

Ukon

Universal Conversion Platform

Installation & Operator's Manual

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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



Servicing instructions where given, are for use by qualified service 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.

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 :



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, moulé mâle/femelle.

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.

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



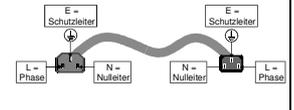
Die angeführten Service-/Reparatur-Anweisungen sind ausschließlich von qualifiziertem Service-Personal auszuführen. Um das Risiko eines lektroschocks zu reduzieren, führen Sie ausschließlich die im Benutzerhandbuch eschriebenen Anweisungen aus, es sei denn, Sie haben die entsprechende Qualifikation. 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 identifizierbaren 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:

GRÜN GELB E = Schutzleiter (⊕)
 BLAU N = Nullleiter
 BRAUN L = P = Phase



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

Explicación de los Símbolos de Seguridad

ESP

-  Éste símbolo refiere al usuario información importante contenida en la literatura incluida. Referirse al manual.
-  Éste 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:

VERDE/ AMARILLO conectado a E (Conductor de protección a Tierra -Earth en el original-)
 AZUL conectado a N (Conductor Neutro -Neutral en el original-)
 MARRÓN conectado a L (Conductor Fase -Live en el original-)



-  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:

I

 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.

Forklaring på sikkerhedssymboler

DK

 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 jordet.
- Dette apparat skal forbindes til en nettilslutning, der yder BESKYTTENDE 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 lystnetudgange fra den samme fase.

Förklaring av Säkerhetssymboler

S

 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 försörjd från ett strömssystem som är försedd med jordanslutning (⊕) 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 hankontakt 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.

Turvamerkkien selitys

FI

 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 nolllaliitännän on oltava luotettavasti tunnistettavissa.
- Sähköpistorasian tulee olla laitteen lähellä ja helposti tavoitettavissa.

Sähkökytkentä

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

KELTA-VIHREÄ suojamaajohtoin E-napaan
SININEN nolllajohtoin 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

P

-  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 elimina-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

G



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 επισκευασικά 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 πέρα από μόνο τις συμπεριλαμβανόμενες στο εγχειρίδιο των οδηγιών, εκτός και αν έχετε τις 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 εξασφαλίσετε 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 συνοδεύεται συνήθως από ένα καλώδιο τροφοδοσίας με ένα σταθερό βύσμα τροφοδοσίας ρευματός τύπου πυραμίδας στη μια άκρη του και μια σταθερή υποδοχή τροφοδοσίας ρευματός τύπου τυρφημίδας 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 βραβίωθε ότι και τα δύο καλώδια τροφοδοσίας είναι συνδεδεμένα σε εξόδους τροφοδοσίας που βρίσκονται στην ίδια φάση.

Products employing Lithium batteries

CAUTION

This equipment contains a lithium battery.
There is a danger of explosion if this is replaced incorrectly.
Replace only with the same or equivalent type.
Dispose of used batteries according to the instructions of the manufacturer.
Batteries **shall only** be replaced by trained service technicians.

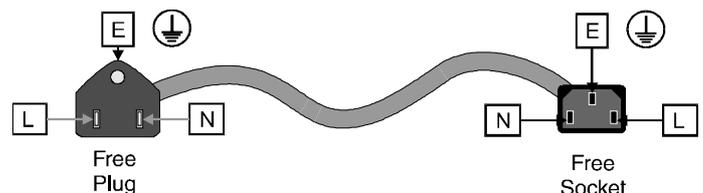
Power cable supplied for the USA

The equipment is shipped with a power cord with a standard IEC molded free socket on one end and a standard 3-pin 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 lead connected to E (Protective Earth Conductor)

BLACK lead connected to L (Live Conductor)

WHITE lead connected to N (Neutral Conductor)



For products with more than one power supply inlet

Caution: To reduce the risk of electric shock plug each power supply cord into separate branch circuits employing separate service grounds.

Rack Mounting the Enclosure



This product must not be rack mounted using only the front rack ears.



When rack-mounting the product, one of the following methods of installation must be used: -

- Place the unit on a suitably specified, and installed rack shelf and secure the product to the rack via the front rack ears or,
 - Fit the unit using the rear rack mount kit available from Snell & Wilcox by quoting the order code FGACK RACK-MNT-KIT.
-

Safety Standard

Safety standards are pending:



EMC Standards

This unit conforms to the following standards:

BS EN 55103-1 : 1997

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

BS EN 55103-2 : 1997

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

Federal Communications Commission Rules Part 15, Class A :1998

EMC Environment

The product(s) described in this manual conform to the EMC requirements for, and are intended for use in, *either*

The commercial and light industrial environment (including, for example, theatres) E2

or

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

The applicable environment is stated in the Technical Profile section of the product operation manual under "*EMC Performance Information/Environment.*"

EMC Performance Information

Please refer to the *Technical Profile/Specifications* section of the product operation manual.

EMC Performance of Cables and Connectors

Snell & Wilcox 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.

About this Manual

This manual contains information for the installation and operation of the Ukon unit.

Update/revision sheets should replace existing pages when supplied by the agent or Snell & Wilcox Ltd.

Note that the date at the bottom of the page is the release date of the current revision.

Packing List

The unit is supplied in a dedicated packing carton provided by the manufacturer and should not be accepted if delivered in inferior or unauthorised materials. Carefully unpack the carton and check for any shipping damage or shortages.

Any shortages or damage should be reported to the supplier immediately.

Enclosures:

- Ukon Universal Conversion Platform
- Ukon Installation & Operator's Manual
- Power cable
- Spare Fuse 3.15 A (T)
- Generic Power Supply Module Installation Manual

Software Version Amendments

Notes about Versions Fitted

Software. This Ukon is shipped with Software version A4_1_000.

Manufacturers Notice

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Important Notice

No responsibility is taken by the manufacturer or supplier for any non-compliance to EMC standards due to incorrect installation.

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Product Support Procedure

If you experience any technical or operational difficulties with a Snell & Wilcox product please do not hesitate to contact us or utilize our online form to request assistance.

There is a lot of information you can give us that will enable us to diagnose your problem swiftly. Please read the following guidelines, as these suggestions will help us to help you.

Basic Information

For Units Please provide the exact product Model, unit Serial Number and Software Version information.

For Cards or Modules . Please provide the Sub-Assembly Number, card Serial Number and the Software Version information.

Basic Application

Inputs Please provide full details of the Input Signals being used including any references etc. and where they are being generated.

Outputs Please provide full details of the Output Signals required and how they are being monitored.

System Please provide a brief description of the system in which your S&W equipment is currently being used.

Basic Tests

Preset Unit Please use the Preset Unit function to return the settings back to the factory default.

RollCall Is your unit currently connected to a RollCall capable PC? This software is obtainable for free and provides a very user friendly GUI for virtually all S&W equipment - perfect for complex products, large systems or those with passive front panels.

Card Edge Info. What is the status of the card edge LEDs or display? These can often provide information such as power status and input detection conditions.

Internal TPG Many S&W products have an internal test pattern/tone generator. Please activate this to assist you with your problem analysis.

In addition to the above, please do not forget to provide us with all of the necessary contact information:

- Names
- Telephone & Fax numbers
- e-mail addresses
- Business address

A form has been provided for this information and will be found on the next page or an on-line form is available on the Snell & Wilcox website at:

<http://www.snellwilcox.com/support/request>

Product Support Request Form

Name: *		
Company:		
Address Details: *		
Post/ZIP Code:		
Country: *		
Telephone: *		
Fax:		
Email: *		
Local S&W Center: *		
Product Name: *		
Product Type: *	Switchers (i.e. Magic DaVE, Switchpack, Kahuna)	
	File & Data Transfer Products (i.e. RollCall, Memphis & Asteroid)	
	Video Products (i.e. Modular, Kudos Plus and Alchemist)	
Unit Serial Number: *		
Fault/Spare Part Information: * (please advise us how many units show this fault and the system layout showing all other manufacturers' products)		
* Preferred Method of Contact:	e-mail	
	Phone	

- Item is required.

Please mail to: Snell & Wilcox Ltd., Southleigh Park House, Eastleigh Road, Havant, Hants, PO9 2PE. United Kingdom.	Service Contact Information: Tel: +44 (0) 2392 489058 Fax: +44 (0) 2392 489057 http://www.snellwilcox.com/support ftp://ftp.snellwilcox.com/support
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Description

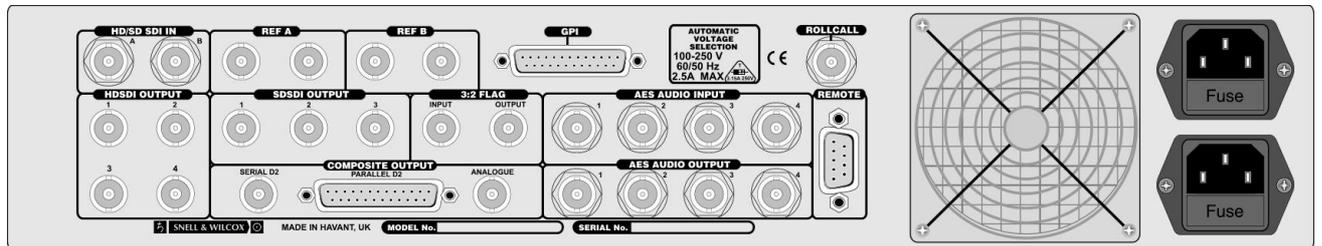
In an era where there is a proliferation of HD standards, with different frame rates, image sizes and aspect ratios, the Ukon provides a future-proof way of safeguarding your investment in HD. Additional functions can be conveniently and economically added in situ, as and when required.

Integrating important functions such as aspect ratio conversion with pan, scan and zoom, time-code conversion and 3:2 cadence correction, the Ukon is designed as a total solution for real world requirements. This means that whatever the input – including combinations of film and video originated material, it will always produce the finest possible results, whether “up”, “down” or “cross”.

FRONT VIEW



REAR VIEW



Features

- All current SMPTE 292M and ITU 709 HD standards supported
- Digital color space conversion
- Aspect ratio control
- Either 1 x HD/SD-Serial Digital in (loop-through) or 2 x HD/SD-Serial Digital in
- 4 x HD-Serial Digital out / 3 x Rec. 601 out (option)
- Powerful 3:2 detection and repair
- Image enhancer/de-enhancer
- 4 user display memories
- 2 genlock inputs with loop-through
- 8 global control memories
- Audio processing with adjustable audio delay
- Time-code processing
- Real-time pan/zoom control

Technical Profile

Features

Signal Inputs

Serial Digital	2 x BNC 10-bit HD or SD SDI digital inputs HDTV 1.48GHz - SMPTE 292-1997 and embedded audio SMPTE 299M and or 270MHz Rec 656 and embedded audio SMPTE 272M.
Analog Reference	2 x BNC HDTV Tri-syncs or SD Bi-sync for Genlock – SMPTE 240M/274M
Film Sequence Flag	1 x BNC
RS422	1 x Control port 9-pin D type
Network	1 x RollCall/RollNet remote via BNC
Audio embedder/dis-embedder option	4 x BNC 20-bit 48kHz AES3 75 Ohm unbalanced digital audio inputs

Signal Outputs

Serial	4 x HDTV serial digital outputs at 1.48GHz – SMPTE 292-1996 and embedded audio SMPTE 299M 3 x SD serial digital outputs at 270MHz – Rec. 601 and embedded audio SMPTE 272M (Option)
Serial	1 x BNC Input Loop-through on units with only one digital input fitted.
Film Sequence Flag	1 x BNC
Analog Reference	2 x loop-through
Audio embedder/dis-embedder option	4 x BNC 20-bit 48kHz AES3 75Ohm unbalanced digital audio outputs <i>Note - embedded audio is not available for 625/24sF and 625/23sF input or output video standards. The AES/EBU inputs and outputs are always available.</i>

(Encoder Option)

Serial Digital Composite	1 x (D2 to SMPTE 259M-C) PAL, NTSC
Parallel Digital Composite	1 x 25 way D connector
Analog Composite Video	1 x encoded outputs to CCIR report 624-3 PAL, NTSC, PAL M

Input Standard

HD to SMPTE 292M, 299M
HD-SDI
750(720)/60p, 1125(1080)/30i
750(720)/59p, 1125(1080)/30p
750(720)/50p, 1125(1080)/30sF
750(720)/30p, 1125(1080)/29i
750(720)/29p, 1125(1080)/29p
750(720)/25p, 1125(1080)/29sF
750(720)/24p, 1125(1080)/25i
750(720)/23p, 1125(1080)/25p
750(576)/50p, 1125(1080)/25sF
750(480)/60p, 1125(1080)/24p
750(480)/59p, 1125(1080)/24sF
1125(1080)/23p
1125(1080)/23sF
1125(1035)/30i
1125(1035)/29i

Output Standard

SD-SDI (Upconverter Option)
525(480)/29i, 625(576)/25i
625(576)/24sF, 625(576)/23sF
HD – SMPTE 292M, 299M
HD-SDI
750(720)/60p, 1125(1080)/30i
750(720)/59p, 1125(1080)/30p
750(720)/50p, 1125(1080)/30sF
750(720)/30p, 1125(1080)/29i
750(720)/29p, 1125(1080)/29p
750(720)/25p, 1125(1080)/29sF
750(720)/24p, 1125(1080)/25i
750(720)/23p, 1125(1080)/25p
750(576)/50p, 1125(1080)/25sF
750(480)/60p, 1125(1080)/24p
750(480)/59p, 1125(1080)/24sF
1125(1080)/23p
1125(1080)/23sF
1125(1035)/30i
1125(1035)/29i

Input & Output Blanking

SD-SDI (Down-Converter Option)
525(480)/29i, 625(576)/25i
625(576)/24sF, 625(576)/23sF
Left & Right in steps of 1 pixel.
Top & Bottom in steps of 1 line.

Input Loss

Input/Black

Video Sync Modes

Auto/Optimize/Interpolate/
Synchronize

Conversion Modes

Auto/Video/Video to sF/Video to 3:2/Film/Film to sF/Film to 3:2/sF to 3:2/sF to 1:1/3:2 to sF/3:2 to 1:1/1:1 to 3:2/1:1 to sF

Audio Embedding (Option)

Strip ANC data, select tone/silence, audio pass

Color-space conversion

Auto, SMPTE 274, 260, 240, BT709, No correction

Enhance

Vertical, Horizontal, DeRing

Control Functions

GPI	6 inputs, 6 outputs
Display	Preset Sizes:- Full Height, Full Width, Anamorphic, 16:9 Letterbox, 14:9 Letterbox, Center 4:3 Variable Pan, Tilt. Size, Aspect and slew-rate.
Display memories	4 user memories
Reference	Auto / Ref.A / Ref.B / Input Input Horizontal & Vertical timing
Memory	8 machine memories
Utilities	Pattern On/Off, Pattern select Freeze On/Off Mono On/Off. Mono type Timecode output/synchronizing Y/C delay

Specifications

(Encoder Option)	
Reference Input Standard	525/625 (same standard as 656 input)
Composite or Black Burst Reference Level	Standard level ± 3 dB
Composite Encoding	12 bit (D2 – 10 bit)
Y Frequency Response	5.75 MHz \pm 0.25 dB
U/I & V/Q Frequency Response	<-3 dB @ 1.3 MHz (Full) Q=-3 dB @ 600 kHz (narrow)
Differential Gain	Better than 0.5%
Differential Phase	Better than 0.5°
Luminance to chrominance delay	Less than 10ns.
Luminance K Factor 2T pulse	<0.5%.
NTSC setup	54mV (7.5 IRE) selectable on/off
Sch Phase	0° As per D2 specification
Genlock SC Phase offset	360° in steps of 0.1°
Q Signal Bandwidth	Wide/Narrow
Subcarrier pull-in range	± 25 Hz
Subcarrier locking time	<1 s
Signal to Noise Ratio	>55 dB

Power

Mains Supply	115 V to 230 V AC 45/60 Hz
Power Consumption	Max. 240 W

Mechanical

Temperature Range	0° to 40° C operating
Cooling	Axial fan
Case Type	2RU Rack Mounting
Dimensions	483 mm x 530 mm x 95 mm (w,d,h)
Weight	14 kg

Installation

UNPACKING THE Ukon

The unit is packed in a single carton. The contents of the carton are as follows:

- 1 Ukon unit
- 1 Power cable
- 2 Spare a.c. power fuses 3.15 A (T)
- 1 Ukon Installation and Operating Manual
- 1 Generic Power Supply Installation Manual

Unpack the carton carefully and check for any shortages or shipping damage. Immediately report any shortages or damage to Snell and Wilcox Limited. (see front page section 0)

POWER CONNECTIONS

Power Supply

Mains power is supplied to the unit via two filtered IEC connectors. The upper connector is for the PSU installed in the upper position and the lower connector is for the PSU in the lower position. If only one PSU module is installed, only one power connection needs to be made. If two PSU's are fitted then both IEC connectors can be connected to the same power source or different power sources.

The mains power rating is 2.5A maximum from 100V to 250V

One, or optionally two, Snell & Wilcox generic power supply modules type SHDPSUA15 are fitted. The Ukon does not have a monitoring system; the operation of the LED indicators on the front panel of the module are described in the manual for the power supply.

The power supply ON/OFF switches are located on the front of the power supplies inside the front panel.



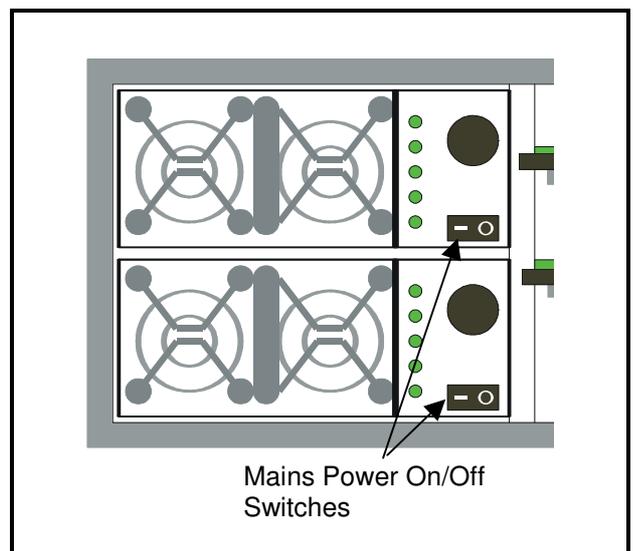
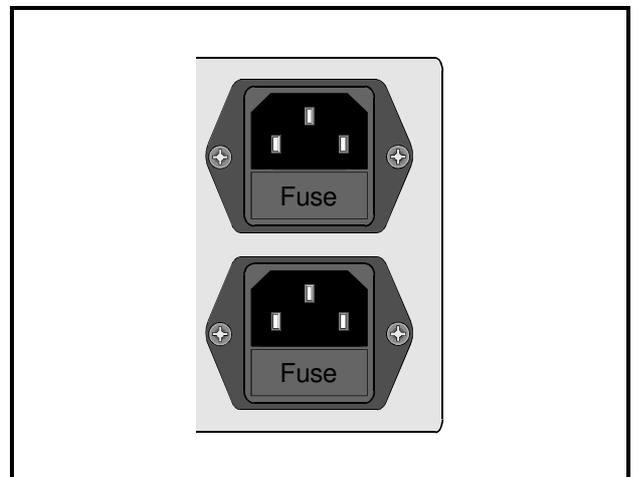
CAUTION: THE FAN EXIT VENTILATION HOLES AT THE SIDE AND REAR OF THE UNIT MUST NOT BE OBSCURED.

Supply Voltage

The power supplies are auto switching for input voltages in the ranges of 100 V to 250 V nominal. No voltage adjustment procedure is required.



CAUTION: THIS UNIT MUST NOT BE OPERATED WITHOUT AN EARTH CONNECTION.



Environment

Although ruggedly constructed to meet the normal environmental requirements, it is important that there is a free flow of air at the front, left-hand side (looking from the front) and rear to dissipate the heat produced during operation. Installations should be designed to allow for this.

Remote Control

The unit may be controlled via the RollCall remote control system from an active front panel or a PC running the RollCall Control Panel software.

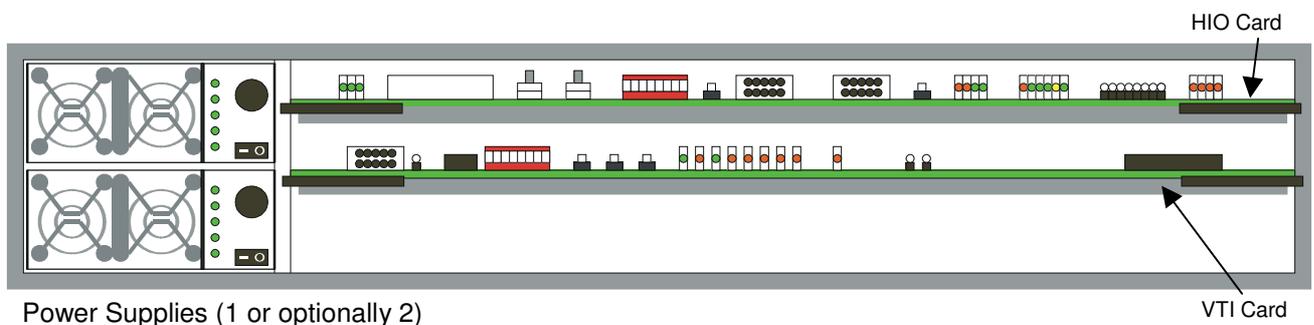
OPENING THE FRONT PANEL

Open the front panel by Turning the black knob at the right-hand end a half-turn anti-clockwise and then hinging the panel open to the left.

The rack mount fixing “ears” are revealed when the panel is open.

Refit the front panel by hinging it back into position and turning the black retaining knob.

Internal View Showing Power Supply and Card Position

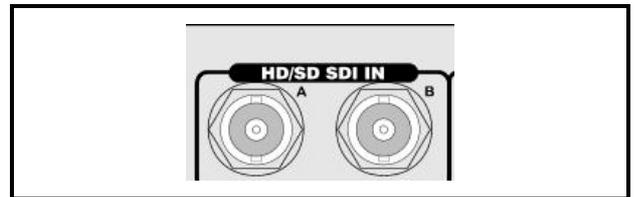


INPUT CONNECTIONS

All the connectors are mounted on the rear panel of the unit and are appropriately annotated.

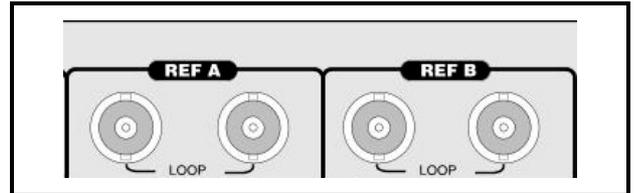
D1 Serial Digital Inputs

These are the two inputs (A and B) for HD or SD SDI input signals.



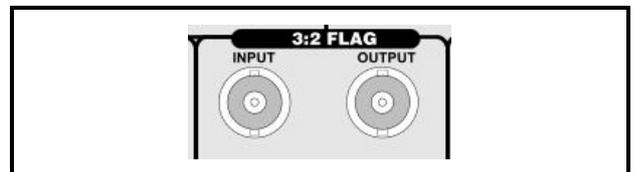
Genlock Reference

External HD trisync or SD bi-sync analogue reference signals may be connected to either (REF A or REF B) of these two loop-through BNC connectors.



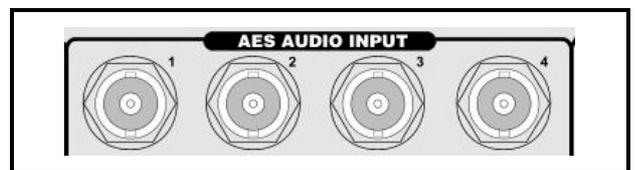
3:2 Flag

Processing can be controlled from an external 3:2 flag, and the Ukon can supply a 3:2 flag for external use, using these BNC connectors.



Audio Input Option

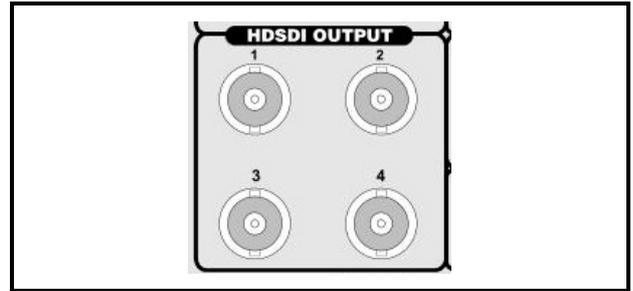
Four external stereo channels can be input for embedding in the HD output.



OUTPUT CONNECTIONS

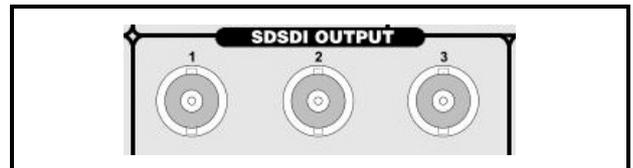
HD SDI Output

Four BNC connectors provide identical HD SDI outputs at 1.5 GHz.



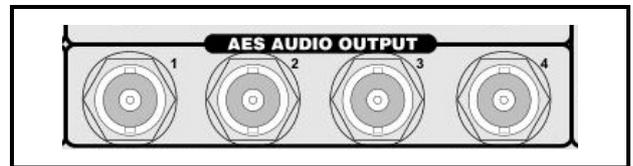
SD SDI Output

Three BNC connectors provide identical SD SDI outputs.



AES Audio Output

The four AES audio outputs are available from these connectors.

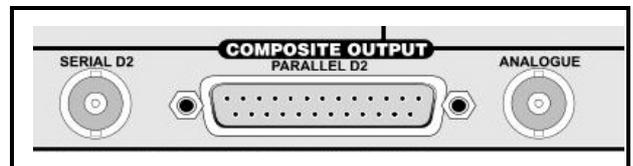


Composite Output (Encoder option fitted)

Analogue Composite Output

There is 1 output of composite video available from the unit via a BNC connector.

Nominal output level is 1V p-p into 75 Ohms and Return Loss is >35dB to 5.5MHz.



Serial D2 Digital Output

There is 1 Serial Digital output of the unit via a BNC connector.

Parallel D2 Digital Output

This is the Parallel Digital output for the unit via a 25-way 'D' female connector.

The pin-out is in accordance with SMPTE 259M-C and signal lines (11) are for 100 Ohms.

The signal is encoded in accordance with SMPTE 259M-C, D2 format.

Note that if the Encoder option is not fitted these connectors will have no function.

COMMUNICATION CONNECTIONS

RollCall

The unit can be controlled via RollCall using the BNC connector or the RS-422 9-way D-type connector.

The RollCall BNC system should be connected using 75 Ohm "T" pieces in a similar manner to an "Ethernet" system. Both extremities of the system must be terminated in 75 Ohms.

A unique address for each unit on the RollCall system must be set by two Hex switches (SW1, SW3) on the printed circuit board. The addresses 00 and FF are reserved and must not be used.

Hex Switches

Both of these switches are used to define the Unit Address code for the equipment. They are only read at power-up.

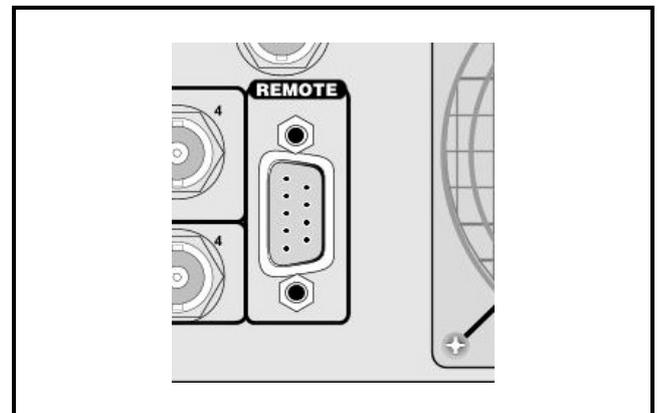
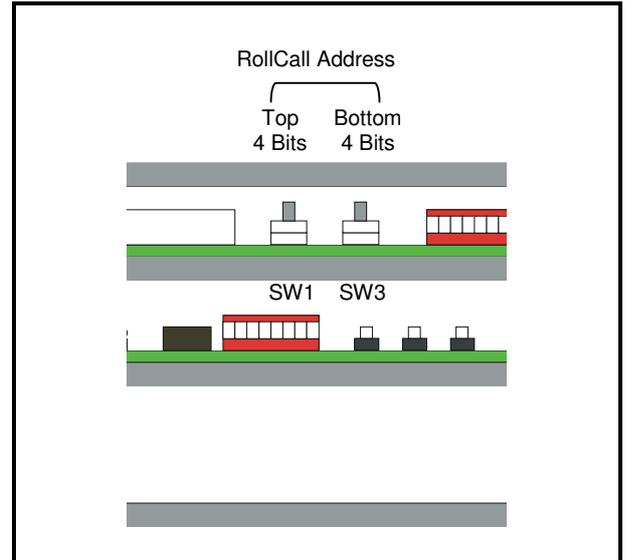
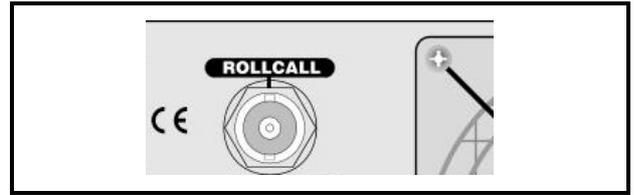
All positions on these switches are used to set the Unit Address code in Hex (0 to F).

Notes: In a RollCall™ segment, all units must have different unit address codes. For more information see RollCall™ section.

The coaxial link is bi-directional and therefore must not be passed through signal switching networks. Also, to allow hum and noise cancellation the screen of the coaxial connection must not be earthed.

RS-422 Port

Pin	Function	Direction
1	Ground	
6	Tx signal common	
2	Transmit A	Ukon → Remote
7	Transmit B	Ukon → Remote
3	Receive B	Ukon ← Remote
8	Receive A	Ukon ← Remote
4	Rx signal common	
9	Ground	
5	Spare	



GPI

The General Purpose Interfaces (GPI's) are accessed via a 25 way D type female connector. In the table GPI refers to inputs and GPO refers to outputs.

Pin	Function
2	GPI 0 Signal
14	GPI 0 Return
3	GPI 1 Signal
15	GPI 1 Return
4	GPI 2 Signal
16	GPI 2 Return
5	GPI 3 Signal
17	GPI 3 Return
6	GPI 4 Signal
18	GPI 4 Return
7	GPI 5 Signal
19	GPI 5 Return
8	GPO 4 Signal
20	GPO 4 Return
9	GPO 5 Signal
21	GPO 5 Return
10	GPO 0 Signal
22	GPO 0 Return
11	GPO 1 Signal
23	GPO 1 Return
12	GPO 2 Signal
24	GPO 2 Return
13	GPO 3 Signal
25	GPO 3 Return
1	Ground

The output (GPO) characteristics are as follows:

Operating Voltage Range	0 to ± 60 V (DC/AC peak)
Maximum Load current	1.0 A (AC/DC)
Maximum On-State Resistance @ Tamb = +25°C	500 mOhm
Minimum Off-State Resistance @ Tamb = +25°C, V = ± 48 V	100 MOhm

GPI Overview

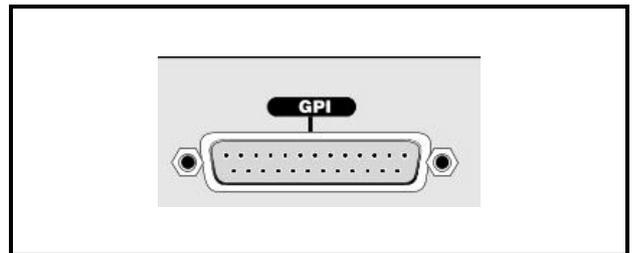
The GPI provides contact closure tally outputs that can be used to turn on lamps etc.

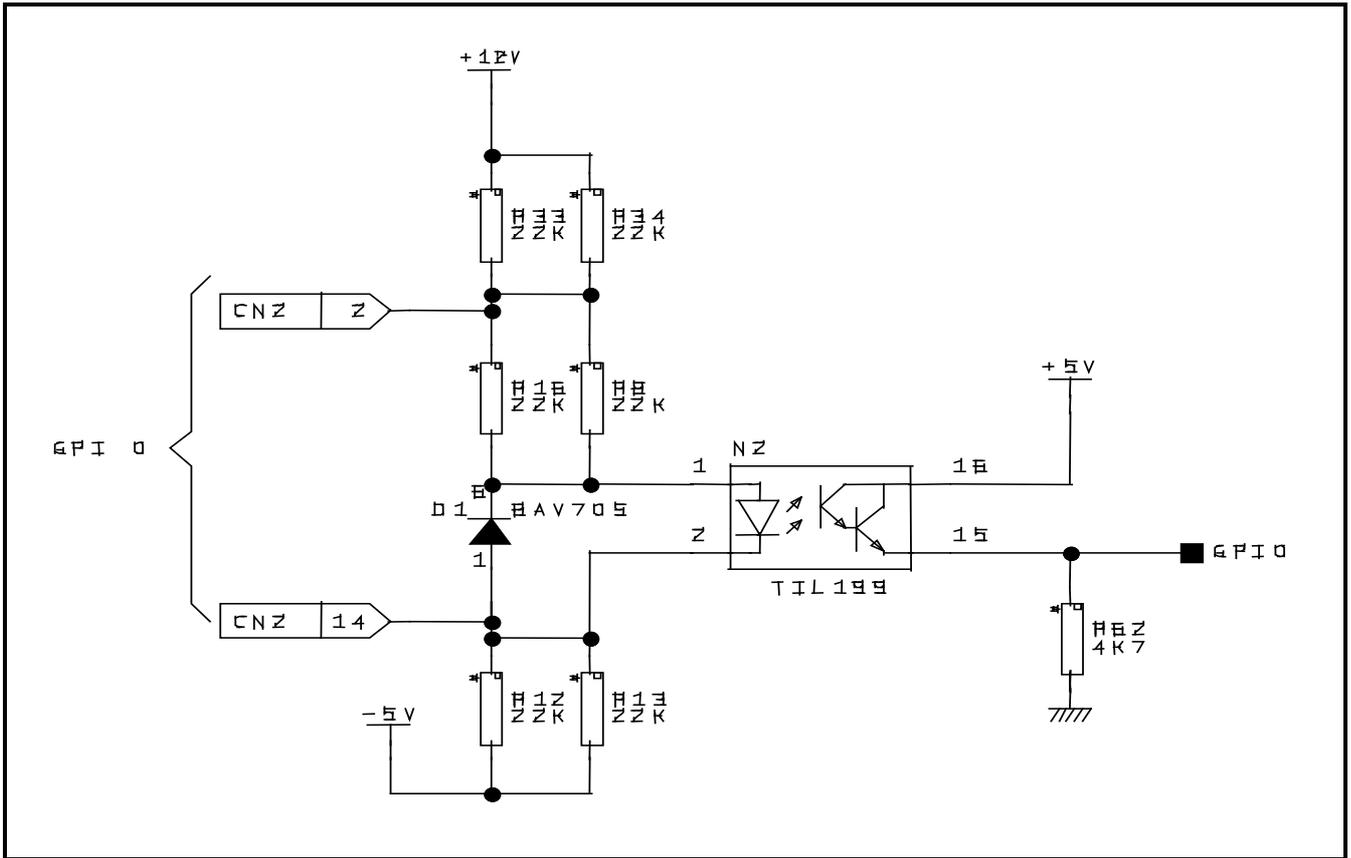
The equivalent circuit of the GPI input is shown on the next page.

Note. On a standard machine when delivered, GPI inputs 0 to 5 select machine memories 1 to 6 and GPI outputs 0 to 5 provide tally outputs indicating which memory is selected.

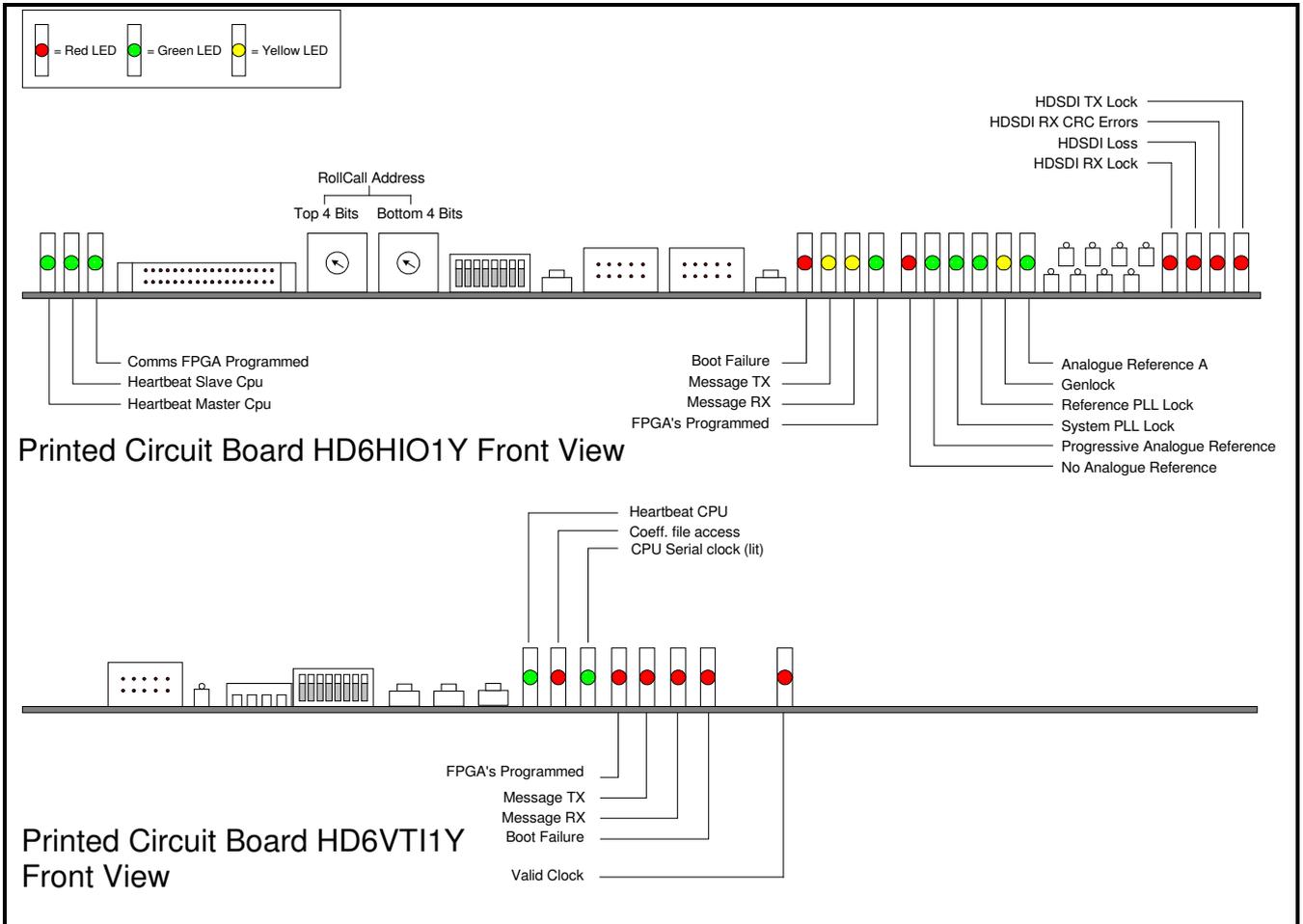
The GPI port is polled approximately 2ms after the vertical sync group of either the input or the output video. This is determined by the Comms Locking mode - see the Setup-Comms menu item in the Operations Section of this manual for further information.

Note. For interlaced output standards the polling occurs at field rate and for progressive output standards it occurs at frame rate.





LED INDICATIONS



SWITCHING ON

Open the front panel. Check that power is connected to the Ukon. Set the power switch on the front of the power unit to ON (I). The opening alphanumeric display will appear on the front panel. Close the front panel.



Operation

GENERAL OPERATING PRINCIPLES



The Ukon may be operated as follows:

1. By using the front panel controls
2. By using a remote control panel or PC via the RollCall control system.
3. RS422 control using the RollCall protocols.
4. Using GPI connections to recall memory presets.

All operational parameters and selections may be made by pressing dedicated push buttons and selecting items from a system of menus displayed in the window.



GENERAL OPERATING INFORMATION

Display Window

The control window displays all selection menus sub-menus and unit status information.

Home Display

An example of unit status is shown in Figure 1 indicating that the unit is set to accept a 1125 line interlaced signal (1080 active lines) at 29.97Hz frame rate and the output signal is selected to be 1125 line segmented frame format (1080 active lines) at 23.97 frames per second.

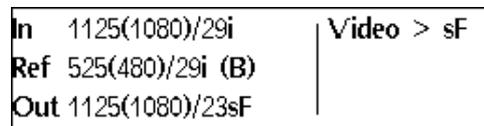


Figure 1

The unit is currently locked to a 525 line reference applied to Reference input B.

If the input is not available the words Input Loss! will be displayed and the output will be determined by the set up. See Figure 2.



Figure 2

If the Ukon is unable to establish what the format of the input signal is, the word Unknown will be displayed and the output will be determined by the set up. See Figure 3.

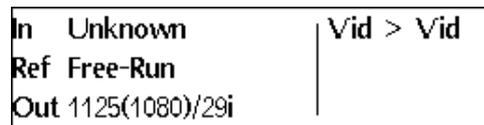


Figure 3

If the Ukon has had the input video format forced to a particular standard but, the incoming video format does not match the forced setting, the word Mismatch will be displayed and the output will be determined by the set up. See Figure 4.



Figure 4

The following warning messages may appear to the right of the vertical line:

Pattern, Freeze, Mono, 

The **Home**  button always allows a return to the home status screen in the display window from any position in the menu hierarchy.

The **Preset**  button will return all settings of the displayed menu to factory or display memory default settings.

