commonly used menus.



For example, to access the Video menu:

- On the front panel, press the VIDEO Shortcut button. The Video menu list is displayed.

**Note:**

Shortcuts are only available when the buttons are illuminated.

## 7. System Setup Menus

This section details all of the screens, menu lists, options, and controls available for setting up the unit from the front panel.

For information about using the front panel controls, see “Front Panel Features” on page 27. For information about navigating menus, see “Operation Using the Front Panel” on page 29.

**Note:** This section does not show every available menu screen. The screens shown are for guidance and reference only, and may be slightly different to those on your unit.

### 7.1 System

The System home screen shows status of the unit in use. You can access the System screen at any time and from any menu by pressing the SYSTEM Shortcut button.



### 7.2 CVBS (MC1000/MC2000 Only)

The CVBS menu enables you to set up and view options for a video input source and the video output signal. CVBS provides options for the four composite video input/output slots (if the CVBS option is fitted).

Composite encoding and decoding options will have been chosen at the time of product purchase. Y/C decoding is also available.

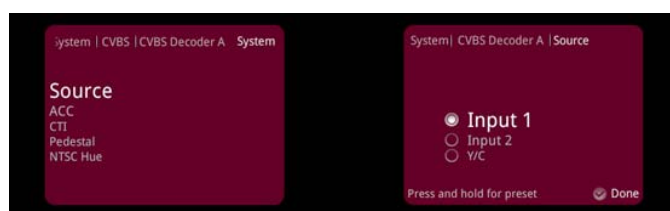
The composite capability is determined by the number of processing channels and certain hardware restrictions. The composite variants allowed are as follows:

Product	Composite codes allowed	Description	Hardware fitted
MC1000	CT1	One channel composite decode	CVBS A or B is a decoder
		One channel composite encode	CVBS C or D is an encoder
MC2000	CT 2	Two channels composite decode	CVBS A & B are decoders
		Two channels composite encode	CVBS C & D are encoders

**Note:** Note that routing of the composite signals through the various processing channels is restricted by the product hardware. See “Block Diagrams” on page 15.

### 7.2.1 CVBS Decoder A and B

Each slot has two composite video connections.



- **Source:** Use to select a video input source. If using a composite source, only one of the two CVBS connectors are used.
  - **Input 1:** Connection A1 (or B1) contains the input composite signal.
  - **Input 2:** Connection A2 (or B2) contains the input composite signal.
  - **Y/C:** When using Y/C signals both composite connectors are used, so this option must be selected.

- **ACC:** The Automatic Chroma Control (ACC) examines the input burst amplitude and adjusts chrominance gain to compensate for chroma level attenuation.

*Note: Use this control when chroma levels are low compared to luminance. This may occur when using YC installations or composite from RF links.*

- **CTI:** The Chroma Transient Improver (CTI) examines the input video data. CTI detects transitions of chroma and enhances chroma edges in order to artificially restore lost color bandwidth.

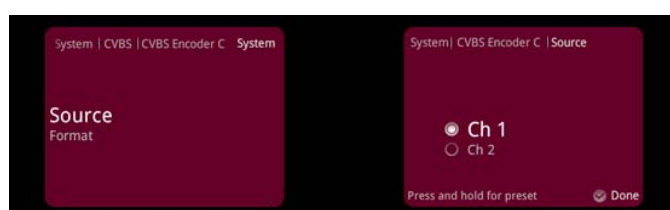
*Note: Use this control when the input video has chroma bandwidth limitations.*

- **Pedestal:** When turned on, allows the composite source (NTSC only) to be treated as if a pedestal is present.
- **NTSC Hue:** Adjusts the NTSC hue to correct tonal color changes.

**Note:** The unit automatically detects the input standard.

### 7.2.2 CVBS Encoder C and D

Each slot has two composite video connections.



- **Source:** Use to route the a processing channel to the chosen CVBS encoder.
- **Format:** Specifies the CVBS output standard. The options are:
  - PAL/NTSC
  - PAL-M/PAL-N
  - PAL/NTSC-J

### 7.2.3 Routing a Processing Channel

To route a specific processing channel output to a CVBS output:

1. From the System menu, select CVBS > CVBS Encoder C (or D) > Source.
2. Choose the processing channel you want to route to this slot, then select Done.
3. From the CVBS menu, select Format.
4. Choose the format of the composite output, then select Done.

For example, to create a PAL composite output on slot C1 where the converted output has been downconverted using processing channel 2:

1. Select CVBS > CVBS Encoder C > Source, Ch 2, then select Done.
2. Select CVBS > CVBS Encoder C > Format, PAL/NTSC, then select Done.

**Note:**

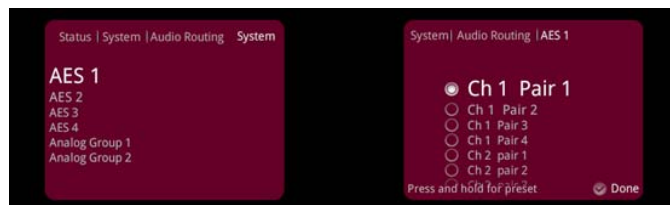
If an illegal signal such as HD video is routed to a CVBS encoder, there will be no output signal from this connector.

## 7.3 Audio Routing

The Audio Routing menu enables you to set up the routing for the AES and analog outputs.

**Note:** The AES and analog audio menus are only available if the CVBS option is fitted.

### 7.3.1 AES 1–4



- **AES 1–4:** Selects where to route the AES audio for each output.

**Note:** Only pairs 1–4 from can be routed to the AES output. Pairs 5–8 are not available on the AES output.

### 7.3.2 Analog Group 1–2

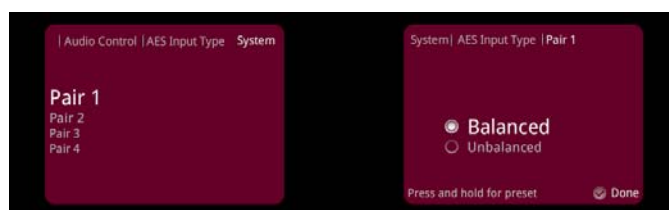
- **Group 1–2:** Selects where to route the analog audio for each output group.

**Note:** Only groups 1–2 can be routed to the analog output groups. Pairs 5–8 are not available on the analog output groups.

## 7.4 Audio Control

The Audio Control menu enables you to set up the unit's input and output audio handling options.

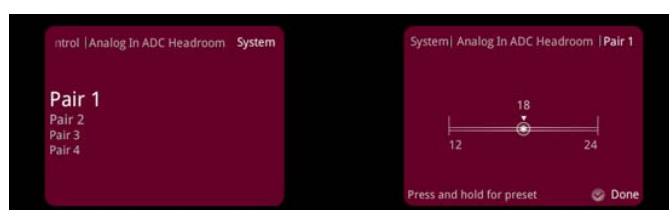
### 7.4.1 AES Input Type (Option, MC1000/MC2000 Only)



- **Pair 1–4:** Use to select an AES input source from either the balanced or unbalanced input connections (if fitted).

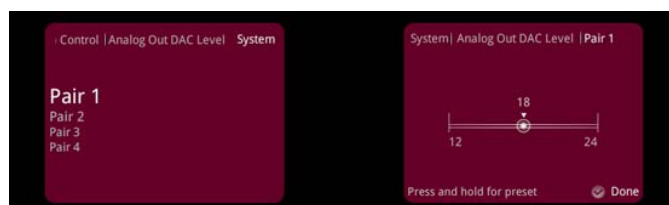
**Note:** The MC1000-IQ/MC2000-IQ units do not have unbalanced AES inputs.

### 7.4.2 Analog In ADC Headroom



- **Pair 1–4:** Adjusts the ADC headroom level for each analog input pair. The adjustment range is 12 dB to 24 dB. The preset value is 18 dB.

### 7.4.3 Analog Out DAC Level



- **Pair 1–4:** Adjusts the DAC audio output level for each analog output pair. The adjustment range is 12 dB to 24 dB. The preset value is 18 dB.

## 7.5 Genlock

The Genlock controls lock the output video clock to the genlock source (input or reference) regardless of the video standard. If the genlock source and the video output are the same frame rate, for example, 50 Hz or 59.94 Hz, Genlock locks the output to the vertical phase of the genlock source, giving consistent and repeatable delay.

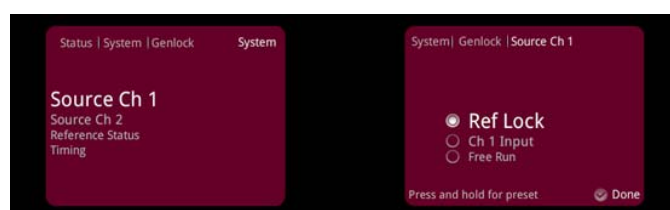
**Note:** Lock to input wherever possible. Only lock to an external reference if necessary.

When attempting to pass non-PCM audio, ensure that Genlock is enabled. If using an external reference, it must be clock-locked to the input video.

**Note:** If Genlock is set to Free Run, non-PCM audio will always be corrupt.

### 7.5.1 Source Ch 1 and Ch 2

The Source Ch 1 and Ch 2 menus enable you to select options for a genlock source.

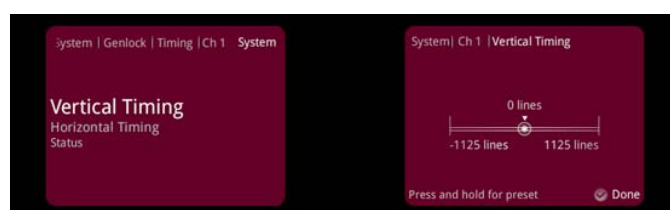


- **Ref Lock:** Locks the output video to the incoming reference.
- **Ch 1 Input:** Locks the output video to the channel 1 input. (For Source Ch 2, this will be the Ch 2 input.)
- **Free Run:** Locks the output video to an internal reference clock.

### 7.5.2 Reference Status

Reference Status shows the standard of the reference signal. If reference has been assigned using the controls but an input signal is not detected on the assigned reference input, Current reference standard shows “Invalid input”.

### 7.5.3 Timing



#### 7.5.3.1 Ch 1 and Ch 2

The Timing controls enable you to specify the horizontal and vertical genlock timing.

- **Vertical Timing:** Adjusts the vertical timing of the output signal with respect to the reference signal. The adjustment range is one output line in one-line steps. The preset value is 0.
- **Horizontal Timing:** Adjusts the horizontal timing of the output signal with respect to the reference signal. The adjustment range is one output frame in one-pixel steps. The preset value is 0.
- **Status:** Shows the status of the currently assigned reference. For example, if genlock is assigned to input 1, status shows “Ch 1 Input” followed by the current status of the input. If there is no signal on the assigned reference, status shows “REF Loss”.

## 7.6 Dolby

The Dolby menu enables you to set up the how the unit handles Dolby audio. The MC1000/MC1000-IQ/MC2000/MC2000-IQ unit supports Dolby D and E decoding as well as Dolby E transcoding when frame rate converting. Dolby E encoding from a PCM input is not supported.

**Note:** The Dolby encoder acts in tandem with the Dolby decoder: Dolby transcoding from one frame rate to another is enabled. It is not possible to author Dolby audio from a PCM input.

Dolby transcoding means that a change to the Dolby frame rate is enabled, but a change to the Dolby program format is not possible. For example, if the incoming video is at 50 Hz with 5.1+2 Dolby audio, when the MC1000/MC1000-IQ/MC2000/MC2000-IQ is set to standards convert the video to 59 Hz, the Dolby transcode function enables you to create 5.1+2 Dolby audio at 59 Hz. The output Dolby frame rate follows the output video frame rate chosen for the appropriate processing channel.

The Dolby E capability is determined by the number of processing channels and certain hardware restrictions. The Dolby E option variants allowed are as follows:

Product	Dolby option codes allowed	Description
MC1000/ MC1000-IQ	Dolby E single channel option	One set of Dolby modules: decode and transcode
MC2000/ MC2000-IQ	Dolby E single channel option	One set of Dolby modules: decode and transcode
MC2000/ MC2000-IQ	Dolby E dual channel option	Two sets of Dolby modules: decode and transcode

**Note:** Routing of the Dolby E decoded and transcoded outputs to embedded SDI is limited by hardware. If one Dolby option is fitted, the output of this decoder/transcoder is only available as embedded audio on SDI outputs A1 and A2, and can be routed to any AES or analog audio encoder. See “Block Diagrams” on page 15.

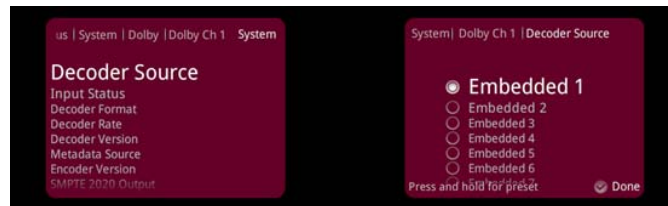
For more information about the Dolby decoder and transcoder, see the *KudosPro Dolby Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## 7.6.1 Dolby Ch 1 and Ch 2 (Option)

Each Dolby slot houses a Dolby encoder and transcoder.

**Note:** If the Dolby option is not fitted, the Dolby Ch 1 and Dolby Ch2 menus are grayed out.



- **Decoder Source:** Enables you to route the chosen incoming audio source (SDI or AES) to the Dolby decoder. See “Block Diagrams” on page 15.
- **Input Status:** Shows the detected audio. If this shows as “PCM”, the incoming audio is not Dolby and Dolby processing is not active.
- **Decoder Format:** Provides Dolby E/D source information. For example, in the case of Dolby E, this could be 5.1+2, 7.1, 8x1 etc.
- **Decoder Rate:** Shows the frame rate of the incoming Dolby audio (50 Hz or 59 Hz).
- **Decoder Version:** Shows the version number of the Dolby decoder. The Dolby E decoder and encoder both have their own software version installed which is independent from the rest of the unit. Dolby updates this software continually.
- **Metadata Source:** Enables you to choose whether to use the incoming Dolby metadata when transcoding. Select the Decoder radio button to enable the metadata or the None radio button to discard it.
- **Dolby Delay Compensation:** Enables you to select delay compensation to maintain correct alignment.
- **Encoder Version:** Shows the version number of the Dolby encoder. The Dolby E decoder and encoder both have their own software version installed which is independent from the rest of the unit. Dolby updates this software continually.
- **SMPTE 2020 Output:** Selects the output line on which to insert a SMPTE 2020 VANC packet if the output is enabled. The range is from line 8 to line 20 in one-line steps.

It is possible to set a forced association in the SMPTE 2020 metadata which sets the Secondary Data ID (SDID) values used to identify the VANC packets to 45/02 (pair 1). To use this control, enable “SDID Pair 1 Forced Assoc” from the Dolby menu under the sub-menu SMPTE 2020 Output. When enabled, the outgoing 2020 data will be labelled 45/02 (pair 1).

- **Packet Type:** Selects a method of data mapping for output SMPTE 2020 VANC packets.
  - **A:** SMPTE 2020-2-2008.
  - **B:** SMTE 2020-3-2008.
- **Dolby Metadata Output Line Status:** Shows the actual output line number on which the SMPTE 2020 VANC packet is embedded, as set on the SMPTE 2020 Output slider. If no line number is selected, “OFF” is displayed.

*Note: If the line selected is already in use (by VITC, for example), the VANC embedding hierarchy will embed the SMPTE 2020 packet on the nearest available line.*

## 7.7 Network

The Network menu provides access to the unit's network details and setup.

### 7.7.1 Ethernet

The Ethernet controls enable you to view and set up all information relating to the unit's network connections.



- **Current IP address:** Shows the current IP address.
- **Current IP Netmask:** Shows the current netmask.
- **Current IP Gateway:** Shows the current gateway.
- **MAC Address:** Shows the unit's MAC address
- **IP Configuration:** Enables you to specify whether the unit is to use a DHCP or a static IP address. For information about setting static and DHCP IP addresses, see page 41.
- **IP Address:** Enables you to enter an IP address.
- **IP Gateway:** Enables you to enter a gateway address.
- **IP Netmask:** Enables you to enter a netmask address.
- **Apply IP Changes:** Applies any changes you make in the Ethernet menu.
- **IP Configuration Status:** Shows the current IP configuration.
- **Interface Status:** Shows the status of the Ethernet connection, for example, "100M full duplex".

*Note: If Interface Status shows "down", it means that no Ethernet connection is detected.*

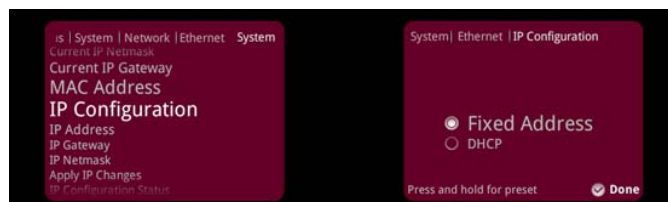
### 7.7.1.1 Setting a Static IP Address

To set a static IP address, you will need to enter all the following information: IP address, IP gateway (even if you are not using an IP gateway), and IP netmask.

In the following example, we are setting a static IP address of 192.168.1.42.

To set a static IP address:

1. From the System menu, select Network > Ethernet > IP Configuration.
2. Select Fixed Address, then select Done.



3. Select IP Address.
4. Enter 192.168.1.42 using the Alphanumeric buttons, then select Done.
5. Select IP Gateway.
6. Enter 192.168.1.12 using the Alphanumeric buttons, then select Done.
7. Select IP Netmask.
8. Enter 255.255.255.0 using the Alphanumeric buttons, then select Done.
9. When all addresses are set, you must apply the changes. To do this:
  - Select the Apply IP Changes button, then select Done. The system updates and saves the changes made in the Ethernet menu.

**Note:** You must disconnect the unit from your Local Area Network before setting a static IP address to avoid IP conflicts on the network.

**Note:** If the combination of IP address, IP gateway, and IP netmask is invalid, the system will not update the IP address.

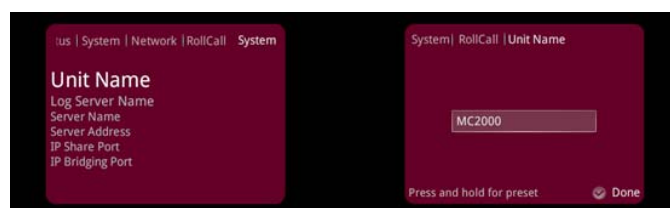
### 7.7.1.2 Setting a DHCP IP Address

- From the System menu, select Network > Ethernet > IP Configuration > DHCP, then select Done.

**Note:** If you make any changes to the settings in the Ethernet menu, you must select the Apply IP Changes button to confirm the changes.

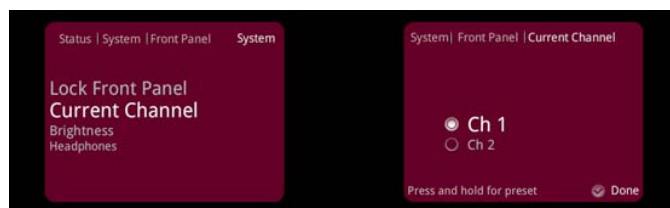
## 7.7.2 RollCall

The RollCall menu enables you to view and set up the unit's RollCall attributes.



## 7.8 Front Panel

The Front Panel menu enables you to customize the front panel features for ease of use.



### 7.8.1 Lock Front Panel

Lock Front Panel locks all of the front panel controls to prevent accidental changes to the unit's settings.

### 7.8.2 Current Channel (MC2000/MC2000-IQ Only)

Current Channel shows which channel is currently being controlled. The chosen current channel appears on the HDMI output and on the front panel thumbnail image.

### 7.8.3 Brightness

The Brightness control enables you to adjust the brightness of the front panel display. Using a lower setting can help save power and increase screen life.

### 7.8.4 Headphones

- **Source:** Selects the source for audio monitoring.
- **Level:** Adjusts the volume level. The adjustment range is -140 to +12. The preset value is -36.
- **Status:** Shows the audio monitoring status.

## 7.9 Memories

The Memories menu enables you to save up to eight system-level memory setups and recall them when required.

You can change the default memory names to more relevant ones if required.

Memories set at a system level store all system settings *except for* the following:

- Network > DHCP
- Network > IP Configuration
- Network > IP Gateway
- Network > IP Netmask
- RollCall > Unit Name

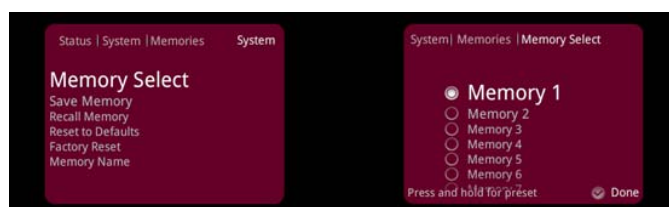
Settings stored in the system memories include:

- CVBS encoder or decoder settings (if fitted) - MC1000/MC2000 only
- Dolby option settings (if fitted)
- Genlock selection and adjustment
- AES and analog audio routing
- CVBS calibration - MC1000/MC2000 only

System memories do not store any processing channel data.

### 7.9.1 Memory Select

Memory Select lists the eight available memories.



### 7.9.2 Save Memory

Use the Save Memory button to save a new memory.

### 7.9.3 Recall Memory

The Recall Memory list recalls the settings saved in a memory location.

### 7.9.4 Reset to Defaults

Reset to Defaults recalls the unit's default memory settings at both system and channel level. All controls are reset to their preset values *except* for the following:

- Network > DHCP
- Network > IP Configuration
- Network > IP Gateway
- Network > IP Netmask
- RollCall > Unit Name

**Note:** Reset to Defaults does not affect user memories.

### 7.9.5 Factory Reset



Factory Reset clears all user memories. Make a note of any important settings before performing a factory reset.

Factory Reset recalls the unit's default memory settings at both system and channel level. All controls and user memories are reset to their preset values.

The default settings for IP Configuration is to set the unit to DHCP. Any saved settings for IP Address, IP Netmask, and IP Gateway are also lost when performing a factory reset. The unit returns all three to their default settings, which are as follows:

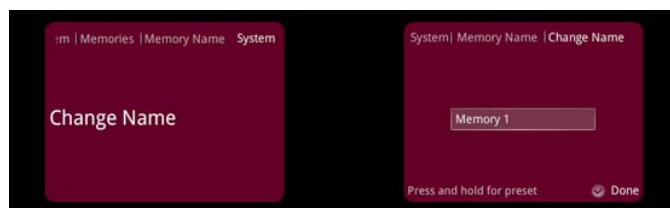
- IP Configuration: DHCP
- IP Address: 192.168.151.1
- IP Netmask: 255.255.255.0
- IP Gateway: 192.168.151.200

#### 7.9.5.1 Performing a Factory Reset

1. On the front panel, press the SYSTEM Shortcut button.
2. Select Memories > Factory Reset, then select Done.
3. Do one of the following to apply the changes:
  - Select Network > Apply IP Changes, then select Done.
  - Reboot the system.

**Note:** If performing a factory reset via a remote link, when you select Apply IP Changes, the remote link will be lost.

### 7.9.6 Memory Name



To change a memory name:

1. From the Memory Name menu, select Change Name.
  2. Select the text box. The text entry cursor appears.
  3. Press an Alphanumeric button, 1 to 8, repeatedly until the desired character appears. If the next character you want is on the same button as the present one, wait until the cursor blinks once before pressing the button again.
- To enter a space between characters, press button 0.
  - To enter a special character, such as the @ symbol, press button 9.
  - To delete a character, press the Back button.

To save a memory name:

- From the Save Memory menu, select Save Memory.

## 7.10 Logging

Logging defines what parameter information is made available to a logging device attached to the RollCall network.

You can select from any of the following logging options:

- Serial Number
- Uptime (how long the unit has been powered up, in days/hours/minutes/seconds)
- PSU 1 State, PSU 2 State
- Reference Standard

## 7.11 Status

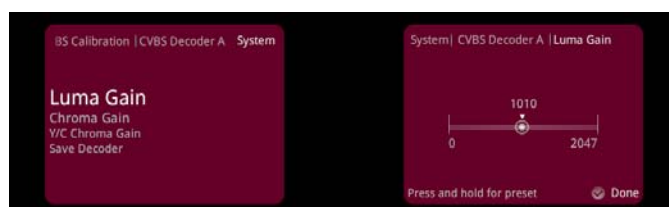
The Status menu shows the status of the unit's hardware and software.

- **Software Version:** The currently installed software version.
- **Serial Number:** The unique serial number of the unit.
- **PSU A, PSU B:** The PSU voltage.
- **Module 1 Temperature:** The current temperature of the FPGA module.
- **Dolby Ch 1 and Ch 2:** Whether the Dolby channel is available.

## 7.12 Calibration (MC1000/MC2000 Only)

The Calibration menu enables you to calibrate the CVBS decoders and encoders.

### 7.12.1 CVBS Decoder/Encoder A–D



- **Luma Gain:** Adjusts the composite luminance signal.
- **Chroma Gain:** Adjusts the composite chrominance signal.
- **Y/C Chroma Gain:** Adjusts the component Y/C chrominance signal.
- **Save Decoder:** Saves the gain settings.

### 7.12.2 CVBS Encoder C and D

- **DAC Gain:** Adjusts the DAC video output gain level.
- **Save:** Saves the gain setting.

**Note:**

CVBS calibration is not required in normal operation. If calibration is required, it should only be carried out by suitably trained technicians.

## 8. Channel Operation Menus

This section details all of the menu lists, options, and controls available for performing signal processing, frame rate, and format conversions from the front panel.

Each processing channel has its own set of system operation menus. The MC2000/MC2000-IQ units have channels 1–2 available.

For information about using the front panel controls, see “Front Panel Features” on page 27. For information about navigating menus, see “Operation Using the Front Panel” on page 29.

**Note:** This section does not show every available menu screen. The screens shown are for guidance and reference only, and may be slightly different to those on your unit.

### 8.1 Home

The Home screen shows status of the unit in use. You can access the Home screen at any time and from any menu by pressing the HOME button.

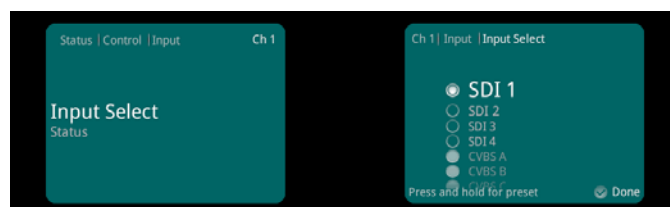


### 8.2 Input

The Input menu enables you to specify a video input source.

#### 8.2.1 Input Select

Input Select lists the available input sources.



You can choose from the following, where applicable:

- SDI 1–4
- CVBS A–D - (MC1000/MC2000 only)
- SFP A1, A2, B1, B2

**Note:** The unit automatically detects the input standard.

#### 8.2.2 Status

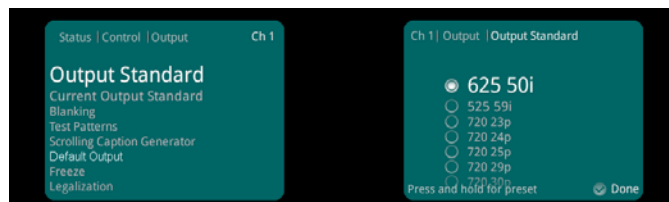
The Status list shows the current input status for any input. This is the same as the Input Select list.

## 8.3 Output

The Output menu enables you to apply various settings and adjustments to the video output signal.

### 8.3.1 Output Standard

The Output Standard list enables you to specify the output standard of a conversion, for example, 625 50i.



### 8.3.2 Current Output Standard

Current Output Standard shows the output standard currently in use, for example, 625 50i.

### 8.3.3 Blanking

- **Embedded Audio:**
  - **Enable** (Default): enables embedded audio
  - **Blank:** removes embedded audio
- **SD Half Line:**
  - **Pass** (Default): enables source half lines
  - **Blank:** will blank the source half lines. This can be useful for certain ARC settings, for example, SD16:9AN to SD4:3 Fit to Width

### 8.3.4 Test Patterns

The Test Patterns list enables you to choose the type of pattern displayed on the output picture. You can choose from Off, Black, Ramp, and Bars.

### 8.3.5 Default Output

On input signal loss, select “black” to set output to black (default), or “pattern” to set output to the test pattern. See section 8.3.4 for selection of the test pattern.

**Note:** If the test pattern has been set to black, then if default output is chosen to be “pattern”, the output will go to black on input loss.

### 8.3.6 Scrolling Caption Generator

The Scrolling Caption Generator overlays a black text box with a user-defined caption onto the output video. This is generally used as a setup or debug tool to help identify a video stream on a monitor.

- **Caption Entry:** User-defined caption.  
*Note: Text can be no more than 19 characters.*
- **Caption Scroll:** Enables slow-speed horizontal scrolling of the caption within the black text box. Scrolling is from right to left, and wraps around for continuous display.
- **Caption Enable:** The master enable – turns the caption display on and off.

### 8.3.7 Freeze

When Freeze is enabled, the output picture displays a frozen frame picture.

### 8.3.8 Legalization

All color video signals are ultimately coded as RGB for display on a picture monitor. The Legalizer ensures that the output video stays within the legal RGB gamut limit, making it suitable for the broadcast signal chain. To achieve this, the Legalizer reduces the gain equally on all channels.

The level the legalizer scales down to is selected from the options on the front panel. Anything in the RGB space above the selected level is scaled down to that level. Anything in the RGB space below 0 mV is clipped to 0 mV. This is a good compromise between minimizing hue change and raising apparent brightness.

Legalizer choices are:

- Off (Default)
- 700mV
- 721mV
- 735mV
- 746mV

### 8.3.9 Logo Control

Logo control enables static or animated graphics to be keyed on to the video output of a channel.

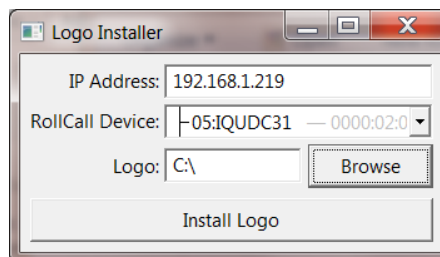
Logo files are uploaded to the KudosPro unit using a SAM application.

The application is available for download under the “Support” tab at:

<http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/>

#### Logo Up-loader

To upload logos onto the MC1000/MC1000-IQ/MC2000/MC2000-IQ, run the logo upload application on your PC. A dialog box will appear as shown below:



Enter the IP address of your unit and browse to the folder containing your required logos (see section 7.7.1 and 10.6.1 for a summary of how to set the unit's IP address). Then click on the Install Logo button. This will upload the logo to your unit.

**Note:** This stage can take up to a minute depending on the length of the logo. Short or static logos will upload in a few seconds.

Once the logo file(s) have been uploaded to the KudosPro unit they will be automatically displayed in the Logo Selection box.

**Valid logo file requirements:**

- A number of image file types are supported by KudosPro. For a full list of currently supported image file types see the *Supported Image File types Application Note* under the "Support" tab at:  
<http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro>
- A logo file must contain a key. If no key is found the entire image will be displayed i.e. a rectangle cut-out of the logo image size
- Maximum logo size of 400 Pixels by  $\frac{1}{4}$  picture height (Max. 480 lines)

**Logo naming convention:**

- All logo files take the form `<logo_name><specifier>.<extension>` where `<logo_name>` equals the directory's name.
- Logo filenames must be all in lowercase.
- A `<specifier>` of the form `_<standard>` indicates that this logo is intended for this specific standard. If no `_<standard>` specifier is included, then this logo is the default for any standards which do not have a standard-specific logo. Possible values for `<standard>` are: 525i, 625i, 720p, 1080p and 1080i.
- A `<specifier>` of the form `_<index>` indicates that this file is part of a multi-file sequence for an animated logo. Any non-negative decimal value may be used for `<index>`. The files in a sequence are sorted in increasing order of their respective `<index>`s by numerical value. Leading zeros do not affect the sort order, and it is not required that the `<index>` values are contiguous, however all images in a multi-file sequence must have the same width and height.
- If both `_<standard>` and `_<index>` specifiers are used, then they should be written as `_<standard>_<index>`, not `_<index>_<standard>`.
- The `<extension>` is ignored, the KudosPro unit will auto-detect the actual image format.

**Example logo file names:**

- `sam_1080p.png` - a logo file for use with 1080p signals
- `sam_720p_01.bmp`, `sam_720p_02.bmp` and `sam_720p_03.bmp`  
- three logo files in a multi file sequence

**Features and Functions:**

- All logos are available to for all channels
- Up to 64 logos can be stored on a KudosPro unit
- RGB graphic formats are automatically converted to SD and HD color spaces and levels
- YUV graphic formats are presented as is for SD and HD
- YUV range is assumed to be 16 (black) to 235 (white). Other values are clipped.
- Key channel levels for all graphic formats are 0 (off) to 255 (100% key)

**Animation details:**

- Animations are always displayed as a sequence, static frames cannot be selected
- The maximum animation duration depends on the logo image size.  
For example an animated logo image with a 10% raster size overlaid on 60Hz signal is limited to a maximum of 10 seconds
- Sequence capacity of 10,000 pixels maximum.  
(approximately 44 Seconds for 150 x 50 Pixels at 60 Hz)
- Interlaced video standards will treat each image of the original sequence as a single field of the resultant animation. Frame to field conversion is performed by simply removing those lines which should not be present in a particular field.
- Animations will not be displayed in the logo selection box until the upload is complete
- Animations will always start from the first frame of the sequence on 'Take'
- Animations can be loaded as a sequence of still images or a sequence of moving video (e.g. MPEG) files. One animation can be created from a sequence of files of different file types so long as the image size is the same in each file
- Animations are displayed at the output-side frame rate. If an animation is designed to be played at 50fps but the current output standard is 59Hz it will play out faster than designed.

**Logo Control Setup:**

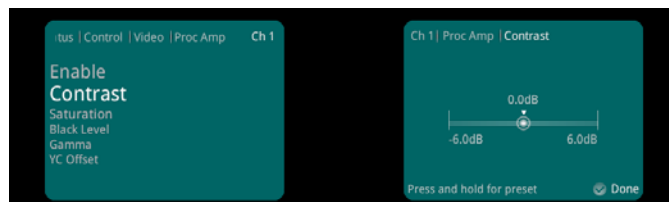
- **Logo Selection:** Select a logo for the current channel:  
Select a logo by clicking on the logo name. The selected logo is highlighted. Click on **None Selected** if no logo is required for the channel.
- **H Position:** Set the position of the left edge of the logo image from the left of the screen as a percentage of the screen size. Adjustment range 0 to 100%.  
0 = left edge of the logo is at the left edge of the screen.
- **V Position:** Set the position of the lower edge of the logo image from the bottom of the screen as a percentage of the screen size. Adjustment range 0 to 100%.  
0 = lower edge of the logo is at the lower edge of the screen.
- **Transparency:** Set the transparency level of the logo from 0 to 100%.  
100% = Invisible
- **Pre-Shaped:** Sets the key format to Pre-shaped when checked and Linear when unchecked.  
  
When the key format is set to Pre-shaped it is possible to simply cross-fade between background and foreground. This changes the edge shape of the logo but the pre-processing of the key means that the final result will be the intended edge shape.  
  
When Pre-shaped is not checked a linear key format is used and cross-fades between background + foreground and foreground so the key follows the shape of the logo.
- **Take:** Enables and disables logo display on the video output of the channel.  
When Take is checked the logo is displayed on the video output of the channel.
- **State:** Displays the state of the selected logo. Typically this would be "Logo load complete"
- **Logo Selected:** Displays the name of the selected logo.
- **Delete:** Deletes the currently selected logo. If the logo is in use this action will fail.

## 8.4 Video

The Video menu enables you to apply various types of signal processing to the signal being converted, and includes Proc Amp, Enhance, and Noise Reduction controls.

### 8.4.1 Proc Amp

The Process Amplifier (Proc Amp) enables you to correct video inconsistencies, such as contrast.



- **Enable:** Enables the Proc Amp.
- **Contrast:** Adjusts the contrast. The adjustment range is -6 dB to 6 dB in 0.2 dB steps. The preset value is 0 dB.
- **Saturation:** Adjusts the color saturation. The adjustment range is -6 dB to 6 dB in 0.2 dB steps. The preset value is 0 dB.
- **Black Level:** Adjusts the black level. The adjustment range is -100 mV to 100 mV. The preset value is 0 mV.
- **Gamma:** Adjusts the gamma curve. The adjustment range is 0.4 to 1.7 in 0.1 steps. The preset value is 1.0.
- **YC Offset:** Adjusts the horizontal chroma shift, for use when correcting upstream luma-chroma displacement. The adjustment range is -20 to 20 in steps of 2 luma clocks.

At the input picture edge, zero chroma is shifted into the active picture area. If the ARC is set to show less than the full width of the input picture, valid input picture chroma is shifted into the output picture area.

### 8.4.2 Enhance – Nonlinear Enhancer

The Nonlinear Enhancer defines the amount of enhancement applied to a video to help regain lost detail. This could be as a result of degraded material, post production processes, or because the initial capture conditions were not ideal.

The controls enable you to apply enhancement to the low, medium, and high frequency bands, and to create a custom setting if required.

