

Archangel Ph.C

Real-time Motion Compensated Video Archive Processor

Operator's Manual

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About this Manual

This manual contains information for the operation of the Archangel Ph.C unit.

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

Note that the text in the lower left-hand corner of the page shows the release date in day, month, year sequence and the current revision.

Important Notice

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

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 wartende Teile im Geräteinneren. Dieses Gerät sollte nur von geschultem Personal gewartet werden

Sicherheits-Warnhinweise



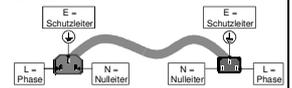
Die angeführten Service-/Reparatur-Anweisungen sind ausschließlich von qualifiziertem Service-Personal auszuführen. Um das Risiko eines lektroschocks zu reduzieren, führen Sie ausschließlich die im Benutzerhandbuch eschriebenen Anweisungen aus, es sei denn, Sie haben die entsprechende Qualifikation. 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 Nulleiter 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 austauschen müssen, entsorgen Sie diesen bitte umgehend. Die farbliche Belegung des Netzkabels ist wie folgt:

- GRÜN GELB E = Schutzleiter (⊕)
- BLAU N = Nulleiter
- 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 in the original-)
- AZUL conectado a N (Conductor Neutro -Neutral in the original-)
- MARRÓN conectado a L (Conductor Fase -Live in the 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:



- ⚠ 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



- ⚠ 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 udføres 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



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

Säkerhetsvarningar



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

- För att reducera risken för elektrisk stöt, utsätt inte apparaten för regn eller fukt.
- Se alltid till att apparaten är ordentligt jordad samt att strömtillförseln är korrekt utförd.
- Denna apparat måste bli försörd från ett strömsystem som är försedd med 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 honkontakt på ena änden samt en standard IEC gjuten hankontakt på den andra änden. Om man måste avlägsna den gjutna hankontakten, avyttra denna kontakt omedelbart på ett säkert sätt. Färgkoden för ledningen är följande:

GRÖN/GUL ledning ansluten till E (Skyddsjordad ledare)

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



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

Turvamerkkien selitys



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

Turvaohjeita



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

- Sähköiskujen välttämiseksi suojaa laite sateelta ja kosteudelta.
- Varmistu, että laite on asianmukaisesti maadoitettu ja että sähkökytkennät on tehty oikein.
- Laitteelle tehoa syöttävässä järjestelmässä tulee olla SUOJAMAALITÄNTÄ (⊕) ja nolliäitännän 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 suojamaajohtin E-napaan
 SININEN nollijohtin N-napaan
 RUSKEA vaihejohtin L-napaan



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

Símbolos de Segurança



- O símbolo triangular adverte para a necessidade de consultar o manual antes de utilizar o equipamento ou efectuar qualquer ajuste.
- Este símbolo indica a presença de voltagens perigosas no interior do equipamento. As peças ou partes existentes no interior do equipamento não necessitam de intervenção, manutenção ou manuseamento por parte do utilizador. Reparações ou outras intervenções devem ser efectuadas apenas por técnicos devidamente habilitados.

Avisos de Segurança

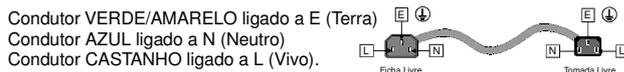


As instruções de manutenção fornecidas são para utilização de técnicos qualificados. Para reduzir o risco de choque eléctrico, não devem ser realizadas intervenções no equipamento não especificadas no manual de instalações a menos que seja efectuadas por técnicos habilitados.

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

Ligação da alimentação noutros países que não os EUA

O equipamento é, normalmente, enviado com cabo de alimentação com ficha IEC fêmea standard num extremo e uma ficha IEC macho standard no extremo oposto. Se for necessário substituir ou alterar alguma destas fichas, deverá remove-la e elimina-la imediatamente de maneira segura. O código de cor para os condutores é o seguinte:



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

Επεξήγηση των Συμβόλων Ασφαλείας



- Αυτό το σύμβολο παραπέμπει το χρήστη σε σημαντικές πληροφορίες που συμπεριλαμβάνονται στο συνοδευτικό εγχειρίδιο.
- Αυτό το σύμβολο υποδεικνύει ότι στο εσωτερικό υφίστανται επικίνδυνες ηλεκτρικές τάσεις. Στο εσωτερικό δεν υπάρχουν επισκευάσιμα μέρη. Αυτή η μονάδα πρέπει να εκσκευάζεται μόνο από ειδικά εκπαιδευμένο προσωπικό.

Προειδοποίηση Ασφαλείας

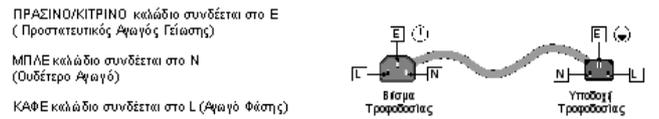


Οδηγίες επισκευής, όπου παρέχονται, αναφέρονται αποκλειστικά και μόνο σε εξειδικευμένο προσωπικό. Για να μειωθεί ο κίνδυνος ηλεκτροπληξίας, μην εκτελείτε επισκευές πέρα από μόνο τις συμπεριλαμβανόμενες στο εγχειρίδιο των οδηγιών, εκτός και αν έχετε τις απαραίτητα προσόντα για να το κάνετε. Όλες οι επισκευές 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 ΠΡΟΣΤΑΥΕΥΤΙΚΗ 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 πυραμίδας στην άλλη άκρη του. Εάν χρειαστεί να αφαιρέσετε το σταθερό βύσμα τροφοδοσίας μην το επαναχρησιμοποιείτε, θεωρείται άχρηστο. Ο χρωματικός οδηγός για το καλώδιο τροφοδοσίας είναι ο παρακάτω:



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

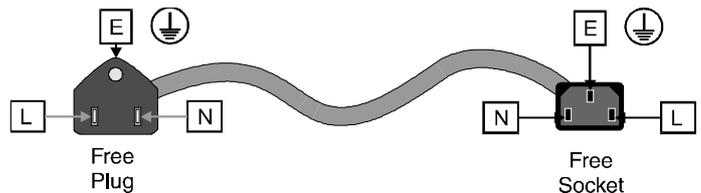
Products employing Lithium batteries

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

This unit conforms to the following standard:

BS EN60950:1992 *Specification for safety of information technology equipment, including electrical business equipment.*

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 8281 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.

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:

- Archangel One
- Archangel Two
- Tangent Synergy Timeline Controller (option)
- Operator's Manual
- Power cable
- Spare Fuse 6.3 A (T)
- RS422 Cable

Manufacturers Notice

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Software Version Amendments

Notes about Version Fitted - none

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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.

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

Archangel Ph.C - Real-time Motion Compensated Video Archive Processor

Archangel Ph.C cleans up, fixes and stabilizes, in real-time, any video material that has deteriorated or been damaged, either by age or other factors.

Typical material can be restored within two or three times it's running length. And the end result is often better than when it was first shot.

Until now this level of restoration quality could only be achieved by laborious, time-consuming and expensive processes.

Consequently, a lot of material remains unrestored because, although potentially useful, it is not valuable enough to warrant such expenditure.

Now virtually anything can be treated – not just high-value footage – at a cost far less than frame-by-frame restoration.

Archangel One



Archangel Two

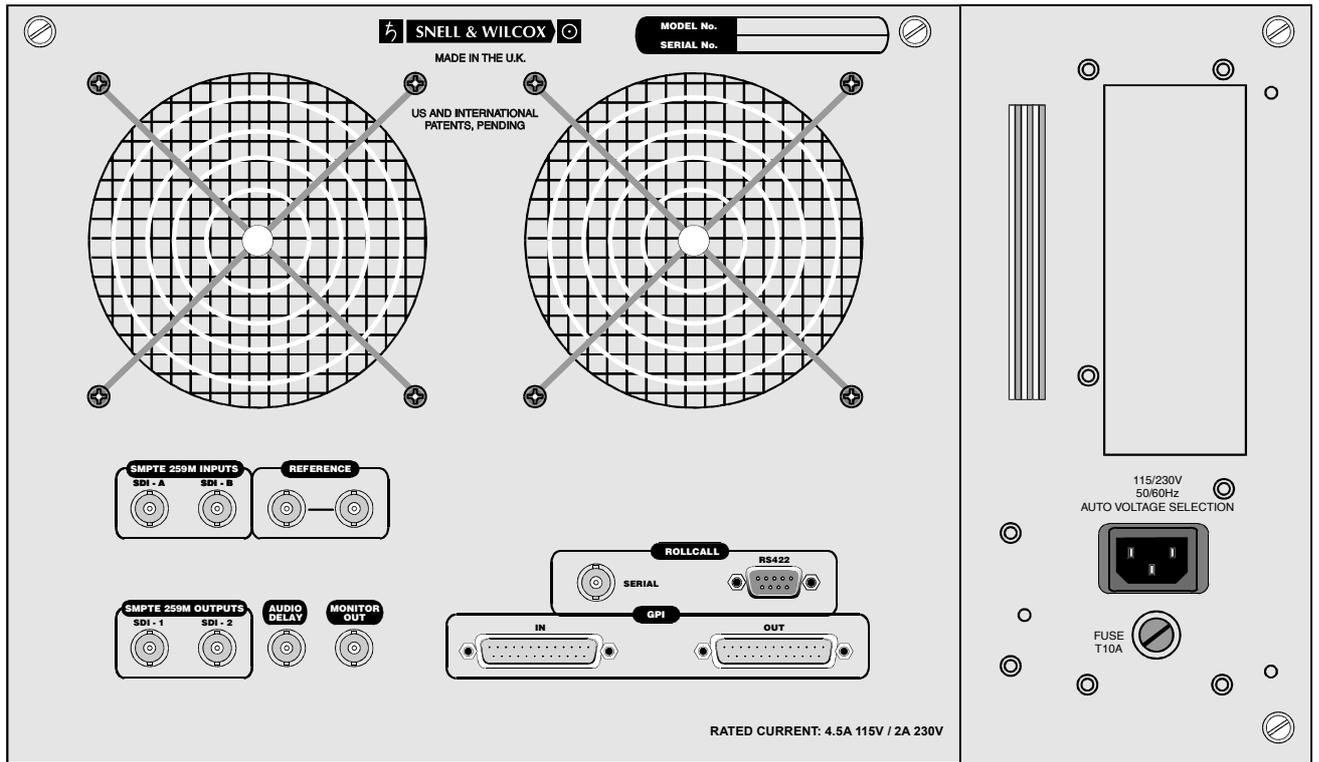


Tangent Synergy Timeline Controller (option)

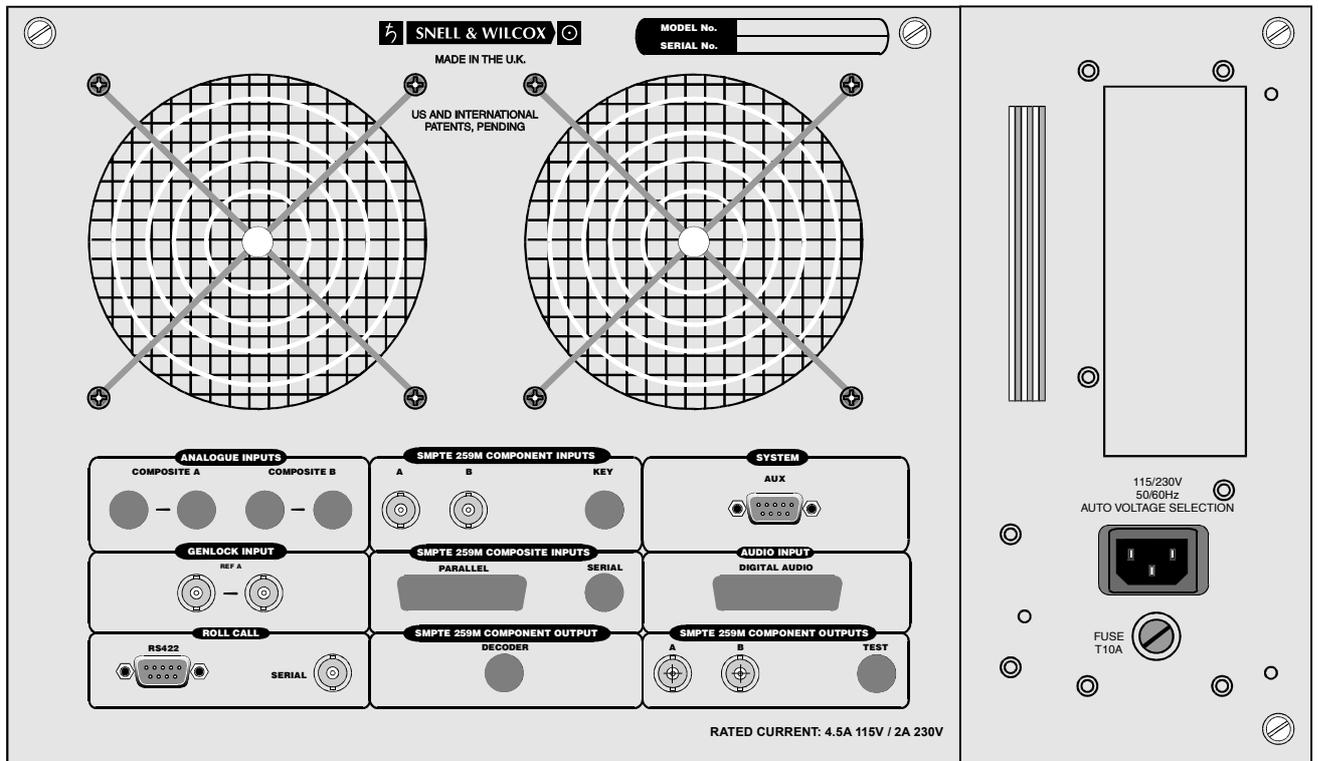


RollCall Control (option)

Archangel One



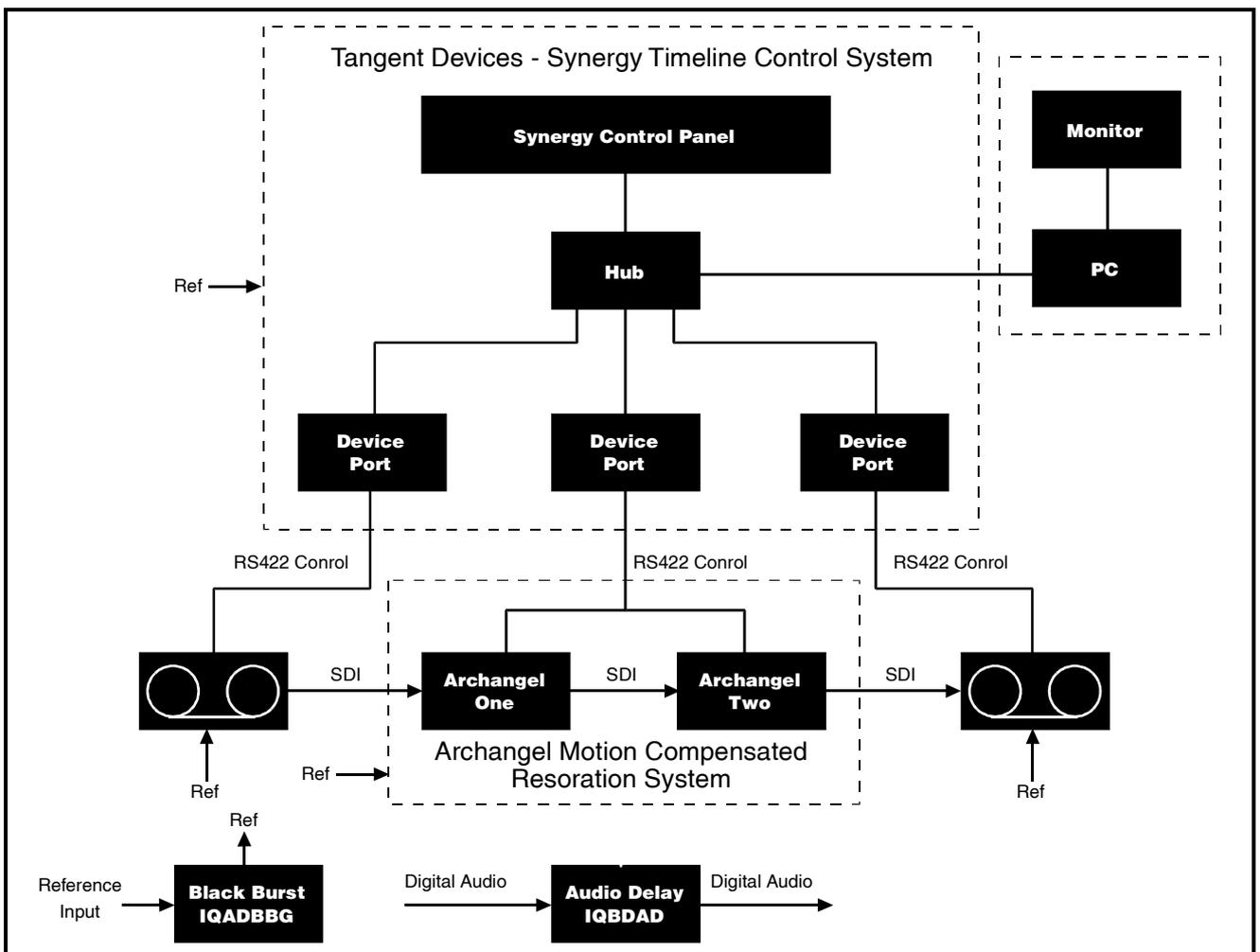
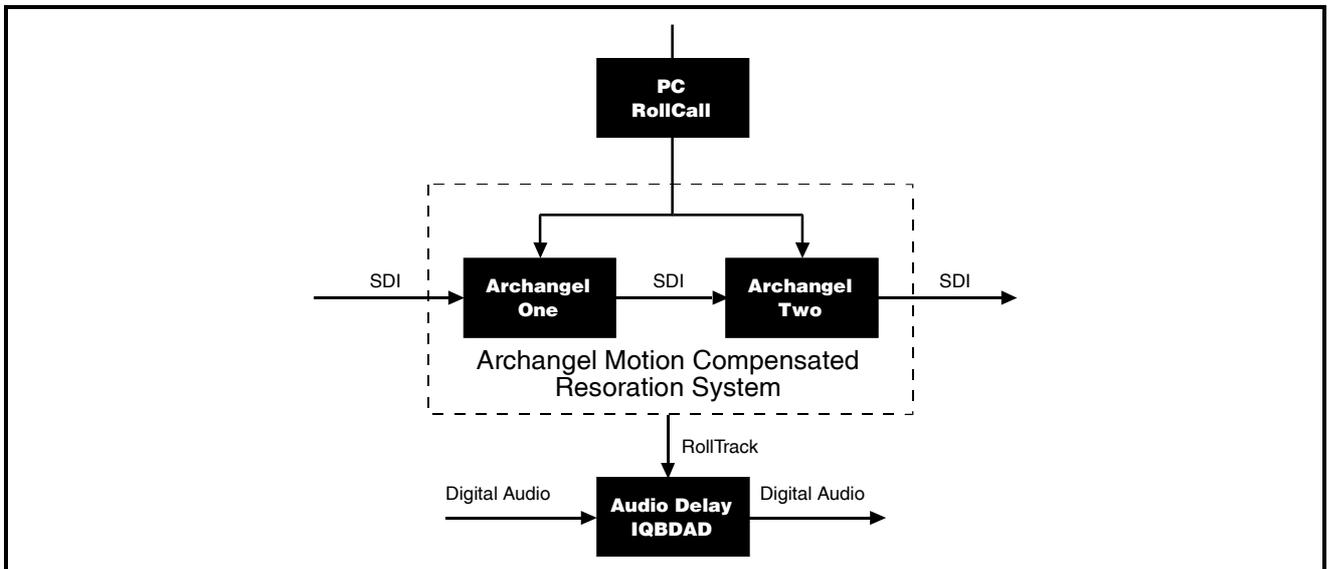
Archangel Two



Features

- Real-time restoration of a wide variety of film and video impairments
- Motion-compensated processing using Ph.C technology
- Signal Processing Features
 - Unsteadiness
 - Luminance Flicker
 - Dirt
 - Tramline Scratch
 - Noise and Grain
 - Video Dropout
 - Two Inch Scratch
 - Linear Filter
 - Multiband Spatial Filter
 - Non Linear Enhancer

Typical Systems



Technical Profile

Archangel One

Signal Inputs

Serial Digital To Rec 656 standard via 2 x BNC connectors.

Genlock Reference Loop-through input via BNC connectors. Analog Black and Burst

GPI 1 x 25 way D-Type Recall of memory settings 1-4

Signal Outputs

Serial Digital To Rec. 656 serial via 2 x BNC connectors.

Analog Composite (output monitoring) 1 via BNC Connector

GPI 1 x 25 way D-Type tally of memory settings 1-4

Delay Audio delay pulse, TTL high for delay time through unit, via BNC connector

Communications

Network Control RollCall via BNC connector

Remote Interface RS422 via 1 x 9 way D-Type.

Input Select SDI-A, SDI-B

Input Standard Select 625, 525 or Auto Select

Input Type Video, Film

Film Phase Auto 2:2 phase detect. Overrides: f1>f2, f2:f1 (625)
Auto 3:2 phase detect.

Latency 320ms (625Lines 50Hz)
Genlock Off / Input / External Reference

Genlock Horizontal Timing 0 to 863 pixels (625)
0 to 857 pixels (525)
in steps of 1 pixel.

Genlock Vertical Timing 0 to 624 (625) or
0 to 524 (525) lines
in steps of 1 line

Archangel Two

Signal Inputs

SMPTE 259M Inputs SMPTE 259M - C A input
SMPTE 259M - C B input

Input Return Loss Reference Loop Better than 17 dB at 270 MHz
Analogue loop-through input 1V pk-pk, 75 Ohm impedance

Reference Return Loss Better than 35 dB to 5.0 MHz

Signal Outputs

SMPTE 259M - C Outputs 2 off Outputs

Output Return Loss Better than 17 dB at 270 MHz

Communications

Serial Net RollCall™ Proprietary Snell & Wilcox interface
multi-drop via BNC-T network
System Communication 9 Pin D-Type RS422 Slave

Input Select SDI-A, SDI-B

Input Standard Select 625, 525 or Auto Select

Transfer Mode Can be field or frame based set by user or left to automatic detection.
Auto/Field Mode/Frame Mode
Film Phase Film 3:2 phase can be left in automatic mode or set to fixed phase.