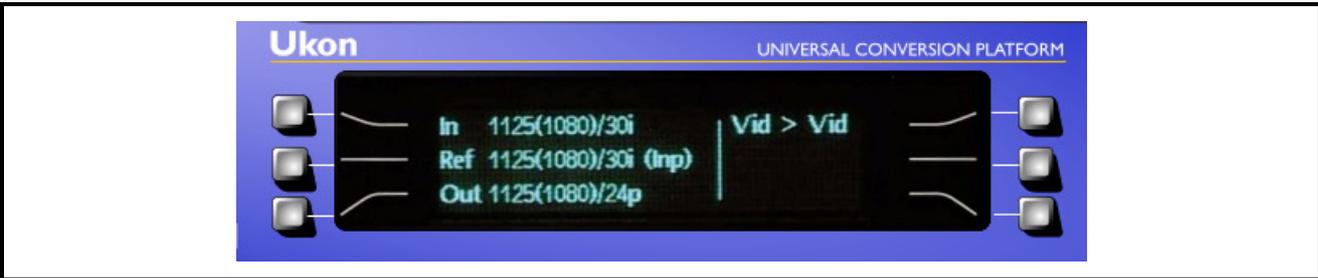
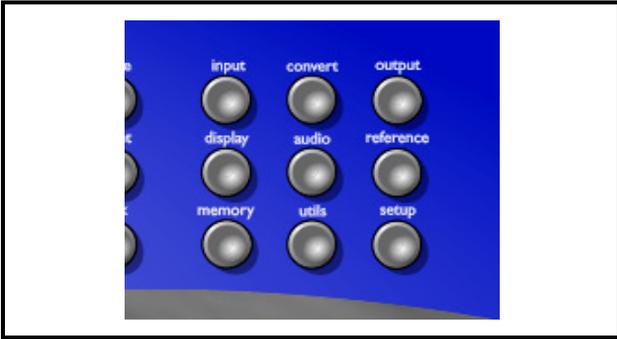
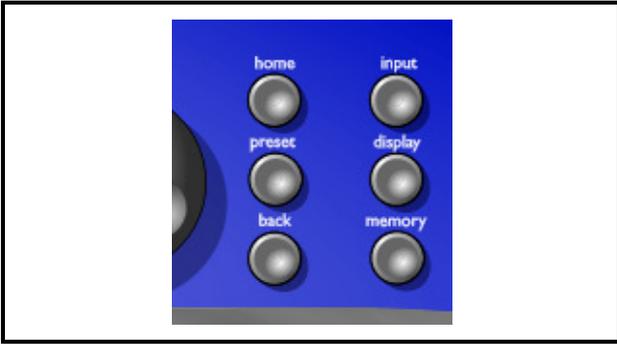
The **Back**  button allows a return to the last menu screen that was displayed. Up to 32 menu screens may be retraced using this function.

Using The Control Push Buttons

Various specific operations may be carried out by using these push buttons to access particular functions.

When pressed the relevant menu will appear in the display window and the button LED will become illuminated, indicating that the function is active.

Display Buttons



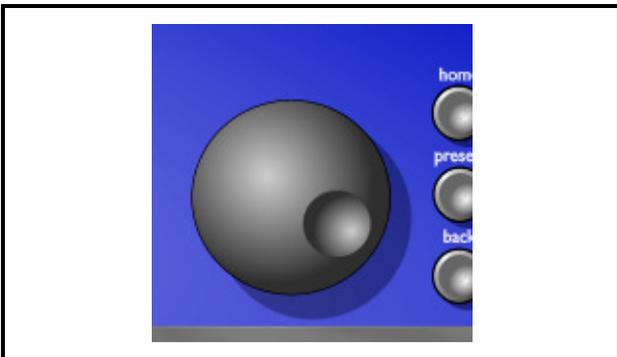
Pressing the button adjacent to the required item makes a selection; the text will become highlighted (reversed text) when active.

Spinwheel

The spinwheel allows selections to be made from the menu. In the example above, rotating the spinwheel clockwise will select the next input standard (the scroll bar shows that there are more standards to select – when the selection is at the limit of the list the appropriate arrow on the scroll bar will become dotted).

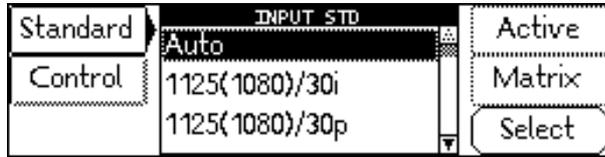
In some cases, in which a change has to be actioned, the item will be enclosed in an oblong box instead of highlighted. The user must then push the “Select” button to action.

Note that the item last selected will be shown highlighted when the menu function is selected.



INPUT

The following menu items are all related to the input signal selection and control.



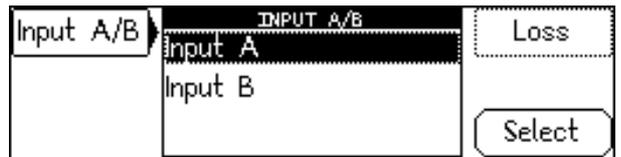
STANDARD

Allows the standard of the input video to be selected. The standards are named using the convention: - total number of lines (active lines)/ frame rate. The options are:

Auto	The machine automatically determines the input video standard.	
750(720)/60p	1125(1080)/30i	} Forces the input to the selected standard
750(720)/59p	1125(1080)/30p	
750(720)/50p	1125(1080)/30sF	
750(720)/30p	1125(1080)/29i	
750(720)/29p	1125(1080)/29p	
750(720)/25p	1125(1080)/29sF	
750(720)/24p	1125(1080)/25i	
750(720)/23p	1125(1080)/25p	
750(576)/50p	1125(1080)/25sF	
750(480)/60p	1125(1080)/24p	
750(480)/59p	1125(1080)/24sF	
525(480)/29i	1125(1080)/23p	
625(576)/25i	1125(1080)/23sF	
625(576)/24sF	1125(1035)/30i	
625(576)/23sF	1125(1035)/29i	

Note - not all the listed standards may appear on the list, as they may not be available if the appropriate Ukon option is not fitted.

When the required standard is highlighted, press the lower right-hand button adjacent to Select to activate it.



CONTROL

This menu controls the behavior on loss of the video input and, if the Ukon is fitted with two serial inputs allows input selection.

INPUT A/B

Allows selection of a serial input. Note - this menu item will not be visible if the Ukon is not fitted with two serial inputs.

LOSS

Controls the system response to a loss of input signal.



The options on loss of signal are:

Input	The incoming signal will be displayed whenever possible.
Black	The output will cut to black

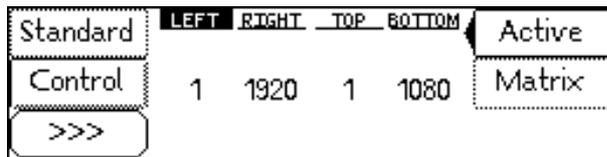
When the required option is highlighted, press the lower right-hand button adjacent to Select to activate it.

ACTIVE

Allows adjustment of input blanking. It is used where the source video is known to have pixels/lines at the edge of the picture that are not required to be displayed. When set, the machine will blank any output data generated by the input data, regardless of the display control settings.

Note that the Ukon keeps a separate record of input blanking for each distinct input active picture raster.

To select each of the parameters, press the lower left hand button adjacent to >>>.

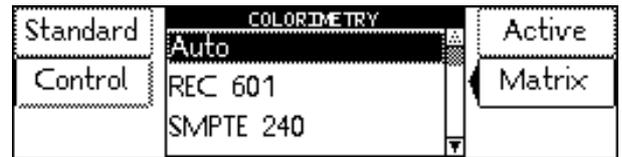


The settings are as follows:

- Left** Adjusts the left-hand edge of blanking. A setting of 1 indicates that no input pixels that are normally visible should be blanked, 2 causes the first input pixel to be blanked, etc.
- Right** Adjusts the right-hand edge of blanking. A value equal to the number of active pixels per line in the current input standard indicates that no input pixels that are normally visible should be blanked. Subtracting 1 from this causes the last input pixel to be blanked, etc.
- Top** Adjusts the top edge of blanking. A setting of 1 indicates that no input lines that are normally visible should be blanked, 2 causes the first input line to be blanked, etc.
- Bottom** Adjusts the bottom edge of blanking. A value equal to the number of active pixels per line in the current input standard indicates that no input lines that are normally visible should be blanked. Subtracting 1 from this causes the last input line to be blanked, etc.

MATRIX

Allows the colorimetry on the input signal to be set.



The color correction options are:

- Auto** Automatically selects the colorimetry most appropriate for the output video standard.
- REC 601** Colorimetry to REC 601 requirements is applied.
- SMPTE 240** Colorimetry to SMPTE 240 requirements is applied.
- SMPTE 274** Colorimetry to SMPTE 274 requirements is applied.
- BT709** Colorimetry to BT709 requirements is applied.

 **CONVERT**

The following menus relate to the conversion from the input signal to the output signal.

MODE

The Ukon has a number of processing modes and it is important to use the correct mode to achieve the desired conversion.

More details of the available modes are described in the Application note *The Ukon film modes* attached to this manual.



MODE

Auto In Auto mode the Ukon checks the input and output standards in order to work out the required processing mode. In general, the Ukon will assume that the incoming material is Video unless one of the SF input standards are being received.

Video > Video This makes the Ukon treat both the input and output as video. i.e with field to field motion. The Ukon should not be forced into this mode if an SF style output standard is required and the input material is video.

The way this mode operates is controlled by the Video Control menu setting that allows the user to switch between synchronizing and interpolating operation.

Video > SF This mode makes the Ukon treat the incoming material as video but, it converts in such a way that the output only has object motion on frame boundaries. This is the mode that should be used whenever the incoming material is video and an SF style output format is required.

Video > 3:2

This mode makes the Ukon treat the incoming material as video but, it converts in such a way that the output only has object motion on 3:2 frame boundaries. The 3:2 sequence is produced by an internal 3:2 sequence generator that can be reset based on timecode if desired. (See Menu Convert - Film Ctl - Free Run - Reset Frm below)

Film > Film

This mode makes the Ukon treat the incoming material as film with a film sequence determined by the Film Sequence Timing Source menu (see below). If the input and output standards have the same frame rate then the Ukon will endeavor to produce the same film sequence at the output as is present at the input. If the input and output frame rates are different then the output sequence will not be the same as the input but, the Ukon will never interpolate across input frame boundaries.

SF > 3:2

This mode is used to convert SF material to 3:2. It is useful for converting 23.97/24Hz SF inputs to 29.97/30/59.94/60Hz outputs with 3:2 sequence. In this mode special care is taken to ensure the integrity of the outgoing 3:2 sequence with respect to the incoming SF. The output is guaranteed to have 3:2 sequence but this may require the repeating or dropping of input frames if the input and output are not locked together or the input SF is not correct.

If this mode is used with 720P/60 or 720P/59.94 as the output standard, then the 720P output will have a 3:2 motion profile. That is, objects will move every two frames, then every three frames etc. The net rate of new frames will be 24Hz.

3:2 > SF	<p>This mode is used to convert 3:2 film material to SF. It is useful for converting 29.97/59.94Hz with 3:2 sequence to 23.96/24Hz SF. In this mode special care is taken to ensure the integrity of the outgoing SF sequence with respect to the incoming 3:2.</p> <p>The output is guaranteed to have perfect SF sequence but this may require the repeating or dropping of input frames if the input and output are not locked together or the input sequence is broken.</p>	Film > SF	<p>This mode is designed to take in film material with non-perfect SF sequence and convert it to perfect SF sequence. The output is guaranteed to be perfect SF. Its primary use will be to process material that has good SF sequence that has been disrupted at edit points. It is NOT designed to take in material that has been played off speed (Varispeed) and correct the sequence.</p> <p>This mode can also be used to generate SF style output standards that are guaranteed to have complete SF frames. If the incoming material has perfect sequence and an SF output standard is desired, this mode will give good results.</p>
SF > 1:1	<p>This mode is used to convert incoming SF material to a progressive type output. This mode is targeted at producing the low frame rate progressive output standards. For example, it could be used to convert 24Hz SF to 1080P/24 etc. The Ukon takes special care to try and use all incoming frames when generating the output.</p>	Film > 3:2	<p>This mode is designed to take in film material with non-perfect 3:2 sequence and convert it to perfect 3:2 sequence. The output is guaranteed to be perfect 3:2. Its primary use will be to process material that has good 3:2 sequence that has been disrupted at edit points. It is NOT designed to take in material that has been played off speed (Varispeed) and correct the sequence.</p>
3:2 > 1:1	<p>This mode is used to convert incoming 3:2 material to a progressive type output. This mode is targeted at producing the low frame rate progressive output standards. For example, it could be used to convert 1080I/29.97 with 3:2 motion to 1080P/23.96 etc. The Ukon takes special care to try and use all incoming frames when generating the output.</p>	1:1 > 3:2	<p>This mode is designed to take in low frame rate progressive inputs (e.g. 1080P/23.96) and convert it to have 3:2 sequence (e.g. 1080I/29.97). The output is guaranteed to be perfect 3:2.</p>

VIDEO CONTROL

The following menu items are all related to the temporal conversion of video (not film) based signals. The Ukon contains a video synchronizer for conversions where the input and output field rates are not locked together. These settings also affect the way that the synchronization is performed.



The options are as follows:

- Auto** Selects Synchronise mode when the input and output field rates are the same and optimise mode when they are different.

- Optimise** The unit operates as in the Synchronise mode but monitors the amount of slippage between the input and output timing. When the slippage exceeds a preset value the unit performs an interpolation to move to the next available minimum blur temporal position. The effect of this is to give the same high performance as the Synchronise mode but without periodically discarding or repeating a field; for example, in 59.94 to 60Hz mode only about half a second of interpolation occurs in every 16 seconds. However, because of the system used, the video delay through the machine can vary by up to plus or minus half a field.

- Interpolate** The output is always interpolated from the input. This will give the smoothest output but at the expense of potential blurring of moving objects.

- Synchronise** Gives the highest performance with minimum output blurring. If the input and output field rates are not identical it can cause field drops or repeats which may have the effect of causing moving objects to judder.

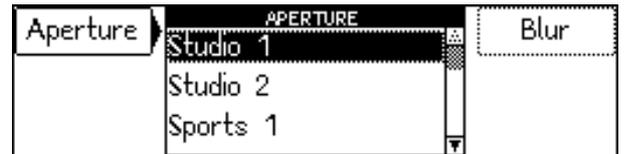
VIDEO CUTS

If VIDEO CUTS are enabled then an internal scene change detector is employed to try and ensure that interpolation is not done across scene changes. Note that this setting only affects the performance if the Ukon is in a video input mode. i.e. Video > Video, Video > sF or Video > 3:2.

VIDEO APERTURE

APERTURE

The video aperture control varies the temporal filter shape.



The options are:

- Studio 1** The most diffuse temporal aperture. Useful for stills and slow-moving video with fading cuts.

- Studio 2**
- Sports1**
- Sports 2** The sharpest temporal aperture. Appropriate for fast-moving material with fast pans and field-based cuts, etc.



BLUR

The blur control adjusts the amount of temporal low pass filtering applied to the video input. This can be used to adjust the output picture temporal sharpness to achieve the desired look. This control can also be useful for conversions such as Video>sF and Video>3:2. For some combinations of input and output standards (e.g 525/59.94 in and 1080/23sF out) the conversion can produce undesirable low frequency beat frequencies on the output. These can be reduced by increasing the Blur setting to Medium or High.

- Auto** The Ukon uses the input and output standards to determine the optimum blur setting. This will give the best result for most conversions.

- Off** The minimum possible amount of blur is produced.

- Low, medium & High** These have gradually increasing amounts of blur.

SHARP

When selected the following menu is displayed.



This controls the vertical sharpness of the Ukon output pictures. The selected filter sharpness is applied as an offset to the automatically calculated filter sharpness. This allows the user to make the pictures sharper or softer than the default setting. Positive values on the Sharp menu make the output vertically sharper. Negative values make the picture vertically softer. Zero applies no offset to the automatic value and is the default. The Sharpness is controlled by adjusting the amount of vertical low pass filtering applied by the Ukon.

The effect of the Sharp setting depends on the format conversion being undertaken and the vertical size of the output image. For example, if the Ukon has the same format at the input and output and the display conversion mode has been set to Anamorphic (see Display menu Section for a full description) then, the Ukon will not apply any vertical low pass filtering in its automatic calculation. Thus, making the Sharp setting positive will not increase the vertical sharpness of the output as it will already be at the maximum sharpness setting. Making the setting negative will however make the picture vertically softer.

Conversely, if the Ukon is downconverting from HD to SD and the image size has been reduced to the minimum then the automatic value of sharpness will use the maximum amount of low pass filtering. So, making the sharp setting negative will not make the output picture any softer. However making the setting positive will make the output sharper.

Making the setting too positive can cause excessive twitter and alias at the output. Making the setting too negative can make the pictures very soft. Care should be taken to ensure that the setting is acceptable when either the format conversion or the display size is adjusted.

FILM CONTROL

When selected the menu shown below is displayed.

FLAG SOURCE

This selects the source of the film sequence information for the input video stream.

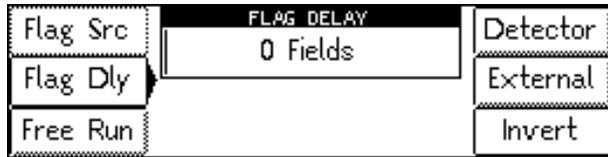
The options are:

- Auto** If the input video is an sF video format the Ukon switches to Internal Mode (see below) otherwise it uses the internal film sequence detector.
- Free Run** The Ukon generates an internal free running continuous 2:2 or 3:2 film sequence. The type of free run sequence (2:2 or 3:2) is determined by the CONVERT - FILM CTL - FREE RUN -TYPE menu setting. The phase of the free run sequence with respect to the input video is set by the CONVERT - FILM CTL - FLAG DELAY menu setting.
- Detect** The Ukon uses an internal film sequence detection algorithm to establish the incoming film sequence. This can be used with "broken" film sequence as well as "perfect" 2:2 or 3:2 film sequences.
- Internal** This uses the frame signal of the input video to establish the pairing of 2:2 film sequences. i.e input field ones are the first field of the film frames and input field twos are the second field of the film frames. If the input dominance is reversed the internal sequence may be inverted using the FILM CTL - INVERT button.

- External This uses an external TTL pulse from the BNC connector on the rear panel. The meaning, sense and delay of the input pulse are set using the FILM CTL - EXTERNAL sub-menu settings.
- Timecode (Trig) This uses the internal free running 2:2 or 3:2 sequence generator as described in FREE RUN mode above. However, the phase of the free running sequence generator is reset by the timecode on the incoming video. The input timecode value that causes the free run generator to be reset is set on the UTILS - TIMECODE - TRIGGER menu. The phase of the free run generator at the reset point is set using the CONVERT - FILM CTL - FLAG DELAY menu setting.
- Timecode (0 & 5) This uses the internal free running sequence generator. The free run generator is reset whenever the input video timecode has a frame count of zero or 5. This is useful when the incoming 3:2 sequence has a timecode locked sequence. Note that this method can only work if the incoming timecode is non-drop and, the phase of the free run generator at the 0 and 5 frame counts is set by the CONVERT - FILM CTL - FLAG DELAY menu setting.
- Remote This uses the RS-422 remote control port as the source of film sequence information. The film sequence information can be sent every field using the RS-422 connection so that arbitrary film sequences can be identified. Alternatively, the remote controller can send a single film sequence command and the Ukon input film sequence will then free run from that point onwards with the defined phase.

FLAG DELAY

This is used to align the free running film sequence pulse with the incoming video. The adjustment represents the number of fields of delay applied to the free running pulse train.

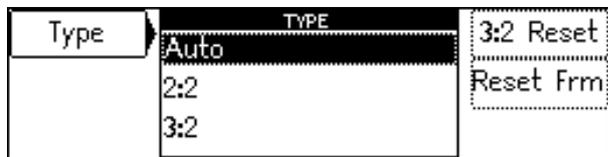


This is used to align the free running film sequence pulse with the incoming video. The adjustment represents the number of fields of delay applied to the free running pulse train.

If the free running pulse is of 3:2 type then the correct delay will be a value between 0 and 4 fields inclusive. If the pulse is of 2:2 type then there are only two possible phases. Thus setting the delay to 0,2 or 4 produce one phase and setting the delay to 1 or 3 produces the alternate phase.

Note that this setting has an effect when the flag source is set to Free Run, Timecode (Trig) or Timecode (0 & 5).

FREE RUN



These menu items are used to set up the internal free running **input** film sequence generator and, the **output** internal 3:2 sequence generator.

- TYPE** This sets up the internal **input** film sequence generator.
- AUTO** The Ukon will use the input video standard to determine the free running sequence type.
- 2:2** The free run generator is forced to make 2:2 (sF) film sequence.
- 3:2** The free run generator is forced to make 3:2 film sequence.

3:2 RESET



This sets up the internal output 3:2 film sequence generator. If the Ukon internal 3:2 sequence generator is in use (in conversion modes Video>3:2,Film>3:2,sF>3:2 and 1:1>3:2) then the phase of the 3:2 generator can be reset using the input and output timecode values (see UTILS-TIMECODE section below).

- Off** The internal 3:2 sequence generator cannot be reset by timecode.
- On** The internal 3:2 sequence generator can be reset by timecode.

RESET FRM



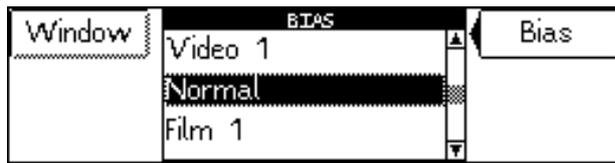
This sets up the reset phase of the internal **output** 3:2 film sequence generator if the 3:2 RESET menu item above has been set top ON.

- A Frame** When the internal output 3:2 generator is reset it makes an A Frame.
- B Frame** When the internal output 3:2 generator is reset it makes a B Frame.

If the Ukon is in Timecode Synchro Mode then the following two additional menu items will be available. These items are not available in any other timecode synchronizing mode.

- C Frame** When the internal output 3:2 generator is reset it makes a C Frame.
- D Frame** When the internal output 3:2 generator is reset it makes a D Frame.

DETECTOR



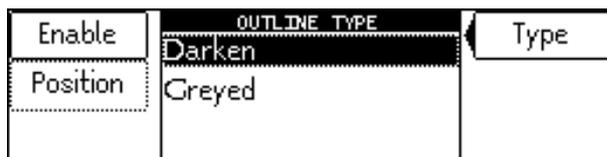
This menu controls the operation of the internal film sequence detector.

BIAS

This menu adjusts the bias of the internal film sequence detector. This should not normally be necessary, the Normal setting works well on most material. However, on difficult material it can be used to steer the detector towards the correct answer. If the bias is adjusted towards video it is more likely to detect orphan fields. If the bias is adjusted away from video and towards film it is less likely to generate orphan fields and more likely to generate repeat fields.

This can be particularly useful on Varispeed material. If the playback speed is high then the detector can be adjusted towards video to help find any orphan fields. If the playback speed is low then the detector can be adjusted towards film to help find any extra repeat fields. The default setting is Normal. Video 1 adds a small bias towards finding orphan fields. Video 2 adds a larger bias towards orphan fields. Film 1 adds a small bias towards repeat fields. Film 2 adds a larger bias towards repeat fields.

WINDOW



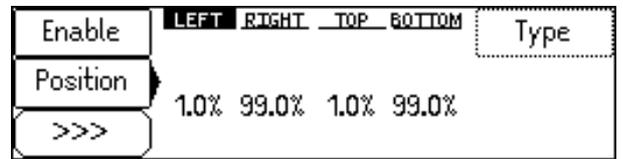
The Ukon film sequence detection circuit operates over a windowed section of the input picture. By default the whole of the input image lies within the window. However, it may be desirable to exclude certain areas of the picture from the window. To facilitate this, the window can be made visible on the Ukon output video so that it can easily be adjusted.

Note, the window is applied to the Ukon input video so it is advisable to have all of the input video visible when making the adjustment. For example, by selecting a full height display (see DISPLAY-PRESETS menu).

ENABLE

Turns the film sequence window on and off. This should be set to off, except when adjusting the sequence window, or the Ukon output will be incorrect.

POSITION



This controls the position of the film sequence window. The window co-ordinates are expressed as a percentage of the active area.

To select each of the parameters, press the lower left hand button adjacent to >>>.

Left Adjusts the left-hand edge of the window.

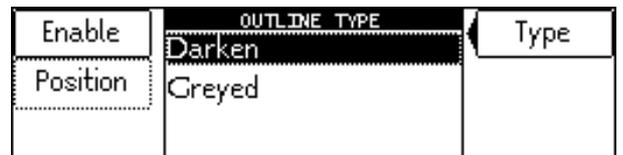
Right Adjusts the right-hand edge of the window.

Top Adjusts the top edge of the window.

Bottom Adjusts the bottom edge of the window.

TYPE

This controls the appearance of the sequence window when it is visible.



The options are:

Darken The gain of video inside the window is reduced.

Greyled The video inside the window is monochrome.

EXTERNAL

These menus are used to set up the input and output TTL film pulses on the Ukon rear panel BNCs.

In Type	INPUT TYPE	Out Type
In Sense	New Frame	Out Sense
Delay	Repeat	

IN TYPE

This menu selects what type of pulse is being applied to the input film sequence pulse BNC.

New Frame If New Frame is selected the Ukon expects a pulse which indicates that a new film frame has been produced by the Telecine. This is also known as a Start of Frame pulse or a Read Frame Sequence pulse.

Repeat If Repeat is selected the Ukon expects a pulse which indicates that a repeat field has been produced by the Telecine.

IN SENSE

This menu selects the electrical form that the input film sequence pulse takes.

In Type	INPUT SENSE	Out Type
In Sense	Positive	Out Sense
Delay	Negative	

Positive field Selects a pulse that is active HI during a new or repeat field.

Negative field selects a pulse which is active LO during a new or repeat

OUT TYPE

This menu selects what type of pulse is being applied to the output film sequence pulse BNC.

In Type	OUTPUT TYPE	Out Type
In Sense	New Frame	Out Sense
Delay	Repeat	
	Toggle	

New Frame If New Frame is selected the Ukon outputs a pulse which indicates that a new film frame has been produced by the Ukon

Repeat if Repeat is selected the Ukon outputs a pulse which indicates that a repeat field has been produced by the Ukon.

Toggle if Toggle is selected the Ukon outputs a pulse that toggles every time a new film frame is produced by the Ukon.

Cuts If Cuts is selected the output of the Ukon internal scene change detector will be output. For interlaced (or sF) inputs the pulse appears one input frame (two input fields) after the scene change is at the input to the Ukon. For progressive inputs the scene change appears two input frames after the scene change is at the input to the Ukon.

OUT SENSE

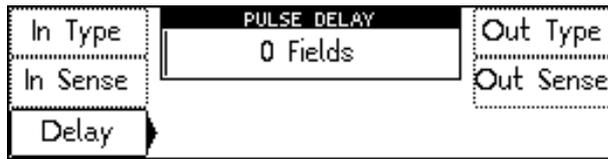
This menu selects the electrical form that the output film sequence pulse takes.

In Type	OUTPUT SENSE	Out Type
In Sense	Positive	Out Sense
Delay	Negative	

Positive Field Selects a pulse that is active HI during a new or repeat field.

Negative Field Selects a pulse that is active LO during a new or repeat field.

DELAY



This sets the number of input fields of delay that are applied to the incoming film sequence pulse. This allows the user to set the timing of the pulse so that it matches the incoming video sequence. Thus, if there is a video processing delay between the Telecine and the Ukon then this can be compensated for with this setting. Up to 15 input fields of delay can be applied to the incoming pulse.

INVERT

If the input film sequence source has been set to INTERNAL the INVERT button controls the dominance of the internal (2:2) film sequence generator. For input material with normal dominance INVERT should be OFF. For material with inverted dominance, INVERT should be ON. Normal dominance occurs when a frame is made by field ones and the following field twos. Inverted dominance occurs when a frame is made by field twos and the following field ones

FILM AP

These menus control the filter apertures used when the Ukon is in a conversion mode that treats the incoming material as film. In these modes the Ukon will treat the material as individual film frames and will not interpolate across frame boundaries.



The options are:

- Sharp** The Ukon aims to extract the maximum possible vertical resolution from the incoming material. Film material can be converted to provide greater resolution than is possible with video material when the incoming material contains the extra detail.
- Normal** This aperture does not extract quite as much vertical resolution as the Sharp aperture. It does however still assume that the incoming material is film based and can therefore give very good results in the presence of vertical detail. Because it does not try to retain all possible detail it is much more tolerant of film sequence detection errors. As such it is suitable for all but the most demanding film applications and would normally be recommended.
- Anti Alias (1)** This aperture incorporates a vertical low pass filter. This provides two main benefits. Firstly, if the Ukon is outputting standard definition signals then, this filter should ensure that not too much vertical detail is retained in the output. Too much vertical detail can give the appearance of excess twitter and alias. Secondly, this aperture is even more tolerant of film sequence errors than the NORMAL aperture.
- Anti Alias (2)** This aperture incorporates more vertical low pass filtering than the anti-alias filter above. This provides the same benefits as the anti-alias filter but gives extra twitter reduction. This is particularly useful when the Ukon is being used in down-conversion mode (HD to SD conversion).
- Safe** The film frame pairing algorithms are still used. However, the filter does not try to extract as much vertical resolution from the input and the filter is tolerant of video based material.

ADAPTION



If the Film Adaption setting is turned on then the Ukon will adapt the film conversion aperture to match the incoming material if the sequence detector is turned on. This allows mixed film and video to be put through the Ukon with film material using a film aperture and video material using a video aperture. Adaption is also undertaken around scene changes to provide protection against undetected orphan fields in the edit point regions, which could otherwise cause picture tearing.

○ DISPLAY

This menu is used to control the size, shape and position of the output picture.



PRESETS

This allows selection of the preset display sizes.

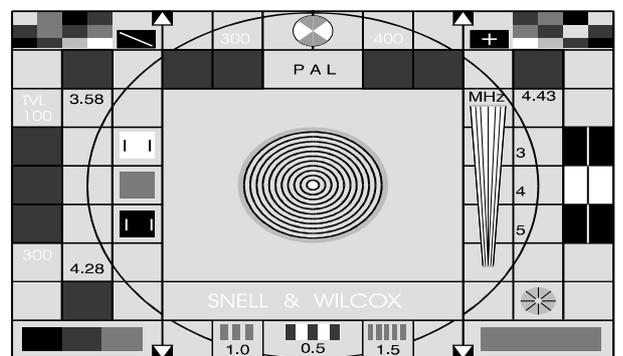
The options are:

Anamorphic This setting retains all picture information from the input and passes it to fill the output image regardless of the aspect ratio conversion. This means that 16:9 to 4:3 conversions will appear squeezed horizontally.

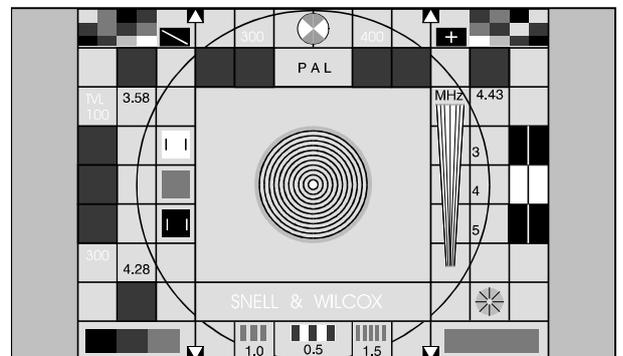
Full Height For 4:3 to 16:9 aspect ratio conversions only. Produces a 4:3 output with all input picture information retained and blanked columns to the left and right of the image.

Full Width Produces a 16:9 output. The whole output screen is filled and information at the top and bottom of the input image may be lost. Used when converting a 4:3 image to a 16:9 display when it is necessary to fill the entire output display.

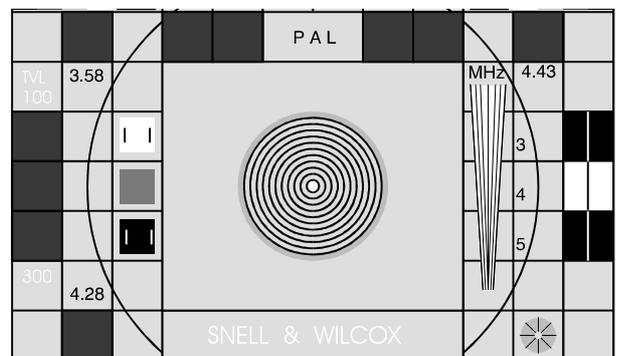
To activate the newly selected display type press the lower right button adjacent to Select.



Anamorphic



Full Height



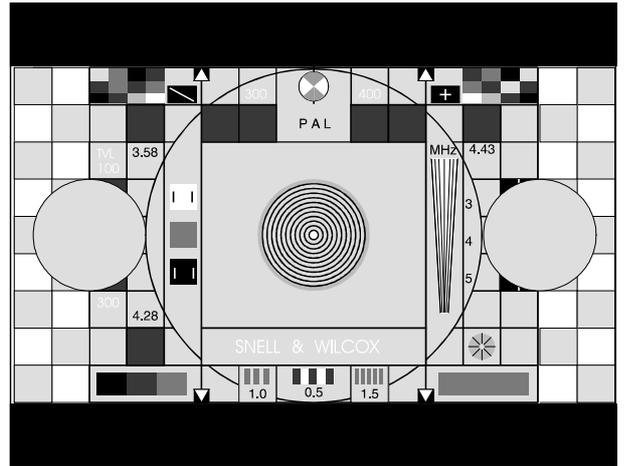
Full Width

Letterbox For 16:9 to 4:3 aspect ratio conversions only. To maintain the correct shape of objects on the 16:9 input, this displays the 16:9 picture as a strip across the centre of the 4:3 display.

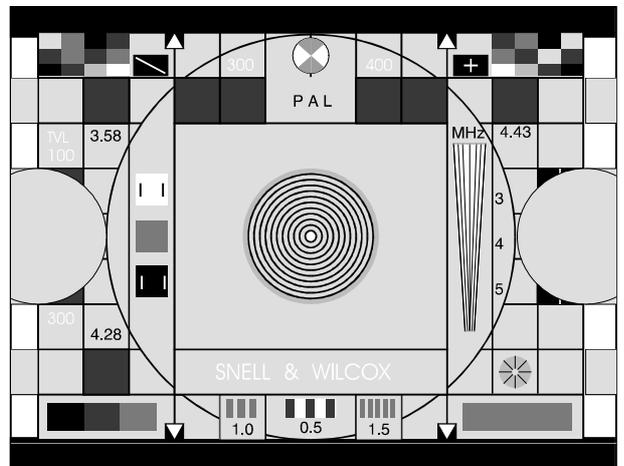
Letterbox (14:9) For 16:9 to 4:3 aspect ratio conversions only. To display as large a picture as possible without losing too much of the 16:9 picture, the sides are cropped slightly.

Centre (4:3) For 16:9 to 4:3 aspect ratio conversions only. To maintain the correct shape of objects on the 16:9 input, this setting retains all vertical detail but crops the left and right edges of the image.

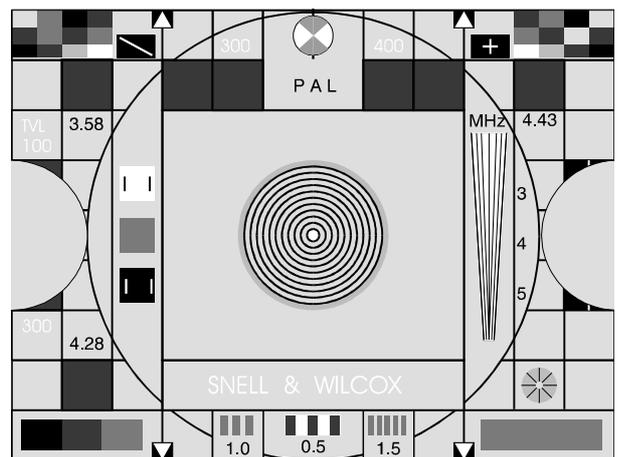
To activate the newly selected display type press the lower right button adjacent to Select.



Letterbox



Letterbox (14:9)



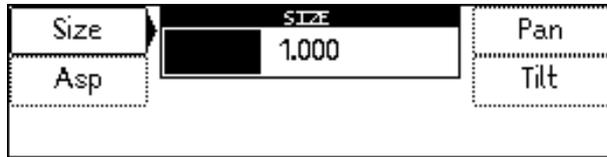
Center (4:3)

VAR

Allows the picture size, shape and position to be adjusted to meet custom requirements.

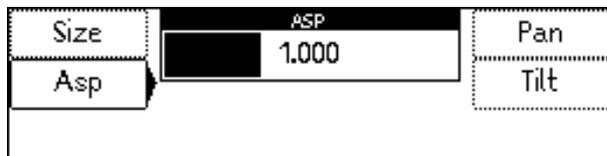
The options are:

Size



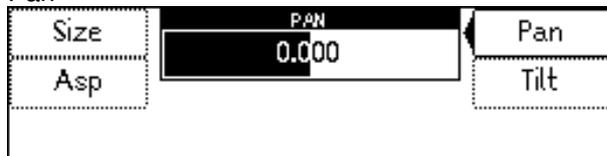
Adjusts the size of the whole image. Both vertical and horizontal size change together while maintaining the aspect ratio of the image.

Asp



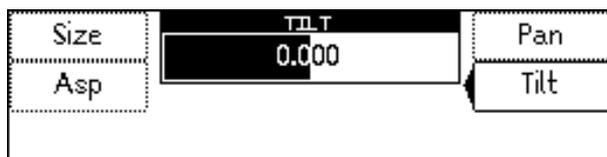
Adjusts the horizontal size of the image, allowing the shape (aspect ratio) of the output image to be changed.

Pan



Adjusts the horizontal position of the output image.

Tilt



Adjusts the vertical position of the output image.

SLEW

Controls the method and the timing of a picture size change



If Slew is not zero and there is no trigger, when a change of aspect ratio is made it will slew from one to another with the specified profile and duration. This will also occur if another memory is selected, which has a different aspect ratio.

TRANSITION TYPE

Selects the type of transition that will be performed. Options are:

Immediate Transition from one picture size to another is instantaneous.

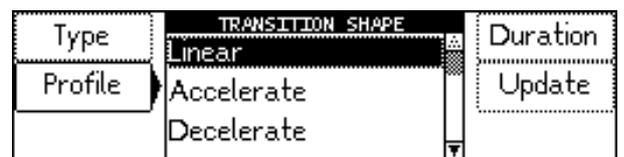
Slew Transition from one picture size to the next occurs at a speed set by the DISPLAY-SLEW-DURATION menu and follows a profile set by the DISPLAY-SLEW-PROFILE menu.

Trigger Transition from one picture size to the next only occurs when a trigger command is sent down one of the remote control channels. Multiple picture parameters can be set in advance and then activated using a single trigger command. Note that if trigger mode is selected then adjusting the picture size, shape or position from the front or remote control panel will have no effect unless a trigger command is received. Trigger mode causes an immediate transition to the next picture size.

Trigger Slew Trigger Slew works the same as Trigger mode (above) but, instead of an immediate transition to the next picture size the transition is slewed at a speed set by the DISPLAY-SLEW-DURATION menu.

PROFILE

Selects the "shape" of the transition.



The options are:

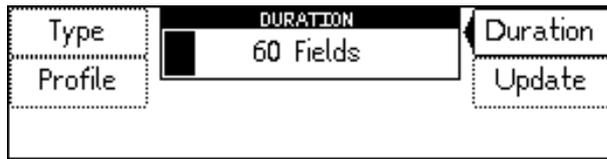
Linear The rate of change of the picture parameters is constant throughout the transition.

Accelerate The rate of change of the picture parameters increases throughout the transition.

Decelerate The rate of change of the picture parameters decreases throughout the transition.

S-Curve The rate of change increases and then decreases as the transition progresses.

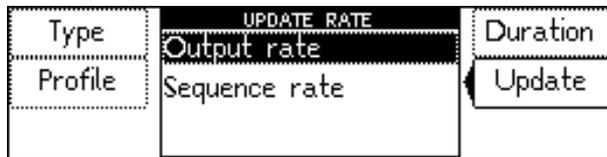
DURATION



Sets the duration of the transition in fields or frames if the output video standard is interlaced or progressive respectively.

UPDATE

This menu is used to control the way in which the Ukon updates the picture display size and position when the Comms mode has been set to Output Locking (see the Setup-Comms menu description below for further information).



Output Rate In this mode the Ukon updates the picture size and position at the first available output field boundary.

Sequence Rate In this mode the Ukon respects any film sequence that it is introducing when building it's output. Thus if it is in Video-> sF, Film-> sF or 3:2->sF conversion mode then it will only update the output size and position on field one outputs. If it is in Video->3:2, Film->3:2, sF-> 3:2 or 1:1->3:2 conversion mode then it will only update the picture size and position on output 3:2 sequence frame boundaries. This prevents the Ukon from making broken sF or 3:2 sequence during pan/scan operations (for example).

Note that if the Ukon is in Input Locked Comms mode the display size and position is effectively always in Sequence Rate Update mode.

MEMORY

This menu is used to store and recall the various User Display memories. There are four User Display memories available in each of the eight machine memories. Each User Display memory contains the Size, Aspect ratio, Pan and Tilt parameters of the image.



REFERENCE

This menu is used to control the genlocking functions of the Ukon.



ENABLE

Toggles between genlocking on and genlocking off.

SOURCE

Selects the source of the reference signal. Options are:

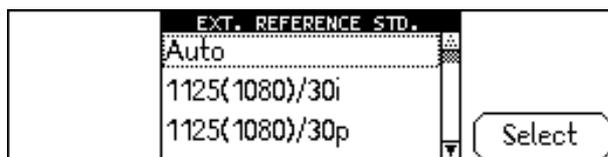
- Auto** The Ukon will scan the Reference-A input, the Reference-B input and the Input video until it finds a suitable reference signal. If a new search of the available reference inputs is required, toggling the genlock enable button will cause a new search to begin at Ref A.
- Ref A** Forces the Ukon to operate from the external reference A input.
- Ref B** Forces the Ukon to operate from the external reference B input.
- Input** Forces the Ukon to lock to the video input.

To activate the newly selected source press the lower right button  adjacent to Select.

Note - if the encoder output option has been fitted to the Ukon and it is required to burst lock the unit, the Black burst reference must be applied to Ref B. See the OUTPUT-CONTROL - D2 O/P menu item for more information.

EXTERNAL REFERENCE

Sets the reference standard. The selected standard will appear on the second line of the Home screen.



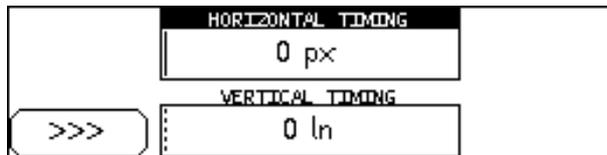
To activate the newly selected reference press the lower right button  adjacent to Select.

The user can force the reference standard to the required value or select Auto. The full range of references is as follows:

Auto	The Ukon measures the selected reference signal and automatically chooses the reference standard.	
750(720)/60p	1125(1080)/30I	} Forces the reference standard selected
750(720)/59p	1125(1080)/30p	
750(720)/50p	1125(1080)/30sF	
750(720)/30p	1125(1080)/29i	
750(720)/29p	1125(1080)/29p	
750(720)/25p	1125(1080)/29sF	
750(720)/24p	1125(1080)/25i	
750(720)/23p	1125(1080)/25p	
750(576)/50p	1125(1080)/25sF	
750(480)/60p	1125(1080)/24p	
750(480)/59p	1125(1080)/24sF	
525(480)/29i	1125(1080)/23p	
625(576)/25i	1125(1080)/23sF	
625(576)/24sF	1125(1035)/30i	
625(576)/23sF	1125(1035)/29i	

TIMING

This menu allows the adjustment of the genlock timing with respect to the selected reference signal.