For more information about enhance processing, see the *KudosPro Enhancer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)



- **Enable:** Enables the horizontal enhancer.
- **Level:** Adjusts the level of enhancement from 0 to 192. The preset value is 0.
- **Mode:** Preset controls.
  - **Low:** Sets Level to 2 and Noise Rejection to 15% for the selected frequency band.
  - **Medium:** Sets Level to 4 and Noise Rejection to 15% for the selected frequency band.
  - **High:** Sets Level to 6 and Noise Rejection to 15% for the selected frequency band.
  - **Super:** Sets Level to 8 and Noise Rejection to 15% for the selected frequency band.
  - **Manual:** Enables you to manually adjust the Gain and Noise Rejection controls.
- **Frequency Band:** Specifies the frequency band to which the enhancement is applied. You can choose from Low, Medium, and High.
- **Noise Rejection:** Enables you to manually adjust the Gain and Noise Rejection controls. The adjustment range is 0 to 100 in steps of 1. The preset value is 0.

### 8.4.3 Enhance – Conversion Aperture

The Conversion Aperture menu enables you to control the horizontal and vertical rescaler apertures from a range of presets.

#### 8.4.3.1 Preset

Preset returns all settings to their default values.

### 8.4.3.2 Horizontal

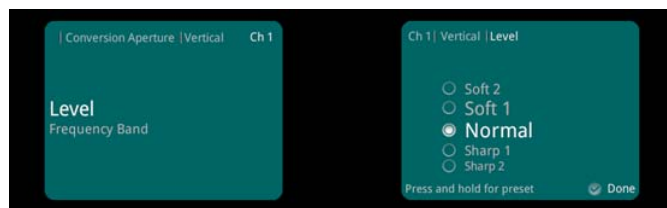
Horizontal Aperture controls aliasing in down-converted content.



- **Sharpness:** Determines the sharpness of the output by changing the rate of anti-alias filter cut-off.
  - **Soft 2:** Recommended for severely over enhanced source material.
  - **Soft 1:** Recommended for over enhanced source material.
  - **Normal:** Optimum setting for balancing detail and alias.
  - **Sharp 1:** Recommended for slightly soft source material.
  - **Sharp 2:** Recommended for very soft source material.
- **Detail:** Determines the amount of detail allowed through to the output by moving the anti-alias filter stop band.
  - **Low 2:** Recommended for severely over enhanced source material.
  - **Low 1:** Recommended for over enhanced source material.
  - **Normal:** Optimum setting for balancing detail and alias.
  - **High 1:** Recommended for slightly soft source material.
  - **High 2:** Recommended for very soft source material.

### 8.4.3.3 Vertical

Vertical controls aliasing in down-converted content.



- **Level:** Specifies the enhancer strength.
  - **Soft 1–2:** Provides attenuation in the frequency band specified.
  - **Normal:** Nominally flat frequency response.
  - **Sharp 1–2:** Applies more boost in the frequency band specified.
- **Frequency Band:** Specifies the frequency band to which enhancement is applied.

For more information about the horizontal and vertical conversion aperture controls, see the *KudosPro Enhancer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 8.4.4 Noise Reduction

The Noise Reduction controls enable you to reduce levels of noise and grain.

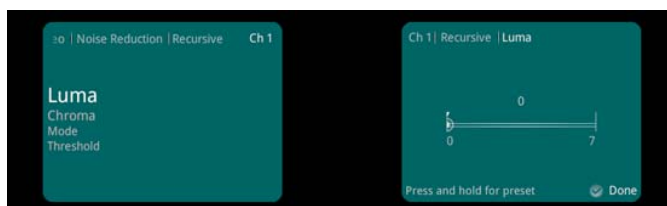
#### 8.4.4.1 Enable

The Enable check box is the master enable for all noise reduction processing.

#### 8.4.4.2 Recursive

To achieve noise reduction, Recursive applies a temporal recursive filter to both luminance and chrominance picture content. To avoid blurring moving objects, the filter includes motion detection and adaption which disables the filter when significant motion is present.

The Luma and Chroma controls set the maximum noise reduction (0 = Off). You can set the sensitivity of motion detection either automatically with Auto mode, or manually with the Threshold slider.



- **Luma:** Adjusts the noise reduction applied to the luminance signal. The adjustment range is 0 to 7. The preset value is 0.
- **Chroma:** Adjusts the noise reduction applied to the chrominance signal. The adjustment range is 0 to 7. The preset value is 0.
- **Mode:** Choose between automatic or manual filtering.

In Auto mode, the background noise level is measured and the threshold set to give a good compromise between noise reduction and motion blur. In Manual mode, increasing the Threshold value allows for pictures with higher background noise.

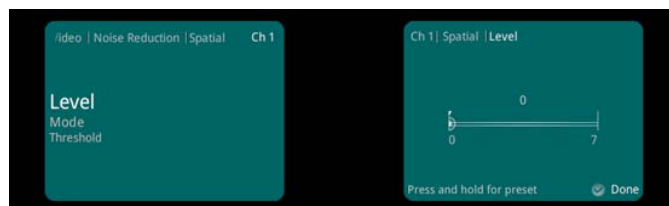
*Note: For best results in Manual mode, always set the threshold to the lowest value for the desired noise reduction.*

- **Threshold:** Adjusts the noise reduction threshold. The adjustment range is 0 to 7. The preset value is 0.

### 8.4.4.3 Spatial

The spatial noise reduction filter operates on luminance only and uses nearby samples to average out noise. Picture objects and edges are detected and the filtering disabled.

You can set the sensitivity of edge detection either automatically with Auto mode, or manually with the Threshold slider.



- **Level:** Adjusts the level of noise reduction applied to the signal. The adjustment range is 0 to 7. The preset value is 0.
- **Mode:** Choose between automatic and manual filtering.

In Auto mode, the background noise level is measured and the threshold set to give a good compromise between noise reduction and picture softness. In Manual mode, increasing the Threshold value allows for pictures with higher background noise.

*Note: For best results in Manual mode, always set the threshold to the lowest value for the desired noise reduction.*

- **Threshold:** Adjusts the noise reduction threshold. The adjustment range is 1 to 4. The preset value is 1.

### 8.4.4.4 Split Screen

When enabled, Split Screen displays a split screen view of the output image – one side of the screen shows the image with noise reduction, and the other side of the screen shows the image without noise reduction.

## 8.5 Convert

The Convert menu enables limited control of input and output cadence, and control of motion processing to improve the conversion performance of stationary content.

### 8.5.1 Motion Processing

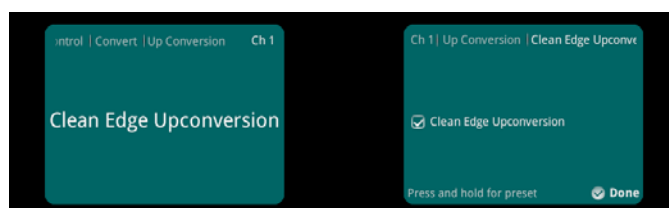


- **Motion Process:** Enables motion compensation.
- **Enhanced Motion:** When used together with the Still Process option, Enhanced Motion detects constant motion and applies an aperture with full (progressive) vertical frequency response.
- **Still Process:** Uses powerful motion detection techniques to extract the maximum resolution from interlaced sources while format or standards converting. The benefits of this processing are prominent on static logos and computer-generated overlays.
- **Enhanced Still:** Adds field motion detection to still processing. This prevents artifacts on moving repetitive patterns.
- **Enhanced Film:** Applies an aperture with full progressive frequency response where the input is film transported by an interlaced video rate input, with cadence enabled.
- **Enhanced De-interlace:** Replaces missing lines with a gradient between the previous and following lines. This control improves the appearance of de-interlaced images and is useful when dealing with complex shapes.
- **Clean Cut:** Prevents temporal filtering across a cut in scenes, which can result in several frames either side of the cut being a mix of the two different scenes.

For more information about motion processing and enhanced film settings, see the *KudosPro Still Mode Application Note* and *KudosPro Film Mode Application Note*, under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 8.5.2 Up Conversion



- **Clean Edge Upconversion:** Enables the Texture Adaptive Upconversion (TAU) process. TAU helps to adapt away any horizontal ringing (vertical edges), common in very high-frequency graphics.

### 8.5.3 Input Cadence

Input Cadence enables you to define any cadence associated with the input video.



- **Film Cadence:** Enables the processing of film-originated content transported by a cadence.
- **59 Cadence:** For standards with a field rate of 59 Hz and with cadence enabled, you can choose either 2:2 or 2:3 (psf).

*Note: Standards with field rate of 50 Hz and with cadence enabled are interpreted as 2:2.*

- **2:3 Source:** Selects whether a 2:3 cadence is determined automatically or derived from the input timecode.
  - **Automatic:** The cadence detection circuit automatically detects the cadence. This is useful when the source material contains mixed cadences.
  - **Input Timecode:** Defines the relationship between timecode and the 2:3 sequence. This is useful when the source material contains known, continuous 2:3.
- **2:3 Start Hour:** Sets the starting hour for the timecode (when 2:3 Source is set to Input Timecode). The adjustment range is from hour 0 to hour 23 in one-hour steps.

### 8.5.4 Output Cadence

Output Cadence enables you to define the required cadence of the output video.



- **Film Cadence:** Enables the cadence of the output content.
- **59 Cadence:** For standards with a field rate of 59 Hz, you can choose either 2:2 or 2:3 (psf) cadence generation.

*Note: Standards with field rate of 50 Hz are interpreted as 2:2.*

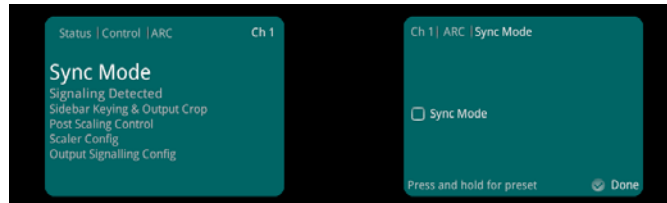
- **2:3 Source:** Selects whether a 2:3 cadence is free-running or derived from the output timecode.
  - **Free Run:** In Free Run mode the output 2:3 cadence is undefined. The output will have continuous 2:3, but may vary from conversion to conversion.
  - **Output Timecode:** Defines the point at which the 2:3 sequence starts relative to timecode.
- **2:3 Start Hour:** Sets the starting hour for the timecode (when 2:3 Source is set to Output Timecode). The adjustment range is from hour 0 to hour 23 in one-hour steps.

## 8.6 ARC

The Aspect Ratio Control (ARC) menu enables you to determine the aspect ratio of a picture from a range of options, or to adjust the size and position of the picture manually.

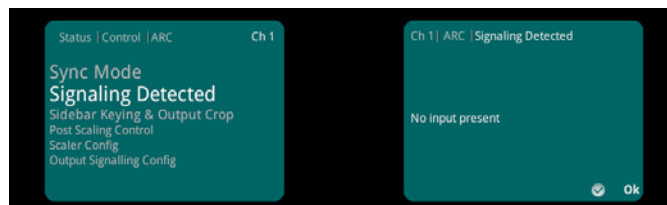
### 8.6.1 Sync Mode

The Sync Mode control disables the ARC feature when input and output formats are the same. This gives the lowest latency.



### 8.6.2 Signaling Detected

Signaling Detected shows the status of any aspect ratio signaling detected at the input.



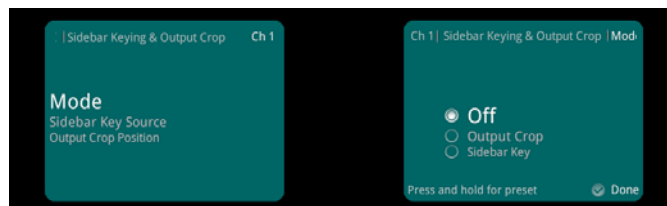
### 8.6.3 Sidebar Keying & Output Crop

The Sidebar Keying & Output Crop functionality provides post ARC cropping of the output picture and allows a second video picture to be keyed into the cropped area. When output cropping is enabled, the actual size of the output picture does not change, just how much of the active picture remains visible. The portion that is “cropped” is either default black (in Output Crop mode) or is replaced by a secondary video picture (in Sidebar Key mode) – the “cropped” portion still forms part of the output picture.

For more information about sidebar keying, see the *Sidebar Keyer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

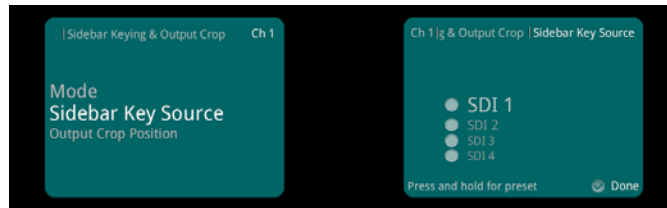
#### 8.6.3.1 Mode



- **Off:** Disables both Output Crop and Sidebar Keying.
- **Output Crop:** Crops the output picture. In this mode the cropped area is black by default. The cropped area is defined using the Output Crop Position controls. See section 8.6.3.3.
- **Sidebar Key:** Keys a second video picture into the cropped area, as defined using the Output Crop Position controls (see section 8.6.3.3). When selected, the source of the second video picture becomes available in the Sidebar Key Source menu. See page 60.

### 8.6.3.2 Sidebar Key Source

If the sidebar key option is available, the Sidebar Key Source control will also be present. This control becomes active when Sidebar Key mode is selected. Firstly a border is set up around the active picture using the separate Output Crop Position controls. This control then selects the secondary video source to be keyed over the border area.



In order for this to work correctly, the following rules must be met:

- Sidebar Key Source must be of the same format and frame rate to the output video standard for this channel.
- If the key source selected is of a different standard to the main video output standard, only Output Crop Mode is available.
- Ensure the key source has the correct vertical genlock alignment. If not, the sidebar key will not have the correct vertical position.

The available sidebar key sources vary depending on the product variant:

- Single-channel product: all video inputs are available.
- Dual-channel product: all video inputs are available.

**Note:** All video inputs is Serial SDI, CVBS, and SFP.

Sidebar Key Source options that are not available to the product are hidden from the selection list (for example, the output of the second channel in a single-channel product, or SFP input if no SFP rear is fitted).

Sidebar Key Source options that are not suitable are grayed out from the selection list (for example, the source is the not the same output standard as the video it is being “keyed” into, or SFP 2 is actually a TX so is not available as an input).

### 8.6.3.3 Output Crop Position

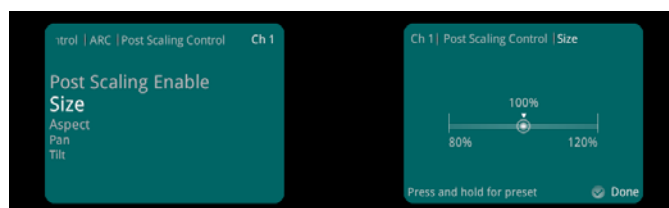
The Output Crop position controls enable you to adjust which portion of the video picture is visible by applying a border around the outside of the picture. The controls do not alter the output active picture size – each control separately defines a percentage of the picture to be replaced by a border. In Output Crop mode, the border is default black. In Sidebar Key mode, the border is the “key” area replaced by the secondary Sidebar Key video source.

Controls are paired: top with bottom and left with right. A pair of controls has limitations to prevent an overlap. The rule is that only 99% of the picture can be cropped, either horizontally or vertically. For example, if Top is set to 50%, Bottom cannot exceed 49%.

- **Top:** Crops the output picture, from the top-edge down. The adjustment range is 0% to 99% in 1% steps (0%). The default is 0%.
- **Bottom:** Crops the output picture, from the bottom-edge up. The adjustment range is 0% to 99% in 1% steps. The default is 0%.
- **Left:** Crops the output picture, from the left-edge right. The adjustment range is 0% to 99% in 1% steps. The default is 0%.
- **Right:** Crops the output picture, from the right-edge left. The adjustment range is 0% to 99% in 1% steps. The default is 0%.

## 8.6.4 Post Scaling Control

Post Scaling Control enables you to manually adjust the size and position of the output picture.



- **Post Scaling Enable:** Enables the Post Scaling controls.
- **Size:** Adjusts the size of the whole output image while maintaining aspect ratio. The adjustment range is 80% to 120% in 1% steps. The preset value is 100%.
- **Aspect:** Adjusts the aspect ratio of the output image. The adjustment range is 70% to 150% in 1% steps. The preset value is 100%.
- **Pan:** Adjusts the horizontal position of the output image. The adjustment range is -50 to 50 in steps of 1. The preset value is 0.
- **Tilt:** Adjusts the vertical position of the output image. The adjustment range is -50 to 50 in steps of 1. The preset value is 0.

## 8.6.5 Scaler Config – Presets

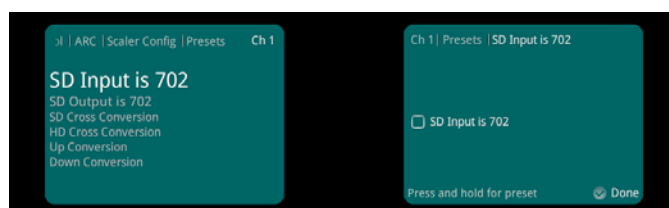
If no input aspect signaling is available and the conversion required is always from a known input aspect ratio to another known input aspect ratio, one of the standard presets may be selected. The presets are sub-divided into SD to SD cross conversion, SD to HD/3G up conversion, and HD/3G to SD down conversion.

**Note:** These presets are only active when the Use Presets check box is selected.

### 8.6.5.1 SD Input is 702

SD Input is 702 is an additional ARC preset mode, which is available for incoming content that uses a 702 sample line rather than a 720 sample line. If the incoming content uses a 702 sample line, select the check box. This introduces an additional H scaling factor of 720/702, resulting in a slight horizontal stretch.

This control only has an effect on SD inputs.

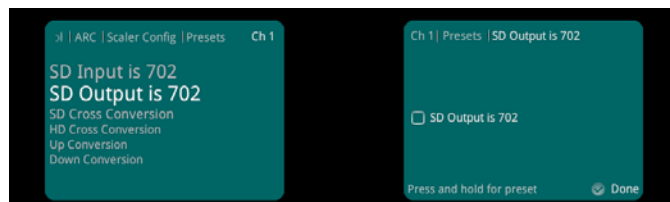


**Note:** 702 input introduces an additional H factor of 720/702.

### 8.6.5.2 SD Output is 702

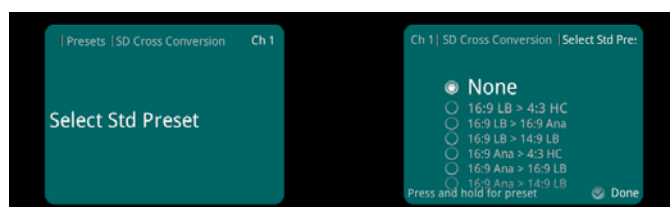
SD Output is 702 is an additional ARC preset mode, which is available for outgoing content that requires a 702 sample line rather than a 720 sample line. If the outgoing content requires a 702 sample line, select the check box. This introduces an additional H scaling factor of 702/720, resulting in a slight horizontal squeeze.

This control only has an effect on SD outputs.

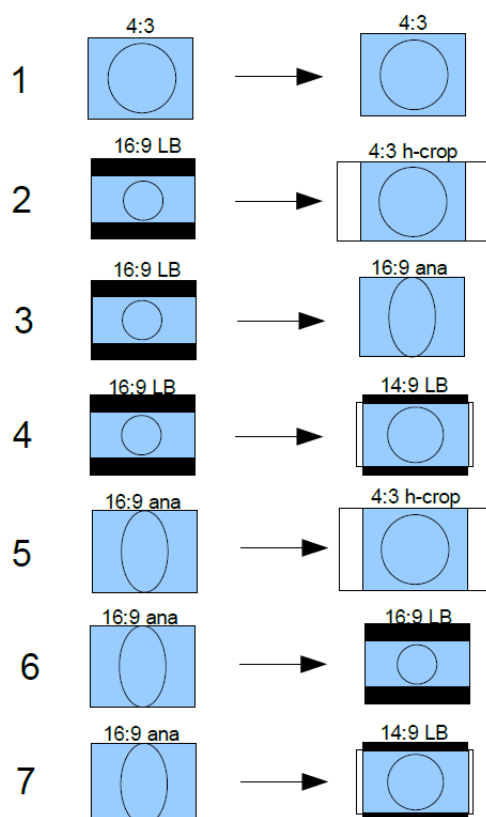


**Note:** SD Output 702 introduces an additional H scaling factor of 702/720.

### 8.6.5.3 SD Cross Conversion – Select Standard Preset

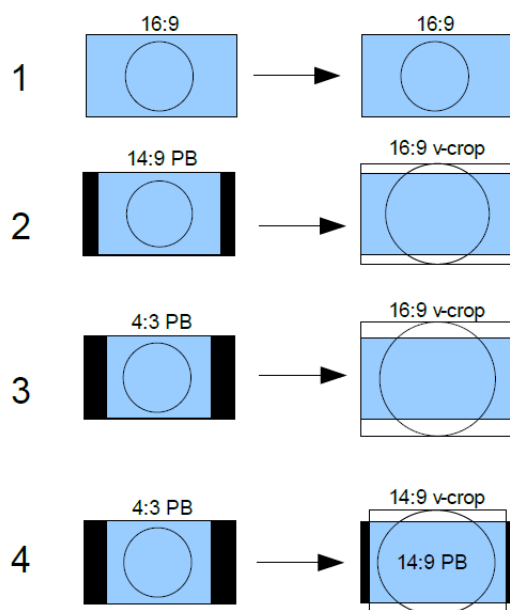


LB = letterbox, h-crop = horizontal crop, ana = anamorphic.



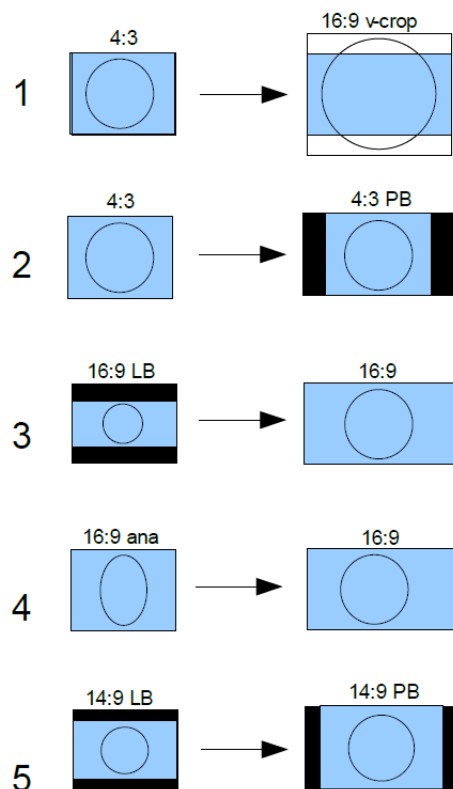
### 8.6.5.4 HD Cross Conversion – Select Standard Preset

PB = pillarbox, v-crop = vertical crop, ana = anamorphic.



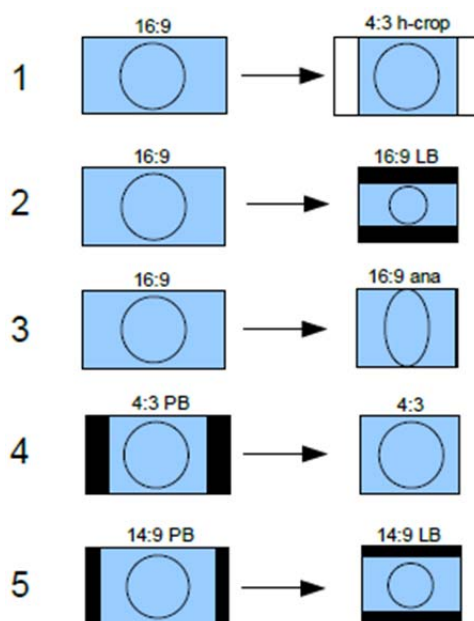
### 8.6.5.5 Up Conversion – Select Standard Preset

LB = letterbox, PB = pillarbox, v-crop = vertical crop, ana = anamorphic.



### 8.6.5.6 Down Conversion – Select Standard Preset

LB = letterbox, PB = pillarbox, h-crop = horizontal crop, ana = anamorphic.



### 8.6.6 Scaler Config – Input Config

The Input Config functions define which of the supported aspect signaling standards defines the input of the ARC.

#### 8.6.6.1 Input Signaling Source

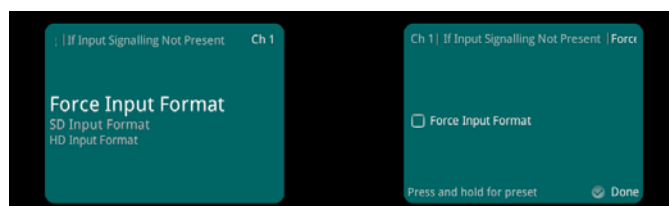
Input Signaling Source lists the available supported aspect signaling standards.



- **SMPTE 2016:** SMPTE ST 2016-1. Format for Active Format Description (AFD) and Bar Data.
- **L23 ETSI:** ETSI EN 300 294 v1.4.1. Television systems, 625-line television Widescreen signaling (WSS)
- **L23 AFD:** West Country TV/HTV/Central TV L23\_SPEC.doc 1997.
- **VI SMPTE:** SMPTE RP 186-1995. Video Index Information Coding for 525- and 625-line Television Systems.
- **VI AFD:** SMPTE RP 186-2008. Video Index Information Coding for 525- and 625-line Television Systems.

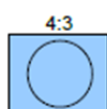
### 8.6.6.2 If Input Signaling Not Present

When using input aspect signaling with an SD or HD input source, it is possible to set a default input ARC setting. If, for any reason, the input aspect signaling cannot be detected, the ARC assumes this default setting.

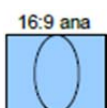


- **Force Input Format:** Enables manual ARC control, which will force the aspect ratio conversion if the input aspect signaling cannot be detected.
- **SD Input Format:** The SD input format.

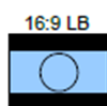
- **Normal:** Default 4:3 aspect ratio.



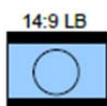
- **Anamorphic:** Horizontally squeezes a widescreen image to fit a standard 4:3 aspect ratio.



- **16:9 Letterbox:** Preserves the original aspect ratio of film shot in a widescreen aspect ratio, with bars visible at the top and bottom of the screen.

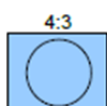


- **14:9 Letterbox:** A 14:9 letterbox image in a 16:9 frame.

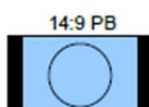


- **HD Input Format:** The HD input format.

- **Normal:** Default 4:3 aspect ratio.



- **14:9 Pillarbox:** A 14:9 pillarbox image in a 16:9 frame.



- **4:3 Pillarbox:** A 4:3 pillarbox image in a 16:9 frame.

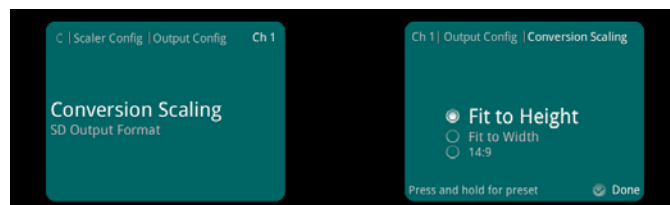


## 8.6.7 Scaler Config – Output Config

The Output Config functions define which of the supported aspect signaling standards defines the input of the ARC.

### 8.6.7.1 Conversion Scaling

Conversion Scaling enables you to set fixed ARC output aspects.

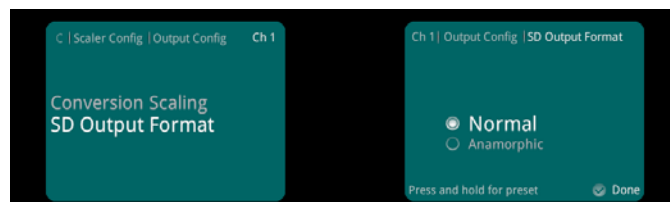


- **Fit to Height:** Scales the image to fit the height of the screen while maintaining the aspect ratio.
- **Fit to Width:** Scales the image to fit the width of the screen while maintaining the aspect ratio.
- **14:9:** Can scale either a 4:3 image for viewing on a 16:9 screen, or a 16:9 image for viewing on a 4:3 screen. This is a compromise in order to maintain the aspect ratio of the image, but will crop some of the image in the process (top and bottom when viewing 16:9 and left and right when viewing 4:3).

See section 8.6.8 for a list of possible ARC conversions using input signaling and a combination of SD Output Format and Conversion Scaling controls.

### 8.6.7.2 SD Output Format

When the output video is SD, this control enables you to set fixed output aspects for the ARC.



- **Normal:** Default aspect ratio.
- **Anamorphic:** Horizontally squeezes a widescreen image to fit a standard 4:3 aspect ratio.

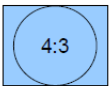
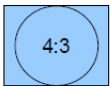
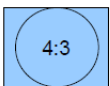
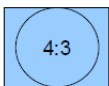
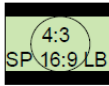
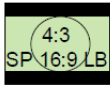
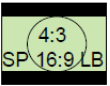
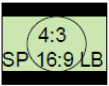


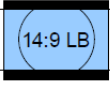
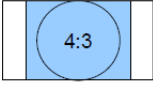
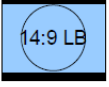
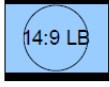
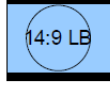

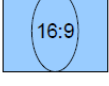
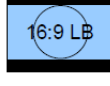
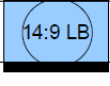
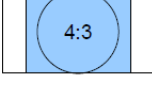
## 8.6.8 Input Signaling ARC Conversions

It is possible to manually fix the output aspect of the ARC when using input signaling. The input to the ARC is then defined by the dynamic input signaling.

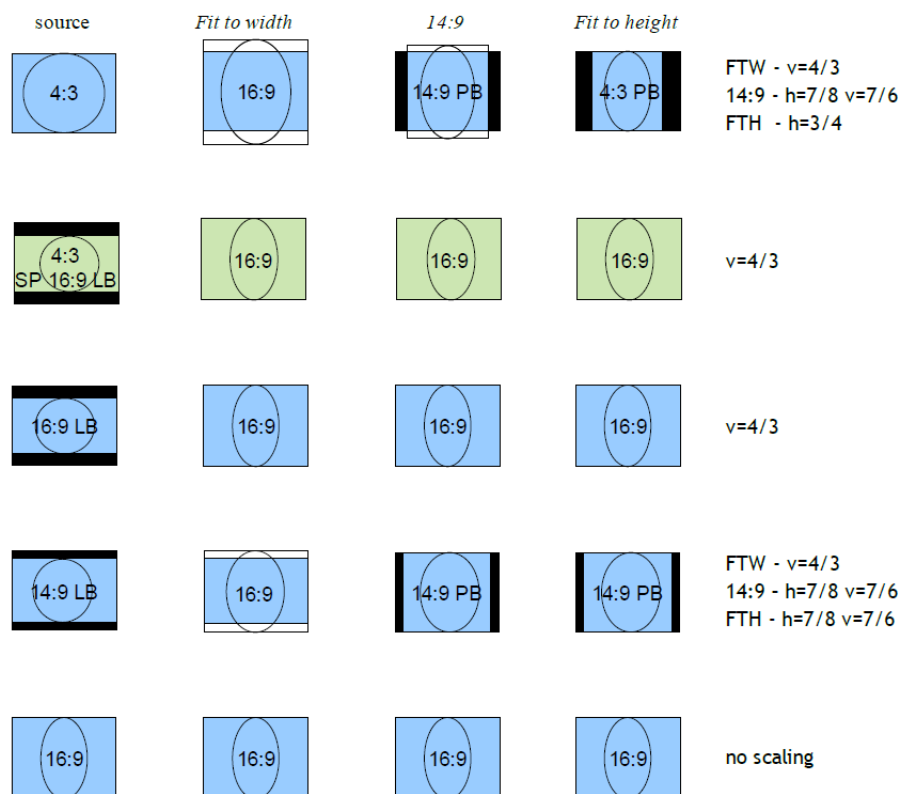
The following sections show the ARC conversions possible using input signaling and a combination of SD Output Format and Conversion Scaling controls. For each of the conversions there are four columns of images. The first column shows the source image in various formats, with each format described in the accompanying input signal. The next three columns show the output image format when the Fit to Width, 14:9, or Fit to Height Conversion Scaling controls are selected.

### 8.6.8.1 SD Cross Conversion

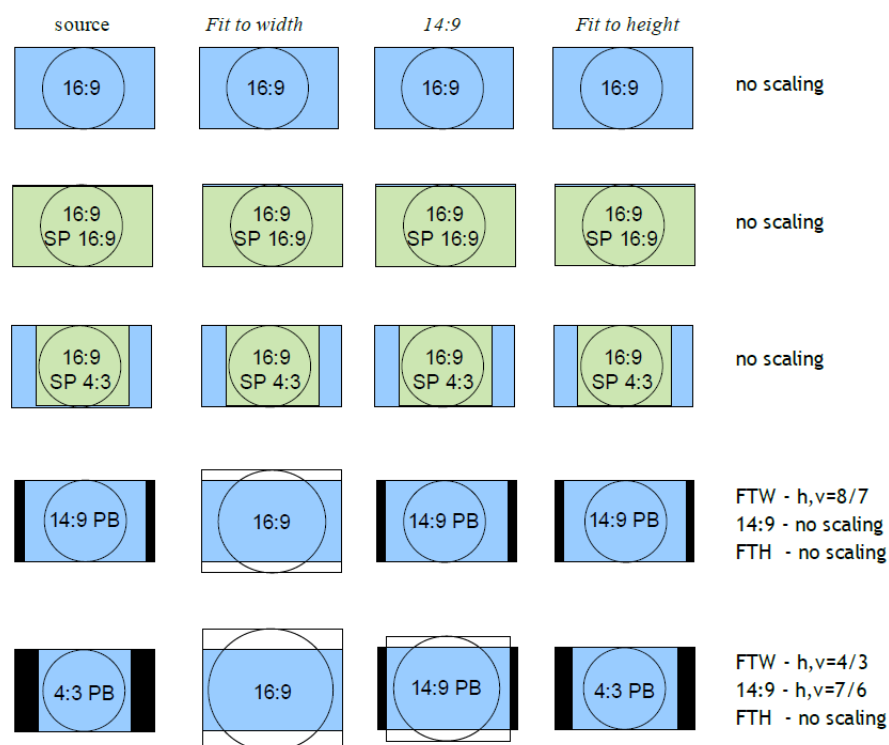
SD Output Format = Normal (4:3).

source	Fit to width	14:9	Fit to height	
				no scaling
				no scaling
				FTW - no scaling 14:9 - h,v=8/7 FTH - h,v=4/3
				FTW - no scaling 14:9 - no scaling FTH - h,v=7/6
				FTW - v=3/4 14:9 - h=8/7 v=6/7 FTH - h=4/3

## SD Output Format = Anamorphic (16:9).

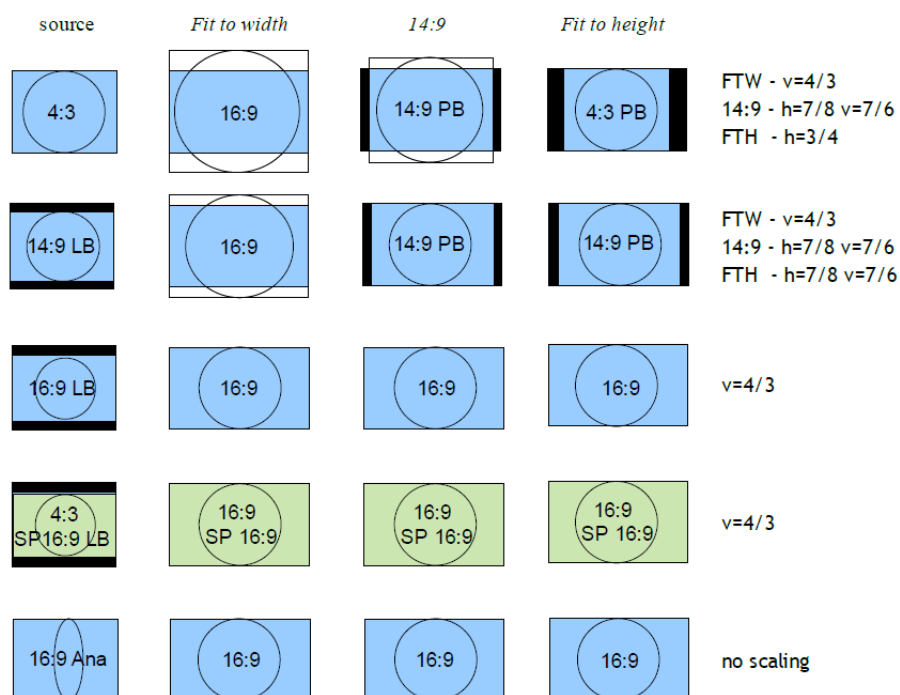


## 8.6.8.2 HD Cross Conversion



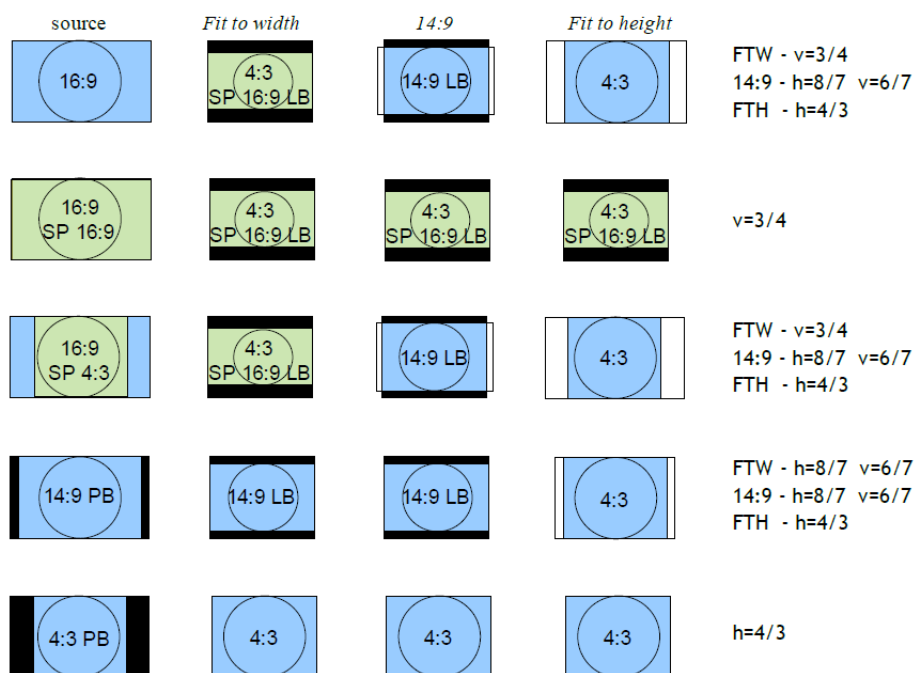
### 8.6.8.3 Up Conversion

SD Output Format has no effect as output is HD.