(525) AUTO/Fixed Phase 0..4
(625) AUTO/F1/F2
Latency 340ms (625Lines 50Hz)
Genlock Off - Output free runs.
On (Ref/Input) - If the reference is not present or invalid, then the genlock source will be the Input

H-Lock 0 - 63455nsec (625)
[0 - 1727 samples]
0 - 63899nsec (525)
[0 - 1715 samples]

V-Lock 0 - 624 lines (625)
0 - 524 lines (525)

Archangel One

Memory	4 Locations (contain front panel control settings)
Output Blanking Horizontal	Off / 704/696/688 pixels preset plus adjustable to individual pixels.
Output Blanking Vertical	Off / 4:3 / 14:9 / 16:9 letterbox presets plus adjustable to individual lines.
Aperture Correction Horizontal	Up to +9 dB Enhancement (at 3.375 MHz)
Aperture Correction Vertical	Up to +6 dB Enhancement (at 156.25 cph)
Color Balance	Red/White: ±25% Red/Black Level: ±25% Blue/White: ±25% Blue/Black Level: ±25%
Black Level	±88 mV
Video Gain	±6dB
Chroma Gain	±6 dB
Y/C Displacement Horizontal	-450 ns to +600 ns with 1/32 pixel resolution (2.31 ns)
Luminance Clipping	Off / On
Gamut Limit	Off / On
Utilities	Monochrome Freeze: Field / Frame
Demonstration Modes	Unsteadiness cross hairs and graph Diagnostics Internal Temperature Checking Internal Voltage Checking GPI group containing Input On/Off and Output On/Off
Rollcall	RollCall Name LogServer and Logging On/Off
Audio	RollTrack™
Patterns	Internal Test patterns 100% Bars,75% Bars,EBU Bars,Y Ramp, UV Ramp, Y Sweep, UV Sweep, Bowtie
Bypass	Non-corrected output Modes: Unsteadiness & Flicker / Unsteadiness, Flicker & ProcAmp

Archangel Two

User Memories	Store Recall User Recall Preset Set name	User defined memory slots 1 - 8 User defined memories 1 - 8 Recall Preset memories or Factory Set Memory Name 1-8(user defined) 19 characters ASCII character set
Profiles		A range of preset profiles are provided to cater for a wide range of noise types and impairments.
Utilities		Monochrome Freeze: Field / Frame PhC On/Off
Demonstration Keys		Allows split screen facilities to monitor effect of digital filtering applied to the key area only Off, H-Split, V-Split, H-Repeat, PhC Repeat
Rollcall		RollCall Name LogServer and Logging On/Off
Audio		RollTrack™
Patterns		Internal Test patterns Black/EBU Bars/100% Bars/100% Ramp/UV Ramp/Y Sweep/UV Sweep/Bowtie
Bypass		Single command BYPASSES ALL filters

Signal Processing Specifications – Archangel One

Unsteadiness	
Correction Level	0 – 60% of picture in steps of 0.25%
Overscan	None (add blanking around edges)/ Correction Level (overscan to fill screen)
Unsteadiness Process	Off / On
Cut Detector	Off / On
Algorithm Adjustments	Select screen area Unsteadiness effort unsteadiness motion profile (rock steady, pan, etc.) Cut detector sensitivity
Interpolation	Selection of proprietary temporal-spatial apertures
Internal Processing	13.5 MHz 10-bit (Y) 6.75 MHz 10-bit (Cb, Cr)
Video Apertures	Video Normal Video to Film Video Anti-Alias
Film Apertures	Film Normal Film Sharp Film Anti-Alias
Flicker	
Flicker Process	Off / On

Signal Processing Specifications - Archangel Two

Dirt	Controls the parameters of the dirt detector	Keys	
Level	Sets for dirt filter –3 to –1, Normal, 1 to 9	Keys 1 to 4	Up to 4 rectangular user defined keys can be specified to control the area processed by the dirt or scratch filter. If none of the keys are enabled the entire picture is processed. The keys are processed on a priority basis, highest enabled key number has priority. Key controls for each key are:- Key Enable
Type	Controls the type of dirt to be filtered:- All, White + Dust, Black + Dust, White, Black, Black + White, Dust	Key	
View	View detected dirt and protected areas	Dirt/Tramline Left	Select which filter is to be processed by the key Left key coordinate in Y pixels
Tramline Scratch		Width Top	Key width in Y pixels Top of key as a percentage of picture height
Scratch strength	Variable 1-4, Full	Height	Height of key as a percentage of picture height
Scratch Width	Variable scratch width setting, range 1 to 5	Invert	Process area outside the key
Overshoot	Scratch overshoot correction 1 to 4	View	Colored overlay for key if key is enabled.
View	View detected scratch.		

<p>Noise and Grain Recursive Filter</p> <p>Level</p> <p>Threshold</p> <p>Fallback</p> <p>View</p>	<p>Motion-compensated Recursive Noise reduction</p> <p>This defines the maximum amount of recursive noise reduction, level 0-15</p> <p>This defines the sensitivity of the recursive filter to movement, level Auto/1..15</p> <p>This defines the amount of spatial fallback, level 0..15</p> <p>View corrected recursive noise</p>	<p>Dropout</p> <p>Level</p> <p>View</p>	<p>Non correlated dropout enable/disable</p> <p>ON/OFF</p> <p>View detected dropouts</p>
<p>Enhancer</p> <p>Gain</p> <p>Coring</p> <p>Horizontal Boost Frequency</p> <p>H/V Balance Advanced</p> <p>Diagonal Control</p> <p>Adaptation</p>	<p>Spatial 2D enhancer utilizing separately derived non-linear and linear edge detection and compression</p> <p>range -7 to +31</p> <p>range 0 to 4</p> <p>1MHz to 5MHz</p> <p>range -15 to +15</p> <p>range -2 to +2</p> <p>off/med/full</p>	<p>2 Inch Scratch</p> <p>Repeat</p> <p>Rep Level</p> <p>View</p>	<p>Filter targeted specifically at repetitive defects from 2 inch tape machines</p> <p>Special filter for correlated scratches range 1 to 62</p> <p>View detected scratch</p>
<p>Spatial Filter</p> <p>Luminance/Chrominance Spatial band</p> <p>View</p> <p>Solo</p>	<p>Multiband spatial filter</p> <p>AUTO, 0- 31 Level Setting for each band</p> <p>high frequency diagonal, vertical horizontal</p> <p>low frequency diagonal, vertical ,horizontal</p> <p>View detected noise for <u>all</u> spatial bands</p> <p>View detected noise <u>within</u> selected band</p>	<p>Linear Filter</p> <p>Mode</p> <p>Cut-Off</p> <p>Boost</p> <p>Cut-Off</p> <p>Gaussian</p> <p>View</p>	<p>15 tap linear digital filter</p> <p>Brickwall with Boost, Brickwall, Gaussian</p> <p>Full bandwidth 4.2MHz to 2.5MHz</p> <p>Brickwall Low Pass.</p> <p>Can be used to correct for HF loss with boost setting on full bandwidth.</p> <p>Level : None/1/2/3/4.5/6dB</p> <p>Extra low pass filters, no boost</p> <p>2.44MHz to 0.94MHz</p> <p>Gaussian filters can be used to de-enhance previously enhanced material without substantial loss of horizontal resolution.</p> <p>-4 to -40dB (6.75MHz) in 4dB steps.</p> <p>View removed noise</p>

Installation

Unpacking the Archangel Units

The units are packed in separate flight cases. The contents of the flight cases are as follows:

- Archangel One
- Archangel Two
- Tangent Synergy Timeline Controller (option)
- Operator's Manual
- Power cable
- Spare Fuse 6.3 A (T)
- RS422 Cable

Unpack the flight cases carefully and check for any shortages or shipping damage. Immediately report any shortages or damage to Snell and Wilcox Limited.

POWER CONNECTIONS

Power Supply

Mains power is supplied to the units via a filtered IEC connector.

The mains power fuse rating is 6.3 A (T) and the rated current for the unit is 4.5 A at 115 V and 2.2 A at 230 V.

The power supply ON/OFF switch is located on the front of the power supply inside the front panel.



CAUTION:

Note that the fan ventilation holes on the rear panel must not be obscured.

SWITCHING ON

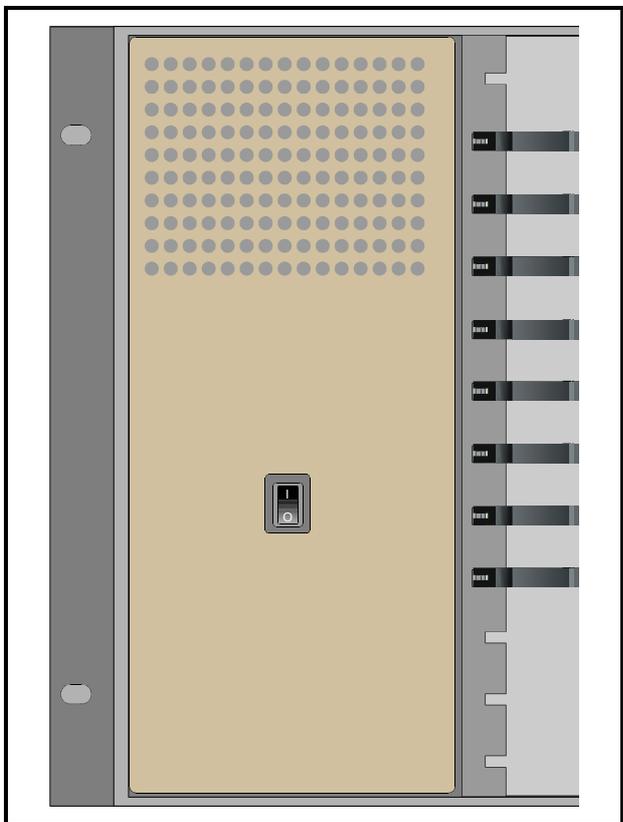
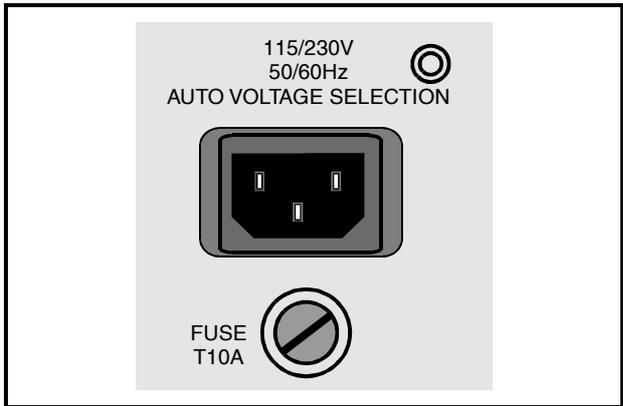
Open the front panel. Check that power is connected to the Archangel units. Set the power switch on the front of the power unit to ON (I). The opening alphanumeric display will appear on the front panel. Close the front panel.

Supply Voltage

The power supply is auto switching for the rated input voltages.

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 and rear to dissipate the heat produced during operation. Installations should be designed to allow for this.

If servicing is to be carried out in situ allow space (approximately 230mm) at the rear for the rear panel to be hinged down.

Remote Control

The unit may be controlled via the RollCall remote control system using the RollCall PC templates.

For details of the RollCall system consult the Modular System Operation manual.

The unit may also be controlled using the Tangent Devices Synergy Timeline Controller. For details please see the Synergy Timeline Controller User Manual.

For information regarding use of other third party controllers please contact Snell & Wilcox.

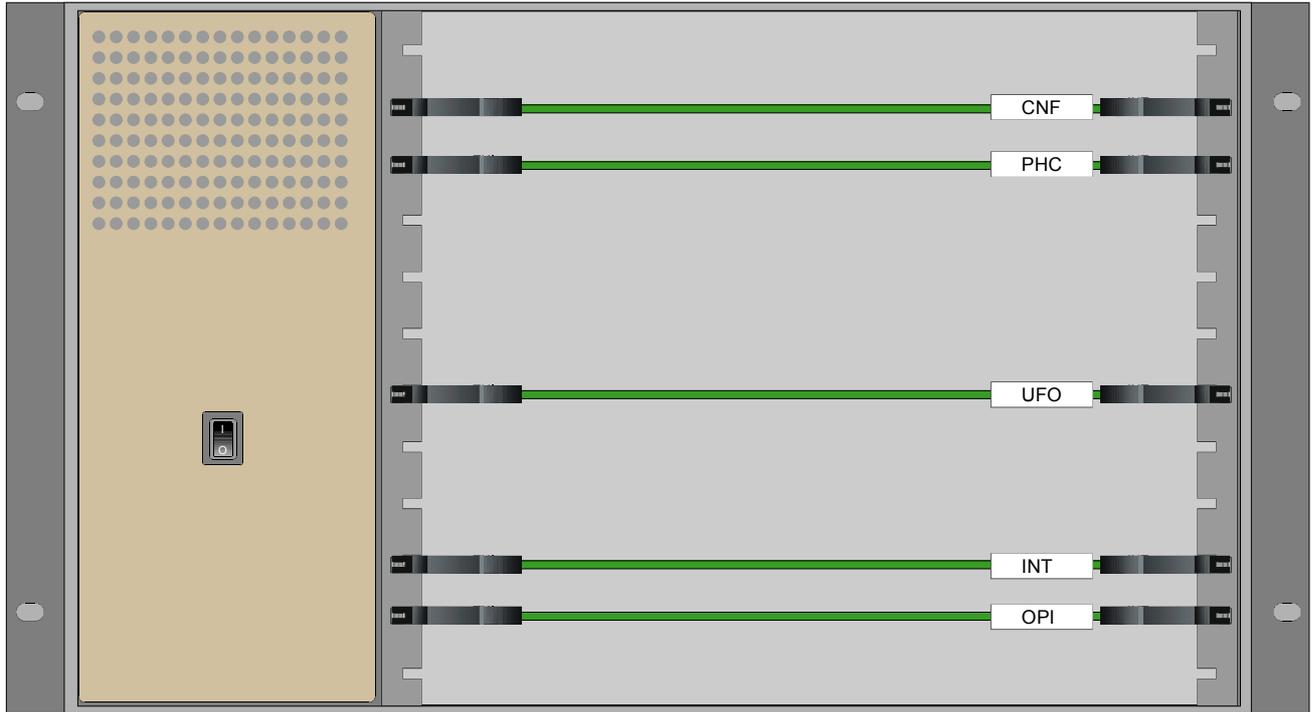
OPENING THE FRONT PANEL

To open the front panel start by grasping the panel at either end, lifting up the two black levers, pulling the panel slightly forward and then hinging it to the left.

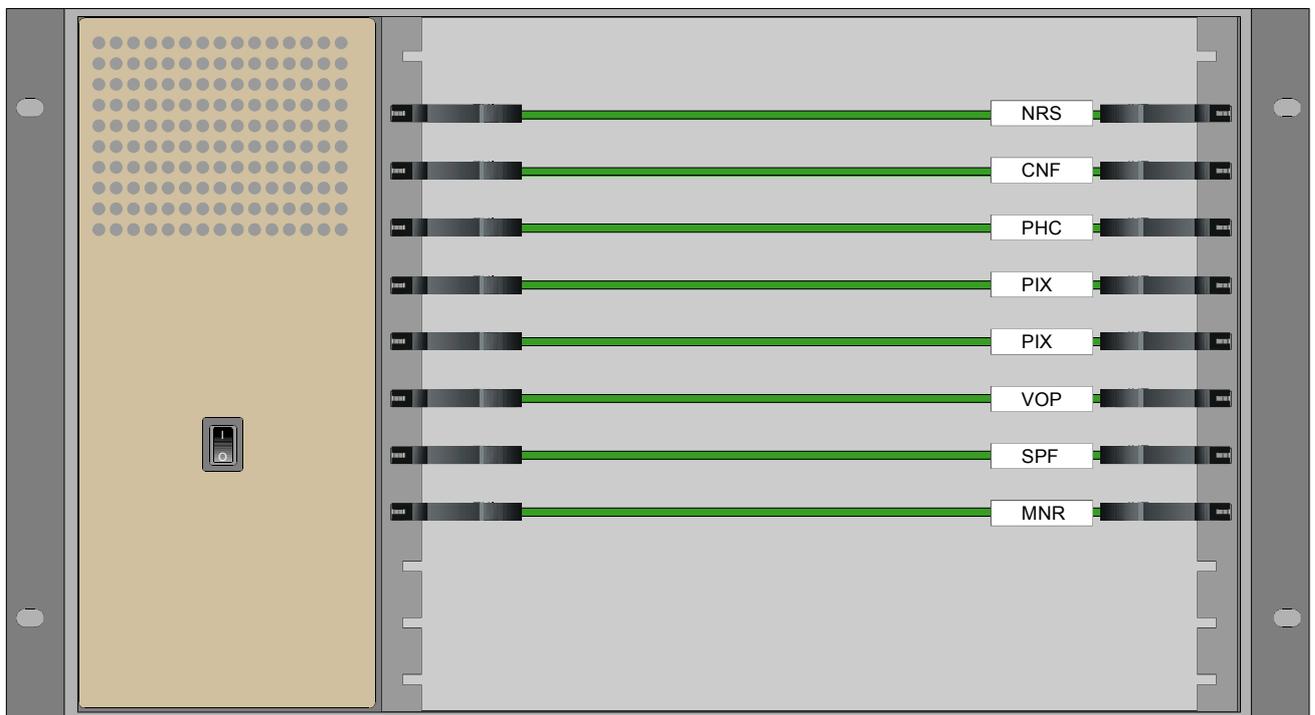
The Rack mount fixing "ears" are revealed when the panel is open.

Refit the front panel by pushing it back into position (the levers will click into place)

Card Positions



Archangel One



Archangel Two

**Unpacking the Tangent Synergy Timeline
Controller Option**

For more information please refer to the Tangent Synergy Timeline Controller Installation manual

Unpack the case carefully and check for any shortages or shipping damage. Immediately report any shortages or damage to Snell and Wilcox Limited.

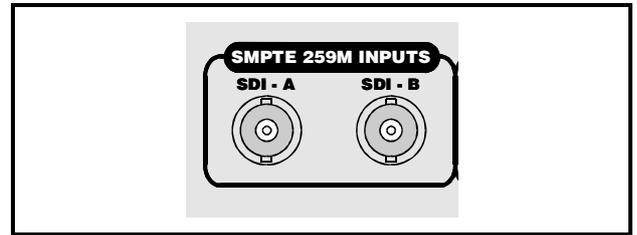
REAR PANEL CONNECTIONS

Signal Connections (Archangel One)

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

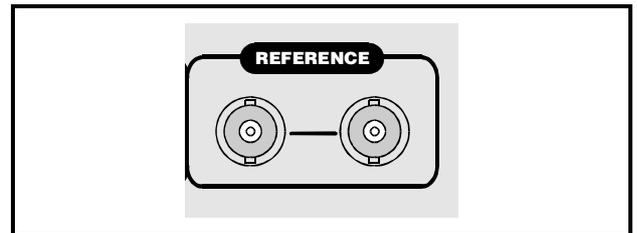
D1 Serial Digital Inputs A and B

These are the two SDI serial digital inputs.



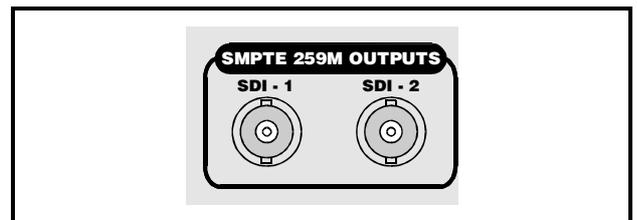
Reference

An external analog reference signal may be connected to these loop-through BNC connectors.



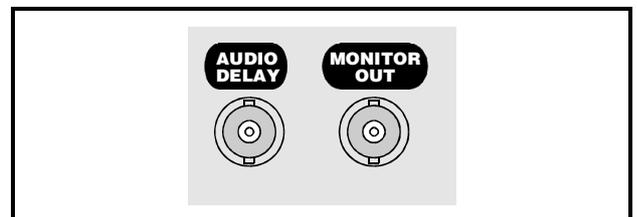
D1 Digital Output

Archangel One provides two serial D1 outputs.



AUDIO DELAY

This BNC connector provides a TTL level pulse that remains high for a period of time equal to the delay through the unit.



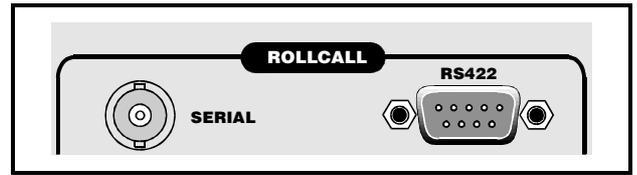
MONITOR OUT

A standard composite video output is provided for monitoring purposes.

Communication Connections (Archangel One)

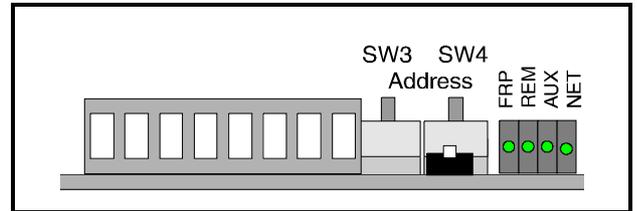
SERIAL (RollCall)

The unit can be controlled via RollCall using this BNC connector. Control can be also provided from an external source via an RS-422 9-way D-type connector.



The RollCall 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 SW3 and SW4 on the OPI card. The address 00 is reserved and must not be used.



Hex Switches (Behind Card Edge Controls)

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 may be used to set the Unit Address code in Hex (SW3 switch 0 to F, SW4 switch 0 to F).

If an address is already in use by RollCall™ a message will be displayed on the front panel at power-up. The unit must then be powered-down, the code reset, and the unit powered-up again.

Note that in a RollCall™ segment, all units must have different unit address codes. For more information see RollCall™ section.

Note 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.

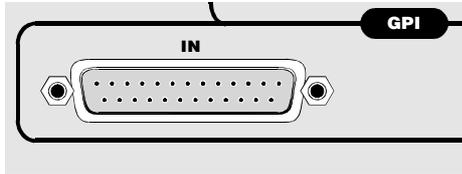
RS-422 Port

Pin	Function	Direction
1	Ground	
6	Rx signal common	
2	Receive -	Archangel One ← Remote
7	Receive +	Archangel One ← Remote
3	Transmit +	Archangel One → Remote
8	Transmit -	Archangel One → Remote
4	Tx signal common	
9	Ground	
5	Spare	

GPI (Archangel One)

GPI functions are implemented as follows:

GPI Inputs

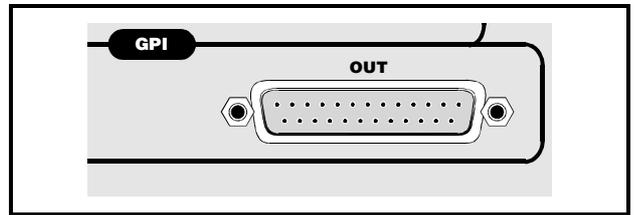


These are accessed via a 25 way D type connector labeled GPI Input.

GPI = GPI input

GPI input	Contact pins	Action
0	12, 25	Recall Memory 1
1	11, 24	Recall Memory 2
2	10, 23	Recall Memory 3
3	9, 22	Recall Memory 4
4	8, 21	Not yet used
5	7, 20	Not yet used
6	6, 19	Not yet used
7	5, 18	Not yet used
8	4, 17	Not yet used
9	3, 16	Not yet used
10	2, 15	Not yet used
11	1, 14	Not yet used
	13	Ground

GPI Outputs



These are accessed via a 25-way D type connector and connections are as follows:

GPO = GPI output

GPI output	Contact pins	Action
0	2, 14	Recall Memory 1
1	3, 15	Recall Memory 2
2	4, 16	Recall Memory 3
3	5, 17	Recall Memory 4
4	6, 18	Open
5	7, 19	Open
6	8, 20	Open
7	9, 21	Open
8	10, 22	Open
9	11, 23	Open
10	12, 24	Open
11	13, 25	Open
	1	Ground

The GPO output 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=±48V	100 MOhm

GPI Overview (Archangel One)

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

GPO 0 tracks GPI 0 so if the display memory that GPI 0 recalls is active then GPO 0 will close. Similarly, GPO 1 tracks GPI 1 etc.

This functions even if the GPI inputs have been assigned different recall memories and if the memory was recalled via a front panel button rather than via the GPI.

GPI interface Delay

The GPI interface has a delay that matches the video processing delay through the unit.

Ideally, the contact should be closed a few lines after the vertical sync group of the reference video, and, should remain closed for at least one field period.

REAR PANEL CONNECTIONS

Signal Connections (Archangel Two)

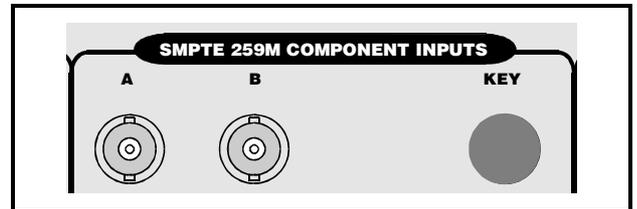
All the connectors are mounted on the rear panel of the unit and are appropriately annotated.

SMPTE259M Component Inputs – A ,B

These are the two SDI serial digital inputs.

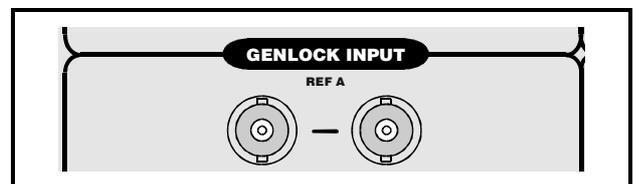
SMPTE259M Component Inputs - KEY

This input is not used.



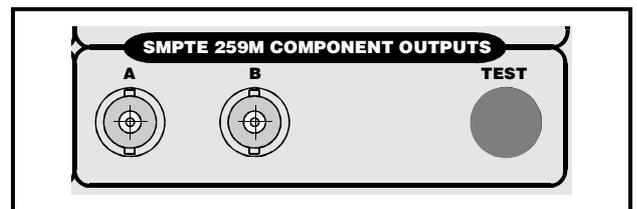
Genlock Reference

An external analog reference signal may be connected to these loop-through BNC connectors.



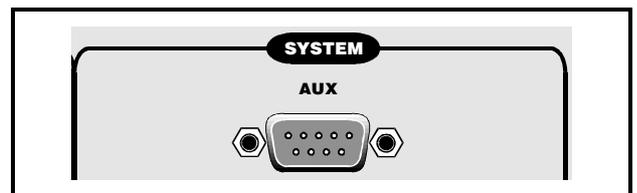
SMPTE 259M Component Outputs

Archangel Two provides two serial D1 outputs



System Aux

This is a RS422 slave interface which may be used to control Archangel Two by a control device.