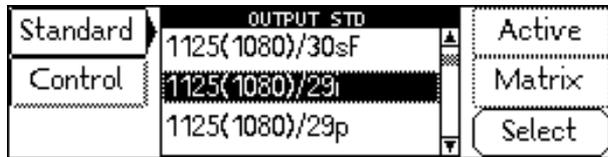


To select each of the parameters, press the lower left hand button adjacent to >>>. The options are:

- Horizontal Timing Adjusts horizontal genlock timing. Range is zero to one output line in steps of one output pixel.
- Vertical Timing Adjusts vertical genlock timing. Range is zero to one output frame in steps of one output line.

OUTPUT

The following menu items are all related to the output signal standard and control.



STANDARD

This allows selection of the output video standard. The standards are named using the following convention: total number of lines, (active lines), frame rate. For an Ukon fitted with High Definition output capability the following standards are available: -

- 750(720)/60p 1125(1080)/30i
- 750(720)/59p 1125(1080)/30p
- 750(720)/50p 1125(1080)/30sF
- 750(720)/30p 1125(1080)/29i
- 750(720)/29p 1125(1080)/29p
- 750(720)/25p 1125(1080)/29sF
- 750(720)/24p 1125(1080)/25i
- 750(720)/23p 1125(1080)/25p
- 750(576)/50p 1125(1080)/25sF
- 750(480)/60p 1125(1080)/24p
- 750(480)/59p 1125(1080)/24sF
- 1125(1080)/23p
- 1125(1080)/23sF
- 1125(1035)/30i
- 1125(1035)/29i

For an Ukon fitted with Standard Definition output capability the following standards are available: -

- 525(480)/29i
- 625(576)/25i
- 625(576)/24sF
- 625(576)/23sF

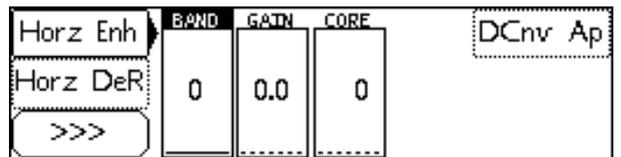
To activate the newly selected standard press the lower right-hand button  adjacent to Select.

CONTROL (Encoder Option not fitted)

When Control is selected, the image below is displayed.



HORIZONTAL APERTURE



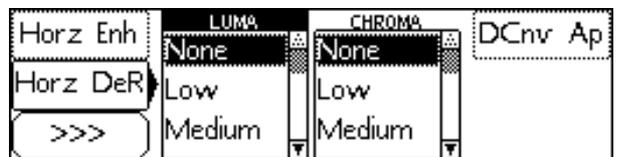
These menus adjust the horizontal filter settings.

HORIZONTAL ENHANCEMENT

Controls the high frequency horizontal information to make the output pictures appear sharper. Options are:

- Band** Selects which frequency band within the picture is enhanced, 0 corresponds to lowest frequency band, 3 is the highest.
- Gain** The amount of gain applied to the band selected for enhancement before the coring process.
- Core** Used to reject signals below the selected threshold before addition to the original signal. This has the effect of preventing the enhancement process from amplifying noise.

HORIZONTAL DE-RING



Controls the de-ringing filters for both luminance and chrominance. Options are:

- None
- Low Minimum de-ring
- Medium
- High Maximum de-ring

DCNV AP

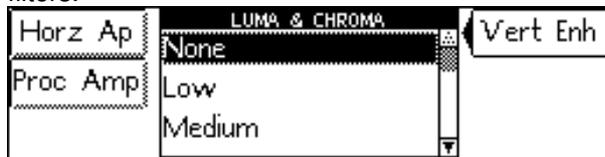


This selects the horizontal filter used when the Ukon is being used as a down-converter i.e high definition video in, standard definition video out.

- Normal This selects an aperture that has been optimized for the normal range of down-conversions. This setting will give the best results under most circumstances.
- Zoom This aperture can be used if a very large horizontal zoom has been applied by the Ukon. e.g. if the ASP control (see DISPLAY -VAR-ASP menu setting) has been set to the maximum value. Choosing the Zoom aperture under these circumstances can provide increased horizontal resolution at the output of the Ukon.

VERTICAL ENHANCEMENT

This controls the detail processing in the vertical filters.

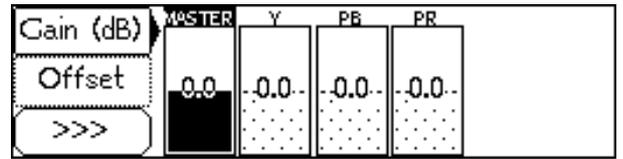


The enhancer adjusts the levels of high frequency vertical information for luminance and chrominance together to make the output pictures appear sharper or softer. Options are:

- None
 - Low
 - Medium
 - High
- Minimum enhancement
 ↓
 Maximum enhancement

PROCESSING AMPLIFIERS

Allows adjustment of the gain and offset of the output video.



GAIN

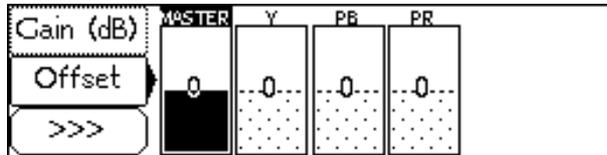
These menu items allow the user to adjust the gain of the luminance (Y), blue color difference channel (Pb) and the red color difference channel (Pr). The Master gain is applied to all three channels simultaneously while the Y, Pb and Pr gains are only applied to the selected channel. Thus, the overall gain of any channel is the product of the master gain and the individual gain. The gain controls have a range of ±6dB with a preset value of 0dB. The options are:

- Master All 3 channels adjusted simultaneously
- Y } Individual channel adjustment
- Pb }
- Pr }

To select each of the parameters, press the lower left hand button adjacent to >>>.

OFFSET

This allows adjustment of the offset for luminance (Y), blue color difference (Pb) and red color difference (Pr). The Master offset is applied to all three channels simultaneously while the Y, Pb and Pr offsets are only applied to the selected channel. The controls are shown in 10-bit digital video levels.



To select each of the parameters, press the lower left hand button adjacent to >>>. The options are:

- Master All 3 channels adjusted simultaneously
- Y } Individual channel adjustment
- Pb } Individual channel adjustment
- Pr } Individual channel adjustment

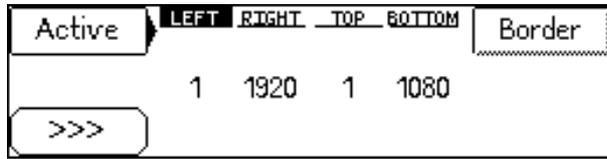
CLIPPER



This enables the output clipper function. When the clipper is turned on, the output digital luminance signal is clipped to a maximum of 940 and a minimum of 64. The output digital chrominance signal is clipped to a maximum of 960 and a minimum of 64. These figures are 10 bit video levels.

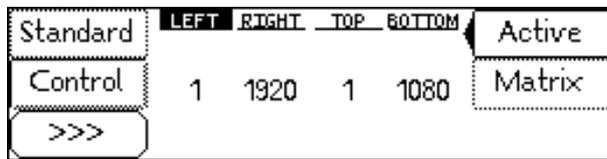
ACTIVE

This controls the output blanking and colored border insertion.



Output blanking is used when it is required that ranges of output lines or pixels are never active. For example, it is possible to impose an artificial letterbox by bringing the top output blanking down and the bottom output blanking up.

Note that the Ukon keeps a separate record of output blanking for each distinct output active picture raster.

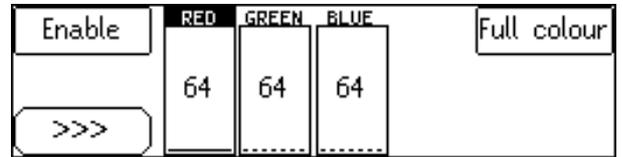


To select each of the parameters, press the lower left hand button adjacent to >>>. The options are:

- Left** Adjusts the left-hand edge of output blanking. A setting of 1 indicates that no output pixels that are normally visible should be blanked, 2 causes the first output pixel to be blanked, etc.
- Right** Adjusts the right-hand edge of blanking. For example, 1920 indicates that no output pixels that are normally visible should be blanked in the 1125(1080)/29I output standard. 1919 causes the last output pixel to be blanked, etc.
 Note that the preset value will vary with the output standard as it is equal to the number of active pixels per line.
- Top** Adjusts the top edge of output blanking. A setting of 1 indicates that no output lines that are normally visible should be blanked, 2 causes the first output line to be blanked, etc.
- Bottom** Adjusts the bottom edge of blanking. For example 1080 indicates that no output lines that are normally visible in the 1125(1080)/29I output standard should be blanked, 1079 causes the last output line to be blanked, etc.
 Note that the preset value will vary with the output standard as it is equal to the number of active lines per frame.

BORDER

These menu items allow the user to adjust the appearance of any blanking border around the active picture. By default, the color of any border around the active picture is black. However, the user can adjust this to any desired color.



The border color is controlled by adjusting the amount of Red (R), Green (G) and Blue (B) in the border. The RGB values are displayed as 10-Bit digital video levels.

The default value for all the border colors is 64 which produces a black border. Note also that when the border is enabled and its color adjusted away from black then there is often a black band between the active picture and the color border. This occurs when the active picture does not completely fill the digital active line length of the input standard. To remove this black band the input blanking should be adjusted via the Input-Active menus to match the blanking of the incoming programme material.

ENABLE

This menu item turns the border on and off. If the border is not enabled then it will appear black regardless of the settings of the red, green and blue border values.

FULL COLOUR

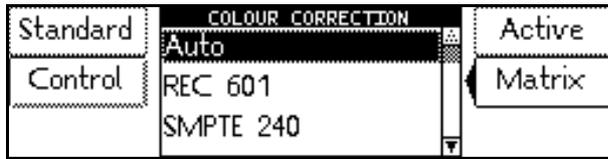
This menu controls the behavior of the color border for output standards which do not fill the entire raster. Currently these are 750(480)/60p, 750(480)/59p and 750(576)/50p. In these cases the active picture is transported within a larger raster corresponding to a different output standard. In this instance, if the color border is turned on then by default it only extends to the edge of the largest possible active picture for the given output standard. This means that there will be a large black border around the picture (from the edge of the active picture to the edge of the transporting raster). If Full Color is enabled the color border will be extended to the edges of the transporting raster.

To select each of the parameters, press the lower left-hand button adjacent to >>>. The options are:

- Red** -Adjusts the amount of Red in the border.
- Green** - Adjusts the amount of Green in the border.
- Blue** - Adjusts the amount of Blue in the border.

MATRIX

Allows the colorimetry on the output signal to be set.



The color correction options are:

Auto	Automatically selects the colorimetry most appropriate for the output video standard.
REC 601	No color space conversion is applied.
SMPTE 240	Colorimetry to SMPTE 240 requirements is applied.
SMPTE 274	Colorimetry to SMPTE 274 requirements is applied.
BT709	Colorimetry to BT709 requirements is applied.
None	No correction

CONTROL

(Additional items when Encoder Option fitted)

The D2 O/P menu item becomes available when the Encoder option is fitted to the Ukon unit.



D2 O/P

This menu selection allows the encoder options of the unit to be set.

625



This allows selection of the encoder output video standard when the Ukon output standard is set to 625(576)/25i. The options are as follows:

PAL D2 PAL N

525



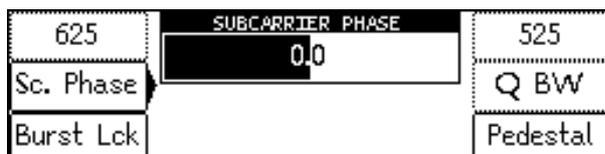
This allows selection of the encoder output video standard when the Ukon output standard is set to 525(480)/29i. The options are as follows:

NTSC D2 PAL M

Sc. Phase

This allows adjustment of the subcarrier phasing with respect to the reference in steps of 0.1 degree.

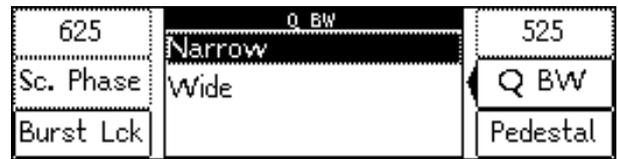
Overall range is -180.0° to 179.9°



Selecting Preset returns the setting to the calibrated value of 0.

Q BW

In NTSC mode only, the bandwidth of the Q signal may be selected as Wide or Narrow.



Pedestal

In NTSC mode only, the option of adding a pedestal of 7.5 IRE (54 mV) to the video output can be achieved.

Burst Lock

This allows the Ukon to genlock to an external reference signal which may be either a black burst or a standard composite color video signal.



When Burst Lock is selected the unit regardless of the current genlock status will only use external reference B for genlocking. The unit will only achieve burst lock, if genlock is enabled and a black burst or composite video signal of the currently selected output standard is present on the reference B input. Selection of reference source and standard will be unavailable whilst in burst lock mode.

When Burst Lock is de-selected the previous genlock status of the unit will be resumed.

Additional Standards available when Encoder option fitted

- 525(480)/29i
- 625(576)/25i
- 625(576)/24sF
- 625(576)/23sF

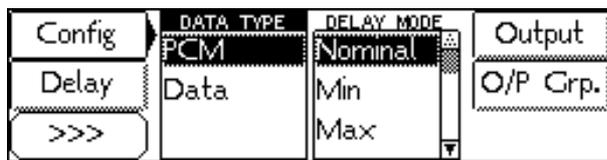
AUDIO (Optional)

This menu is used to control all the Ukon functions related to the audio processing blocks.

Note that if this option is not fitted the display will show the words "Feature not fitted"

There are four stereo pair processing blocks that may be assigned to any four of the input and output groups.

Individual or group control of the audio delay of the embedded or AES audio paths is possible.



PCM this mode should normally be selected. Audio rate conversion is used to accommodate differing input and output video/audio rates

Data in this case the audio is treated as a data stream that cannot be rate converted. This is useful if the audio is a compressed format such as Dolby-E. Because the audio is not rate converted this mode will only work if the input and output audio clocks are locked together. This is most easily achieved if the Ukon is genlocked to its video input and, the incoming data stream is also locked to the video input. This can also be done by locking the Ukon to an external reference that also drives the audio source.

Note that if the embedded audio input channels are being used, the embedded audio must also be synchronized to the input video. If the AES audio inputs are in use, the input audio need not be locked to the input video but, it must be locked to the Ukon output video.

If the audio contains a mix of PCM and Data channels then the Ukon should be put into data mode and, both the data and PCM audio input channels should have their audio clocks locked to the Ukon output.

Output



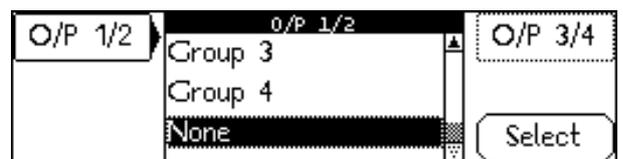
This selects the source for the selected output channel.

The options for each source are:

- AES I/P 1
 - AES I/P 2
 - AES I/P 3
 - AES I/P 4
- } Inputs from rear panel
- Disembed CH 1/2
 - Disembed CH 3/4
 - Disembed CH 5/6
 - Disembed CH 7/8
 - Disembed CH 9/10
 - Disembed CH 11/12
 - Disembed CH 13/14
 - Disembed CH 15/16
- } Input from embedded audio in programmes
- Tone
 - Mute
- A 1kHz test tone
Silence

Output Grp.

For the embedded outputs this selects the group to embed the pair on.

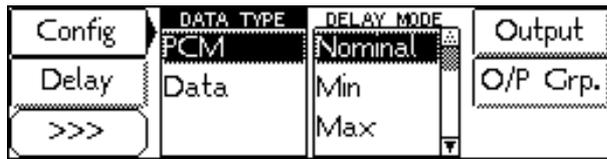


Options are:

- Group 1
- Group 2
- Group 3
- Group 4
- None

Note - embedded audio is not available for slow PAL video standards. (625/24sF and 625/23sF). Thus, if the input is slow PAL, embedded audio input is not possible. If the output is slow PAL, embedded audio output is not possible. The AES/EBU audio inputs and outputs are however always available.

Delay



DELAY MODE

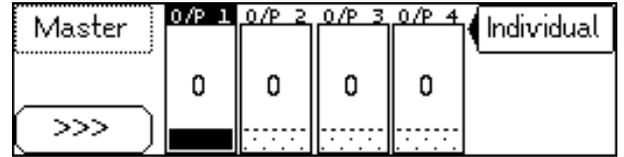
Used to control the delay applied to the audio as it passes through the machine. The audio delay applied comprises two components; the machine automatic delay which compensates for the delay in video processing, and any additional delay the user wishes to apply to compensate for upstream or downstream video processing delays.

The menu controls the way in which the automatic audio delay works. The video delay through the machine depends on many variables. If the unit is not running with its input and output locked together then the processing delay may be variable – if the unit is in Synchronise or Optimise mode.

The options are:

- Nominal The automatic audio delay is set to the nominal value for the conversion being undertaken. This is the average video delay that can be incurred. This will be the same as the actual video delay for conversions that have the input and output frame rates locked together and, the vertical genlock timing set so that the output and input vertical syncs are roughly co-timed.
- Min The audio delay is set to the minimum video processing delay that can be incurred for the conversion being undertaken.
- Max The audio delay is set to the maximum video processing delay that can be incurred for the conversion being undertaken.
- Zero The audio delay is set to zero and the user can set the entire audio delay using the AUDIO – MAN DEL menu

The audio channels (AES or embedded) may be delayed either individually or via a master control that is added to the individual settings.

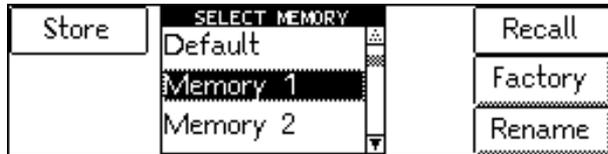


This allows the user to apply a manual offset to the audio delay setting. This offset can be positive or negative, thus allowing the user to increase or decrease the audio delay as required. The audio delay offset is added to the automatic audio delay to provide the total audio delay.

The audio delay range when the automatic audio delay mode is set to ZERO is 0 to 500ms. The actual audio delay applied is the sum of the automatic delay and the manual delay. For example, if the automatic delay works out to be 64ms the manual delay range will be –64ms to 436ms.

MEMORY

This menu is used to store and recall the various system Memories. There are eight system memories available. Each memory contains a complete record of the machine settings (including the display memory settings).



The current machine setting is stored in the system memory. This will be recalled on powering-up (it can't be recalled by the user). If the user recalls a user-memory, its setting will be copied to the system memory, i.e. the previous system setting gets lost. All machine settings, except the following, can be stored to / recalled from individual user memories:

Status of "action buttons" (like "Store", "Rename", "Recall") are not stored in any memory

System status like temperature, Timecode etc. are not stored in any memory

The names of memories, the selection of current memory, the GPI enable selection, the RollTrack addresses and the service controls are only stored on a system base (i.e. they don't change on recalling a user-memory).

Input and output active values are remembered for the last standard selection while the unit is powered on.

STORE

Stores the system settings in the memory selected.

RECALL

Changes the system settings to those stored in the memory selected.

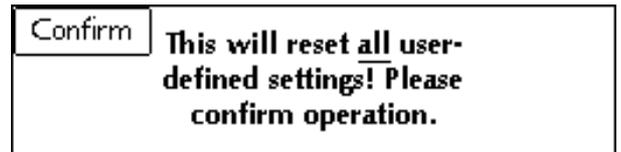
The memory options are:

- Default
- Memory 1
- Memory 2
- Memory 3
- Memory 4
- Memory 5
- Memory 6
- Memory 7
- Memory 8

The Default memory can only be recalled, it cannot be stored. When the Default memory is recalled, all the unit settings are restored to the factory default values. The other memory contents are however left untouched.

FACTORY

This allows the machine to be set back to the factory defaults state. In this case all settings are put back to their factory preset values. In addition, all machine memories are also set back to the factory default values. This function requires the user to hit the confirm button to ensure that it is not accidentally pressed. To avoid clearing the memory contents, use the Default memory recall described above.

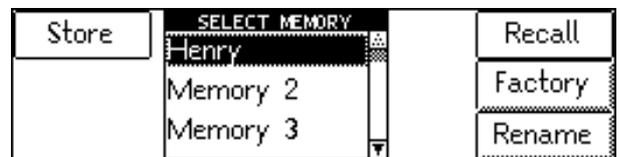


RENAME

The 8 memories may be renamed using the standard edit string dialog.



Selecting ACCEPT will accept the new name.





Controls the various utility functions the Ukon provides. The menu functions are shown below:



PATTERN

Used to control the internal test pattern generator.



The selected pattern is only active when Enable is highlighted by pressing the upper left-hand button (toggle action).

The test pattern options are:

- 100% Bars
- 75% Bars
- SMPTE Bars
- EBU Bars
- Tartan
- Ramp
- Sweep
- Pulse & Bar

MONOCHROME

Controls the monochrome output functions.



The menu options are as follows:

- Y only
- C only

To activate monochrome output of the selected type, press the upper left button adjacent to Enable.

Y/C DELAY



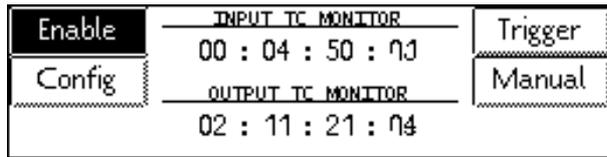
This controls delay placed in the chroma channel to correct for input timing errors. The resolution is dependent on the conversion being performed. Careful use is required to ensure Y and C and co-timed at the color space converter.

FREEZE

Used to control the Ukon picture freeze function.

Pressing the top right-hand button manually toggles between freeze and no freeze.

TIMECODE



This is the home screen for timecode control. The top half of the screen displays the source (input) timecode as it is received by the Ukon. If the input timecode is not found then question marks are displayed. If the incoming timecode is of Drop Frame type the characters “df” are placed at the end of the timecode value.

The bottom half of the screen displays the Ukon output timecode as it is inserted. If the inserted timecode is of Drop Frame type the characters “df” are placed at the end of the timecode value. If output timecode is not enabled the word “off” is displayed on the screen.

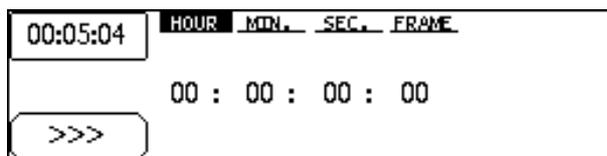
The timecode values are updated approximately every half a second so not all timecode values will appear on the screen.

The Ukon can perform complex timecode manipulation and it can synchronize this with output film sequence generation. The operation of the timecode and film sequence system is described in more detail in the Application note "Ukon Timecode operation" attached to the end of this manual.

ENABLE

This turns on the insertion of timecode in the Ukon video output.

TRIGGER



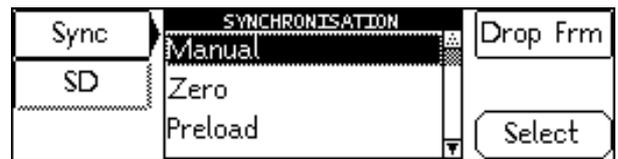
This sets the input timecode value for subsequent *trigger* events.

The button which shows a partial timecode value can be pressed to grab the current input timecode and transfer it to the timecode trigger value. The timecode value shown is the current input timecode value apart from the frame count (for reasons of space). When the input timecode value is grabbed, the entire input timecode value including frame number is transferred.

CONFIG

This menu sets the configuration of the output timecode insertion.

SYNCHRONISATION



This determines how the output timecode is synchronised.

Manual

Control from manual dialog, i.e. reset to zero, load the preload value or calculate a Synchro timecode and insert it.

Zero

When the input time code reaches the *trigger* value the output timecode is reset to zero.

Preload

When the input time code reaches the *trigger* value the output timecode is set to the *preload* value.

Synchro

When the User presses the Synchro button in the Manual section of the timecode menus, the Ukon will examine the Trigger timecode, the Preload timecode and the current input video timecode. It will then calculate new Trigger and Preload values a few seconds in advance of the current input timecode such that, when the input video reaches the Trigger value the output timecode will have the Preload value. This allows the unit to generate continuous timecode in advance of a Trigger/Preload point provided continuous timecode is applied to the input of the unit. For further information see the timecode application note attached to this manual

Echo

When the input time code reaches the *trigger* value the output timecode is set to the *trigger* value.

E-E

The input timecode is fed directly through to the output, this is only appropriate in IO locked mode. Note that under certain circumstances the timecode frame count at the Ukon output may not accurately reflect the input video timecode. However the seconds count should be correct.

A detailed description of E-E mode operation is given in the application note “Ukon Timecode Operation” attached to the end of this manual.

DROP FRM

This enables the output of drop frame timecode from the Ukon. This option is not available if the output video standard has a 25 or 50Hz frame rate or, the unit is in E-E mode.

SD

These menus control the reading and inserting of timecode for **standard definition** input and output standards. These menus may not be visible if the Ukon does not have SD options fitted.

TC Src	TC SOURCE VITC	TC Out
VITC In	Ancillary	VITC Out
Slow PAL		ANC Out

TC SRC

VITC The input video timecode is read from VITC signals.

Ancillary The input video timecode is read from embedded ancillary data.

VITC In

TC Src	INPUT VITC LINE Line 14 (327)	TC Out
VITC In		VITC Out
Slow PAL		ANC Out

This menu controls the input video line from which the input video VITC is read.

Slow PAL

TC Src	MAX FRAME 24	TC Out
VITC In	23	VITC Out
Slow PAL		ANC Out

This menu controls whether the timecode for 625/24sF and 625/23sF video standards counts from frame 0 to frame 24 or, from frame 0 to frame 23. Note that this menu setting affects both the input and output timecode.

TC OUT

TC Src	TC OUT VITC	TC Out
VITC In	Ancillary	VITC Out
Slow PAL		ANC Out

VITC The output video timecode is inserted as VITC signals.

Ancillary The input video timecode is inserted as embedded ancillary data.

VITC Out

TC Src	OUTPUT VITC LINE Line 14 (327)	TC Out
VITC In		VITC Out
Slow PAL		ANC Out

This menu controls the output video line on which the output VITC is inserted. Note that the VITC is inserted on two lines per field. This menu setting specifies the first line that has VITC inserted on it. The second line of VITC is inserted two lines after the first line.

ANC Out

TC Src	LINE 14 (277)	TC Out
VITC In		VITC Out
Slow PAL		ANC Out

This sets the line number on which embedded ancillary timecode is inserted.

MANUAL

Preload	HOUR	MIN.	SEC.	FRAME	Zero
Synchro	02	: 11	: 03	: 00	00:05:20
>>>					

This menu page allows the entry of a timecode Preload value using the knob and the select arrows button. Note that this timecode is always in the correct format for the Ukon output video standard.

If the Zero button is pressed the output timecode will immediately be set to all Zeroes and will then free run.

If the Preload button is pressed the output timecode will immediately be set to the Preload value that has been entered on this menu page and will then free run.

If the Synchro button is pressed and the synchronization mode has been set to Synchro (see above), the Ukon will examine the Trigger timecode, the Preload timecode and the current input video timecode. It will then calculate new Trigger and Preload values a few seconds in advance of the current input timecode such that, when the input video reaches the Trigger value the output timecode will have the Preload value. Three or four seconds after the Synchro button has been pressed the

The output timecode will be set to the internally calculated value and will then free run.

The button which shows a partial timecode value can be pressed to grab the current input timecode and transfer it to the timecode preload value. The timecode value shown is the current input timecode value apart from the frame count (for reasons of space). When the input timecode value is grabbed, the entire input timecode value including frame number is transferred. If the Ukon is undertaking a format conversion then the input timecode value can be illegal in the output timecode standard. In this case the input value is converted to a legal value before transfer. Thus, if the input frame count value is greater than the maximum allowed by the current output standard, the frame value is clipped to the maximum value. Also, if the input timecode is non-drop-frame but the output is drop-frame then the grabbed value is converted to a legal drop-frame value before transfer.

OLD F

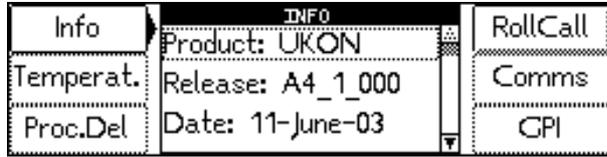
Pattern	YC-DELAY	Freeze
Mono	0.00 ns	Timecode
YC-Delay		Old F

This is a toggle button that may be of use when driving older equipment if the output interlace looks incorrect.

○ SETUP (Config)

Provides additional machine setup items.

Info

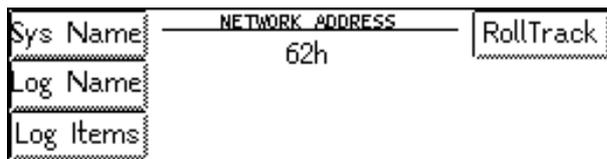


INFO

This will display the product code, the software release version number and the release date.

ROLLCALL

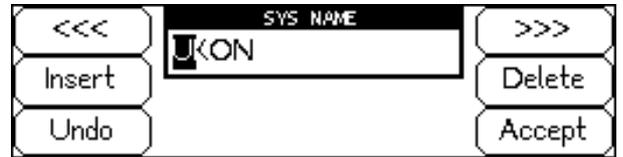
Allows the unit name and logging information to be set. The current RollCall address (in Hex) is displayed when RollCall is selected.



Note that this address must be set using switches on the main board (see Section 3, under RollCall) and this menu can only display the address, not change it.

SYSTEM NAME

Sets the RollCall unit name. The default is 'Ukon'. The character selected for editing will be highlighted.



To edit a different character press either the upper left-hand button adjacent to '<<<' or the upper right-hand button adjacent to '>>>'. Once the character is selected turning the front panel knob changes the character.

Pressing the middle left-hand button adjacent to 'Insert' adds a space character to the name at the highlight position. Pressing the middle right-hand button adjacent to 'Delete' removes a character from the name at the highlight position.

Pressing the bottom left-hand button adjacent to 'Undo' returns the name to its value when the Sys Name menu was last entered. Pressing the bottom right-hand button adjacent to 'Accept' makes the changes active.

LOG NAME

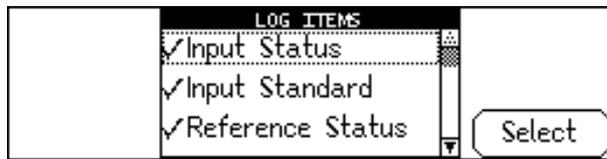
If the Ukon is attached to a RollCall network with a logging device, information about various parameters can be made available to the logging device.



If the Log Name is blank (obtained by pressing the PRESET button) and the cursor is at the left (no spaces), logging information is available to all logging devices on the RollCall network. If Log Name is set to the name of a particular logging device, only that device will receive information. The log name can be edited as described in the Sys Name section above.

LOG ITEMS

Selecting this item reveals a display that allows information about five parameters to be made available for logging.



The Log Items are:

- | | |
|------------------|--|
| Input Status | When activated, a loss of input signal condition will be indicated to the logging device. |
| Input Standard | When activated, the current input standard will be available to the logging device. |
| Reference Status | When activated, a loss of reference signal condition will be indicated to the logging device. |
| Output Standard | When activated, the current output standard will be available to the logging device. |
| Picture | When activated, the current state of the output picture (i.e. pattern, normal, frozen) will be available for the logging device. |

Select the parameter to be changed using the front panel knob. Pressing the bottom right-hand button

adjacent to 'Select' toggles the status of the selected parameter. Enabled parameters will be marked.

ROLLTRACK

Addr. A	Addr. B
Addr. C	Addr. D
Addr. E	Addr. F

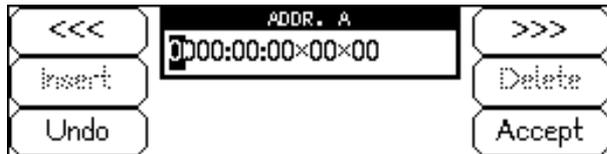
The RollTrack function allows the Ukon to automatically control remote audio/video delay modules using the RollCall system.

As the delay through the Ukon varies according to the conversion underway, delay modules connected via the RollTrack system will automatically have their delay updated to match.

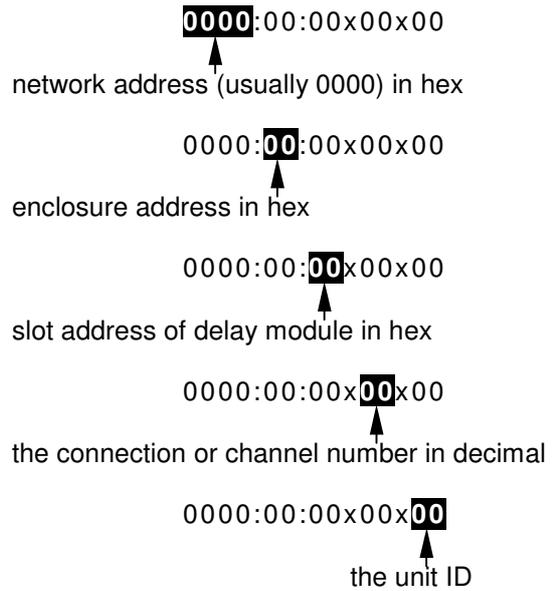
The delay sent out via the RollTrack system matches the internal audio delay of the Ukon. Thus, it will be equal to the sum of the automatic internal delay and the user controlled manual delay setting (see audio setup section). For more detailed information, see Section 7 RollTrack Audio Delay Tracking.

The destination for the delay information is set from the RollTrack address as follows:

Selecting RollTrack provides a sub-menu that allows up to 6 audio delays to be selected as a destination. Selecting any of the 6 Address buttons produces an address editing menu as shown below.



The menu provides a string that looks like this:



For more detailed information, see Section 7 RollTrack Audio Delay Tracking.

In a typical setup, the network address will be 0000, the enclosure and slot address would match those of the destination module, and the channel number would be one of 14,15,16 or 17 and the unit ID would be left at 00.

The Ukon RollTrack output becomes active as soon as the enclosure address is set to be non-zero and the Accept button is pressed.

Note that if the Accept button is not pressed at the end of editing the string, the changes will not take effect.

TEMPERATURE

Displays the current temperature of the power supplies and the main printed circuit boards.

Info	PSU1	PSU2	HIO	VTI	RollCall
Temperat.	26c	33c	30c	27c	Comms
Proc.Del					GPI

The indications are:

PSU1

PSU2

HIO board

VTI board

COMMS

This menu item controls the way the Ukon synchronizes its picture size and position updates with the incoming or outgoing video streams. This affects the behavior of the front panel controls, the RS-422 and RollCall BNC connections and, the GPI port polling. An application note entitled "Real Time Control of the Ukon" is attached to this manual and this describes in detail the impact of the Comms Lock control. This is recommended reading for users who wish to do pan/scan operations from the front panel as well as remote control of the Ukon.

Info	COMMS	RollCall
Temperat.	Output Locked	Comms
Proc.Del	Input Locked	GPI

The options are:

Output Locked

In this case the Ukon synchronizes its communications to the output video stream. The RS-422, RollCall BNC and GPI port are processed synchronized to the Ukon output stream. Also, slewed display size changes occur on every output field (subject to the Display-Slew-Update menu setting).

Input Locked

In this case the Ukon synchronises its communications to the input video stream. The RS-422, RollCall BNC and GPI port are processed synchronized to the Ukon input stream. Also, slewed display size changes occur at input field rate. In this mode of operation, if the Ukon is doing a format conversion then the display size/position changes are locked to particular input fields or frames. Changes in size and position only appear at the output of the Ukon when different input frames are used to build the output video. For example, if the input video standard is 1080/23sF, the output format is 525/59.94 and the conversion mode is set to sF to 3:2. Then, if size/position changes are supplied to the Ukon at the 23sF rate (i.e one command per 23sF frame) then, the output of the Ukon will only change at 3:2 sequence boundary changes matching the input 23sF frames.

PROC DEL

Info	PROCESSING DELAY	RollCall
Temperat.	100 ms	Comms
Proc.Del		GPI

This menu item displays the current nominal processing delay of the UKON. This allows external audio delays to be correctly configured to compensate for the delay through the UKON. This value is dependent upon the input and output video standards to the UKON.

GPI

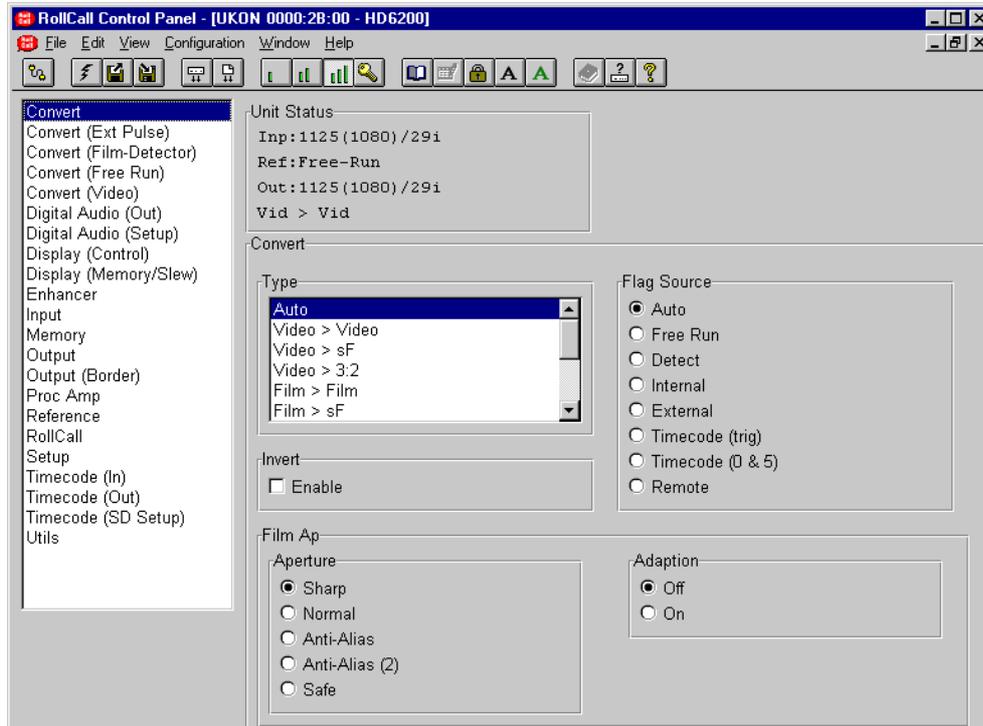
Determines whether the General Purpose Interface is active or not. There are two positions, GPI disabled and GPI enabled.

Note that this menu item is not stored in the Ukon machine memories. This prevents the GPI from disabling itself when a GPI memory recall is undertaken.

Info	GPI STATUS	RollCall
Temperat.	GPI disabled	Comms
Proc.Del	GPI enabled	GPI

RollCall Templates for the Ukon

Convert



This screen relates to the conversion of the input signal to the output signal.

Mode

The Ukon has a number of processing modes and it is important to use the correct mode to achieve the desired conversion.

For full details please see page 4.6

Flag Source

This selects the source of the film sequence information for the input video stream.

For full details please see page 4.9.

Invert

If the input film sequence source has been set to INTERNAL the INVERT button controls the dominance of the internal (2:2) film sequence generator. For input material with normal dominance INVERT should be OFF. For material with inverted dominance, INVERT should be ON. Normal dominance occurs when a frame is made by field ones and the following field twos. Inverted dominance occurs when a frame is made by field twos and the following field ones

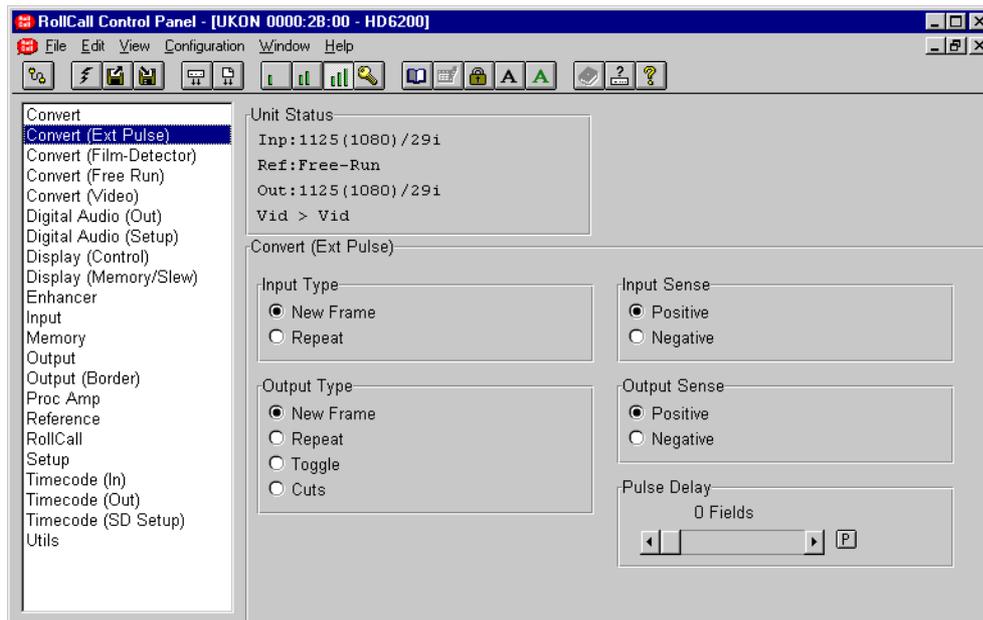
Film Ap(erture)

These items control the filter apertures used when the Ukon is in a conversion mode that treats the incoming material as film. In these modes the Ukon will treat the material as individual film frames and will not interpolate across frame boundaries.

For full details please see page 4.14.

Adaption

If the Film Adaption setting is turned on then the Ukon will adapt the film conversion aperture to match the incoming material if the sequence detector is turned on. This allows mixed film and video to be put through the Ukon with film material using a film aperture and video material using a video aperture. Adaption is also undertaken around scene changes to provide protection against undetected orphan fields in the edit point regions, which could otherwise cause picture tearing.

Convert (Ext Pulse)

These items are used to set up the input and output TTL film pulses on the Ukon rear panel BNCs.

Input Type

This item selects what type of pulse is being applied to the input film sequence pulse BNC.

New Frame

If New Frame is selected the Ukon expects a pulse which indicates that a new film frame has been produced by the Telecine. This is also known as a Start of Frame pulse or a Read Frame Sequence pulse.

Repeat

If Repeat is selected the Ukon expects a pulse which indicates that a repeat field has been produced by the Telecine.

In Sense

This item selects the electrical form that the input film sequence pulse takes.

Positive

Selects a pulse that is active HI during a new or repeat field.