### 8.6.8.4 Down Conversion

SD Output Format = Normal (4:3).



## SD Output Format = Anamorphic (16:9).

source	Fit to width	14:9	Fit to height	
				no scaling
				no scaling
				no scaling
				FTW - h,v=8/7 14:9 - no scaling FTH - no scaling
				FTW - h,v=4/3 14:9 - h,v=7/6 FTH - no scaling

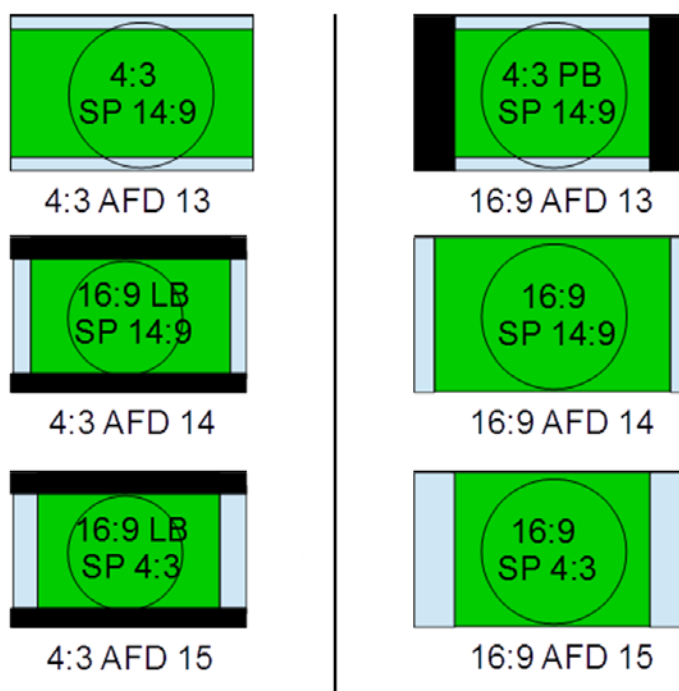
### 8.6.8.5 Alternative Center Cut

Alternate center cut is off by default. When off, behavior on receipt of certain specific AFD codes ignores protected regions. When Alternate center cut is on, the ARC behavior for these six specific codes will be to remove any Black bars and also remove the grey bars that will leave the “Alternative Centre”. The Alternative centre will therefore be stretched to fit the screen so that the whole “white area” fills the screen. This will override Fit to width, 14:9 and Fit to height setting, so that all three give the same output result. It also overrides the “SD Output Format” control (“Anamorphic” or “Normal”). See SMPTE ST 2016-1:2009, pages 7, 8 and 9.

The behavior with Alternate center cut on and off is shown in the table below:

AFD Format	Interpretation with Alternate Centre Cut Off	Interpretation with Alternate Centre Cut On
4:3 AFD 13	4:3	4:3 Alt 14:9
4:3 AFD 14	16:9LB	16:9LB Alt 14:9
4:3 AFD 15	16:9LB	16:9LB Alt 4:3
16:9 AFD 13	4:3PB	4:3PB Alt 14:9
16:9 AFD 14	16:9	16:9 Alt 14:9
16:9 AFD 15	16:9	16:9 Alt 4:3

#### Alternate Center Cut Illustrations

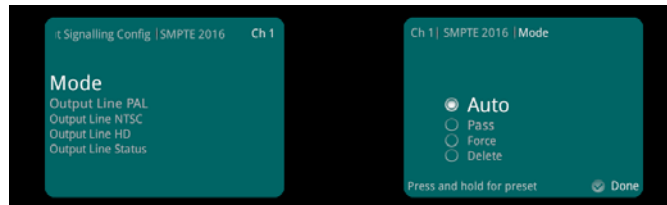


## 8.6.9 Output Signaling Config

The Output Signaling Config controls define which of the supported aspect signaling standards defines the input of the ARC.

### 8.6.9.1 SMPTE 2016

The SMPTE 2016 controls define how the SMPTE 2016 signaling is configured. The controls also enable you to choose the output line number on which output signaling is embedded.



- **Mode:** Four modes of operation are available.
  - **Auto:** Automatically generates an output SMPTE 2016 signal with AFD data that matches the output aspect of the ARC.
  - **Pass:** Passes input signal information through the unit unchanged when SMPTE 2016 is selected as the input signaling source.

The output signal may not represent the actual aspect of the output image. If no SMPTE 2016 signal is present at the input, no SMPTE 2016 signal will be output.

- **Force:** Generates an output SMPTE 2016 signal with AFD data that matches what is selected in the Force Mode Config – SMPTE 2016 list. The list contains 16 AFD codes for coded frame AR of 4:3, and eight AFD codes for a coded frame AR of 16:9.
- **Delete:** Disables embedding of SMPTE 2016 output signaling in the output video.
- **Output Line PAL:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is 625. The range is from line 7 to line 22 in one-line steps. The default is line 12.
- **Output Line NTSC:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is 525. The range is from line 11 to line 19 in one-line steps. The default is line 11.
- **Output Line HD:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is HD. The range is from line 9 to line 20 in one-line steps. The default is line 11.
- **Output Line Status:** Shows the output line number on which SMPTE 2016 signaling is embedded. If no line number is selected, “OFF” is displayed.

**Note:** In the SD domain, take care to avoid a line clash if embedded VITC and SMPTE 2016 are both enabled. VITC will take priority and overwrite the SMPTE 2016 packet if the same output line is selected for both.

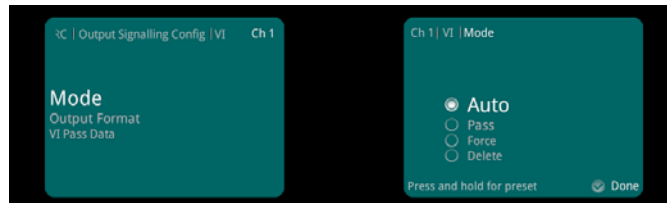
### 8.6.9.2 VI

The Video Index (VI) Config controls enable you to specify VI signaling output actions.

VI is valid for both 625 and 525 output video formats. The lines used are:

- 625: Field 1 line 11, field 2 line 324.
- 525: Field 1 line 14, field 2 line 276.

VI signaling supports two output formats, which are the two versions of the SMPTE RP 186 specification.

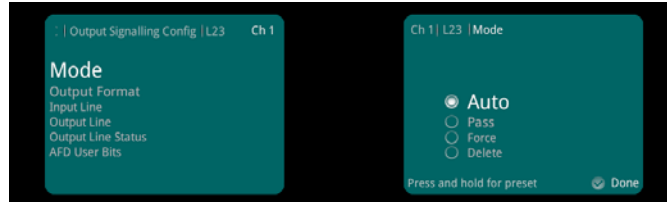


- **Mode:** Output options.
  - **Auto:** When Output Format is set to SMPTE, Auto generates an output VI signal conforming to SMPTE RP 186-95 with scanning system information that matches the output aspect of the ARC. If Output Format is set to AFD, Auto generates an output VI signal conforming to SMPTE RP 186-08, with scanning system information and AFD that matches the output aspect of the ARC.
  - **Pass:** When either VI SMPTE or VI AFD is selected as the input signaling source, any valid SMPTE RP 186-95/08 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signal may not represent the actual aspect of the output image. If no VI signal is present at the input, then no VI signal will be output.
  - **Force:** When Output Format is set to SMPTE, Force generates an output SMPTE RP 186-95 signal with scanning system information that matches what is selected in the Force Mode Config – SMPTE RP 186 list. 4:3 and 16:9 are available, but the actual code used is determined by the output video standard: 625 or 525.  
  
When Output Format is set to AFD, Force generates an output SMPTE RP 186-08 signal with scanning system information and AFD codes that match what is selected in the Force Mode Config – AFD list. The list contains eight AFD codes for scanning 4:3 system information, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used is determined by the output video standard: 625 or 525.
  - **Delete:** Disables embedding of any SMPTE RP 186-95/08 output signaling in the output video.
- **Output Format:** Output format options.
  - **SMPTE:** Generates output VI signaling conforming to SMPTE RP 186-95, carrying just the scanning system information relating to the output aspect of the ARC.
  - **AFD:** Generates output VI signaling conforming to SMPTE RP 186-08. This carries the scanning system information as well as AFD codes relating to the output aspect of the ARC. (This specification was originally generated as ARDSPEC1 by several Major UK broadcasters and later incorporated into SMPTE RP 186 2008 version.)
- **VI Pass Data:** Allows passing of VI user bits data to the output video. Note that the input signaling source selected has to match the selected output format.

### 8.6.9.3 L23

The L23 Config controls define how the output ETSI EN 300 294 signaling is configured. This signaling format is generally referred to as WSS or Line 23 (L23), as this is the default line used to carry this signal in 625. WSS is only valid for 625 output video formats and is only supported for 625 output video format.

WSS signaling supports two output formats: ETSI EN 300 294, and a non-standard variant of ETSI EN 300 294.



- **Mode:** Output options.
  - **Auto:** If Output Format is set to ETSI, Auto generates an output WSS signal conforming to ETSI EN 300 294, with AFD codes that match the output aspect of the ARC. If Output Format is set to AFD, Auto generates an output WSS signal conforming to L23, with scanning system information and AFD codes that match the output aspect of the ARC.
  - **Pass:** When either L23 ETSI or L23 AFD is selected as the input signaling source, any valid ETSI EN 300 294 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signal may not represent the actual aspect of the output image. If no WSS signal is present at the input, then no WSS signal will be output.
  - **Force:** When Output Format is set to ETSI, Force generates an output ETSI EN 300 294 signal with AFD codes that match what is selected in the Force Mode Config – ETSI list. The list contains eight AFD codes.
 

When Output Format is set to AFD, Force generates an output ETSI EN 300 294 signal that is modified to carry VI scanning system information and AFD codes that match what is selected in the Force Mode Config – AFD list. The list contains eight AFD codes for scanning 4:3 system information, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used will always be 625, as WSS is only supported in 625 video output.
  - **Delete:** Disables embedding of ETSI EN 300 294 output signaling in the output video.
- **Output Format:** Inserts L23 information in either AFD or ETSI format.
  - **ETSI:** Generates output WSS signaling conforming to ETSI EN 300 294, carrying just the AFD codes relating to the output aspect of the ARC.
  - **AFD:** Generates output WSS signaling conforming to ETSI EN 300 294; however, payload of the signal has alternative meaning: it has been modified to carry Video Index Scanning system information and AFD codes relating to the output aspect of the ARC. (This specification was originally generated as L23 spec by several major UK broadcasters and manufacturers. It has never been released as an official standard.)
- **Input Line:** WSS information is generally carried in the first half of line 23; however, if the information is required on a different line, use the slider to specify the line on which it is carried in the input. The range is from line 10 to line 23 in one-line steps.

*Note: ETSI EN 300 294 signaling will only be extracted from this line number if the video input format is 625.*

- **Output Line:** WSS information is generally carried in the first half of line 23; however, if the information is required on a different line, use the slider to specify the line on which it is carried in the output. The range is from line 10 to line 23 in one-line steps.

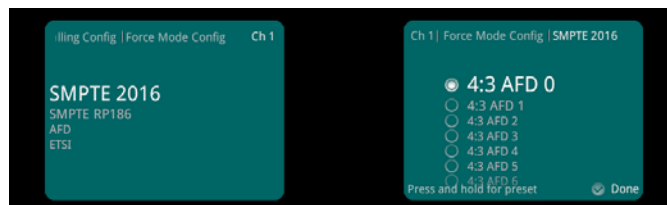
*Note: ETSI EN 300 294 signaling will only be extracted from this line number if the video input format is 625.*

- **Output Line Status:** Shows the output line number on which WSS information is carried. If no line number is selected, "OFF" is displayed
- **AFD User Bits:**
  - **Force User Bits Value:** Forces the value set on the User Bits Value slider into the L23 output.
  - **User Bits Value:** Sets the line on which the four additional user bits are carried.

**Note:** WSS output signaling is only available in SD 625 output video format.

### 8.6.10 Output Signaling Config – Force Mode Config

Force Mode Config enables you to define the scanning system information and AFD codes inserted in the output signaling when Force is selected for any of the following three signaling types: SMPTE 2016, VI SMPTE RP 186, and WSS ETSI EN 300 294.



- **SMPTE 2016:** When SMPTE 2016 output signaling mode is set to Force, this control offers a list of 16 AFD codes for coded frame AR of 4:3 and the same AFD codes for a coded frame AR of 16:9. Selecting one will generate a SMPTE 2016 output signal.
- **SMPTE RP186:** When VI output signaling mode is set to Force and output format is set to SMPTE, this control offers a list of two scanning system information codes: 4:3 and 16:9. The actual code used is determined by the output video standard: 625 or 525. Selecting one will generate a SMPTE RP 186-95 output signal.
- **AFD:** When VI or L23 output signaling modes are set to Force, and their output formats are set to AFD, this control offers a list of eight AFD codes for scanning system information of 4:3, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used is determined by the output video standard: 625 or 525. Selecting one will generate the following output signaling:
  - SMPTE RP 186-08: VI mode = Force, Output Format = AFD.
  - ETSI EN 300 294 (with SMPTE RP 186-08 payload): L23 mode = Force, Output Format = AFD.
- **ETSI:** When WSS output signaling mode is set to Force and output format is set to ETSI, this control offers a list of eight AFD codes. Selecting one will generate a ETSI EN 300 294 output signal.

## 8.7 Audio

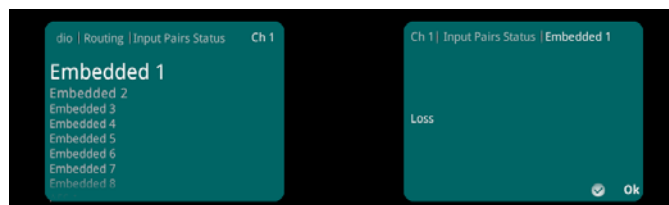
The Audio menu enables you to control the routing of the unit's audio options.

### 8.7.1 Routing

The Routing control enables you to route the incoming audio to an embedded audio output.

#### 8.7.1.1 Input Pairs Status

The Input Pairs Status list shows the status of the audio input pairs.

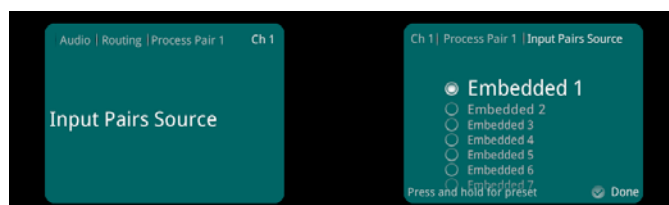


The audio status display information is as follows:

- PCM: Audio is PCM
- Mute: Audio is muted
- Tone: Audio is a test tone
- DolbyE: Audio is Dolby
- Loss: Audio is unavailable or invalid

#### 8.7.1.2 Process Pair 1–8

For each of the output pairs, 1–8, you can select the audio source to be passed to each audio processor on the Audio Shuffle screen.



For each of the output pairs you can select the audio source from any of the following inputs:

- Embedded 1–8
- AES 1–4
- Analog 1–4
- Dolby Decoder (if fitted). You can select each of the four audio pairs from the Dolby decoder individually:
  - Dolby decoder 1 is pair 1 from the Dolby decoder
  - Dolby decoder 2 is pair 2 from the Dolby decoder
  - Dolby decoder 3 is pair 3 from the Dolby decoder
  - Dolby decoder 4 is pair 4 from the Dolby decoder
- Dolby Decoder Downmix (if fitted): The Lt/Rt downmix (applicable to 5.1 and 4 channel Dolby formats)

- Dolby Encoder (if fitted)

For schematic information on audio routing, see “Block Diagrams” on page 15.

**Note:** AES and analog audio are controlled at a frame level, not at a channel level.

To route the AES and analog audio outputs, see “Audio Routing” on page 35.

For more information about audio routing, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 8.7.1.3 Process Pairs 1–8 Status

The Status list shows the status of the audio output pairs.



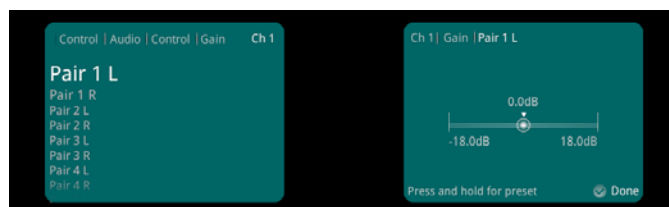
The audio status display information is as follows:

- P = PCM
- L = Loss
- N = Non-PCM

## 8.7.2 Control

The Control menu enables you to adjust the gain of the audio channels.

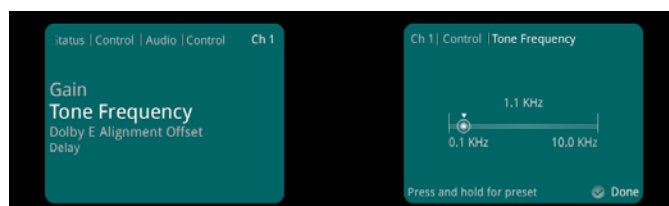
### 8.7.2.1 Gain



- **Pair 1–8 L/R:** Adjust the gain of the left and right channels of the audio pairs. The adjustment range is -12 dB to 12 dB in 0.1 dB steps. The preset value is 0 dB.

### 8.7.2.2 Tone Frequency

The Tone Frequency slider adjusts the frequency of the test tones. The adjustment range is 0.1 kHz to 10 kHz in 0.1 kHz steps. The preset value is 0.

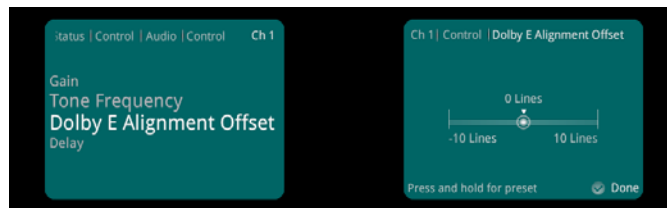


**Points to consider:**

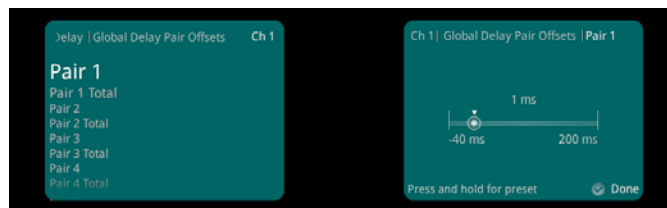
- Each embedded pair (EMB1/2 to EM15/16) has its own individual tone generator.
- AES can be balanced or un-balanced (MC1000-IQ/MC2000-IQ, balanced AES only). Only four pairs of AES can be processed.
- Analog audio processing is limited to four pairs.
- Analog and AES outputs are derived from Embedded pairs, hence test-tones follow Embedded audio settings.

**8.7.2.3 Dolby E Alignment Offset**

The Dolby E Alignment Offset slider sets the guard-band position of any output pair containing Dolby E, to allow for downstream processing. By default, the position of the guard-band is set automatically, and is dependent on the output standard.

**8.7.2.4 Delay**

The Delay controls enable you to set delay pair offsets and the audio delay relative to the video delay.



- **Global Delay Pair Offsets:** Global delay offsets for pair 1–8.
  - **Pair 1–8:** Adjusts the audio delay offset for each of the eight audio channel pairs. The adjustment range is -40 ms to 200 ms in 1 ms steps. The preset value is 0 ms.
  - **Pair 1–8 Total:** Shows the current total pair delay.
- **Global Delay:** Global delay settings for pair 1–8.
  - **Audio:** Adjusts the audio delay relative to the video delay. The adjustment range is -40 ms to 200 ms in 1 ms steps. The preset value is 0 ms.
  - **Audio Total:** Shows the current total audio delay.
  - **Video Total:** Shows the current total video delay.

**Note:**

Global delay is applied to all channels. Individual channel delays are added/subtracted from this delay.

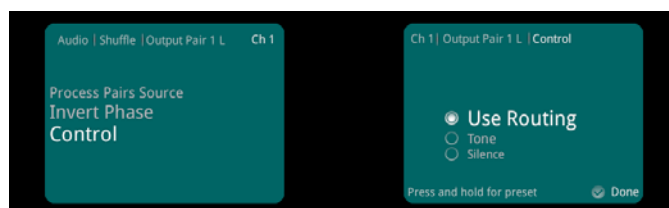
For more information about audio control, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 8.7.3 Shuffle

The Shuffle menu contains the output information from the audio processors, as defined on the Routing screen.

#### 8.7.3.1 Output Pairs 1–8 L/R



- **Process Pairs Source:** For each of the output pairs, 1–8, you can select the audio source to be routed to the output.

*Note: Certain rules determine which combinations are valid. An invalid combination will force the output to silence. The following table shows the rules that govern output pair combinations:*

	Non-PCM	PCM	Tone	Silence	Loss
Non-PCM	N or F	F	F	F	F
PCM	F	P	P	P	F
Tone	F	P	T	P	F
Silence	F	P	P	S	F
Loss	F	F	F	F	F

P = PCM, N = non-PCM, S = silence, T = test tone, F= forced mute (silence).

- **Invert Phase:** Enables you to invert the phase of the left and right audio channels. This control is useful for dealing with input audio discrepancies.
- **Control:** Control options.
  - **Use Routing:** Routes the audio output from the audio processor.
  - **Tone:** Makes the audio input source a test tone.
  - **Silence:** Mutes the audio input source.

For more information about audio routing, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## 8.8 Timecode

The Timecode menu enables you to set up and control the unit's timecode options for VITC (Vertical Interval Timecode), LTC (Linear Timecode), and ATC (Ancillary Timecode).

For HD video inputs, ATC LTC and ATC VITC timecode data formats are supported. For HD video outputs, the timecode data format is fixed to ATC VITC. This is present in all HD video outputs if Follow Input mode is selected (with a valid input timecode detected), or if Generate mode is selected.

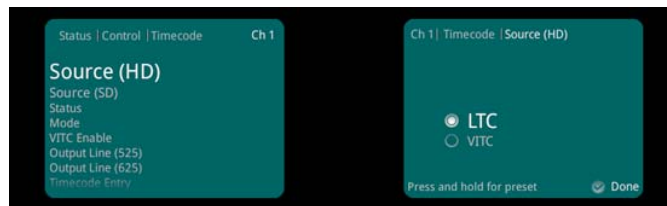
For SD video inputs, VITC, ATC LTC and ATC VITC timecode data formats are supported. For SD video outputs, the timecode data format is fixed to VITC. This is present in all SD video outputs if the VITC Enable check box is selected, and either Follow Input mode is selected (with a valid input timecode detected), or Generate mode is selected.

Where the input frame rate is 29.97 fps, both drop frame and non-drop frame modes are supported. For 29.97fps outputs, timecode can be configured as either drop frame or non-drop frame.

**Note:** External LTC timecode is not supported.

### 8.8.1 Source (HD/SD)

The Source controls enable you to choose a timecode type from the input: LTC or VITC for HD, and VITC, ATC LTC, or ATC VITC for SD.



For HD video standards, the supported input timecode format is ATC. This means that timecode data formatted as LTC, VITC, or both will be detected at the input; however, only one format can be selected.

- **LTC:** Select ATC LTC only if detected when video input is HD.
- **VITC:** Select ATC VITC only if detected when video input is HD.

If the selected format is not detected at the input, no timecode processing will be available.

For SD video standards, the supported input timecode formats are VITC and ATC. As with HD, ATC can mean that timecode data formatted as LTC, VITC, or both will be detected at the input; however, only one format can be selected.

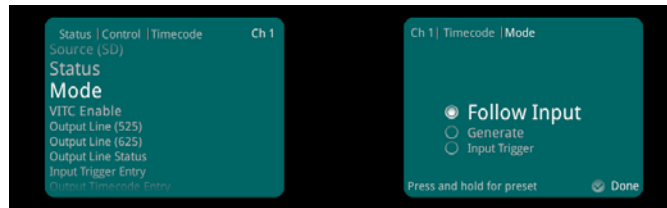
- **VITC:** Select VITC only if detected when video input is SD.
- **ATC LTC:** Select ATC LTC only if detected when video input is SD.
- **ATC VITC:** Select ATC VITC only if detected when video input is SD.

If the selected format is not detected at the input, no timecode processing will be available.

### 8.8.2 Status

Status reports which type of embedded timecode is detected within the video input to this processing channel.

### 8.8.3 Mode



- **Follow Input:** The input timecode is read every frame and the actual time elapsed since timecode 00:00:00:00 is calculated. This elapsed time is then converted into an output timecode that matches the output video frame, and inserted into the output.

There is an additional process to compensate for clock offset between in and out, which will generate repeated or skipped timecodes as necessary, just as happens when synchronizing at the same standard. If the output is clock-locked to the input, this process has no effect.

- **Generate:** The unit generates the output timecode internally to match the output video standard. You can specify a start time in the Timecode Entry field. See “Section 8.8.10 Timecode Entry”.
- **Input Trigger:** The unit generates the output timecode from a specified input timecode trigger. You can specify a trigger and start time in the Input Trigger Entry and Output Timecode Entry fields.

### 8.8.4 VITC Enable

VITC Enable embeds the VITC in the SD output.

**Note:** This control only enables the embedding of VITC. In order for VITC to be present in the output SD video, a valid timecode must be detected at the input when in Follow Input mode, or when Generate mode is selected.

### 8.8.5 Output Line (525)

The Output Line (525) slider selects the output line on which VITC is placed when the channel output is 525. The range is from line 11 to line 17 in one-line steps. The default is line 14.

### 8.8.6 Output Line (625)

The Output Line (625) slider selects the output line on which VITC is placed when the channel output is 625. The range is from line 7 to line 20 in one-line steps. The default is line 19.

**Note:** The line number stated is the first of the two lines used to embed VITC. The second line will always be the line selected + 2. For example, the default line for 525 is 14. Therefore VITC will be embedded on lines 14 and 16.

### 8.8.7 Output Line Status

Output Line Status shows the actual output line number on which SD VITC packets are inserted. If no line number is selected, “OFF” is displayed.

**Note:** If the line selected is already in use, the VANC embedding hierarchy will place the SD VITC packet on the nearest available line.

### 8.8.8 Input Trigger Entry

In the Input Trigger Entry field you can enter a value to specify when the output timecode starts. Once set, the output timecode will start when the video source input timecode reaches the trigger value set in the Input Trigger Entry field.

### 8.8.9 Output Timecode Entry

In the Output Timecode Entry field you can enter a value to specify when the output timecode starts. Once set, the output timecode will start when the input timecode reaches the trigger value set in the Input Trigger Entry field.

### 8.8.10 Timecode Entry

In the Timecode Entry field you can enter a value to specify when the internally generated free-running timecode starts. Once set, the internally generated timecode will start when you select the Timecode Load button.

### 8.8.11 Timecode Load

Timecode Load enables you to manually trigger the internally generated timecode, as defined in the Timecode Entry field.

### 8.8.12 On Timecode Loss

On Timecode Loss defines how the embedded output timecode should behave if input timecode cannot be detected.

- **Freeze:** On timecode loss, the output timecode will freeze at the last valid detected input value, until the valid input returns.
- **Free Run:** On timecode loss, the output timecode will switch to free-run and generate its own timecode starting from the last valid detected input value, until the valid input returns.

### 8.8.13 Non Drop Frame

Output timecode always follows the correct count sequence for the output standard, except when following an input timecode that does not represent actual time (except if the input is flagged as 59 non-drop).

Drop Frame operates as follows:

- When converting timecode from 29/59 Hz to 29/59 Hz standards, the output drop-frame type automatically matches the input (the Drop Frame control has no effect).
- When using the internal timecode generator with a 29/59 Hz output standard, the drop-frame type is determined by the Drop Frame control.
- When converting 23 Hz inputs to anything, follow input will give a broken sequence.

## 8.9 Metadata

The Metadata menu enables you to control a set of closed captions and teletext subtitle information.

Incoming SD or HD closed captions and subtitles are converted to the correct format in the HD or SD output when upconverting or downconverting at the same frame rate.

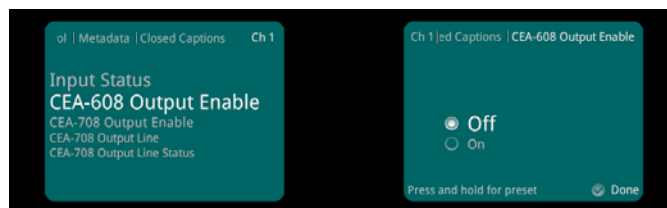
### 8.9.1 Closed Captions

Closed Captions covers CEA-608 and CEA-708 specified captioning. Although these specifications support captioning in multiple video standards, CEA-608 is only supported in 525 input or output as a line 21 signal. CEA-708 is only supported in 59 Hz HD video standards as a VANC packet with a Caption Distribution Packet (CDP) payload.

Closed Caption pass-through is possible if a valid input closed caption is present and input and output video standards are the same.

Closed Caption transcoding is supported from CEA-608 to CEA-708 by taking the decoded bytes from the line 21 signal and inserting them into the compatibility byte within the CDP. Transcoding from CEA-708 to CEA-608 is possible if the CDP contains a compatibility bytes, which are extracted and encoded as an output line 21 signal.

Closed captions are automatically detected in the input video, and the detected format shown in the Status window. For closed captions to be embedded in the output video, they must be enabled. User control for on which line to embed CEA-708 is provided, but CEA-608 is always fixed at line 21.



- **Input Status:** Shows if CEA-608 or CEA-708 captions are detected on the input.
- **CEA-608/708 Output Enable:** Enables embedding of CEA-608 captioning as a line 21 signal in 525 output video, and CEA-708 captioning as an embedded VANC packet in 59 Hz HD output video.

*Note: The Output Enable controls only enable embedding of output closed captioning. For closed captioning to be present in the output video, valid input closed captioning must be detected, and you must select the correct output standard to support pass-through or transcoding.*

- **CEA-708 Output Line:** Selects the output line on which to insert CEA-708 VANC packets. The range is from line 8 to line 20 in one-line steps. The default is line 10.
- **CEA-708 Output Line Status:** Shows the actual output line number on which CEA-708 VANC packets are inserted. If no line number is selected, "OFF" is displayed.

*Note: If the line selected is already in use, the VANC embedding hierarchy will place the CEA-708 packet on the nearest available line.*

## 8.9.2 Multi-line WST

The unit can pass World System Teletext (WST) for SD and RDD-08 or SMPTE 2031 teletext for HD. You can enable or disable teletext output and specify the input and output lines used.

Teletext covers World System Teletext (WST) subtitles, SMPTE RDD-08 and SMPTE 2031. For WST and RDD-08, only subtitle information is supported or processed. SMPTE 2031 VANC packets may be teletext subtitles, non-subtitles, or inverted teletext.

WST is only supported in 625 input or output encoded signals. RDD-08 is only supported in 50 Hz HD video standards as a VANC packet with a Subtitling Distribution Packet (SDP) payload. Teletext subtitle transcoding is supported from WST to RDD-08 by taking the decoded bytes from the WST signal and inserting them into the payload within the SDP (see below). Transcoding from RDD-08 to WST is only possible if the SDP contains valid subtitles, which are extracted and encoded as an output WST signal.



Menu Choice	Operation	
<b>625 captions</b>	<ul style="list-style-type: none"> <li>WST (Default)</li> <li>CEA-608</li> </ul>	
<b>SD VBI setup</b>	WST Origin Line 7 to 22	<ul style="list-style-type: none"> <li>Off (default)</li> <li>Enable</li> </ul>
	WST Origin Line 7 to 22 Status	Reports WST status of each input line
	WST OP Line 7 to 22 Status	Reports status of each output line
	Allow WST Remap	<ul style="list-style-type: none"> <li>Off (default)</li> <li>Enable</li> </ul>
	WST Origin Line	Select from 7 to 22 using slider or numeric entry Default is line 10
	WST Origin Line Status	Reports status of the origin line
	WST Output Line	Select from 7 to 22 using slider or numeric entry Default is line 10
	WST Output Line Status	Reports the chosen output line
	<b>Note:</b> Only one WST origin line may be remapped	

Menu Choice	Operation		
<b>SMPTE RDD08/ SMPTE ST2031</b>	RDD08/2031 Input Packet Type	<ul style="list-style-type: none"> <li>• SMPTE RDD08 (default)</li> <li>• SMPTE 2031</li> </ul>	
	RDD08 / 2031 Output Packet Enable	<ul style="list-style-type: none"> <li>• Off (Default)</li> <li>• RDD08/2031 Output Packet Enable</li> </ul>	
	RDD08/2031 Output Packet Type	<ul style="list-style-type: none"> <li>• SMPTE RDD08 (default)</li> <li>• SMPTE 2031</li> </ul>	
	SMPTE RDD08	RDD08 Output Line PKT 1	Select from 8 to 20 Default is line 10
		RDD08 Output Line PKT 2	Select from 8 to 20 Default is line 10
		RDD08 Output Line PKT 3	Select from 8 to 20 Default is line 10
		RDD08 Output line PKT 1 status	Reports the chosen output line for PKT 1
		RDD08 Output line PKT 2 status	Reports the chosen output line for PKT 2
		RDD08 Output line PKT 3 status	Reports the chosen output line for PKT 3
	SMPTE 2031	2031 Data Unit ID PKT 1 to 5	<ul style="list-style-type: none"> <li>• Teletext Subtitle (default)</li> <li>• Teletext Non-Subtitle</li> <li>• Inverted Teletext</li> </ul>
		2031 Output Line All PKTs	Select from 8 to 20 Default is line 10
		2031 Output Line All PKTs Status	Reports the chosen output line

### Teletext pass-through

Teletext pass-through is possible if a valid input teletext subtitle is present and input and output video standards are the same. For SD video that uses a large number of WST VBI (where the VBI may have multiple lines of WST and 2 Timecode lines) the unit can encode/decode/transcode up to 15 lines of WST. In up and down conversion applications, this would use up to 3 RDD-08 (OP47) packets. RDD08 OP47 allows for 15 lines of WST to be encoded. SMPTE2031 allows only 5 lines of WST to be encoded.

## 625 Input - 625 Output

You can select which input lines of WST are encoded on the output (see instructions for SD VBI line setup below). For the lines selected the status of WST being detected on that line is reported back.

The unit allows for up to 15 lines of WST to be selected on the input. If valid WST is detected on the selected lines, they will be placed on the same lines on the output. The status for each line will be reported back.

It is also possible to remap one WST origin line. In this case, select Allow WST remap (see menu list table on page 84). If valid WST is detected on the line selected by "WST origin line" it will be put on the line selected by the user control "WST output line".

**Note:**

Only one WST origin line may be remapped.

## 625 Input - HD Output

In applications where the video is upconverted, you can select which lines of WST are encoded.

1. If RDD08 (OP47) conversion is selected, then up to 15 lines can be encoded in the RDD-08 packet. A maximum of 3 packets are allowed on the output, each with individual line number controls. The number of output RDD-08 packets on the output is decided by the number of valid WST lines decoded on the input. The first five WST lines are encoded in the first RDD-08 packet, the next 5 in the second RDD-08 packet and so on.
2. If SMPTE2031 conversion is selected, then the first 5 lines selected on the input are encoded in the 2031 packet. Each single WST line corresponds to one SMPTE2031 packet on the output. All packets will be placed on the same line selected by the user control (see control Output Line All PKTs in the menu list table on page 84). The Data Unit ID can be set to Teletext, Non-Teletext or Inverted Teletext.