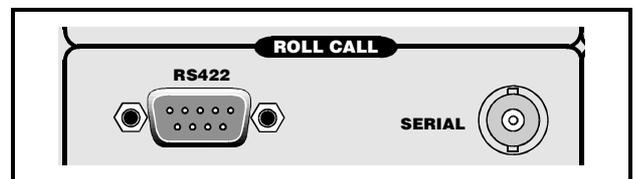


ROLLCALL (Serial)

The unit can be controlled via RollCall using this BNC connector.

The RollCall 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. This is set using via the front panel or via RollCall. The address 00 is reserved and must not be used.



Note 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.

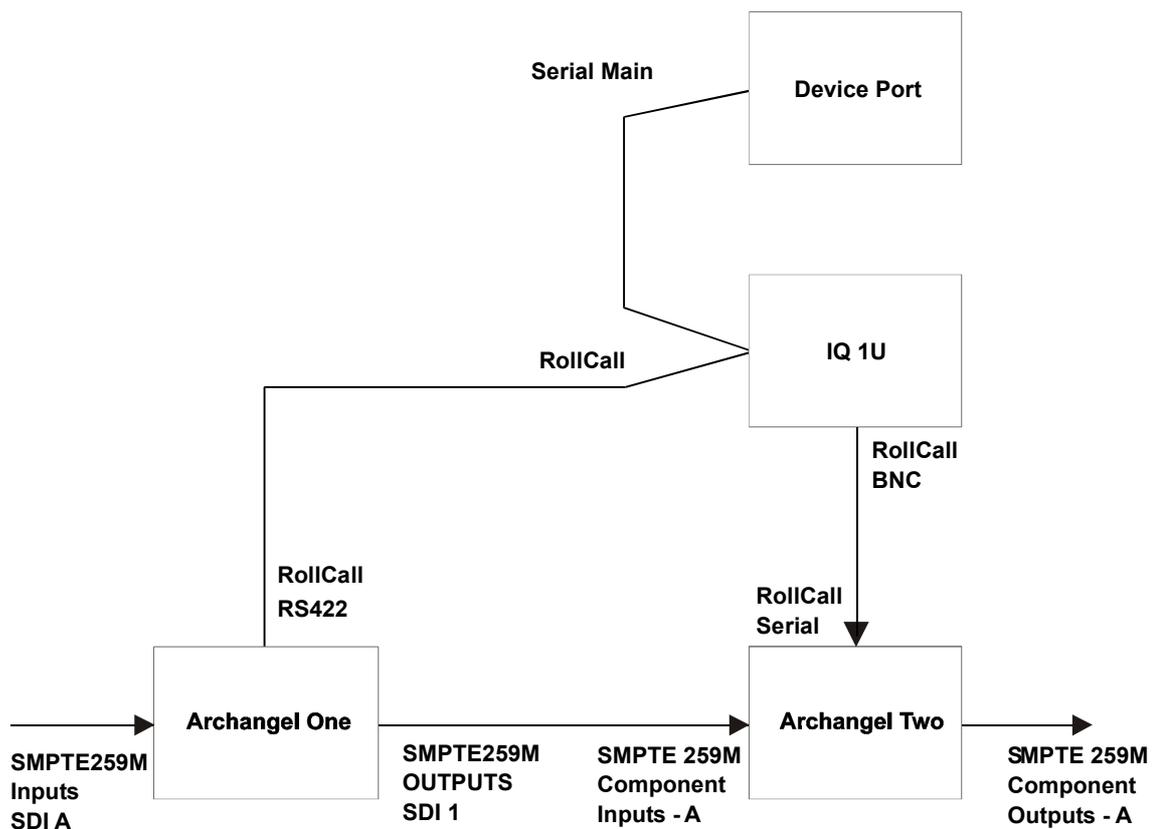
Installation with the Tangent Devices Synergy System

Archangel can be controlled using the Synergy system from Tangent Devices. The Synergy system is a flexible and expandable timeline controller that is used to control transport devices such as VTRs and processing devices such as Archangel.

For Full details of the Synergy system please see the Synergy User Manual and the the Synergy Instalation Manual from Tangent Devices Ltd.

Installation of Archangel with Synergy.

A Synergy device port is used to send real-time control commands to the Archangel on a serial RS422 link. A special cable (see Annex A) is supplied with the Archangel system for this purpose. The diagram below indicates how this cable is used.



The cable should be connected as follows: -

'Arch1' is connected to Archangel One connector named 'RollCall RS422'

'S Box' (middle connector) is connected to the IQ 1U connector named 'Remote'.

'Pogle' is connected to the device port allocated to control the Archangel on the connector named 'Serial Main'.

A RollCall connection must be made between the IQ1U and Archangel Two. This should be done using 75ohm cable terminated at each end with 75 Ohm. This is a RollCall connection, no other units should be connected to this network.

Note: A RollCall BNC connection should not be made to Archangel One. Since no other RollCall connections should be made the audio delay should be set manually. In the case where both Archangel are reference locked then the delay is 16 Frames (PAL) and 17 Frames (NTSC).

Archangel Configuration

Archangel One must be set to real-time, this is done from the front panel 'Real-time' is found in the Utils menu. The RollCall address of Archangel Two should be set to 42.

Video Path

Archangel One: The input SDI video path should be connected, Input A or B can be used and this should be selected from the front panel. Either Output may be used.

Archangel Two: The output of Archangel One should be connected to Archangel 2. Input A or B can be used and this should be selected from the front panel. The SDI video output should be taken from Archangel 2, either of the outputs can be used.

Reference

The Reference inputs to Archangel One and Archangel Two should be connected to the same reference that is used for the video source and video recorder and the Synergy device ports. Genlock should be enabled on both units and any timing adjustments can be made.

The sync frequency in the Synergy system window should be selected to match the video and reference.

Protocol Version

The Synergy system allows for different version of the Archangel real-time control protocol to be used. The protocol is selected from the 'Room Configuration Window' section of the Synergy GUI, select the required protocol for the device port allocated to control the Archangel. The table below indicates which protocol should be selected.

Archangel protocol on Synergy	v2	v3
Archangel One	OPI 7,8	OPI 9 onwards
Archangel Two	NRS 2.xx	NRS 3.xx

The software versions on Archangel One can be selected from the front panel in the Utils\Diag\Test\Boards menu.

The software versions on Archangel Two can be selected from the front panel in the Utils\Ver menu.

All systems are currently shipped with the v3 protocol.

Archangel Control Cable Pin Connections

Archangel 1			3	8
IQ 1U	2	7	3	8
Device Port	2	7	3	8

Note that this cable is supplied with the Archangel Synergy system.

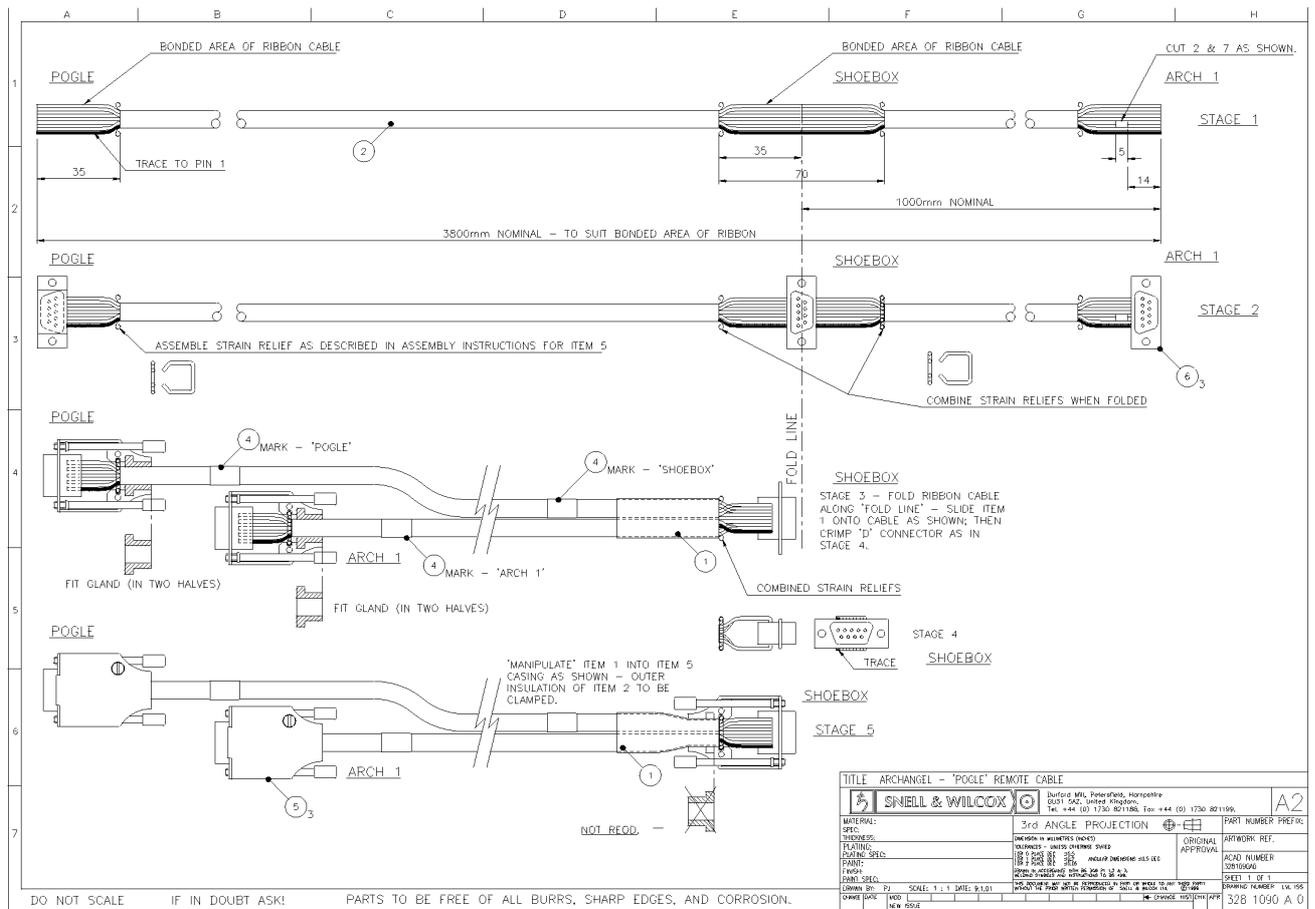
Configuration of IQ1U Enclosure

The toggle switch to the left of the Power Switch (front left of IQ1U) should be down (RS422 comms, NOT RS485).

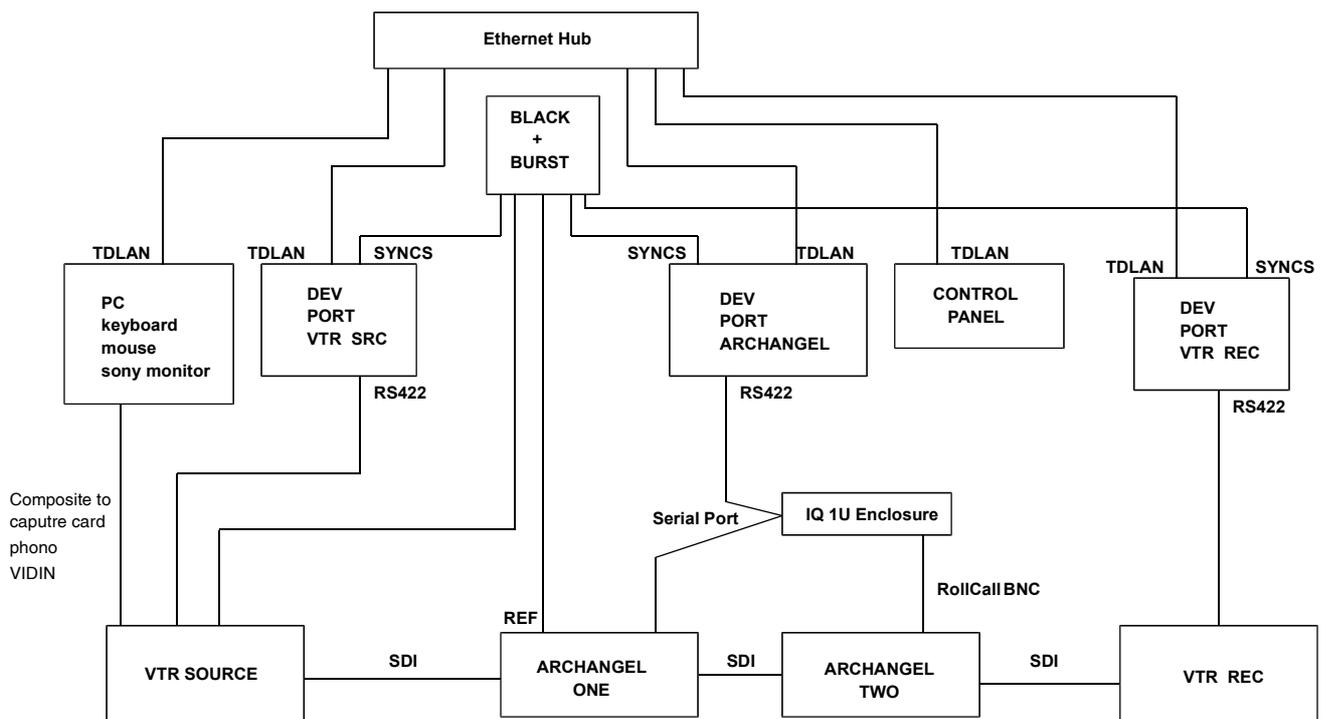
The following parameters should be set:

Port – 38400
System - blind ctrl

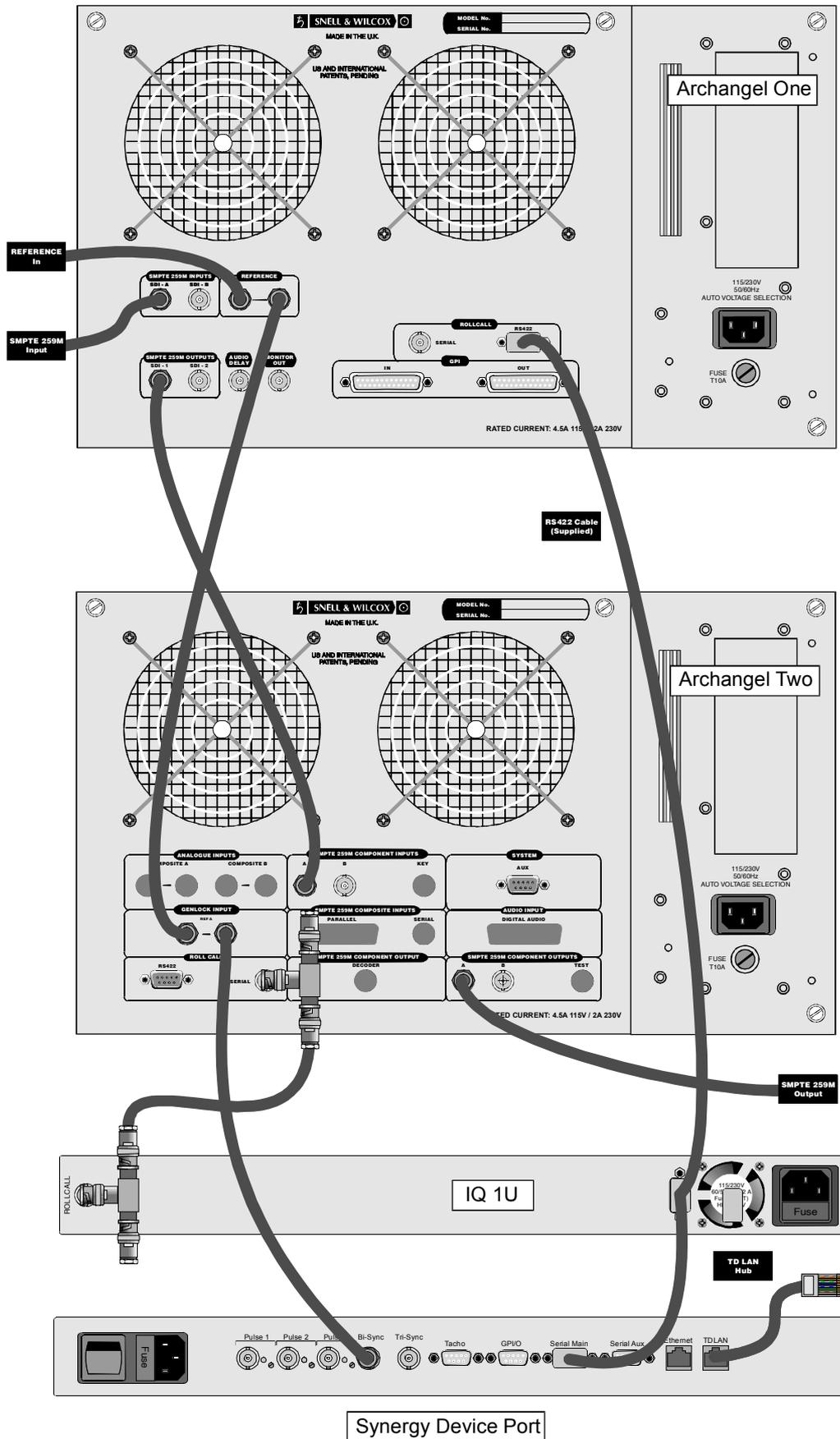
Remote Control Cable



System Block Diagram



System Rear Panel Interconnections



Operation

GENERAL OPERATING PRINCIPLES

Archangel may be operated by three methods:

1. Front panel controls
2. RollCall control system
3. Third party controller such as the Tangent Synergy Timeline Controller.

This section deals with the front panel controls.



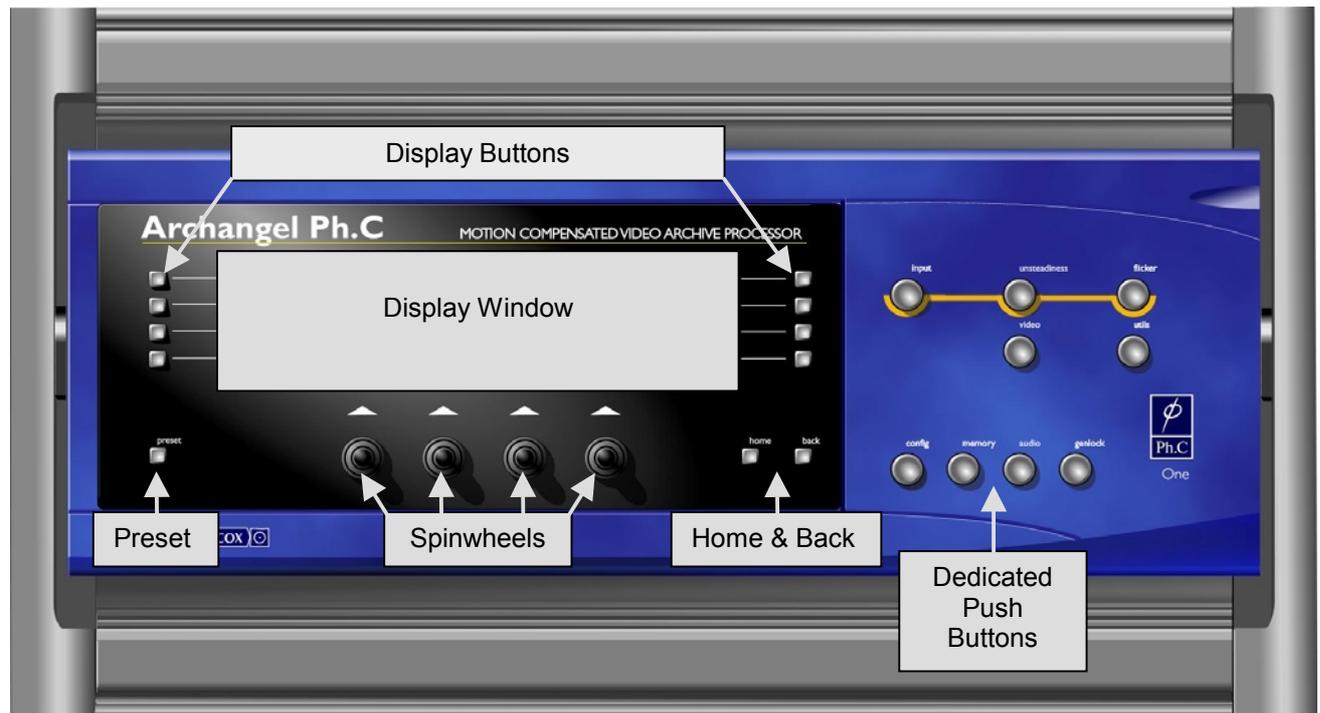
OPERATION USING THE FRONT PANEL CONTROLS

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.

Menus are selected by push buttons and further menu selections made by using 4 spinwheels.

The spinwheels also allows continuously variable parameters, e.g. Gain, to be adjusted and the numerical value or setting to be seen in the window.

Various specific operations may be achieved by operating dedicated push buttons.



Display Window

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

A selection is made by pressing the button adjacent to the required item and will become highlighted (reversed text) when active.

Home

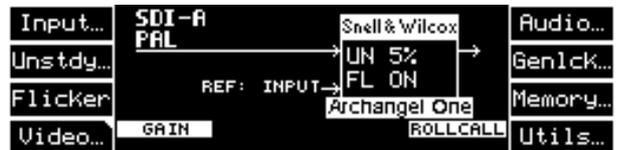
Pressing the Home button will display the home status screen in the display window from any position in the menu hierarchy.

It will display the current system set-up (showing the type, correction modes and status of input and output signals) and also two lists of functions that may be accessed by pressing the adjacent buttons.

Note that all these functions may also be accessed by pressing the relevant dedicated push button; the button will become illuminated when the function has been selected from either the menu or the push button.

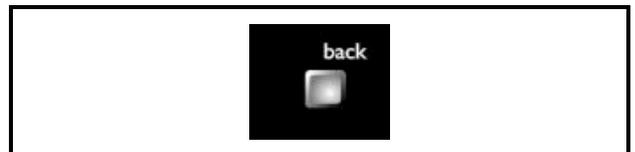


Home Display



Back

The Back button allows a return to the last menu that was visited. Up to 20 menus may be retraced using this function.



Preset

Pressing this button will return all settings of the displayed menu to zero or default settings.



Display Buttons

Pressing the button adjacent to the required item makes a selection and the display will then show the information relevant to that function.

Alternatively, the dedicated buttons (see below) may be used to access the same function.



SpinWheels

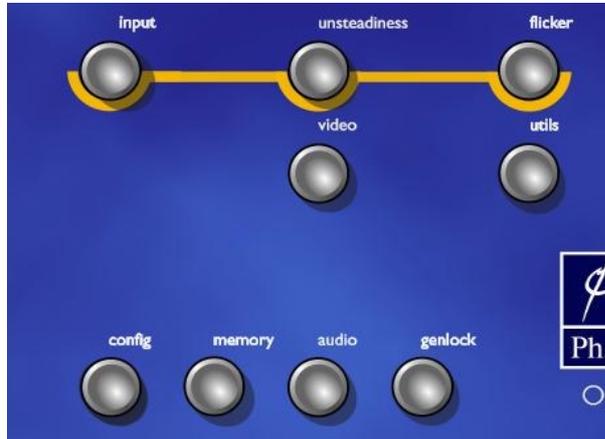
The four spinwheels allow variable parameters, e.g. amount of *Video Gain* or *Dirt filter Type* to be adjusted and the numerical value or setting to be seen in the Display window.



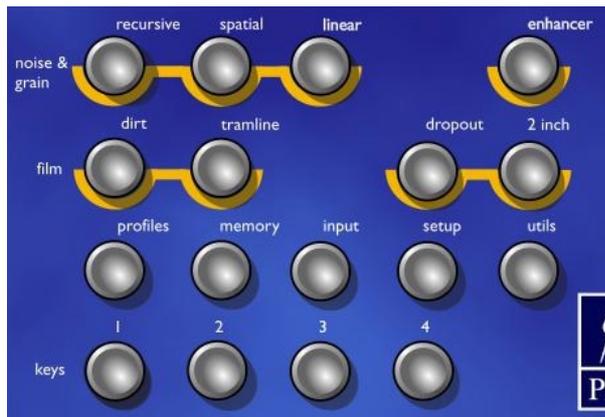
Dedicated Pushbuttons

The dedicated pushbuttons shown below allow direct access to the menu functions identified by each button.

Archangel One



Archangel Two

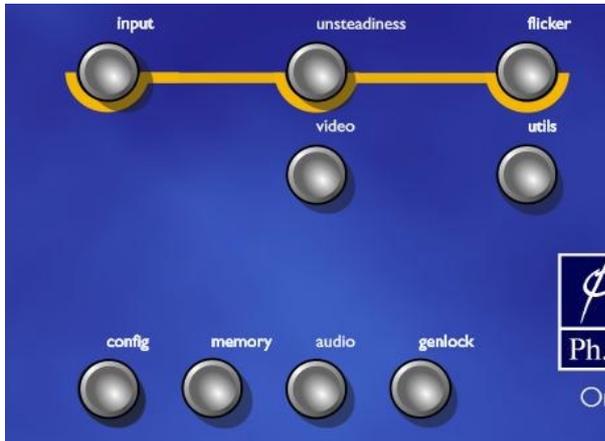


Archangel One

Dedicated Pushbuttons

The dedicated pushbuttons shown below allow direct access to the menu functions identified by each button.