Negative

Selects a pulse which is active LO during a new or repeat

Output Type

This item selects what type of pulse is being applied to the output film sequence pulse BNC.

New Frame

If New Frame is selected the Ukon outputs a pulse which indicates that a new film frame has been produced by the Ukon
Repeat

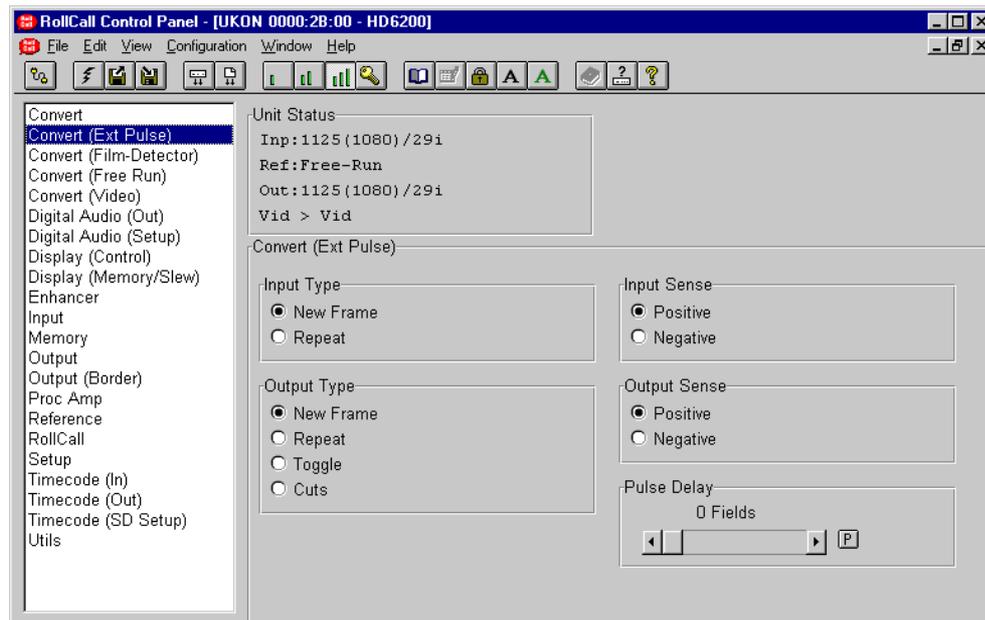
If Repeat is selected the Ukon outputs a pulse which indicates that a repeat field has been produced by the Ukon.

Toggle

If Toggle is selected the Ukon outputs a pulse that toggles every time a new film frame is produced by the Ukon.

Cuts

If Cuts is selected the output of the UKON internal scene change detector will be output. For interlaced (or sF) inputs the pulse appears one input frame (two input fields) after the scene change is at the input to the Ukon. For progressive inputs the scene change appears two input frames after the scene change is at the input to the Ukon.

Convert (Ext Pulse) continued**Output Sense**

This item selects the electrical form that the output film sequence pulse takes.

Positive

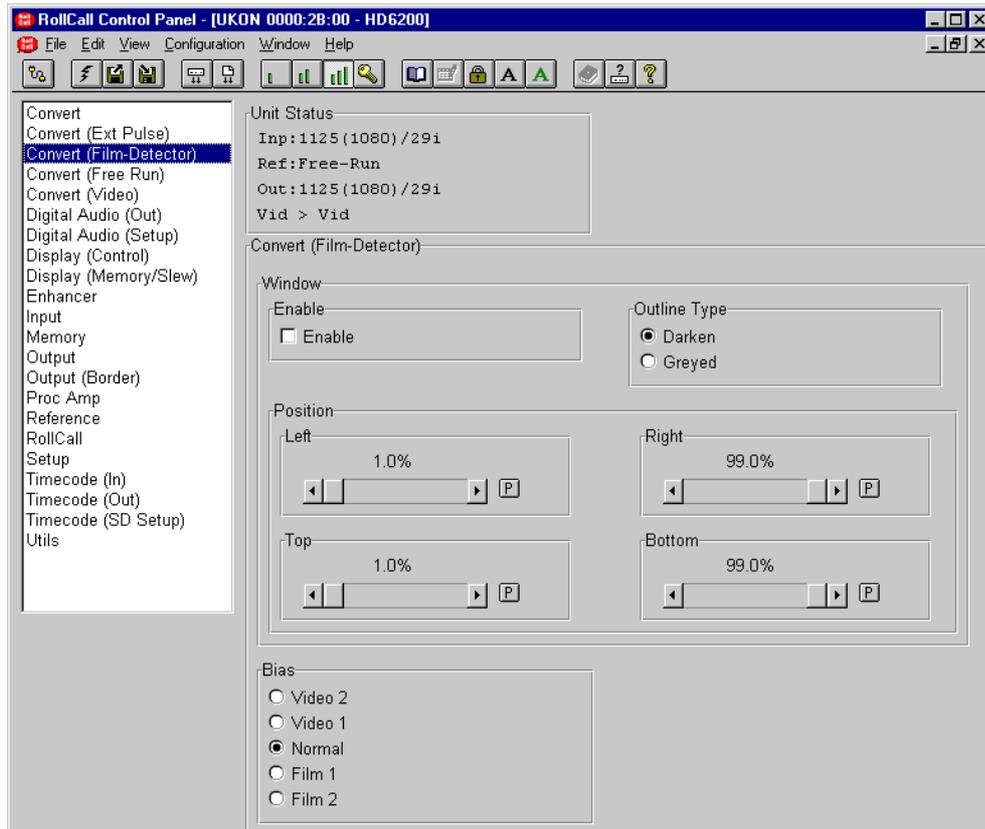
Selects a pulse that is active HI during a new or repeat field. Negative

Selects a pulse that is active LO during a new or repeat field.

Pulse Delay

This sets the number of input fields of delay that are applied to the incoming film sequence pulse. This allows the user to set the timing of the pulse so that it matches the incoming video sequence. Thus, if there is a video processing delay between the Telecine and the Ukon then this can be compensated for with this setting. Up to 15 input fields of delay can be applied to the incoming pulse.

Convert (Film-Detector)



This item controls the operation of the internal film sequence detector.

Window

The Ukon film sequence detection circuit operates over a windowed section of the input picture. By default the whole of the input image lies within the window. However, it may be desirable to exclude certain areas of the picture from the window. To facilitate this, the window can be made visible on the Ukon output video so that it can easily be adjusted.

Note, the window is applied to the Ukon input video so it is advisable to have all of the input video visible when making the adjustment. For example, by selecting a full height display (see DISPLAY-PRESETS menu).

Enable

This turns the film sequence window on and off. This should be set to off, except when adjusting the sequence window, or the Ukon output will be incorrect.

Outline Type

This controls the appearance of the sequence window when it is visible.

The options are:

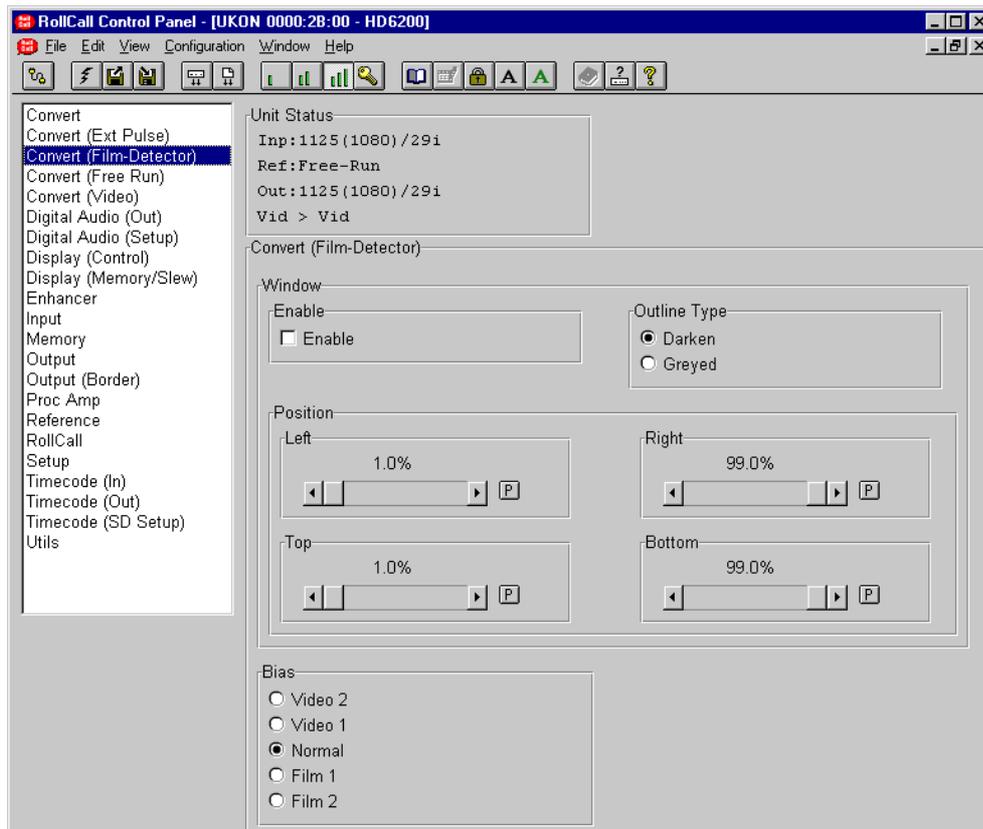
- Darken The gain of video inside the window is reduced.
- Greyed The video inside the window is monochrome.

Position

This controls the position of the film sequence window. The window co-ordinates are expressed as a percentage of the active area.

- Left Adjusts the left-hand edge of the window.
- Right Adjusts the right-hand edge of the window.
- Top Adjusts the top edge of the window.
- Bottom Adjusts the bottom edge of the window.

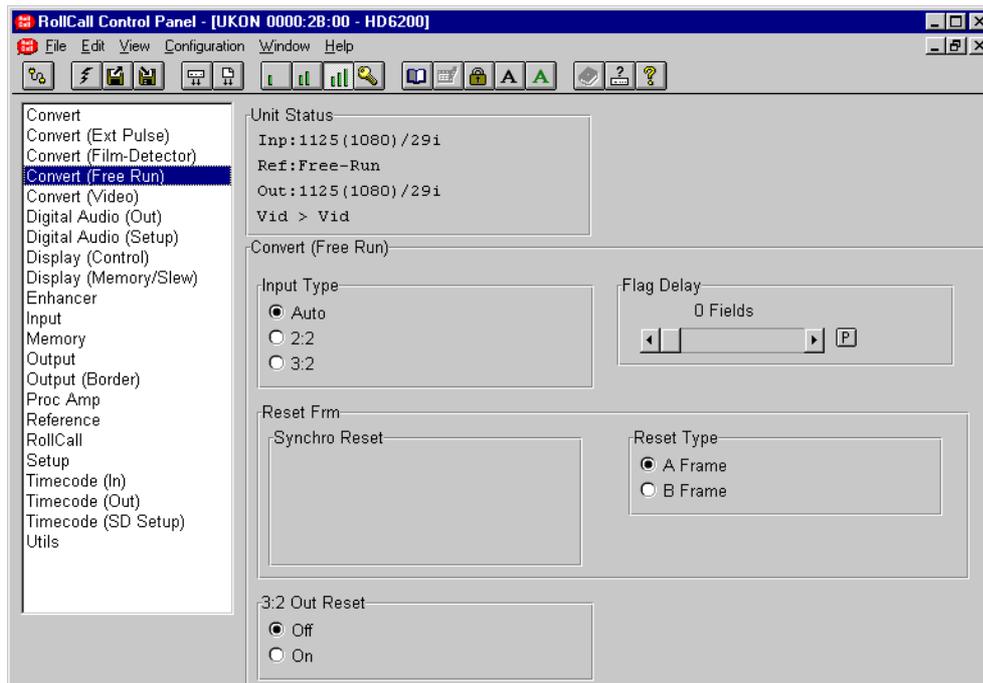
Convert (Film-Detector) continued



Bias

This item adjusts the bias of the internal film sequence detector. This should not normally be necessary, the Normal setting works well on most material. However, on difficult material it can be used to steer the detector towards the correct answer. If the bias is adjusted towards video it is more likely to detect orphan fields. If the bias is adjusted away from video and towards film it is less likely to generate orphan fields and more likely to generate repeat fields.

This can be particularly useful on Varispeed material. If the playback speed is high then the detector can be adjusted towards video to help find any orphan fields. If the playback speed is low then the detector can be adjusted towards film to help find any extra repeat fields. The default setting is Normal. Video 1 adds a small bias towards finding orphan fields. Video 2 adds a larger bias towards orphan fields. Film 1 adds a small bias towards repeat fields. Film 2 adds a larger bias towards repeat fields.

Convert (Free Run)**Free Run**

These items are used to set up the internal free running **input** film sequence generator and, the **output** internal 3:3 sequence generator.

Input Type

This sets up the internal input film sequence generator.

- Auto The Ukon will use the input video standard to determine the free running sequence type.
- 2:2 The free run generator is forced to make 2:2 (sF) film sequence.
- 3:2 The free run generator is forced to make 3:2 film sequence.

Reset Frm

This sets up the reset phase of the internal **output** 3:2 film sequence generator if the 3:2 RESET menu item above has been set top ON.

- A Frame When the internal output 3:2 generator is reset it makes an A Frame.
- B Frame When the internal output 3:2 generator is reset it makes an B Frame.

If the Ukon is Timecode Synchro Mode then the following two additional menu items will be available. These items are not available in any other timecode synchronizing mode.

C Frame When the internal output 3:2 generator is reset it makes a C Frame.

D Frame When the internal output 3:2 generator is reset it makes a D Frame.

3:2 Out Reset

This sets up the internal output 3:2 film sequence generator. If the Ukon internal 3:2 sequence generator is in use (in conversion modes Video>3:2, Film>3:2, sF>3:2 and 1:1>3:2) then the phase of the 3:2 generator can be reset using the input and output timecode values.

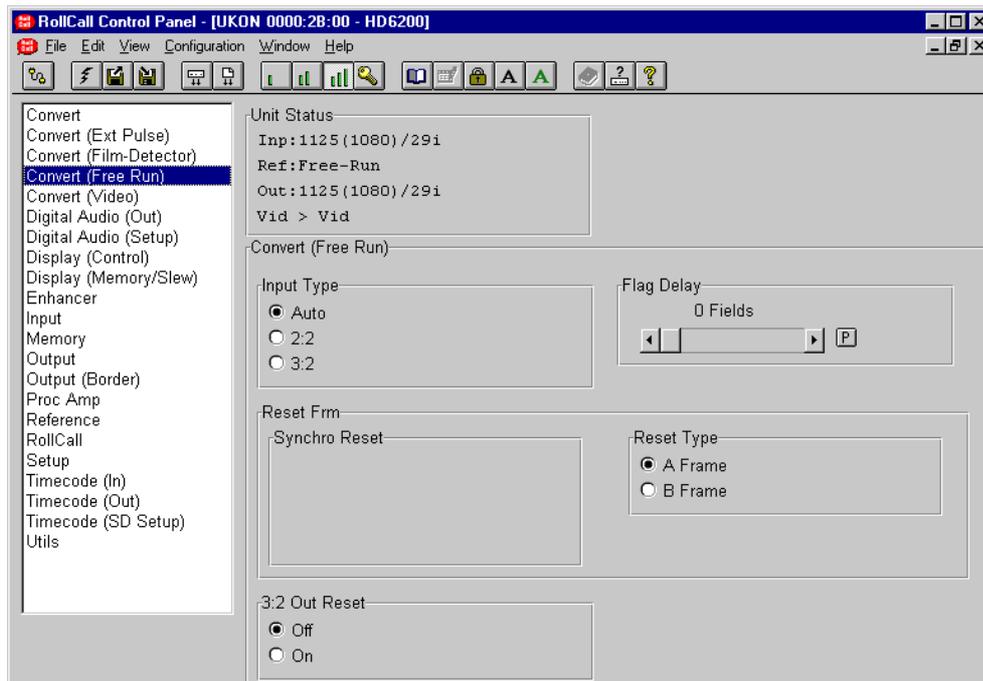
Off

The internal 3:2 sequence generator cannot be reset by timecode.

On

The internal 3:2 sequence generator can be reset by timecode.

Convert (Free Run) continued

**Flag Delay**

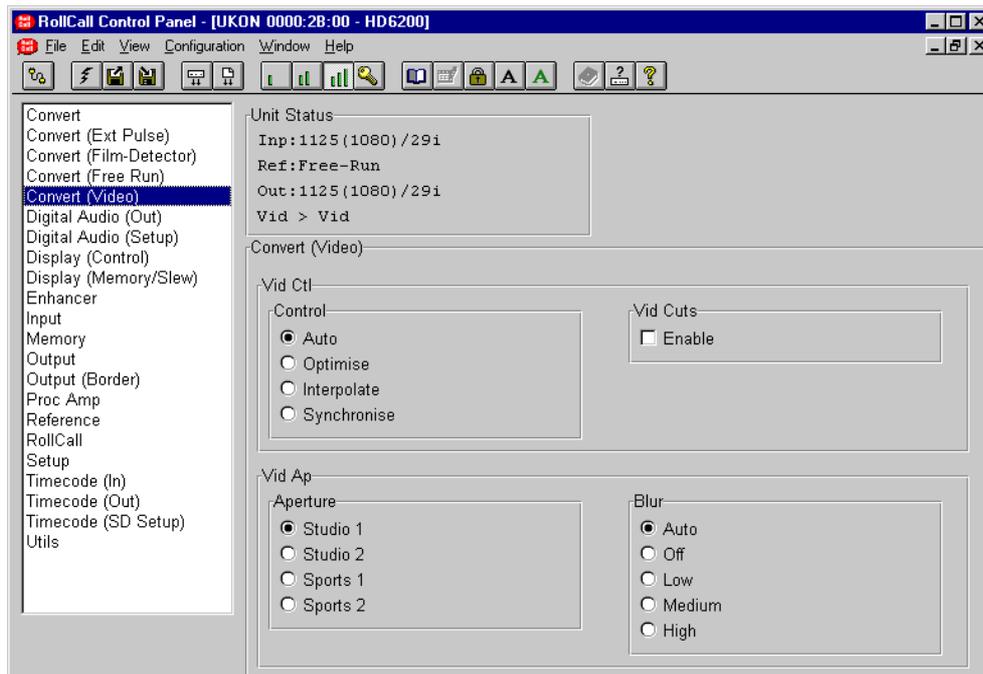
This is used to align the free running film sequence pulse with the incoming video. The adjustment represents the number of fields of delay applied to the free running pulse train.

This is used to align the free running film sequence pulse with the incoming video. The adjustment represents the number of fields of delay applied to the free running pulse train.

If the free running pulse is of 3:2 type then the correct delay will be a value between 0 and 4 fields inclusive. If the pulse is of 2:2 type then there are only two possible phases. Thus setting the delay to 0,2 or 4 produce one phase and setting the delay to 1 or 3 produces the alternate phase.

Note that this setting has effect when the flag source is set to Free Run, Timecode (Trig) or Timecode (0 & 5).

Convert (Video)



Vid Ctl (Video Control)

The following menu items are all related to the temporal conversion of video (not film) based signals. The Ukon contains a video synchronizer for conversions where the input and output field rates are not locked together. These settings also affect the way that the synchronization is performed.

The options are as follows:

- Auto** Selects Synchronise mode when the input and output field rates are the same and optimise mode when they are different.
- Optimise** The unit operates as in the Synchronise mode but monitors the amount of slippage between the input and output timing. When the slippage exceeds a preset value the unit performs an interpolation to move to the next available minimum blur temporal position. The effect of this is to give the same high performance as the Synchronise mode but without periodically discarding or repeating a field; for example, in 59.94 to 60Hz mode only about half a second of interpolation occurs in every 16 seconds. However, because of the system used, the video delay through the machine can vary by up to plus or minus half a field.

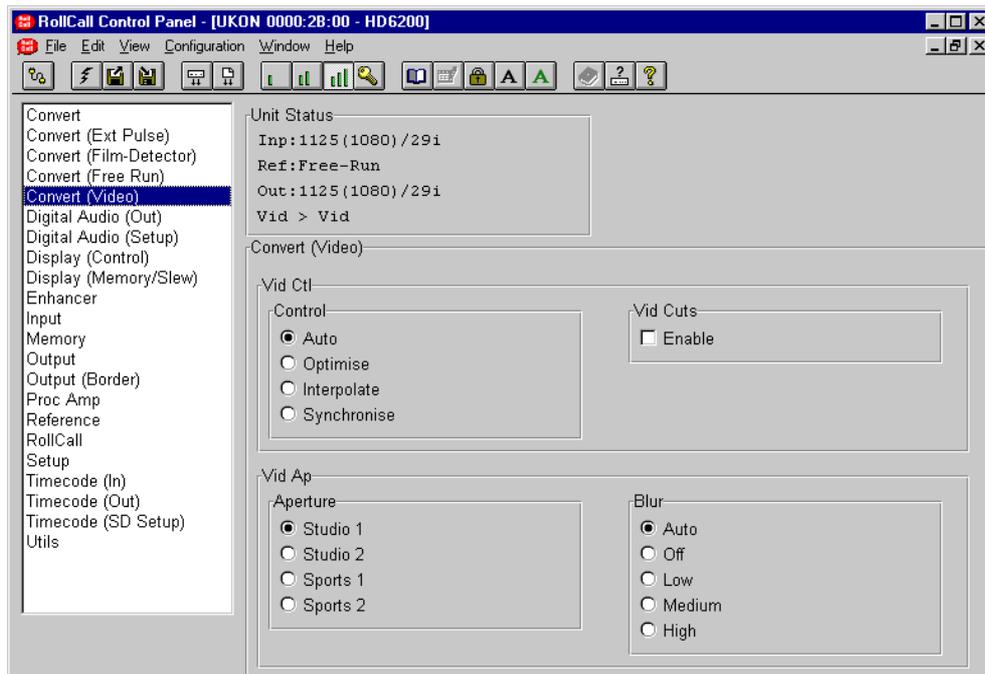
Interpolate The output is always interpolated from the input. This will give the smoothest output but at the expense of potential blurring of moving objects.

Synchronise Gives the highest performance with minimum output blurring. If the input and output field rates are not identical it can cause field drops or repeats which may have the effect of causing moving objects to judder.

Vid Cuts (Video Cuts)

If VIDEO CUTS are enabled then an internal scene change detector is employed to try and ensure that interpolation is not done across scene changes. Note that this setting only affects the performance if the Ukon is in a video input mode. i.e. Video > Video, Video > sF or Video > 3:2.

Convert (Video)



Vid Ap (Video Aperture)

The video aperture control varies the temporal filter shape. The options are:

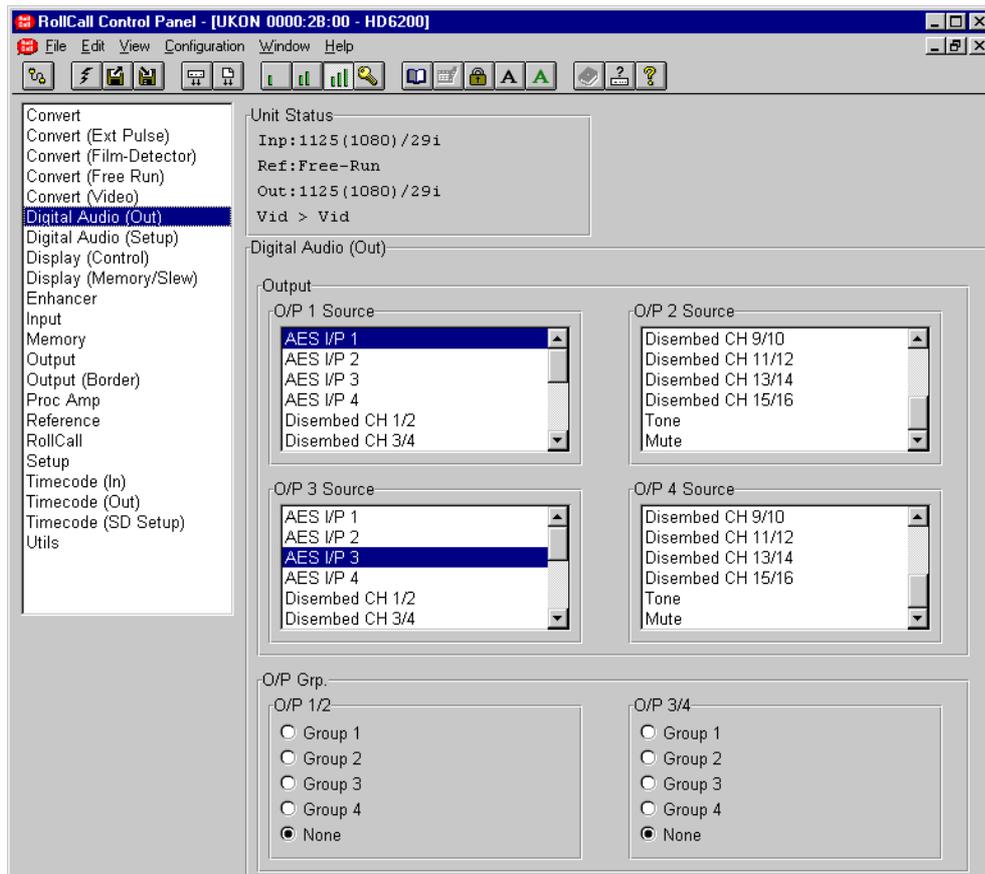
- Studio 1 The most diffuse temporal aperture. Useful for stills and slow-moving video with fading cuts.
- Studio 2 ↓
- Sports1 ↓
- Sports 2 The sharpest temporal aperture. Appropriate for fast-moving material with fast pans and field-based cuts, etc.

Blur

The blur control adjusts the amount of temporal low pass filtering applied to the video input. This can be used to adjust the output picture temporal sharpness to achieve the desired look. This control can also be useful for conversions such as Video>sF and Video>3:2. For some combinations of input and output standards (e.g 525/59.94 in and 1080/23sF out) the conversion can produce undesirable low frequency beat frequencies on the output. These can be reduced by increasing the Blur setting to Medium or High.

- Auto The Ukon uses the input and output standards to determine the optimum blur setting. This will give the best result for most conversions.
- Off The minimum possible amount of blur is produced.
- Low, medium, High These have gradually increasing amounts of blur.

Audio (Out)



Output

This selects the source for the selected output channel.

The options for each source are:

- | | | |
|-------------------|---|---|
| AES I/P 1 | } | Inputs from rear panel |
| AES I/P 2 | | |
| AES I/P 3 | | |
| AES I/P 4 | | |
| Disembed CH 1/2 | } | Input from embedded audio in programmes |
| Disembed CH 3/4 | | |
| Disembed CH 5/6 | | |
| Disembed CH 7/8 | | |
| Disembed CH 9/10 | | |
| Disembed CH 11/12 | | |
| Disembed CH 13/14 | } | A 1kHz test tone |
| Disembed CH 15/16 | | |
| Tone | | |
| Mute | | Silence |

Output Group.

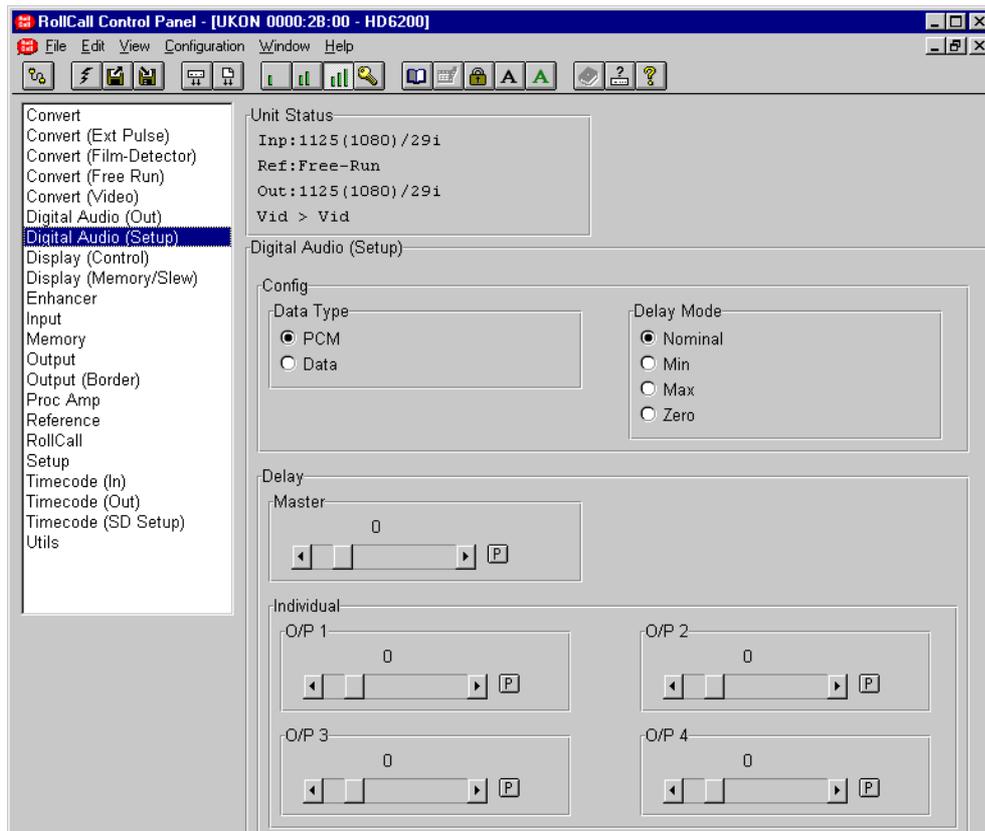
For the embedded outputs this selects the group to embed the pair on.

Options are:

- Group 1
- Group 2
- Group 3
- Group 4
- None

Note - embedded audio is not available for slow PAL video standards. (625/24sF and 625/23sF). Thus, if the input is slow PAL, embedded audio input is not possible. If the output is slow PAL, embedded audio output is not possible. The AES/EBU audio inputs and outputs are however always available.

Audio (Setup)



This screen is used to control all the Ukon functions related to the audio processing blocks.

Note that if this option is not fitted the display will show the words "Feature not fitted"

There are four stereo pair processing blocks that may be assigned to any four of the input and output groups.

Config

Individual or group control of the audio delay of the embedded or AES audio paths is possible.

PCM This mode should normally be selected. Audio rate conversion is used to accommodate differing input and output video/audio rates

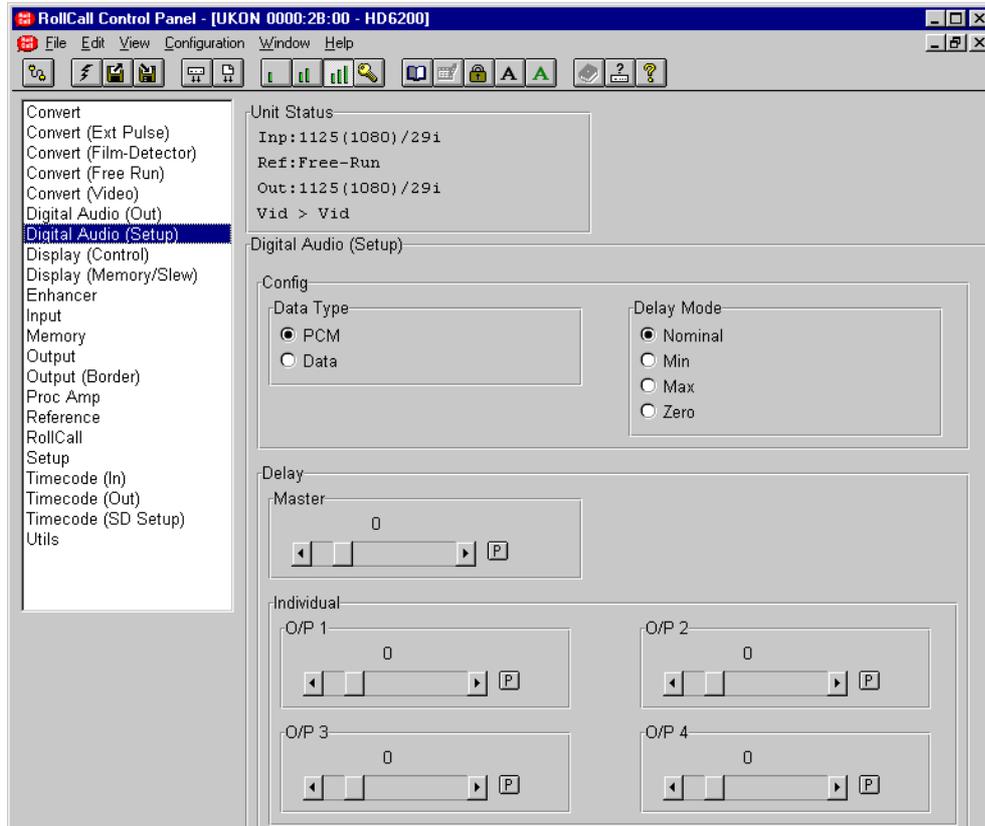
Data

In this case the audio is treated as a data stream that cannot be rate converted. This is useful if the audio is a compressed format such as Dolby-E. Because the audio is not rate converted this mode will only work if the input and output audio clocks are locked together. This is most easily achieved if the Ukon is genlocked to its video input and, the incoming data stream is also locked to the video input. This can also be done by locking the Ukon to an external reference that also drives the audio source.

Note that if the embedded audio input channels are being used, the embedded audio must also be synchronized to the input video. If the AES audio inputs are in use, the input audio need not be locked to the input video but, it must be locked to the Ukon output video.

If the audio contains a mix of PCM and Data channels then the Ukon should be put into data mode and, both the data and PCM audio input channels should have their audio clocks locked to the Ukon output.

Audio (Setup) continued



Delay Mode

Used to control the delay applied to the audio as it passes through the machine. The audio delay applied comprises two components; the machine automatic delay which compensates for the delay in video processing, and any additional delay the user wishes to apply to compensate for upstream or downstream video processing delays.

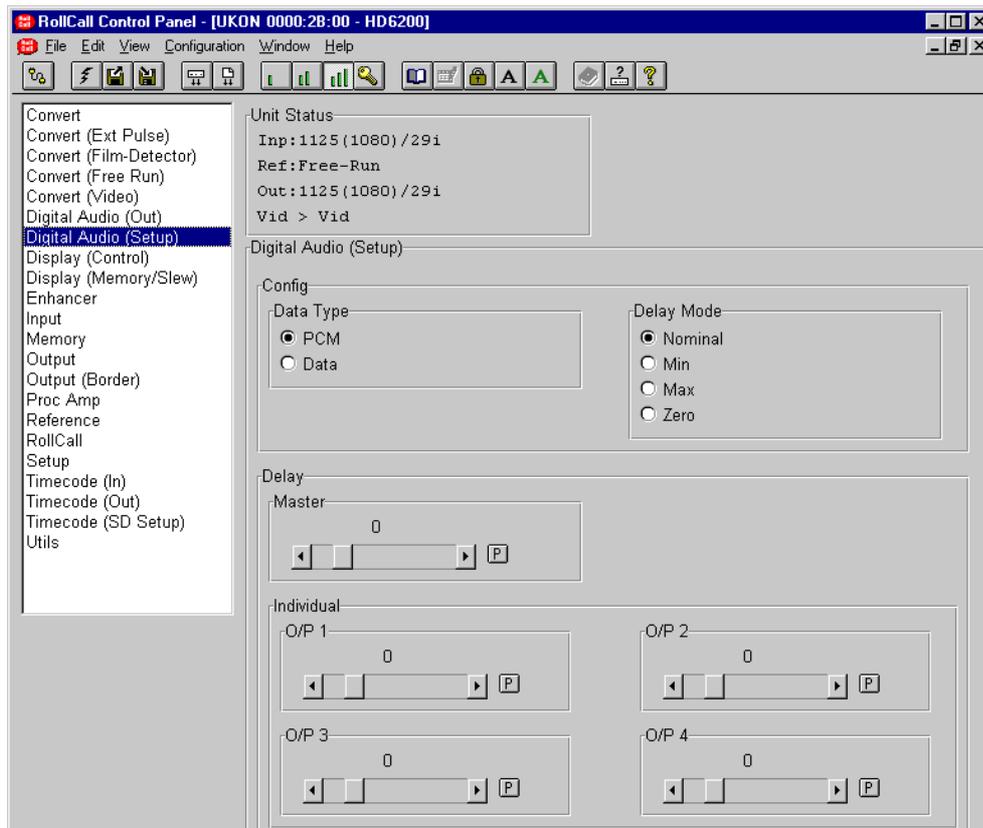
Delay Mode (continued)

This item controls the way in which the automatic audio delay works. The video delay through the machine depends on many variables. If the unit is not running with its input and output locked together then the processing delay may be variable – if the unit is in Synchronise or Optimise mode.

The options are:

- Nominal The automatic audio delay is set to the nominal value for the conversion being undertaken. This is the average video delay that can be incurred. This will be the same as the actual video delay for conversions that have the input and output frame rates locked together and, the vertical genlock timing set so that the output and input vertical syncs are roughly co-timed.
- Min The audio delay is set to the minimum video processing delay that can be incurred for the conversion being undertaken.
- Max The audio delay is set to the maximum video processing delay that can be incurred for the conversion being undertaken.
- Zero The audio delay is set to zero and the user can set the entire audio delay using the AUDIO – MAN DEL menu

Audio (Setup) continued



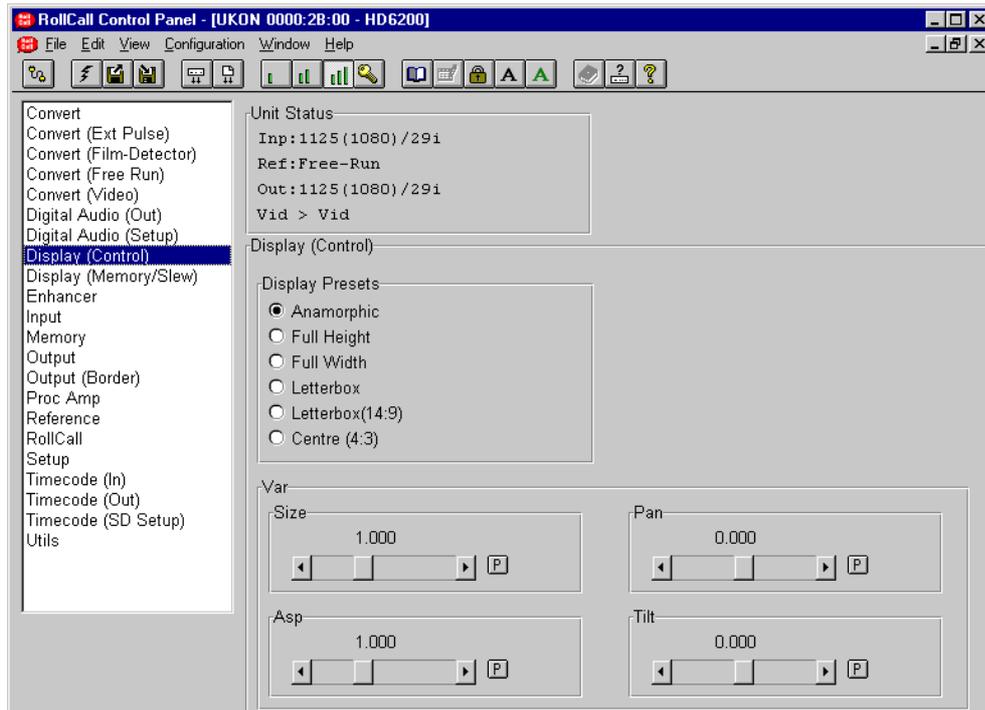
Delay

The audio channels (AES or embedded) may be delayed either individually or via a master control that is added to the individual settings.

This allows the user to apply a manual offset to the audio delay setting. This offset can be positive or negative, thus allowing the user to increase or decrease the audio delay as required. The audio delay offset is added to the automatic audio delay to provide the total audio delay.

The audio delay range when the automatic audio delay mode is set to ZERO is 0 to 500ms. The actual audio delay applied is the sum of the automatic delay and the manual delay. For example, if the automatic delay works out to be 64ms the manual delay range will be -64ms to 436ms.

Display Control



This item is used to control the size, shape and position of the output picture.

Presets

This allows selection of the preset display sizes.

The options are:

- Anamorphic** This setting retains all picture information from the input and passes it to fill the output image regardless of the aspect ratio conversion. This means that 16:9 to 4:3 conversions will appear squeezed horizontally.
- Full Height** For 4:3 to 16:9 aspect ratio conversions only. Produces a 4:3 output with all input picture information retained and blanked columns to the left and right of the image.
- Full Width** Produces a 16:9 output. The whole output screen is filled and information at the top and bottom of the input image may be lost. Used when converting a 4:3 image to a 16:9 display when it is necessary to fill the entire output display.
- Letterbox** For 16:9 to 4:3 aspect ratio conversions only. To maintain the correct shape of objects on the 16:9 input, this displays the 16:9 picture as a strip across the centre of the 4:3 display.

Letterbox (14:9) For 16:9 to 4:3 aspect ratio conversions only. To display as large a picture as possible without losing too much of the 16:9 picture, the sides are cropped slightly.

Centre (4:3) For 16:9 to 4:3 aspect ratio conversions only. To maintain the correct shape of objects on the 16:9 input, this setting retains all vertical detail but crops the left and right edges of the image.

For more details please see page 4.16.

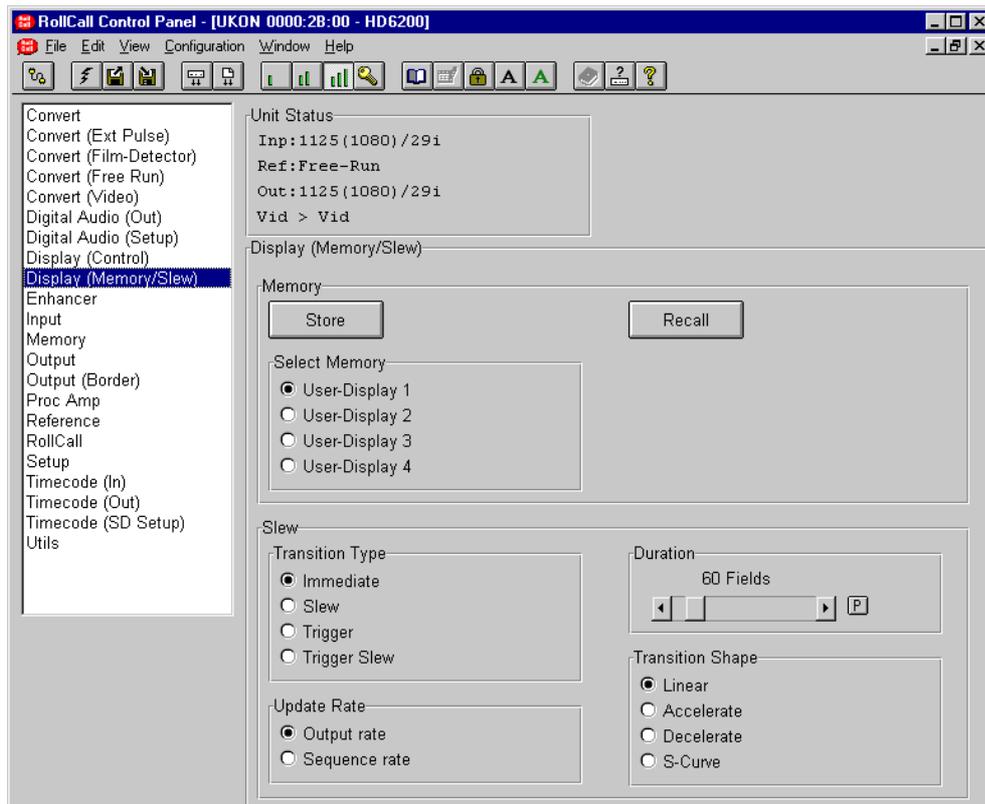
Var

This allows the picture size, shape and position to be adjusted to meet custom requirements.