## HD Input - HD Output

You can select which input HD WST packet is to be decoded - RDD-08 or SMPTE2031. Cross-conversion between the packet types is allowed. The option to select individual WST lines contained in the input packets is still available using the WST origin and status menu items. This is because both the SMPTE2031 and RDD-08 packet contain within them the original source SD line number information. The input line selection refers to this line number and not the ANC packet position line number.

## HD Input - 625 Output

You can select which input HD WST packet is to be decoded - RDD-08 or SMPTE2031. You can specify which lines of WST to encode on the output using the WST origin and menu item. The WST lines will be encoded on the line number information encoded within the input HD packet, unless "Allow WST remap" is selected in which case you can change the line number for one WST line on the output (similar to the SD to SD case described above).

**Note:**

Only one WST origin line may be remapped

## 8.10 Memory

The Memory menu enables you to save up to eight memory setups for each processing channel, and recall them when required.

You can change the default memory names to more relevant ones if required.

Memories set at a channel level save all parameters associated with the processing channel including:

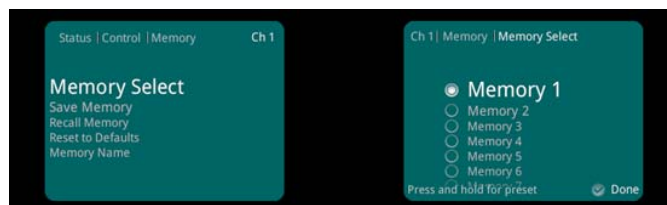
- Input routing.
- Output standard and aspect ratio controls.
- Video processing settings such as noise reduction parameters, proc amp settings, and enhancer parameters.
- Conversion options such as Still Process.
- Signaling parameters.
- SDI output audio routing per processing channel.
- PCM audio controls (gain, delay, L/R swap).
- Timecode settings.
- Closed caption processing choices.

**Note:**

Memories set and recalled for any chosen processing channel do not affect any other processing channel.

### 8.10.1 Memory Select

Memory Select lists the eight available memories.



### 8.10.2 Save Memory

Use the Save Memory button to save a new memory.

### 8.10.3 Recall Memory

The Recall Memory list recalls the settings saved in a memory location.

### 8.10.4 Reset to Defaults

Reset to Defaults recalls all the unit's default memory settings at a channel level. All controls are reset back to their preset values.

**Note:**

Reset to Defaults does not affect user memories.

### 8.10.5 Memory Name



To change a memory name:

1. From the Memory Name menu, select Change Name.
  2. Select the text box. The text entry cursor appears.
  3. Press an Alphanumeric button, 1 to 8, repeatedly until the desired character appears. If the next character you want is on the same button as the present one, wait until the cursor blinks once before pressing the button again.
- To enter a space between characters, press button 0.
  - To enter a special character, such as the @ symbol, press button 9.
  - To delete a character, press the Back button.

To save a memory name:

- From the Save Memory menu, select Save Memory.

### 8.11 RollCall

The RollCall menu enables you to name the unit for use remotely with the RollCall Control Panel. For more information about the RollCall Control Panel, see page 89.

### 8.12 Logging

Logging defines what parameter information is made available to a logging device attached to the RollCall network.

You can select to enable logging and view the status of the following parameters:

- Input Ident
- Input Standard
- Input State
- Output Ident
- Output Standard
- MSG Status

**Note:**

MSG Status shows a confirmation message that the log server is running.

## 9. Operation Using the RollCall Control Panel

In addition to the front panel, the RollCall Control Panel enables you to control the MC1000/MC1000-IQ/MC2000/MC2000-IQ unit through various different screens.

Refer to the *RollCall Control Panel Installation & Operator's Manual* for information on installation and setup of the RollCall Control Panel.

**Note:**

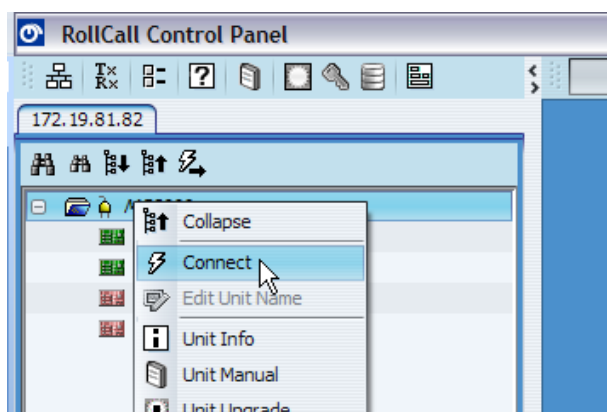
- Each processing channel has its own set of RollCall system operation screens in addition to the system setup RollCall screens. The MC2000/MC2000-IQ has Channel 1 and Channel 2 available.
- If one or two IQ modules have been fitted in MC1000-IQ or MC2000-IQ, these modules will appear in the Channel list below the System level (see screen below). For information about how to control any fitted IQ module, please see the relevant manual for that module.

### 9.1 Opening the System Setup Screens

The system setup screens contain all of the menu lists, options, and controls available for setting up the unit.

To open the system setup screens:

- At the top of the RollCall network tree, right-click the product name and select Connect.



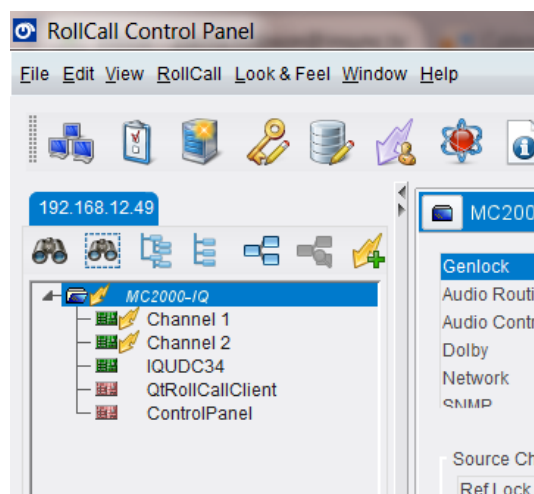
The Input screen is displayed.

## 9.2 Opening the Channel Operation Screens

The channel operation screens contain all of the menu lists, options, and controls available for performing signal processing, frame rate, and format conversions for each processing channel.

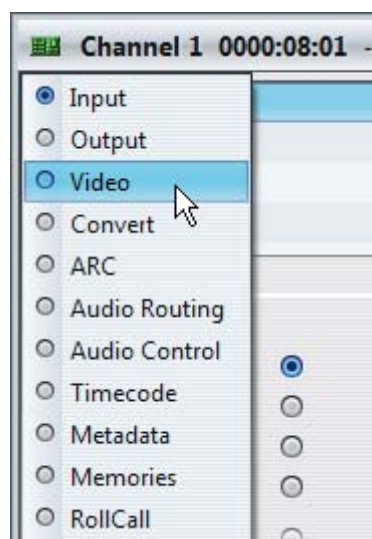
To open the channel operation screens:

- On the RollCall network tree, double-click the required channel name.



The Input screen is displayed.

## 9.3 Navigating Screens



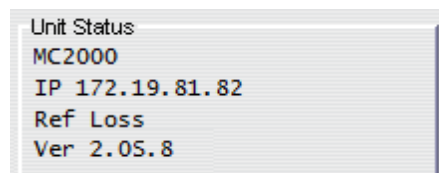
The list at the top-left of each screen shows each template screen available for the unit in use.

To select a different template screen, choose one from the list. Alternatively, right-click anywhere on-screen in an opened template and choose one from the list.

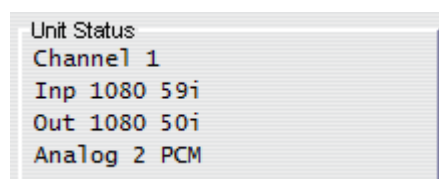
## 9.4 Unit Status Windows

The Unit Status windows at the top of each screen display information about the status of the unit.

The Unit Status window on a system setup screen shows the IP address of the unit, the reference status, and the software version.



The Unit Status window on a channel operation screen shows the current channel and the input, output, and audio status.



The audio information line (shown here as Analog 2 PCM) cycles through the audio input sources every few seconds, showing the status of each one in turn.

The audio status display information is as follows:

- PCM: Audio is PCM
- Mute: Audio is muted
- Tone: Audio is a test tone
- DolbyE: Audio is Dolby
- Loss: Audio is unavailable or invalid

**Note:**

The Unit Status information is also present on the System screen and the Home screen on the front panel.

## 9.5 Using the Web Applet

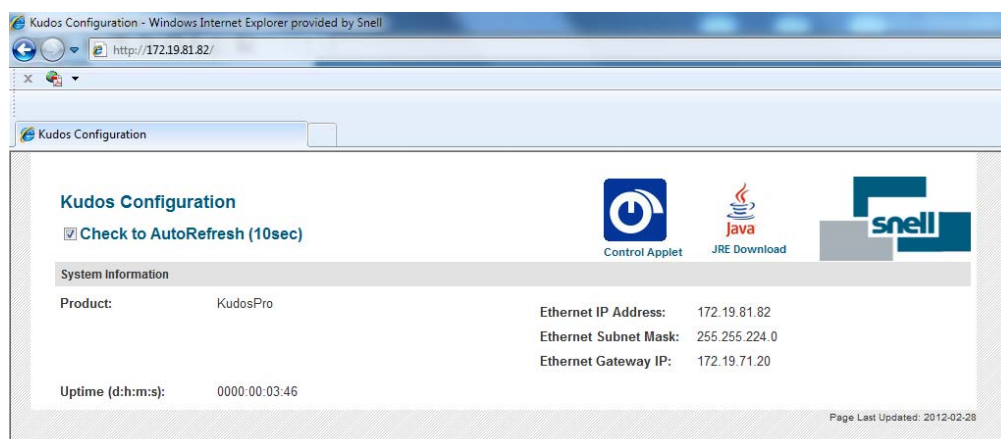
In addition to the front panel and the RollCall Control Panel, the web applet enables you to control the MC1000/MC1000-IQ/MC2000/MC2000-IQ unit from a web browser. The appearance and controls are the same as the RollCall Control Panel.

For information about the RollCall Control Panel template screens and controls, see “RollCall Control Panel System Setup Screens” on page 93 and “RollCall Control Panel Channel Operation Screens” on page 110.

**Note:** To use the web applet you must have Java installed on your PC.

To start the web applet:

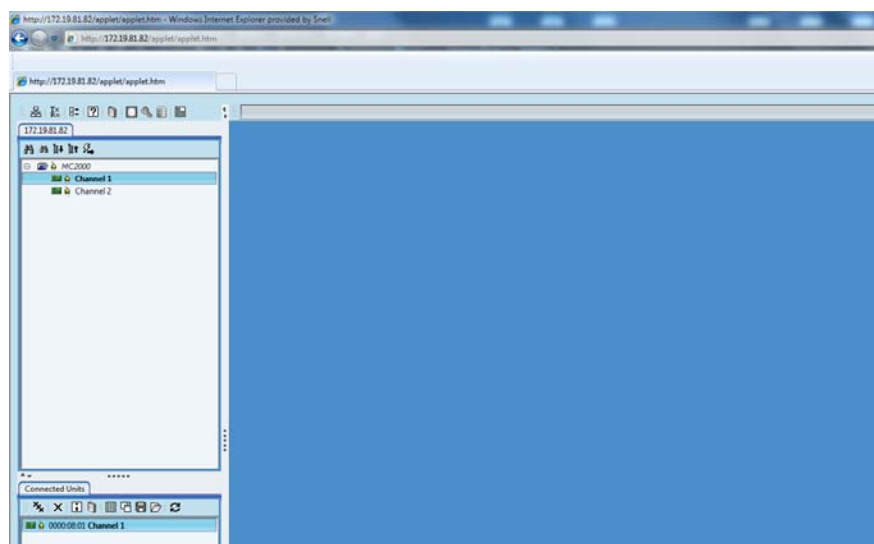
1. Enter the IP address of the unit into your web browser and press Enter. The Kudos Configuration screen appears.



2. Click the Control Applet icon.



After a few moments the template screen appears.



You can now use the web applet to control the unit as detailed at the start of this section.

## 10. RollCall Control Panel System Setup Screens

This section details all of the screens, menu lists, options, and controls available for setting up the unit from the RollCall Control Panel.

**Note:** The screens shown in this section are for guidance and reference only, and may be slightly different to those on your unit.

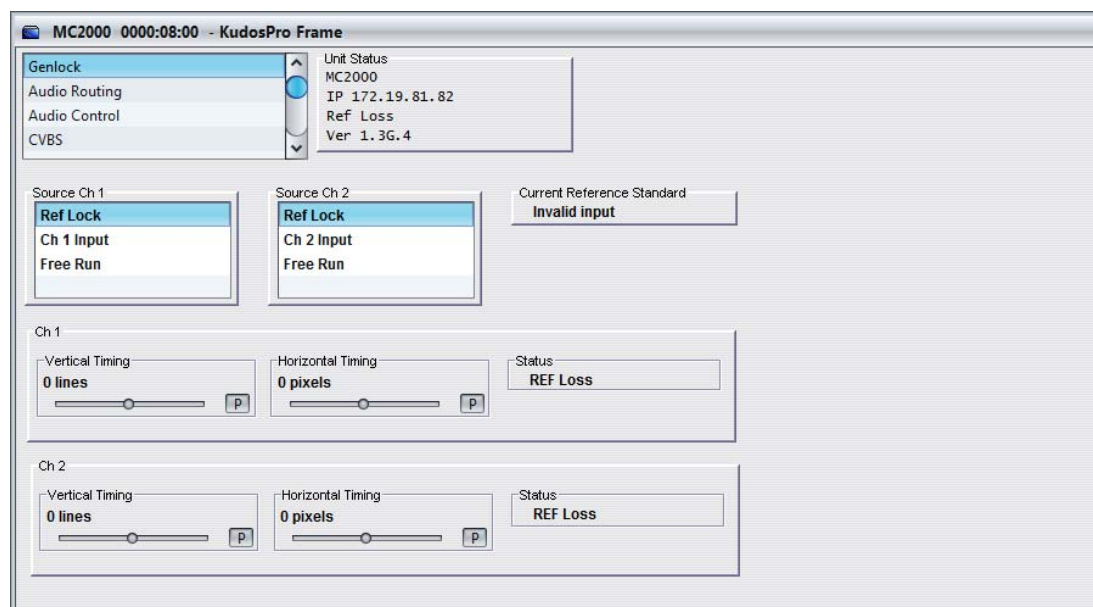
### 10.1 Genlock

The Genlock screen provides controls that lock the output video clock to the genlock source (input or reference) regardless of the video standard. If the genlock source and the video output are the same frame rate, for example, 50 Hz or 59.94 Hz, Genlock locks the output to the vertical phase of the genlock source, giving consistent and repeatable delay.

**Note:** Lock to input wherever possible. Only lock to an external reference if necessary.

When attempting to pass non-PCM audio, ensure that Genlock is enabled. If using an external reference, it must be clock-locked to the input video.

**Note:** If Genlock is set to Free Run, non-PCM audio will always be corrupt.



#### 10.1.1 Source Ch 1 and Ch 2

The Source menu enables you to select options for a genlock source.

- **Ref Lock:** Locks the output video to the incoming reference.
- **Ch 1 Input:** Locks the output video to the channel 1 input.
- **Ch 2 Input:** Locks the output video to the channel 2 input.
- **Free Run:** Locks the output video to an internal reference clock.

#### 10.1.2 Current Reference Standard

Current Reference Standard displays the standard of the reference signal. If reference has been assigned using the controls but an input signal is not detected on the assigned reference input, Current Reference Standard shows "Invalid Input".

### 10.1.3 Channel 1 and Channel 2 Timing

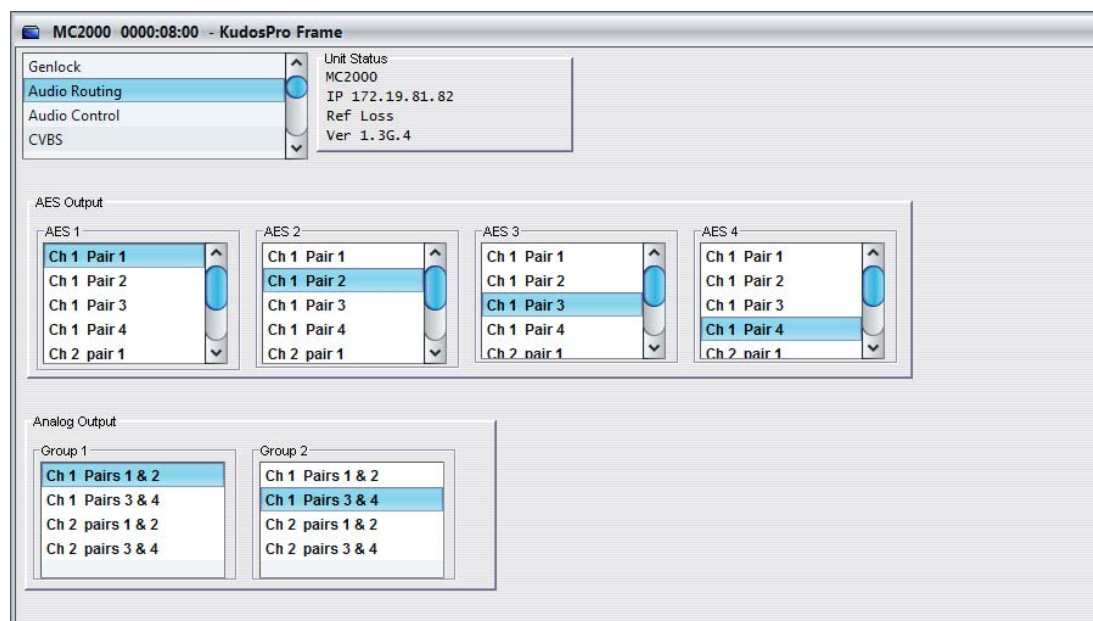
The Timing controls enable you to specify the horizontal and vertical genlock timing for each channel.

- **Vertical Timing:** Adjusts the vertical timing of the output signal with respect to the reference signal. The adjustment range is one output line in one-line steps. The preset value is 0.
- **Horizontal Timing:** Adjusts the horizontal timing of the output signal with respect to the reference signal. The adjustment range is one output frame in one-pixel steps. The preset value is 0.
- **Status:** Shows the status of the currently assigned reference. For example, if genlock is assigned to input 1, Status shows “Ch 1 Input” followed by the current status of the input. If there is no signal on the assigned reference, Status shows “REF Loss”.

## 10.2 Audio Routing

The Audio Routing screen enables you to set up the routing for the AES and analog outputs.

**Note:** The AES and analog audio menus are only available if the CVBS option is fitted.



### 10.2.1 AES Output 1–4

You can choose where to route the AES audio for each output.

**Note:** Only pairs 1–4 from can be routed to the AES output. Pairs 5–8 are not available on the AES output.

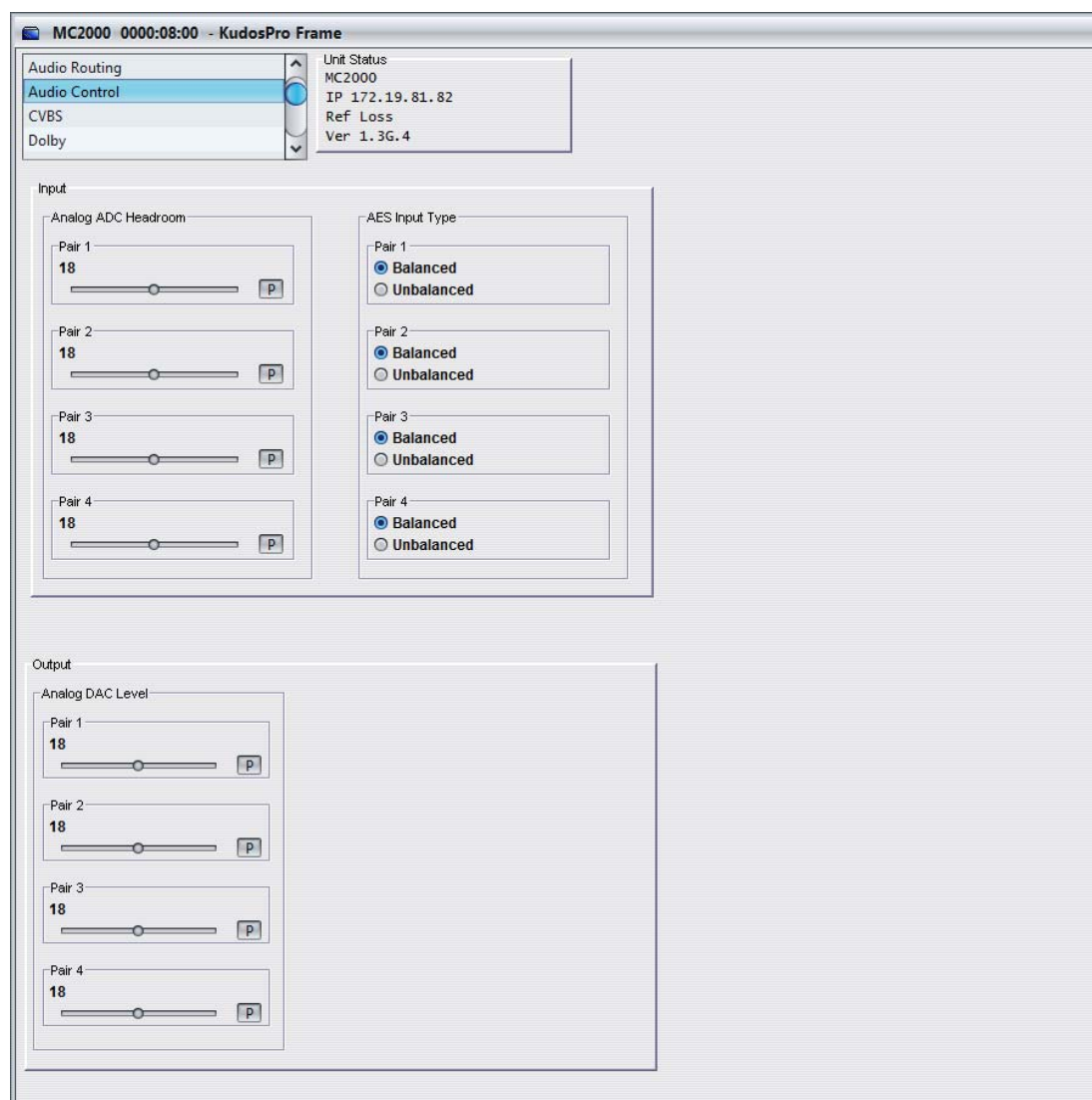
### 10.2.2 Analog Output 1–2

You can choose where to route the analog audio for each output group.

**Note:** Only groups 1–2 can be routed to the analog output groups. Pairs 5–8 are not available on the analog output groups.

## 10.3 Audio Control

The Audio Control screen enables you to set up the unit's input and output audio handling options.



### 10.3.1 Input

The Input menu provides controls for the input analog audio signal.

#### 10.3.1.1 Analog ADC Headroom

- **Pair 1–4:** Adjusts the ADC headroom level for each analog input pair. The adjustment range is 12 dB to 24 dB. The preset value is 18 dB.

#### 10.3.1.2 AES Input Type (Option, MC1000/MC2000 Only)

- **Pair 1–4:** Use to select an AES input source from either the balanced or unbalanced input connections (if fitted).

**Note:**

The MC1000-IQ/MC2000-IQ units do not have unbalanced AES inputs.

### 10.3.2 Output

The Output menu provides controls for the output analog audio signal.

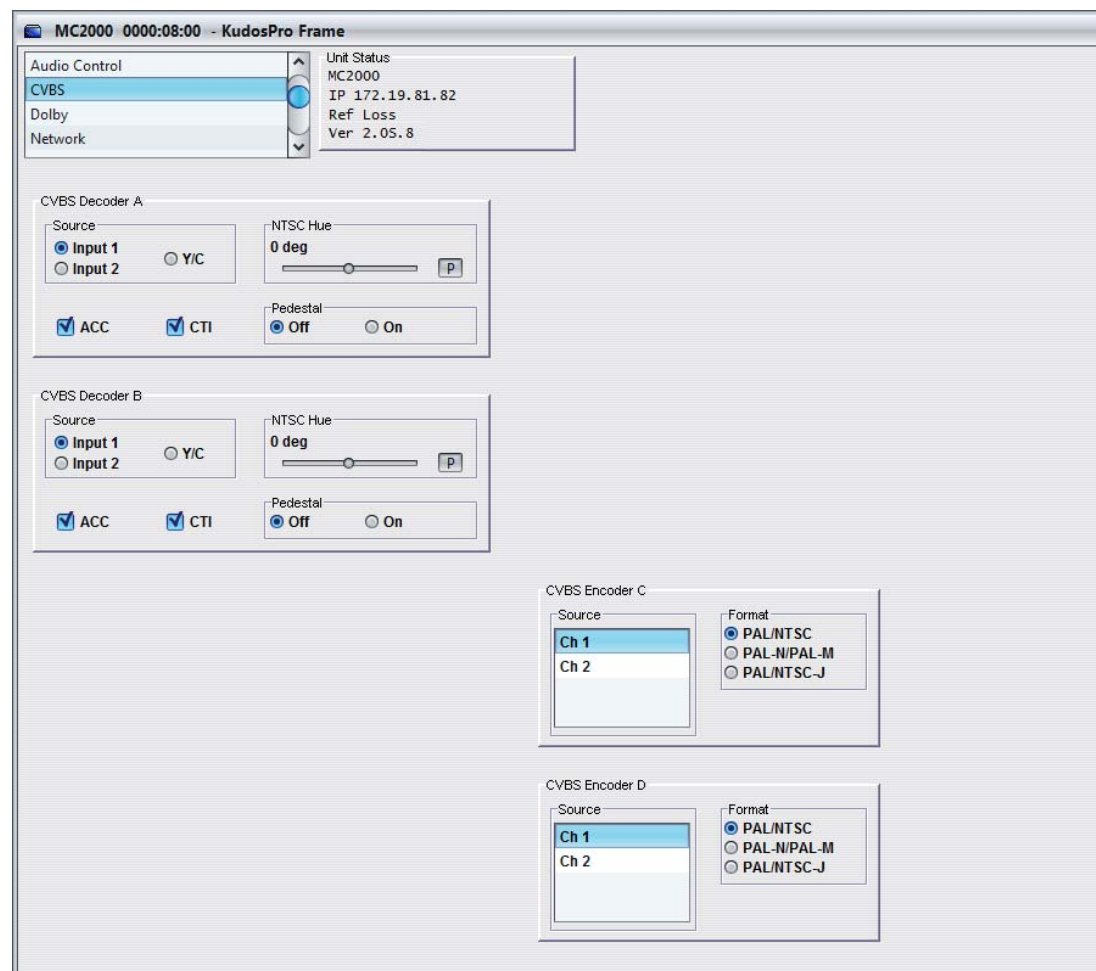
### 10.3.2.1 Analog DAC Level

- **Pair 1–4:** Adjusts the DAC audio output level for each analog output pair. The adjustment range is 12 dB to 24 dB. The preset value is 18 dB.

## 10.4 CVBS (MC1000/MC2000 Only)

The CVBS screen enables you to set up and view options for a video input source and the video output signal. CVBS provides options for the four composite video input/output slots (if the CVBS option is fitted).

Composite encoding and decoding options will have been chosen at the time of product purchase. Y/C decoding is also available.



The composite capability is determined by the number of processing channels and certain hardware restrictions. The composite variants allowed are as follows:

Product	Composite codes allowed	Description	Hardware fitted
MC1000	CT1	One channel composite decode	CVBS A or B is a decoder
		One channel composite encode	CVBS C or D is an encoder
MC2000	CT 2	Two channels composite decode	CVBS A & B are decoders
		Two channels composite encode	CVBS C & D are encoders

**Note:** Note that routing of the composite signals through the various processing channels is restricted by the product hardware. See "Block Diagrams" on page 15.

### 10.4.1 CVBS Decoder A and B

- **Source:** Use to select a video input source. If using a composite source, only one of the two CVBS connectors are used.
  - **Input 1:** Connection A1 (or B1) contains the input composite signal.
  - **Input 2:** Connection A2 (or B2) contains the input composite signal.
  - **Y/C:** When using Y/C signals both composite connectors are used, so this option must be selected.
- **ACC:** The Automatic Chroma Control (ACC) examines the input burst amplitude and adjusts chrominance gain to compensate for chroma level attenuation.

*Note: Use this control when chroma levels are low compared to luminance. This may occur when using YC installations or composite from RF links.*

- **CTI:** The Chroma Transient Improver (CTI) examines the input video data. CTI detects transitions of chroma and enhances chroma edges in order to artificially restore lost color bandwidth.

*Note: Use this control when the input video has chroma bandwidth limitations.*

- **Pedestal:** When turned on, allows the composite source (NTSC only) to be treated as if a pedestal is present.
- **NTSC Hue:** Adjusts the NTSC hue to correct tonal color changes.

**Note:** The unit automatically detects the input standard.

### 10.4.2 CVBS Encoder C and D

Each slot has two composite video connections.

- **Source:** Use to route a processing channel to the chosen CVBS encoder.
- **Format:** Specifies the CVBS output standard. The options are:
  - PAL/NTSC
  - PAL-M/PAL-N
  - PAL/NTSC-J

### 10.4.3 Routing a Processing Channel

To route a specific processing channel output to a CVBS output:

1. From the System menu list, select CVBS.
2. Under CVBS Encoder C (or D) > Source, choose the processing channel you want to route to this slot.
3. Under CVBS Encoder C (or D) > Format, choose the format of the composite output.

For example, to create a PAL composite output on slots C1 and C2 where the converted output has been downconverted using processing channel 2:

1. Under CVBS Encoder C > Source, select Ch2.
2. Under CVBS Encoder C > Format, select PAL/NTSC.

**Note:** If an illegal signal such as HD video is routed to a CVBS encoder, there will be no output signal from this connector.

## 10.5 Dolby

The Dolby screen enables you to set up the how the unit handles Dolby audio. The MC1000/MC1000-IQ/MC2000/MC2000-IQ unit supports Dolby D and E decoding as well as Dolby E transcoding when frame rate converting. Dolby E encoding from a PCM input is not supported.

The screenshot shows the 'MC2000 0000:08:00 - KudosPro Frame' window. On the left, a sidebar lists 'CVBS', 'Dolby', 'Network', and 'Front Panel', with 'Dolby' selected. The main area is divided into two sections: 'Dolby Ch 1' and 'Dolby Ch 2'.

**Dolby Ch 1 Configuration:**

- Decoder Source:** A list with 'Embedded 1' selected, followed by Embedded 2 through 8, and AES 1 through 4.
- Metadata Source:** Radio buttons for 'Dolby Decoder' (selected) and 'SMPTE 2020'.
- DolbyE Delay Compensation:** Radio buttons for 'Early > Early' (selected), 'Early > Normal', 'Early > Late', 'Normal > Normal', 'Normal > Late', and 'Late > Late'.
- SMPTE 2020 Output:** Checkboxes for 'Output Enable' and 'SDID Pair 1 Forced Assoc'. Below is an 'Output Line' slider set to 10 and a 'Packet Type' section with radio buttons for 'A' and 'B'.
- Input Status:** PCM
- Decoder Rate:** N/A
- Decoder Format:** N/A
- Decoder Version:** 2.1.2.7
- Encoder Version:** 1.1.4.0
- Dolby Metadata Output Line Sta...**

**Dolby Ch 2 Configuration:**

- Decoder Source:** A list with 'Embedded 1' selected, followed by Embedded 2 through 5.
- Metadata Source:** Radio buttons for 'Dolby Decoder' (selected) and 'SMPTE 2020'.
- DolbyE Delay Compensation:** Radio buttons for 'Early > Early' (selected) and 'Early > Normal'.
- Input Status:** PCM
- Decoder Rate:** N/A

**Note:** The Dolby encoder acts in tandem with the Dolby decoder: Dolby transcoding from one frame rate to another is enabled. It is not possible to author Dolby audio from a PCM input.

Dolby transcoding means that a change to the Dolby frame rate is enabled, but a change to the Dolby program format is not possible. For example, if the incoming video is at 50 Hz with 5.1+2 Dolby audio, when the MC1000/MC1000-IQ/MC2000/MC2000-IQ is set to standards convert the video to 59 Hz, the Dolby transcode function enables you to create 5.1+2 Dolby audio at 59 Hz. The output Dolby frame rate follows the output video frame rate chosen for the appropriate processing channel.

The Dolby E capability is determined by the number of processing channels and certain hardware restrictions. The Dolby E option variants allowed are as follows:

Product	Dolby option codes allowed	Description
MC1000/ MC1000-IQ	Dolby E single channel option	One set of Dolby modules: decode and transcode
MC2000/ MC2000-IQ	Dolby E single channel option	One set of Dolby modules: decode and transcode
MC2000/ MC2000-IQ	Dolby E dual channel option	Two sets of Dolby modules: decode and transcode

**Note:**

Routing of the Dolby E decoded and transcoded outputs to embedded SDI is limited by hardware. If one Dolby option is fitted, the output of this decoder/transcoder is only available as embedded audio on SDI outputs A1 and A2, and can be routed to any AES or analog audio encoder. See "Block Diagrams" on page 15.

For more information about the Dolby decoder and transcoder, see the *KudosPro Dolby Application Note* under the "Support" tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 10.5.1 Dolby Ch 1 and Ch 2

Each Dolby slot houses a Dolby encoder and transcoder.

**Note:** If the Dolby option is not fitted, the Dolby Ch 1 and Dolby Ch 2 menus are grayed out.

- **Decoder Source:** Enables you to route the chosen incoming audio source (SDI or AES) to the Dolby decoder. See “Block Diagrams” on page 15.
- **Metadata Source:** Enables you to choose whether to use the incoming Dolby metadata when transcoding. Select the Decoder radio button to enable the metadata or the None radio button to discard it.
- **Dolby Delay Compensation:** Enables you to select delay compensation to maintain correct alignment.
- **SMPTE 2020 Output:** Selects the output line on which to insert a SMPTE 2020 VANC packet if Output Enable is selected. The range is from line 8 to line 20 in one-line steps.

It is possible to set a forced association in the SMPTE 2020 metadata which sets the Secondary Data ID (SDID) values used to identify the VANC packets to 45/02 (pair 1). To use this control, enable “SDID Pair 1 Forced Assoc” from the Dolby menu under the sub-menu SMPTE 2020 Output. When enabled, the outgoing 2020 data will be labelled 45/02 (pair 1).

- **Packet Type:** Selects a method of data mapping for output SMPTE 2020 VANC packets.
  - **A:** SMPTE 2020-2-2008.
  - **B:** SMTE 2020-3-2008.
- **Input Status:** Shows the status of the Dolby encoders and if the Dolby is valid.
- **Decoder Rate:** Shows the frame rate of the incoming Dolby audio (50 Hz or 59 Hz).
- **Decoder Format:** Shows the current decoder format. For example, in the case of Dolby E, this could be 5.1+2, 7.1, 8x1 etc.
- **Decoder Version:** Shows the version number of the Dolby decoder. The Dolby E decoder and encoder both have their own software version installed which is independent from the rest of the unit. Dolby updates this software continually.
- **Encoder Version:** Shows the version number of the Dolby encoder. The Dolby E decoder and encoder both have their own software version installed which is independent from the rest of the unit. Dolby updates this software continually.
- **Output Line Status:** Shows the actual output line number on which the SMPTE 2020 VANC packet is embedded, as set on the SMPTE 2020 Output slider. If no line number is selected, “OFF” is displayed.

*Note: If the line selected is already in use (by VITC, for example), the VANC embedding hierarchy will embed the SMPTE 2020 packet on the nearest available line.*

## 10.6 Network

The Network screen provides access to the unit's network details and setup.

MC2000 0000:08:00 - KudosPro Frame

Dolby  
**Network**  
 Front Panel  
 Memories

Unit Status  
 MC2000  
 IP 172.19.81.82  
 Ref Loss  
 Ver 1.3G.4

Ethernet

IP Configuration Status: DHCP - ok

Current IP Address: 172.19.77.137

Current IP Gateway: 172.19.71.20

Current IP Netmask: 255.255.224.0

IP Configuration:  
☐ Fixed Address  
☒ DHCP

IP Address: 192.168.151.1 [P] [S]

IP Gateway: 192.168.151.200 [P] [S]

IP Netmask: 255.255.255.0 [P] [S]

Interface Status: 100M, full duplex

Apply IP Changes

MAC Address: 0050c25c7776

RollCall

Unit Name: MC2000 [P] [S]

IP Share Port: 2050 [P] [S]

IP Bridging Port: 2600 [P] [S]

Log Server Name: [P] [S]

Current Log Server: [P] [S]

Current Log Server Address: [P] [S]

### 10.6.1 Ethernet

The Ethernet controls enable you to view and set up all information relating to the unit's network connections.