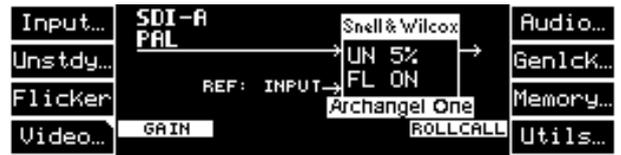
Archangel One



Archangel One Pushbuttons

Where an LED inside a Pushbutton is illuminated it means that the menu items associated with that pushbutton are currently active in the display window.

Home Display



The example of unit status is shown above indicating that the unit is set to accept a PAL input signal, with an input reference, unsteadiness set for 5% correction and flicker correction on.

Home Display

Warnings

A flashing cursor in the top right-hand corner of a function box (the Video box in the example above) indicates that the function has been adjusted away from the default setting.

Selected functions are also displayed highlighted on the front panel if the function has been changed from the preset value i.e **Gain** as shown above.

The RollCall Control symbol in the Home menu signifies that the unit is connected to, and is communicating with, a RollCall remote control panel.

If an input is not available the word Loss! will be displayed and the output picture will fade to black.

After 30 minutes of inactivity the display will dim and will toggle between normal and an inverse version approximately once per minute. This occurs until a button is pressed, when the screen will revert to normal mode of full brightness

Archangel One GPI Inputs

In addition, GPI connections may be used to recall memory presets.

INPUT

This button will display a list of input signal selections available.



Input formats that may be selected are:

- SDI-A Serial Digital video
- SDI-B Serial Digital video

Input Std

The input standard selection may be set using the spinwheel immediately below the list. Selections are force to PAL, force to NTSC or Auto. The force positions may be used where the input standard is known otherwise the Auto position (which automatically senses the input standard) should be used.

Preset selects the Auto position

Input Type

The Archangel One Stabilizer has automatic detection of film originated and video material. This may be manually overridden using this control. While in Auto mode, a good general-purpose interpolation aperture will be used.

If Video or Film is selected, an additional menu will become available, allowing manual selection of interpolation apertures.



Aperture

The Aperture selection screen, when available, will show a list of interpolation apertures which may be selected.



In video mode, the following options are available:

Video Normal For use with video or mixed film and video.

Video-to-Film Takes video material and field pairs to create a 'film look'.

Video_Anti-alias Reduces the video aliasing.



In film mode, the following options are available:

Film_Normal Film Aperture – tolerant of changing field dominance and non frame locked edit points.

Film_Sharp Progressive Film Aperture. Dependent on constant field dominance and frame edit points.

Film_Anti-alias Film Aperture with optimized to reduce vertical alias components.

Field Dom

The Archangel One Stabilizer has automatic field dominance/film phase detection for use when stabilizing film originated material. In 625/50 this can be manually overridden. In 525/60, automatic 3:2 pulldown detection is employed and this mode is not available. It is also not available in video mode.

UNSTEADINESS

Enable



This allows the unsteadiness process to be enabled or disabled. Correction may also be applied only in the horizontal or vertical direction.



If unsteadiness is not enabled in a particular direction, an offset may be manually applied for that direction, e.g. a vertical offset may be applied if only horizontal unsteadiness is being corrected.

Field Repeat (Twin Lens correction)

If the fields of the picture are misaligned or one field is corrupted, one of the input fields may be discarded and the remaining field repeated. Select f1:f1 or f2:f2 for field 1 repeat or field 2 repeat respectively.

Note that Unsteadiness correction will not be active when the Field Repeat mode is active.

Correct

The maximum amount of unsteadiness that can be taken out of the video images is determined by the correction factor. The correction factor is also proportional to the overscan applied to the video, unless the overscan is defeated (see when "Other" is selected).



Correction Level

The higher the unsteadiness correction factor, the more severe the unsteadiness that can be removed, at the expense of losing more of the picture due to overscanning.

Perform

The unsteadiness process has safeguards to allow automatic use. These safeguards may be defeated to increase performance on 'difficult sequences' where the unit would normally not apply correction.



Unsteadiness Effort

This setting determines the effort the unsteadiness applies to the screen. It is useful to put this into max mode if there are two or more objects with different speeds within the picture. i.e. a vehicle moving against a background, etc.

Field Depth

Increasing the field depth setting is useful for scenes with high levels of perspective, such as a camera mounted on the front of a moving vehicle, or scenes where there is a combination of close foreground and distant background objects.

Small Objects

The unsteadiness process usually does not remove unsteadiness on pictures with small objects (less than approx.10% of the screen area) against a plain background, e.g. aircraft in the sky, small captions on a plain background, etc. Use this control to override this safeguard.

Profile



Pan Detection

Normally the unsteadiness process detects pans and tilts automatically. You can manually override this control. In steady mode, the image will ignore pans, until the edge of the correction window is reached. This may be useful where ultimate stability is required at the cost of the occasional re-framing of the image.

Frequency Response

The response of the unsteadiness correction system to different frequencies of motion may be changed if required. This will alter the range of motion speeds that the unit regards as unsteadiness.

The Normal setting is sensitive enough to differentiate pans from unsteadiness in most cases. The Very Low or Steady frequency response settings may be useful to remove particularly slow film weave, which the unsteadiness process would normally consider as camera re-framing. This is also useful when combined with the pan detection control.

Cut Detect



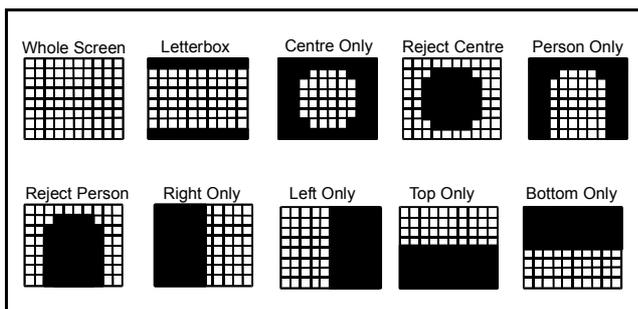
The cut detector may be switched off using this control. When set to On, the sensitivity to a cut can be adjusted (5 is normal). Increased sensitivity may be used where cuts between similar scenes are present. Decreased sensitivity may be useful on material with unusual motion profiles or vari-speed.

Select Area



Select Region

The area of the image to lock to may be selected using this control. This is very useful in situations where multiple moving objects are present within the picture, allowing the user to select which area to stabilize.



Screen Overlay

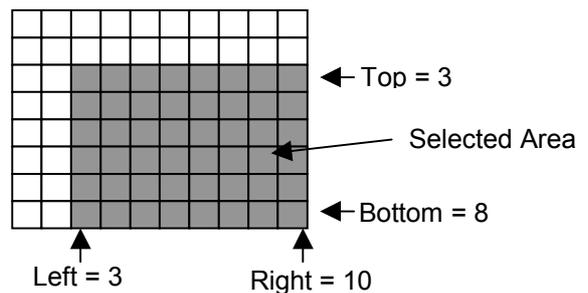
An overlay can be added to the output of the unit to show the approximate area of the input image that the unsteadiness process is using to calculate the unsteadiness. This is particularly useful when setting up the user defined region.

Note that Correction is disabled when the overlay is on the screen.

User Defined



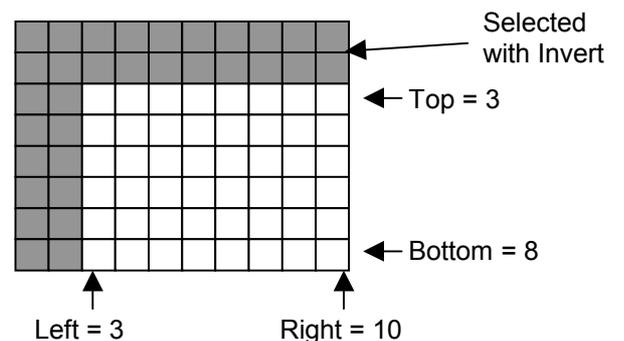
Allows a user selection area of rectangular shape to be defined. There are 8 blocks vertically and 10 blocks horizontally. Using 'top' you can select which of the 8 rows vertically is the top of the selected rectangle. Similarly, bottom, left and right allow you to define the bottom, left and right of the box. For example:



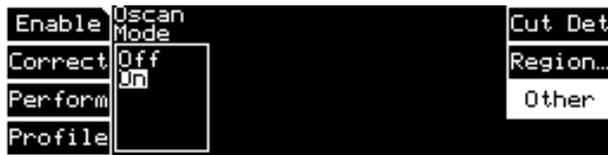
Invert



The selection may be inverted using the 'Invert' toggle button. In this case only the blocks outside the defined area will be active, for example:



Other Controls

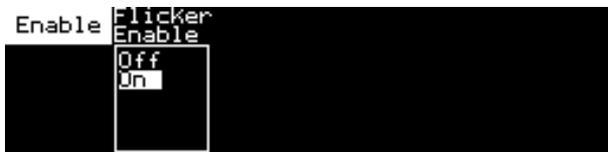


Overscan Mode

This is a mode that allows correction without overscanning. This may be useful for very unstable images where ultimate correction is required. Note that blanking areas will enter the image, up to a limit set by the correction factor.



FLICKER



Enable

Flick Enable

The flicker correction may be enabled from this control. No further configuration is required for the flicker correction.



VIDEO



This button will display a list of video parameters (selected by using the adjacent push buttons) that may be adjusted using the spinwheels below. The cursor arrow will move in sympathy with the rotation of the spinwheel and a numerical readout will be shown below the cursor display. To return all settings to zero or their preset settings, press the preset button.

Gain Adjustments

Video Gain

The video gain may be adjusted over a range of ± 6 dB in steps of 0.01 dB

Note that this can produce output signals above standard levels.

Black Level

The black level of the output signal may be adjusted over a range of ± 88 mV in steps of 0.1 mV.

Chroma Gain

The chroma gain may be adjusted over a range of ± 6 dB in steps of 0.01 dB.

Enhance



This function allows enhancement to be applied to the picture.

Up to 9 dB of horizontal enhancement, and 6 dB of vertical enhancement, in steps of 0.1 dB is available.

Color Balance Adjustments



Col Bal (Color Balance)

The color balance of the picture may be adjusted using these controls.

There are two controls to adjust the amount of red in the picture and two for the amount of blue.

The **Red White** control will adjust the amount of red in the highlights (near peak level) and the **Red Black** will adjust the amount of red in the lowlights (near black level)

The range of control is $\pm 25\%$ in steps of 0.1%

The **Blue White** control will adjust the amount of blue in the highlights (near peak level) and the **Blue Black** will adjust the amount of blue in the lowlights (near black level)

The range of control is $\pm 25\%$ in steps of 0.1%

Y/C Delay Adjustments



Y/C Del

The relative timing between the luminance signal and the chrominance signal may be adjusted with these controls.

The Delay Horiz will change the horizontal timing (left/right) by +600 ns to -450 ns in steps of 1 ns.

A positive value of delay will shift the chrominance signal to the left of the picture and a negative value will shift the chrominance to the right of the picture.

The luminance signal will remain stationary.

Output



This selection allows a luminance clipper and the Gamut limiter to be enabled.

Gamut Limit

The color Gamut limiter may be switched ON or OFF

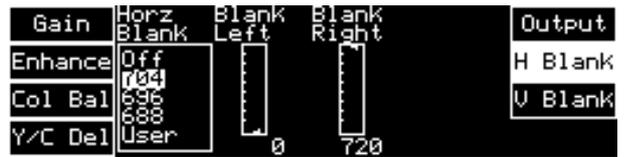
Luma Clip

The luminance clipper may be switched ON or OFF

Blanking

As the unsteadiness correction works by moving the picture around, it is vital to the correct operation that the blanking positions are correctly set. If the blanking positions set are outside those of the input video, then it is possible that blanking will be moved into the active picture area. To prevent this, it is recommended that new source material presented to the unit be inspected to determine the blanking positions. These positions should then be set in the user-settings in H Blank and V Blank controls, which will prevent edge effects occurring.

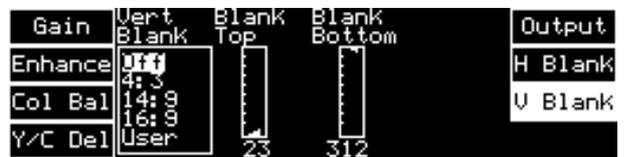
H Blank



Horz Blank

It is recommended that the output is blanked to at least the analog (704) blanking position. Additional tighter blanking positions are also given. This blanking may also be turned to the digital blanking position (720 = Off) or when User is selected the blanking can be defined to the nearest pixel (Blank Left, Blank Right).

V Blank



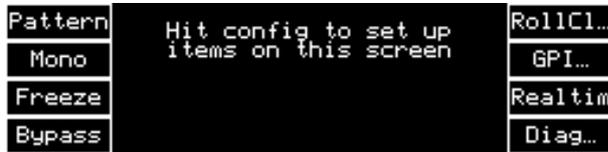
Vert Blank

Archangel One is designed to work with pre-recorded or live material. Some pre-recorded material may be letter-boxed. Archangel One is designed to work with material in 4:3, 14:9 and 16:9 letterbox modes. These can be selected from the output menu. When User is selected, the blanking can be defined to the nearest line (Blank Top, Blank Bottom).

Note that the numbers refer to the first/last active line, i.e. if Blank Top is 23 then line 23 will be passed and line 22 will be blanked.



This function allows various actions to be applied to the output signal. It will also allow a self-test facility and a Debug program to be run.



Note: To set up the attributes of these functions press the CONFIG button.

All functions except RollCl, GPI and Diag are toggle ON/OFF; the function is highlighted when it is on

Pattern

This selection produces a pattern as the output.

Mono

The picture will become monochrome.

Freeze

When enabled the picture will become frozen.

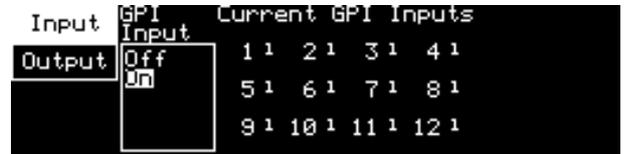
Bypass

When the bypass function is enabled the video will pass through the unit with certain functions disabled, in accordance with the configuration selected.

Note that the Gain and Color Balance controls may also be bypassed via the CONFIG function. When Bypass is selected, the delay through the unit remains the same.

GPI

The General Purpose Interface display can be used for monitoring the input and output status of the GPI card ports.



INPUT provides a view of the current status of the inputs. The input may be set Off (inactive) or On (active). The active input will be denoted by a "0" instead of the "1" shown.

OUTPUT provides a view of the current status of the outputs.

The output may be set Off (inactive), On (active) or Invert (action inverted).

Realtime

When selected a "beep" will be heard and the machine becomes receptive to inputs on the RS-422 input. This function is provided for future use.

The Archangel One will work with a POGLE Platinum, but not a POGLE Classic.

Connections

The RS422 cable must be connected such that one end is attached to the "NOISE" output socket on the Pogle, the other end is attached to the "Serial Port" socket on the Shoebox, and the middle plug of the cable is attached to the "Rem" socket on the Archangel One.

One end of a coaxial cable must be connected to the BNC on the Shoebox marked "NETWORK" via a T connector with a 75 Ohm terminator. The other end of the coaxial cable must be connected to the BNC on the Archangel 2 marked "Serial" in the section marked "RollCall" via a T connector with a 75 Ohm terminator.

Settings

Archangel Two's RollCall address must be set to 0x2a. Archangel must be selected in the Pogle's Room Setup window

The RS422 Cable

The RS422 cable is a simple one to one pinout, but with connections to pins 2 and 7 cut on the Box 1 connection. An RS422 cable of this form is supplied with every Archangel sold.

RollCall

This enables configuration of RollCall communications.

Name

This allows the name of the unit on the RollCall network to be changed from the default of *Archangel One*.



Use the first spinwheel (**Pos**) to select the position of the character in the name.

Use the second spinwheel (**Char**) to select the alphanumeric required for the first character.

Use the third spinwheel (**Space**) to select a space instead of a character.

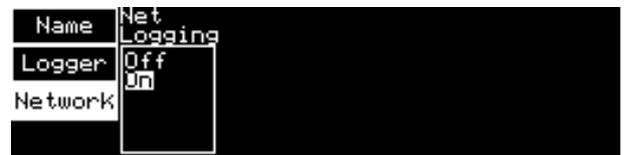
Repeat the above three steps for the other characters until the required name is completed.

Logger



This allows the name of the logging server on the RollCall network to be changed. Use the same method as the name function above.

Network



This item allows the Logging function to be enabled or disabled by selecting **off** or **on**.

Diag...(nostics)

When Diag is selected the following screen is displayed.



Demonstration Modes

The demonstration modes are provided primarily for sales personnel.

Off Mode not enabled

Unstdy Marker Four markers are superimposed on the input picture. After processing through Archangel One, the amount of movement of the markers is indicative of the amount of correction Archangel One is performing. This is especially useful for demonstrating the effectiveness of Archangel One with a single monitor.

Unstdy Graph The measured horizontal and vertical motion is displayed on a graph, with history detailing the last 250 fields. A vertical line on the graph indicates a detected cut.

Note that Archangel One will not correct unsteadiness when the graphs are displayed.

Graph H-Gain

The horizontal gain of the graph may be adjusted using this control.

Graph V-Gain

The vertical gain of the graph may be adjusted using this control.

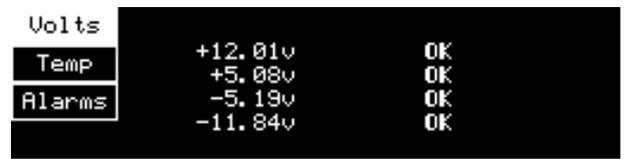
Valid Blocks (Diagnostics)



This overlay shows the regions of the screen that the unsteadiness process is using in its calculations.

System (Diagnostics)

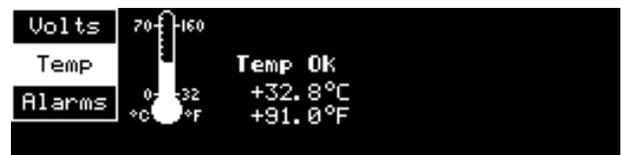
When System is selected the following screen is displayed.



Volts

This display gives an indication of the voltage level of the +5, -5, +12 and -12 V power supplies and is provided as a diagnostic tool. The voltages should be within $\pm 5\%$ of the nominal level.

Temp



When the temperature limit is approached, an intermittent chirp will be heard from the box. A continuous beep will be heard when the maximum range is exceeded. The unit will continue to run and will not automatically shut down if the maximum temperature is reached, however it is advised that the unit should be turned off at the first opportunity.

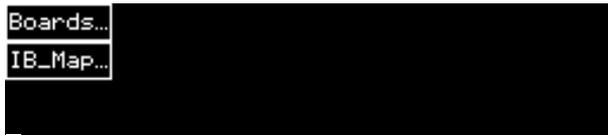
If the unit is overheating, check that the ventilation fan is operating on the rear of the unit and the airflow is not restricted by external objects or the build-up of dust/dirt in the fan grille.

Alarms

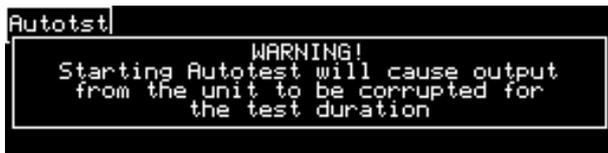


The temperature warning beep can be disabled by setting the temperature alert in the **Alarms** menu to Off.

Test (Diagnostics)



If Board Testing is selected, the Autotst introduction screen is displayed for 5 seconds, unless the user rotates one of the front panel controls.



A list of boards present in the unit, the software version number of the board and the results of an autotest is displayed.

Autotst	Board	Present	Version	Autotest
	CNF	yes	11	Untested
	FHC	yes	08	Untested
	UFO	yes	03	Untested
	INT	yes	13	N/A
	OPI	yes	05	N/A

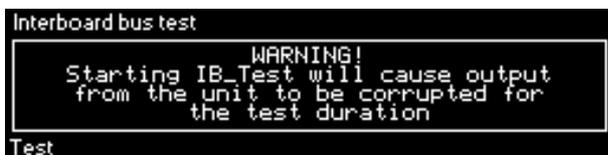
AutoTest

Pressing AutoTest will initiate the automatic test program for the boards and the word ...Testing... will appear crawling through a box outline. When the test has finished the results of the test program for each board will be shown at the right.

The result may be Passed, or if the test could not be completed, an error code will be generated. This will be the letter G (Group) followed by a number and the letter T (Test) followed by a number. This information will be required when communicating with the Snell & Wilcox service department.

IB_Maps

If IB_Maps is selected (interboard bus test) the warning below will appear.



After a few seconds the warning changes to the following display.



To initiate the test program select TEST (lower left-hand button). The unit will then carry out the test program, the sequence indicated by the appearance of dotted lines between the blocks.

When all the tests are complete you should get a no errors found message.

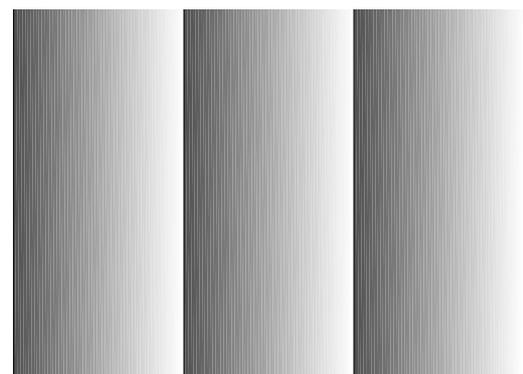


After a few seconds this clears and the connections that are working are shown by animated dotted lines.

To restart the machine when there are no errors RESET (bottom right button) must be pressed.



If errors are found, then an 'errors found' message is displayed and the inter-board connection(s) will then appear as a solid flashing line and remedial action (e.g. call Snell & Wilcox or their agents) should be taken. The RESET button (bottom right) will change to DEBUG (this is a toggle On/Off function) and if this is pressed a ramp signal will be passed through the failed path and the result will be shown on the output monitor (this is intended for factory use only). If more than one interconnect fails, then the failures can be cycled through by pressing the debug button again.



Note that once a test has been carried out and failed, the resulting displays will remain until another test is made or the unit powered down.

 (Diagnostics)

Password Entry

This function allows a service password to be entered. This facility provides access to debug functions used for servicing at the factory and should not be accessed under normal conditions.

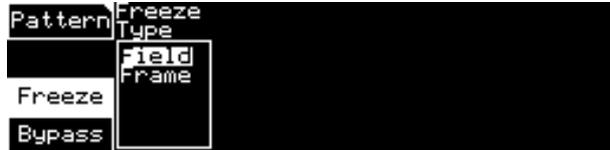
 CONFIG

When the Utils display is on the screen and the CONFIG button the pattern, freeze and bypass parameters can be set.



Patterns available are:

- 100% Bars 75% Bars EBU Bars
- Y Ramp U/V Ramp
- Y Sweep U/V Sweep Bowtie



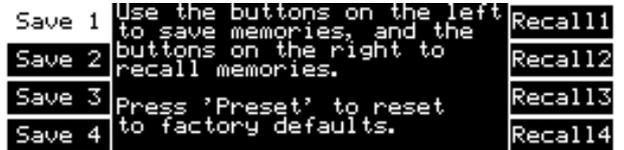
The type of freeze may either Field or Frame.



There are two bypass options: Unsteadiness+Flicker where the unsteadiness correction and overscan functions are turned disabled but the video settings remain enabled, for example Video Gain and Color Balance settings. Unsteadiness+ProcAmp where all functions are turned off and the signal passes straight through.

 MEMORY

This selection reveals the memory save and recall functions



There are 4 memory locations where all settings may be saved. To save settings select a memory location, for example, Save 1. When this is highlighted the settings will be saved in the Recall 1 location. To recall a memory, select the required location. When it is highlighted the settings stored in that location will be loaded.

To return to factory set default values press the Preset button.



AUDIO

This allows the status of the audio channels to be set up and RollTrack to be selected.



Intern

This allows settings for the Internal (embedded) audio to be made.

Note that this is only applicable if Archangel One is used as a stand-alone unit.

Audio Control

The embedded audio output may be set to Off (no audio data), On (audio data from selected input group), Mute (silence) or Test Tone.