The options are:

- Size** This adjusts the size of the whole image. Both vertical and horizontal size change together while maintaining the aspect ratio of the image.
- Pan** This adjusts the horizontal position of the output image.
- Asp** This adjusts the horizontal size of the image, allowing the shape (aspect ratio) of the output image to be changed.
- Tilt** Adjusts the vertical position of the output image.

Display (Memory/Slew)



Memory

This item is used to store and recall the various User Display memories. There are four User Display memories available in each of the eight machine memories. Each User Display memory contains the Size, Aspect ratio, Pan and Tilt parameters of the image.



Selecting this item will store the settings in the selected User Display memory location.



Selecting this item will recall the settings from the selected User Display memory location.

Slew

This controls the method and the timing of a picture size change.

If Slew is not zero and there is no trigger, when a change of aspect ratio is made it will slew from one to another with the specified profile and duration. This will also occur if another memory is selected, which has a different aspect ratio.

Transition Shape

Selects the “shape” of the transition.

The options are:

- Linear The rate of change of the picture parameters is constant throughout the transition.
- Accelerate The rate of change of the picture parameters increases throughout the transition.
- Decelerate The rate of change of the picture parameters decreases throughout the transition.
- S-Curve The rate of change increases and then decreases as the transition progresses.

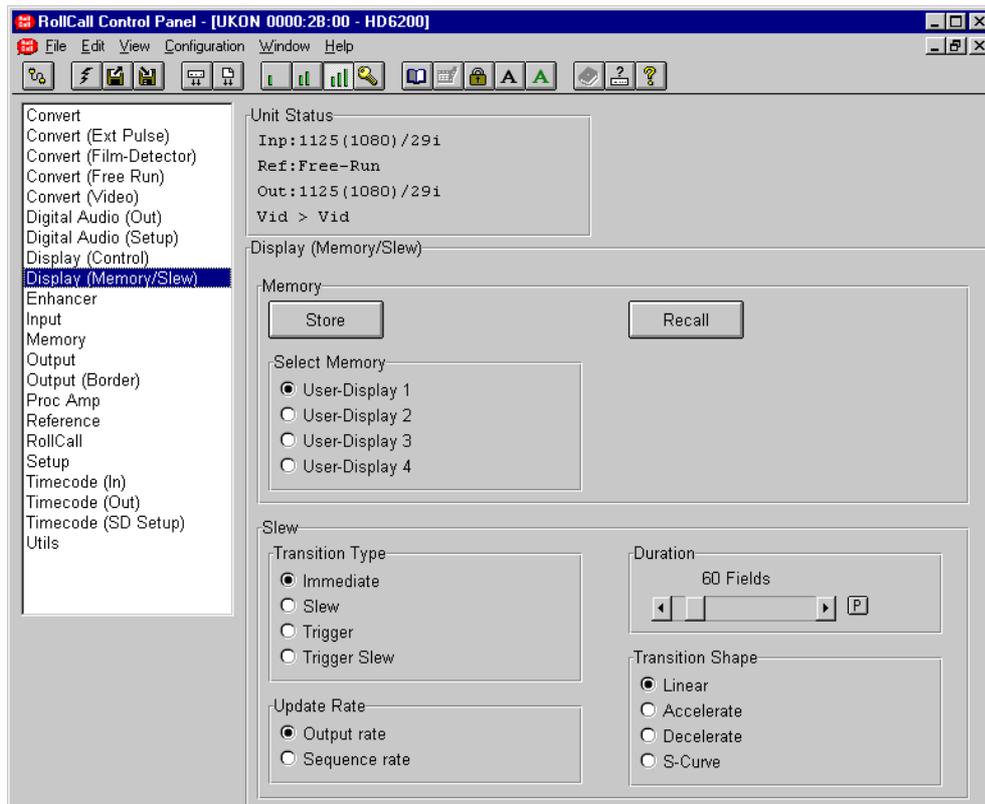
Duration

This sets the duration of the transition in fields or frames if the output video standard is interlaced or progressive respectively.

Update Rate

For details please see [page 4.19](#).

Display (Memory/Slew) continued



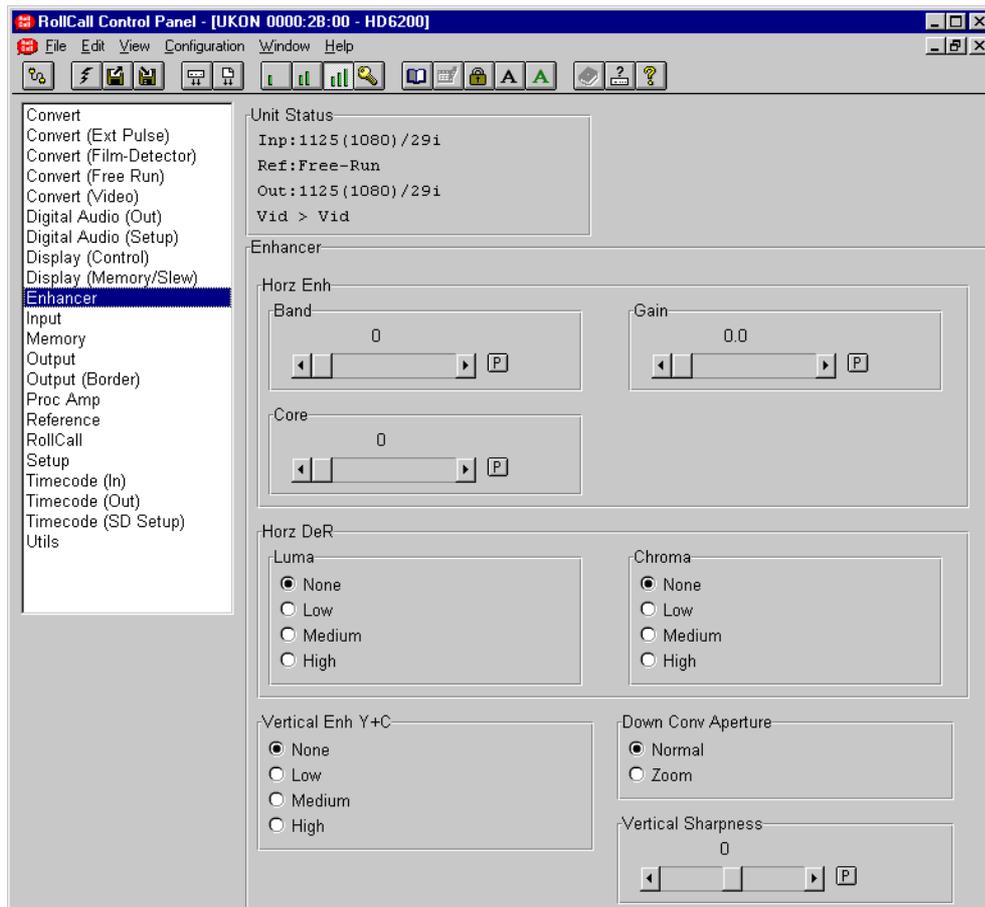
Transition Type

Selects the type of transition that will be performed. Options are:

- Immediate Transition from one picture size to another is instantaneous.
- Slew Transition from one picture size to the next occurs at a speed set by the DISPLAY-SLEW-DURATION menu and follows a profile set by the DISPLAY-SLEW-PROFILE menu.
- Trigger Transition from one picture size to the next only occurs when a trigger command is sent down one of the remote control channels. Multiple picture parameters can be set in advance and then activated using a single trigger command. Note that if trigger mode is selected then adjusting the picture size, shape or position from the front or remote control panel will have no effect unless a trigger command is received. Trigger mode causes an immediate transition to the next picture size.

Trigger Slew Trigger Slew works the same as Trigger mode (above) but, instead of an immediate transition to the next picture size the transition is slewed at a speed set by the DISPLAY-SLEW-DURATION menu.

Enhancer



This function allows various enhancements to be applied to the picture.

Horz Enh (Horizontal Enhancement)

This controls the high frequency horizontal information to make the output pictures appear sharper. Options are:

Band Selects which frequency band within the picture is enhanced, 0 corresponds to lowest frequency band, 3 is the highest.

Gain The amount of gain applied to the band selected for enhancement before the coring process.

Core Used to reject signals below the selected threshold before addition to the original signal. This has the effect of preventing the enhancement process from amplifying noise.

Horz DeR (Horizontal De-Ring)

This controls the de-ringing filters for both luminance and chrominance. Options are:

- None
- Low
- Minimum de-ring
- Medium
- High
- Maximum de-ring



Vertical Enh Y + C (Vertical Enhancement)

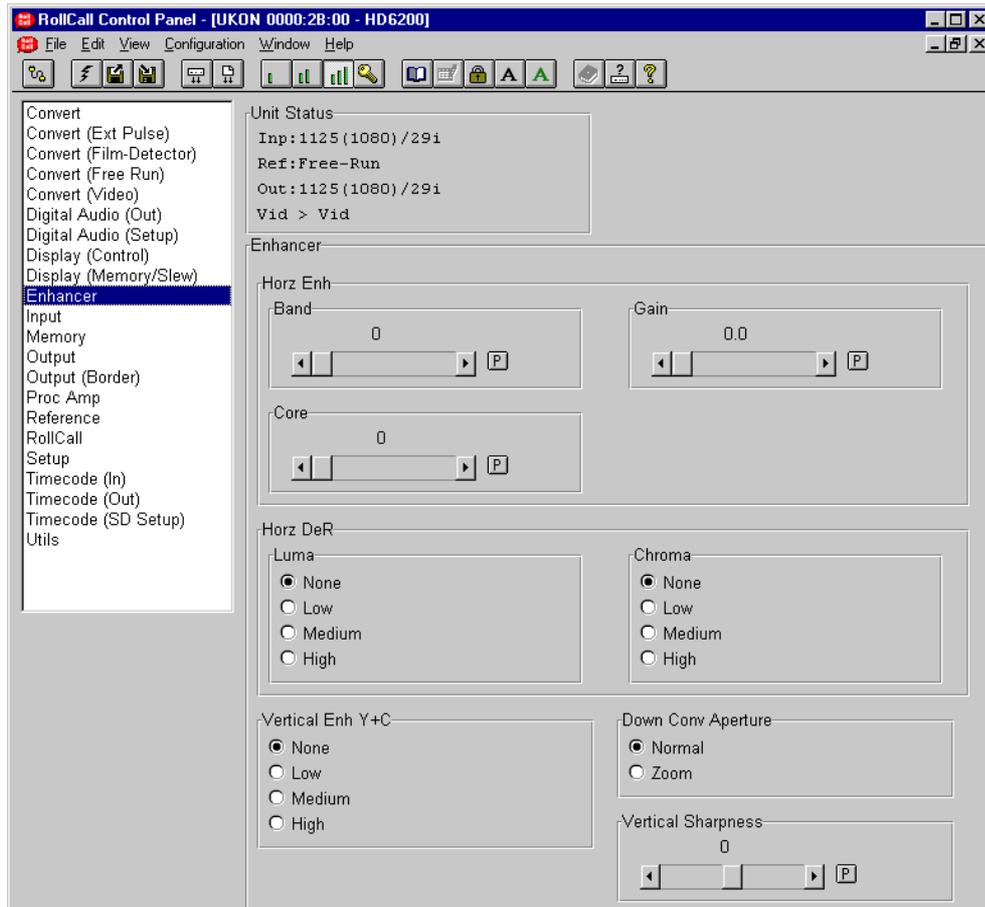
This controls the detail processing in the vertical filters.

The enhancer adjusts the levels of high frequency vertical information for luminance and chrominance together to make the output pictures appear sharper or softer. Options are:

- None
- Low
- Minimum enhancement
- Medium
- High
- Maximum enhancement



Enhancer continued



Down Conv(ert)er) Aperture

This selects the horizontal filter used when the Ukon is being used as a down-converter i.e high definition video in, standard definition video out.

Normal This selects an aperture that has been optimized for the normal range of down-conversions. This setting will give the best results under most circumstances.

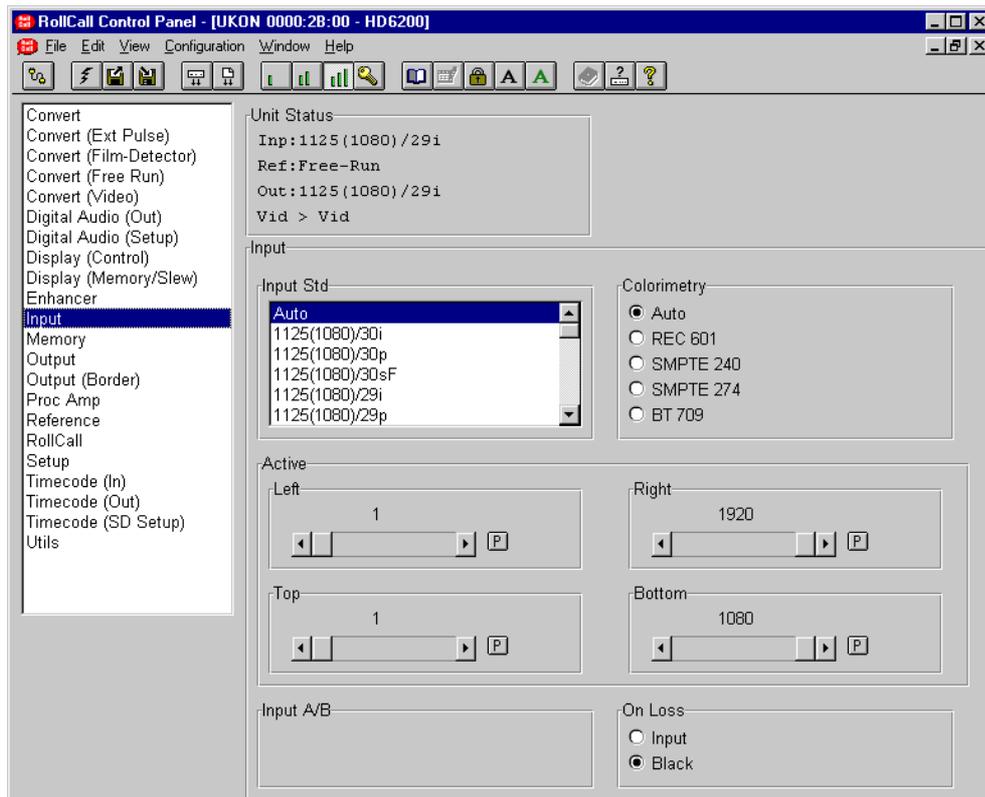
Zoom This aperture can be used if a very large horizontal zoom has been applied by the Ukon. e.g. if the ASP control (see DISPLAY -VAR-ASP menu setting) has been set to the maximum value. Choosing the Zoom aperture under these circumstances can provide increased horizontal resolution at the output of the Ukon.

Vertical Sharpness

This controls the vertical sharpness of the Ukon output pictures.

For more details please see [page 4.9](#)

Input



This screen is related to the input signal selection and control.

Note that for this and other screens the following applies:

The **P** symbol represents the Preset function and will return the function to the default setting.

The and symbols at the ends of the scroll bar allow the value to be adjusted in discrete steps.

The value will be shown above the scroll bars.

Input Std (Input Standard)

This allows the standard of the input video to be selected.

The standards are named using the convention: - total number of lines (active lines)/ frame rate.

The options are:

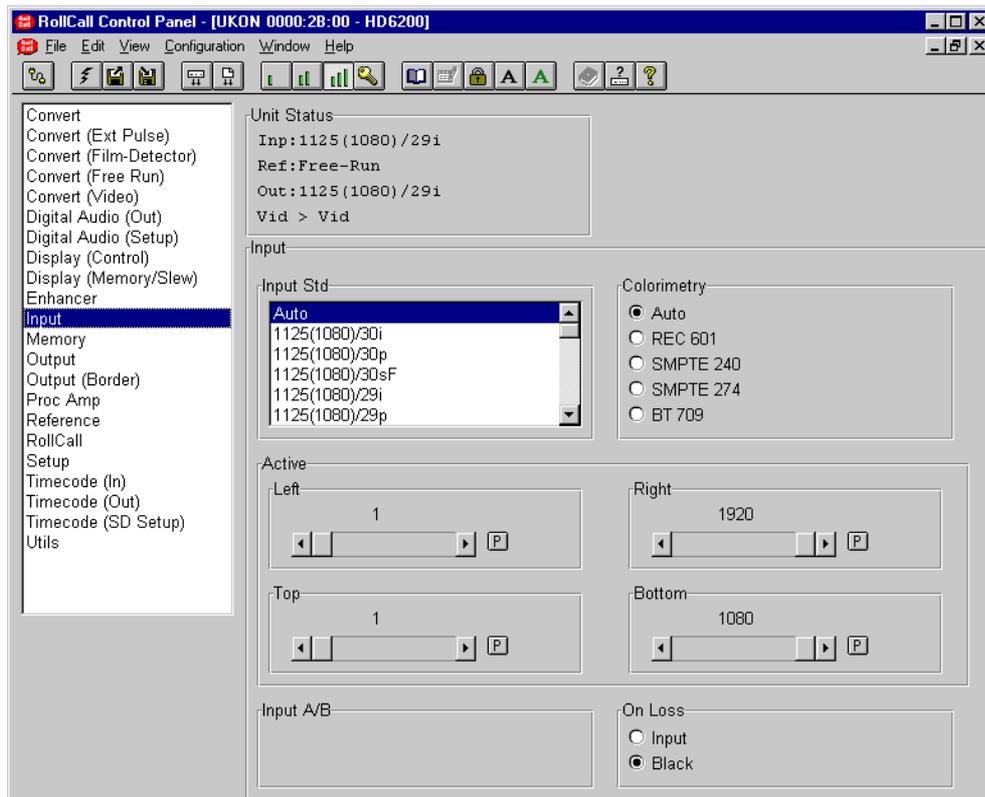
Auto	The machine automatically determines the input video standard.
750(720)/60p	1125(1080)/30i
750(720)/59p	1125(1080)/30p
750(720)/50p	1125(1080)/30sF
750(720)/30p	1125(1080)/29i
750(720)/29p	1125(1080)/29p
750(720)/25p	1125(1080)/29sF
750(720)/24p	1125(1080)/25i
750(720)/23p	1125(1080)/25p
750(576)/50p	1125(1080)/25sF
750(480)/60p	1125(1080)/24p
750(480)/59p	1125(1080)/24sF
525(480)/29i	1125(1080)/23p
625(576)/25i	1125(1080)/23sF
625(576)/24sF	1125(1035)/30i
625(576)/23sF	1125(1035)/29i

} Forces the input to the selected standard

Note - not all the listed standards may appear on the list, as they may not be available if the appropriate Ukon option is not fitted.

The selected standard will appear on the first line of the Unit Status area.

Input



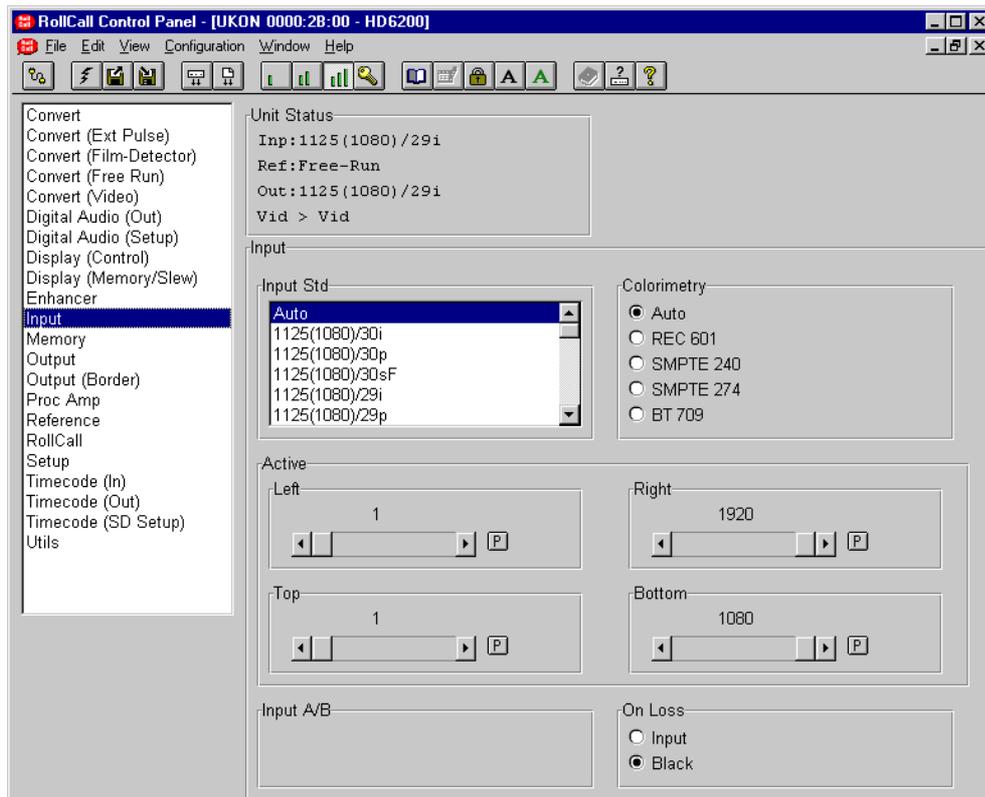
Matrix

This allows the colorimetry on the input signal to be set.

The color correction options are:

- Auto Automatically selects the colorimetry most appropriate for the output video standard.
- REC 601 Colorimetry to REC 601 requirements is applied.
- SMPTE 240 Colorimetry to SMPTE 240 requirements is applied.
- SMPTE 274 Colorimetry to SMPTE 274 requirements is applied.
- BT709 Colorimetry to BT709 requirements is applied.

Input (continued)



Active

This function allows adjustment of input blanking. It is used where the source video is known to have pixels/lines at the edge of the picture that are not required to be displayed. When set, the machine will blank any output data generated by the input data, regardless of the display control settings.

Note that the Ukon keeps a separate record of input blanking for each distinct input active picture raster.

The settings are as follows:

Left Adjusts the left-hand edge of blanking. A setting of 1 indicates that no input pixels that are normally visible should be blanked, 2 causes the first input pixel to be blanked, etc.

Right Adjusts the right-hand edge of blanking. A value equal to the number of active pixels per line in the current input standard indicates that no input pixels that are normally visible should be blanked. Subtracting 1 from this causes the last input pixel to be blanked, etc.

Top

Adjusts the top edge of blanking. A setting of 1 indicates that no input lines that are normally visible should be blanked, 2 causes the first input line to be blanked, etc.

Bottom

Adjusts the bottom edge of blanking. A value equal to the number of active pixels per line in the current input standard indicates that no input lines that are normally visible should be blanked. Subtracting 1 from this causes the last input line to be blanked, etc.

Input A/B

This allows the selection of a serial input.
Note - this menu item will not be visible if the Ukon is not fitted with two serial inputs.

On Loss

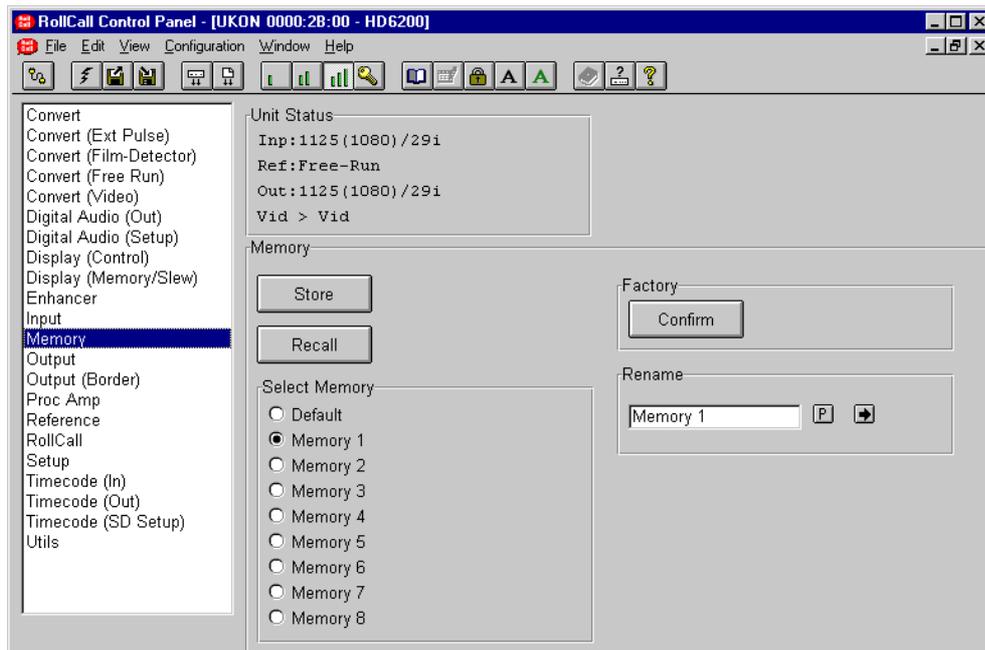
This controls the system response to a loss of input signal.

The options on loss of signal are:

Input The incoming signal will be displayed whenever possible.

Black The output will cut to black

Memory



This item is used to store and recall the various system Memories. There are eight system memories available. Each memory contains a complete record of the machine settings (including the display memory settings).

The current machine setting is stored in the system memory. This will be recalled on powering-up (it can't be recalled by the user). If the user recalls a user-memory, its setting will be copied to the system memory, i.e. the previous system setting gets lost. All machine settings, except of the following, can be stored to / recalled from individual user memories:

Status of "action buttons" (like "Store", "Rename", "Recall") are not stored in any memory

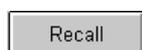
System status like temperature, Timecode etc. are not stored in any memory

The names of memories, the selection of current memory, the GPI enable selection, the RollTrack addresses and the service controls are only stored on a system base (i.e. they don't change on recalling a user-memory).

Input and output active values are remembered for the last standard selection while the unit is powered on.



Selecting this item stores the system settings in the memory selected.



Selecting this item changes the system settings to those stored in the memory selected.

The memory options are:

- Default
- Memory 1
- Memory 3
- Memory 5
- Memory 7
- Memory 2
- Memory 4
- Memory 6
- Memory 8

The Default memory can only be recalled, it cannot be stored. When the Default memory is recalled, all the unit settings are restored to the factory default values. The other memory contents are however left untouched.

Factory

This allows the machine to be set back to the factory defaults state. In this case all settings are put back to their factory preset values. In addition, all machine memories are also set back to the factory default values. This function requires the user to select the confirm button  to ensure that it is not accidentally pressed. To avoid clearing the memory contents, use the Default memory recall described above.

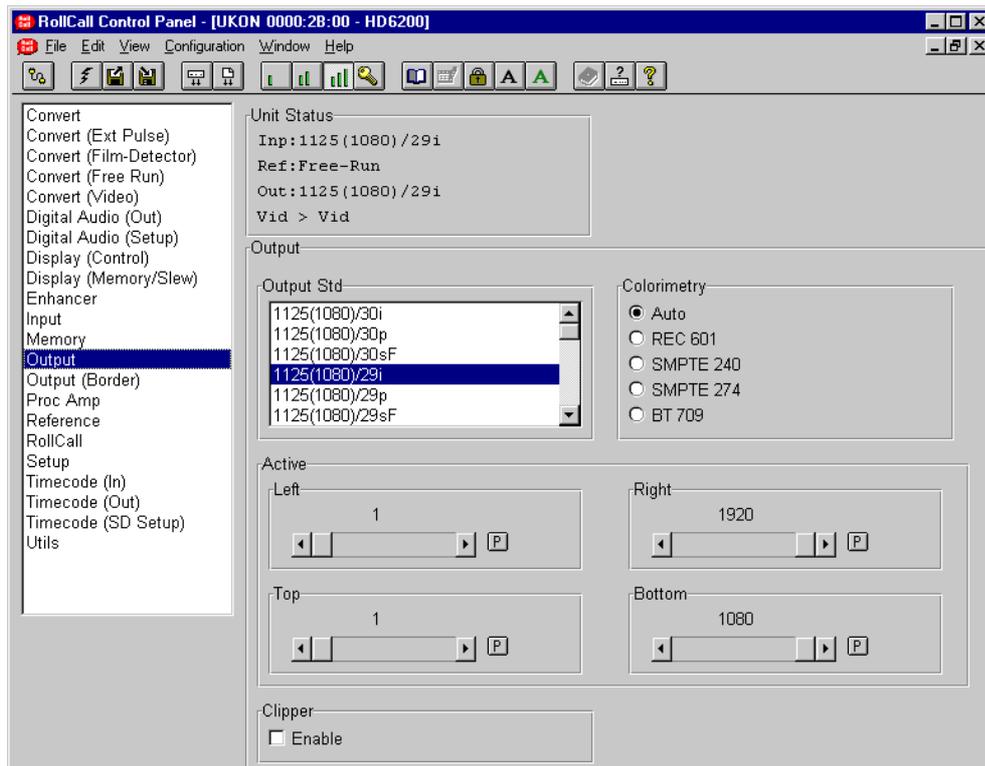
RENAME

The 8 memories may be renamed using the standard edit string dialog.

To change the memory name, type the new name in the text area and then select  (return).

Selecting Preset  will return the text to the default name.

Output



The functions in this screen are all related to the output signal standard and control.

Output Std (Standard)

This allows selection of the output video standard. The standards are named using the following convention: total number of lines, (active lines), frame rate. For an Ukon fitted with High Definition output capability the following standards are available: -

- 750(720)/60p 1125(1080)/30i
- 750(720)/59p 1125(1080)/30p
- 750(720)/50p 1125(1080)/30sF
- 750(720)/30p 1125(1080)/29i
- 750(720)/29p 1125(1080)/29p
- 750(720)/25p 1125(1080)/29sF
- 750(720)/24p 1125(1080)/25i
- 750(720)/23p 1125(1080)/25p
- 750(576)/50p 1125(1080)/25sF
- 750(480)/60p 1125(1080)/24p
- 750(480)/59p 1125(1080)/24sF
- 1125(1080)/23p
- 1125(1080)/23sF
- 1125(1035)/30i
- 1125(1035)/29i

For an Ukon fitted with Standard Definition output capability the following standards are available: -

- 525(480)/29i
- 625(576)/25i
- 625(576)/24sF
- 625(576)/23sF

The selected standard will appear on the third line of the Unit Status area.

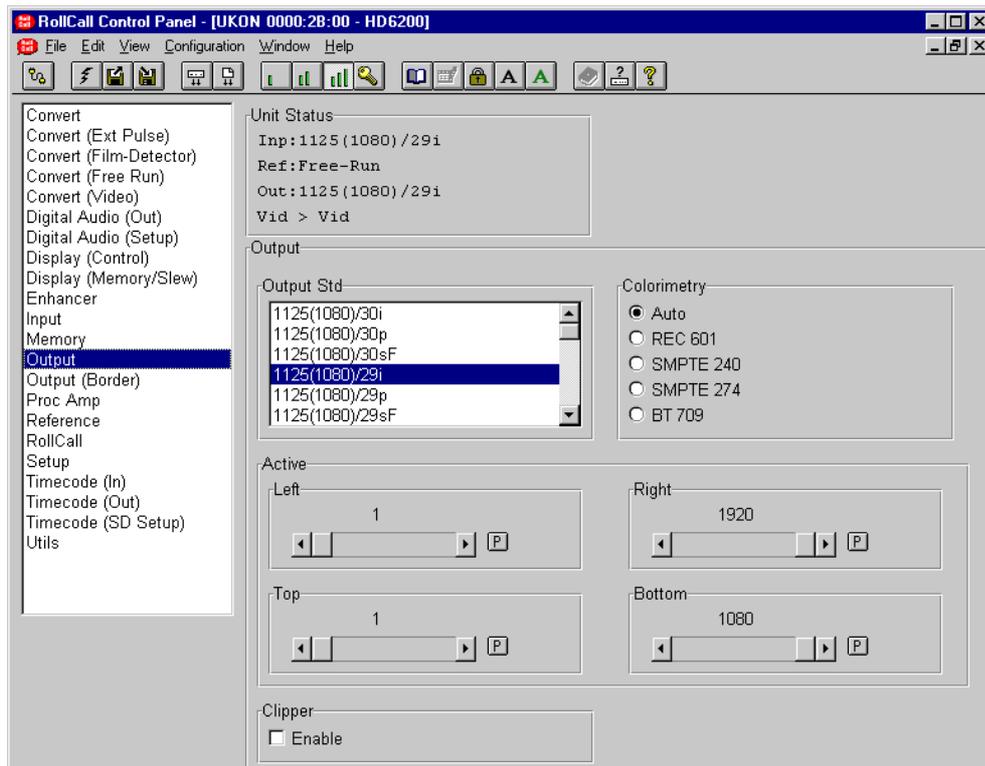
Colorimetry

This allows the colorimetry on the output signal to be set.

The color correction options are:

- Auto** Automatically selects the colorimetry most appropriate for the output video standard.
- REC 601** No color space conversion is applied.
- SMPTE 240 Colorimetry** to **SMPTE 240** requirements is applied.
- SMPTE 274 Colorimetry** to **SMPTE 274** requirements is applied.
- BT709** Colorimetry to BT709 requirements is applied.

Output (continued)



Active

Allows the user to adjust the output blanking. Output blanking is used when it is required that ranges of output lines or pixels are never active. For example, it is possible to impose an artificial letterbox by bringing the top output blanking down and the bottom output blanking up.

Note that the Ukon keeps a separate record of output blanking for each distinct output active picture raster.

Left Adjusts the left-hand edge of output blanking. A setting of 1 indicates that no output pixels that are normally visible should be blanked, 2 causes the first output pixel to be blanked, etc.

Right Adjusts the right-hand edge of blanking. For example, 1920 indicates that no output pixels that are normally visible should be blanked in the 1125(1080)/29I output standard. 1919 causes the last output pixel to be blanked, etc.

Note that the preset value will vary with the output standard as it is equal to the number of active pixels per line.

Top Adjusts the top edge of output blanking. A setting of 1 indicates that no output lines that are normally visible should be blanked, 2 causes the first output line to be blanked, etc.

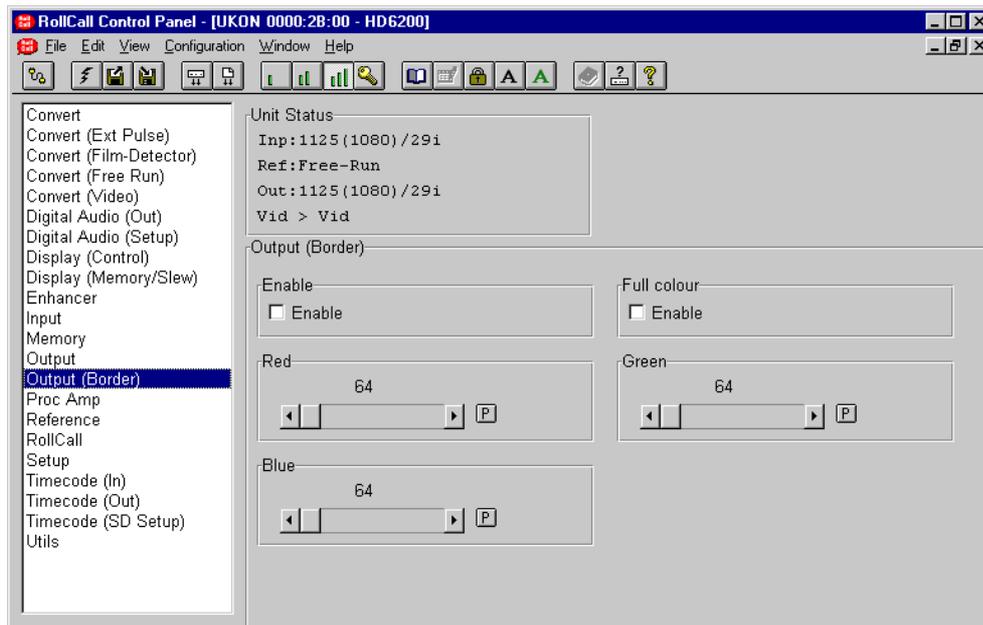
Bottom Adjusts the bottom edge of blanking. For example 1080 indicates that no output lines that are normally visible in the 1125(1080)/29I output standard should be blanked, 1079 causes the last output line to be blanked, etc.

Note that the preset value will vary with the output standard as it is equal to the number of active lines per frame.

Clipper

When the clipper is enabled, the output digital luminance signal is clipped to a maximum of 940 and a minimum of 64. The output digital chrominance signal is clipped to a maximum of 960 and a minimum of 64. These figures are 10 bit video levels.

Output (Border)



This screen allows the user to adjust the appearance of any blanking border around the active picture. By default, the color of any border around the active picture is black. However, the user can adjust this to any desired color.

The border color is controlled by adjusting the amount of Red (R), Green (G) and Blue (B) in the border. The RGB values are displayed as 10-Bit digital video levels.

The default value for all the border colors is 64 which produces a black border. Note also that when the border is enabled and its color adjusted away from black then there is often a black band between the active picture and the color border. This occurs when the active picture does not completely fill the digital active line length of the input standard. To remove this black band the input blanking should be adjusted via the Input-Active menus to match the blanking of the incoming programme material.

Enable

This item turns the border on and off. If the border is not enabled then it will appear black regardless of the settings of the red, green and blue border values.

Full Colour

This controls the behavior of the color border for output standards which do not fill the entire raster. Currently these are 750(480)/60p, 750(480)/59p and 750(576)/50p. In these cases the active picture is transported within a larger raster corresponding to a different output standard. In this instance, if the

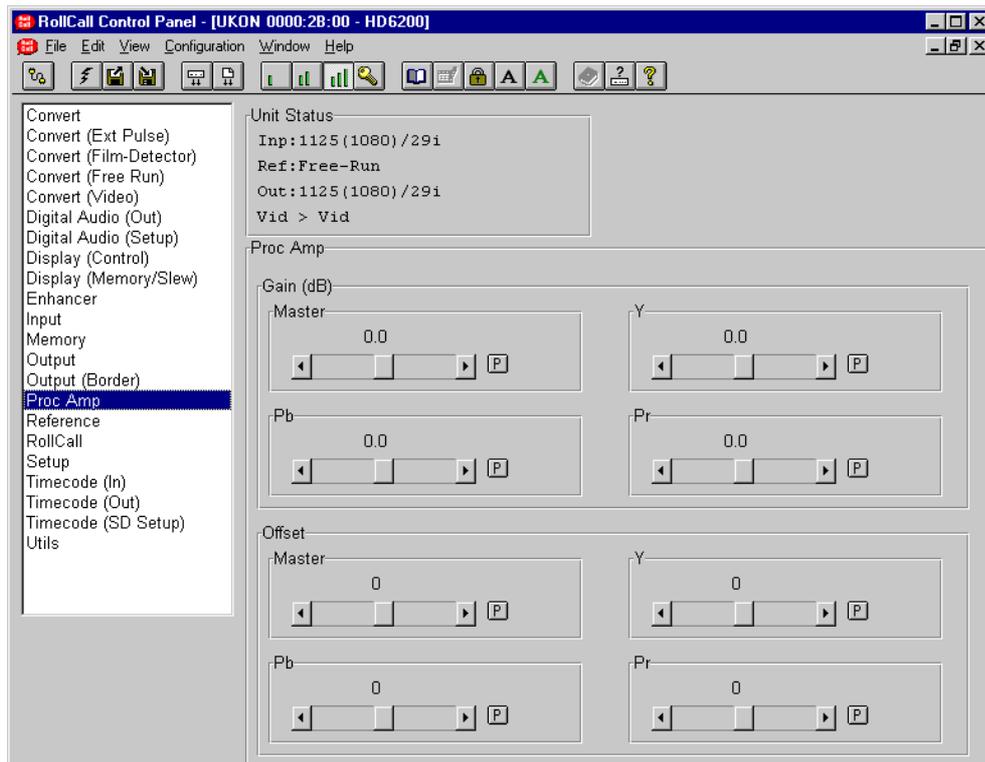
color border is turned on then by default it only extends to the edge of the largest possible active picture for the given output standard. This means that there will be a large black border around the picture (from the edge of the active picture to the edge of the transporting raster). If Full Color is enabled the color border will be extended to the edges of the transporting raster.

Red Adjusts the amount of Red in the border.

Green... Adjusts the amount of Green in the border.

Blue..... Adjusts the amount of Blue in the border.

Proc Amp



This item allows adjustment of the gain and offset of the output video.

Gain

These items allow the user to adjust the gain of the luminance (Y), blue color difference channel (Pb) and the red color difference channel (Pr).

The Master gain is applied to all three channels simultaneously while the Y, Pb and Pr gains are only applied to the selected channel. Thus, the overall gain of any channel is the product of the master gain and the individual gain. The gain controls have a range of $\pm 6\text{dB}$ with a preset value of 0dB.