- **IP Configuration Status:** Shows the current IP configuration.
  - **Current IP Address:** Shows the current IP address.
  - **Current IP Gateway:** Shows the current IP gateway.
  - **Current IP Netmask:** Shows the current IP netmask.
  - **IP Configuration:** Enables you to specify whether the unit is to use a DHCP or a static IP address. For information about setting static and DHCP IP addresses, see page 104.
  - **IP Address:** Enables you to enter an IP address.
  - **IP Gateway:** Enables you to enter a gateway address.
  - **IP Netmask:** Enables you to enter a netmask address.
  - **Interface Status:** Shows the status of the Ethernet connection.
- Note: If status is shows "down", it means that no Ethernet connection is detected.*
- **Apply IP Changes:** Applies any changes you make in the Ethernet menu.
  - **MAC Address:** Shows the unit's MAC address.

### 10.6.1.1 Setting a Static IP Address

To set a static IP address, you will need to enter all the following information: IP address, IP gateway (even if you are not using an IP gateway), and IP netmask.

In the following example, we are setting a static IP address of 192.168.1.42.

To set a static IP address:

1. From the System Menu, select Network.
2. Under IP Configuration, select Fixed Address.
3. In the IP Address box, enter 192.168.1.42 and then click S.
4. In the IP Gateway box, enter 192.168.1.12 and then click S.
5. In the IP Netmask box, enter 255.255.255.0 and then click S.

*Note: To return any box to its default value, click P.*

6. When all addresses are set, you must apply the changes. To do this:
  - Click Apply IP Changes. The system updates and saves the changes made in the Ethernet menu.

**Note:** You must disconnect the unit from your Local Area Network before setting a static IP address to avoid IP conflicts on the network.

**Note:** If the combination of IP address, IP gateway, and IP netmask is invalid, the system will not update the IP address.

### 10.6.1.2 Setting a DHCP IP address

1. From the System Menu, select Network.
2. Under Ethernet > IP Configuration, select DHCP.
3. Click Apply IP Changes.

**Note:** If you make any changes to the settings in the Ethernet menu, you must click Apply IP Changes to confirm the changes.

## 10.6.2 RollCall

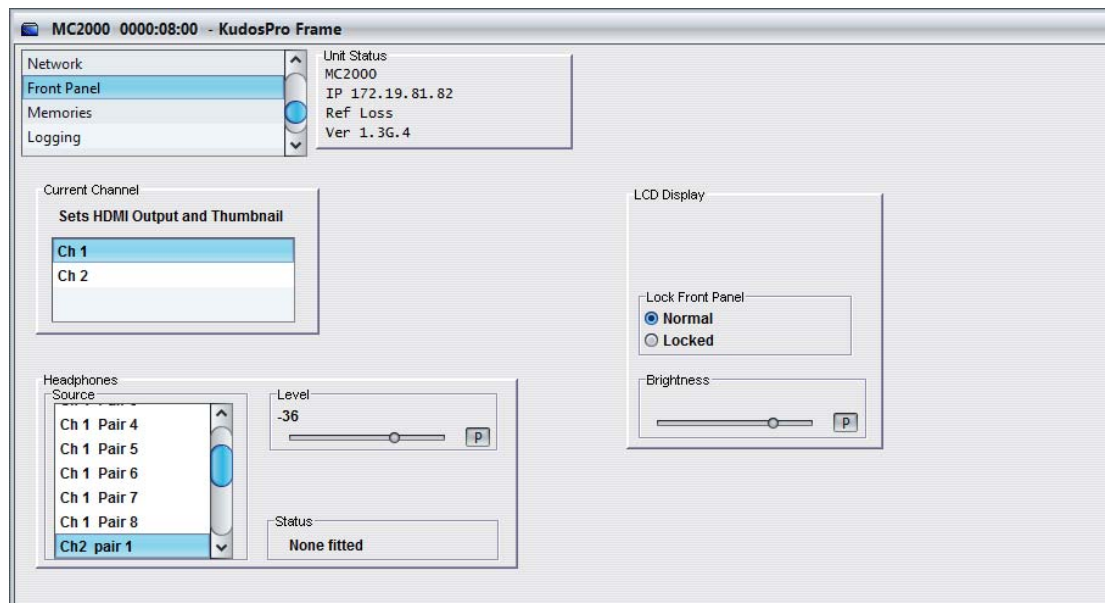
The RollCall controls enables you to view and set up the unit's RollCall attributes for use remotely with the RollCall Control Panel.

To change the name of the unit:

1. In the Change Name field, type a new name for the unit.
2. To save the memory name, click S. To return the memory to its default value, click P.

## 10.7 Front Panel

The Front Panel screen enables you to customize the front panel features for ease of use.



### 10.7.1 Current Channel (MC2000/MC2000-IQ Only)

Current Channel shows which channel is currently being controlled. The chosen current channel appears on the HDMI output and on the front panel thumbnail image.

### 10.7.2 LCD Display

- **Lock Front Panel:** Locks all of the front panel controls to prevent accidental changes to the unit's settings.
- **Brightness:** Adjusts the brightness of the front panel display. Using a lower setting can help save power and increase screen life.

### 10.7.3 Headphones

- **Source:** Selects the source for audio monitoring.
- **Level:** Adjusts the volume level. The adjustment range is -140 to +12. The preset value is -36.
- **Status:** Shows the audio monitoring status.

## 10.8 Memories

The Memories screen enables you to save up to eight system-level memory setups and recall them when required.

You can change the default memory names to more relevant ones if required.

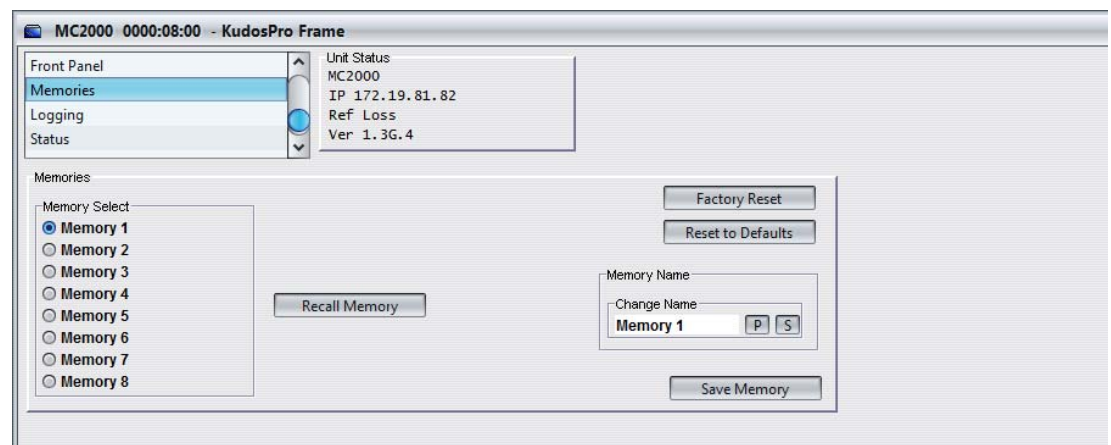
Memories set at a system level store all system settings *except for* the following:

- Network > DHCP
- Network > IP Configuration
- Network > IP Gateway
- Network > IP Netmask
- RollCall > Unit Name

Settings stored in the system memories include:

- CVBS encoder or decoder settings (if fitted) - MC1000/MC2000 only
- Dolby option settings (if fitted)
- Genlock selection and adjustment
- AES and analog audio routing
- CVBS calibration - MC1000/MC2000 only

System memories do not store any processing channel data.



### 10.8.1 Creating and Saving Memories

1. In the Memory Select column, choose a memory.
2. In the Change Name field, type a new name for the memory.
3. To save the memory name, click S. To return the memory to its default value, click P.
4. To save the memory, click Save Memory.

The new memory name appears in the Memory Select column.

## 10.8.2 Recall Memory

The Recall Memory button recalls the settings saved in a memory location.

To recall a memory:

1. In the Memory Select column, choose a memory you want to recall.
2. Click Recall Memory.

The recalled settings are applied.

## 10.8.3 Reset to Defaults

The Reset to Defaults button recalls the unit's default memory settings at both system and channel level. All controls are reset to their preset values *except* for the following:

- Network > DHCP
- Network > IP Configuration
- Network > IP Gateway
- Network > IP Netmask
- RollCall > Unit Name.

**Note:**

Reset to defaults does not affect user memories.

## 10.8.4 Factory Reset



Factory Reset clears all user memories. Make a note of any important settings before performing a factory reset.

Factory Reset recalls the unit's default memory settings at both system and channel level. All controls and user memories are reset to their preset values.

The default settings for IP Configuration is to set the unit to DHCP. Any saved settings for IP Address, IP Netmask, and IP Gateway are also lost when performing a factory reset. The unit returns all three to their default settings, which are as follows:

- IP Configuration: DHCP
- IP Address: 192.168.151.1
- IP Netmask: 255.255.255.0
- IP Gateway: 192.168.151.200

### 10.8.4.1 Performing a Factory Reset

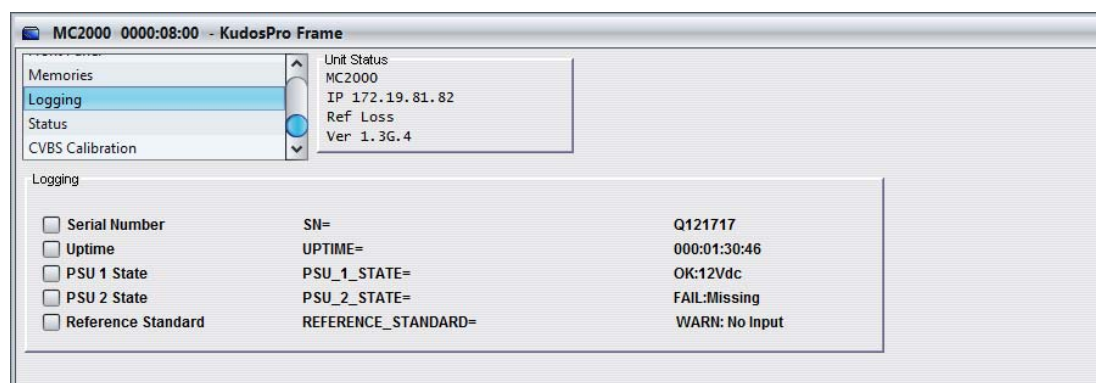
1. From the System menu, select Memories > Factory Reset.
2. Do one of the following to apply the changes:
  - From the Network screen, click Apply IP Changes.
  - Reboot the system.

**Note:**

If performing a factory reset via a remote link, when you press Apply IP Changes, the remote link will be lost.

## 10.9 Logging

The Logging screen defines what parameter information is made available to a logging device attached to the RollCall network.

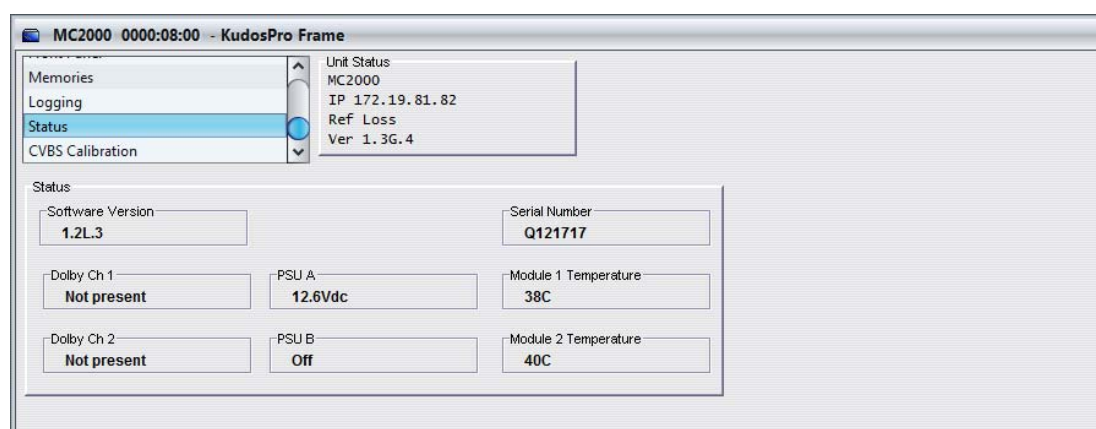


You can select from any of the following logging options:

- Serial Number
- Uptime (how long the unit has been powered up, in days/hours/minutes/seconds)
- PSU 1 State, PSU 2 State
- Reference Standard

## 10.10 Status

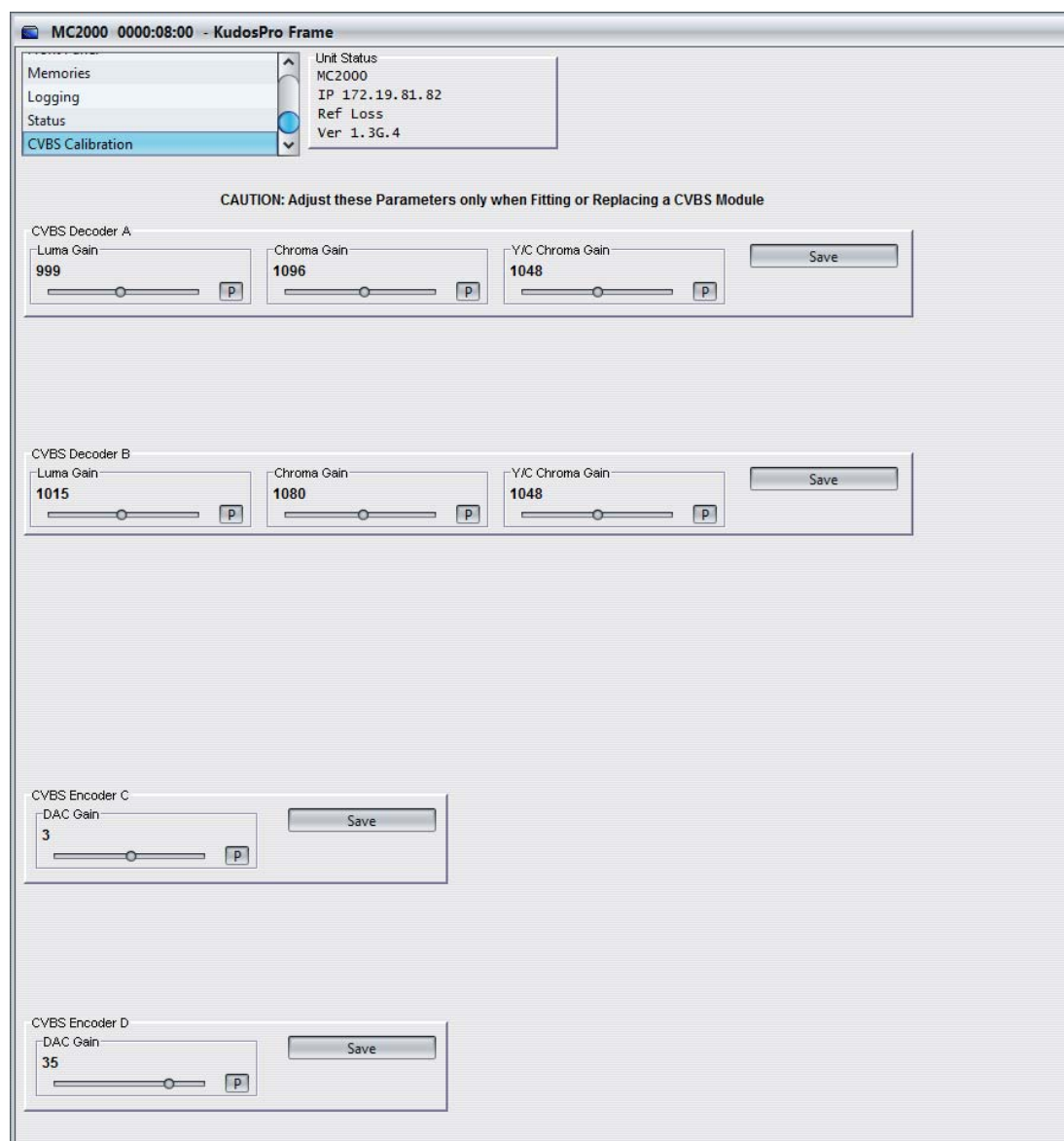
The Status screen shows the status of the unit's hardware and software.



- **Software Version:** The currently installed software version.
- **Serial Number:** The unique serial number of the unit.
- **Dolby Ch 1 and Ch 2:** Whether the Dolby channel is available.
- **PSU A, PSU B:** The PSU voltage.
- **Module 1 and Module 2 Temperature:** The current temperature of the FPGA modules.

## 10.11 CVBS Calibration (MC1000/MC2000 Only)

The CVBS Calibration screen enables you to calibrate the CVBS decoders and encoders.



### 10.11.1 CVBS Decoder A and B

- **Luma Gain:** Adjusts the composite luminance signal.
- **Chroma Gain:** Adjusts the composite chrominance signal.
- **Y/C Chroma Gain:** Adjusts the component Y/C chrominance signal.
- **Save:** Saves the gain settings.

### 10.11.2 CVBS Encoder C and D

- **DAC Gain:** Adjusts the DAC video output gain level.
- **Save:** Saves the gain setting.

**Note:**

CVBS calibration is not required in normal operation. If calibration is required, it should only be carried out by suitably trained technicians.

## 11. RollCall Control Panel Channel Operation Screens

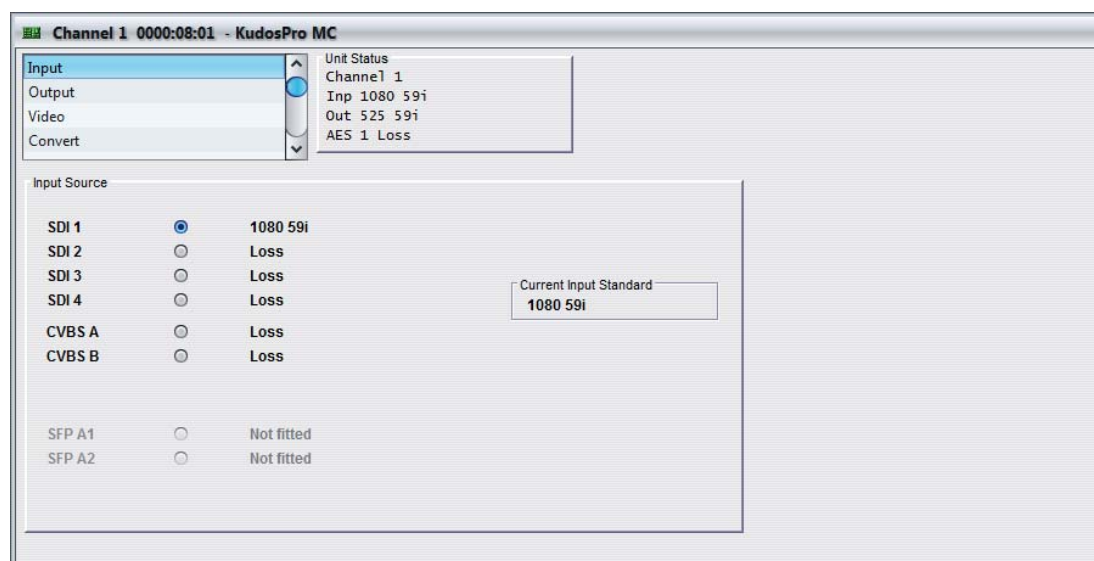
This section details all of the menu lists, options, and controls available for performing signal processing, frame rate, and format conversions from the RollCall Control Panel.

Each processing channel has its own set of system operation screens. The MC2000/MC2000-IQ units have channels 1–2 available.

**Note:** The screens shown in this section are for guidance and reference only, and may be slightly different to those on your unit.

### 11.1 Input

The Input screen enables you to specify a video input source.



#### 11.1.1 Input Source

Input Source lists the available video input sources. You can choose from the following, depending on the options fitted:

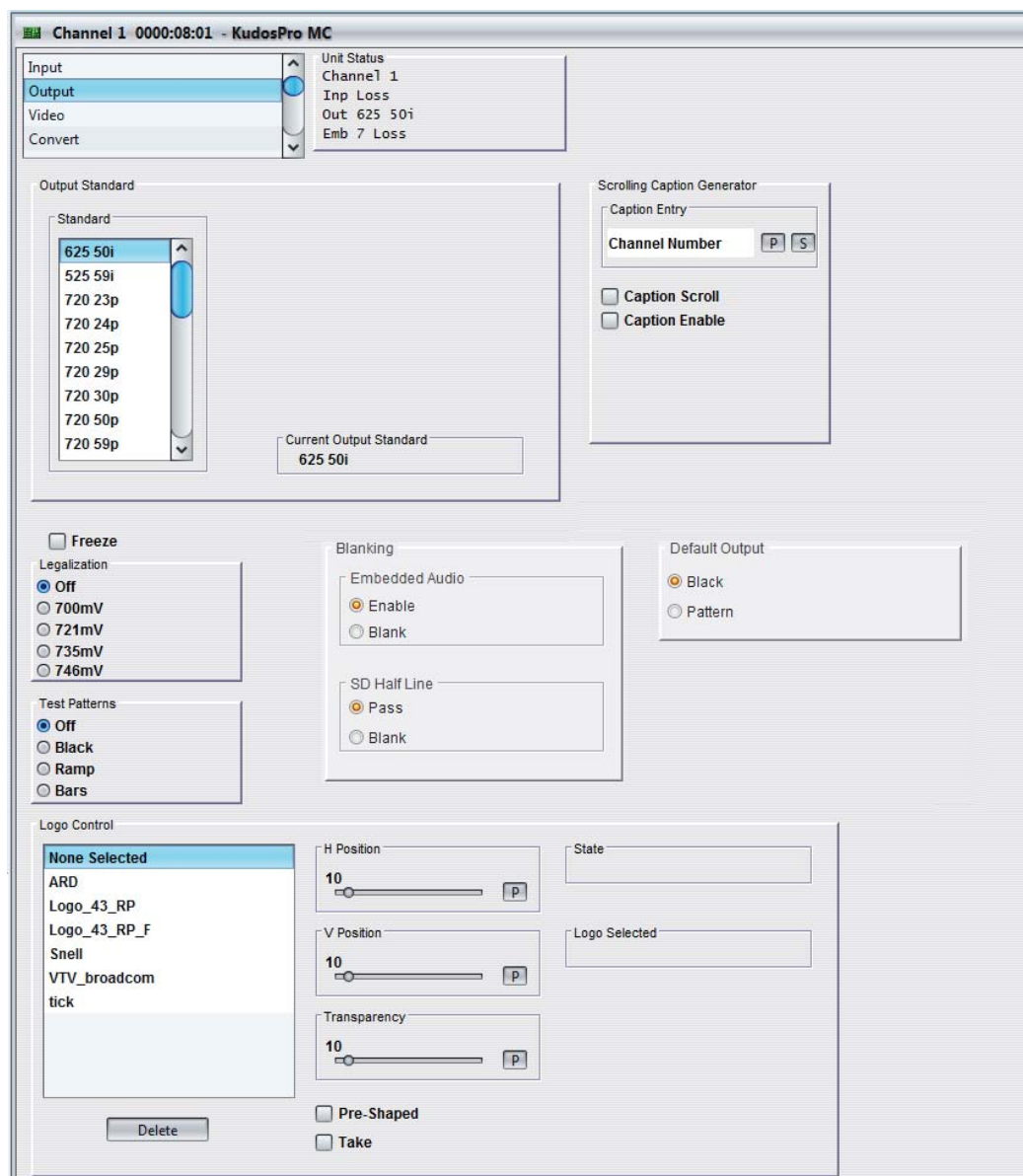
- SDI 1–4
- CVBS A–D - (MC1000/MC2000 only)
- SFP A1, A2, B1, B2

The Current Input Standard box shows the input standard in currently in use.

**Note:** The unit automatically detects the input standard.

## 11.2 Output

The Output screen enables you to apply various settings and adjustments to the video output signal.



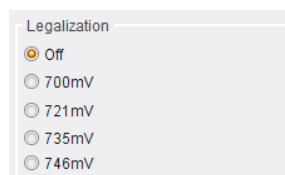
### 11.2.1 Output Standard

- **Standard:** Specifies the output standard of a conversion.
- **Current Output Standard:** Shows the output standard currently in use.

### 11.2.2 Freeze

The freeze check box enables you to freeze the output picture.

### 11.2.3 Legalization



All color video signals are ultimately coded as RGB for display on a picture monitor. The Legalizer ensures that the output video stays within the legal RGB gamut limit, making it suitable for the broadcast signal chain. To achieve this, the legalizer reduces the gain equally on all channels.

The level the legalizer scales down to is selected using the radio buttons. Anything in the RGB space above the selected level is scaled down to that level. Anything in the RGB space below 0 mV is clipped to 0 mV. This is a good compromise between minimizing hue change and raising apparent brightness.

Legalizer choices are:

- Off (Default)
- 700mV
- 721mV
- 735mV
- 746mV

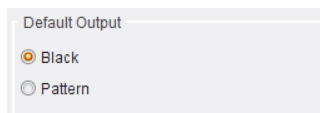
### 11.2.4 Test Patterns

The Test Patterns list enables you to choose the type of pattern displayed on the output picture. You can choose from Off, Black, Ramp, and Bars.

### 11.2.5 Blanking

- **Embedded Audio:**
  - **Enable** (Default): enables embedded audio
  - **Blank:** removes embedded audio
- **SD Half Line:**
  - **Pass** (Default): enables source half lines
  - **Blank:** will blank the source half lines. This can be useful for certain ARC settings, for example, SD16:9AN to SD4:3 Fit to Width

### 11.2.6 Default Output



On input signal loss, select “black” to set output to black (default), or “pattern” to set output to the test pattern. See section 11.2.4 for selection of the test pattern.

**Note:**

If the test pattern has been set to black, then if default output is chosen to be “pattern”, the output will go to black on input loss.

### 11.2.7 Scrolling Caption Generator

The Scrolling Caption Generator overlays a black text box with a user-defined caption onto the output video. This is generally used as a setup or debug tool to help identify a video stream on a monitor.

- **Caption Entry:** User-defined caption. To enter a caption:

In the Caption Entry field, enter the required text and click S to set. To return to the preset value, click P ("Channel 1" is the preset caption).

*Note: Text can be no more than 19 characters.*

- **Caption Scroll:** Enables slow-speed horizontal scrolling of the caption within the black text box. Scrolling is from right to left, and wraps around for continuous display.
- **Caption Enable:** The master enable – turns the caption display on and off.

### 11.2.8 Logo Control

Logo control enables static or animated graphics to be keyed on to the video output of a channel.

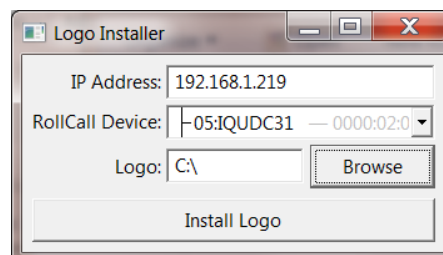
Logo files are uploaded to the KudosPro unit using a SAM application.

The application is available for download under the "Support" tab at:

<http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/>

#### Logo Up-loader

To upload logos onto the MC1000/MC1000-IQ/MC2000/MC2000-IQ, run the logo upload application on your PC. A dialog box will appear as shown below:



Enter the IP address of your unit and browse to the folder containing your required logos (see section 7.7.1 and 10.6.1 for a summary of how to set the unit's IP address). Then click on the **Install Logo** button. This will upload the logo to your unit.

**Note:** This stage can take up to a minute depending on the length of the logo. Short or static logos will upload in a few seconds.

Once the logo file(s) have been uploaded to the KudosPro unit they will be automatically displayed in the Logo Selection box.

#### Valid logo file requirements:

- A number of image file types are supported by KudosPro. For a full list of currently supported image file types see the *Supported Image File types Application Note* under the "Support" tab at: <http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/>
- A logo file must contain a key. If no key is found the entire image will be displayed i.e. a rectangle cut-out of the logo image size
- Maximum logo size of 400 Pixels by  $\frac{1}{4}$  picture height (Max. 480 lines)

**Logo naming convention:**

- All logo files take the form <logo\_name><specifier>.<extension> where <logo\_name> equals the directory's name.
- Logo filenames must be all in lowercase.
- A <specifier> of the form \_<standard> indicates that this logo is intended for this specific standard. If no \_<standard> specifier is included, then this logo is the default for any standards which do not have a standard-specific logo. Possible values for <standard> are: 525i, 625i, 720p, 1080p and 1080i.
- A <specifier> of the form \_<index> indicates that this file is part of a multi-file sequence for an animated logo. Any non-negative decimal value may be used for <index>. The files in a sequence are sorted in increasing order of their respective <index>es by numerical value. Leading zeros do not affect the sort order, and it is not required that the <index> values are contiguous, however all images in a multi-file sequence must have the same width and height.
- If both \_<standard> and \_<index> specifiers are used, then they should be written as \_<standard>\_<index>, not \_<index>\_<standard>.
- The <extension> is ignored, the KudosPro unit will auto-detect the actual image format.

**Example logo file names:**

- sam\_1080p.png - a logo file for use with 1080p signals
- sam\_720p\_01.bmp, sam\_720p\_02.bmp and sam\_720p\_03.bmp  
- three logo files in a multi file sequence

**Features and Functions:**

- All logos are available to for all channels
- Up to 64 logos can be stored on a KudosPro unit
- RGB graphic formats are automatically converted to SD and HD color spaces and levels
- YUV graphic formats are presented as is for SD and HD
- YUV range is assumed to be 16 (black) to 235 (white). Other values are clipped.
- Key channel levels for all graphic formats are 0 (off) to 255 (100% key)

**Animation details:**

- Animations are always displayed as a sequence, static frames cannot be selected
- The maximum animation duration depends on the logo image size.  
For example an animated logo image with a 10% raster size overlaid on 60Hz signal is limited to a maximum of 10 seconds
- Sequence capacity of 10,000 pixels maximum.  
(approximately 44 Seconds for 150 x 50 Pixels at 60 Hz)
- Interlaced video standards will treat each image of the original sequence as a single field of the resultant animation. Frame to field conversion is performed by simply removing those lines which should not be present in a particular field.
- Animations will not be displayed in the logo selection box until the upload is complete
- Animations will always start from the first frame of the sequence on 'Take'
- Animations can be loaded as a sequence of still images or a sequence of moving video (e.g. MPEG) files. One animation can be created from a sequence of files of different file types so long as the image size is the same in each file
- Animations are displayed at the output-side frame rate. If an animation is designed to be played at 50fps but the current output standard is 59Hz it will play out faster than designed.

**Logo Control Setup:**

- **Logo Selection Box:** Select a logo for the current channel:  
  
Select a logo by clicking on the logo name in the Logo Selection Box. The selected logo is highlighted. Click on **None Selected** if no logo is required for the channel.
- **H Position:** Set the position of the left edge of the logo image from the left of the screen as a percentage of the screen size. Adjustment range 0 to 100%.  
0 = left edge of the logo is at the left edge of the screen. To return to the preset value, click P (10% is the preset value).
- **V Position:** Set the position of the lower edge of the logo image from the bottom of the screen as a percentage of the screen size. Adjustment range 0 to 100%.  
0 = lower edge of the logo is at the lower edge of the screen. To return to the preset value, click P (10% is the preset value).
- **Transparency:** Set the transparency level of the logo from 0 to 100%.  
100% = Invisible. To return to the preset value, click P (10% is the preset value).
- **Pre-Shaped:** Sets the key format to Pre-shaped when checked and Linear when unchecked.  
  
When the key format is set to Pre-shaped it is possible to simply cross-fade between background and foreground. This changes the edge shape of the logo but the pre-processing of the key means that the final result will be the intended edge shape.  
  
When Pre-shaped is not checked a linear key format is used and cross-fades between background + foreground and foreground so the key follows the shape of the logo.
- **Take:** Enables and disables logo display on the video output of the channel.  
When Take is checked the logo is displayed on the video output of the channel.
- **State:** Displays the state of the selected logo. Typically this would be "Logo load complete"
- **Logo Selected:** Displays the name of the selected logo.
- **Delete:** Deletes the currently selected logo. If the logo is in use this action will fail.

## 11.3 Video

The Video screen enables you to apply various types of signal processing to the signal being converted, and includes Proc Amp, Nonlinear Enhancer, and Noise Reduction controls.

### 11.3.1 Proc Amp

The Process Amplifier (Proc Amp) enables you to correct video inconsistencies, such as contrast.

- **Enable:** Enables the Proc Amp.
- **Contrast:** Adjusts the contrast. The adjustment range is -6 dB to 6 dB in 0.2 dB steps. The preset value is 0 dB.
- **Saturation:** Adjusts the color saturation. The adjustment range is -6 dB to 6 dB in 0.2 dB steps. The preset value is 0 dB.
- **Black Level:** Adjusts the black level. The adjustment range is -100 mV to 100 mV. The preset value is 0 mV.
- **Gamma:** Adjusts the gamma curve. The adjustment range is 0.4 to 1.7 in 0.1 steps. The preset value is 1.0.

- **YC Offset:** Adjusts the horizontal chroma shift, for use when correcting upstream luma-chroma displacement. The adjustment range is -20 to 20 in steps of 2 luma clocks.

At the input picture edge, zero chroma is shifted into the active picture area. If the ARC is set to show less than the full width of the input picture, valid input picture chroma is shifted into the output picture area.

### 11.3.2 Nonlinear Enhancer

The Nonlinear Enhancer defines the amount of enhancement applied to a video to help regain lost detail. This could be as a result of degraded material, post production processes, or because the initial capture conditions were not ideal.

The controls enable you to apply enhancement to the low, medium, and high frequency bands, and to create a custom setting if required.

- **Enable:** Enables the enhancer.
- **Mode:** Preset controls.
  - **Low:** Sets Level to 2 and Noise Rejection to 15% for the selected frequency band.
  - **Medium:** Sets Level to 4 and Noise Rejection to 15% for the selected frequency band.
  - **High:** Sets Level to 6 and Noise Rejection to 15% for the selected frequency band.
  - **Super:** Sets Level to 8 and Noise Rejection to 15% for the selected frequency band.
  - **Manual:** Enables you to manually adjust the Gain and Noise Rejection.
- **Frequency Band:** Specifies the frequency band to which the enhancement is applied.
- **Level:** Adjusts the enhancement level. The adjustment range is 0 to 192. The preset value is 0.
- **Noise Rejection:** Adjusts the Gain and Noise Rejection. The adjustment range is 0 to 100 in steps of 1. The preset value is 0.

### 11.3.3 Conversion Aperture

The Conversion Aperture controls enable you to control the horizontal and vertical rescaler apertures from a range of presets

#### 11.3.3.1 Preset

Preset returns all settings to their default values.

### 11.3.3.2 Vertical

Vertical controls aliasing in down-converted content.

- **Level:** Specifies the enhancer strength.
  - **Soft 1–2:** Provides attenuation in the frequency band specified.
  - **Normal:** Nominally flat frequency response.
  - **Sharp 1–2:** Applies more boost in the frequency band specified.
- **Frequency Band:** Specifies the frequency band to which the enhancement is applied.

For more information about the vertical conversion aperture controls, see the *KudosPro Enhancer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 11.3.3.3 Horizontal

Horizontal controls aliasing in down-converted content

- **Sharpness:** Determines the sharpness of the output by changing the rate of anti-alias filter cut-off.
  - **Soft 2:** Recommended for severely over enhanced source material.
  - **Soft 1:** Recommended for over enhanced source material.
  - **Normal:** Optimum setting for balancing detail and alias.
  - **Sharp1:** Recommended for slightly soft source material.
  - **Sharp 2:** Recommended for very soft source material.
- **Detail:** Determines the amount of detail allowed through to the output by moving the anti-alias filter stop band.
  - **Low 2:** Recommended for severely over enhanced source material.
  - **Low 1:** Recommended for over enhanced source material.
  - **Normal:** Optimum setting for balancing detail and alias.
  - **High 1:** Recommended for slightly soft source material.
  - **High 2:** Recommended for very soft source material.

For more information about the horizontal conversion aperture controls, see the *KudosPro Enhancer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 11.3.4 Noise Reduction

The Noise Reduction controls enable you to reduce levels of noise and grain.

- **Enable:** Master enable for all the noise reduction processing.
- **Split Screen:** Displays a split screen view of the output image – one side of the screen shows the image with noise reduction, and the other side of the screen shows the image without noise reduction.

### 11.3.4.1 Recursive

To achieve noise reduction, the recursive filter applies a temporal recursive filter to both luminance and chrominance picture content. To avoid blurring moving objects, the filter includes motion detection and adaption which disables the filter when significant motion is present.

The Luma and Chroma controls set the maximum noise reduction (0 = Off). You can set the sensitivity of motion detection either automatically with Auto mode, or manually with the Threshold slider.

- **Luma:** Adjusts the amount of noise reduction applied to the luminance signal. The adjustment range is 0 to 7 in steps of 1. The preset value is 0.
- **Chroma:** Adjusts the amount of noise reduction applied to the chrominance signal. The adjustment range is 0 to 7 in steps of 1. The preset value is 0.
- **Threshold:** Adjusts the noise reduction threshold. The adjustment range is 0 to 7 in steps of 1. The preset value is 0.
- **Mode:** Choose between automatic or manual filtering.