Delay Offset

In addition to the delay compensating for the video path through the system, an extra delay period can be added to compensate for the video delay introduced elsewhere in the system. The time may be adjusted over a range of 0 to 750 ms using the rotary control.

Input Group

Use the Input Group item to set the input group to 1, 2, 3, or 4.

Output Group

Use the Output Group item to select the output group to 1, 2, 3, or 4.

Note that this function will be available even when the Reference is selected to be Input as the input and output clocks are locked together.

R-Trk...

Selecting R-Trk will enable the RollTrack audio delay tracking system.

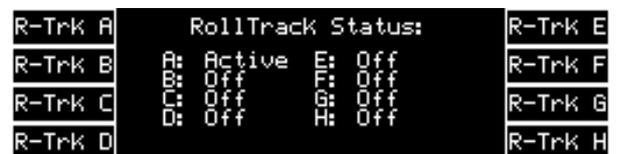
This function will be remote controlled via the Snell & Wilcox RollTrack audio tracking system.

This function allows the value of the delay time produced by this module to be sent, via the RollCall™ network, to audio delay units connected on the same network. This enables compatible audio delay units to produce an audio delay dependent on this and other similar units. The audio delay unit will dynamically follow or track the received delay-time information allowing processed video signals to be timed correctly with audio signals. This automatic tracking system via the RollCall™ network is called **RollTrack**.

For more detailed information, see the RollTrack section (Appendix) at the end of this manual.

The destination for the delay information is set by the network code address as follows:

Selecting R-Trk provides a sub-menu that allows up to 8 audio delays to be selected as a destination.



A further sub-menu then appears to allow the code to be set up (using the spinwheels below) to edit the text.

The full network address has five sets of numbers.

NET

The first set (0000) is the network segment code number



(Each spinwheel adjusts the portion of the address above it; the Preset button sets the text line to all zero's and the SAVE function, which appears when the address has been changed, accepts the network address)

Setup

Active	RollTrack A			
Net	Unit Address	Port	Virtual Channel	Unit ID
Setup	00	01	14	000

The second set (00) is the number identifying the Unit address (enclosure/mainframe)

The third set (01) is the Port (slot number) in the unit.

The fourth set (14) is the (Virtual) channel number.

Note that only channel numbers 14, 15, 16 & 17 should be used for audio delay cards.

The fifth set (000) is the Unit Identification.

Once a destination address for a unit has been set the SAVE function will save the data.

Note that the settings will not become active until saved and re-activated by selecting ACTIVE.



This function allows genlock to be enabled and the reference source selected. The selected setup will be indicated in the Home display.

Genlock Mode
Free-running
Input-Locked
Ext-Locked

Genlock

This allows the genlock mode to be selected. If there is no reference "Genlock" alternates with "No Ref!"

Selections are:

Free-Running The unit will lock to internal clocks and will not be locked to any external signal.

Input-Locked The output video is locked to the selected video input signal.

Ext-Locked The output video will be locked to the external reference signal connected to the REF input connector. This must be an analog black and burst signal.

Timing

The relative timing between the reference signal and the output signal may be adjusted using these controls.

Note that these control functions are not available in the Free running mode.

Genlock Timing	Horiz Offset	Vert Offset
	0 pix	0 lin

Horiz Offset

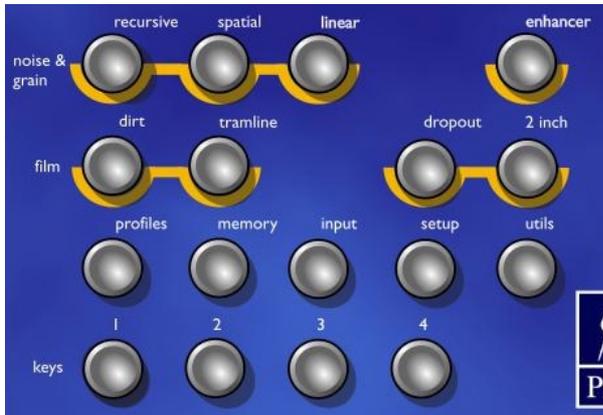
The horizontal or line timing may adjusted over a range of 0 to 863(PAL) or 857(NTSC) pixels in steps of 1 pixel.

Vert Offset

The vertical timing may be adjusted over a range of 0 to 624 (PAL) or 524 (NTSC) lines in steps of 1 line.

Archangel Two

Dedicated Pushbuttons



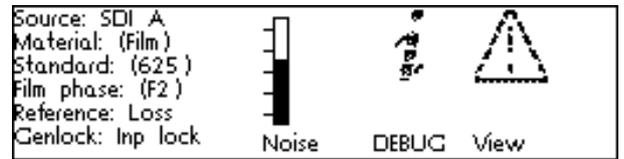
Archangel Two Pushbuttons

Where an LED inside a Filter or Key pushbutton is illuminated it means that the filter is enabled. When the LED flashes it means that the filter is enabled and the view function for that filter is also enabled.

If the Setup pushbutton LED flashes when a test pattern or freeze is enabled. When mono is enabled the pushbutton LED is illuminated.

If the Utils pushbutton LED flashes bypass on or PhC is off.

Home Display



When the Archangel Two unit has powered up, the Home Status Screen is displayed in the Display Window. The Home Status Screen displays the current system set-up. This includes the status of input signals and the noise level.

The space to the right of the Noise bar is reserved for information icons and warning icons.

The Home Status Screen may be accessed from any position in the menu hierarchy by pressing the **home** button.

Noise Bar

The Noise bar provides a visual indication of the noise floor level.

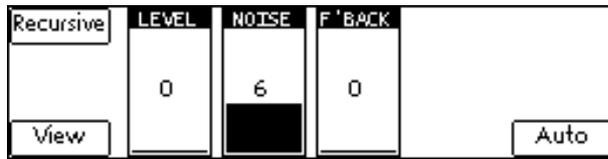
Status Information

Up to six lines of status information are displayed on the home page. This information is defined in the following table.

Home Page Status Information:-

Line	Title	Value	Explanation
1	Source:	SDI A SDI B	Input A Input B
2	Material:	Film Video (Film) (Video) Error	Manual Film mode Manual Video mode Automatic Film mode Automatic Video mode Manual is not the same as automatic
3	Standard:	625 525 (625) (525) Loss Error	Manual 625 Manual 525 Automatic 625 Automatic 525 Input Loss Manual is not the same as automatic
4	Film Phase: (625 lines)	F1 F2 (F1) (F2) 1:1 (1:1) Error	Manual field 1 Manual field 2 Automatic field 1 Automatic field 2 Video mode set manually Video mode detected automatically Manual is not the same as automatic
4	Film Phase: (525 lines)	(3:2) 1:1 (1:1) Error	Automatic 3:2 detection Video mode set manually Video mode detected automatically Manual is not the same as automatic
5	Reference:	(625) (525) Input Error	Reference input is 625 lines Reference input is 525 lines In input locked mode the external reference input is not used Reference standard is not the same as input standard
6	Genlock:	Free Run Ref Lock Input Lock	Free Running Locked to reference Locked to input

FILTER MENUS



Enable

The "Recursive" button may be toggled to enable and disable the recursive filter.

View

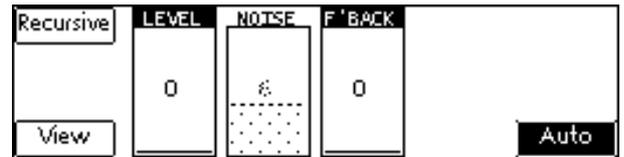
The recursive "View" control allows the user to directly view the difference between the current and previous pictures in effect the amount of noise reduction the recursive filter is currently achieving. To see the "view image" the filter must be enabled.

Level

The "LEVEL" control changes the amount of noise reduction for both luminance and chrominance by limiting the maximum level of noise reduction, where 15 is maximum and 0 is minimum. The actual level of noise reduction is dynamically adjusted on a pixel-by-pixel basis with regard to the noise reduction setting for the same pixel in the previous frame. Other factors such as movement contribute to the current pixel setting. This mechanism ensures that the optimum level of noise reduction is applied to each pixel.

Noise

The "NOISE" control sets the threshold for the motion detector. The lowest level of 0 gives the greatest sensitivity to motion, but allows more noise to break through, while 15 gives the greatest noise reduction but can lead to excessive filtering of low-level textures. When this is set to auto the threshold is dynamically set to an appropriate value for the current input noise level.



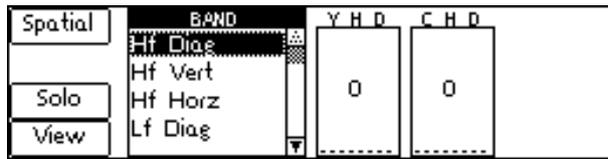
Auto

The "Auto" button provides access to the auto threshold mode.

Fallback

The "F'BACK" control adjusts the level, or strength, of spatial filtering used in the spatial/recursive blend. It does not adjust the ratio of the blend; this is done automatically to give the optimum results.

 **Spatial**



Enable

The "Spatial" button may be toggled to enable and disable the spatial filter.

Solo

The "Solo" button allows the user to view the noise reduction in an individual band. The band is selected using the "BAND" control. To view this single band's contribution, both "Enable" and "View" must be selected.

View

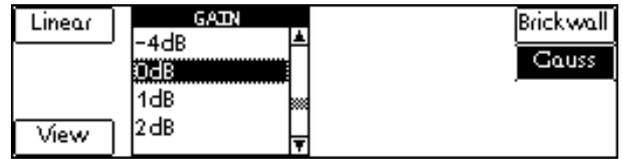
The spatial "View" button allows the user to see how much of the impairment is being removed by the spatial filter. This facility makes it easier to select the appropriate level and band to specifically target the impairment whilst preserving the image detail. To see the overall effect of the spatial band filtering (all bands) the "View" must be selected and the "Solo" disabled.

Band

The "BAND" control selects the active band of the filter for control and adjustment purposes. To check the level of the nine bands use this control to scan through each band in turn. This control is also used to determine which band will be active when "Solo" is enabled. The bands are:- to determine which band will be active when "Solo" is enabled. The bands are: -

Band	Luma Level	Chroma Level	Description
H-D	Y H-D	C H-D	High Frequency Diagonal
H-V	Y H-V	C H-V	High Frequency Vertical
H-H	Y H-H	C H-H	High Frequency Horizontal
L-D	Y L-D	C L-D	Low Frequency Diagonal
L-V	Y L-V	C L-V	Low Frequency Vertical
L-H	Y L-H	C L-H	Low Frequency Horizontal

 **Linear**



Enable

The "Linear" button may be toggled to enable and disable the linear filter.

Enable

The "Linear" button may be toggled to enable and disable the linear filter.

View

The *low-pass* filter mode is employed to noise reduce with less severity than the brickwall filter and/or to compensate for any irregularities in the luminance signal such as inherent high frequency gain.

This mode has 10 user selectable levels at 6.75 MHz ranging from -4dB to -40dB in -4dB steps.

Gaussian Low Pass (Gauss)

The *high-pass* filter mode is employed to compensate for high frequency attenuation in the luminance spectrum. This high frequency attenuation may be mainly caused by stray capacitance inherent throughout the cables of an installation. This mode has 5 user selectable levels at 6.75 MHz: 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

The *high-pass* filter mode is employed to compensate for high frequency attenuation in the luminance spectrum. This high frequency attenuation may be mainly caused by stray capacitance inherent throughout the cables of an installation. This mode has 5 user selectable levels at 6.75 MHz: 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

Brickwall Low Pass (Brickwall)

The *brickwall low-pass* filter mode is employed to reduce noise resident in the high frequency region of the luminance spectrum.

This mode has 18 user selectable cut-off frequencies (specified at -6 dB) ranging from 4.2 MHz down to 2.5 MHz in 0.1 MHz steps. The stop-band performance is -34 dB or better with no boost.

In addition to the selectable cut-off frequencies the user can also select a given boost at each cut-off: 0 dB (no boost), 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

There are a further 6 Extra Low Pass filters with cutoffs from 2.44MHz to 0.92MHz, the boost at the cut off frequency is not available for these filters.

The boost value selected is the amount of gain applied to the filter response at the chosen cut-off frequency. The selectable boost facility is incorporated to allow the user to increase the perception of sharpness in the picture by boosting the contrast. The sharpness of a picture can sometimes be significantly reduced by filtering the high luminance frequencies so the inclusion of the extra boost helps to restore some of the sharpness to the picture. A boost of 6 dB will result in the cut-off frequency being increased by up to 0.4 MHz. The actual amount of boost selected will be a trade-off between cut-off and picture sharpness.

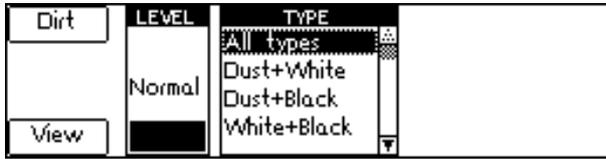
Linear View

The linear view control allows the user to directly view the difference between the input and the output from the linear filter. The signal represents the value of the correction which would be applied to the picture. The polarity of the output signal can be either positive or negative depending on the polarity of the picture so the output is displayed on a grey pedestal. Positive correction values will extend towards white and negative correction values will extend towards black.



Dirt

The dirt filter has two controls, Level and Type.



Level

The default value for this control is **Normal** and should be used most of the time. It is an optimized setting.

If some low contrast picture content (such as helicopter rotor blades for example) is being damaged, then levels -1 to -3 can be used to correct this artifact.

On the other hand, if some residues or shadow of dirt are still present, then levels 1 to 3 can be used to reduce them.

Levels 5 to 9 are respectively more aggressive settings that can be used on pictures with slow or no movement when the level of dirt concealment with the Normal setting is not satisfactory.

Please note that with the "Dust only" setting, the level setting has no effect.

Type

In many materials the types of dirt include black dirt, white dirt and dust. In this case the "All types" setting should be used. If there is only one type of dirt present, then there is no need to try to remove other types since it could lead to the introduction of artifacts. In this case, just select the type of dirt you want to remove. For example, if the material only contains small pieces of dirt (up to around 10 pixels wide in any direction), then the "Dust only" type should be used.

If the "Normal" level setting causes damage to complex or fast motion, one of two remedies may be used. If large pieces of dirt are present in these pictures, use the keys to disable the dirt filter in the area where the damage is occurring. If no large pieces of dirt are present, change the type setting to "Dust only".

The "Dust only" setting should be artifact free, but in the very unlikely case of some very small moving objects (such as lights, buttons or small details) disappearing or flashing, try to disable the dust by using from among the "White only", "Black only" and "White + Black" settings the one corresponding to your case.

View

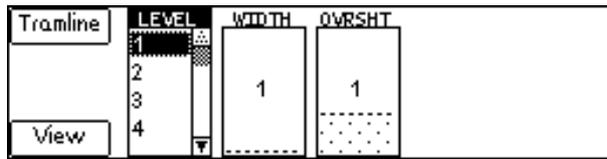
The "View" control allows the user to directly view what the filter is removing from the picture.

Dirt Keys

Even though Archangel Two contains a sophisticated automatic dirt detection and repair algorithm, there will still be some instances where picture content matches the characteristics of dirt. In these cases, a key can be defined to restrict the area of detection and concealment of the algorithm within the picture. When processing a picture where the horizontal or vertical blanking extends into the normal active picture area, for example letterbox, a key can be assigned to the dirt to define the edge of picture.

See section on Keys below.

Tramline



The tramline filter controls allow the user to improve the selectivity of the automatic detection and concealment.

Enable

The "Tramline" button may be toggled to enable and disable the tramline filter.

Tramline Width (*WIDTH*)

The "WIDTH" control is the most important of the tramline filter controls. It restricts the algorithm to detect scratches of the selected width and narrower. By restricting the algorithm to narrower scratches it substantially reduces the probability of false alarm caused by picture detail.

Tramline Overshoot (*OVRSHY*)

Most tramline scratches have an associated overshoot adjacent to the scratch. Hence a black scratch will have a white overshoot and vice-versa. However, the amount of overshoot is quite variable depending on the depth of the scratch, hence this control allows the user to vary the amount of overshoot correction which is applied.

Tramline Sensitivity (*LEVEL*)

The tramline sensitivity control effectively determines the limits of detection of the algorithm. Some scratches are easier to detect than others and in such cases a low sensitivity setting could be used but where the scratch is vertically skewed or inconsistent throughout the frame, a higher sensitivity setting is required. Generally, the lowest sensitivity setting should be used to reduce the probability of false alarms.

Tramline View

The tramline "View" control allows the user to directly view the output from the detection/correction algorithm. The signal represents the value of the correction that would be applied to the picture to correct the scratch. The polarity of the output signal can be either positive or negative depending on the polarity of the original scratch so the output is displayed on a grey pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To see the "view image" the filter must be enabled. To use the "view" associated with an individual key, the tramline view and the key filter must both be enabled).

Tramline Keys

Even though Archangel Two contains a sophisticated automatic scratch detection algorithm, there will still be some instances where picture detail matches the selected scratch criteria. In these cases, a key can be defined to restrict the range of detection and concealment of the algorithm.

See section on Keys below.

Using the Tramline filter

The following procedure is a useful guide to using the scratch filter.

1. Ensure that all keys are off so that the entire picture is filtered
2. Select the maximum sensitivity
3. Select maximum overshoot
4. Starting from the narrowest scratch width, gradually increase the setting until the scratch disappears. This adjustment can also be made in the View mode by adjusting the width control until the correction signal is clearly visible.
5. Reduce the sensitivity setting until the scratch becomes visible and then increase the setting by 1 level.
6. Reduce the overshoot range until the overshoots become visible as tramlines adjacent to the scratch and then increase the overshoot correction by one level to conceal the overshoots.



Enable

The “Dropout” button may be toggled to enable and disable the dropout filter.

View

The dropout “View” control allows the user to directly view the effectiveness of the detection/correction algorithm. The difference between the input and the corrected output is shown when view is active. Another way to consider this signal is that it represents the detected impairment that is subtracted from the input when view is turned off.

The polarity of the output signal can be either positive or negative depending on the polarity of the dropout so the output is displayed on a grey pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To obtain the "view" image, the filter must be enabled.



Enable

The “2 inch” button may be toggled to enable and disable the two inch filter.

View

The “View” control allows the user to optimally adjust the level setting by viewing where the scratches have been detected. To obtain the "view" image, the filter must be enabled.

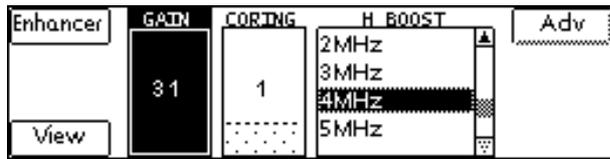
Repeat

The “Repeat” control allows the user to use a stronger filter to remove correlated scratches, the strengths can be adjusted by ‘Rep Level’. This mode would not normally be needed.

Rep Level

The “Rep Level” control allows the user to control the sensitivity of the filter. A low number means that the filter is not very sensitive, and may not detect many scratches. A high number means that the filter is able to detect many scratches, however there may be false alarms where periodic image detail is detected.

 **Enhancer**



Enable

The "Enhancer" button may be toggled to enable and disable the enhancer.

Gain

The "GAIN" control defines the amount of enhancement required. A positive value provides enhancement, whereas a negative value provides de-enhancement. The higher the value, the greater the amount of enhancement. Too high a value is likely to result in unwanted artifacts.

Coring

The purpose of the "CORING" control is to reduce or prevent the enhancement of noise in the picture. The noisier the material, the higher the coring should be.

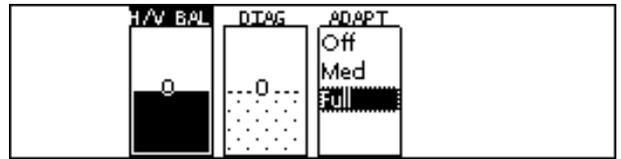
View

A "View" button is provided to visualize the enhancer signal in isolation. To obtain the "view" image, the enhancer must be enabled.

Horizontal Boost

The "H BOOST" control defines from which horizontal frequency the horizontal enhancement applies.

The "ADV" button accesses the following controls:



H/V balance

The "H/V BAL" control determines the horizontal and vertical enhancement ratio. A positive value provides more enhancement in the horizontal than in the vertical, whereas a negative value provides more enhancement in the vertical than in the horizontal.

Diagonal

The "DIAG" control determines diagonal enhancement. A null value provides as much enhancement in the diagonal as in the horizontal and vertical. A positive value provides more enhancement in the diagonal, and a negative value provides less enhancement in the diagonal than in the horizontal and vertical direction.

Adaptation (Adapt)

The "ADAPTION" control allows the user to control bright and dark adaptation. Enhancement is often not desired in the very bright and very dark areas of the pictures since it would result in unwanted artifacts. In order to lower the level of enhancement according to the brightness and darkness of the picture, three level of adjustment are provided: OFF, MID, FULL.

ANCILLARY FUNCTIONS



Key

Archangel Two provides up to four user-definable rectangular keys that can be used to restrict the range of detection and concealment of the Dirt and Tramline filters. The keys are prioritized to allow overlapping and more complex shapes if necessary and are directly accessible from the front panel.

Key 1	LEFT	TOP	WIDTH	HEIGHT	Dirt
	359pix	5%	280pix	45%	Tramline
Invert					
View					

Key 2	LEFT	TOP	WIDTH	HEIGHT	Dirt
	70pix	5%	142pix	45%	Tramline
Invert					
View					

Key 3	LEFT	TOP	WIDTH	HEIGHT	Dirt
	70pix	49%	142pix	95%	Tramline
Invert					
View					

Key 4	LEFT	TOP	WIDTH	HEIGHT	Dirt
	388pix	55%	280pix	95%	Tramline
Invert					
View					

Tramline Keys

In normal operation the key color overlay includes a soft edge to minimize the visibility of the scratch filter as it turns off an on at the key edge. The key includes the partially filtered area to indicate to the user the overall extent of the filter, which effectively extends the filtered area by 7Y pixels each side. In the inverted mode, which is used to protect an area of the picture, the key width is deliberately modified (reduced by 7Y pixels each side) to indicate the area which is fully protected. If the key width were not reduced, then there would possibly be some damage to the periphery of the keyed area caused by the partial filtering of the soft edge.

Key View

The keys are color-coded for easy identification.

- key 1 - yellow
- key 2 - cyan
- key 3 - red
- key 4 - blue

If Key View and Tramline View is selected the Key view overrides the tramline view.

If Key View and Dirt View is selected, the Dirt View is visible, with a chroma outline on the left and right.

For each Key, the user may select either the Dirt filter or the Tramline filter.

Profiles



This menu allows preset unit configurations to be recalled. The “Recall” button recalls the unit configuration stored in the highlighted slot of the “FACTORY PROFILES” selection.

The “BIAS” setting allows the user to increase or decrease the effect of the preset unit configuration by up to 100%, subject to the altered value of each setting being within its possible range.

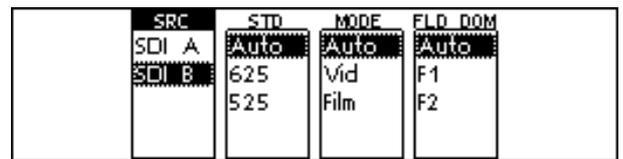
Memory



This menu allows unit configurations to be stored and recalled. “USER MEMORIES” accesses eight initially empty memory slots. The “Store” button stores the unit configuration in the highlighted slot, and the “Recall” button recalls the unit configuration previously stored in the highlighted slot.

The “Rename” button allows the user to change the name of the highlighted slot using the spinwheels.

Input

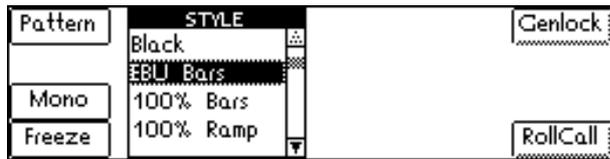


The “SRC” control selects the video input, and the menu displays the available options SDI A and SDI B.

The Archangel Two has the ability to automatically detect the video standard of the selected source, and will do so if the “Auto” option of the “STD” control is selected. The standard can be manually selected if required by selecting “625” or “525”.

If the “Auto” button of “MODE” is enabled, the Archangel Two automatically detects the mode (i.e. video or film). If required, the user may select the mode manually.

If the “Auto” button of “FLD DOM” is enabled the Archangel Two automatically detects the field dominance. If required, the user may select the field dominance manually.

 Setup**Pattern**

The “Pattern” button may be toggled to enable and disable the pattern. When enabled it produces a pattern as the output.

Patterns available under the “STYLE” control are:

- Black
- EBU Bars
- 100% Bars
- 100% Ramp
- Valid Ramp
- Y Sweep
- UV Sweep
- Bowtie

Mono

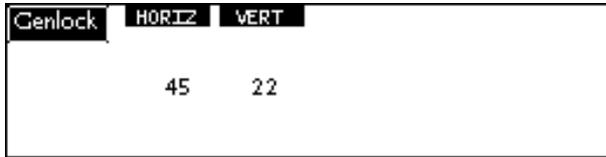
When enabled the chroma content of the picture will be removed and the picture will become monochrome.