The options are:

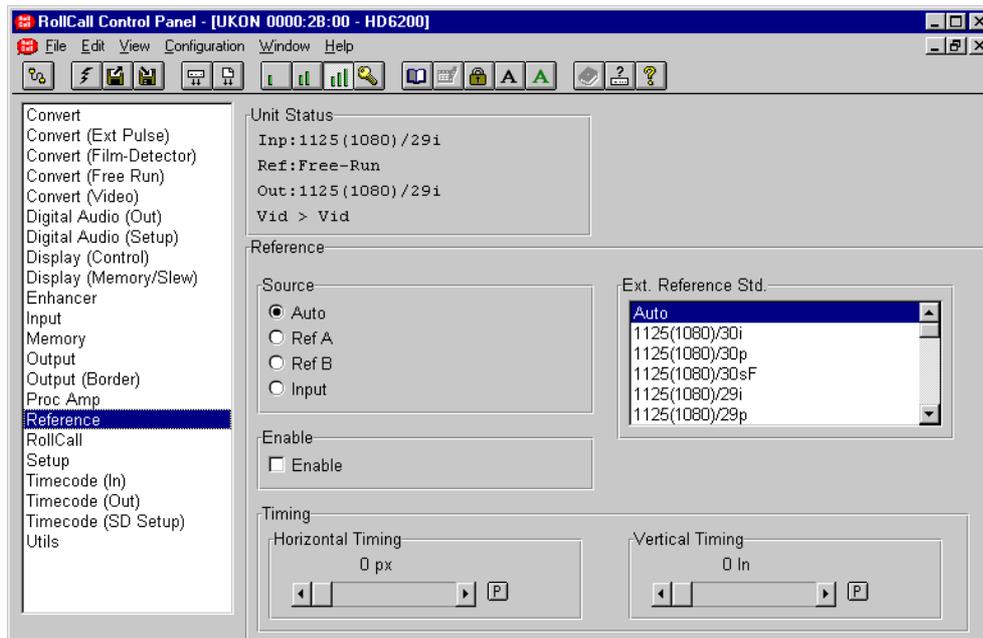
- Master All 3 channels adjusted simultaneously
- Y } Individual channel adjustment
- Pb } Individual channel adjustment
- Pr } Individual channel adjustment

Offset

This allows adjustment of the offset for luminance (Y), blue color difference (Pb) and red color difference (Pr). The Master offset is applied to all three channels simultaneously while the Y, Pb and Pr offsets are only applied to the selected channel. The controls are shown in 10-bit digital video levels.

- Master All 3 channels adjusted simultaneously
- Y } Individual channel adjustment
- Pb } Individual channel adjustment
- Pr } Individual channel adjustment

Reference



This screen is used to control the genlocking functions of the Ukon.

Enable

This item toggles between genlocking ON and genlocking OFF.

Source

Selects the source of the reference signal. Options are:

- Auto** The Ukon will scan the Reference-A input, the Reference-B input and the Input video until it finds a suitable reference signal. If a new search of the available reference inputs is required, toggling the genlock enable button will cause a new search to begin at Ref A.
- Ref A** Forces the Ukon to operate from the external reference A input.
- Ref B** Forces the Ukon to operate from the external reference B input.
- Input** Forces the Ukon to lock to the video input.

Note - if the encoder output option has been fitted to the Ukon and it is required to burst lock the unit, the Black burst reference must be applied to Ref B. See the OUTPUT-CONTROL - D2 O/P menu item for more information.

Timing

This menu allows the adjustment of the genlock timing with respect to the selected reference signal. The options are:

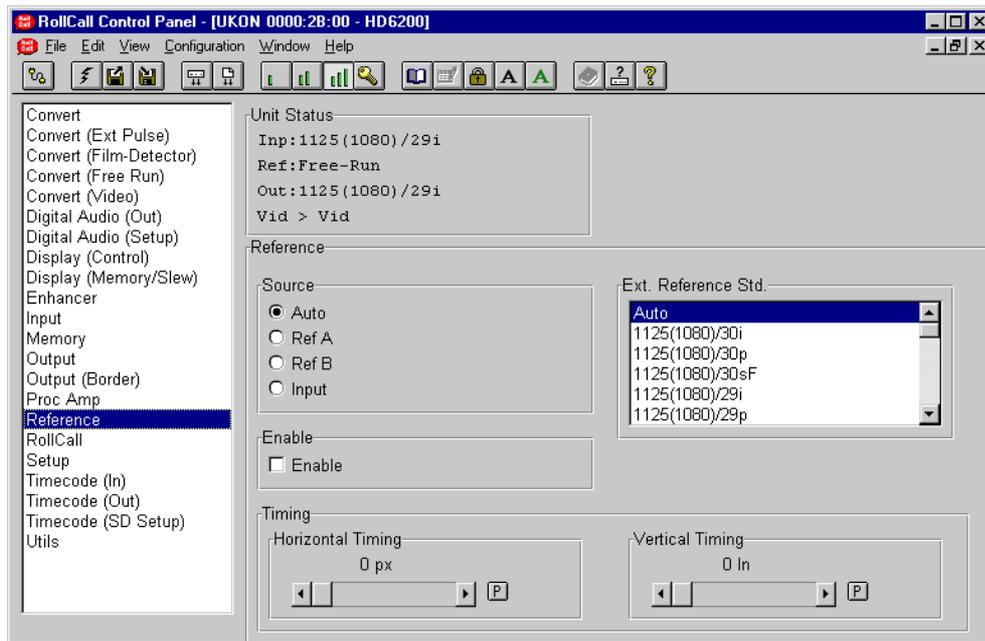
Horizontal Timing Adjusts horizontal genlock timing. Range is zero to one output line in steps of one output pixel.

Vertical Timing Adjusts vertical genlock timing. Range is zero to one output frame in steps of one output line.

Ext Reference Std

Sets the reference standard. The selected standard will appear on the second line of the Unit Status area.

Reference continued

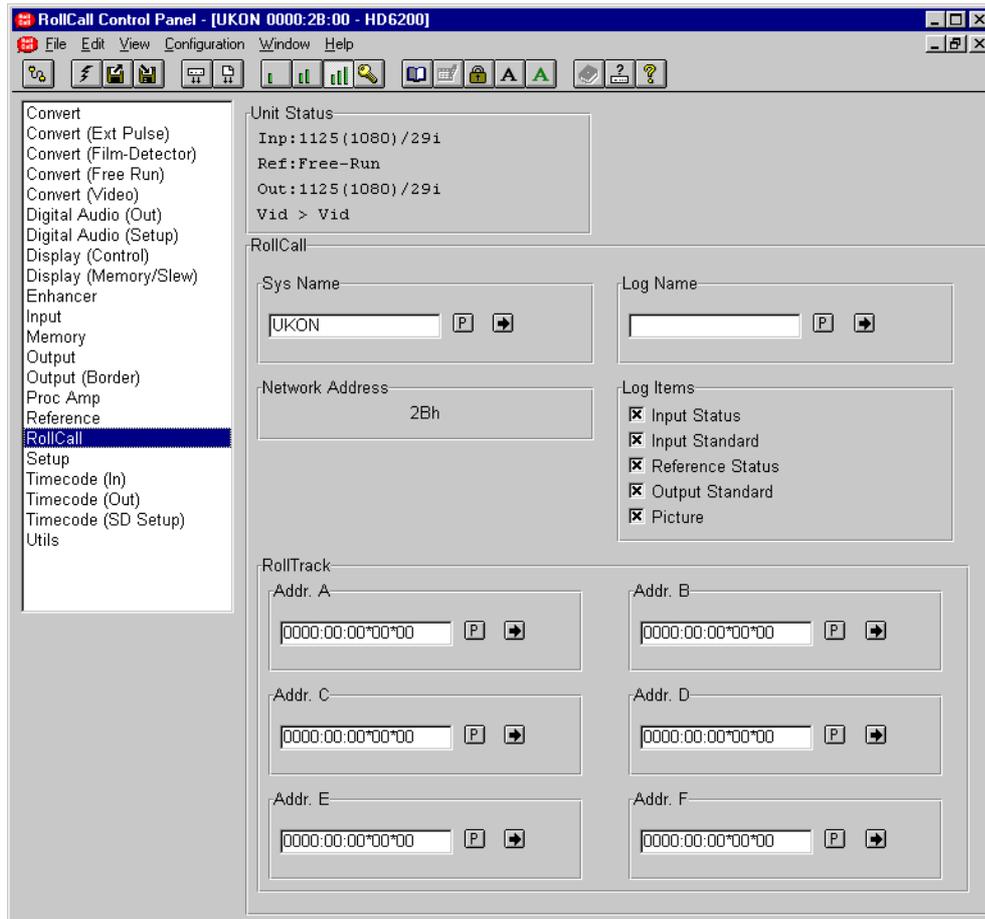


The user can force the reference standard to the required value or select Auto. The full range of references is as follows:

Auto	The Ukon measures the selected reference signal and automatically chooses the reference standard.
750(720)/60p	1125(1080)/30i
750(720)/59p	1125(1080)/30p
750(720)/50p	1125(1080)/30sF
750(720)/30p	1125(1080)/29i
750(720)/29p	1125(1080)/29p
750(720)/25p	1125(1080)/29sF
750(720)/24p	1125(1080)/25i
750(720)/23p	1125(1080)/25p
750(576)/50p	1125(1080)/25sF
750(480)/60p	1125(1080)/24p
750(480)/59p	1125(1080)/24sF
525(480)/29i	1125(1080)/23p
625(576)/25i	1125(1080)/23sF
625(576)/24sF	1125(1035)/30i
625(576)/23sF	1125(1035)/29i

} Forces the reference standard selected

RollCall



If the Ukon is attached to a RollCall™ network with a logging device, information about various parameters can be made available to the logging device.

This function allows the unit name and logging information to be set. The current RollCall address (in Hex) is displayed when RollCall is selected.

Note that this address must be set using switches on the main board (see Section 3, under RollCall) and this menu can only display the address, not change it.

System Name

Sets the RollCall unit name. The default is 'Ukon'. The character selected for editing will be highlighted.

To change the name, type the new name in the text area and then select  (return).

Selecting Preset  will return the text to the default name.

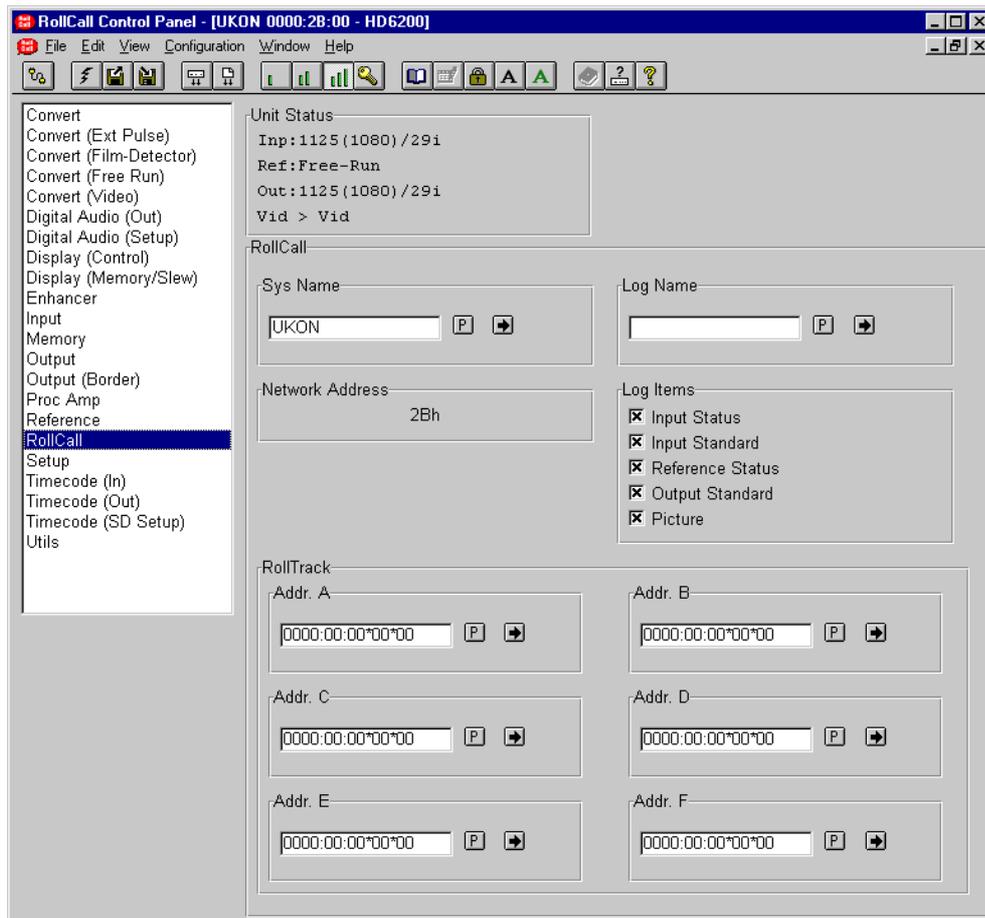
Log Items

This item allows information about five parameters to be made available for logging.

The Log Items are:

- Input Status** When activated, a loss of input signal condition will be indicated to the logging device.
- Input Standard** When activated, the current input standard will be available to the logging device.
- Reference Status** When activated, a loss of reference signal condition will be indicated to the logging device.
- Output Standard** When activated, the current output standard will be available to the logging device.
- Picture** When activated, the current state of the output picture (i.e. pattern, normal, frozen) will be available for the logging device.

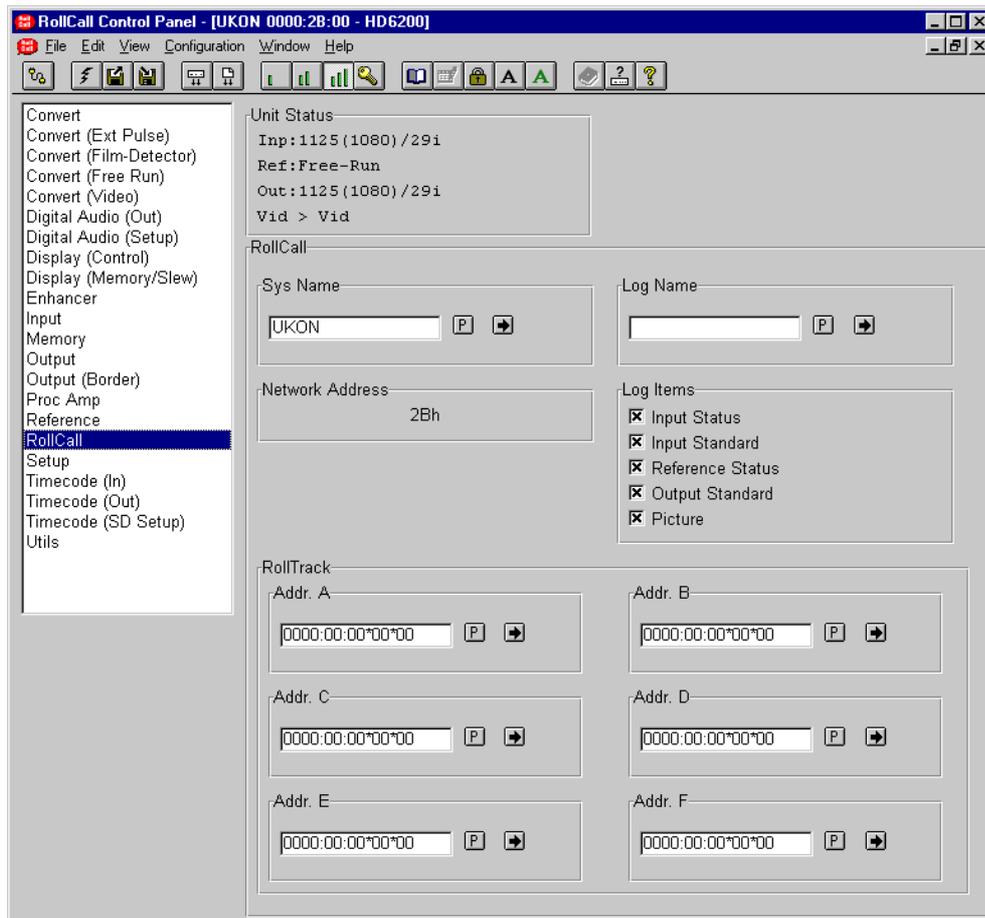
RollCall (continued)



Log Name

If the Log Name is blank (obtained by pressing the PRESET button) and the cursor is at the left (no spaces), logging information is available to all logging devices on the RollCall network. If Log Name is set to the name of a particular logging device, only that device will receive information. The log name can be edited as described in the System Name section above.

RollCall (continued)



Rolltrack

The RollTrack function allows the Ukon to automatically control remote audio/video delay modules using the RollCall system.

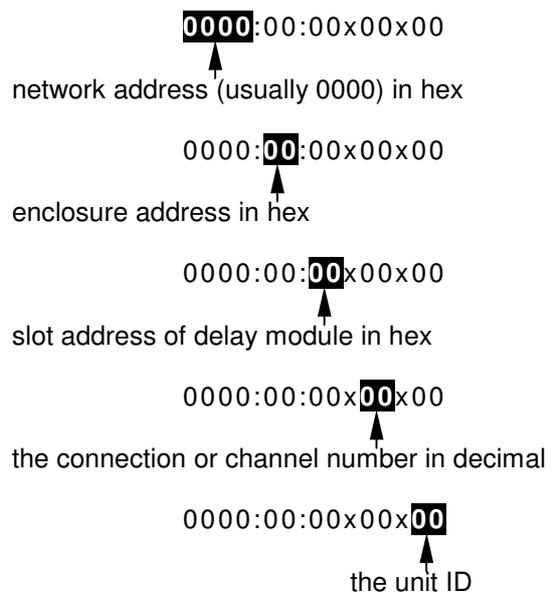
As the delay through the Ukon varies according to the conversion underway, delay modules connected via the RollTrack system will automatically have their delay updated to match.

The delay sent out via the RollTrack system matches the internal audio delay of the Ukon. Thus, it will be equal to the sum of the automatic internal delay and the user controlled manual delay setting (see audio setup section). For more detailed information, see Section 7 RollTrack Audio Delay Tracking.

The destination for the delay information is set from the RollTrack address as follows:

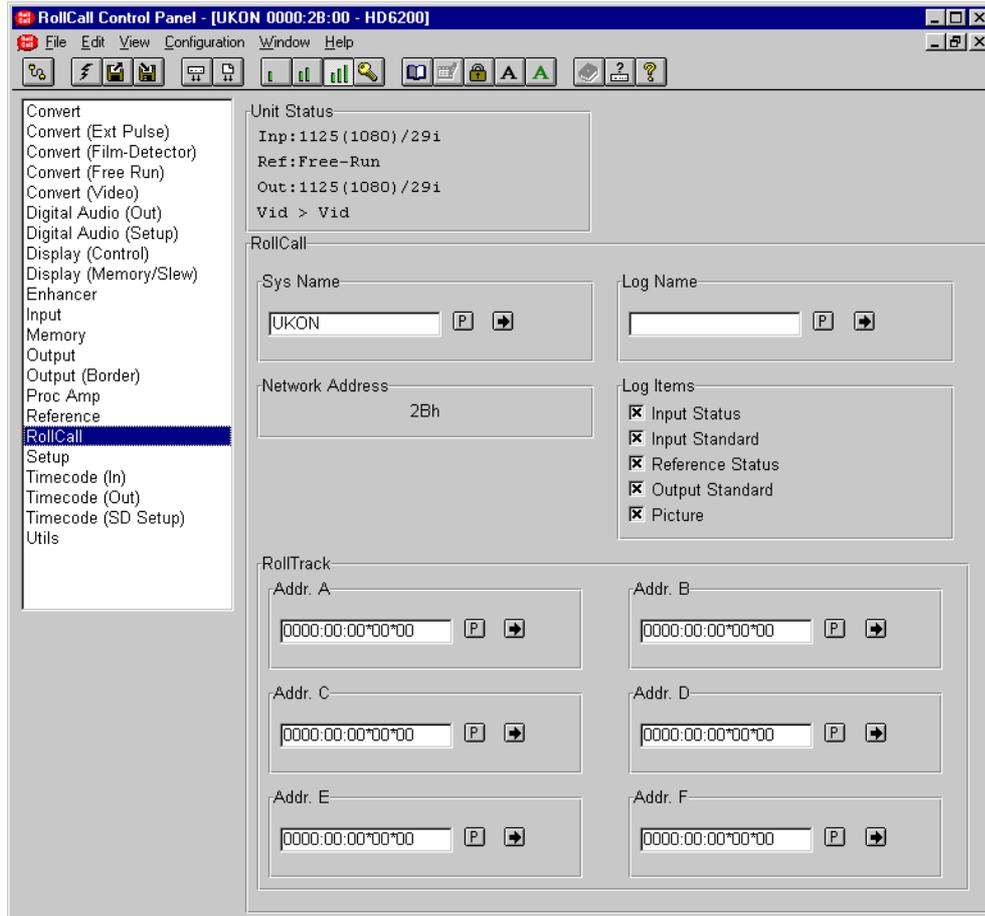
RollTrack allows up to 6 audio delays to be selected as a destination.

The string that looks like this:



For more detailed information, see Section 7 RollTrack Audio Delay Tracking.

RollCall (continued)



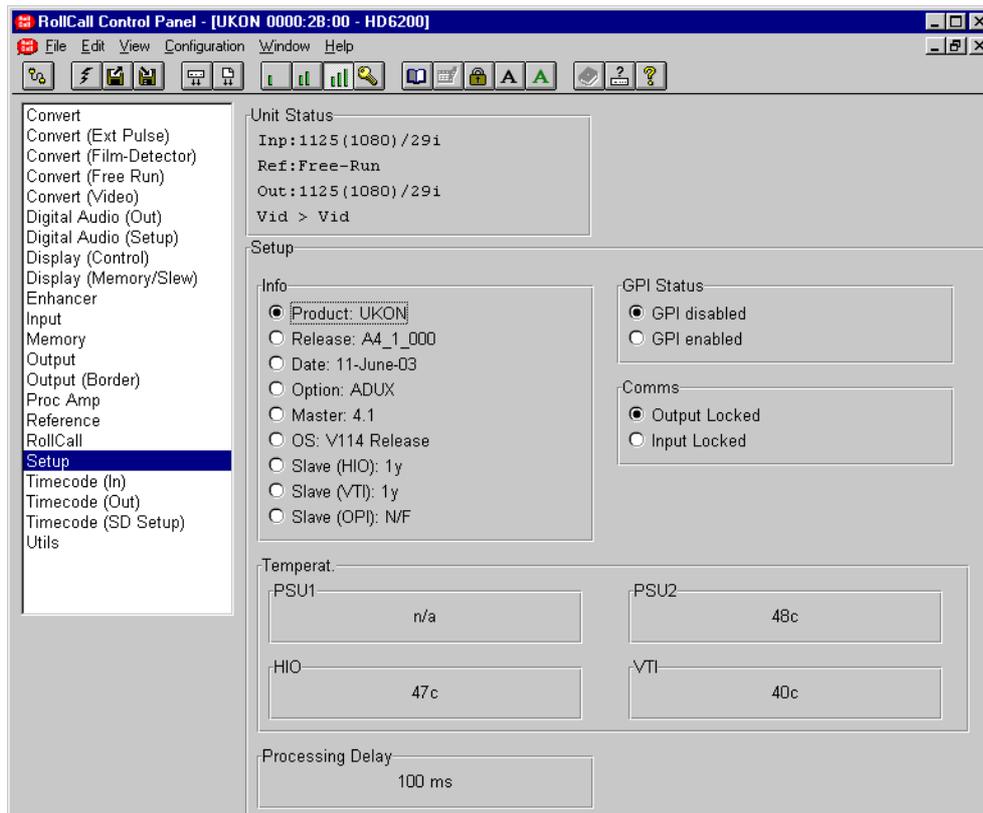
Rolltrack (continued)

In a typical setup, the network address will be 0000, the enclosure and slot address would match those of the destination module, and the channel number would be one of 14,15, 16 or 17 and the unit ID would be left at 00.

The Ukon RollTrack output becomes active as soon as the enclosure address is set to be non-zero and the Accept button is pressed.

Note that if the  (return) button is not selected the changes will not take effect.

Setup



This screen provides additional machine setup items.

Info

This will display the product code, the software release version number and the release date.

GPI/GPI Status

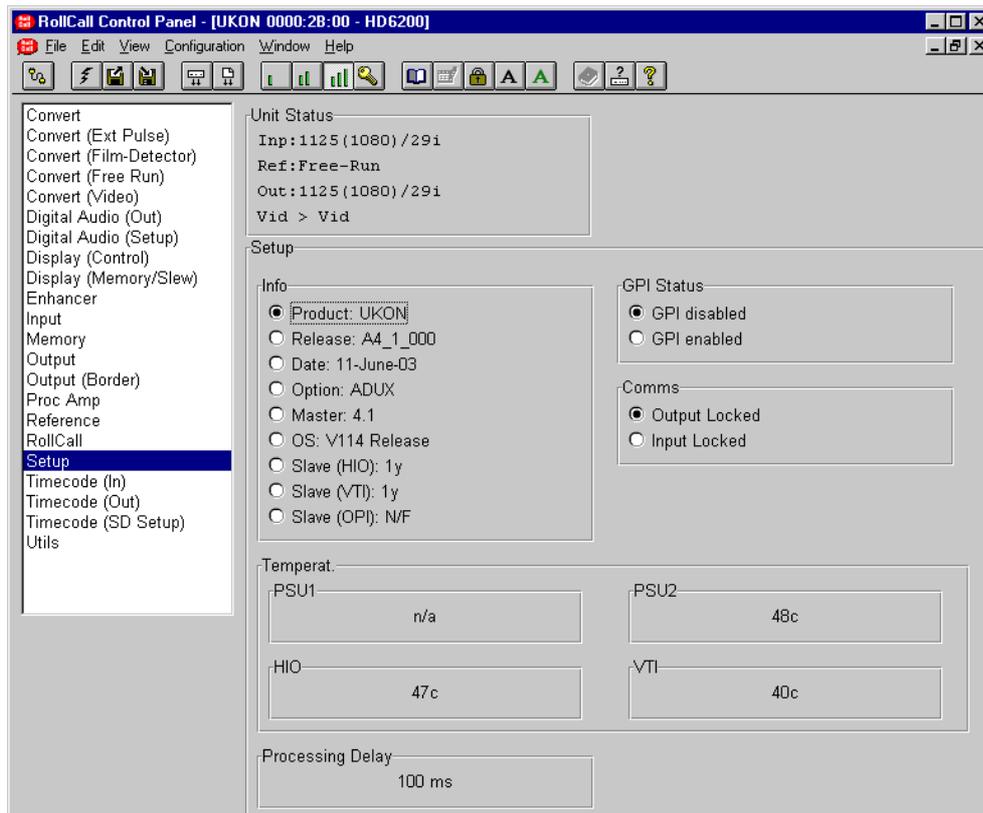
This determines whether the General Purpose Interface is active or not. There are two positions, GPI disabled and GPI enabled.

Note that this item is not stored in the Ukon machine memories. This prevents the GPI from disabling itself when a GPI memory recall is undertaken.

Comms

This item controls the way the Ukon synchronizes its picture size and position updates with the incoming or outgoing video streams. This affects the behavior of the front panel controls, the RS-422 and RollCall BNC connections and, the GPI port polling. An application note entitled "Real Time Control of the Ukon" is attached to this manual and this describes in detail the impact of the Comms Lock control.

This is recommended reading for users who wish to do pan/scan operations from the front panel as well as remote control of the Ukon.

Setup continued

Comms options are:

Output Locked

In this case the Ukon synchronizes its communications to the output video stream. The RS-422, RollCall BNC and GPI port are processed synchronized to the Ukon output stream. Also, slewed display size changes occur on every output field (subject to the Display-Slew-Update menu setting).

Input Locked

In this case the Ukon synchronises its communications to the input video stream. The RS-422, RollCall BNC and GPI port are processed synchronized to the Ukon input stream. Also, slewed display size changes occur at input field rate. In this mode of operation, if the Ukon is doing a format conversion then the display size/position changes are locked to particular input fields or frames. Changes in size and position only appear at the output of the Ukon when different input frames are used to build the output video.

For example, if the input video standard is 1080/23sF, the output format is 525/59.94 and the conversion mode is set to sF to 3:2. Then, if size/position changes are supplied to the Ukon at the 23sF rate (i.e one command per 23sF frame) then, the output of the Ukon will only change at 3:2

sequence boundary changes matching the input 23sF frames.

Temperat(ure)

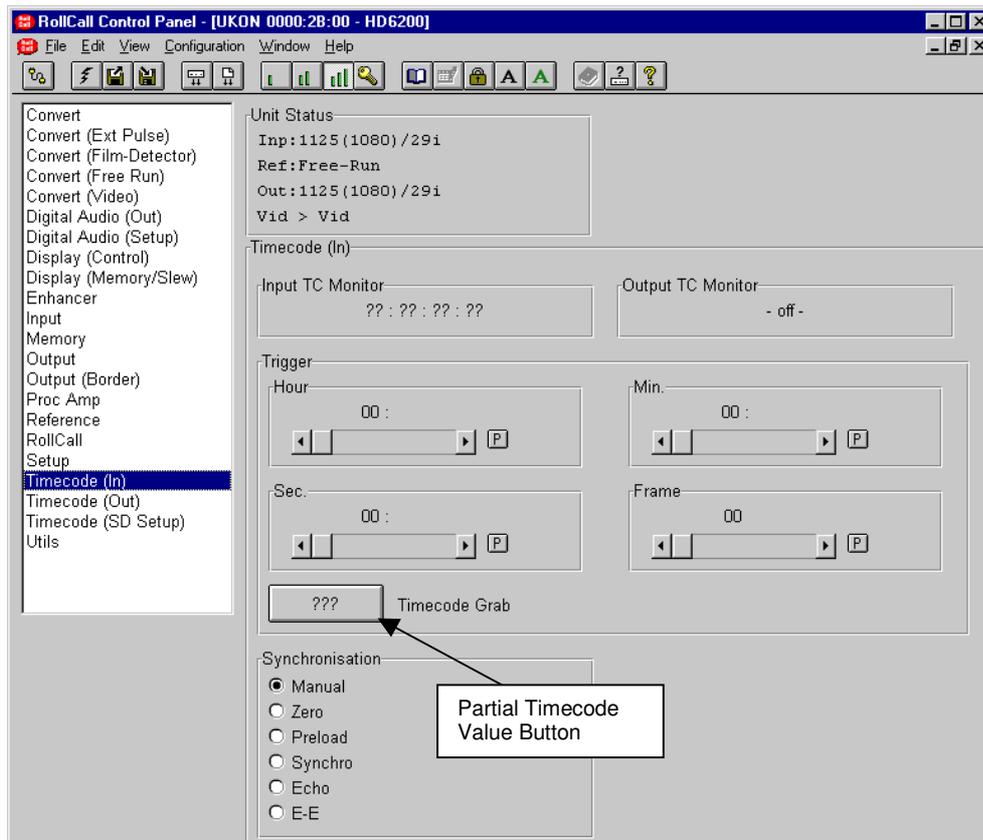
This displays the current temperature of the power supplies and the main printed circuit boards.

The indications are for PSU1, PSU2, HIO board and VTI board.

Processing Delay

This item displays the current nominal processing delay of the UKON. This allows external audio delays to be correctly configured to compensate for the delay through the UKON. This value is dependent upon the input and output video standards to the UKON.

Timecode (In)



This is the home screen for the input timecode control.

Input TC Monitor

This displays the source (input) timecode as it is received by the Ukon. If the input timecode is not found then question marks are displayed. If the incoming timecode is of Drop Frame type the characters “df” are placed at the end of the timecode value.

Output TC Monitor

This displays the Ukon output timecode as it is inserted. If the inserted timecode is of Drop Frame type the characters “df” are placed at the end of the timecode value. If output timecode is not enabled the word “off” is displayed on the screen.

The timecode values are updated approximately every half a second so not all timecode values will appear on the screen.

The Ukon can perform complex timecode manipulation and it can synchronize this with output film sequence generation. The operation of the timecode and film sequence system is described in more detail in the Application note "Ukon Timecode operation" attached to the end of this manual.

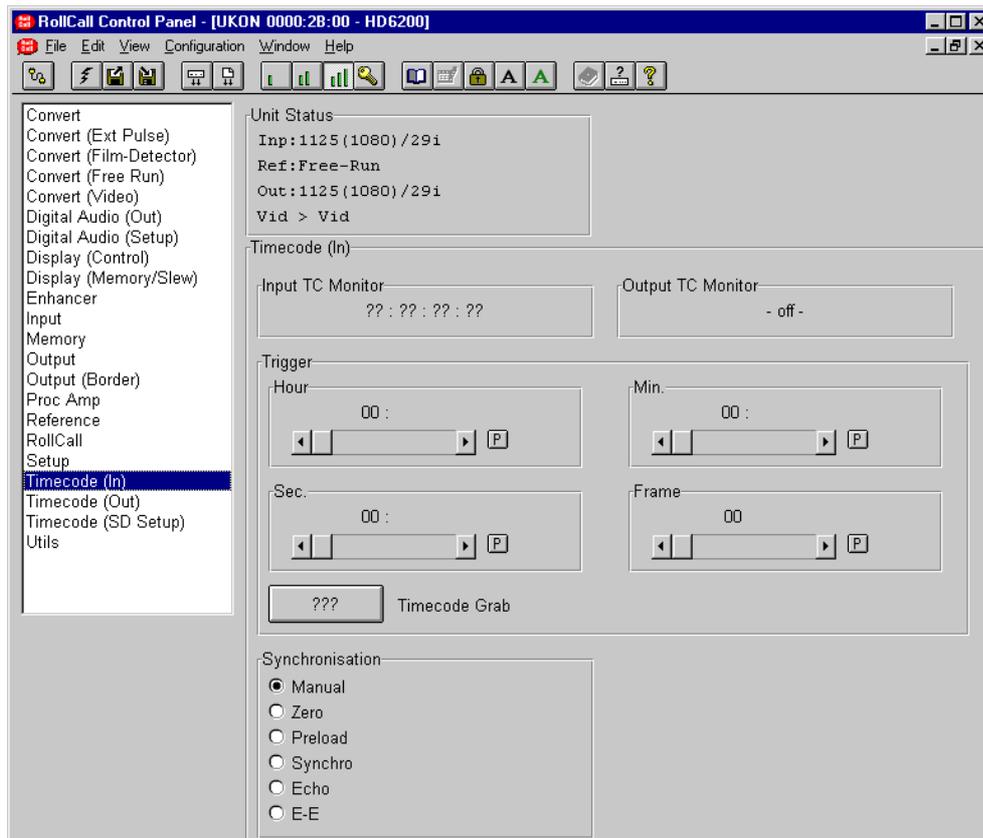
Trigger

This sets the input timecode value for subsequent *trigger* events.

Partial Timecode Value Button

The button which shows a partial timecode value can be pressed to grab the current input timecode and transfer it to the timecode trigger value. The timecode value shown is the current input timecode value apart from the frame count (for reasons of space). When the input timecode value is grabbed, the entire input timecode value including frame number is transferred.

Timecode (In) continued



Synchronisation

This determines how the output timecode is synchronized.

Manual

Control from manual dialog, i.e. reset to zero, load the preload value or calculate a Synchro timecode and insert it.

Zero

When the input time code reaches the *trigger* value the output timecode is reset to zero.

Preload

When the input time code reaches the *trigger* value the output timecode is set to the *preload* value.

Synchro

When the User selects the Synchro button in the Manual section of the timecode menus, the Ukon will examine the Trigger timecode, the Preload timecode and the current input video timecode. It will then calculate new Trigger and Preload values

a few seconds in advance of the current input timecode such that, when the input video reaches the Trigger value the output timecode will have the Preload value. This allows the unit to generate continuous timecode in advance of a Trigger/Preload point provided continuous timecode is applied to the input of the unit. For further information see the timecode application note attached to this manual.

Echo

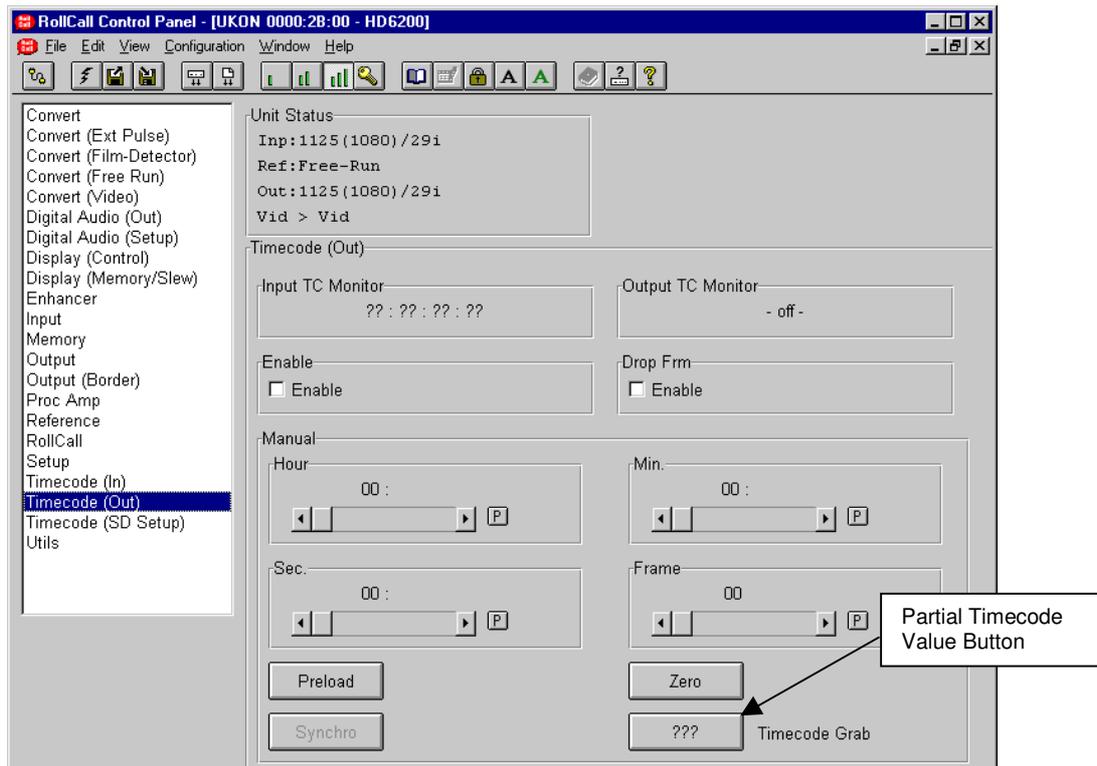
When the input time code reaches the *trigger* value the output timecode is set to the *trigger* value.

E-E

The input timecode is fed directly through to the output, this is only appropriate in IO locked mode. Note that under certain circumstances the timecode frame count at the Ukon output may not accurately reflect the input video timecode. However the seconds count should be correct.

A detailed description of E-E mode operation is given in the application note "Ukon Timecode Operation" attached to the end of this manual.

Timecode (Out)



Enable

This turns on the insertion of timecode in the Ukon video output.

Drop Frm

This enables the output of drop frame timecode from the Ukon. This option is not available if the output video standard has a 25 or 50Hz frame rate or, the unit is in E-E mode.

Manual

This item allows the entry of a timecode Preload value using the knob and the select arrows button.

Note that this timecode is always in the correct format for the Ukon output video standard.

If the Zero button is selected the output timecode will immediately be set to all Zeroes and will then free run.

If the Preload button is selected the output timecode will immediately be set to the Preload value that has been entered on this menu page and will then free run.

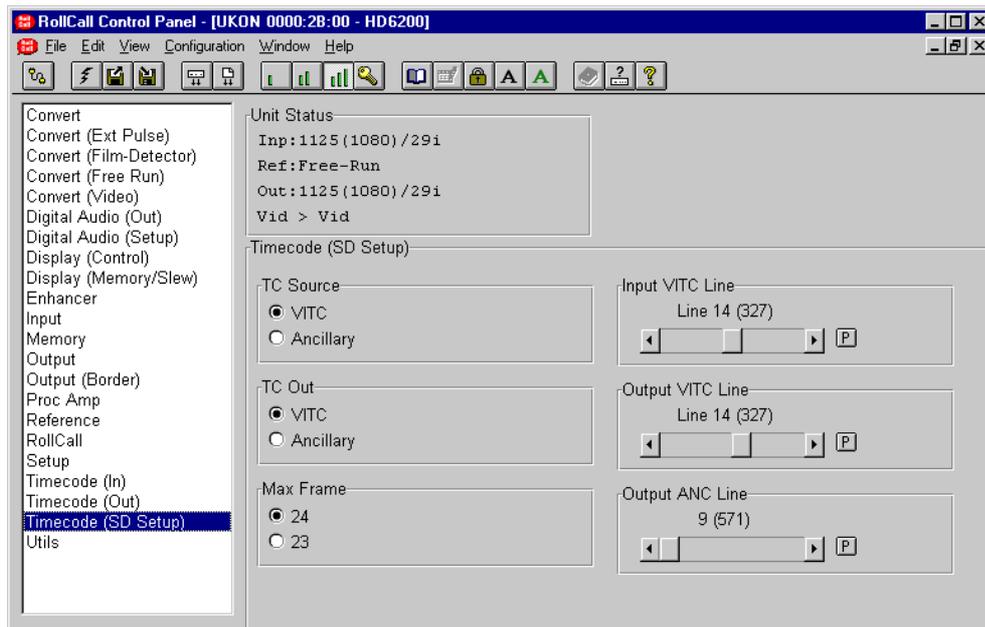
If the Synchro button is selected and the synchronization mode has been set to Synchro (see above), the Ukon will examine the Trigger timecode, the Preload timecode and the current input video timecode. It will then calculate new

Trigger and Preload values a few seconds in advance of the current input timecode such that, when the input video reaches the Trigger value the output timecode will have the Preload value. Three or four seconds after the Synchro button has been pressed the

The output timecode will be set to the internally calculated value and will then free run.

The button which shows a partial timecode value can be selected to grab the current input timecode and transfer it to the timecode preload value. The timecode value shown is the current input timecode value apart from the frame count (for reasons of space). When the input timecode value is grabbed, the entire input timecode value including frame number is transferred. If the Ukon is undertaking a format conversion then the input timecode value can be illegal in the output timecode standard. In this case the input value is converted to a legal value before transfer. Thus, if the input frame count value is greater than the maximum allowed by the current output standard, the frame value is clipped to the maximum value. Also, if the input timecode is non-drop-frame but the output is drop-frame then the grabbed value is converted to a legal drop-frame value before transfer.

Time Code (SD Setup)



These items control the reading and inserting of timecode for **standard definition** input and output standards. These items may not be visible if the Ukon does not have SD options fitted.

TC Source

- VITC The input video timecode is read from VITC signals.
- Ancillary The input video timecode is read from embedded ancillary data.

Input VITC Line

This item controls the input video line from which the input video VITC is read.

TC Out

- VITC The output video timecode is inserted as VITC signals.
- Ancillary The input video timecode is inserted as embedded ancillary data.

Output VITC Line

This item controls the output video line on which the output VITC is inserted. Note that the VITC is inserted on two lines per field. This item setting specifies the first line that has VITC inserted on it. The second line of VITC is inserted two lines after the first line.