In Auto mode, the background noise level is measured and the threshold set to give a good compromise between noise reduction and motion blur. In Manual mode, increasing the Threshold value allows for pictures with higher background noise.

*Note: For best results in Manual mode, always set the threshold to the lowest value for the desired noise reduction.*

### 11.3.4.2 Spatial

The spatial noise reduction filter operates on luminance only and uses nearby samples to average out noise. Picture objects and edges are detected and the filtering disabled.

You can set the sensitivity of edge detection either automatically with Auto mode, or manually with the Threshold slider.

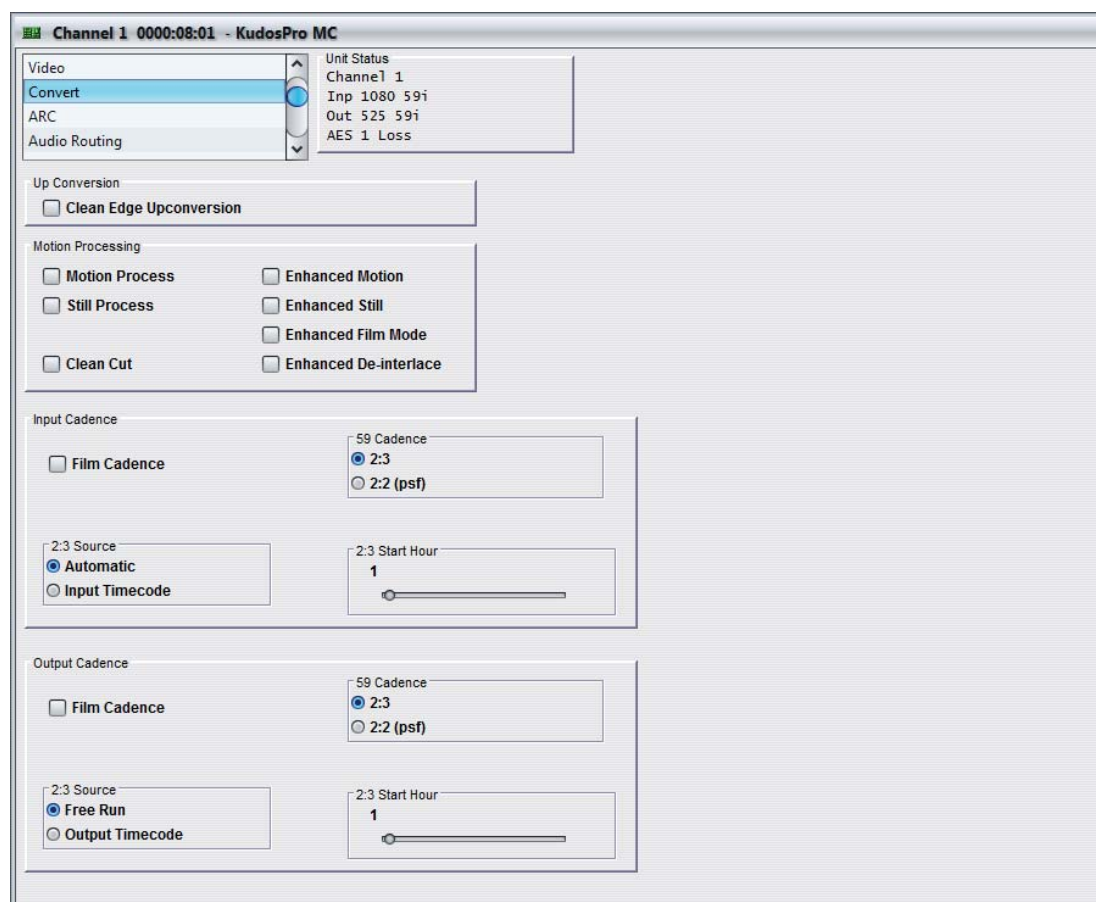
- **Level:** Adjusts the level of noise reduction applied to the signal. The adjustment range is 0 to 7 in steps of 1. The preset value is 0.
- **Threshold:** The adjustment range is 1 to 4 in steps of 1. The preset value is 1.
- **Mode:** Choose between automatic and manual filtering.

In Auto mode, the background noise level is measured and the threshold set to give a good compromise between noise reduction and picture softness. In Manual mode, increasing the Threshold value allows for pictures with higher background noise.

*Note: For best results in Manual mode, always set the threshold to the lowest value for the desired noise reduction.*

## 11.4 Convert

The Convert screen enables limited control of input and output cadence, and control of motion processing to improve the conversion performance of stationary content.



### 11.4.1 Up Conversion

- **Clean Edge Upconversion:** Enables the Texture Adaptive Upconversion (TAU) process. TAU helps to adapt away any horizontal ringing (vertical edges), common in very high-frequency graphics.

### 11.4.2 Motion Processing

- **Motion Process:** Enables motion compensation.
- **Still Process:** Uses powerful motion detection techniques to extract the maximum resolution from interlaced sources while format or standards converting. The benefits of this processing are prominent on static logos and computer-generated overlays.
- **Enhanced Motion:** When used together with the Still Process option, Enhanced Motion detects constant motion and applies an aperture with full (progressive) vertical frequency response.
- **Enhanced Still:** Adds field motion detection to still processing. This prevents artifacts on moving repetitive patterns.
- **Enhanced Film Mode:** Applies an aperture with full progressive frequency response where the input is film transported by an interlaced video rate input, with cadence enabled.
- **Clean Cut:** Prevents temporal filtering across a cut in scenes, which can result in several frames either side of the cut being a mix of the two different scenes.

- **Enhanced De-interlace:** Replaces missing lines with a gradient between the previous and following lines. This control improves the appearance of de-interlaced images and is useful when dealing with complex shapes.

For more information about motion processing and enhanced film settings, see the *KudosPro Still Mode Application Note* and *KudosPro Film Mode Application Note*, under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 11.4.3 Input Cadence

Input Cadence enables you to define any cadence associated with the input video.

- **Film Cadence:** Enables the processing of film-originated content transported by a cadence.
- **59 Cadence:** For standards with a field rate of 59 Hz and with cadence enabled, you can choose either 2:2 or 2:3 (psf).

*Note: Standards with field rate of 50 Hz and with cadence enabled are interpreted as 2:2.*

- **2:3 Source:** Selects whether a 2:3 cadence is determined automatically or derived from the input timecode.
  - **Automatic:** The cadence detection circuit automatically detects the cadence. This is useful when the source material contains mixed cadences.
  - **Input Timecode:** Defines the relationship between timecode and the 2:3 sequence. This is useful when the source material contains known, continuous 2:3.
- **2:3 Start Hour:** Sets the starting hour for the timecode (when 2:3 Source is set to Input Timecode). The adjustment range is from hour 0 to hour 23 in one-hour steps.

### 11.4.4 Output Cadence

Output Cadence enables you to define the required cadence of the output video.

- **Film Cadence:** Enables the cadence of the output content.
- **59 Cadence:** For standards with a field rate of 59 Hz, you can choose either 2:2 or 2:3 (psf) cadence generation.

*Note: Standards with field rate of 50 Hz are interpreted as 2:2.*

- **2:3 Source:** Selects whether a 2:3 cadence is free-running or derived from the output timecode.
  - **Free Run:** In Free Run mode the output 2:3 cadence is undefined. The output will have continuous 2:3, but may vary from conversion to conversion.
  - **Output Timecode:** Defines the point at which the 2:3 sequence starts relative to timecode.
- **2:3 Start Hour:** Sets the starting hour for the timecode (when 2:3 Source is set to Output Timecode). The adjustment range is from hour 0 to hour 23 in one-hour steps.

## 11.5 ARC

Aspect Ratio Control (ARC) enables you to determine the aspect ratio of a picture from a range of options, or to adjust the size and position of the picture manually.

**Channel 1 0000:08:01 - KudosPro MC**

Convert  
ARC  
Audio Routing  
Audio Control

Unit Status  
Channel 1  
Inp Loss  
Out: 525 59i  
AES 1 Loss

☐ Sync Mode

Signalling Detected  
No input present

Sidebar Keying & Output Crop

Mode  
☒ Off  
☐ Output Crop  
☐ Sidebar Key

Sidebar Key Source  
SDI 1  
SDI 2  
SDI 3  
SDI 4

Output Crop Position  
Top: 0%  
Bottom: 0%  
Left: 0%  
Right: 0%

Post Scaling Control

☐ Post Scaling Enable

Size: 100%  
Aspect: 100%  
Pan: 0  
Tilt: 0

Scaler Config

☐ Use Presets

Presets

☐ SD Input is 702

SD Cross Conversion  
None  
16:9 LB > 4:3 HC  
16:9 LB > 16:9 Ana  
16:9 LB > 14:9 LB  
16:9 Ana > 4:3 HC

HD Cross Conversion  
None  
14:9 PB > 16:9 VC  
4:3 PB > 16:9 VC  
4:3 PB > 14:9 PB VC

Up Conversion  
4:3 > 16:9 VC  
4:3 > 4:3 PB  
16:9 LB > 16:9  
16:9 Ana > 16:9  
14:9 LB > 14:9 PB

☐ SD Output is 702

Down Conversion  
16:9 > 4:3 HC  
16:9 > 16:9 LB  
16:9 > 16:9 Ana  
4:3 PB > 4:3  
14:9 PB > 14:9 LB

Input Config

Input Signalling Source  
☒ SMPTE 2016  
☐ L23 ETSI  
☐ L23 AFD  
☐ VI SMPTE  
☐ VI AFD

☐ Alternate Center Cut

If Input Signalling Not Present  
☐ Force Input Format

SD Input Format  
☒ Normal  
☐ Anamorphic  
☐ 16:9 Letterbox  
☐ 14:9 Letterbox

HD Input Format  
☒ Normal  
☐ 14:9 Pillarbox  
☐ 4:3 Pillarbox

Output Config

Conversion Scaling  
☒ Fit to Height  
☐ Fit to Width  
☐ 14:9

SD Output Format  
☒ Normal  
☐ Anamorphic

Output Signalling Config

SMPTE 2016

Mode  
☒ Auto  
☐ Pass  
☐ Force  
☐ Delete

Output Line PAL: 12

Output Line NTSC: 11

Output Line HD: 11

Output Line Status: 11

VI

Mode  
☒ Auto  
☐ Pass  
☐ Force  
☐ Delete

Output Format  
☒ SMPTE  
☐ AFD

☐ VI Pass Data

L23

Mode  
☒ Auto  
☐ Pass  
☐ Force  
☐ Delete

Output Format  
☒ ETSI  
☐ AFD

Input Line: 23

Output Line: 23

Output Line Status: 23

AFD User Bits  
☐ Force User Bits Value  
User Bits Value: 0

Force Mode Config

SMPTE 2016  
4:3 AFD 0  
4:3 AFD 1  
4:3 AFD 2  
4:3 AFD 3  
4:3 AFD 4

SMPTE RP186  
4:3  
16:9

AFD  
4:3 AFD 0  
4:3 AFD 1  
4:3 AFD 2  
4:3 AFD 3  
4:3 AFD 4

ETSI  
4:3 FF  
14:9 Centre  
14:9 Top  
16:9 Centre  
16:9 Top

### 11.5.1 Sync Mode

The Sync Mode check box disables the ARC feature when input and output formats are the same. This gives the lowest latency.

### 11.5.2 Signaling Detected

Signaling Detected shows the status of any aspect ratio signaling detected at the input. If Status shows "None", no valid signaling is detected.

### 11.5.3 Sidebar Keying & Output Crop

The Sidebar Keying & Output Crop functionality provides post ARC cropping of the output picture and allows a second video picture to be keyed into the cropped area. When output cropping is enabled, the actual size of the output picture does not change, just how much of the active picture remains visible. The portion that is "cropped" is either default black (in Output Crop mode) or is replaced by a secondary video picture (in Sidebar Key mode) – the "cropped" portion still forms part of the output picture.

#### 11.5.3.1 Mode

- **Off:** Disables both Output Crop and Sidebar Keying.
- **Output Crop:** Crops the output picture. In this mode the cropped area is black by default. The cropped area is defined using the Output Crop Position controls. See section 11.5.3.2.
- **Sidebar Key:** Keys a second video picture into the cropped area, as defined using the Output Crop Position controls (see section 11.5.3.2). When selected, the source of the second video picture is becomes available in the Sidebar Key Source menu. See page 124.

#### 11.5.3.2 Output Crop Position

The Output Crop position controls enable you to adjust which portion of the video picture is visible by applying a border around the outside of the picture. The controls do not alter the output active picture size – each control separately defines a percentage of the picture to be replaced by a border. In Output Crop mode, the border is default black. In Sidebar Key mode, the border is the "key" area replaced by the secondary Sidebar Key video source.

Controls are paired: top with bottom and left with right. A pair of controls has limitations to prevent an overlap. The rule is that only 99% of the picture can be cropped, either horizontally or vertically. For example, if Top is set to 50%, Bottom cannot exceed 49%.

- **Top:** Crops the output picture, from the top-edge down. The adjustment range is 0% to 99% in 1% steps (0%). The default is 0%.
- **Bottom:** Crops the output picture, from the bottom-edge up. The adjustment range is 0% to 99% in 1% steps. The default is 0%.
- **Left:** Crops the output picture, from the left-edge right. The adjustment range is 0% to 99% in 1% steps. The default is 0%.
- **Right:** Crops the output picture, from the right-edge left. The adjustment range is 0% to 99% in 1% steps. The default is 0%.

### 11.5.3.3 Sidebar Key Source

If the sidebar key option is available, the Sidebar Key Source control will also be present. This control becomes active when Sidebar Key mode is selected. Firstly a border is set up around the active picture using the separate Output Crop Position controls. This control then selects the secondary video source to be keyed over the border area.

In order for this to work correctly, the following rules must be met:

- Sidebar Key Source must be of the same format and frame rate to the output video standard for this channel.
- If the key source selected is of a different standard to the main video output standard, only Output Crop Mode is available.
- Ensure the key source has the correct vertical genlock alignment. If not, the sidebar key will not have the correct vertical position.

The available sidebar key sources vary depending on the product variant:

- Single-channel product: all video inputs are available.
- Dual-channel product: all video inputs are available.

**Note:**

All video inputs is Serial SDI, CVBS, and SFP.

Sidebar Key Source options that are not available to the product are hidden from the selection list (for example, the output of the second channel in a single-channel product, or SFP input if no SFP rear is fitted).

Sidebar Key Source options that are not suitable are grayed out from the selection list (for example, the source is not the same output standard as the video it is being “keyed” into, or SFP 2 is actually a TX so is not available as an input).

For more information about sidebar keying, see the *Sidebar Keyer Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

### 11.5.4 Post Scaling Control

Post Scaling Control enables you to manually adjust the size and position of the output picture, post ARC scaling. This is an additional level of control which does not affect the ARC.

- **Post Scaling Enable:** Enables the Post Scaling controls.
- **Size:** Adjusts the size of the whole output image while maintaining aspect ratio. The adjustment range is 80% to 120% in 1% steps. The preset value is 100%.
- **Aspect:** Adjusts the aspect ratio of the output image. The adjustment range is 70% to 150% in 1% steps. The preset value is 100%.
- **Pan:** Adjusts the horizontal position of the output image. The adjustment range is -50 to 50 in steps of 1. The preset value is 0.
- **Tilt:** Adjusts the vertical position of the output image. The adjustment range is -50 to 50 in steps of 1. The preset value is 0.

### 11.5.5 Scaler Config – Presets

If no input aspect signaling is available and the conversion required is always from a known input aspect ratio to another known input aspect ratio, one of the standard presets may be selected. The presets are sub-divided into SD to SD cross conversion, SD to HD/3G up conversion, and HD/3G to SD down conversion.

**Note:** These presets are only active when the Use Presets check box is selected.

#### 11.5.5.1 SD Input is 702

SD Input is 702 is an additional ARC preset mode, which is available for incoming content that uses a 702 sample line rather than a 720 sample line. If the incoming content uses a 702 sample line, select the check box. This introduces an additional H scaling factor of 720/702, resulting in a slight horizontal stretch.

This control only has an effect on SD inputs.

**Note:** SD Input 702 introduces an additional H scaling factor of 720/702.

#### 11.5.5.2 SD Output is 702

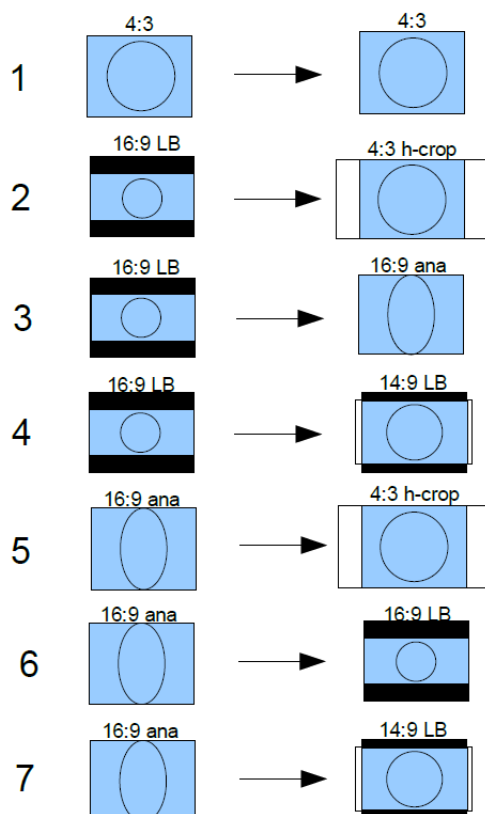
SD Output is 702 is an additional ARC preset mode, which is available for outgoing content that requires a 702 sample line rather than a 720 sample line. If the outgoing content requires a 702 sample line, select the check box. This introduces an additional H scaling factor of 702/720, resulting in a slight horizontal squeeze.

This control only has an effect on SD outputs.

**Note:** SD Output 702 introduces an additional H scaling factor of 702/720.

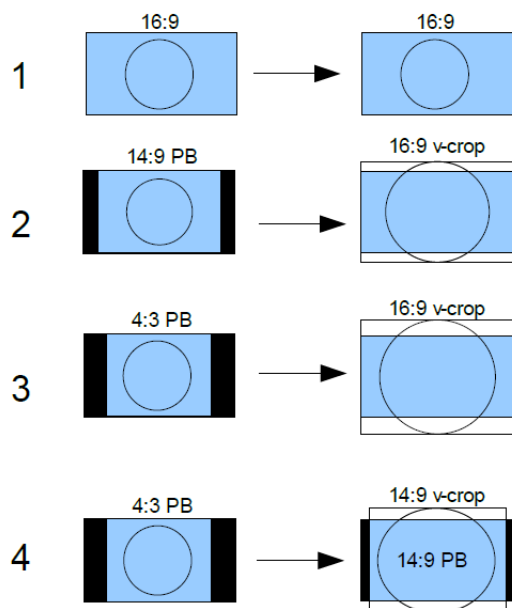
#### 11.5.5.3 SD Cross Conversion

LB = letterbox, h-crop = horizontal crop, ana = anamorphic.



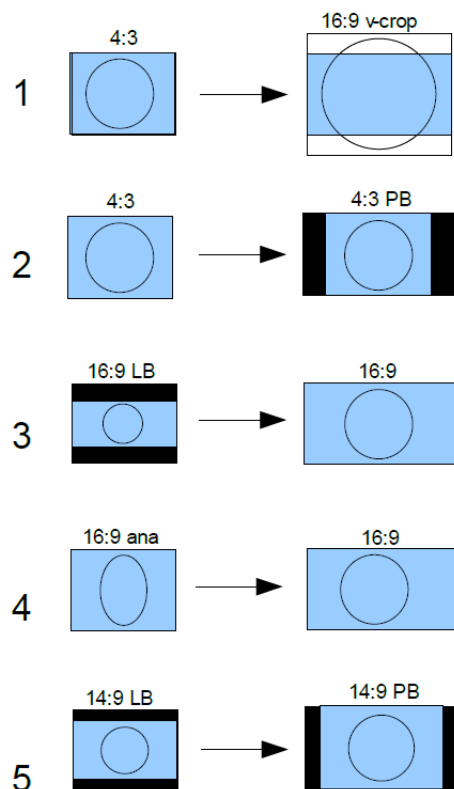
### 11.5.5.4 HD Cross Conversion

PB = pillarbox, v-crop = vertical crop.



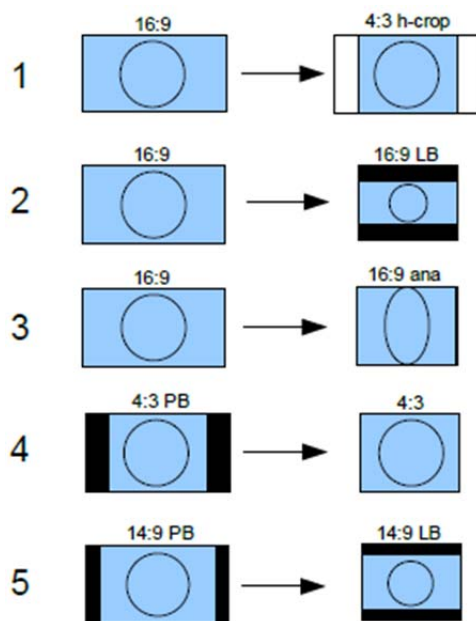
### 11.5.5.5 Up Conversion

LB = letterbox, PB = pillarbox, v-crop = vertical crop, ana = anamorphic.



### 11.5.5.6 Down Conversion

LB = letterbox, PB = pillarbox, h-crop = horizontal crop, ana = anamorphic.



### 11.5.6 Scaler Config – Input Config

The Input Config functions define which of the supported aspect signaling standards defines the input of the ARC.

#### 11.5.6.1 Input Signaling Source

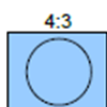
The Input Signaling Source box lists the available supported aspect signaling standards.

- **SMPTE 2016:** SMPTE ST 2016-1. Format for Active Format Description (AFD) and Bar Data.
- **L23 ETSI:** ETSI EN 300 294 v1.4.1. Television systems, 625-line television Widescreen signaling (WSS)
- **L23 AFD:** West Country TV/HTV/Central TV L23\_SPEC.doc 1997.
- **VI SMPTE:** SMPTE RP 186-1995. Video Index Information Coding for 525- and 625-line Television Systems.
- **VI AFD:** SMPTE RP 186-2008. Video Index Information Coding for 525- and 625-line Television Systems.

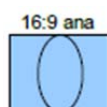
### 11.5.6.2 If Input Signaling Not Present

When using input aspect signaling with an SD or HD input source, it is possible to set a default input ARC setting. If, for any reason, the input aspect signaling cannot be detected, the ARC assumes this default setting.

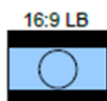
- **Force Input Format:** Enables manual ARC control, which will force the aspect ratio conversion if the input aspect signaling cannot be detected.
- **SD Input Format:** The SD input format.
  - **Normal:** Default 4:3 aspect ratio.



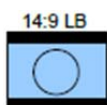
- **Anamorphic:** Horizontally squeezes a widescreen image to fit a standard 4:3 aspect ratio.



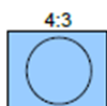
- **16:9 Letterbox:** Preserves the original aspect ratio of film shot in a widescreen aspect ratio, with bars visible at the top and bottom of the screen.



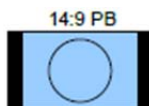
- **14:9 Letterbox:** A 14:9 letterbox image in a 16:9 frame.



- **HD Input Format:** The HD input format.
  - **Normal:** Default 4:3 aspect ratio.



- **14:9 Pillarbox:** A 14:9 pillarbox image in a 16:9 frame.



- **4:3 Pillarbox:** A 4:3 pillarbox image in a 16:9 frame.



## 11.5.7 Scaler Config – Output Config

The Output Config functions define which of the supported aspect signaling standards defines the input of the ARC.

### 11.5.7.1 Conversion Scaling

Conversion Scaling enables you to set fixed ARC output aspects.

- **Fit to Height:** Scales the image to fit the height of the screen while maintaining the aspect ratio.
- **Fit to Width:** Scales the image to fit the width of the screen while maintaining the aspect ratio.
- **14:9:** Can scale either a 4:3 image for viewing on a 16:9 screen, or a 16:9 image for viewing on a 4:3 screen. This is a compromise in order to maintain the aspect ratio of the image, but will crop some of the image in the process (top and bottom when viewing 16:9 and left and right when viewing 4:3).

See see section 11.5.8 for a list of possible ARC conversions using input signaling and a combination of SD Output Format and Conversion Scaling controls.

### 11.5.7.2 SD Output Format

When the output video is SD, this control enables you to set fixed output aspects for the ARC.

- **Normal:** Default aspect ratio.
- **Anamorphic:** Horizontally squeezes a widescreen image to fit a standard 4:3 aspect ratio.

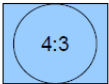
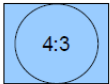
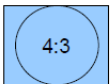
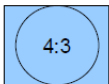
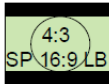
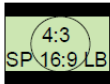
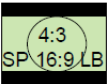
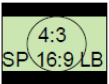




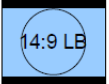
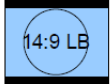
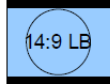

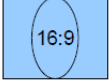

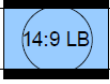

## 11.5.8 Input Signaling ARC Conversions

It is possible to manually fix the output aspect of the ARC when using input signaling. The input to the ARC is then defined by the dynamic input signaling.


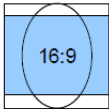

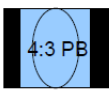
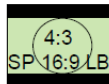
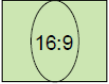
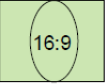
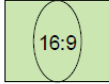

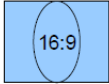
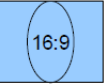
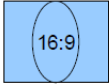
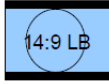

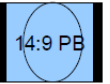

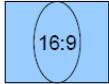
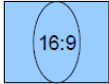
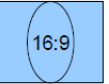
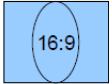
The following sections show the ARC conversions possible using input signaling and a combination of SD Output Format and Conversion Scaling controls. For each of the conversions there are four columns of images. The first column shows the source image in various formats, with each format described in the accompanying input signal. The next three columns show the output image format when the Fit to Width, 14:9, or Fit to Height Conversion Scaling controls are selected.

### 11.5.8.1 SD Cross Conversion

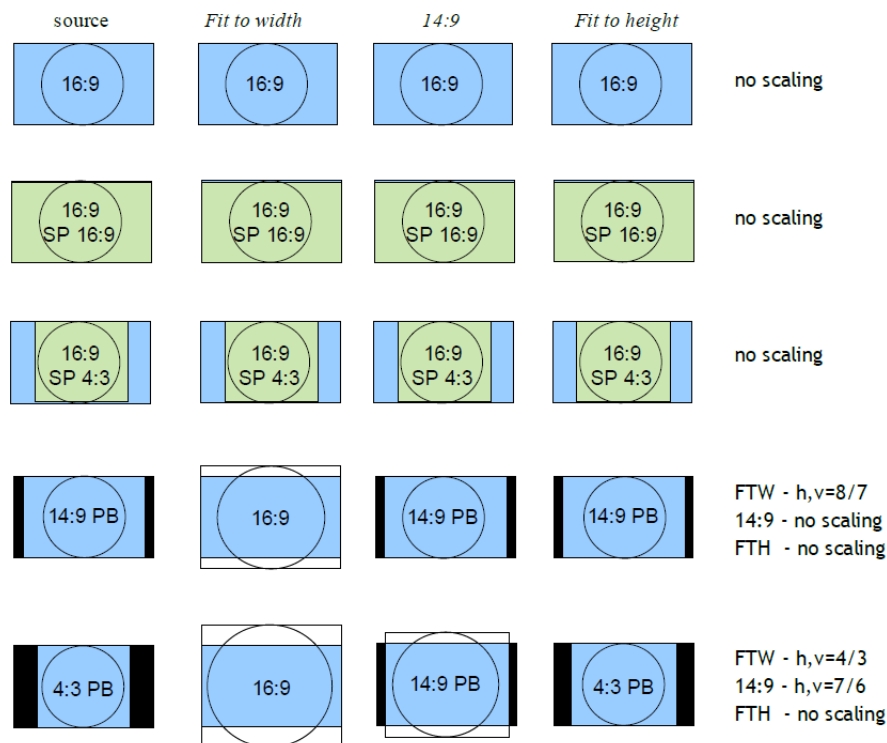
SD Output Format = Normal (4:3).

source	Fit to width	14:9	Fit to height	
				no scaling
				no scaling
				FTW - no scaling 14:9 - h,v=8/7 FTH - h,v=4/3
				FTW - no scaling 14:9 - no scaling FTH - h,v=7/6
				FTW - v=3/4 14:9 - h=8/7 v=6/7 FTH - h=4/3

SD Output Format = Anamorphic (16:9).

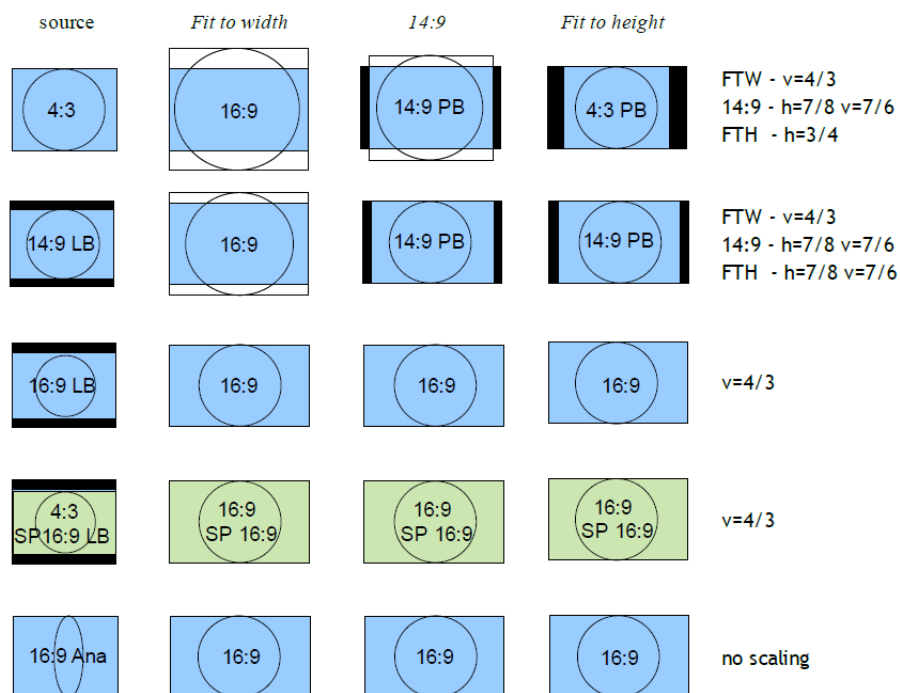
source	Fit to width	14:9	Fit to height	
				FTW - v=4/3 14:9 - h=7/8 v=7/6 FTH - h=3/4
				v=4/3
				v=4/3
				FTW - v=4/3 14:9 - h=7/8 v=7/6 FTH - h=7/8 v=7/6
				no scaling

### 11.5.8.2 HD Cross Conversion



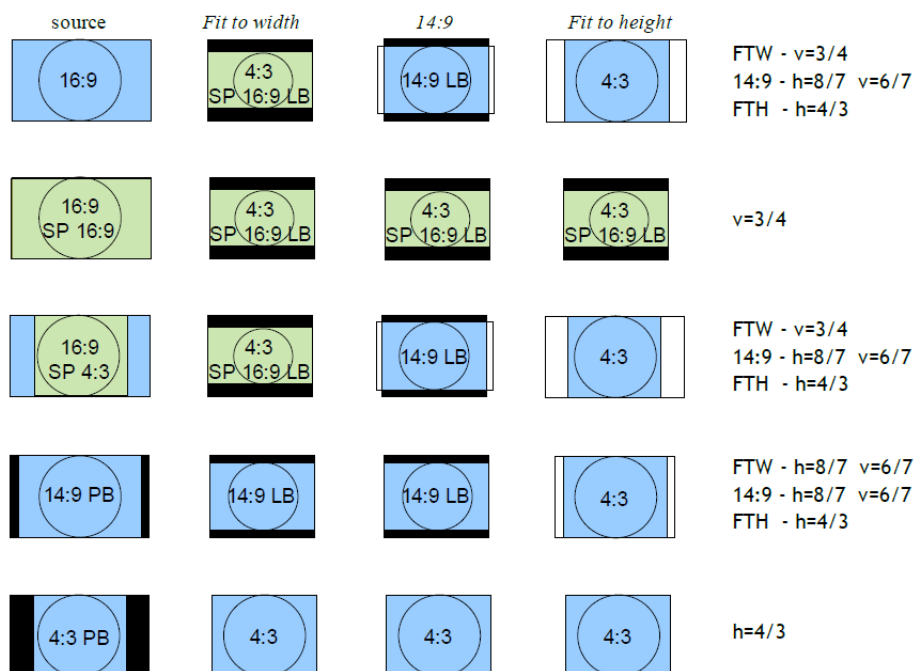
### 11.5.8.3 Up Conversion

SD Output Format has no effect as output is HD.

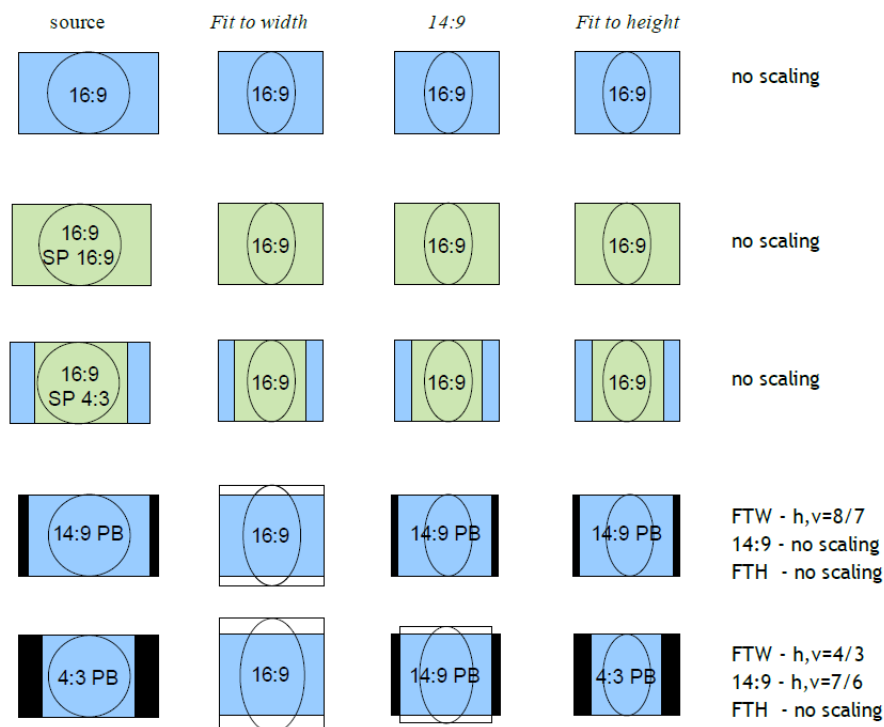


### 11.5.8.4 Down Conversion

SD Output Format = Normal (4:3).



SD Output Format = Anamorphic (16:9).



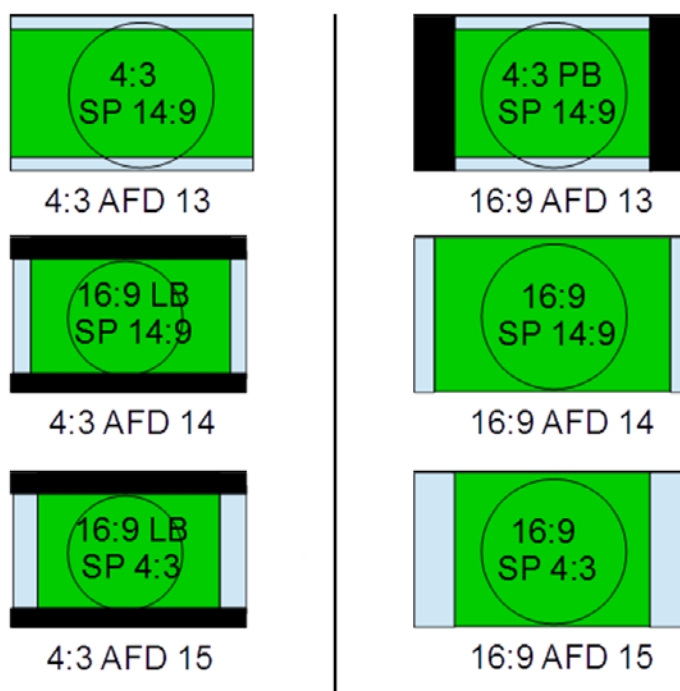
### 11.5.8.5 Alternate Center Cut

Alternate center cut is off by default. When off, behavior on receipt of certain specific AFD codes ignores protected regions. When Alternate center cut is on, the ARC behavior for these six specific codes will be to remove any Black bars and also remove the grey bars that will leave the "Alternative Centre". The Alternative centre will therefore be stretched to fit the screen so that the whole "white area" fills the screen. This will override Fit to width, 14:9 and Fit to height setting, so that all three give the same output result. It also overrides the "SD Output Format" control ("Anamorphic" or "Normal"). See SMPTE ST 2016-1:2009, pages 7, 8 and 9.