Freeze

When enabled the picture will become frozen.



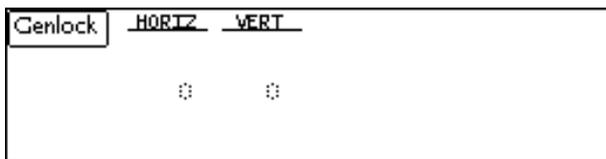
The “Genlock” button on the Setup screen accesses the following controls:



Incorporated onto the noise reduction card is a full frame synchronizer which allows the selected input to be referenced to a signal of the same line standard.

The menu system allows the synchronizer to be switched such that the genlock mode is on or off; this is done by toggling the “Genlock” button.

Genlock Off



When the genlock is forced into the off state the output video will *not be locked* to the input or the reference video signal.

This is sometimes referred to as “free-running”. If the input and output were to be viewed on an oscilloscope the two traces would be seen to be moving one past the other.

Genlock On (Default)

This mode forces the output to be locked to an analogue video signal of the same line standard.

Usually Genlock On will force the output to be locked to the signal that is connected to the reference input.

However, if the reference signal is invalid, or of a different line standard to that of the input, the synchronizer will lock the output to the input.

The status display will always indicate the mode of operation for the synchronizer.

In the event of an input loss (with the unit Genlocked to the input), the output will be momentarily disrupted when the input is returned. This effect can be minimized by ensuring the system is Reference Locked.

Reference Format

The reference signal should be a normal analogue video signal. The nominal input level is 1 volt peak-to-peak.

If the loop-through facility is not required the signal should be terminated here by using a 75 Ohm BNC terminator.

Genlock Offsets

Provision has been made to allow the horizontal and vertical timing of the output to be varied in relation to the “referenced” signal, whether it be the input or the reference. This facility is useful when the output needs to be in synch with other units such as in a studio system. This will allow clean switching between multiple sources which may have different phase relationships.

H-Lock

This changes the Horizontal Genlock Offset.

525 line standard
 Sample Range 0 to 1715
 Duration of Sample 37ns
 Preset 0 Samples

625 line standard
 Sample Range 0 to 1727
 Duration of Sample 37ns
 Preset 0 Samples

V-Lock

This changes the Horizontal Genlock Offset.

525 line standard
 Line Range 0 to 524
 Preset 0 Lines

625 line standard
 Line Range 0 to 624
 Preset 0 Lines

Genlock Status

This is displayed on the home page.

Using the Synchroniser

Archangel Two contains a frame-synchronizer that is essentially just a variable delay which has a little in excess of 1 frame capacity. The purpose of the variable delay is to allow each unit to provide an output picture that is co-timed with other units in a studio system. Normally this is achieved by applying a studio reference signal to each unit in the studio and the variable delay automatically adjusts the output so it is horizontally and vertically phased-up with the studio reference.

The purpose is to allow clean switching between multiple sources which may have different phase relationships.

Another advantage of a synchronizer is that the stability of the output clock is directly related to the quality of the reference signal. This is fundamental, as the output video rate must be phase locked to the reference video signal. In some cases this is also important as it guarantees output clock stability even if the input disappears or is noisy.

The penalty of using a synchronizer is that the input and output sides of the synchronizer are running at different clock rates and sooner or later the synchronizer will be forced to repeat or drop a video frame. A complete frame must be dropped to avoid interlace errors. This is fundamental and will almost certainly be undetectable.

If no reference is applied then the unit will automatically phase lock to the input as long as Genlock ON is selected. In this case there will be no necessity to repeat or drop a video frame and the output of each unit will be a fixed delay relative to the input.

With Genlock OFF the frame synchronizer will once again be running with different clock rates on each side and therefore will either repeat or drop a frame as necessary. The output clock stability will be very high because the read side XTAL will be set to the nominally correct frequency but will not be phase locked.

RollCall

The “RollCall” button on the Setup screen accesses the following controls:

SysName	UNIT ID	RT DLY	ROLLLOG	R Track
LogName	0x2a	17	<input checked="" type="checkbox"/> Inp Status <input type="checkbox"/> Inp Standard <input checked="" type="checkbox"/> Ref Status <input type="checkbox"/> Fault	Select

“UNIT ID” is the RollCall address of this item of equipment. The unit number must be unique on each physical network segment. The Unit number must be set to 42 to allow a third party controller to control Archangel Two.

SYSNAME	
Archangel Two	
<<<	>>>
Insert	Delete
Undo	Accept

The “SysName” button allows the user to change the name by which this item of equipment will be seen on the Rollcall network.

Audio Delay

Track 1	WD DLY	Track 5
Track 2	~340.0	Track 6
Track 3	mSec	Track 7
Track 4		Track 8

This function allows the value of the delay time produced by Archangel to be sent, via the RollCall™ network, to audio delay units connected on the same network. This enables compatible audio delay units to produce an audio delay dependent on this and other similar units. The audio delay unit will dynamically follow or track the received delay-time information allowing processed video signals to be timed correctly with audio signals. This automatic tracking system via the RollCall™ network is call RollTrack.

TRACK 1	
0000:00:00x00x00	
<<<	>>>
Insert	Delete
Undo	Accept

The destination for the delay information is set by the network code address as follows:

Selecting R Track in the Rollcall menu provides a sub-menu that allows up to 8 units (mainframes enclosures etc.) to be selected as a destination.

A further sub-menu then appears to allow the code to be set up using the adjacent push buttons to edit the text. (The '<<<' and '>>>' buttons select the cursor position and the spinwheel selects the character; the preset button sets the text line to all zero's and the 'Accept' button accepts the network address) For more detailed information see the RollTrack section of this manual. The full network address has four sets of numbers.

For example: 0000:10:01*14

The first set (0000) is the network segment code number

The second set (10) is the number identifying the (enclosure/mainframe) unit

The third set (01) is the slot number in the unit

The fourth set (14) separated by an * is the channel number.

Note that only channel numbers 14, 15, 16 & 17 should be used for audio delay cards.

Once a destination address for a unit has been set the OK function will return to the unit menu to allow another address to be set if required.

Logging

LOGNAME	
<<<	>>>
Insert	Delete
Undo	Accept

If a logging device is attached to the RollCall™ network, information about various parameters can be made available to such a device. The name of the logserver can be entered by using the LogName submenu in the Rollcall menu.

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

Input Loss

When activated, a loss of input signal condition will be available for the logging device.

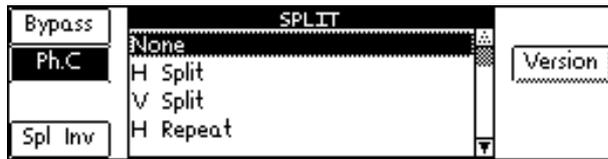
Ref Loss

When activated, a loss of External reference signal condition will be available for the logging device.

EDH Errors

When activated, EDH error reports will be available for the logging device.

 **Utils**



Bypass

The “Bypass” button may be toggled to enable and disable the filters.

Split

When the “SPLIT” control is set to a value other than “None”, the screen is split into two to allow filter previewing.

With “H Split” the right hand half of the screen is filtered.

With “H Repeat” the picture on the left hand half of the screen is repeated on the right hand half of the screen; the right hand half is filtered.

With “V Split” the lower half of the screen is filtered.

If “Spl Inv” is enabled, the split is inverted so that the left hand half of the screen is filtered for a setting of “H Split” or “H Repeat”, and the upper half of the screen is filtered for a setting of “V Split”.

PhC

With PhC selected, Phase Correlation is used to optimise the performance of the enabled filters.

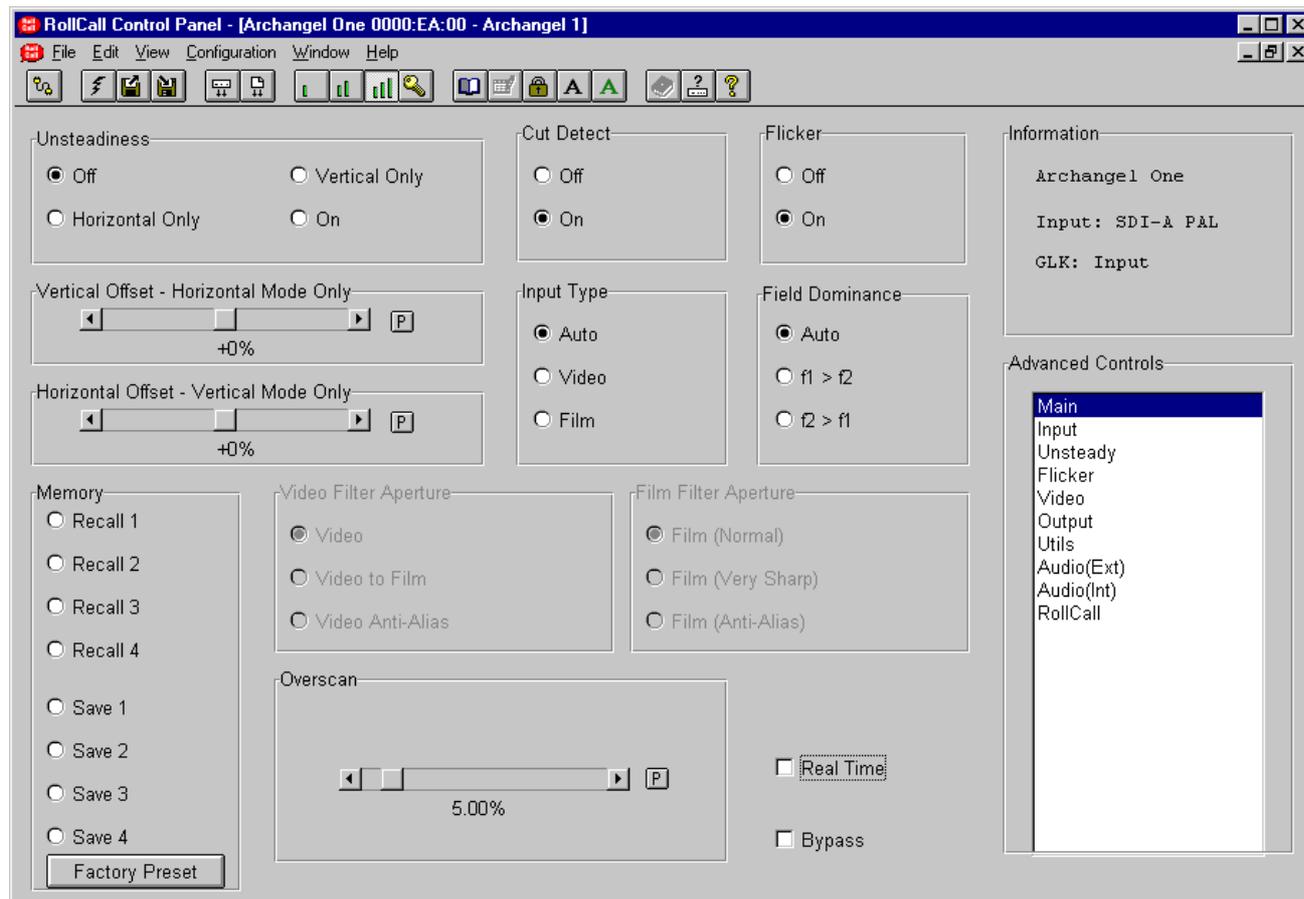
Version



This control accesses a list of the software version used by each of the cards of the system and cannot be modified.

RollCall Control Templates for the Archangel One

Main



Unsteadiness

Off/On

This allows the unsteadiness process to be enabled or disabled.

Vertical and Horizontal Only

These items allow correction to be applied only in the horizontal or vertical direction.

If unsteadiness is not enabled in a particular direction, an offset may be manually applied for that direction; e.g. a vertical offset may be applied if only horizontal unsteadiness is being corrected.

Vertical Offset – Horizontal Mode Only

The amount of Offset may be varied by $\pm 100\%$ in steps of 1%. Preset value is 0%.

Horizontal Offset – Vertical Mode Only

The amount of Offset may be varied by $\pm 100\%$ in steps of 1%. Preset value is 0%.

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 numerical value will be shown adjacent the scroll bars.

Main (continued)**Overscan**

The maximum amount of unsteadiness that can be taken out of the video images is determined by the correction factor. The correction factor is also proportional to the overscan applied to the video, unless the overscan is defeated.

The amount of Overscan may be varied from 0% to 60% in steps of 0.25%. Preset value is 5%.

Cut Detect

The cut detector may be switched Off using this control. When set to On, the sensitivity to a cut can be adjusted (5 is normal) via the **Unsteady** screen. Increased sensitivity may be used where cuts between similar scenes are present. Decreased sensitivity may be useful on material with unusual motion profiles or vari-speed.

Flicker

The flicker correction may be enabled with this control. No further configuration is required for the flicker correction.

Real Time

When selected a "beep" will be heard and the machine becomes receptive to inputs on the RS-422 input. This function is provided to allow control by third party systems.

Bypass

When the bypass function is enabled the video will pass through the unit with certain functions disabled, in accordance with the configuration selected.

Note that the Gain and Color Balance controls may also be bypassed via the CONFIG function. When Bypass is selected, the delay through the unit remains the same.

Memory

This item controls the memory save and recall functions.

There are 4 memory locations where all settings may be saved. To save settings select a memory location, for example, Save 1. When selected the settings will be saved in the Recall 1 location. To recall a memory, select the required location. When selected the settings stored in that location will be loaded.



Selecting this item will return the settings to the factory set default values.

Main (continued)**Input Type**

The Archangel One has automatic detection of film originated and video material. This may be manually overridden using this control.

While in Auto mode, a good general-purpose interpolation aperture will be used.

If Video or Film is selected, an additional menu will become available, allowing manual selection of interpolation apertures.

Video Filter Aperture

This function will be available when **Video** is selected via the **Input Type** item. The following options are then available:

Video For use with video or mixed film and video.

Video-to-Film Takes video material and field pairs to create a 'film look'.

Video Anti-Alias Reduces the video aliasing.

Film Filter Aperture

In this mode, the following options are available:

Film (Normal) Film Aperture – tolerant of changing field dominance and non frame locked edit points.

Film (Very Sharp) Sharp Progressive Film Aperture. Dependent on constant field dominance and frame edit points.

Film (Anti-Alias) Film Aperture with optimized to reduce vertical alias components.

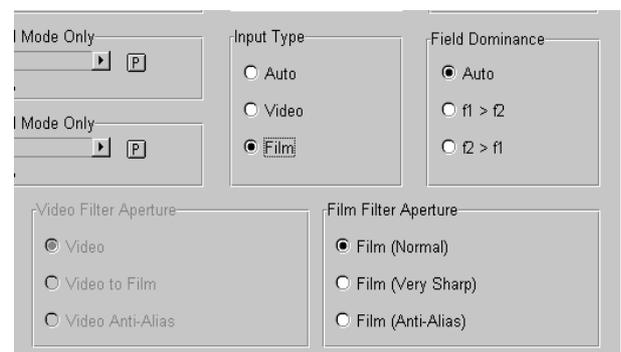
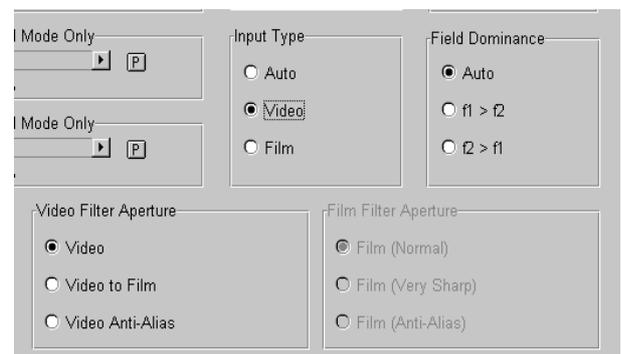
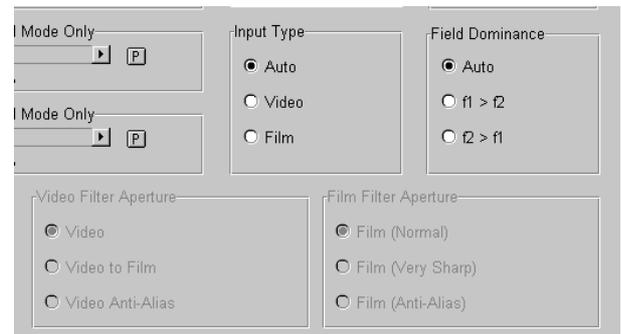
Field Dominance

The Archangel One has automatic field dominance/film phase detection for use when stabilizing film originated material. In **625/50** this can be manually overridden with the following selections:

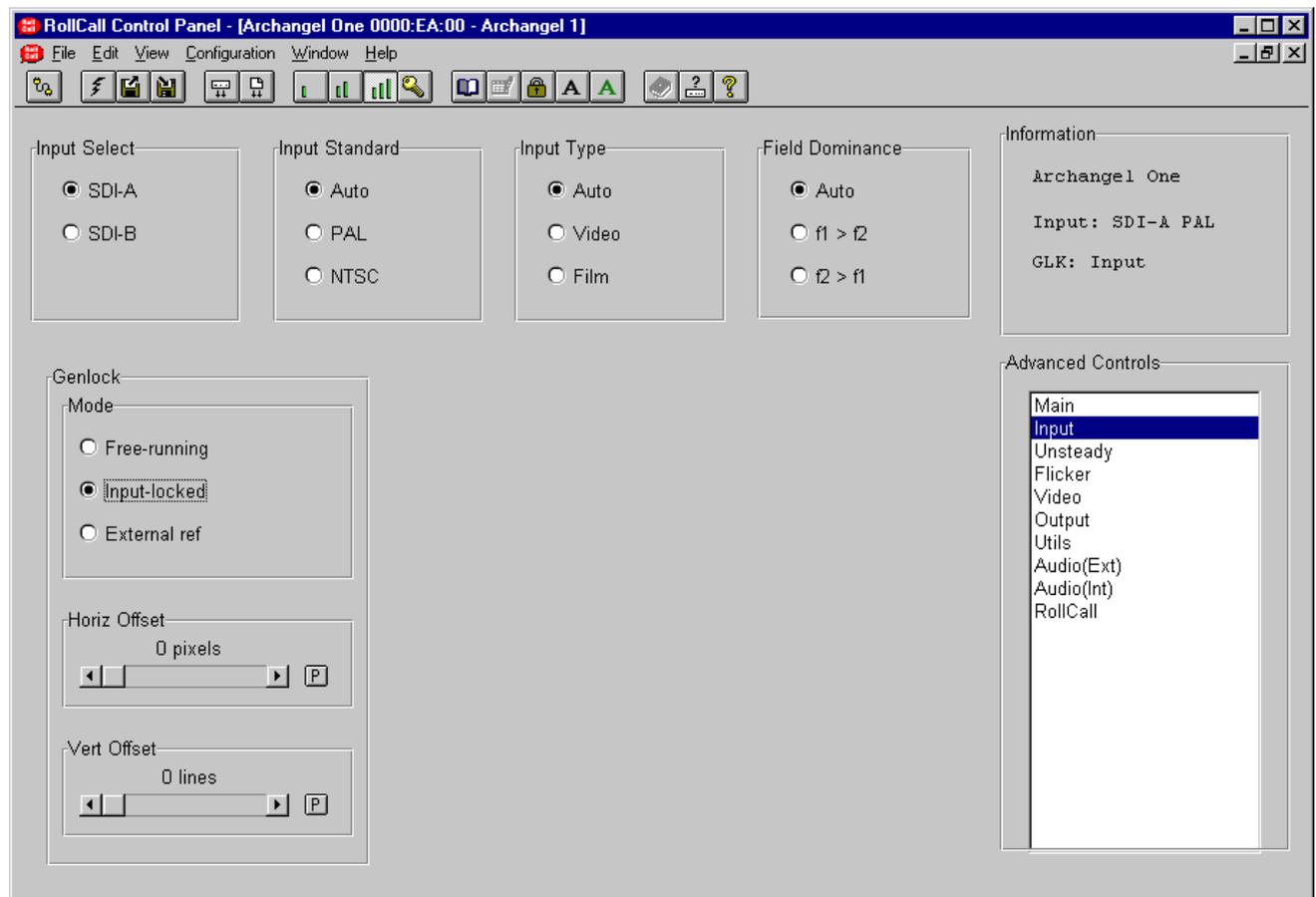
- f1 > f2 Field one dominant
- f2 > f1 Field two dominant

In **525/60**, automatic 3:2 pulldown detection is employed and the manual selection mode is not available.

Note that this function is not available in video mode.



Input



Input Select

This allows either the SDI-A or SDI-B input to be selected.

Input Standard

This allows the input standard to be selected.

Selections are force to PAL, force to NTSC or Auto. The force positions may be used where the input standard is known otherwise the Auto position (which automatically senses the input standard) should be used.

Preset selects the Auto position

Input Type

The Archangel One has automatic detection of film originated and video material. This may be manually overridden using this control.

While in Auto mode, a good general-purpose interpolation aperture will be used.

Video/Film

If Video or Film is selected, an additional menu will become available, allowing manual selection of interpolation apertures. See page 2 for details.

Field Dominance

The Archangel One has automatic field dominance/film phase detection for use when stabilizing film originated material. See page 3 for details.

Input (continued)**Genlock**

This function allows genlock to be enabled and the reference source selected.

Mode

This allows the genlock mode to be selected.

Selections are:

- | | |
|--------------|---|
| Free-Running | The unit will lock to internal clocks and will not be locked to any external signal. |
| Input-Locked | The output video is locked to the selected video input signal. |
| External ref | The output video will be locked to the external reference signal connected to the REF input connector. This must be an analog black and burst signal. |

Horiz Offset and Vert Offset

The relative timing between the reference signal and the output signal may be adjusted using these controls.

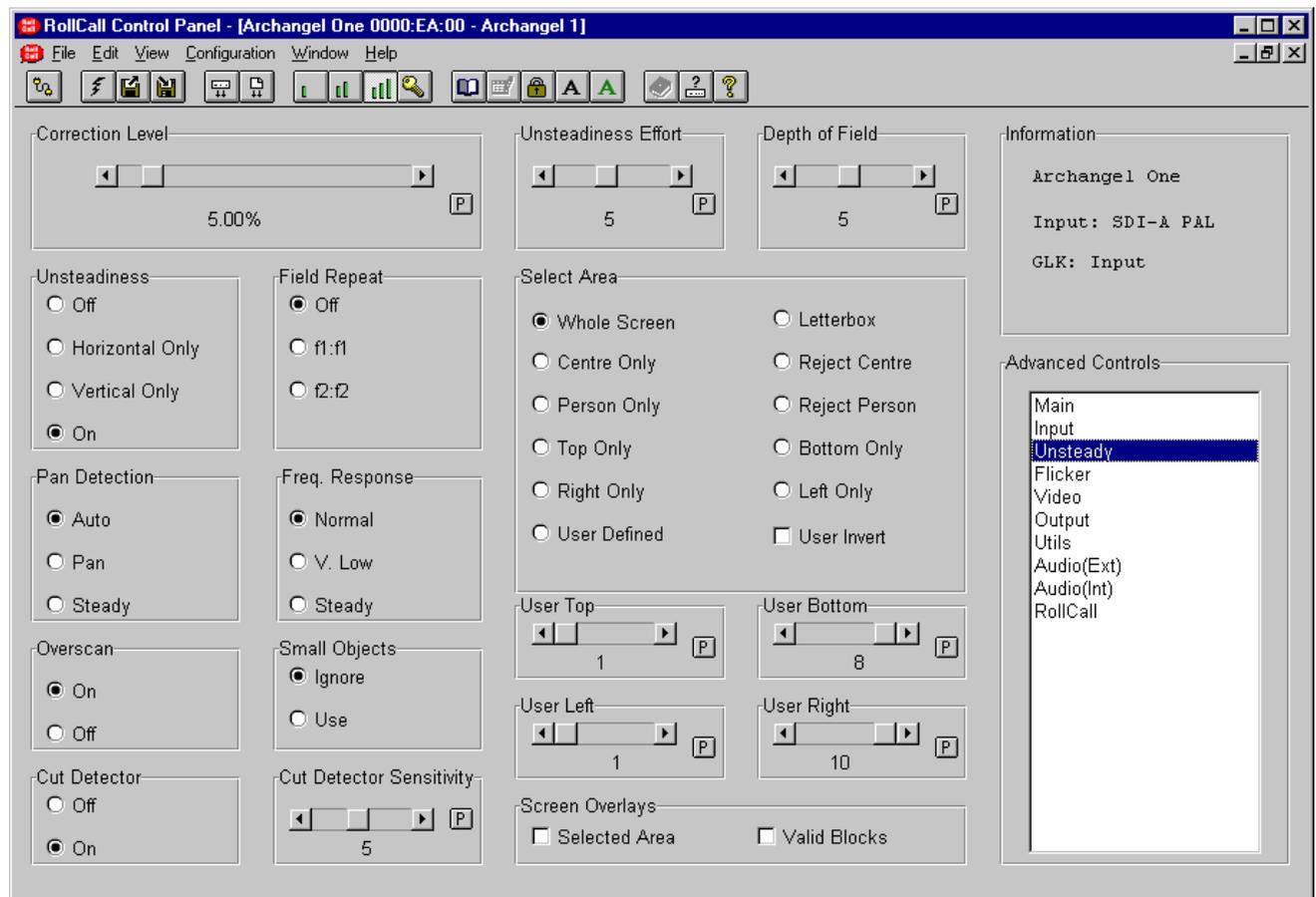
Note that these control functions are not available in the Free running mode.