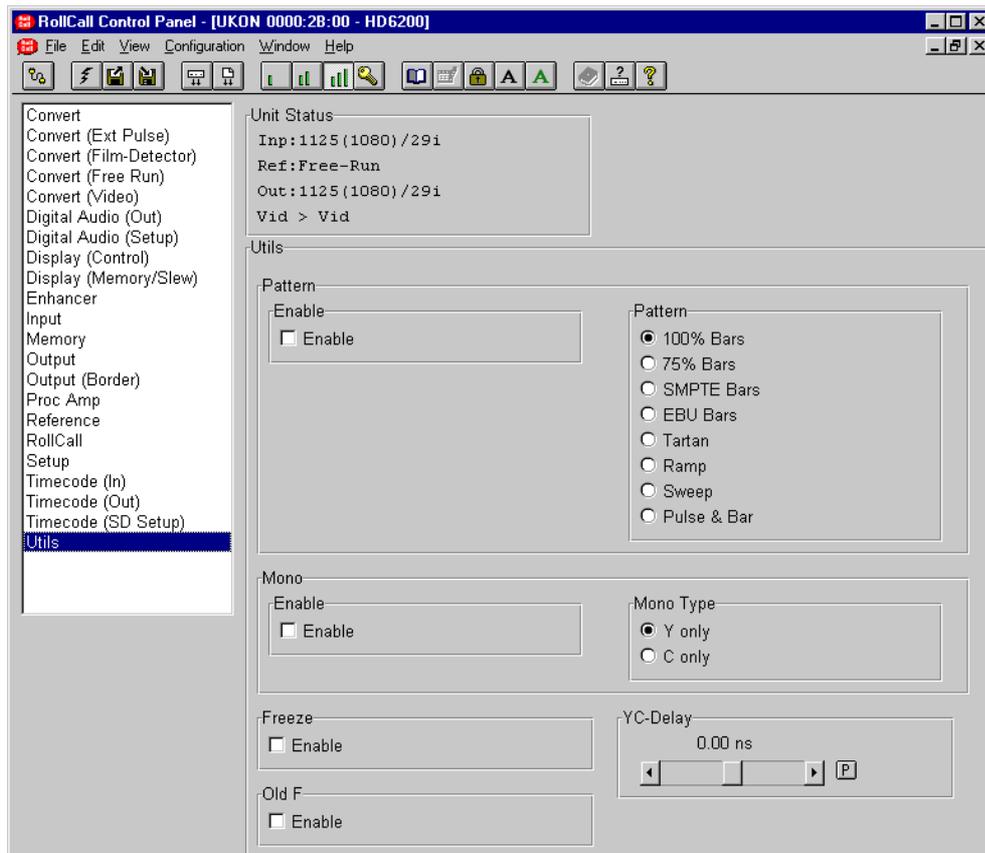
Max Frame

This item controls whether the timecode for 625/24sF and 625/23sF video standards counts from frame 0 to frame 24 or from frame 0 to frame 23. Note that this item setting affects both the input and output timecode.

Output ANC Line

This sets the line number on which embedded ancillary timecode is inserted.

Utils



This function controls the various utility functions the Ukon provides. The functions are shown below:

Pattern

Used to control the internal test pattern generator.

The selected pattern is only active when Enable is selected.

The test pattern options are:

- 100% Bars
- 75% Bars
- SMPTE Bars
- EBU Bars
- Tartan
- Ramp
- Sweep
- Pulse & Bar

Mono/Enable

When selected the monochrome output functions will be enabled.

Mono Type

This controls the monochrome output functions.

The menu options are as follows:

- Y only
- C only

Freeze

Used to control the Ukon picture freeze function.

Selecting enable manually toggles between freeze and no freeze.

Y/C Delay

This controls delay placed in the chroma channel to correct for input timing errors. The resolution is dependent on the conversion being performed. Careful use is required to ensure Y and C and co-timed at the color space converter.

Old F

This is a toggle function that may be of use when driving older equipment if the output interlace looks incorrect.

Application Note - The Ukon Film Modes

The Ukon contains a number of different algorithms for processing film-based material. This document contains notes concerning the operation of the various modes and options. These notes relate to Ukon software version A4_0_000 (released in April 2003) and onwards.

Definition of Terms

A number of terms will be used frequently in this document so they are defined here to avoid ambiguity.

Firstly, Segmented Frame (SF) video formats are the same as 2:2 film in terms of their motion profile. The term SF will be used throughout this document to refer to any 2:2 format.

Secondly, what is film and what is video in this context? The Ukon is only concerned about the motion profile of objects in the incoming feed. Basically, it considers Video to be programme material whose contents *can* move at *every* field boundary. For example, with 525 line, 59.94 field per second source material, a camera pan will cause the scene to move 59.94 times a second. If the source material was SF, objects are only allowed to move on frame boundaries. Thus our example camera pan would only produce 29.97 different scene positions each second. Each of our input frames produces two fields, one with each sense of interlace. If the source material was 3:2 film, objects are only allowed to move after two fields, then three fields, then two fields etc. Our example camera pan would only produce 23.98 different scene positions each second.

Of course this simple definition does not hold true in practice. Still scenes could be considered as video or film. Edited and Varispeed film material can have orphan fields where there is object motion on two or more successive fields. However, these are special cases that arise when processing film material and it is usually clear whether video or film is being used.

Sequence Detection is the act of finding the film frame boundaries. For 'perfect' SF or 3:2 sequence, this will produce a regular pattern of new frames. For 'non-perfect' sequence the pattern will not be regular but might have discontinuities at edit points for example.

Why Do We Need Film Modes

There are a number of reasons why it is important to do film sequence aware picture processing during a conversion.

Firstly, it is possible to modify the conversion filters in the presence of film material to improve the interpolation process. For example, it is theoretically possible to extract more vertical resolution from the film inputs. This can improve the converter output in areas of vertical detail.

Secondly, knowledge of the positions of the film frame boundaries means that the conversion can be done with no artefacts caused by moving objects. On video material, motion compensation is required to achieve this.

Thirdly, MPEG encoders can improve their coding efficiency if they are processing 3:2 film - there is no need to encode or send the repeat field. The converter must maintain the integrity of the incoming 3:2 sequence to allow the encoder to exploit this property.

It is also very useful to be able to convert from video to film material. This allows the integration of video sequences into film material. It also gives material a 'film look' which can be artistically desirable.

The modes available

The Ukon has a number of processing modes and it is important to use the correct mode to achieve the desired conversion. The mode is selected from the *Convert-Mode* menu page.

Auto

In Auto mode the Ukon checks the input and output standards in order to work out the required processing mode. It does not analyse the incoming material to try and ascertain if it is film or video and modify the mode appropriately. Consequently it is important that the user can override the Auto setting if a particular conversion is required. In general, the Ukon will assume that the incoming material is Video unless one of the SF input standards are being received.

Video to Video

This makes the Ukon treat the incoming material as video and it makes no attempt to modify the temporal profile. This mode is 'safe' in that it does not depend on any film sequence information thus, it can't make the wrong decision about how to build the pictures. It will always provide good quality pictures. Note, the Ukon should not be forced into this mode if an SF style output standard is required and the input material is video. If this is done the output will NOT be SF as it will contain object motion on every field. This could cause problems for downstream equipment. The way that this mode operates is controlled by the Video Control menu setting, which allows the user to switch between synchronising and interpolating operation.

Video to SF

This mode makes the Ukon treat the incoming material as video but, it converts in such a way that the output only has object motion on frame boundaries. This is the mode that should be used whenever the incoming material is video and an SF style output is required.

Note some conversions can cause the output to appear to move up and down in regions of high vertical detail. This effect is produced when there is a low beat frequency between the input and output field rates. For example, 59.94 Hz video material being converted to 23.98Hz SF. This effect can be removed by adjusting the Video Blur setting (see below).

Video to 3:2

This mode is the same as Video to SF mode but, it produces an output with a 3:2 motion profile (rather than SF). All comments under Video to SF also apply to Video to 3:2 mode.

Film to Film

This mode makes the Ukon treat the incoming material as film with a film sequence determined by the Film Sequence Timing Source menu (see below). If the input and output standards have the same frame rate then the Ukon will endeavour to produce the same film sequence at the output as is present at the input. If the input and output frame rates are different then the output sequence will not be the same as the input but, the Ukon will never interpolate across input frame boundaries. The performance of this mode is affected by the filter selected, the incoming film sequence and, if the internal sequence detector is being used, how successfully the sequence has been found.

In this mode the Ukon will automatically adapt the filter in use as the incoming sequence dictates. If the film sequence detector is not in use, the Ukon will use the single frame filter selected on the Film Filters menu (Sharp, Normal, Anti-Alias or Safe) for non-orphan fields. If the Sharp, Normal or Anti-Alias filter is selected then it will use a single field filter if it has to process an orphan field. If the Safe aperture is selected this will be used at all times as it is tolerant of both video and film.

If the internal film sequence detector is in use and Adaption has been turned On (see below), a wider range of filters can be automatically selected. This provides tolerance to video material in this mode as well as excellent film performance. This is very useful if a mix of film and video material is being provided and it is desirable to get the best possible performance. Under these conditions the Normal or Anti-Alias filters are a good choice as it provides better protection under conditions of difficult or changing programme material. Adaption also provides protection around scene changes where it can be difficult to detect the incoming film sequence.

SF to 3:2

This mode is used to convert SF material to 3:2. It is useful for converting 23.98/24Hz SF inputs to 59.94/60Hz outputs with 3:2 sequence. In this mode special care is taken to ensure the integrity of the outgoing 3:2 sequence with respect to the incoming SF. The output is guaranteed to have 3:2 sequence but this may require the repeating or dropping of input frames if the input and output are not locked together or the input SF is not correct.

If this mode is used with 720P/60 or 720P/59.94 as the output standard, then the 720P output will have a 3:2 motion profile. That is, objects will move every two frames, then every three frames etc. The net rate of new frames will be 24Hz.

In this mode the Ukon will automatically adapt the filter in use for orphan fields if the incoming sequence makes this necessary. The Ukon will use the single frame filter selected on the Film Filters menu (Sharp, Normal, Anti-Alias or Safe) for non-orphan fields. If the Sharp, Normal or Anti-Alias filter is selected then it will use a single field filter if it has to process an orphan field. If the Safe aperture is selected this will be used at all times as it is tolerant of both video and film. The Adaption setting (see Film to Film above) can also be used if the film sequence detector is active.

3:2 to SF

This mode is used to convert 3:2 film material to SF. It is useful for converting 59.94Hz with 3:2 sequence to 23.98/24Hz SF. In this mode special care is taken to ensure the integrity of the outgoing SF sequence with respect to the incoming 3:2.

The output is guaranteed to have perfect SF sequence but this may require the repeating or dropping of input frames if the input and output are not locked together or the input sequence is broken. The Adaption setting can be used to provide improved performance around scene changes if the sequence detector is in use.

In this mode the Ukon will automatically adapt the filter in the same way that it does for SF to 3:2 mode (see above).

SF to 1:1

This mode is used to convert incoming SF material to a progressive type output. This mode is targeted at producing the low frame rate progressive output standards. For example, it could be used to convert 24Hz SF to 1080/24P etc. The Ukon takes special care to try and use all incoming frames when generating the output.

In this mode the Ukon will automatically adapt the filter in the same way that it does for SF to 3:2 mode (see above).

3:2 to 1:1

This mode is used to convert incoming 3:2 material to a progressive type output. This mode is targeted at producing the low frame rate progressive output standards. For example, it could be used to convert 1080i 59.94 with 3:2 motion to 1080/23.98P etc. The Ukon takes special care to try and use all incoming frames when generating the output.

In this mode the Ukon will automatically adapt the filter in the same way that it does for SF to 3:2 mode (see above).

Film to SF

This mode is designed to take in film material with non-perfect SF sequence and convert it to perfect SF sequence. The output is guaranteed to be perfect SF. Its primary use will be to process material that has good SF sequence that has been disrupted at edit points. It is NOT designed to take in material that has been played off speed (Varispeed) and correct the sequence. Varispeed material may give disappointing results due to the need to do a large number of frame repeats or drops. This can produce a poor motion profile.

This mode can also be used to generate SF style output standards that are guaranteed to have complete SF frames. If the incoming material has perfect sequence and an SF output standard is desired, this mode will give good results.

In this mode the Ukon will automatically adapt the filter in the same way that it does for film to film mode (see above).

Film to 3:2

This mode is designed to take in film material with non-perfect 3:2 sequence and convert it to perfect 3:2 sequence. The output is guaranteed to be perfect 3:2. Its primary use will be to process material that has good 3:2 sequence that has been disrupted at edit points. It is NOT designed to take in material that has been played off speed (Varispeed) and correct the sequence. Varispeed material may give disappointing results due to the need to do a large number of frame repeats or drops. This can produce a poor motion profile.

In this mode the Ukon will automatically adapt the filter in the same way that it does for film to film mode (see above).

1:1 to 3:2

This mode is designed to take in low frame rate progressive inputs (e.g. 1080i /24P) and convert it to have 3:2 sequence (e.g. 1080i/60). The output is guaranteed to be perfect 3:2.

In this mode the Ukon will automatically adapt the filter in the same way that it does for film to film mode (see above).

Film Mode Apertures

A number of different filters may be selected when the Ukon is in a film processing mode. The selection is done on the *Convert-Film Ap-Aperture* menu page.

Sharp

The Sharp aperture can potentially produce the highest resolution pictures that can be obtained. This can give very good results with high-resolution film and graphics material. The price that is paid for this high resolution is that it is very intolerant of any film sequence detection errors. If the Ukon is provided with incorrect sequence information or, its internal sequence detector makes an error, the artefacts can be quite visible. Sequence errors cause a high vertical frequency tearing of the picture on moving objects (variously known as Tearing, Venetian Blinding, Mouse Teeth etc). This is a very distinctive artefact. Because this aperture has been designed for use on film material it gives excellent performance, especially on material that would be difficult to convert if it had a video motion profile. For example, very sharp vertical edges and regions of high vertical detail such as window blinds. It will also give very good results on captions whether stationary or moving - provided of course, they have a film motion profile. This aperture would normally be too sharp for down-conversion modes. e.g. 1080i to 525/59.94. However, if the material is to be subsequently up-converted, this aperture is very useful as it allows the maximum amount of information to be retained in the down-converted image.

Normal

The Normal filter is similar to the Sharp filter (see above) but, offers slightly reduced vertical resolution when compared to the Sharp aperture. This means that it can offer all the advantages of the Sharp filter (good performance in areas of vertical detail etc) but, the visibility of sequence detection errors is very much reduced. Although it will theoretically provide reduced vertical resolution, in practice this is not normally the case. Most programme material is not vertically sharp enough to exploit the full potential of the Sharp filter due to the excessive twitter that can be produced if the source is viewed directly on an interlaced display. This means that the Normal filter is a good choice for the vast majority of film material if there is any uncertainty about the film sequence. This aperture will often be too sharp for down-conversion modes.

Anti-Alias

The Anti-Alias filter is similar to the Normal filter (see above) but, offers reduced vertical resolution when compared to the Normal aperture. This means that it can offer all the advantages of the Normal filter but, the visibility of sequence detection errors is even further reduced. This aperture will still be sharp enough for the majority of conversions. In addition, it is normally the aperture of choice for film down-conversion.

Anti Alias (2)

This aperture incorporates more vertical low pass filtering than the anti-alias filter described above. This provides the same benefits as the anti-alias filter but gives extra twitter reduction. This is particularly useful when the Ukon is being used in down-conversion mode (HD to SD conversion).

Safe

The Safe filter is slightly different to the Sharp, Normal and Anti-Alias filters. It is Safe in the sense that even in the presence of sequence detection errors it will never exhibit the tearing effect described above. It is also tolerant of video material so that it can be used to process any type of programme. The downside of this is that it cannot give such good performance as the dedicated film apertures in areas of high vertical detail.

Other Options

Blur

The amount of Blur produced when a video input is being processed can be controlled from the Convert-Vid Ap-Blur menu. This will be the case when the unit is in Video to Video, Video to SF or Video to 3:2 mode. If the Auto setting is selected then the good results will usually be obtained. However certain Video to SF and Video to 3:2 conversions can benefit from having the Blur setting increased. In addition, conversion from 59.94Hz inputs to (true) 24P outputs can produce more blur than is required with the Auto setting. In this case the Blur setting can be used to reduce the amount of output Blur.

It is recommended that the CUT detector (see below) is turned ON if the Blur setting is set to Medium or High. This prevents excessive interpolation across scene changes

Sharp

The vertical sharpness of the Ukon output can be adjusted via the Convert-Sharp menu item. This is useful in a film-processing context when it is used in conjunction with the Blur setting to improve the quality of certain Video to sF and Video to 3:2 conversions. For some material it may be necessary both to increase the Blur and reduce the Sharpness in order to achieve the optimum result. The Sharpness control can also be used to help match the "look" of converted material when it is being combined with other sources.

Adaption

Film Adaption can be turned on and off using the *Convert-Film Ap-Adaption* menu page. If the Film Adaption setting is turned on then the Ukon will adapt the film conversion aperture to match the incoming material if the sequence detector is turned on. This allows mixed film and video to be put through the Ukon with film material using a film aperture and video material using a video aperture. If adaption is turned off the video material would be processed with a single field aperture which can produce soft output fields. Adaption is also undertaken around scene changes to provide protection against undetected orphan fields in the edit point regions, which could otherwise cause picture tearing.

Cut Detector

The Ukon includes a Video mode Cut detector which can be turned on and off using the *Convert-Vid Ctl-Vid Cuts* menu entry. This is used in the video input modes to detect scene changes as they come in. It steers the video interpolation aperture such that it does not go across the cut or scene change. As noted above, it is recommended that this is turned on when doing video conversions and the Blur setting has been increased (see section Video to SF above)

Film Sequence Detection

The Ukon can derive film sequence information from a variety of sources. This section describes these sources and how to set them up. These choices can be found on the *Convert-Film Ctl-Flag Src* menu. The following text is concerned with the film sequence of the incoming program material alone. It is not concerned with the output film sequence from the Ukon.

Auto

In this mode the Ukon will use INTERNAL mode (see below) if the input video is an SF format. Otherwise it will use DETECT mode (see below).

Free Run

In this mode the Ukon uses an internal free running film sequence generator. This method is only suitable for program material with continuous film sequence. If the program is stopped or paused then it may be necessary to re-phase the sequence generator once the program has been restarted.

This mode may require two further settings to be made.

Firstly, the free running sequence can be either 2:2 or 3:2. The type is determined by the *Convert-Film Ctl-Free Run-Type* menu setting. If the type has been set to Auto then the Ukon will decide the free run type by examining the input video standard. The algorithm is, if it's an SF format then it is 2:2. If it's progressive and the frame rate is greater than 48 it's 3:2. If it's interlaced and the frame rate is greater than 25fps it is 3:2. The user can also force the free run type to be 2:2 or 3:2 as required.

Secondly, the phase of free running sequence generator will need to be adjusted to match the incoming video. This is done using the *Convert-Film Ctl-Flag Delay* menu setting.

Detect

In this mode the Ukon uses an internal film sequence detection system. This can be used with any arbitrary incoming film or video sequence. There are a couple of points worth noting when using the internal sequence detector.

Firstly, it is worthwhile checking the position of the sequence detection window if the edges of the picture are incorrect or if the input picture is letterboxed. The top and bottom of the picture can be disrupted by head switching artefacts and the like. This can cause the detector to produce extra orphan fields. Making sure that the sequence window only contains good active video gives it the best chance of success. The window position can be adjusted from the *Convert-Film Ctl-Detector-Window-Position* menu.

Secondly, it is possible to adjust the bias of the film sequence detector. This should not normally be necessary. However, on difficult material it can be used to steer the detector towards the correct answer. If the bias is adjusted towards video it is more likely to detect orphan fields. If the bias is adjusted away from video and towards film it is less likely to generate orphan fields and more likely to generate repeat fields. This can be particularly useful on Varispeed material. If the playback speed is high then the detector can be adjusted towards video to help find any orphan fields. If the playback speed is low then the detector can be adjusted towards film to help find any extra repeat fields. The bias is adjusted using the *Convert-Film Ctl-Detector-Bias* menu.

Internal

In this mode the Ukon uses an internal 2:2 film sequence generator. Incoming field ones are treated as the first field of the film frame and input field twos are treated as the second field of the film frame. If the input dominance is reversed the internal sequence may be inverted using the *Convert-Film Ctl-Invert* button. This is most often useful for SF format inputs, which should have strictly maintained normal dominance.

External

In this mode the Ukon uses an external TTL pulse from the 3:2 Flag In BNC connector on the rear panel. This can be driven by a Telecine pulldown output to indicate the incoming film sequence. The meaning, sense and delay of the input pulse are set using the *Convert-Film Ctl-External* sub-menu settings. This allows the specification of arbitrary film sequences. The pulse can indicate either the presence of a new film frame or, the presence of a repeat field (e.g. the third field of a 3:2 sequence B frame). There is a separate delay setting for the external pulse which allows the user to align the pulse with the video at the input of the Ukon. The pulse can be specified as active high or active low.

Timecode (Trig)

In this mode the Ukon uses the internal free running 2:2 or 3:2 sequence generator as described in Free Run mode above. However, the phase of the free running sequence generator is reset by the timecode on the incoming video. The input timecode value that causes the free run generator to be reset is set on the *Utils-Timecode-Trigger* menu. The phase of the free run generator at the reset point is set using the *Convert-Film Ctl-Flag Delay* menu setting.

This method is suitable for program material with continuous film sequence. If the program is stopped or paused then it is not necessary to re-phase the sequence generator once the program has been restarted provided, the timecode trigger value is once again passed. This allows the user to preview material any number of times without having to reset the free running sequence generator phase.

Timecode (0 & 5)

In this mode the Ukon uses the internal free running sequence generator. The free run generator is reset whenever the input video timecode has a frame count of zero or 5. This is useful when the incoming 3:2 sequence has a timecode locked sequence. Note that this method can only work if the incoming timecode is non-drop frame. Also, the phase of the free run generator at the 0 and 5 frame counts is set by the *Convert-Film Ctl-Flag Delay* menu setting.

This method is suitable for program material with continuous film sequence. If the program is stopped or paused then it is not necessary to reset the free running sequence generator phase as it will be reset at the following 0 or 5 frame timecode count.

Remote

In this mode the Ukon uses a combination of the internal free running sequence generator and the RS-422 remote control port as the source of film sequence information. The film sequence information can be sent every field using the RS-422 connection so that arbitrary film sequences can be identified. Alternatively, the remote controller can send occasional film sequence phase commands when the sequence changes and the Ukon input film sequence will free run in between them with the last defined phase. The Free Run type (2:2 or 3:2) is determined by the *Convert-Film Ctl-Free Run-Type* menu setting. Note that in this mode the Free Run Flag Delay menu setting has no effect as the phase of the film sequence is determined solely by the incoming RS 422 commands.

Film Sequence Detection Problems

When the Ukon is doing Film processing there are a number of pitfalls waiting for the unwary. These can cause sequence detection failure and problems with the conversion. Some of them are noted here.

Captions

It is quite commonplace for electronic captions to be placed over film material. This is fine if the captions are stationary, however if the captions are moving then this can cause problems if the caption motion is not synchronised with the underlying film material motion profile. For example, if captions are scrolling and they move every field (i.e. they are video captions) then this can cause two problems. Firstly, if the internal film sequence detector is in use it may think that the material is video and change to a video mode. This could involve continuous use of a single field filter and this can give problems in areas of vertical detail. Secondly, it may not 'see' the captions and it will continue to extract the underlying film sequence. This will cause the caption area of the signal to be distorted by the film filters. This will also happen if an external source of film sequence is applied which signals the underlying film sequence rather than the video captions. The exact behaviour of the internal film sequence detector will depend upon the relative amounts of detail in the captions and the film and the amount of motion and so it is very material dependant. Using the Normal or Anti-Alias rather than the Sharp film aperture will help reduce the visibility of picture disturbance as will the use of the Safe aperture. Depending on the output standard in use, it may be necessary to put the Ukon into Video to SF mode, Video to 3:2 mode, Film to SF or Film to 3:2 mode to convert the captions to a film style motion profile even though the underlying material is already film.

Video effects

If film material is processed using electronic video effects then this can effectively convert the film material into video. This is commonly seen when the film material is electronically faded. The fade level changes every field to give a smooth effect. Unfortunately this means that to the Ukon the scene changes every field which it interprets as video. If the unit is operating in a film mode this can cause continuous use of a single field filter, tearing of the scene or disrupted output sequence. To avoid these problems the unit must be put into one of the safe modes (e.g. by using the Safe aperture) or, the incoming material must be treated as video and converted to film for the duration of the effect. If the internal sequence detector is being used, the Ukon is in a film mode and Adaption is turned on, then, it should be reasonably tolerant of this kind of effect, as it will adapt the filters appropriately. If strictly correct output film sequence is required then the Film to 3:2 or Film to SF modes may be required. In this case the Ukon may be forced to drop or repeat frames from the underlying film as the 'true' film sequence is masked by the video fade. The same problems occur when there is a fade between two film segments that have different film sequence phases.

Varispeed Playback

Off-speed playback can cause some problems with field sequence detection. The problems usually occur when the slow down or speed-up is done by shifting material up and down to simulate material with the opposite sense of interlace. For example, to slow down some 3:2 material it may be necessary to generate an extra field two. One way of doing this is to take the preceding field one and shift it vertically. This won't be very visible to the eye during playback. Unfortunately, if the scene contains a reasonable amount of vertical detail the film sequence detector will 'see' the picture shift and it will think that it represents a change in camera position say. This produces an orphan field instead of the extra repeat field. This shouldn't be very visible at the converter output, as it will just produce an isolated field built with (say) the single field filter but, it won't cause any tearing effects. The sequence detector bias can be adjusted to compensate for this (see above).

In addition, if the Ukon is doing a conversion like Film to SF or Film to 3:2 then, Varispeed will often require a large number of dropped or repeated film frames. This can give the output an undesirable motion profile which results in jerky object movement. The dropped or repeated frames are inevitable, as the Ukon has to produce output frames at a constant rate in real time.

Artificial Motion Profiles

Another common effect is changing the timeline of a piece of material by dropping or inserting frames or fields. This is not normally a problem however it can cause problems if the object motion from field to field is inconsistent. For example, if an object is moving with a fairly steady and reasonably large motion then, for one field it moves a much smaller amount before resuming the large movements then this can cause the motion to be misinterpreted as a repeat field rather than an orphan.

Input and Output Field Rates

It is worthwhile considering carefully the input and output field rates before undertaking a conversion. This is particularly true for the one part in a thousand field rate difference associated with 59.95 and 60Hz (and also of course with 23.98 and 24Hz). Every time the input and output syncs run through a frame, the Ukon must drop or repeat a field or frame to compensate. A field repeat or drop is much less visible than a frame drop. Field repeats or drops tend to be used in video modes whereas film modes tend to use frame drops. This means that the run through can be much more apparent in film modes.

So, if the input field rate is 59.94Hz it is much better to convert to output frame rates of 59.94, 47.95 or 23.98 rather than 60, 48 or 24Hz. Similarly, if the input is 24Hz the ideal output frame rate would be 24, 48 or 60Hz. Also, the input and output sync trains should be locked together. This is very easily achieved with the Ukon if the unit is locked to the input signal. This can also be achieved with the use of common reference signals.

Output Film Sequence

When the Ukon is converting to SF or 3:2 output formats then it uses an internal output film sequence generator to produce the output film sequence.

When the output format is SF there is no need to control the output film sequence, as it is always Normal dominance. i.e. an output frame is made of a field one and the following field two.

When the conversion produces a 3:2 style output then the phase of the 3:2 may need to be linked to the timecode inserted at the output of the Ukon. For example, it may be desirable to have an A-Frame at the on-the-hour timecode value. The Ukon can do this and, the methodology is described in another Ukon Application Note - "Ukon Timecode Operation"

Application Note - The Ukon Timecode Modes

The Ukon can use a number of different methods for the insertion of timecode. This document contains notes concerning the operation of the various timecode modes and options and, how to link the timecode operations to output film sequence. These notes relate to Ukon software version A4_0_000 and onwards (released in April 2003).

Operating Concepts

The Ukon has the ability to monitor its input video timecode and act upon it in a variety of user selectable ways to change the output timecode that it inserts. In addition, when it is doing certain film conversions it can lock the Ukon output film sequence to the timecode that it is inserting. The combination of these two factors provides very powerful video processing ability. For example, it is possible to specify that a given input frame will produce an output frame with a specified 3:2 sequence phase and timecode and that the Ukon will output "perfect" 3:2 sequence. This is a very useful technique for 3:2 re-mastering.

The Ukon timecode insertion is principally based upon two timecode concepts. The first of these is the Timecode Trigger and the second is the Timecode Preload.

*The Timecode trigger is simply the value of input video (source) timecode that will cause an output timecode event to occur. In other words, when the input video timecode equals the trigger value, the Ukon will modify the timecode it inserts according to the user specified timecode synchronisation mode. If the input timecode is drop frame then it is essential to ensure that the Trigger value entered is a **legal drop frame value**. If a value is entered that cannot occur in drop frame timecode then a Trigger will not happen. The timecode Trigger value is entered on the Ukon Utils-Timecode-Trigger menu page.*

*The Timecode Preload is the value of output timecode to be inserted on the video frame that the Ukon generated from the input video frame with the Trigger timecode value. Note that in doing this the Ukon automatically compensates for its internal processing delay. If the output timecode is drop frame then it is essential to ensure that the Preload value entered is a **legal drop frame value**. If a value is entered that cannot occur in drop frame timecode then the Ukon output timecode will not be standard drop frame timecode and this could cause problems with downstream equipment. The timecode Trigger value is entered on the Ukon Utils-Timecode-Manual menu page.*

The Timecode Synchronising Modes

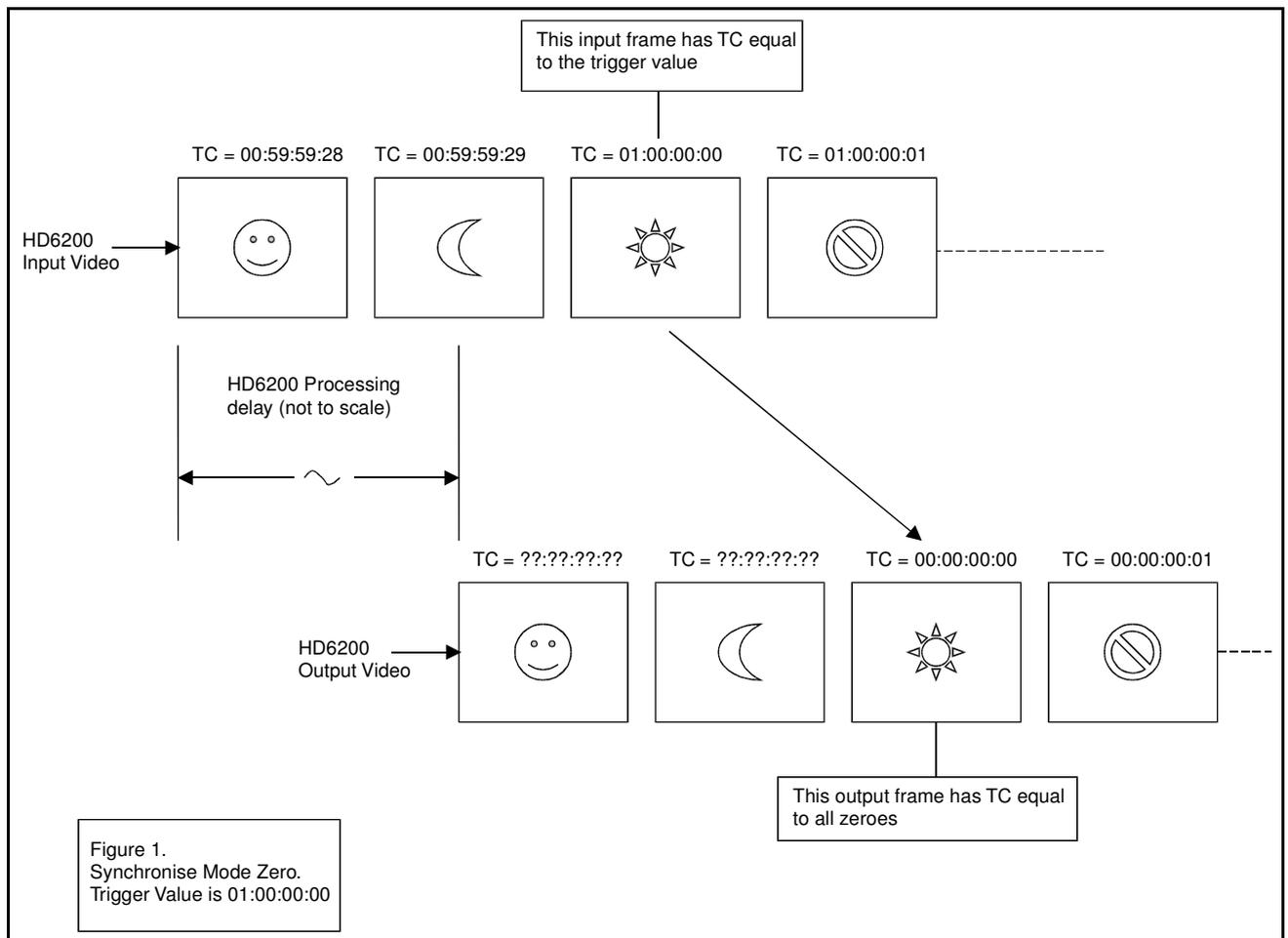
The timecode synchronising mode is selected from the Utils-Timecode-Config-Sync menu page. The Ukon has the following timecode synchronising modes available:-

Manual Mode

In this mode, the timecode trigger value is not used. The timecode can be set to all zeroes at any point by pressing the Zero button. Alternatively, the output timecode can be set to the Preload value at any time by pressing the Preload button. The output timecode is not affected by the input timecode. The Zero and Preload buttons are located on the Utils-Timecode-Manual menu.

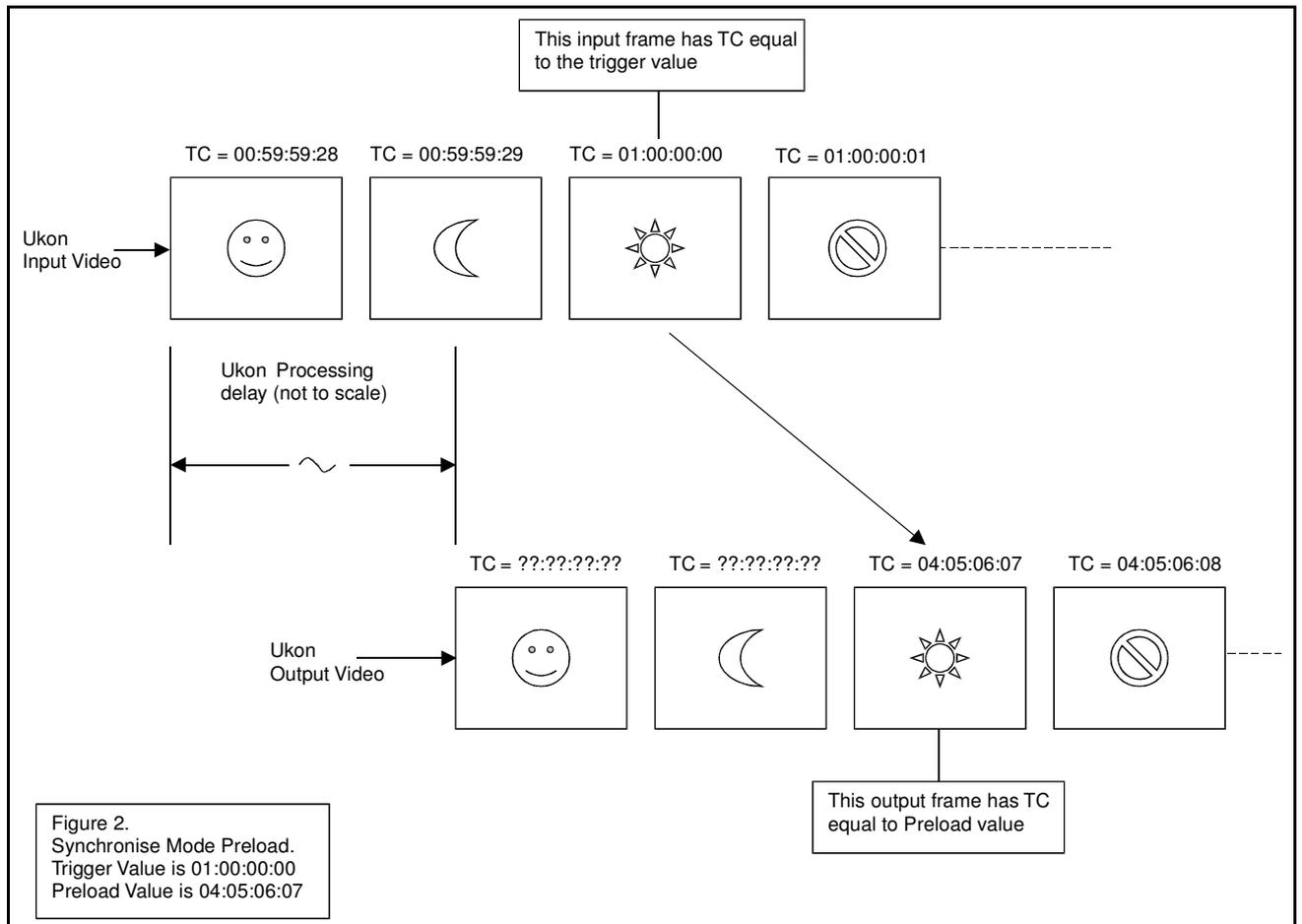
Zero Mode

In this mode, when the input video timecode is equal to the timecode trigger value, the output timecode is set to be all zeroes (zero hours, zero minutes, zero seconds and zero frames). This is illustrated in Figure 1. In this example the trigger timecode has been set to the one-hour point (01:00:00:00). When the Ukon produces an output video frame from the input frame that had timecode 01:00:00:00 this frame will be stamped with the all zeroes timecode (00:00:00:00) and the inserted timecode will free run from there onwards. This mode can be used even when the Ukon is standards converting because, the output timecode generator free runs after it has been reset by the input video timecode.



Preload Mode

In this mode, when the input video timecode is equal to the timecode trigger value, the output timecode is set to the user entered Preload value. This is illustrated in Figure 2. In this example the trigger timecode has been set to the one hour point (01:00:00:00) and the Preload value has been set to 04:05:06:07. When the Ukon produces an output video frame from the input frame that had timecode 01:00:00:00 this frame will be stamped with the Preload timecode (04:05:06:07) and the inserted timecode will free run from there onwards. Once again this mode can be used even when the Ukon is standards converting because, the output timecode generator free runs after it has been reset by the input video timecode.



Synchro Mode

Synchro mode is an enhanced version of Preload mode. A common requirement is to have a synchronised timecode point, that is, where a given input timecode produces a specified output timecode and, in addition, to have continuous output timecode for some period prior to the synchronisation point.

For example, suppose that we have some input program material that has its first frame at timecode 01:00:00:00 and we require the Ukon to make the first output program frame with timecode 02:00:00:00. In addition the input program material has a particular test pattern for about 30 seconds prior to the first program frame and, it is desired to transfer the test pattern to the Ukon with continuous timecode through both the test pattern data and the program material

This could be achieved using Preload mode as described above. However, the user would have to calculate the Trigger and Preload points by working backwards from the synchronisation point. This can be a very difficult calculation if the input or output timecode is drop frame and/or the Ukon is doing frame rate conversion.

In Synchro mode the Ukon will perform this calculation itself. The user enters the desired synchronisation point just as in Preload mode. Thus in our example the trigger would be set to 01:00:00:00 and the Preload is set to 02:00:00:00. The program material to the Ukon is then started. Once a stable input to the Ukon is available the User can press the Synchro button. Once this has been done the Ukon will perform the required timecode calculations. A few seconds after the Synchro button has been pressed, the Ukon output timecode will reset to a new value and will free run from that point. When the input timecode reaches the Trigger value the output timecode will have the Preload value as desired.

The operation of Synchro mode is shown in Figure 3.

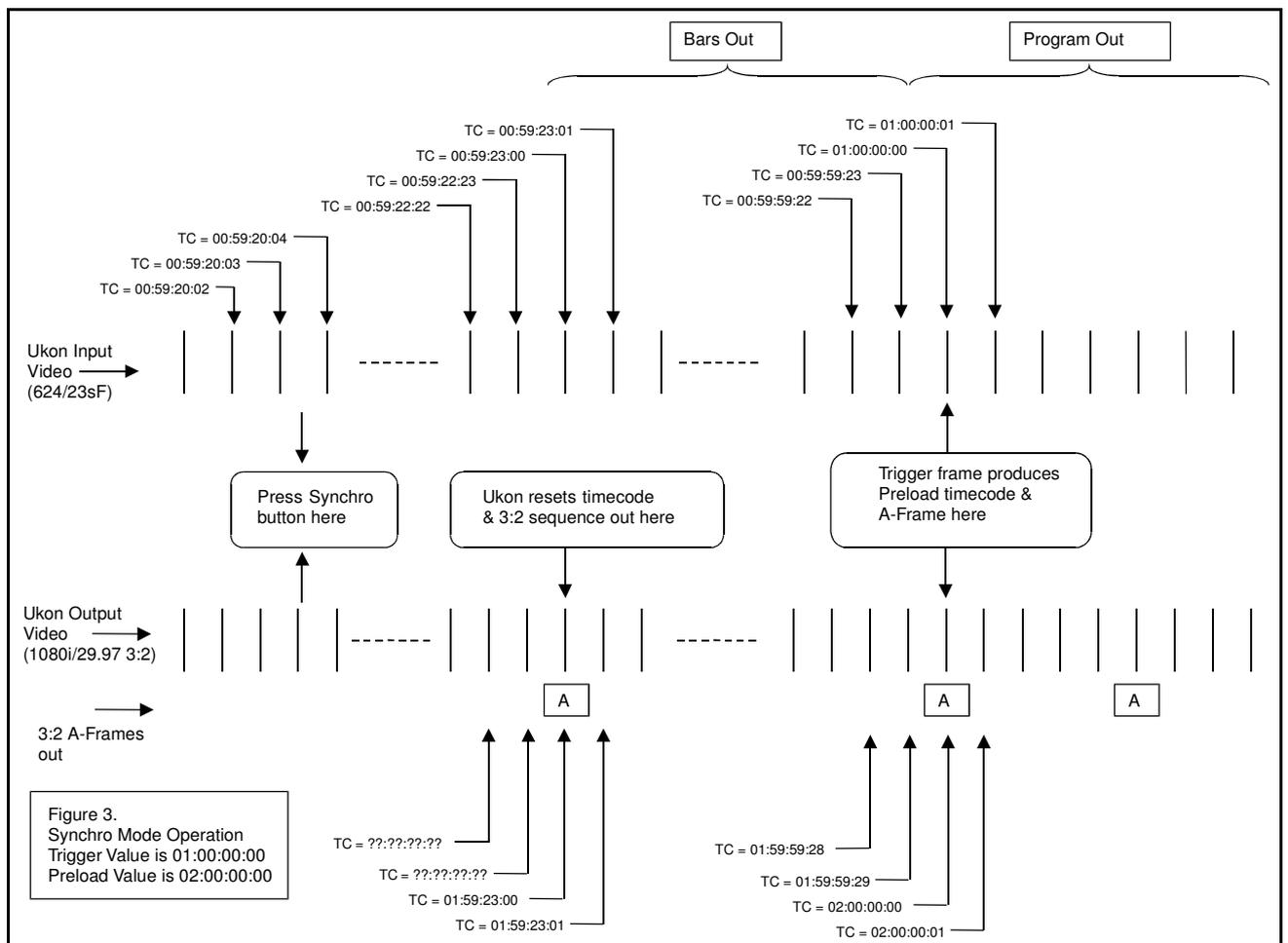


Figure 3.
Synchro Mode Operation
Trigger Value is 01:00:00:00
Preload Value is 02:00:00:00

Note there are some precautions that must be taken if Synchro mode is to be used reliably.