The behavior with Alternate center cut on and off is shown in the table below:

AFD Format	Interpretation with Alternate Centre Cut Off	Interpretation with Alternate Centre Cut On
4:3 AFD 13	4:3	4:3 Alt 14:9
4:3 AFD 14	16:9LB	16:9LB Alt 14:9
4:3 AFD 15	16:9LB	16:9LB Alt 4:3
16:9 AFD 13	4:3PB	4:3PB Alt 14:9
16:9 AFD 14	16:9	16:9 Alt 14:9
16:9 AFD 15	16:9	16:9 Alt 4:3

#### Alternate Center Cut Illustrations



## 11.5.9 Output Signaling Config

The Output Signaling Config controls define which of the supported aspect signaling standards defines the input of the ARC.

### 11.5.9.1 SMPTE 2016

The SMPTE 2016 controls define how the SMPTE 2016 signaling is configured. The controls also enable you to choose the output line number on which output signaling is embedded.

- **Mode:** Four modes of operation are available.
  - **Auto:** Automatically generates an output SMPTE 2016 signal with AFD data that matches the output aspect of the ARC.
  - **Pass:** Passes input signal information through the unit unchanged when SMPTE 2016 is selected as the input signaling source.

The output signal may not represent the actual aspect of the output image. If no SMPTE 2016 signal is present at the input, no SMPTE 2016 signal will be output.

- **Force:** Generates an output SMPTE 2016 signal with AFD data that matches what is selected in the Force Mode Config – SMPTE 2016 list. The list contains 16 AFD codes for coded frame AR of 4:3, and eight AFD codes for a coded frame AR of 16:9.
- **Delete:** Disables embedding of SMPTE 2016 output signaling in the output video.
- **Output Line PAL:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is 625. The range is from line 7 to line 22 in one-line steps. The default is line 12.
- **Output Line NTSC:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is 525. The range is from line 11 to line 19 in one-line steps. The default is line 11.
- **Output Line HD:** Selects the line number on which SMPTE 2016 signaling is embedded when the video output format is HD. The range is from line 9 to line 20 in one-line steps. The default is line 11.
- **Output Line Status:** Shows the output line number on which SMPTE 2016 signaling is embedded. If no line number is selected, "OFF" is displayed.

**Note:**

In the SD domain, take care to avoid a line clash if embedded VITC and SMPTE 2016 are both enabled. VITC will take priority and overwrite the SMPTE 2016 packet if the same output line is selected for both.

### 11.5.9.2 VI (SMPTE RP 186-95/08)

The Video Index (VI) Config controls enable you to specify VI signaling output actions.

VI is valid for both 625 and 525 output video formats. The lines used are:

- 625: Field 1 line 11, field 2 line 324.
- 525: Field 1 line 14, field 2 line 276.

VI signaling supports two output formats, which are the two versions of the SMPTE RP 186 specification.

- **Mode:** Output options.
  - **Auto:** When Output Format is set to SMPTE, Auto generates an output VI signal conforming to SMPTE RP 186-95 with scanning system information that matches the output aspect of the ARC. If Output Format is set to AFD, Auto generates an output VI signal conforming to SMPTE RP 186-08, with scanning system information and AFD that matches the output aspect of the ARC.
  - **Pass:** When either VI SMPTE or VI AFD is selected as the input signaling source, any valid SMPTE RP 186-95/08 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signal may not represent the actual aspect of the output image. If no VI signal is present at the input, then no VI signal will be output.
  - **Force:** When Output Format is set to SMPTE, Force generates an output SMPTE RP 186-95 signal with scanning system information that matches what is selected in the Force Mode Config – SMPTE RP 186 list. 4:3 and 16:9 are available, but the actual code used is determined by the output video standard: 625 or 525.

When Output Format is set to AFD, Force generates an output SMPTE RP 186-08 signal with scanning system information and AFD codes that match what is selected in the Force Mode Config – AFD list. The list contains eight AFD codes for scanning 4:3 system information, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used is determined by the output video standard: 625 or 525.

- **Delete:** Disables embedding of any SMPTE RP 186-95/08 output signaling in the output video.
- **Output Format:** Output format options.
  - **SMPTE:** Generates output VI signaling conforming to SMPTE RP 186-95, carrying just the scanning system information relating to the output aspect of the ARC.
  - **AFD:** Generates output VI signaling conforming to SMPTE RP 186-08. This carries the scanning system information as well as AFD codes relating to the output aspect of the ARC. (This specification was originally generated as ARDSPEC1 by several Major UK broadcasters and later incorporated into SMPTE RP 186 2008 version.)
- **VI Pass Data:** Allows passing of VI user bits data to the output video. Note that the input signaling source selected has to match the selected output format.

### 11.5.9.3 L23 (ETSI EN 300 294 v1.4.1)

The L23 Config controls define how the output ETSI EN 300 294 signaling is configured. This signaling format is generally referred to as WSS or Line 23 (L23), as this is the default line used to carry this signal in 625. WSS is only valid for 625 output video formats and is only supported for 625 output video format.

WSS signaling supports two output formats: ETSI EN 300 294, and a non-standard variant of ETSI EN 300 294.

- **Mode:** Output options.
  - **Auto:** If Output Format is set to ETSI, Auto generates an output WSS signal conforming to ETSI EN 300 294, with AFD codes that match the output aspect of the ARC. If Output Format is set to AFD, Auto generates an output WSS signal conforming to L23, with scanning system information and AFD codes that match the output aspect of the ARC.
  - **Pass:** When either L23 ETSI or L23 AFD is selected as the input signaling source, any valid ETSI EN 300 294 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signal may not represent the actual aspect of the output image. If no WSS signal is present at the input, then no WSS signal will be output.
  - **Force:** When Output Format is set to ETSI, Force generates an output ETSI EN 300 294 signal with AFD codes that match what is selected in the Force Mode Config – ETSI list. The list contains eight AFD codes.

When Output Format is set to AFD, Force generates an output ETSI EN 300 294 signal that is modified to carry VI scanning system information and AFD codes that match what is selected in the Force Mode Config – AFD list. The list contains eight AFD codes for scanning 4:3 system information, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used will always be 625, as WSS is only supported in 625 video output.

- **Delete:** Disables embedding of ETSI EN 300 294 output signaling in the output video.
- **Output Format:** Inserts L23 information in either AFD or ETSI format.
  - **ETSI:** Generates output WSS signaling conforming to ETSI EN 300 294, carrying just the AFD codes relating to the output aspect of the ARC.
  - **AFD:** Generates output WSS signaling conforming to ETSI EN 300 294; however, payload of the signal has alternative meaning: it has been modified to carry Video Index Scanning system information and AFD codes relating to the output aspect of the ARC. (This specification was originally generated as L23 spec by several major UK broadcasters and manufacturers. It has never been released as an official standard.)
- **Input Line:** WSS information is generally carried in the first half of line 23; however, if the information is required on a different line, use the slider to specify the line on which it is carried in the input. The range is from line 10 to line 23 in one-line steps.

*Note: ETSI EN 300 294 signaling will only be extracted from this line number if the video input format is 625.*

- **Output Line:** WSS information is generally carried in the first half of line 23; however, if the information is required on a different line, use the slider to specify the line on which it is carried in the output. The range is from line 10 to line 23 in one-line steps.

*Note: ETSI EN 300 294 signaling will only be extracted from this line number if the video input format is 625.*

- **Output Line Status:** Shows the output line number on which WSS information is carried. If no line number is selected, "OFF" is displayed
- **AFD User Bits:**
  - **Force User Bits Value:** Forces the value set on the User Bits Value slider into the L23 output.
  - **User Bits Value:** Sets the line on which the four additional user bits are carried.

**Note:** WSS output signaling is only available in SD 625 output video format.

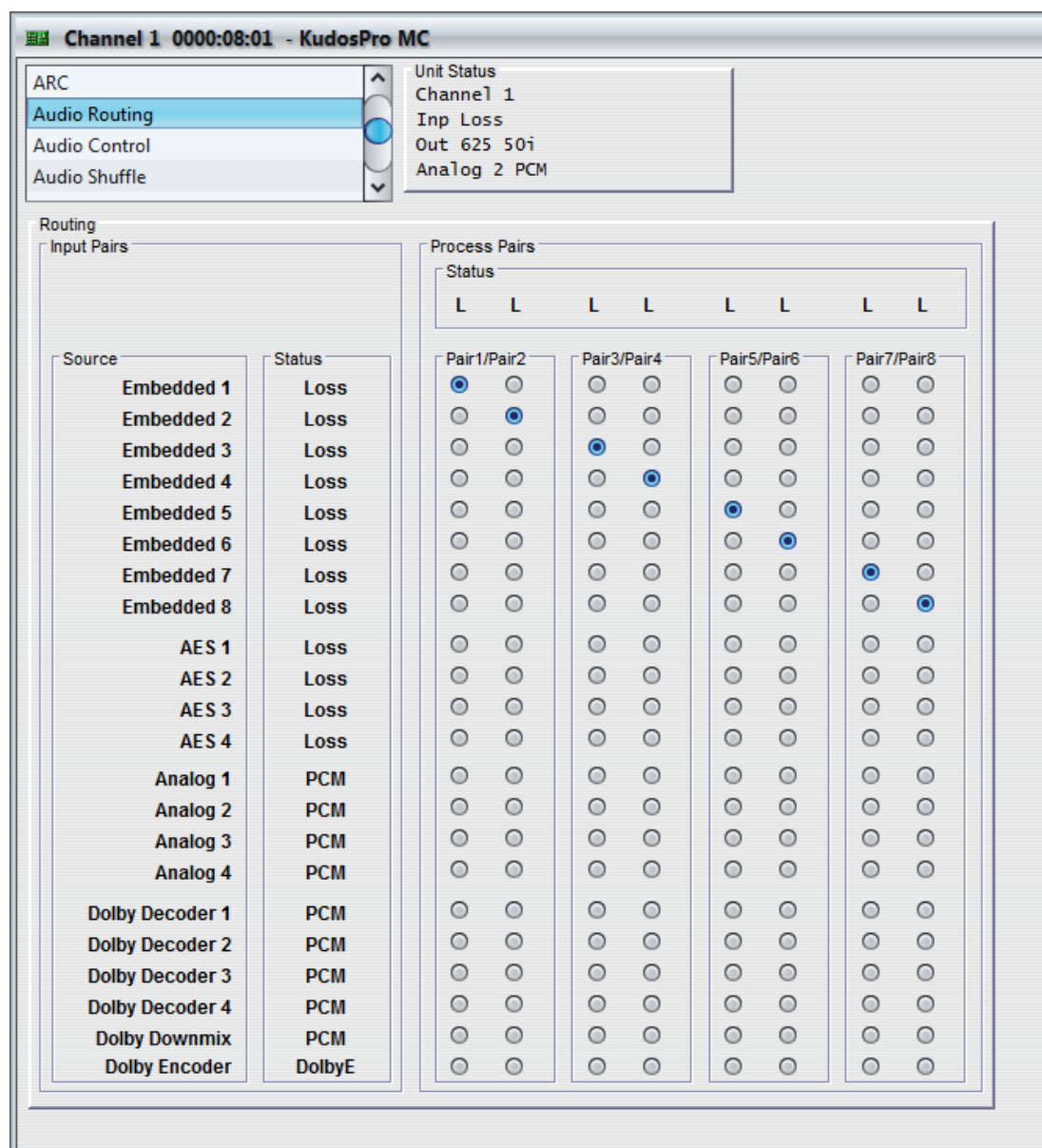
### 11.5.10 Output Signaling Config – Force Mode Config

Force Mode Config enables you to define the scanning system information and AFD codes inserted in the output signaling when Force is selected for any of the following three signaling types: SMPTE 2016, VI SMPTE RP 186, and WSS ETSI EN 300 294.

- **SMPTE 2016:** When SMPTE 2016 output signaling mode is set to Force, this control offers a list of 16 AFD codes for coded frame AR of 4:3 and the same AFD codes for a coded frame AR of 16:9. Selecting one will generate a SMPTE 2016 output signal.
- **SMPTE RP186:** When VI output signaling mode is set to Force and output format is set to SMPTE, this control offers a list of two scanning system information codes: 4:3 and 16:9. The actual code used is determined by the output video standard: 625 or 525. Selecting one will generate a SMPTE RP 186-95 output signal.
- **AFD:** When VI or L23 output signaling modes are set to Force, and their output formats are set to AFD, this control offers a list of eight AFD codes for scanning system information of 4:3, and eight AFD codes for scanning 16:9 system information. The actual scanning system information used is determined by the output video standard: 625 or 525. Selecting one will generate the following output signaling:
  - SMPTE RP 186-08: VI mode = Force, Output Format = AFD.
  - ETSI EN 300 294 (with SMPTE RP 186-08 payload): L23 mode = Force, Output Format = AFD.
- **ETSI:** When WSS output signaling mode is set to Force and output format is set to ETSI, this control offers a list of eight AFD codes. Selecting one will generate a ETSI EN 300 294 output signal.

## 11.6 Audio Routing

The Audio Routing screen enables you to route the incoming audio to the required embedded audio output.



### 11.6.1 Input Pairs

Input Pairs shows the input sources available to be routed.

#### 11.6.1.1 Source

- **Embedded 1–8:** Routes the available embedded audio sources to the eight output pairs.
- **AES 1–4 (if fitted):** Routes the available embedded AES audio sources to the eight output pairs.
- **Analog 1–4 (if fitted):** Routes the available analog audio sources to the eight output pairs.

- **Dolby Decoder 1–4 (if fitted):** You can select each of the four audio pairs from the Dolby decoder individually:
  - Dolby decoder 1 is pair 1 from the Dolby decoder
  - Dolby decoder 2 is pair 2 from the Dolby decoder
  - Dolby decoder 3 is pair 3 from the Dolby decoder
  - Dolby decoder 4 is pair 4 from the Dolby decoder
- **Dolby Decoder Downmix (if fitted):** The Lt/Rt downmix (applicable to 5.1 and 4 channel Dolby formats).
- **Dolby Encoder (if fitted):** Routes the dolby encoder audio pair.

For schematic information on audio routing, see “Block Diagrams” on page 15.

**Note:** AES and analog audio are controlled at a frame level, not at a channel level.

To route the AES and analog audio outputs, see “Audio Routing” on page 95.

#### 11.6.1.2 Status

The Status box shows the status of the audio input pairs. The audio status display information is as follows:

- PCM: Audio is PCM
- Mute: Audio is muted
- Tone: Audio is a test tone
- DolbyE: Audio is Dolby
- Loss: Audio is unavailable or invalid

#### 11.6.2 Process Pairs

For each of the output pairs, 1–8, you can select the audio source from various inputs.

##### 11.6.2.1 Status

The Status box shows the status of the audio output pairs. The audio status display information is as follows:

- P = PCM
- L = Loss
- N = Non-PCM

##### 11.6.2.2 Pair 1–8

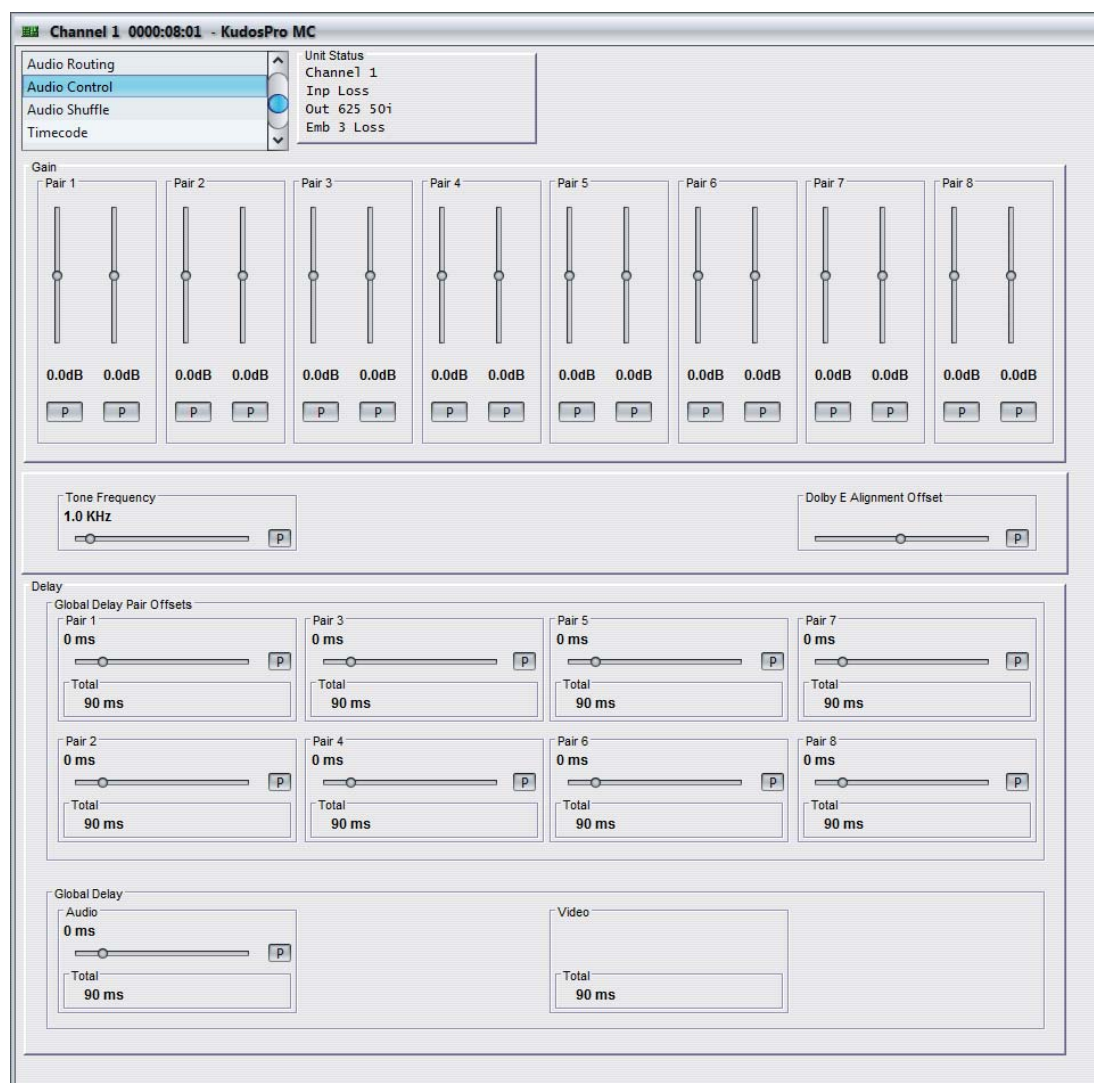
For each of the output pairs, 1–8, you can select the audio source to be passed to each audio processor on the Audio Shuffle screen.

For more information about audio routing, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## 11.7 Audio Control

The Audio Control screen enables you to adjust the gain of the audio channels.



### 11.7.1 Gain

The Pair 1–8 sliders adjust the gain of the left and right channels of the audio pairs. The adjustment range is -12 dB to 12 dB in 0.1 dB steps. The preset value is 0 dB.

### 11.7.2 Tone Frequency

The Tone Frequency slider adjusts the tone frequency. The adjustment range is 0.1 kHz to 10 kHz in 0.1 kHz steps. The preset value is 1 kHz.

#### Points to consider:

- Each embedded pair (EMB1/2 to EM15/16) has its own individual tone generator.
- AES can be balanced or un-balanced (MC1000-IQ/MC2000-IQ, balanced AES only). Only four pairs of AES can be processed.
- Analog audio processing is limited to four pairs.
- Analog and AES outputs are derived from Embedded pairs, hence test-tones follow Embedded audio settings.

### 11.7.3 Dolby E Alignment Offset

The Dolby E Alignment Offset slider sets the guard-band position of any output pair containing Dolby E, to allow for downstream processing. By default, the position of the guard-band is set automatically and is dependent on the output standard.

### 11.7.4 Delay

The Delay controls enable you to set delay pair offsets and the audio delay relative to the video delay.

#### 11.7.4.1 Global Delay Pair Offsets

- **Pair 1–8:** Adjusts the audio delay offset for each of the eight audio channel pairs. The adjustment range is -40 ms to 200 ms in 1 ms steps. The preset value is 0 ms.

The Total box shows the current total pair delay.

#### 11.7.4.2 Global Delay

- **Audio:** Adjusts the audio delay relative to the video delay. The adjustment range is -40 ms to 200 ms in 1 ms steps. The preset value is 0 ms.

The Total box shows the current total audio delay.

- **Video:** The Total box shows the current total video delay.

**Note:**

Global delay is applied to all channels. Individual channel delays are added/subtracted from this delay.

For more information about audio control, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## 11.8 Audio Shuffle

The Audio Shuffle screen contains the output information from the audio processors, as defined on the Audio Routing screen.

**Channel 1 0000:08:01 - KudosPro MC**

Unit Status  
Channel 1  
Inp Loss  
Out 625 50i  
Dolby Dec 4 PCM

**Audio Shuffle**

Shuffle

Process Pairs

Pair	L	R
1	<input checked="" type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input checked="" type="radio"/>
3	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input type="radio"/>
6	<input type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input type="radio"/>
8	<input type="radio"/>	<input type="radio"/>

Output Pairs

Pair	Status	L	R
1	F	<input type="radio"/>	<input type="radio"/>
2	F	<input type="radio"/>	<input type="radio"/>
3	F	<input type="radio"/>	<input type="radio"/>
4	F	<input type="radio"/>	<input type="radio"/>
5	F	<input type="radio"/>	<input type="radio"/>
6	F	<input type="radio"/>	<input type="radio"/>
7	F	<input type="radio"/>	<input type="radio"/>
8	F	<input type="radio"/>	<input type="radio"/>

Invert Phase

Control

1.0 KHz Tone  
Silence  
Use Routing

### 11.8.1 Process Pairs

The Process Pairs box shows the eight audio processor pairs defined on the Audio Routing screen.

### 11.8.2 Output Pairs

- **Status:** Shows the status of the audio output pairs.
- **Pair 1–8:** For each of the output pairs, 1–8, you can select the audio source to be routed to the output.

*Note: Certain rules determine which combinations are valid. An invalid combination will force the output to silence. The following table shows the rules that govern output pair combinations:*

	Non-PCM	PCM	Tone	Silence	Loss
Non-PCM	N or F	F	F	F	F
PCM	F	P	P	P	F
Tone	F	P	T	P	F
Silence	F	P	P	S	F
Loss	F	F	F	F	F

P = PCM, N = non-PCM, S = silence, T = test tone, F= forced mute (silence).

### 11.8.3 Invert Phase

The Invert Phase check boxes enable you to invert the phase of the left and right audio channels. This control is useful for dealing with input audio discrepancies.

### 11.8.4 Control

- **Tone:** Makes the audio input source a test tone.
- **Silence:** Mutes the audio input source.
- **Use Routing:** Routes the audio output from the audio processor.

For more information about audio routing, see the *Audio Processing Application Note* under the “Support” tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## 11.9 Timecode

The Timecode screen enables you to set up and control the unit's timecode options for VITC (Vertical Interval Timecode), LTC (Linear Timecode), and ATC (Ancillary Timecode).

For HD video inputs, ATC LTC and ATC VITC timecode data formats are supported. For HD video outputs, the timecode data format is fixed to ATC VITC. This is present in all HD video outputs if Follow Input mode is selected (with a valid input timecode detected), or if Generate mode is selected.

For SD video inputs, VITC, ATC LTC and ATC VITC timecode data formats are supported. For SD video outputs, the timecode data format is fixed to VITC. This is present in all SD video outputs if the VITC Enable check box is selected, and either Follow Input mode is selected (with a valid input timecode detected), or Generate mode is selected.

Where the input frame rate is 29.97 fps, both drop frame and non-drop frame modes are supported. For 29.97fps outputs, timecode can be configured as either drop frame or non-drop frame.

**Note:** External LTC timecode is not supported.

**Channel 1 0000:08:01 - KudosPro MC**

Audio Shuffle  
**Timecode**  
 Metadata  
 Memories

Unit Status  
 Channel 1  
 Inp 1080 59i  
 Out 525 59i  
 AES 2 Loss

**Source**  
 Source (HD)  
☒ LTC  
☐ VITC  
 Source (SD)  
☒ VITC  
☐ ATC LTC  
☐ ATC VITC  
 Status: None

**Processing**  
 Mode  
☐ Follow Input  
☐ Generate  
☐ Input Trigger  
 Trigger Config  
 Input Trigger Entry [P] [S]  
 Output Timecode Entry [P] [S]

On Timecode Loss  
☐ Freeze  
☐ Free Run

Generator  
 Timecode Entry [P] [S] Timecode Load  
 30FPS  
☐ Drop Frame  
☐ Non-drop Frame

**Embedding**  
☒ VITC Enable  
 Output Line (525) 14 [P]  
 Output Line (625) 19 [P]  
 Output Line Status

### 11.9.1 Source

The Source controls enable you to choose a timecode format for HD and SD input video: LTC or VITC for HD, and VITC, ATC LTC, or ATC VITC for SD.

### 11.9.1.1 Source HD

For HD video standards, the supported input timecode format is ATC. This means that timecode data formatted as LTC, VITC, or both will be detected at the input; however, only one format can be selected.

- **LTC:** Select ATC LTC only if detected when video input is HD.
- **VITC:** Select ATC VITC only if detected when video input is HD.

If the selected format is not detected at the input, no timecode processing will be available.

### 11.9.1.2 Source (SD)

For SD video standards, the supported input timecode formats are VITC and ATC. As with HD, ATC can mean that timecode data formatted as LTC, VITC, or both will be detected at the input; however, only one format can be selected.

- **VITC:** Select VITC only if detected when video input is SD.
- **ATC LTC:** Select ATC LTC only if detected when video input is SD.
- **ATC VITC:** Select ATC VITC only if detected when video input is SD.

If the selected format is not detected at the input, no timecode processing will be available.

### 11.9.1.3 Status

The Status box reports which type of embedded timecode is detected within the video input to this processing channel. If no valid timecode is detected, "None" is displayed.

## 11.9.2 Processing

The processing controls enable you to select a mode of operation for timecode processing.

### 11.9.2.1 Mode

Three modes are available for timecode processing.

- **Follow Input:** The input timecode is read every frame and the actual time elapsed since timecode 00:00:00:00 is calculated. This elapsed time is then converted into an output timecode that matches the output video frame, and inserted into the output.

There is an additional process to compensate for clock offset between in and out, which will generate repeated or skipped timecodes as necessary, just as happens when synchronizing at the same standard. If the output is clock-locked to the input, this process has no effect.

- **Generate:** The unit generates the output timecode internally to match the output video standard. You can specify a start time in the Timecode Entry field. See section 11.9.2.4 below.
- **Input Trigger:** The unit generates the output timecode from a specified input timecode trigger. You can specify a trigger and start time in the Input Trigger Entry and Output Timecode Entry fields. See section 11.9.2.3.

### 11.9.2.2 On Timecode Loss

On Timecode Loss defines how the embedded output timecode should behave if input timecode cannot be detected.

- **Freeze:** On timecode loss, the output timecode will freeze at the last valid detected input value, until the valid input returns.
- **Free Run:** On timecode loss, the output timecode will switch to free-run and generate its own timecode starting from the last valid detected input value, until the valid input returns.

### 11.9.2.3 Trigger Config

When Input Trigger mode is selected, the Trigger Config controls enable you to enter an input timecode value that will trigger the free-running output timecode, and a starting timecode value for the free-running output timecode.

- **Input Trigger Entry:** In this field you can enter a value to specify when the output timecode starts. Once set, the output timecode will start when the video source input timecode reaches the trigger value set in the Input Trigger Entry field. To enter a value:

In the Input Trigger Entry field, enter the required value and click S to set. To return to the preset value, click P.

- **Output Timecode Entry:** In this field you can enter a value to specify when the output timecode starts. Once set, the output timecode will start when the input timecode reaches the trigger value set in the Input Trigger Entry field. To set a value:

In the Output Timecode Entry field, enter the required value and click S to set. To return to the preset value, click P.

**Note:**

For the Input Trigger mode to work, a value is required in both the Input Trigger Entry field and the Output Timecode Entry field.

### 11.9.2.4 Generator

When timecode Generate mode is selected, the Generate controls enable you to enter a specific starting timecode value for the free-running internal timecode generator.

- **Timecode Entry:** In this field you can enter a value to specify when the internally generated free-running timecode starts. Once set, the internally generated timecode will start when you select the Timecode Load button. To enter a value:

In the Timecode Entry field, enter the required value and click S to set. To return to the preset value, click P.

- **Timecode Load:** Manually triggers the internally generated timecode, starting at the time specified in the Timecode Entry field.
- **30FPS:** Output timecode always follows the correct count sequence for the output standard, except when following an input timecode that does not represent actual time (except if the input is flagged as 59 non-drop).

Drop Frame operates as follows:

- When converting timecode from 29/59 Hz to 29/59 Hz standards, the output drop-frame type automatically matches the input (the Drop Frame control has no effect).
- When using the internal timecode generator with a 29/59 Hz output standard, the drop-frame type is determined by the Drop Frame control.
- When converting 23 Hz inputs to anything, follow input will give a broken sequence.

### 11.9.3 Embedding

The Embedding controls enable you to enable/disable embedding of VITC in SD output video, and to choose the line on which it is embedded for both 525 and 625 outputs.

- **VITC Enable:** Enables the embedding of VITC in the SD output.

*Note: This control only enables the embedding of VITC. In order for VITC to be present in the output SD video, a valid timecode must be detected at the input when in Follow Input mode, or when Generate mode is selected.*

- **Output Line (525):** Selects the output line on which VITC is placed when the channel output is 525. The range is from line 11 to line 17 in one-line steps. The default is line 14.
- **Output Line (625):** Selects the output line on which VITC is placed when the channel output is 625. The range is from line 7 to line 20 in one-line steps. The default is line 19.

*Note: The line number stated is the first of the two lines used to embed VITC. The second line will always be the line selected + 2. For example, the default line for 525 is 14. Therefore VITC will be embedded on lines 14 and 16.*

- **Output Line Status:** Shows the actual output line number on which SD VITC packets are inserted. If no line number is selected, "OFF" is displayed.

*Note: If the line selected is already in use, the VANC embedding hierarchy will place the SD VITC packet on the nearest available line.*

## 11.10 Metadata

The Metadata screen enables you to control a set of closed captions and teletext subtitle information.

Incoming SD or HD closed captions and subtitles are converted to the correct format in the HD or SD output when upconverting or downconverting at the same frame rate.

Teletext

625 Captions Source

☒ WST  
☐ CEA-608

SD VBI Setup

WST Origin & Status

<input type="checkbox"/> Line 7	None
<input type="checkbox"/> Line 8	None
<input type="checkbox"/> Line 9	None
<input type="checkbox"/> Line 10	None
<input type="checkbox"/> Line 11	None
<input type="checkbox"/> Line 12	None
<input type="checkbox"/> Line 13	None
<input type="checkbox"/> Line 14	None
<input type="checkbox"/> Line 15	None
<input type="checkbox"/> Line 16	None
<input type="checkbox"/> Line 17	None
<input type="checkbox"/> Line 18	None
<input type="checkbox"/> Line 19	None
<input type="checkbox"/> Line 20	None
<input type="checkbox"/> Line 21	None
<input type="checkbox"/> Line 22	None

WST Output Status

Line 7	None
Line 8	None
Line 9	None
Line 10	None
Line 11	None
Line 12	SMPTE2016
Line 13	None
Line 14	None
Line 15	None
Line 16	None
Line 17	None
Line 18	None
Line 19	VITC Timecode
Line 20	None
Line 21	VITC Timecode
Line 22	None

WST Remap

☐ Allow WST Remap

ONLY ONE WST ORIGIN LINE MAY BE REMAPPED

WST Origin Line

10

WST Output Line

10

WST Origin & Status

None

WST Output Line Status

10

SMPTE RDD08/ SMPTE 2031 VANC PKT

Input PKT Type

☒ SMPTE RDD08  
☐ SMPTE 2031

Output PKT Enable

☐ Enable

Output PKT Type

☒ SMPTE RDD08  
☐ SMPTE 2031

SMPTE RDD08

Output Line PKT 1

10

Output Line Status PKT 1

10

Output Line PKT 2

10

Output Line Status PKT 2

10

Output Line PKT 3

10

Output Line Status PKT 3

10

SMPTE 2031

Data Unit ID Select

Output PKT 1

☒ Teletext Subtitle  
☐ Teletext Non-Subtitle  
☐ Inverted Teletext

Output PKT 2

☒ Teletext Subtitle  
☐ Teletext Non-Subtitle  
☐ Inverted Teletext

Output PKT 3

☒ Teletext Subtitle  
☐ Teletext Non-Subtitle  
☐ Inverted Teletext

Output PKT 4

☒ Teletext Subtitle  
☐ Teletext Non-Subtitle  
☐ Inverted Teletext

Output PKT 5

☒ Teletext Subtitle  
☐ Teletext Non-Subtitle  
☐ Inverted Teletext

Output Line All PKTs

10

Output Line Status All PKTs

10

### 11.10.1 Closed Captions

Closed Captions covers CEA-608 and CEA-708 specified captioning. Although these specifications support captioning in multiple video standards, CEA-608 is only supported in 525 input or output as a line 21 signal. CEA-708 is only supported in 59 Hz HD video standards as a VANC packet with a Caption Distribution Packet (CDP) payload.

Closed Caption pass-through is possible if a valid input closed caption is present and input and output video standards are the same.

Closed Caption transcoding is supported from CEA-608 to CEA-708 by taking the decoded bytes from the line 21 signal and inserting them into the compatibility byte within the CDP. Transcoding from CEA-708 to CEA-608 is possible if the CDP contains a compatibility bytes, which are extracted and encoded as an output line 21 signal.

Closed captions are automatically detected in the input video, and the detected format shown in the Status window. For closed captions to be embedded in the output video, they must be enabled. User control for on which line to embed CEA-708 is provided, but CEA-608 is always fixed at line 21.

#### 11.10.1.1 CEA608/708

- **CEA-608/708 Output Enable:** Enables embedding of CEA-608 captioning as a line 21 signal in 525 output video, and CEA-708 captioning as an embedded VANC packet in 59 Hz HD output video.

*Note: The Output Enable controls only enable embedding of output closed captioning. For closed captioning to be present in the output video, valid input closed captioning must be detected, and you must select the correct output standard to support pass-through or transcoding.*

- **Output Line:** Selects the output line on which to insert CEA-708 VANC packets. The range is from line 8 to line 20 in one-line steps. The default is line 10.
- **CEA-708 Output Line Status:** Shows the actual output line number on which CEA-708 VANC packets are inserted. If no line number is selected, "OFF" is displayed.

*Note: If the line selected is already in use, the VANC embedding hierarchy will place the CEA-708 packet on the nearest available line.*

#### 11.10.1.2 Input Status

The Input Status box shows if either CEA-608 or CEA-708 captions are detected on the input.

### 11.10.2 Multi-line WST

The unit can pass World System Teletext (WST) for SD and RDD-08 or SMPTE 2031 teletext for HD. You can enable or disable teletext output and specify the input and output lines used.

Teletext covers World System Teletext (WST) subtitles, SMPTE RDD-08 and SMPTE 2031. For WST and RDD-08, only subtitle information is supported or processed. SMPTE 2031 VANC packets may be teletext subtitles, non-subtitles, or inverted teletext.

WST is only supported in 625 input or output encoded signals. RDD-08 is only supported in 50 Hz HD video standards as a VANC packet with a Subtitling Distribution Packet (SDP) payload. Teletext subtitle transcoding is supported from WST to RDD-08 by taking the decoded bytes from the WST signal and inserting them into the payload within the SDP (see below). Transcoding from RDD-08 to WST is only possible if the SDP contains valid subtitles, which are extracted and encoded as an output WST signal.

#### Teletext pass-through

Teletext pass-through is possible if a valid input teletext subtitle is present and input and output video standards are the same. For SD video that uses a large number of WST VBI (where the VBI may have multiple lines of WST and 2 Timecode lines) the unit can encode/decode/transcode up to 15 lines of WST. In up and down conversion applications, this would use up to 3 RDD-08 (OP47) packets. RDD08 OP47 allows for 15 lines of WST to be encoded. SMPTE2031 allows only 5 lines of WST to be encoded.

#### 625 Input - 625 Output

You can select which input lines of WST are encoded on the output (see instructions for SD VBI line setup below). For the lines selected the status of WST being detected on that line is reported back.

The unit allows for up to 15 lines of WST to be selected on the input. If valid WST is detected on the selected lines, they will be placed on the same lines on the output. The status for each line will be reported back.

It is also possible to remap one WST origin line. In this case, select Allow WST remap. If valid WST is detected on the line selected by "WST origin line" it will be put on the line selected by the user control "WST output line".

**Note:** Only one WST origin line may be remapped

#### 625 Input - HD Output

In applications where the video is upconverted, you can select which lines of WST are encoded.