Horiz Offset

The horizontal or line timing may adjusted over a range of 0 to 863(PAL) or 857(NTSC) pixels in steps of 1 pixel. Preset value is 0 pixels.

Vert Offset

The vertical timing may be adjusted over a range of 0 to 624 (PAL) or 524 (NTSC) lines in steps of 1 line. Preset value is 0 lines.

Unsteady**Correction Level**

The higher the unsteadiness correction factor, the more severe the unsteadiness that can be removed, at the expense of losing more of the picture due to overscanning.

The level may be adjusted over a range of 0.00 % to 60.00 % in steps of 0.25 %. The preset value is 5.00 %.

Unsteadiness

This allows the unsteadiness process to be turned Off or On. Correction may also be applied only in the horizontal or vertical direction. See page 1 for details.

Unsteadiness Effort

This setting determines the effort the unsteadiness applies to the screen. It is useful to put this into max mode if there are two or more objects with different speeds within the picture. i.e. a vehicle moving against a background, etc.

The range of adjustment is from 1 to 10. The preset value is 5.

Depth of Field

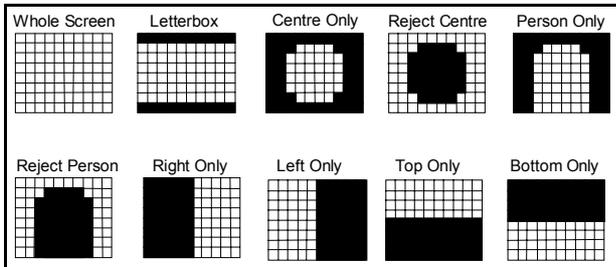
Increasing the field depth setting is useful for scenes with high levels of perspective, such as a camera mounted on the front of a moving vehicle, or scenes where there is a combination of close foreground and distant background objects.

The range of adjustment is from 1 to 10. The preset value is 5.

Unsteady (continued)

Select Area

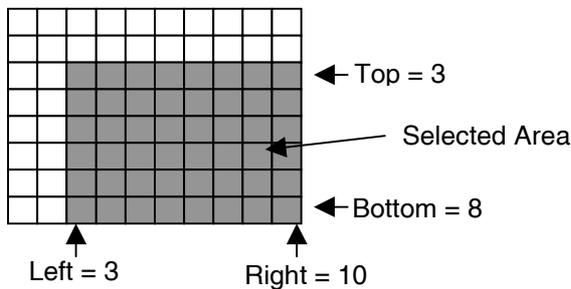
The area of the image to lock to may be selected using this control. This is very useful in situations where multiple moving objects are present within the picture, allowing the user to select which area to stabilize.



User Defined

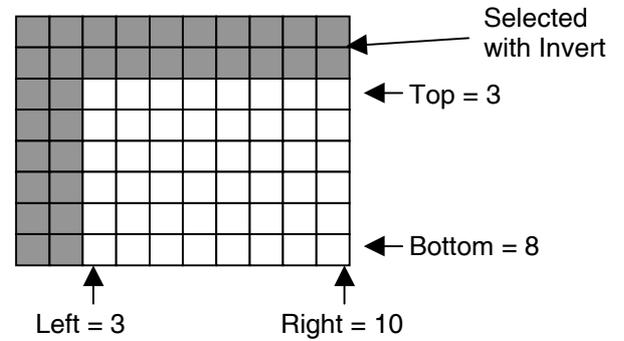
User Top/Bottom/Left/Right

This allows a user selection area of rectangular shape to be defined. There are 8 blocks vertically and 10 blocks horizontally. Using 'top' you can select which of the 8 rows vertically is the top of the selected rectangle. Similarly, bottom, left and right allow you to define the bottom, left and right of the box. For example:



User Invert

The selection may be inverted using this selection. In this case only the blocks outside the defined area will be active, for example:



Screen Overlays

An overlay can be added to the output of the unit to show the approximate area of the input image that the unsteadiness process is using to calculate the unsteadiness. This is particularly useful when setting up the user defined region.

Note that Correction is disabled when the overlay is on the screen.

Unsteady (continued)**Overscan**

When set to On this mode allows correction without overscanning. This may be useful for very unstable images where ultimate correction is required. Note that blanking areas will enter the image, up to a limit set by the correction factor.

Field Repeat

Field Repeat (Twin Lens correction)

If the fields of the picture are misaligned or one field is corrupted, one of the input fields may be discarded and the remaining field repeated. Select f1:f1 or f2:f2 for field 1 repeat or field 2 repeat respectively.

Note that Unsteadiness correction will not be active when the Field Repeat mode is active.

Pan Detection

Normally the unsteadiness process detects pans and tilts automatically. This control may be manually overridden. In steady mode, the image will ignore pans, until the edge of the correction window is reached. This may be useful where ultimate stability is required at the cost of the occasional re-framing of the image.

Freq. Response

The response of the unsteadiness correction system to different frequencies of motion may be changed if required. This will alter the range of motion speeds that the unit regards as unsteadiness.

The Normal setting is sensitive enough to differentiate pans from unsteadiness in most cases. The Very Low or Steady frequency response settings may be useful to remove particularly slow film weave, which the unsteadiness process would normally consider as camera re-framing. This is also useful when combined with the pan detection control.

Small Objects

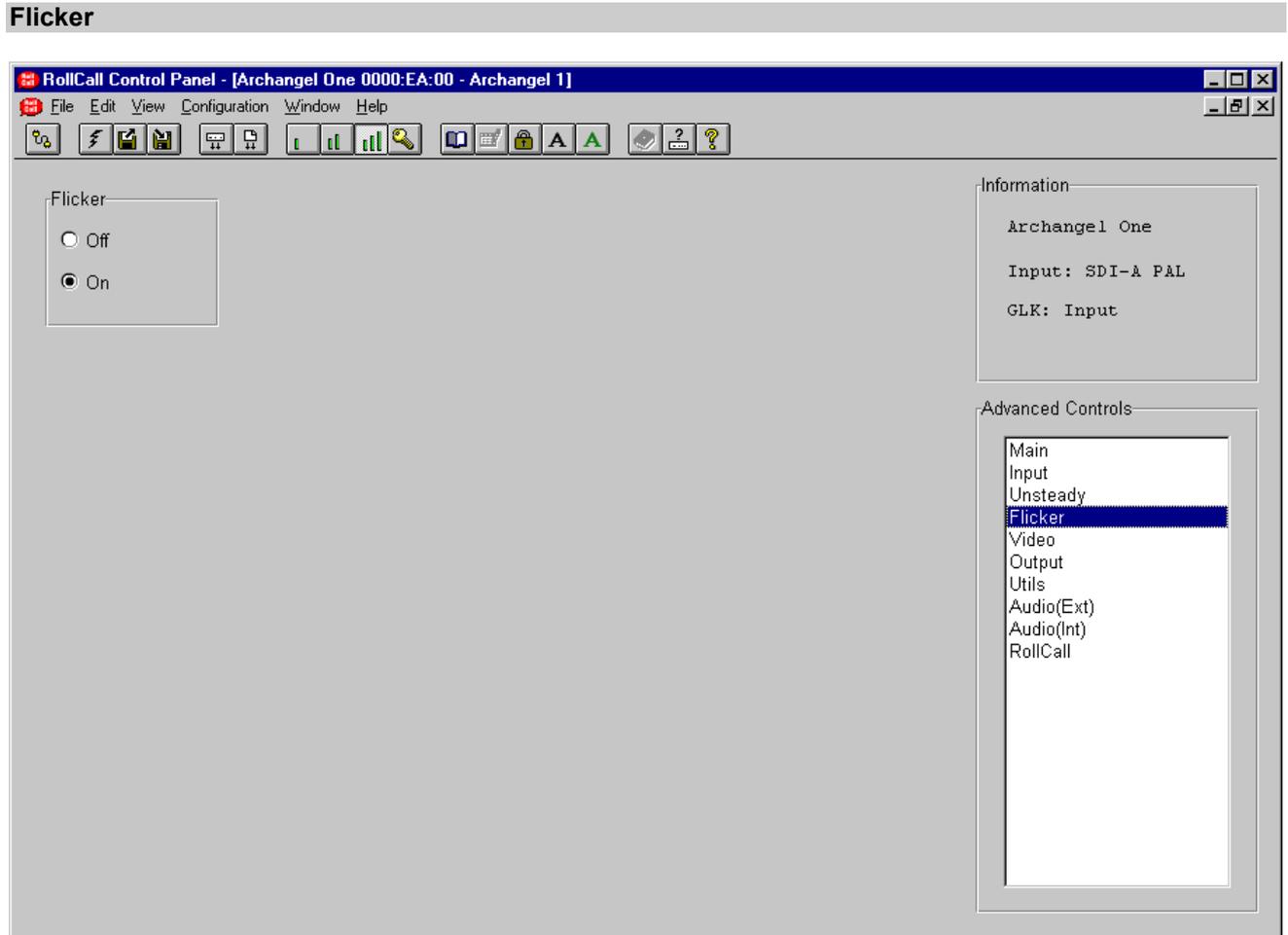
The unsteadiness process usually does not remove unsteadiness on pictures with small objects (less than approx.10% of the screen area) against a plain background, e.g. aircraft in the sky, small captions on a plain background, etc. Use this control to override this safeguard.

Cut Detect

The cut detector may be switched Off using this control. When set to On, the sensitivity to a cut can be adjusted (5 is normal) via the **Unsteady** screen. Increased sensitivity may be used where cuts between similar scenes are present. Decreased sensitivity may be useful on material with unusual motion profiles or vari-speed.

Cut Detector Sensitivity

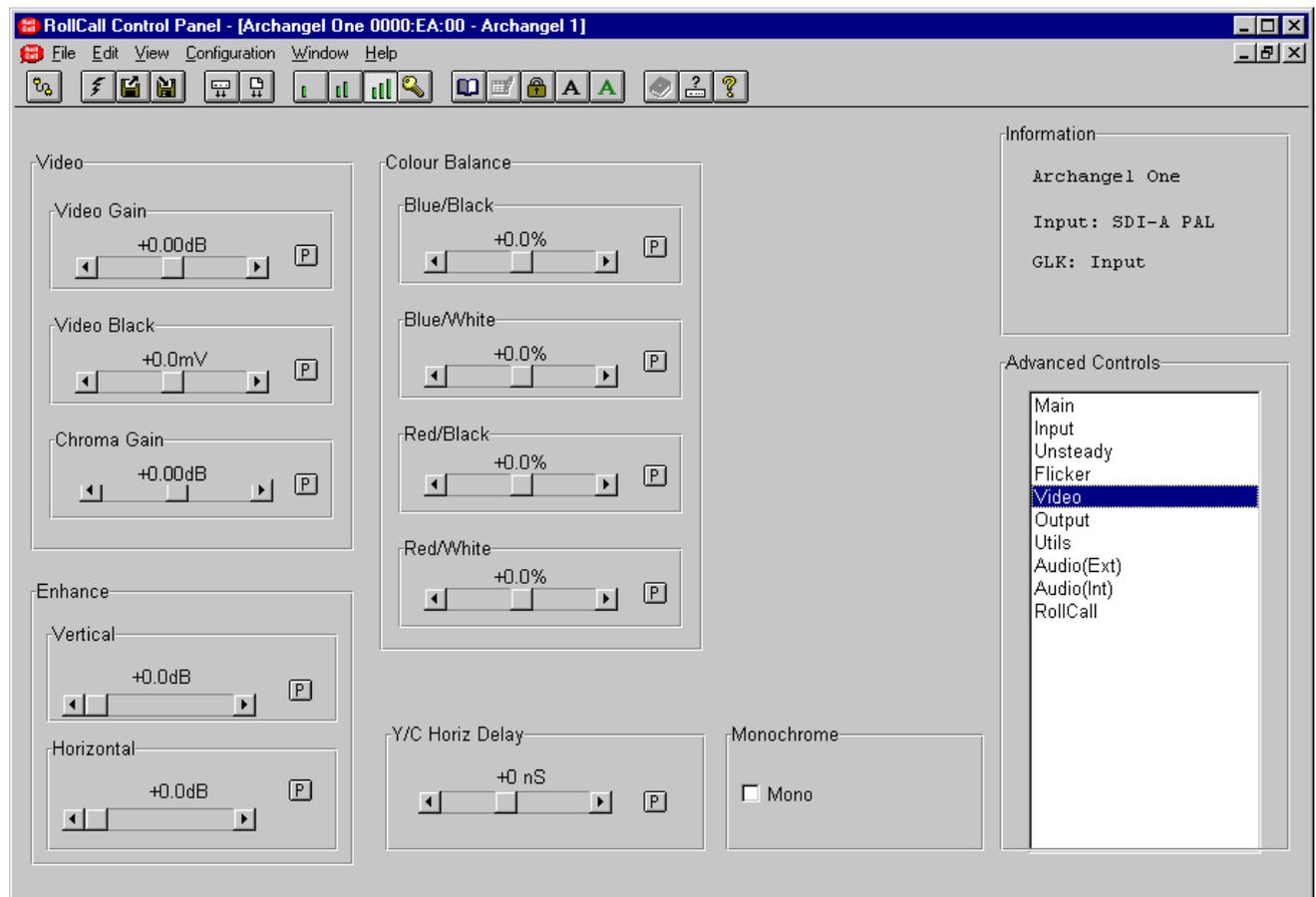
The cut detector may be switched off using this control. When set to On, the sensitivity to a cut can be adjusted (5 is normal). Increased sensitivity may be used where cuts between similar scenes are present. Decreased sensitivity may be useful on material with unusual motion profiles or vari-speed.



Flicker

The flicker correction may be turned On or Off with this control. No further configuration is required for the flicker correction.

Video



Video

This item allows level adjustments to be made to the video signal.

Video Gain

The video gain may be adjusted over a range of ± 6 dB in steps of 0.01 dB. Preset value is 0.00 dB.

Note that this can produce output signals above standard levels.

Video Black

The black level of the output signal may be adjusted over a range of ± 88 mV in steps of 0.1 mV. Preset value is 0.00 mV.

Chroma Gain

The chroma gain may be adjusted over a range of ± 6 dB in steps of 0.01 dB. Preset value is 0.00 dB.

Colour Balance

The color balance of the picture may be adjusted using these controls.

There are two controls to adjust the amount of red in the picture and two for the amount of blue.

The **Blue/White** control will adjust the amount of blue in the highlights (near peak level) and the **Blue/Black** will adjust the amount of blue in the lowlights (near black level)

The range of control is $\pm 25\%$ in steps of 0.1%. Preset value is 0.0 %.

The **Red/White** control will adjust the amount of red in the highlights (near peak level) and the **Red/Black** will adjust the amount of red in the lowlights (near black level)

The range of control is $\pm 25\%$ in steps of 0.1%. Preset value is 0.0 %.

Video (continued)**Enhance**

This function allows enhancement to be applied to the picture.

Up to 9 dB of horizontal enhancement, and 6 dB of vertical enhancement, in steps of 0.1 dB is available.

Preset values are 0.0 dB

Y/C Horiz Delay

The relative timing between the luminance signal and the chrominance signal may be adjusted with these controls.

The Delay Horiz will change the horizontal timing (left/right) by +600 ns to -450 ns in steps of 1 ns. Preset value is 0 ns.

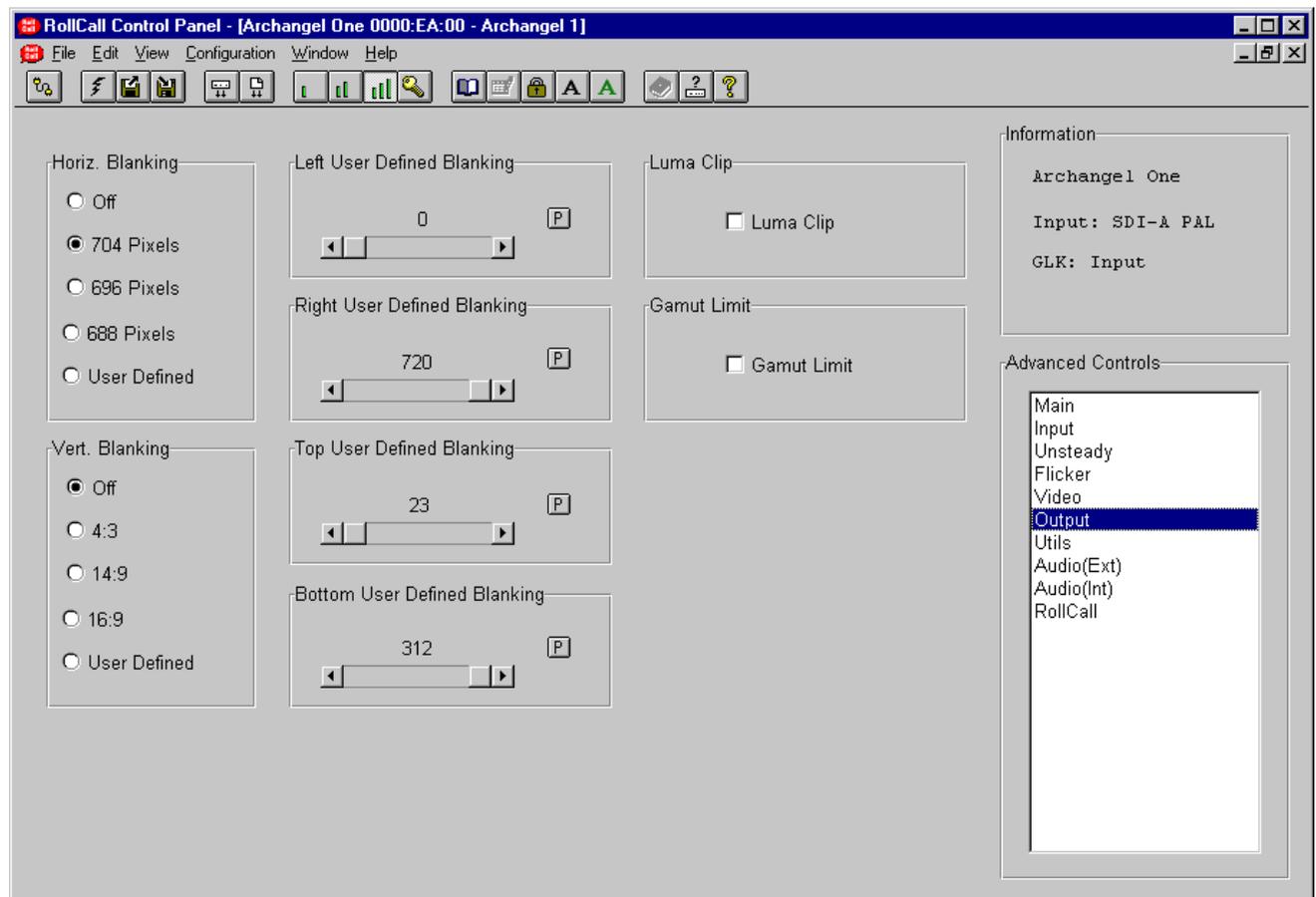
A positive value of delay will shift the chrominance signal to the left of the picture and a negative value will shift the chrominance to the right of the picture. The luminance signal will remain stationary.

Monochrome

Mono

When checked the chroma content of the picture will be removed and the picture will become monochrome.

Output



Blanking Overview

As the unsteadiness correction works by moving the picture around, it is vital to the correct operation that the blanking positions are correctly set. If the blanking positions set are outside those of the input video, then it is possible that blanking will be moved into the active picture area. To prevent this, it is recommended that new source material presented to the unit be inspected to determine the blanking positions. These positions should then be set in the user-settings in the Horiz Blanking and Vert Blanking controls, which will prevent edge effects occurring.

Horz Blanking

It is recommended that the output is blanked to at least the analog (704) blanking position. Additional tighter blanking positions are also given. This blanking may also be turned to the digital blanking position (Off = 720). Preset for this item is Off.

When User Defined is selected the blanking can be defined to the nearest pixel (Left User Defined Blanking, Right User Defined Blanking).

Left User Defined Blanking may be adjusted over a range of 0 to 720. Preset value is 0.

Right User Defined Blanking may be adjusted over a range of 720 to 0. Preset value is 720.

Vert Blanking

Archangel One is designed to work with pre-recorded or live material. Some pre-recorded material may be letter-boxed. Archangel One is designed to work with material in 4:3, 14:9 and 16:9 letterbox modes. These can be selected from the output menu. Preset for this item is Off.

When User is selected, the blanking can be defined to the nearest line (Top User Defined Blanking, Bottom User Defined Blanking).

Top User Defined Blanking may be adjusted over a range of 23 to 312 lines. Preset value is 23 lines.

Bottom User Defined Blanking may be adjusted over a range of 312 to 23 lines. Preset value is 312 lines.

Note that the numbers refer to the first/last active line, i.e. if Blank Top is 23 then line 23 will be passed and line 22 will be blanked.

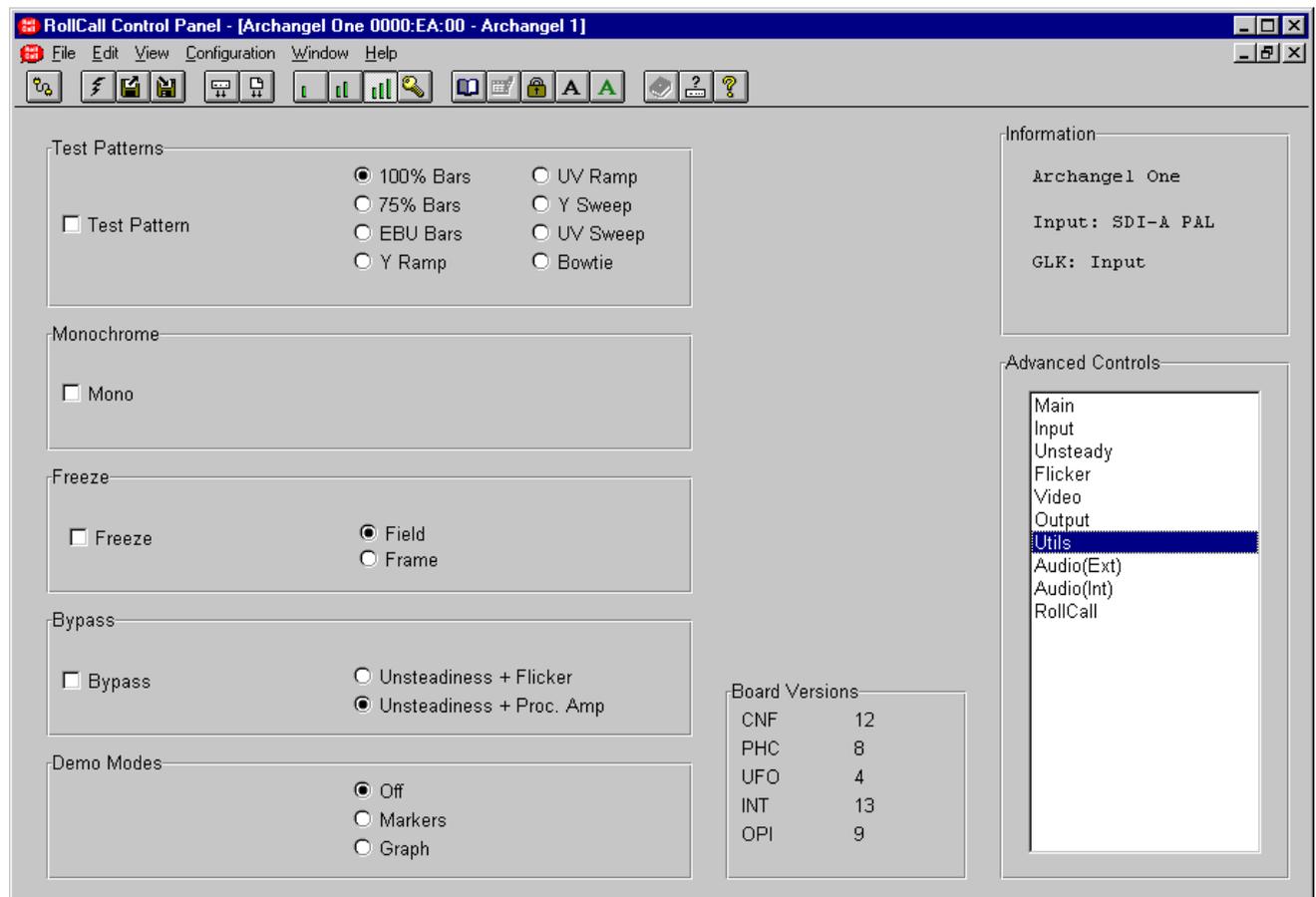
Output (continued)**Luma Clip**

When checked the luminance clipper will be switched on.