1. The timecode calculations have to assume that the input and output of the Ukon are locked together. This does not mean that they have to be the same frame rate but it does mean that either the Ukon is genlocked to its input video or, the video source and the Ukon are locked to a common reference. Thus, 1080i/29.97 can be converted to 1080sF/23.98 with no problem provided the genlock conditions are met. This means that the Ukon must be locked to its reference **before** the Synchro button is pushed.
2. Synchro mode does **not** allow for conversions that have a one part in a thousand frame rate difference. For example, 1080i/29.97 to 1080sF/24 will not give reliable results even if the genlock constraints are met. The timecode calculations cannot allow for the relative sync positions at the time the Synchro button is pushed and so, cannot provide a reliable result in these circumstances.
3. In Synchro mode the output timecode generator free runs once the Synchro reset has been done. Thus, the input video must have **continuous timecode** and must be played in at **normal speed** for successful synchronisation to occur. If for example the input is paused and then restarted it will be necessary to push the Synchro button again once the input is running at normal speed. The Synchro button can be pushed more than once without problem.
4. Because of the time taken to perform the timecode calculations and the need to calculate a Trigger point in advance of the current input timecode there is a minimum time before the synchronisation point that the Synchro button must be pressed. The minimum time varies with input and output frame rates but use of a minimum time of around ten seconds will always work. If insufficient continuous timecode before the synchronisation point is available for successful Synchro operation Preload mode should be used with the Trigger and Preload values set before the synchronisation point. The delay between pressing the Synchro button and the output timecode changing is not fixed and will vary with the input and output standards and the input timecode present at the moment the button is pressed.
5. If a slow PAL (625/23sF or 625/24sF) signal is being used as either the input or output standard then it is essential to ensure that the Ukon slow PAL timecode maximum frame count is set to the correct value or the timecode calculations will not be correct. The Ukon can handle slow PAL timecode that counts either from 0 to 23 frames or, 0 to 24 frames.
6. The input timecode drop frame flag embedded in the incoming timecode is read and used in the timecode calculations. It is essential that this flag is set correctly.

Note the Synchro button is located on the *Utils-Timecode-Manual* menu page. The button is disabled if the timecode synchronisation mode has not been set to Synchro.

Echo Mode

In this mode, when the input video timecode is equal to the timecode Trigger the output timecode is set to the Trigger value. This is equivalent to Preload mode with the Trigger and Preload set to the same value. If either the input **or** output timecode are drop frame then the Trigger value must be a legal drop frame value. If the Ukon is frame rate converting then it is possible that the Trigger timecode could be an illegal output timecode value. For example, if the Ukon is converting from 1080i/29.97 to 1080sF/23.97 the input timecode frame count goes from 0 to 29 whilst the output timecode goes from 0 to 23. Thus if the Trigger timecode frame count is set to more than 23 this will be an illegal output timecode but a legal input timecode. In this case the output timecode frame count load value is clipped to the maximum legal value (23 in the example).

E-E Mode

In E-E mode the input timecode is fed through to the output video. This mode keeps the hours, minutes and seconds of the output timecode the same as the input timecode. The behavior of the output frame count will depend upon the format conversion being undertaken. This works even when the input timecode is discontinuous.

In version A4_0_000 E-E mode has been significantly enhanced so that it can be used even when format conversion is taking place. There are rules governing the operation depending upon the format conversion and these are as follows:

Irrespective of the format conversion, the hours, minutes and seconds are handed over from input to output.

If the frame rate of the input and output formats are the same and the interlaced/progressive nature of the timecode at the input and output are the same then the frame count is also handed over. Note that in this context 720P/60 and 720P/59.94 have interlaced timecode as it uses the timecode field mark bit.

If the frame rates of the input and output are different then the frame count free runs but is reset at second changes of the input timecode.

If the frame rates of the input and output are the same, the drop frame flag from the input timecode is handed over.

If the frame rates at the input and output are different the drop frame setting of the output timecode is determined by the drop frame menu setting. (Unless the output frame rate is 25 or 50Hz in which case drop frame out is disabled).

There is an issue with 720P/60 and 720P/59.94 when converting to interlaced output standards (e.g. 1080I/29.97) if the UKON is referenced to the 720P input or reference. In these 720P standards the timecode only counts from 0 to 29 frames and utilizes the field mark flag as if the video stream was interlaced. Unfortunately, the 720P sync/video signal only contain frame rate information not, half frame rate information. This means that the UKON can reference to the 720P signal in two possible ways. The output field ones can be aligned with the 720P timecode with the field mark either low or high. Thus, there is an unavoidable uncertainty in the hand-over of timecode from 720P to interlaced standards of one frame.

Combining Timecode with 3:2 Film Sequence Output

We have already seen that the Ukon can be set-up such that a given input frame can be used to make an output frame with a specified timecode. Taking this a step further, if the Ukon is using its internal 3:2 sequence generator to output "perfect" 3:2 sequence then, we can also link the 3:2 sequence phase to the output timecode. This enables us to say that a given input frame will produce an output frame with a specified timecode and, a particular 3:2 phase. The Ukon internal 3:2 sequence generator will be used whenever the Ukon is in Video to 3:2, Film to 3:2, sF to 3:2 or 1:1 to 3:2 conversion modes.

Note that the internal 3:2 sequence generator reset must be enabled from the Convert-Film Ctl-Free Run-3:2 Reset menu entry. The default for this setting is disabled. The menu item next to this (Convert-Film Ctl-Free Run-Reset Frm) controls the reset phase of the 3:2 generator when a reset is requested. The 3:2 sequence can be reset to either an A-Frame or a B-Frame. C and D-Frames are not available as reset phases unless the Ukon is in timecode synchro mode. This is because it is illegal to change the timecode frame count between a field one and a field two. Thus, if the 3:2 sequence was reset to a C or D frame (which begin on a field two), either the timecode would not match the film sequence as desired or, illegal timecode would be generated. In timecode synchro mode the reset is done in advance of the synchronization point so it can be adjusted to ensure that legal timecode is produced.

If the 3:2 sequence reset has been enabled, the internal 3:2 sequence can be reset whenever the Ukon has been put in a timecode synchronising mode that uses the timecode Trigger value. So, the reset will occur in Zero, Preload, Synchro and Echo modes. The reset will **not** happen in Manual or E-E modes, which do not use the timecode trigger value. The 3:2 sequence reset occurs on the same output frame that the timecode reset is undertaken.

For example, suppose that we have 625/23sf input and we wish to convert it to a 1080i/29.97 output by inserting 3:2 sequence into the input 2:2 stream. We also wish to have the input frame with timecode 01:00:00:00 emerge from the Ukon with timecode 02:00:00:00 and, we wish this frame to be an A-Frame. Finally, there is about 30 seconds of Bars before the start of program on the source tape and we wish to transfer these to the output yet have continuous timecode through the Bars and synchronise point.

The set-up steps required for this example are shown in

below. The first column shows the function being set-up. The second column shows the setting that is picked for the example conversion. The third column shows the Ukon menu where that setting can be made. Note that the Table probably shows more set-up steps than would be required in practise. Many of the factory default values will actually be correct.

The set-up operation has selected timecode Synchro mode so that we can have continuous timecode before the synchronisation point. Once the set-up is complete the simple steps shown in can be followed to do the actual conversion.

The combination of Timecode Synchro and 3:2 sequence resetting is shown in Figure 3.

Notes On Setting Trigger Points with Film Inputs

If the Ukon is being used with film inputs and timecode trigger points are being set, then it is advisable not to set the Trigger point on Orphan fields. This is because the Ukon will often be able to discard Orphan fields at its output in order to avoid the production of soft output frames. If this happens the Trigger frame will not appear in the output stream and the timecode trigger will happen on the input frame following the frame on which the Trigger was set. For added safety when using the Ukon sequence detector it is usually best to set the trigger point on the first field of a film frame if possible. This provides added protection against sequence detection problems.

Table 1 -Setting the Ukon for timecode synchronised 3:2 reset.

<i>Function</i>	<i>Example setting</i>	<i>Menu Name</i>
<i>Apply the input video to the Ukon.</i>	<i>[625/23sF]</i>	
<i>Select the desired output standard</i>	<i>[1080i/29.97]</i>	<i>Output-standard</i>
<i>Enable genlock</i>	<i>[Enable]</i>	<i>Reference-Enable</i>
<i>Set the reference source</i>	<i>[Lock to input]</i>	<i>Reference-source</i>
<i>Select the required conversion mode</i>	<i>[sF to 3:2]</i>	<i>Convert-Mode</i>
<i>Select the source of film sequence information</i>	<i>[Internal]</i>	<i>Convert-Film Ctl-Flag Src</i>
<i>Turn on resetting of the 3:2 output sequence</i>	<i>[On]</i>	<i>Convert-Film Ctl-Free Run-3:2 Reset</i>
<i>Set the desired 3:2 reset phase</i>	<i>[A-Frame]</i>	<i>Convert-Film Ctl-Free Run-ResetFrm</i>
<i>Select the desired aperture</i>	<i>[Sharp]</i>	<i>Convert-Film Ap-Aperture</i>
<i>Turn on the timecode output</i>	<i>[Enable]</i>	<i>Utils-Timecode-Enable</i>
<i>Set the output timecode to drop frame</i>	<i>[Drop Frm]</i>	<i>Utils-Timecode-Config-Drop Frm</i>
<i>Set the input timecode to be VITC</i>	<i>[VITC]</i>	<i>Utils-Timecode-Config-SD-TC Source</i>
<i>Set the input VITC line number</i>	<i>[14]</i>	<i>Utils-Timecode-Config-SD-VITC In</i>
<i>Set the slow PAL timecode frame count</i>	<i>[23]</i>	<i>Utils-Timecode-Config-SD-Slow PAL</i>
<i>Set the timecode sync mode</i>	<i>[Synchro]</i>	<i>Utils-Timecode-Config-Sync</i>
<i>Set the input timecode trigger value</i>	<i>[01:00:00:00]</i>	<i>Utils-Timecode-Trigger</i>
<i>Set the output timecode preload value</i>	<i>[02:00:00:00]</i>	<i>Utils-Timecode-Manual</i>

Table 2 - Making a conversion

Cue source VTR to start of Bars
Start source tape
Stable timecode from VTR, press the Synchro button
Once the Ukon has reset its timecode and 3:2 sequence output, start recording the Ukon output.

RollTrack Audio Delay Tracking

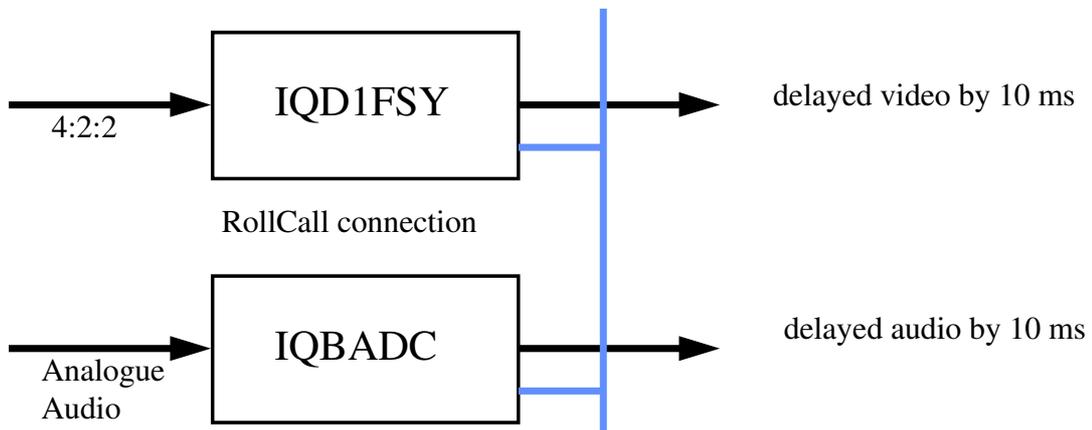
RollTrack is a feature of RollCall™ (Snell & Wilcox's proprietary remote control system), that allows devices to communicate across the RollCall network with no direct user intervention.

RollTrack Audio Delay Tracking enables Snell & Wilcox RollCall™ compatible audio delay products to track delay introduced by RollCall™ compatible video processing products.

The current products that implement RollTrack Audio Delay Tracking are:

Audio Delay Modules	Video Modules	Other Products	
IQBAAD	IQD1FSY	ALCHEMIST	MDD3000
IQBADC	IQDMSDS	CPP100	MDD550
IQBDAC	IQDAFS	CPP200	MDD560
IQBDAD	IQDMSDS	NRS500	MDD570
IQBSYN	IQDMSDP	HD5050	MDD2000
IQBADCD	IQDSYN		

The simplest configuration is a single video unit and a single audio delay in a RollCall™ system. The audio delay will have the same delay as through the video path. If the delay changes the audio delay will track.



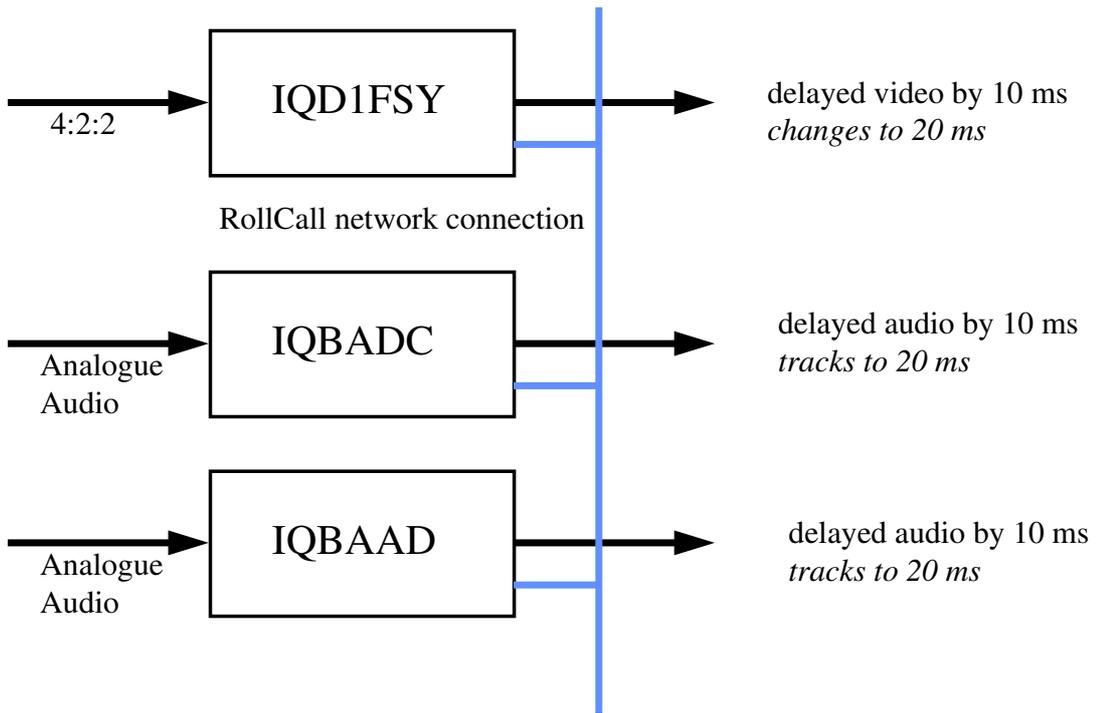
The next level of configuration is where there are multiple Frame Synchronizers (for example) each connected through RollCall™ to their own tracking Audio Delay. (It is worth stating that the synchronizers and audio delays do not have to be in the same enclosure; the addressing scheme, discussed later, allows for the units to be positioned anywhere in the RollCall™ domain.)

The maximum number of video units and audio delays in a RollCall™ system is set by the maximum limit of the number of modules in a RollCall™ network and is currently 3840 on a single network without bridges.

The unique identification of the destination unit (a decimal number) for various modules is as follows:

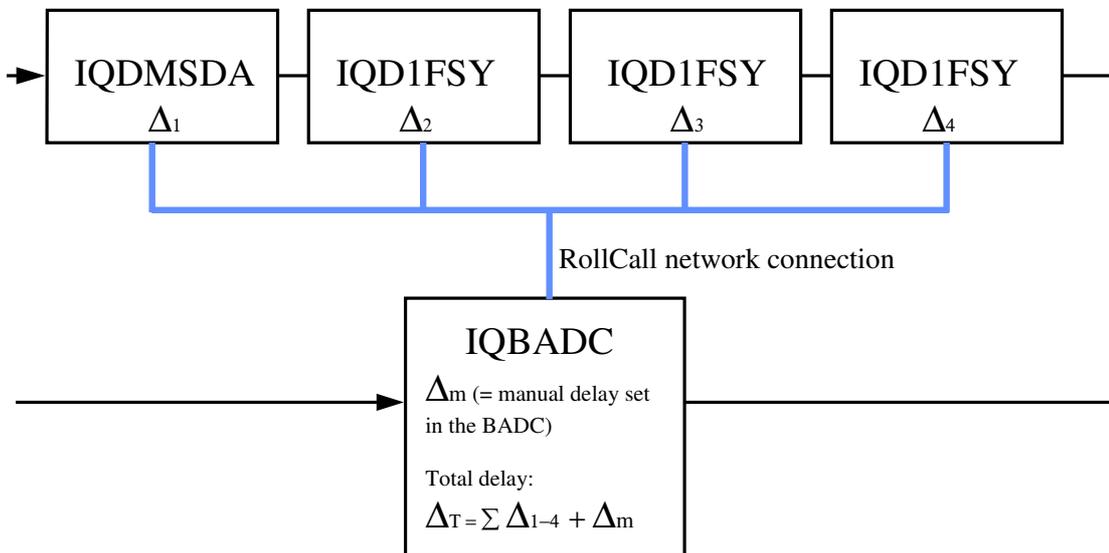
Module	ID
IQBADC	51
IQBDAC	52
IQBAAD	53
IQBDAD	54
IQBSYN	89
IQBADCD	107

The next level of complexity is a *vertical delay cluster* where a video unit can have up to eight audio delays tracking - of the same or different types.



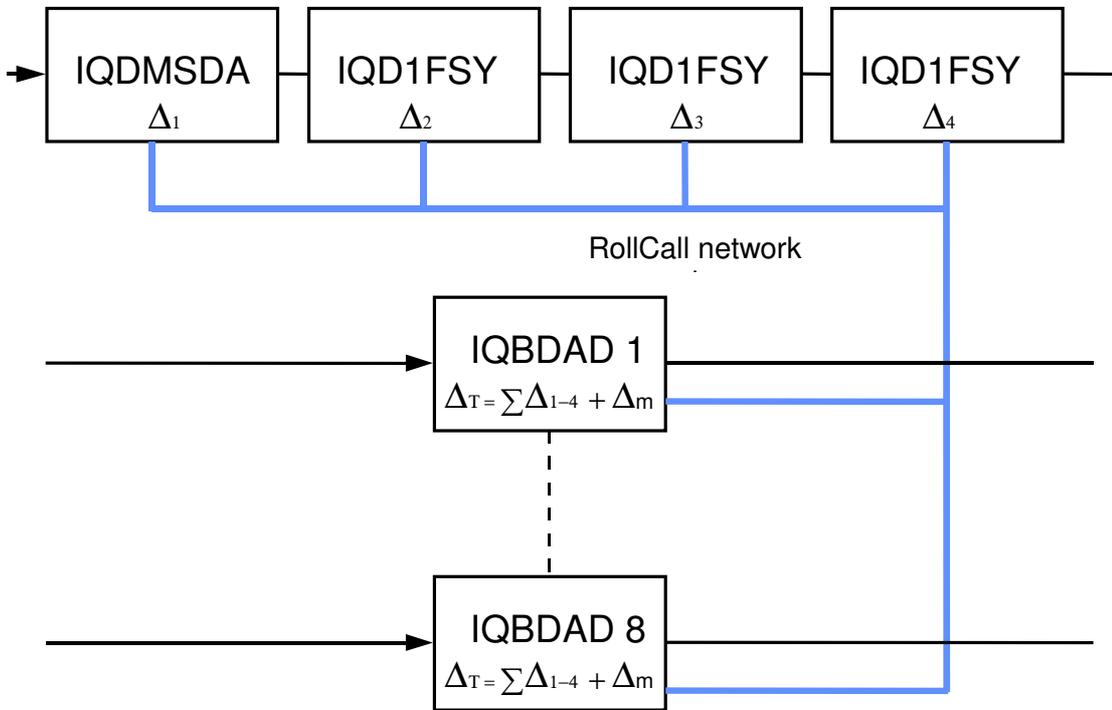
From one to eight audio delay products can be connected via RollCall™ to a single frame synchronizer, for example. If the synchronizer delay changes, then however many audio delays are connected will track the delay. The audio delays can also have a manual delay which will be added to the RollTrack delay.

The next level of complexity is a *horizontal delay cluster* where an audio delay can track up to four video units.



The total delay time through the audio delay is then the sum of the individual delays introduced by the video units plus the manual delay of the audio unit. The manual delay can be set to compensate for any fixed propagation delay in the video path or may be set to zero.

The next level of complexity is a *matrix delay cluster* where each audio delay (up to eight) can track up to four video units. This configuration is in effect a four by eight matrix of video units and audio delay units. The total delay time through the audio delay units is then the sum of the individual delays introduced by the video units plus the manual delay of the audio unit.



As any of the delay times change in the video path so will the audio delay time track this delay. A virtual connection is made between from, say, an IQD1FSY to an IQBDAD by:

- selecting the *Setup...* Menu of the IQD1FSY
- then selecting the *Audio_Delay...* Menu
- then choosing from *Unit_1* to *Unit_8*
- then entering the unique network address of the IQBDAD in the form $nnnn:xx:yy*z*d$
- where $nnnn$ = network address and in most cases will be 0000(hex);
- xx = IQ enclosure address (hex);
- yy = slot address of the IQBDAD (hex)
- z = the connection (or channel) number (decimal) - see table below.
- d = the unique identification of the destination unit (decimal) The ID entered must match the

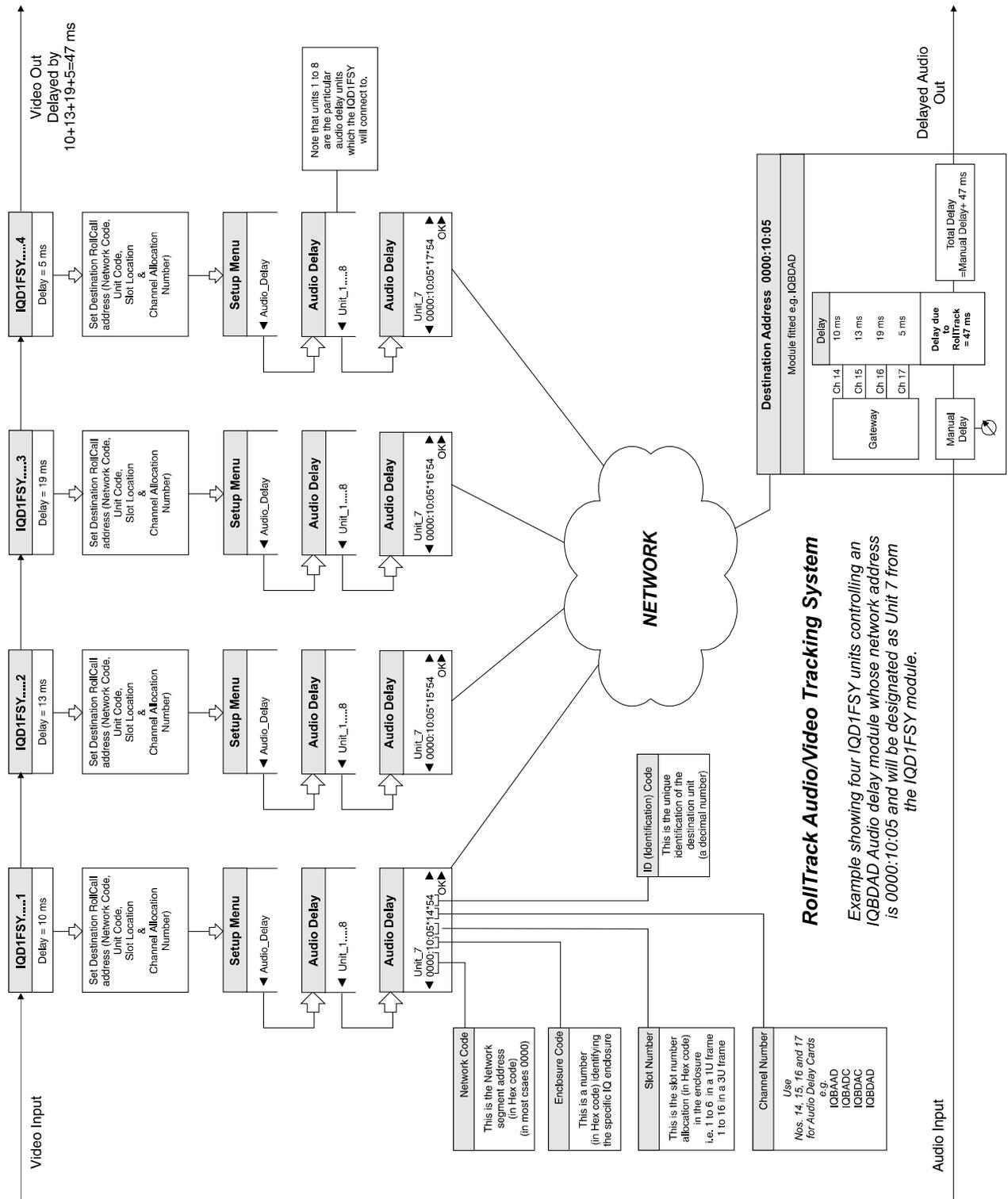
receiving units own ID or else the command will be ignored. If the ID value is set to 00, the receiving unit does not perform an ID match and will always accept the incoming command

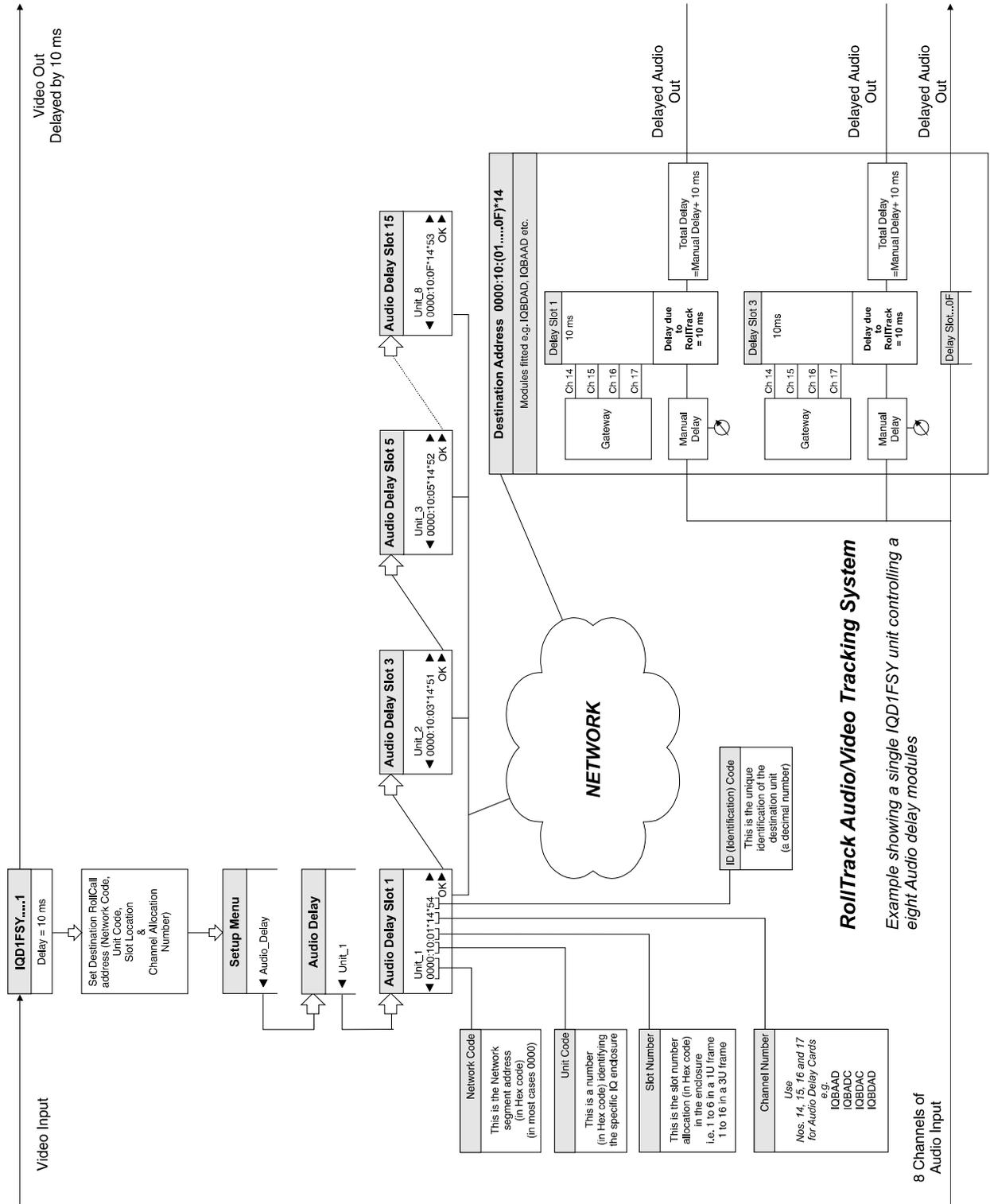
- then selecting the *Delay...* Menu of the IQBDAD
- then selecting *RollTrack*

Example of Network Addresses with Channel Numbers and ID Numbers

	D1FSY 1	D1FSY 2	D1FSY 3	D1FSY 4
Audio delay 1	0000:10:01*14*54	0000:10:01*15*54	0000:10:01*16*54	0000:10:01*17*54
Audio delay 2	0000:10:03*14*54	0000:10:03*15*54	0000:10:03*16*54	0000:10:03*17*54
Audio delay 3	0000:10:05*14*54	0000:10:05*15*54	0000:10:05*16*54	0000:10:05*17*54
Audio delay 4	0000:10:07*14*54	0000:10:07*15*54	0000:10:07*16*54	0000:10:07*17*54
Audio delay 5	0000:10:09*14*54	0000:10:09*15*54	0000:10:09*16*54	0000:10:09*17*54
Audio delay 6	0000:10:0B*14*54	0000:10:0B*15*54	0000:10:0B*16*54	0000:10:0B*17*54
Audio delay 7	0000:10:0D*14*54	0000:10:0D*15*54	0000:10:0D*16*54	0000:10:0D*17*54
Audio delay 8	0000:10:0F*14*54	0000:10:0F*15*54	0000:10:0F*16*54	0000:10:0F*17*54

The most complex system would be an array of matrix delay clusters





Application Note - Real Time Control of the Ukon

Introduction

UKON software version A4_0_000 released in April 2003 introduced the concept of input and output locked updating of UKON parameters. This application notes aims to explain the operation of these modes and outline the implications of their use.

What is Input and Output Locking

The input and output locking control determines the way in which the Ukon updates its output image size and position. This in turn affects the way that the Ukon polls its remote control ports – RS 422, RollCall BNC and GPI and the way the unit responds to front panel display change commands.

Output Locked Mode

If the Ukon is set to output locked mode, the size and position of the output video image are updated (if required) on every output field boundary. This behaviour can be modified by the *Display-Slew-Update* menu item (see below). Similarly, the remote control ports are polled every output field. In this mode remote control display size/position commands should be present at the Ukon control port four input fields before the output image change is required. This is illustrated below: -

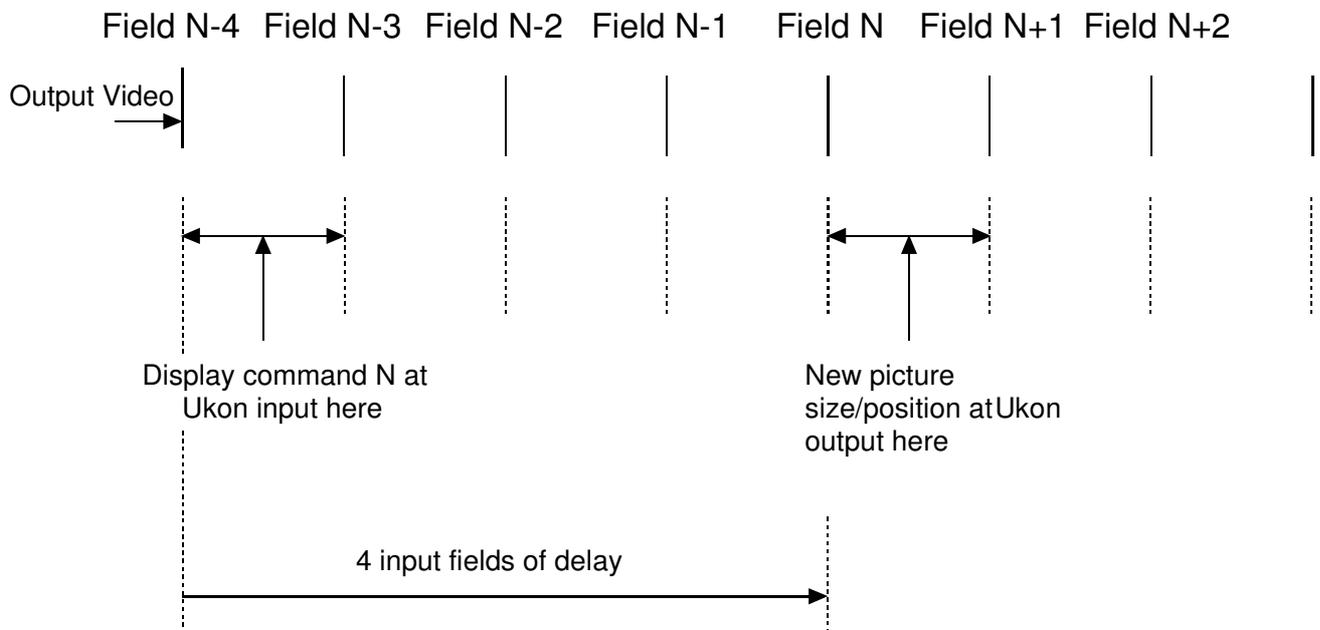


Fig 1. Output Locked Mode

In this mode no account is taken of the input standard or the format conversion being undertaken. The output picture always changes four output fields after the command is present at the Ukon input.

If the output is progressive and not interlaced or segmented frame (sF) format, the system works in the same way but the delays are in frames rather than fields. Thus, in output locked mode with a progressive output format, the display commands should be at the Ukon input four output frames before the display change is required.

Input Locked Mode

If the Ukon is set to input locked mode, the size and position of the output video image are updated (if required) every time a new input field is used to build the output. As the display size and position values arrive at the Ukon they are associated with input video fields to the Ukon. As the video makes it's way through the Ukon the size/position parameters stay with that video field. The remote control ports are polled every input field. The display change commands should be present at the Ukon control port four input fields before the input field to which they relate.

This is illustrated in Figure 2: -

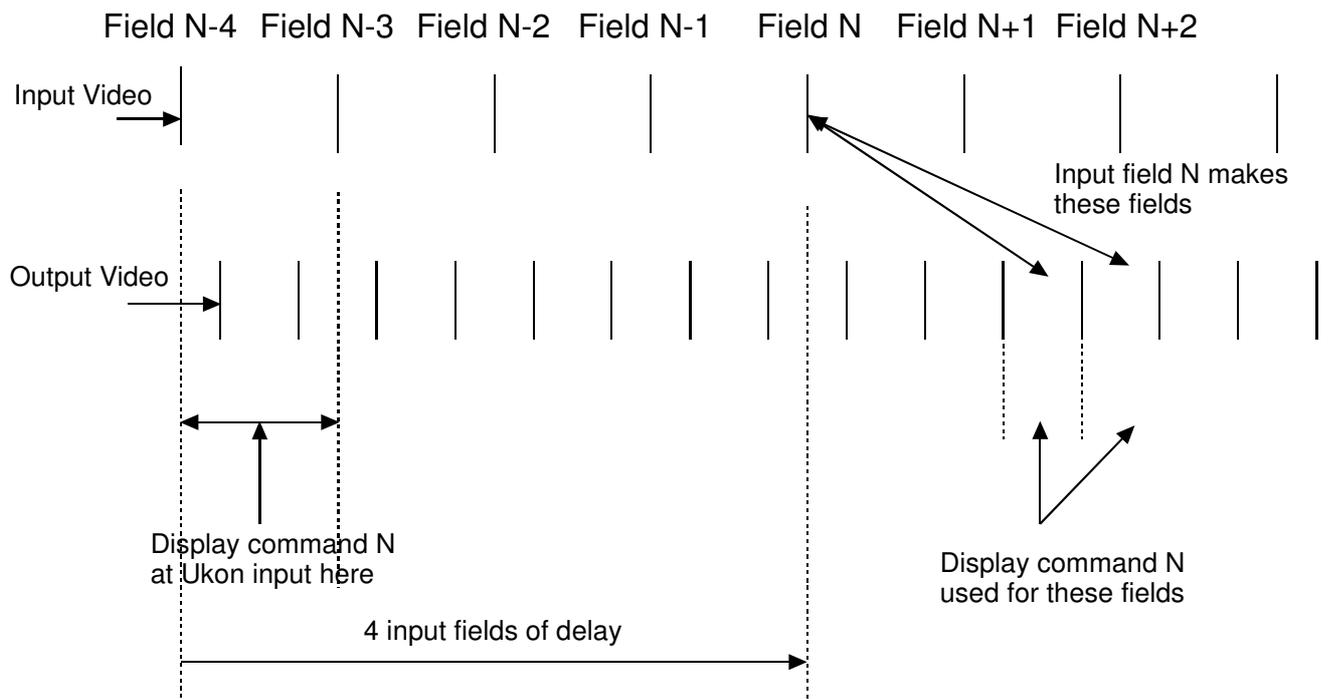


Fig 2 Input locked Mode with frame rate increase format conversion

In Figure 2 an input stream is shown, the fields are numbered N-4, N-3, N-2 etc. In the example the output frame rate is higher than the input frame rate. The display commands received whilst input field N-4 was present at the Ukon input are applied to input field N. Thus, as soon as input field N is used to build an output field, the display commands supplied during input field N-4 are used.

If the input is progressive and not interlaced or segmented frame (sF) format, the system works in the same way but the delays are in frames rather than fields. Thus, in input locked mode with a progressive input format, the display commands should be at the Ukon input four input frames before the frame to which they relate.

If the Ukon is doing a format conversion in input locked mode, the delay from the command being supplied to the output picture change is variable depending upon the conversion being undertaken. However, the delay in the command application will always match the Ukon processing delay so this does not matter.

Format Conversion

If format conversion is being undertaken at the same time as real time control of the Ukon then there are certain constraints to bear in mind.

Firstly, consider output locked mode. In this instance the commands are supplied at output frame rate. Therefore, *all* commands supplied to the Ukon will be applied to an output image. This means that, if desired, the size and position control change will always be smooth in the sense that it can be updated every output field. In output locked mode there is no mechanism to tie the display size/position parameters to particular input fields. The delay through the Ukon may be variable and is, in general, a composite of input and output field delays. There is no way that an external controller can predict the Ukon delay and so it cannot lock a command to a particular input field.

The display updating may not match the input program motion profile. As an example, consider the case where the input to the Ukon is 1080/23sF, the output is 525/59.94 and the conversion mode is sF to 3:2. In output locked mode the display size/position change will always be applied two output frames after they have been received. This makes no allowance for the fact that the output video material stream has a 3:2 sequence motion profile. Thus the application of the display commands can actually prevent the output from being perfect 3:2 sequence as the supplied commands are not locked to the Ukon's internally generated 3:2 sequence. This behavior can be altered by changing the *Display-Slew-Uptate* menu item to sequence-rate rather than output-rate. In this mode if the Ukon is using its internally generated sequence generator then the display size/position updates will be locked to the Ukon output sequence. This can be done in Video to sF, Video to 3:2, Film to sF, Film to 3:2, 3:2 to sF and 1:1 to 3:2 modes. Although this ensures the Ukon makes perfect sF or 3:2 output it is not the same as locking the display commands to particular input frames.

Secondly, consider input locked mode. In this instance the display change parameters **are** associated with input fields. So, if we use the same example as above, (1080/23sF to 525/59.94, sF to 3:2 conversion mode) then, sending the display commands at the 23sF frame rate will cause the Ukon output size/position to automatically change with a 3:2 profile locked to the program material 3:2 sequence. The image changes will also be locked to the input frames the commands were associated with.

Now consider the case of 1080/30 to 1080/25 video mode conversion. If the Ukon is supplied with display change parameters at the 30Hz frame rate then, inevitably, some of these parameters will be associated with input fields that are not used to build output fields. This is because with a frame rate reduction, the Ukon must throw away some input fields albeit in as invisible a fashion as it can. Parameters associated with a dropped video field will also be dropped. Thus some values of the display parameters supplied to the Ukon will never be used. Similarly, if the frame rate is being increased, the number of display commands supplied will be less than the number of video fields produced. Thus, some display commands must be used to produce more than one output field. Essentially, in input locked mode the display size/position commands are synchronised in exactly the same way as the video.

In general, one would use output locked mode if the edit decision list (EDL) being used to generate the real time control parameter values is locked to the Ukon output timecode and, input locked mode if the EDL is locked to the Ukon input timecode

Slews

If slew mode is used the Ukon internally generates timed display size/position changes. The way that the slew is applied is affected by locking mode in the same way that externally applied commands are affected.

Thus, if output lock is selected and a slew is undertaken the output picture size/position will be updated either every output field or, at every internal film sequence boundary - dependant on the *Display-Slew-Update* menu item.

If input lock mode is selected and a slew is undertaken the output picture size/position will be updated every time a new input field is used to generate an output field.

Command Timing

If the Ukon is under the control of an external device then the display size/position command should be sent timed as follows: -

Output Locked Mode

For interlaced or sF output formats: commands are sent 2 output frames (4 output fields) before the Ukon output video is required to change.

For progressive output formats: commands are 4 output frames before the Ukon output video is required to change.

Input Locked Mode

For interlaced or sF input formats: commands are sent 2 input frames (4 input fields) before the input video that will make the new output image size is at the input to the Ukon.

For progressive input formats: commands are sent 4 input frames before the input video that will make the new output image size is at the input to the Ukon.