1. If RDD08 (OP47) conversion is selected, then up to 15 lines can be encoded in the RDD-08 packet. A maximum of 3 packets are allowed on the output, each with individual line number controls. The number of output RDD-08 packets on the output is decided by the number of valid WST lines decoded on the input. The first five WST lines are encoded in the first RDD-08 packet, the next 5 in the second RDD-08 packet and so on.
2. If SMPTE2031 conversion is selected, then the first 5 lines selected on the input are encoded in the 2031 packet. Each single WST line corresponds to one SMPTE2031 packet on the output. All packets will be placed on the same line selected by the user control (see control Output Line All PKTs in the menu list). The Data Unit ID can be set to Teletext, Non-Teletext or Inverted Teletext.

**HD Input - HD Output**

You can select which input HD WST packet is to be decoded - RDD-08 or SMPTE2031. Cross-conversion between the packet types is allowed. The option to select individual WST lines contained in the input packets is still available using the WST origin and status menu items. This is because both the SMPTE2031 and RDD-08 packet contain within them the original source SD line number information. The input line selection refers to this line number and not the ANC packet position line number.

**HD Input - 625 Output**

You can select which input HD WST packet is to be decoded - RDD-08 or SMPTE2031. You can specify which lines of WST to encode on the output using the WST origin and menu item. The WST lines will be encoded on the line number information encoded within the input HD packet, unless "Allow WST remap" is selected in which case you can change the line number for one WST line on the output (similar to the SD to SD case described above).

**Note:**

Only one WST origin line may be remapped

## 11.11 Memories

The Memories screen enables you to save up to eight memory setups for each processing channel, and recall them when required.

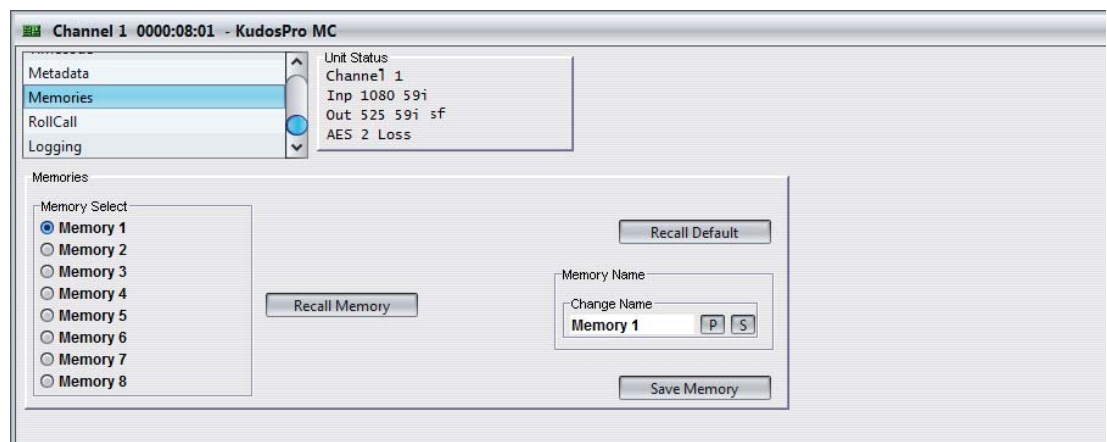
You can change the default memory names to more relevant ones if required.

Memories set at a channel level save all parameters associated with the processing channel including:

- Input routing.
- Output standard and aspect ratio controls.
- Video processing settings such as noise reduction parameters, proc amp settings, and enhancer parameters.
- Conversion options such as still process.
- Signaling parameters.
- SDI output audio routing per processing channel.
- PCM audio controls (gain, delay, L/R swap).
- Timecode settings.
- Closed caption processing choices.

**Note:**

Memories set and recalled for any chosen processing channel do not affect any other processing channel.



### 11.11.1 Creating and Saving Memories

1. In the Memory Select column, select a memory.
2. In the Change Name field, type a new name for the memory.
3. To save the memory name, click S. To return the memory to its preset value, click P.
4. To save the memory, click Save Memory. The new memory name appears in the Memory Select column.

### 11.11.2 Recall Memory

The Recall Memory button recalls the settings saved in a memory location.

To recall a memory:

1. In the Memory Select column, select the memory you want to recall.
2. Click Recall Memory. The recalled settings are applied.

### 11.11.3 Reset to Defaults

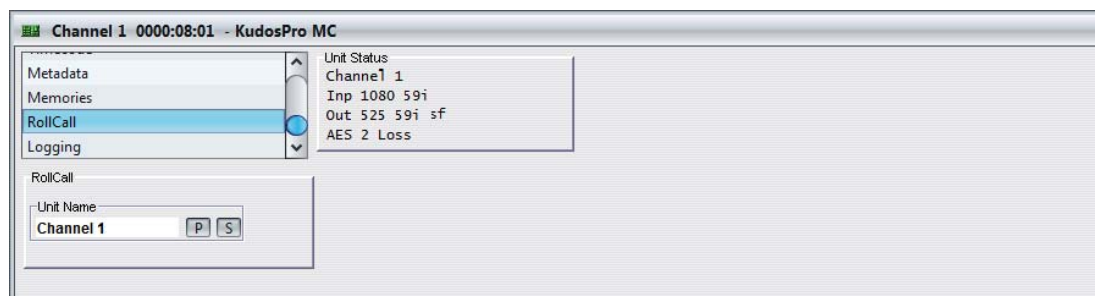
Reset to Defaults recalls all the unit's default memory settings at a channel level. All controls are reset back to their preset values.

**Note:**

Reset to Defaults does not affect user memories.

## 11.12 RollCall

The RollCall screen enables you to name the unit for use remotely with the RollCall Control Panel.

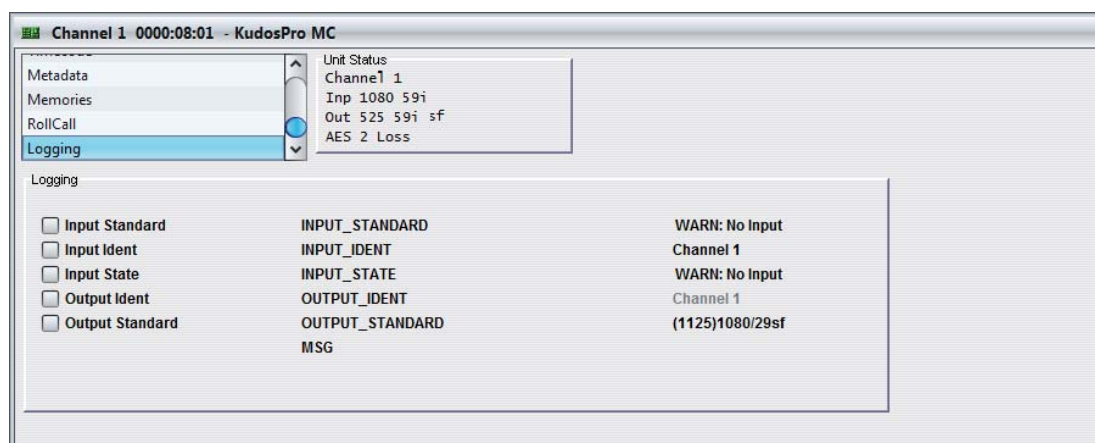


To change the name of the unit:

1. In the Change Name field, type a new name for the unit.
2. To save the name, click S. To return the name to its preset value, click P.

## 11.13 Logging

The Logging screen defines what parameter information is made available to a logging device attached to the RollCall network.



You can select to enable logging and view the status of the following parameters:

- Input Standard
- Input Ident
- Input State
- Output Ident
- Output Standard
- MSG Status

**Note:**

MSG Status shows a confirmation message that the log server is running.

## Appendix A. Conversion Operational Examples

### A.1 MC1000/MC1000-IQ Frame Rate Conversion

#### Example

You have received content at 1080 59i and need to convert it to 1080 50i with an additional audio delay of 100 ms to correct for an upstream error.

#### Steps

1. On the rear panel, connect the SDI source (1080 59i) to SDI In 1.
2. On the front panel, press the INPUT Shortcut button.
3. Choose Input Select > SDI 1, then select Done.

**Note:**

In steps 1 to 3 you have routed the input from SDI In 1 to the processing channel.

4. Press the HOME button.
5. Verify that the status display shows "1080 59i" as the input. If the status display shows "input loss", review steps 1 to 3 to ensure you have correctly connected and routed the source.
6. Press the OUTPUT Shortcut button.
7. Select Output Standard > 1080 50i, then select Done.

**Note:**

In steps 7 and 8 you have set up conversion to HD 1080 50i on the processing channel.

8. Press the HOME button.
9. Verify that the status display shows the correct input and output.
10. Press the AUDIO Shortcut button.
11. Select Control > Audio Delay.
12. Rotate the Control knob clockwise until the delay slider shows 100 ms. Alternatively, enter 100 using the Alphanumeric buttons.
13. Select Done.

## A.2 MC2000/MC2000-IQ Frame Rate Conversion

### Example

You have received content at 1080 50i and need to convert it to both 1080 59i and 525 59i for transmission.

### Steps

1. On the rear panel, connect the SDI source (1080 50i) to SDI In 1.
2. On the front panel, press the CH SELECT button until the Channel 1 LED is illuminated.
3. Press the INPUT Shortcut button.
4. Choose Input Select > SDI 1, then select Done.
5. Press the CH SELECT button until the Channel 2 LED is illuminated.
6. Choose Input Select > SDI 1, then select Done.

**Note:**

In steps 1 to 6 you have routed the input from SDI In 1 to both processing channels.

7. Press the HOME button.
8. Verify that both status displays "1080 50i". If either or both status displays show "input loss", review steps 1 to 6 to ensure you have correctly connected and routed the source.
9. Press CH SELECT button until the Channel 1 LED is illuminated.
10. Press the OUTPUT Shortcut button.
11. Select Output Standard > 1080 59i, then select Done.
12. Press the CH SELECT button until the Channel 2 LED is illuminated.
13. Select Output Standard > 525 59i, then select Done.

**Note:**

In steps 9 to 13 you have set up conversion to HD 1080 59i on processing channel 1 and conversion to SD 525 59i on channel 2.

14. Connect your HD monitor or recording device to Output A1 and your SD monitor or recording device to Output B1.

To ensure that motion compensation is being applied on both channels:

1. Press the CH SELECT button until the Channel 1 LED is illuminated.
2. Press the CONVERT Shortcut button.
3. Select Motion Processing > Motion Process, then select the Motion Process check box.
4. Select Done.

Repeat for channel 2.

## A.3 MC1000 Frame Rate Conversion – SD Composite Video

### Example

You have received SD composite PAL content at 625 50i and need to convert it to SDI 1080 59i. Audio is not required.

**Note:** Not applicable to MC1000-IQ, the MC1000-IQ unit has no CVBS inputs.

### Steps

**Important:** Ensure that you have the CT1 option fitted.

1. On the rear panel, connect the SD composite source (625 50i) to CVBS A1.
2. On the front panel, press the INPUT Shortcut button.
3. Choose Input Select > CVBS A, then select Done.

**Note:** In steps 1 to 3 you have routed the input from CVBS A1 to the processing channel.

4. Press the HOME button.
5. Verify that the status display shows “625 50i” as the input. If the status display shows “input loss”, review steps 1 to 3 to ensure you have correctly connected and routed the source.
6. Press the OUTPUT Shortcut button.
7. Select Output Standard > 1080 59i, then select Done.

**Note:** In steps 6 and 7 you have set up conversion of SD PAL 625 50i to HD SDI 1080 59i on the processing channel.

## A.4 MC2000 Frame Rate Conversion – HD SDI to SD Composite Video

### Example

You have received HD SDI content at 1080 50i and need to convert it to composite NTSC at 525 59i. Audio is not required.

**Note:** Not applicable to MC2000-IQ, the MC2000-IQ unit has no CVBS outputs.

### Steps

**Important:** Ensure that you have the CT1 option fitted.

1. On the rear panel, connect the SDI source (1080 50i) to SDI In 1.
2. On the front panel, press the CH SELECT button until the Channel 1 LED is illuminated.
3. Press the INPUT Shortcut button.
4. Choose Input Select > SDI 1, then select Done.

**Note:** In steps 1 to 4 you have routed the input from SDI In 1 to processing channel 1.

5. Press the HOME button.
6. Verify that the status display for channel 1 shows “1080 50i” as the input. If the status display shows “input loss”, review steps 1 to 4 to ensure you have correctly connected and routed the source.
7. Press the OUTPUT Shortcut button.
8. Select Output Standard> 525 59i, then select Done.
9. Press the SYSTEM Shortcut button, then press the Control knob to enter the System menu list.
10. Select CVBS > CVBS Encoder D > Source > Converter Ch 1, then select Done.

**Note:** In steps 7 to 10 you have set up conversion of HD SDI 1080 50i to SD composite NTSC 525 59i on processing channel 1.

## A.5 Using Decoded Dolby E Audio when Converting Video

### Example

You want to route the first pair from a decoded Dolby E source, using processing channel 1, to PCM on SDI output A1 embedded audio pair 1 (assuming only one Dolby option is fitted).

#### A.5.1 From the Front Panel

1. On the front panel, press the SYSTEM Shortcut button.
2. Select Dolby > Dolby Ch 1 > Decoder Source> Embedded 1, then select Done.
3. Press the HOME button.
4. Press CH SELECT until the channel 1 LED is illuminated.
5. Press the AUDIO Shortcut button.
6. Select Routing > Pair 1 Source > Dolby Decoder 1, then select Done.

*Note: This selects pair 1 from the Dolby decoder.*

#### A.5.2 From the RollCall Control Panel

1. From the System menu list, select Dolby.
2. In the Dolby Ch 1 Decoder Source box, select Embedded 1.
3. From the Channel 1 menu list, select Audio Routing.
4. Next to Dolby Decoder 1, select the radio button under the Pair 1 column.

## A.6 Transcoding Dolby E Audio when Converting Video

### Example

You want to transcode incoming Dolby from a 50 Hz source on pair 1 using processing channel 2 to match a frame rate converted video output at 59 Hz, which will be routed to SDI out B1 embedded audio pair 1 (assuming two Dolby options are fitted).

#### A.6.1 From the Front Panel

1. On the front panel, press the SYSTEM Shortcut button.
2. Select Dolby > Dolby Ch 2 > Decoder Source > Embedded 1, then select Done.
3. Press the HOME button.
4. Press CH SELECT until the channel 2 LED is illuminated.
5. Press the AUDIO Shortcut button.
6. Select Routing > Pair 1 Source > Dolby Encoder, then select Done.

*Note: This selects pair 1 from the Dolby decoder.*

#### A.6.2 From the RollCall Control Panel

1. From the System menu list, select Dolby.
2. In the Dolby Ch 2 Decoder Source box, select Embedded 1.
3. From the Channel 2 menu list, select Audio Routing.
4. Next to Dolby Encoder 1, select the radio button under the Pair 1 column.

*Note: The audio status for pair 1 now shows "E".*

For more Dolby operational examples, see the *KudosPro Dolby Application Note* under the "Support" tab at:

[www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/](http://www.snellgroup.com/products/conversion-and-restoration/conversion/kudospro/)

## Appendix B. Troubleshooting

### B.1 Introduction

In the unlikely event of a fault with the KudosPro unit, follow the advice given in this section.

A fault can arise due to any of the following:

- Incorrect operation
- Errors in upstream equipment
- Incompatibility with downstream equipment
- Software bug
- Hardware fault

If a software bug or hardware fault is causing the problem, please contact SAM Customer Support and provide as much information as possible from the diagnostic stages. See “Contact Details” on page 2.

### B.2 General Troubleshooting

#### B.2.1 Performing a Factory Reset

Before starting the fault-finding process, it is a good idea to perform a factory reset – it may clear the problem if due to an operator error. A factory reset is also useful as it puts the unit under test into a known state prior to starting the fault-finding process.



Factory Reset clears all user memories. Make a note of any important settings before performing a factory reset.

Factory Reset recalls the unit's default memory settings at both system and channel level. All controls and user memories are reset to their preset values.

The default settings for IP Configuration is to set the unit to DHCP. Any saved settings for IP Address, IP Netmask, and IP Gateway are also lost when performing a factory reset. The unit returns all three to their default settings, which are as follows:

- IP Configuration: DHCP
- IP Address: 192.168.151.1
- IP Netmask: 255.255.255.0
- IP Gateway: 192.168.151.200

To perform a factory reset from the front panel:

1. On the front panel, press the SYSTEM Shortcut button.
2. Select Memories > Factory Reset, then select Done.
3. Do one of the following to apply the changes:
  - Select Network > Apply IP Changes, then select Done.
  - Reboot the system.

To perform a factory reset from the RollCall Control Panel:

1. From the System menu, select Memories > Factory Reset.
2. Do one of the following to apply the changes:
  - From the Network screen, click Apply IP Changes.
  - Reboot the system.

**Note:**

If performing a factory reset via a remote link, when you press Apply IP Changes the remote link will be lost.

### B.2.2 PSU Fault

The PSU outputs +12 V. Onboard regulation provides the necessary supply voltages required by the various sub-assemblies. The unit operates on one power supply only but has dual supplies for redundancy.

If you suspect a PSU failure, power each IEC connector in turn to identify if one of the PSU modules has failed.

To confirm the state of both PSUs:

- On the front panel, select System > Status > PSU A/B. The actual output voltage of each PSU is displayed.

## B.3 Video Troubleshooting

### B.3.1 Video Quality Issues

A video quality issue may not mean that there are any problems with the unit. Sometimes problems are due to incorrect conversion parameter settings, or errors in the incoming source.

If you suspect a video processing fault:

- Check that the source content is a supported format.
- Check for quality issues on the source video.
- Make sure that Motion Processing is enabled. To do this:
  1. On the front panel, press the CONVERT Shortcut button.
  - b Select Convert > Motion Processing > Motion Process, and check that Motion Processing is selected.

*Note: Still Process and Enhanced Still improve the quality of some material, such as high resolution still images. However, for moving video content, it is best to disable Still Process and Enhanced Still.*

- Make sure that enhancement is disabled when testing a conversion. You can turn this on selectively during a conversion as required. To do this:
  1. On the front panel, press the ENHANCE Shortcut button.
  - b Select Video > Enhance > Nonlinear Enhancer > Enable, then select Done.
- Make sure that Noise Reduction and all Proc Amp settings are disabled when testing a conversion. You can turn these on selectively during a conversion as required. To do this:
  1. On the front panel, press the VIDEO Shortcut button.
  - b Select Proc Amp or Noise Reduction and ensure that they are disabled and all settings are initially at factory default.

### B.3.2 No Video Output

- Check that the correct standard SDI monitor is connected to the chosen output.

*Note: Some monitors only support a limited number of video standards.*
- Check that a valid input is routed to the appropriate video channel. To do this:
  1. On the front panel, press the CH SELECT button to select an unused processing channel.
  - b Press the INPUT Shortcut button.
  - c From the Input Select menu, choose the SDI input that has a valid video source.

You can create a valid video source from any of the two or four channel products by setting up a test pattern on any of the unused channels. To do this:

1. On the front panel, press the CH SELECT button to select an unused processing channel.
- b Press the OUTPUT Shortcut button.
- c Select Test Patterns and choose Ramp or Bars to create a suitable test pattern.

- If you are using a composite output, check that your monitor accepts composite signals.

*Note: Only SD outputs can use the CVBS encoders.*

- If you are using composite input sources, check that these are connected to the correct CVBS inputs. See “Block Diagrams” on page 15.

### B.3.3 Front Panel Display is Blank

- Check that you have valid SDI video on the video channel selected.
- On the Home screen, check that the correct standard is showing on the status display for the processing channel in use. If the display shows "Input Loss", check that your video source is playing out correctly. If there is no input to the processing channel in use, the right-side of the display is black.
- If you can see a valid input on the channel status screen and you are sure that the correct SDI input has been routed to this processing channel, check the test patterns to ensure that you have not set a black test pattern on the output. To do this:
  1. On the front panel, press the OUTPUT Shortcut button.
  - b Select Test Patterns and make sure that the Off radio button is selected.

### B.3.4 Composite Input Problems (MC1000/MC2000 Only)

If you are routing a composite signal via one of the CVBS decoders:

- Check that you have a valid SD composite source. You can create a valid composite source from any of the two or four channel products by routing an SD test pattern through the CVBS encoder (if fitted) on the unused channel. To do this:
  1. On the front panel, press the CH SELECT button to select an unused processing channel.
  - b Press the OUTPUT Shortcut button.
  - c Select Test Patterns and choose Ramp or Bars to create a suitable test pattern.
  - d Press the SYSTEM Shortcut button.
  - e Select CVBS and route the appropriate channel through the chosen CVBS encoder.

**Note:**

When using the CVBS inputs or outputs, it is important to remember that they can be used for single connection composite signals (such as PAL or NTSC) or for Separated Y/C signals, which use both BNCs.

If you are having problems with composite inputs:

- Check that the correct input format is selected for the chosen input connection(s). To do this:
  1. On the front panel, press the SYSTEM Shortcut button.
  - b Select CVBS > CVBS Decoder (A–D) > Source.
  - c Scroll until the appropriate radio button for the source is highlighted. For example, select Input 1 for a PAL signal on CVBS In A1, or Y/C for a signal using both CVBS in A1 and CVBS In A2.
  - d Select Done.

### B.3.5 Hardware or Software Fault?

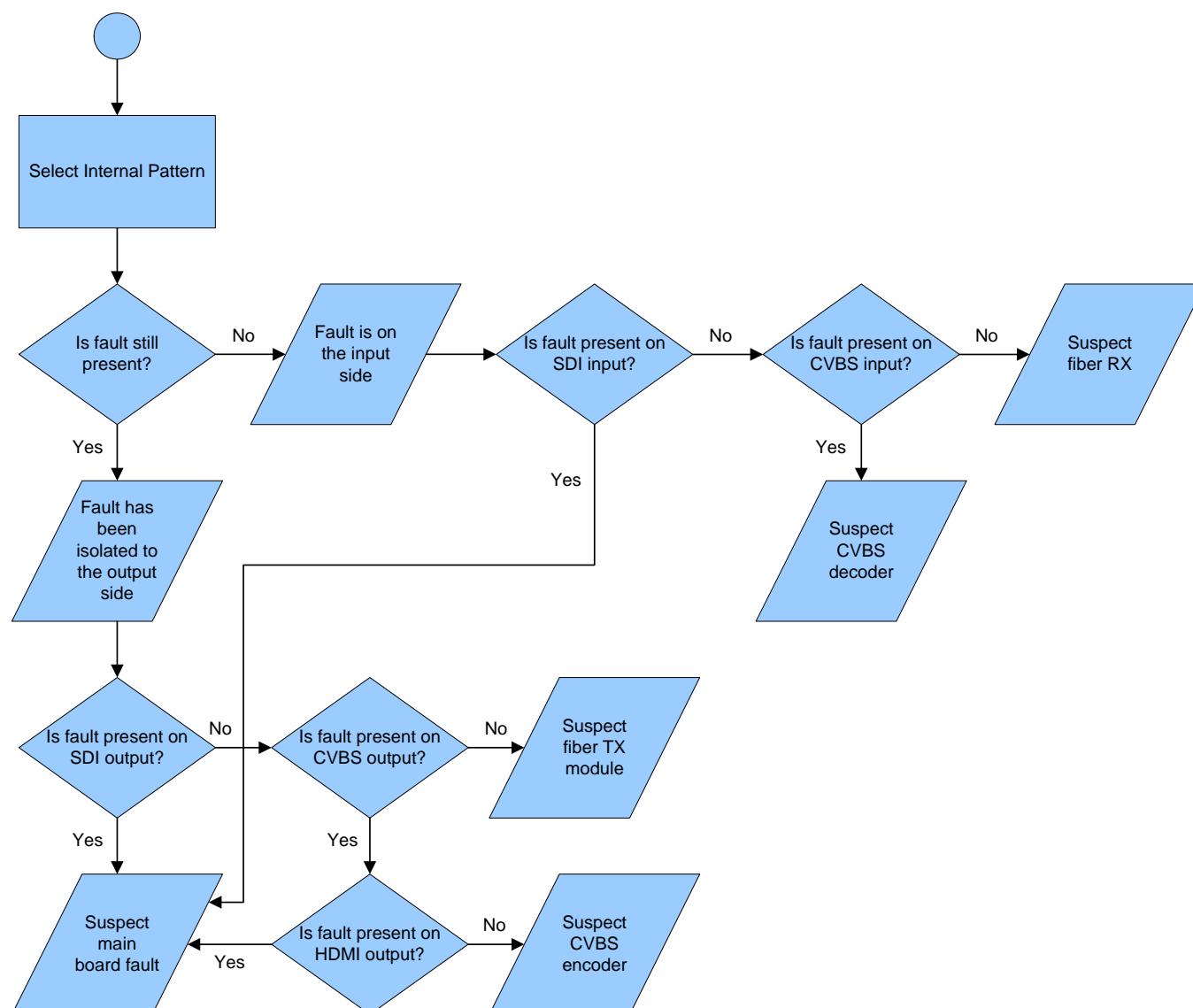
If a fault occurs on more than one unit using the same software code, or on multiple channels on the same unit, a software fault is the likely cause. If a fault occurs on a single channel, a hardware fault could be the cause.

For assistance with locating a fault, see the Section B.3.6 Video Troubleshooting Flowchart.

**Important:**

Always keep the software up to date. A software upgrade may clear a bug identified and fixed in a later release. For information about how to upgrade your software, see “Software Upgrade Procedure” on page 170.

### B.3.6 Video Troubleshooting Flowchart



## B.4 Audio Troubleshooting

KudosPro products can process several audio formats: embedded, balanced AES, and balanced analog as standard, and unbalanced AES if the composite option is fitted.

**Note:** MC1000-IQ/MC2000-IQ units do not have CVBS or unbalanced AES inputs or outputs.

### B.4.1 SD Embedded Audio Problems

In the SD domain, the specification for embedding audio into a video channel is ambiguous. The ambiguity concerns the packet distribution process applied. Two manufacturers can comply with the specification and still be incompatible with one other. Because SAM products often interface with other manufacturers' equipment, we take care to ensure compatibility. However, because there are so many manufacturers interpreting the specifications in their own way, it is difficult for a single manufacturer to be compatible with all other manufacturers.

A packet distribution issue may cause either audio distortion, or "motor-boating". To test for this:

- Apply a known good source that is the same video standard as the problematic source (you can set up an unused KudosPro channel with a video pattern and test tone). If the problem does not occur with a known good source, then it could be due to a packet distribution compatibility issue.

**Note:** In the HD domain, the specification is clearly defined and ambiguities do not occur. It is unlikely that you will encounter any issues in the HD domain, due to the way the audio embedding is implemented.

### B.4.2 Testing Audio

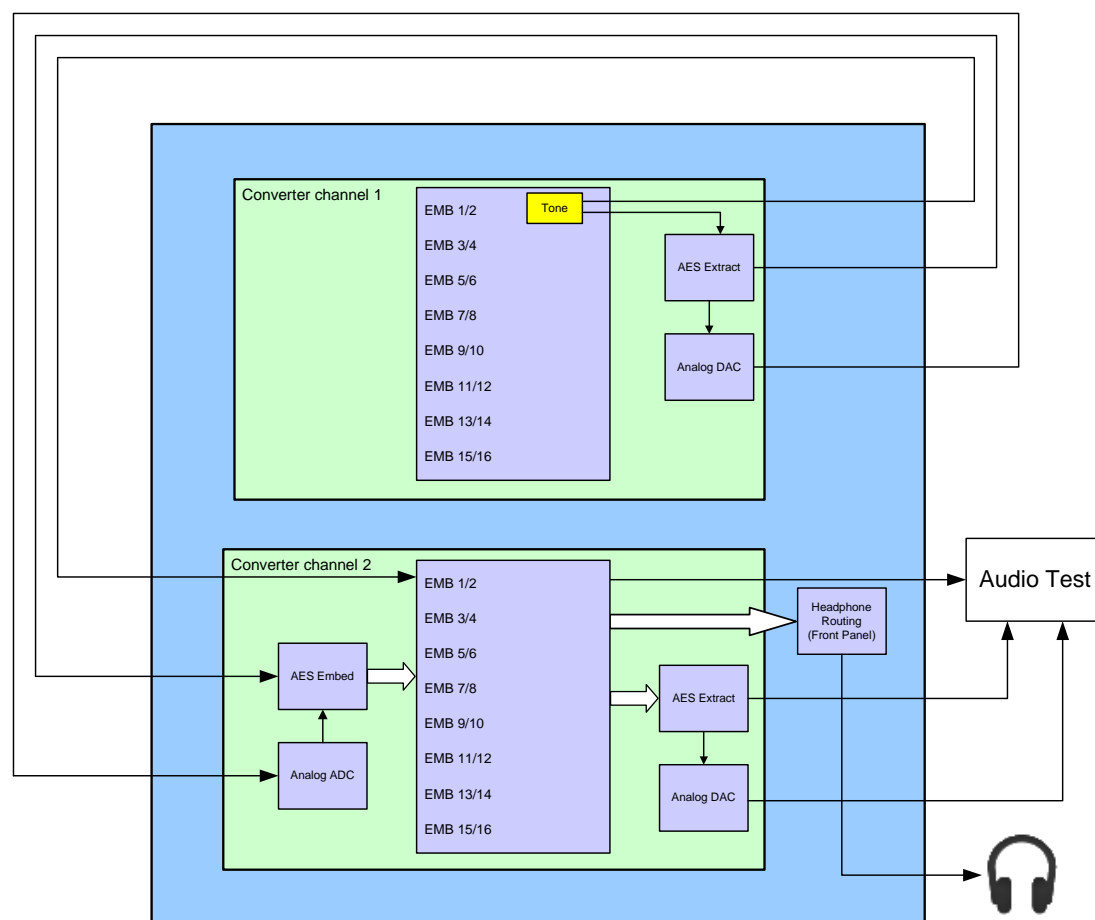
As with video, you can test audio by using a process of elimination. The KudosPro products can handle various formats of audio. If a fault can be isolated to a single format, or perhaps a particular format is not affected, it is valuable information for the troubleshooting exercise.

Because the KudosPro units are multi-channel (except for the MC1000/MC1000-IQ), you can use one conversion channel as a test generator for the other conversion channels. See "Testing Feedback – Two-channel Audio Processing" on page 167.

### B.4.2.1 Testing Feedback – Two-channel Audio Processing

By switching on the tone generator on conversion channel 1 audio processor, then using the conversion channel 2 output as sources for the various audio sources for conversion channel 2, you can test the performance of the audio processing of conversion channel 2.

Similarly, you can test the audio processing of conversion channel 1 by using the audio processor of conversion channel 2, with tone enabled, as an audio source.



This kind of testing is very useful in the field, where reliable audio test sources may not be available. Although this is a simple concept, configuring the unit for this test requires care.

Points to consider:

- Each embedded pair (EMB1/2 to EM15/16) has its own individual tone generator.
- AES can be balanced or un-balanced (MC2000-IQ balanced AES only). Only four pairs of AES can be processed.
- Analog audio processing is limited to four pairs.
- Analog and AES outputs are derived from Embedded pairs, hence test-tones follow Embedded audio settings.
- If audio monitoring equipment is not available, you can use the headphones socket on the front panel to monitor PCM sources for each audio pair.

*Note: The source routed to the headphones socket is configured in the System > Front Panel menu.*

- Monitoring using the front panel headphones socket is only available for PCM audio.

## B.5 Timecode Troubleshooting

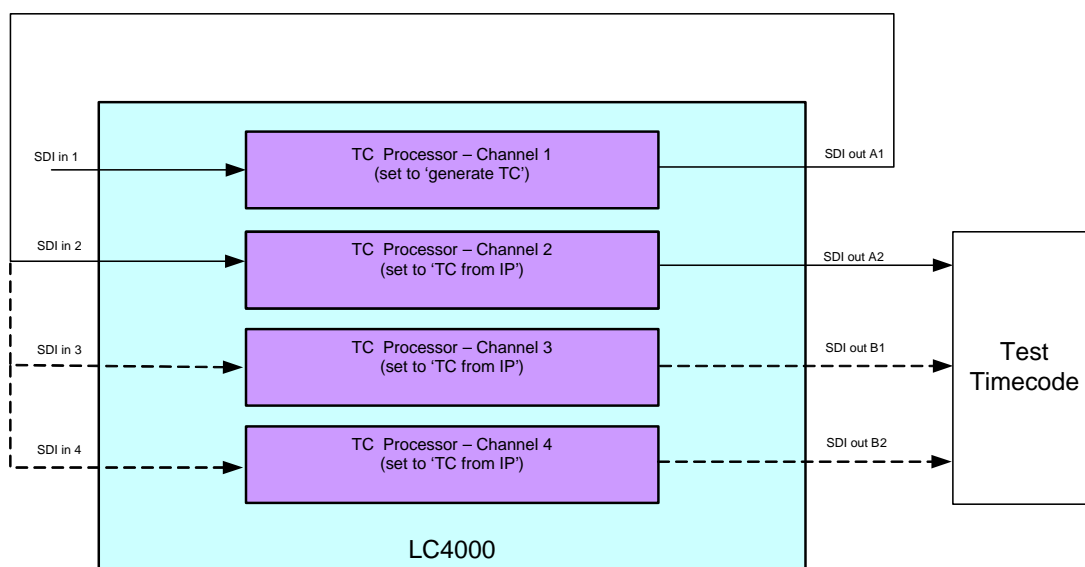
Each video processing channel has its own associated timecode processor. Both Embedded VITC and Embedded LTC are supported in the SD and HD domain. SD also offers VITC. Timecode can either be handed over from the input or internally generated. Where the input frame rate is 29.97 fps, both drop frame and non-drop frame modes are supported. For 29.97fps outputs, timecode can be configured as either drop frame or non-drop frame.

### B.5.1 Testing Timecode

A useful test method on multiple channel units is to use the internal timecode generator of one channel to test all the other channels.

#### B.5.1.1 Testing Timecode Performance

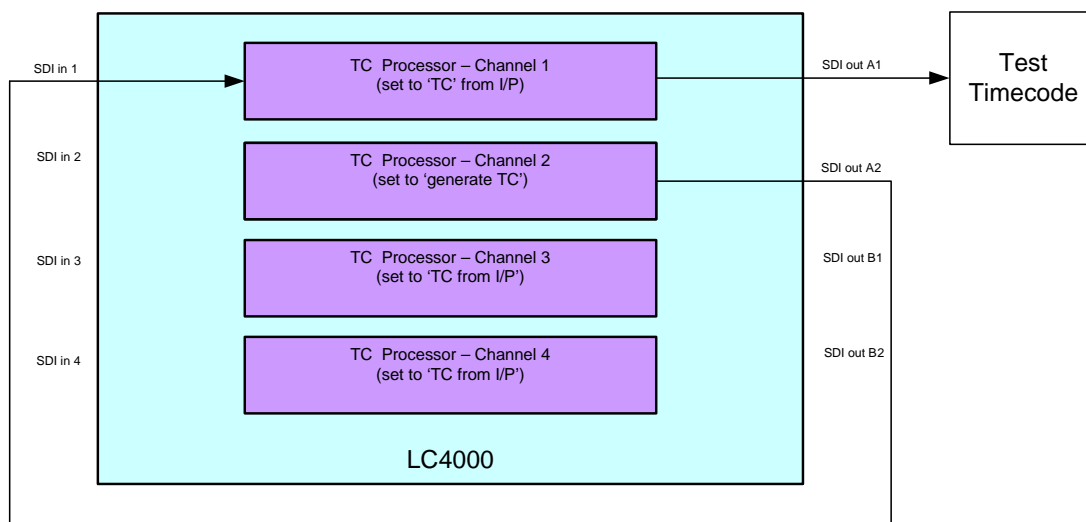
Consider the LC4000: this model has four video channels, each with an independent timecode processor.



If you set channel 1 to “generate TC”, the channel is no longer dependent upon input timecode. You can then feed the output from this video channel back into video channels 2, 3 and 4 in turn, and assess the performance of each channel at its respective output.

### B.5.1.2 Testing Channel 1 Timecode Performance

You can test the timecode performance of channel 1 by repeating the timecode performance test (see “Testing Timecode Performance” on page 168), only this time using one of the other three channels as the generator. In the following example, channel 2 is the timecode generator.



## B.6 Software Upgrade Procedure

**Important:**

Upgrading from software version 1.4F.5 (or earlier) to version 1.5E.6 (or later) will significantly change the structure of the flash. Once a unit has been upgraded to version 1.5E.6 (or later), it should not be downgraded. A downgrade will wipe product licenses and leave the unit unable to boot.

Please contact SAM Customer Support for information about downgrading. See “Contact Details” on page 2.

To update software:

1. Go to:

[www.snellgroup.com/support/software-updates/category/3/conversion-and-restoration](http://www.snellgroup.com/support/software-updates/category/3/conversion-and-restoration)

2. From the “Filter updates by product” drop-down list, select “KudosPro”.
3. Click “How to update your product” and follow the instructions on how to download and run the upgrade.

**Important:**

The upgrade procedure takes approximately 15–20 minutes. During the upgrade do not remove the Ethernet connection or turn off the unit.

If you are still having problems, please contact SAM Customer Support. See “Contact Details” on page 2.