Gamut Limit

When checked the color Gamut limiter will be switched on.

Utils



This function allows various actions to be applied to the output signal.

Test Patterns

When the **Test Pattern** item is checked the output will become the pattern that is checked in the adjacent list.

Monochrome

When the Mono item is checked the picture will become monochrome.

Freeze

When the freeze item is checked the picture will become frozen. Either a frozen **Field** or a frozen **Frame** may be selected.

Bypass

When the bypass function is enabled the video will pass through the unit with either Unsteadiness + Flicker or Unsteadiness + Proc Amp controls disabled.

Demo Modes

The demonstration modes are provided primarily for sales personnel. Normally this item is set to Off.

Markers

Four markers are superimposed on the input picture. After processing through Archangel One, the amount of movement of the markers is indicative of the amount of correction Archangel One is performing. This is especially useful for demonstrating the effectiveness of Archangel One with a single monitor.

Graph

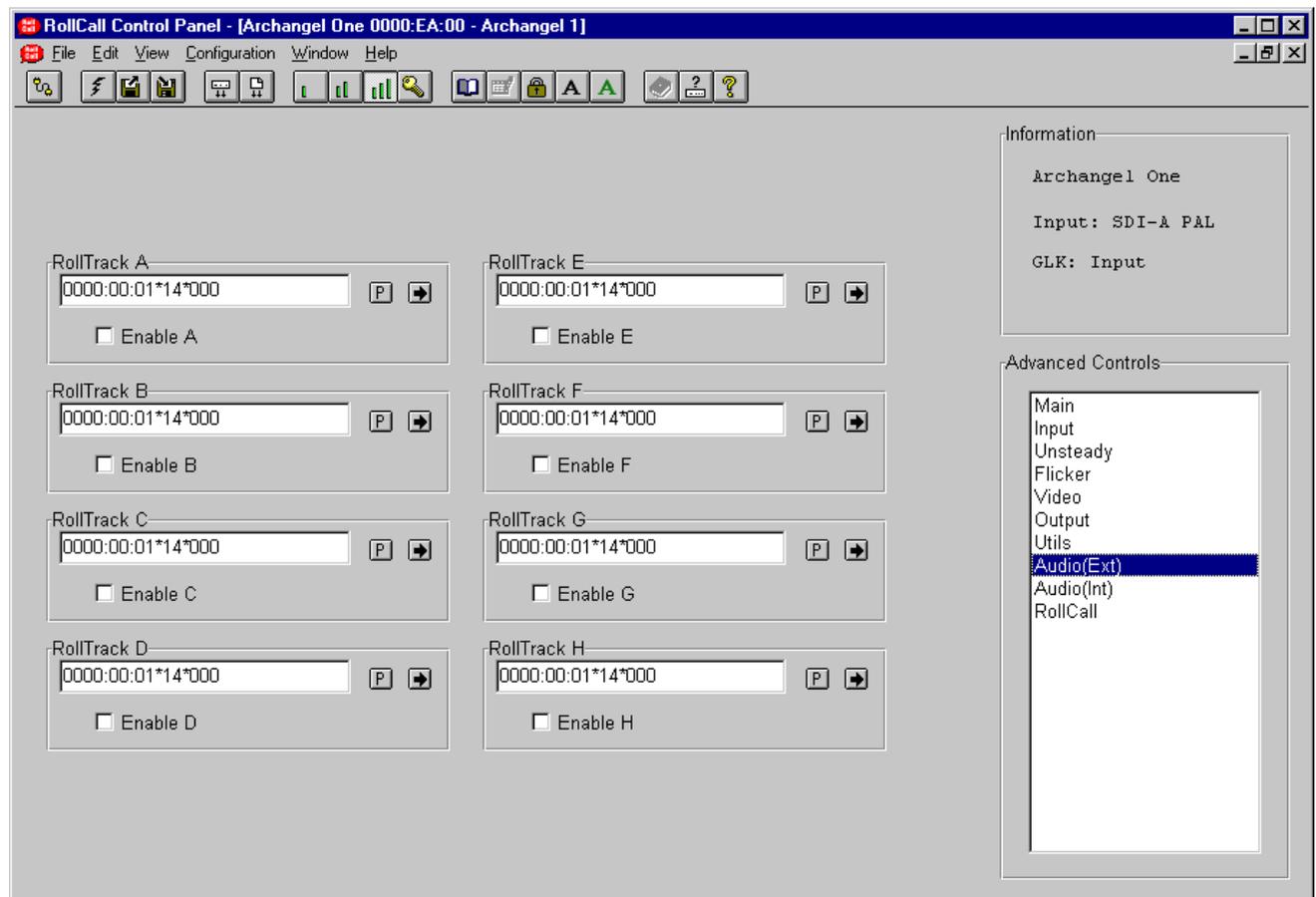
The measured horizontal and vertical motion is displayed on a graph, with history detailing the last 250 fields. A vertical line on the graph indicates a detected cut.

Note that Archangel One will not correct unsteadiness when the graphs are displayed.

Board Versions

This item will show the software versions of the cards.

Audio (Ext)



This function allows the value of the delay time produced by this module to be sent, via the RollCall™ network, to audio delay units connected on the same network. This enables compatible audio delay units to produce an audio delay dependent on this and other similar units. The audio delay unit will dynamically follow or track the received delay-time information allowing processed video signals to be timed correctly with audio signals. This automatic tracking system via the RollCall™ network is called **RollTrack**.

For more detailed information, see the RollTrack section (Appendix) at the end of this manual.

The destination for the delay information is set by the network code address shown in the text box.

Up to 8 audio delays (RollTrack A to H) may be selected as a destination. The **Enable** item will activate the function.

The full network address has five sets of numbers.

The first set (0000) is the network segment code number

The second set (00) is the number identifying the Unit address (enclosure/mainframe)

The third set (01) is the Port (slot number) in the unit.

The fourth set (14) is the (Virtual) channel number.

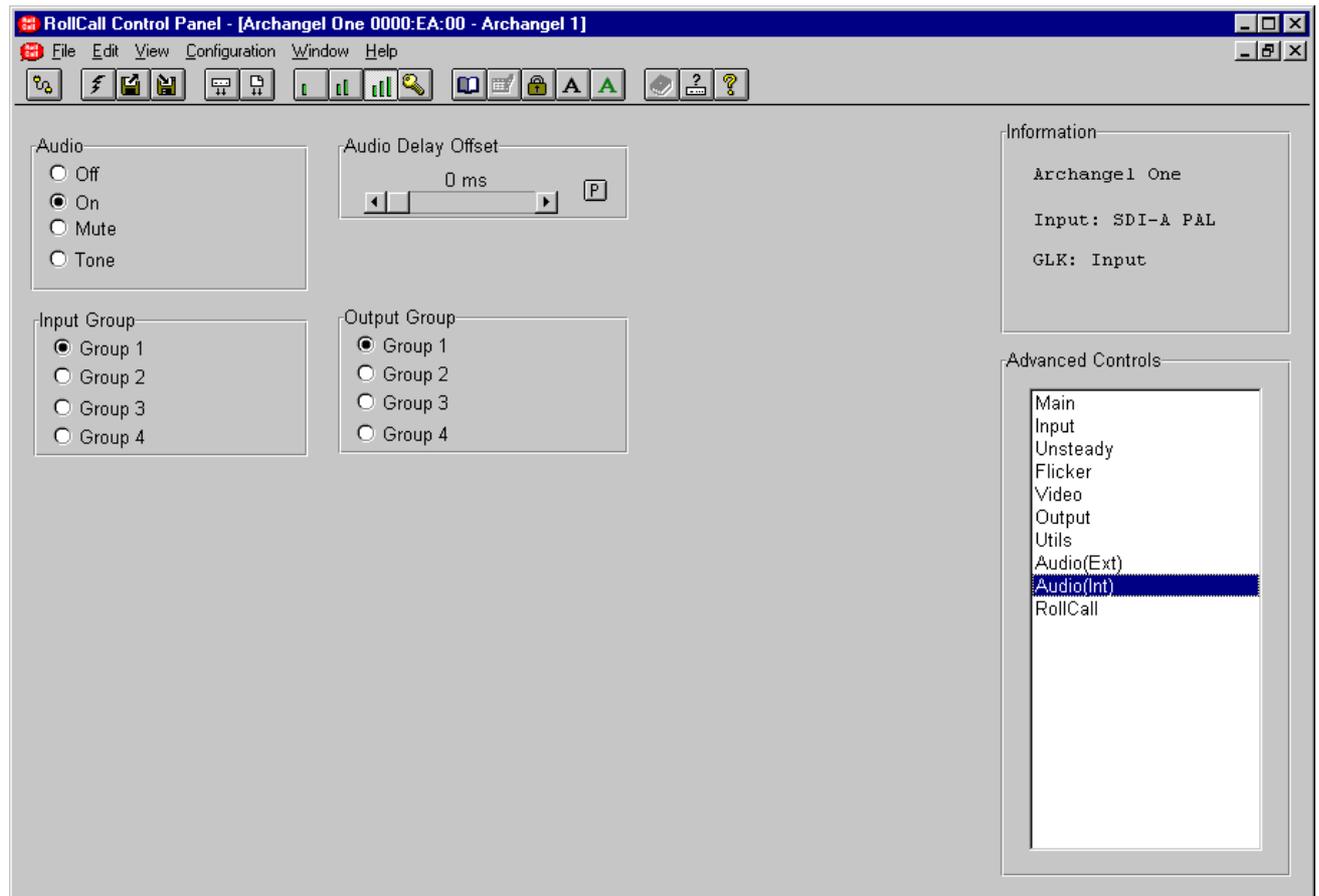
Note that only channel numbers 14, 15, 16 & 17 should be used for audio delay cards.

The fifth set (000) is the Unit Identification.

Once a destination address for a unit has been set selecting the  symbol will save the new address.

The  symbol represents the Preset function and will return the address to the default destination.

*Note that the settings will not become active until saved and re-activated by selecting **Enable**.*

Audio (Int)

This allows settings for the Internal (embedded) audio to be made.

Note that this is only applicable if Archangel One is used as a stand-alone unit.

Audio

The embedded audio output may be set to Off (no audio data), On (audio data from selected input group), Mute (silence) or Test Tone.

Audio Delay Offset

In addition to the delay compensating for the video path through the system, an extra delay period can be added to compensate for the video delay introduced elsewhere in the system.

The time may be adjusted over a range of 0 to 750 ms. Preset value is 0 ms.

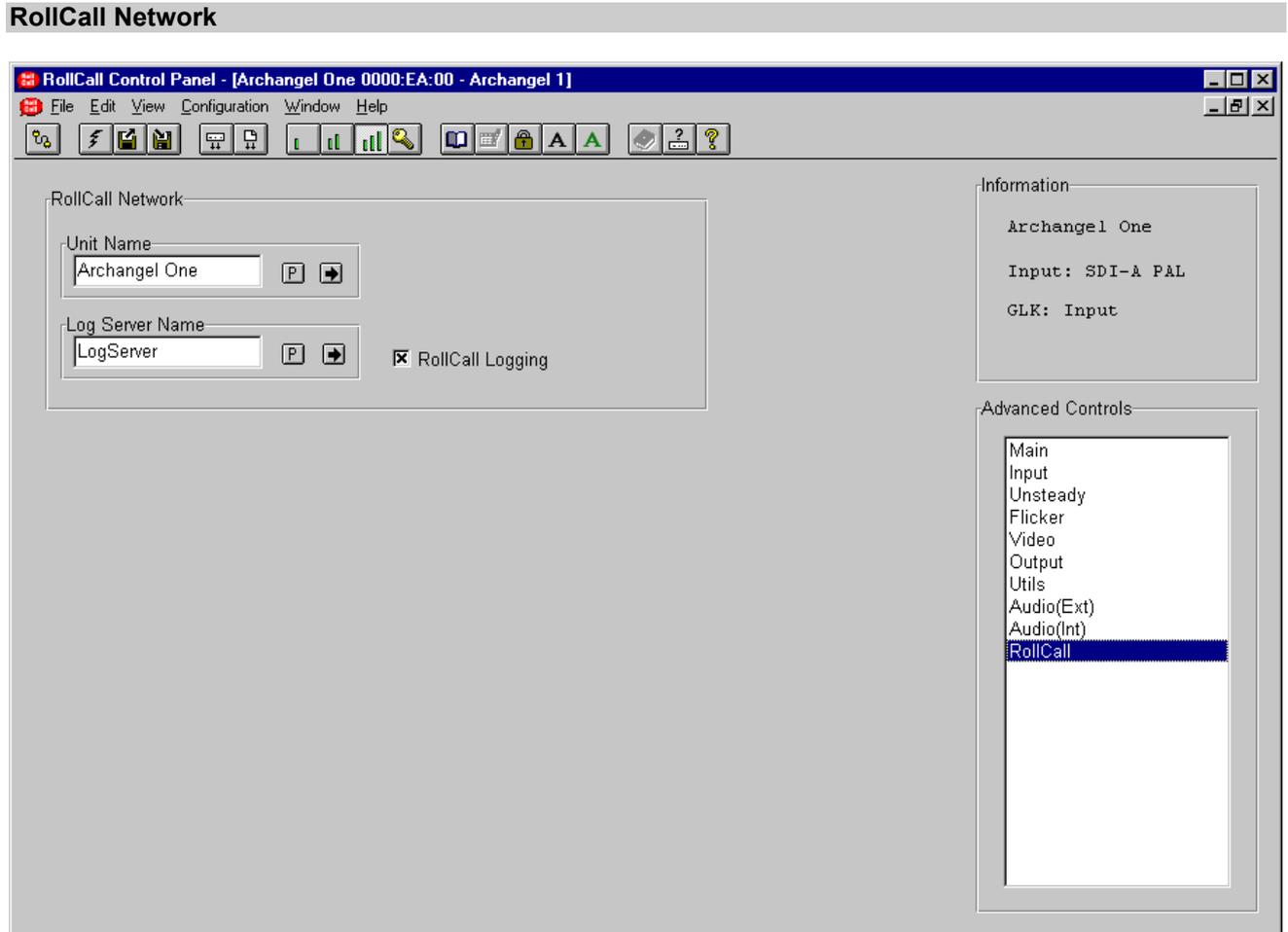
Input Group

Use the Input Group item to set the input group to 1, 2, 3, or 4.

Output Group

Use the Output Group item to select the output group to 1, 2, 3, or 4.

Note that this function will be available even when the Reference is selected to be Input as the input and output clocks are locked together.



This allows the configuration of the RollCall communications.

Unit Name

This allows the name of the unit on the RollCall network to be changed from the default of **Archangel One**.

Log Server Name

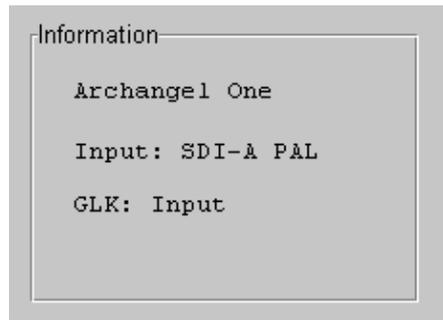
This allows the name of the logging server on the RollCall network to be changed.

Once a name for the Logging server has been set selecting the  symbol will save the new name.

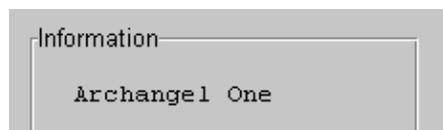
The  symbol represents the Preset function and will return the name to the default name.

RollCall Logging

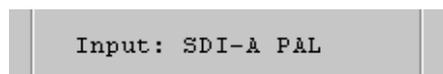
This item allows the Logging function to be enabled or disabled.

Information**Information**

This area provides basic information about the status of the unit.



The first line shows the name of the unit i.e. **Archangel One**.



The second line shows the status of the **Input** signal.

The first text item will show the input designation, either SDI-A or SDI-B.

The second text item will show the standard of the input e.g. PAL.



The third line shows the status of the genlock (**GLK**) function. This may show:

Input

The output video is locked to the selected video input signal.

Free

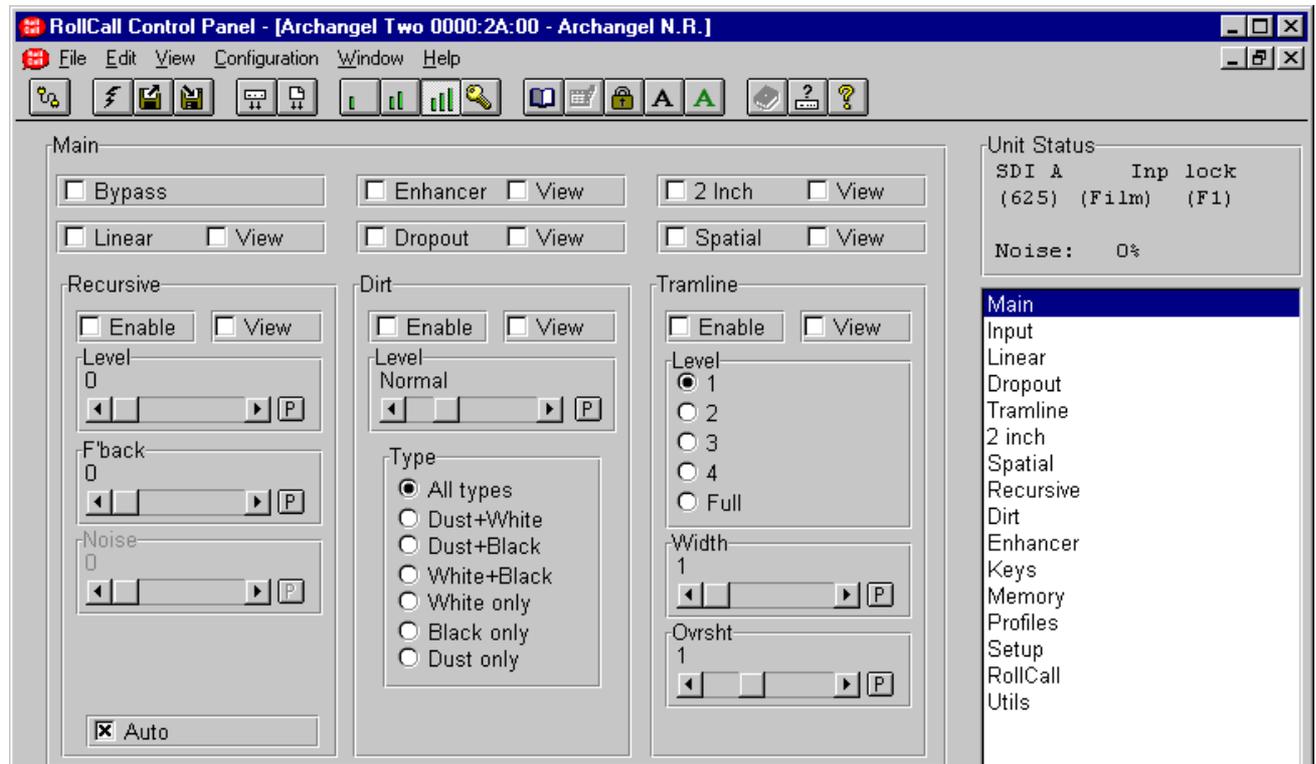
The unit will lock to internal clocks and will not be locked to any external signal.

Ext

The output video will be locked to the external reference signal connected to the REF input connector. This must be an analog black and burst signal.

RollCall Control Templates for the Archangel Two

Main

**Bypass**

This function may be toggled to enable and disable the filters.

Linear

This function may be toggled to enable and disable a suite of linear filters. Please see page 21 for more details.

View (Linear)

This control allows the difference between the input and the output from the linear filter to be viewed. Please see page 21 for more details.

Enhancer

This function may be toggled to enable and disable the enhancer.

View (Enhancer)

This control allows the difference between the input and the output from the enhancer to be viewed. Please see page 31 for more details.

Dropout

This function may be toggled to enable and disable the dropout filter.

View (Dropout)

This control allows the difference between the input and the output from the dropout filter to be viewed. Please see page 23 for more details.

2 Inch

This function may be toggled to enable and disable the 2 Inch filter.

View (2 Inch)

This control allows the difference between the input and the output from the 2 Inch filter to be viewed. Please see page 26 for more details.

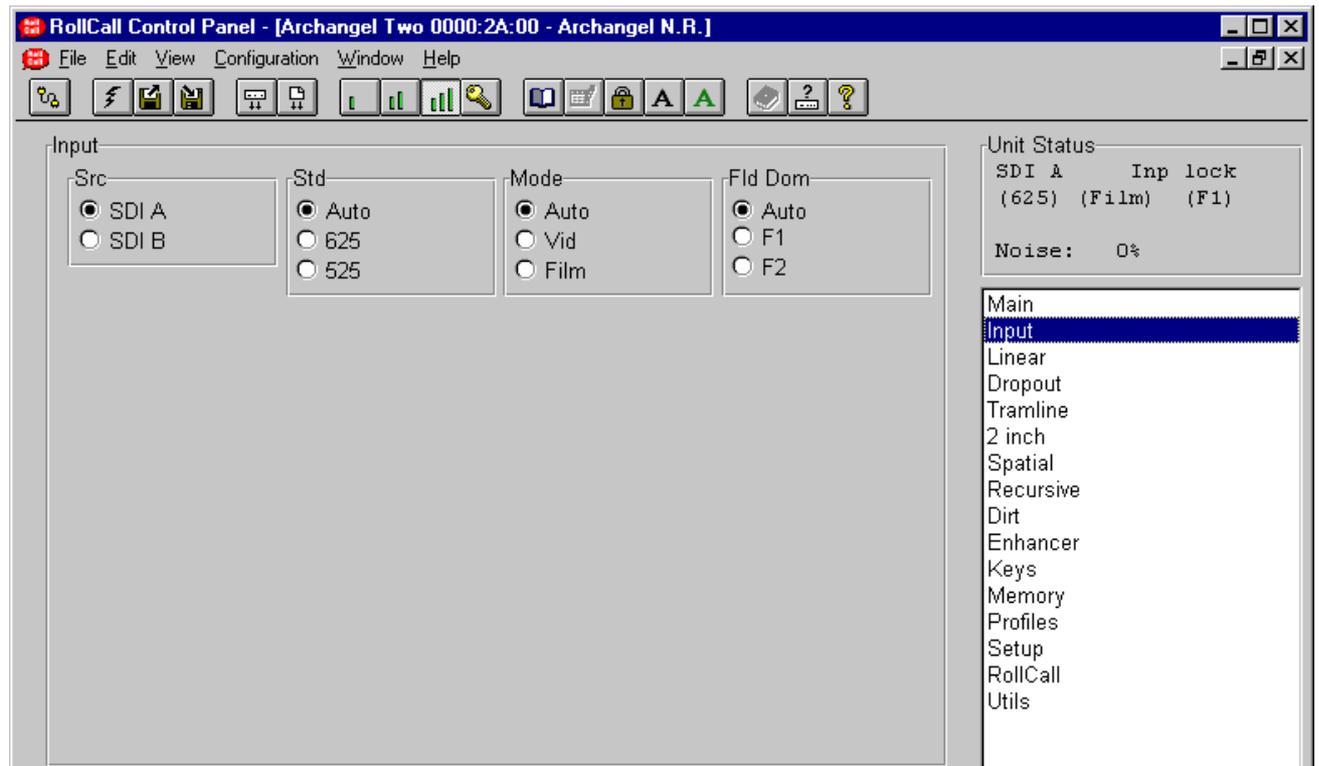
Spatial

This function may be toggled to enable and disable the Spatial filter.

View (Spatial)

This control allows the difference between the input and the output from the Spatial filter to be viewed. Please see page 27 for more details.

Input



Input

Src (Source)

This allows either the SDI-A or SDI-B input to be selected.

Std (Standard)

This allows the input standard to be selected.

Selections are force to 625 lines, force to 525 lines or Auto. The force positions may be used where the input standard is known otherwise the Auto position (which automatically senses the input standard) should be used.

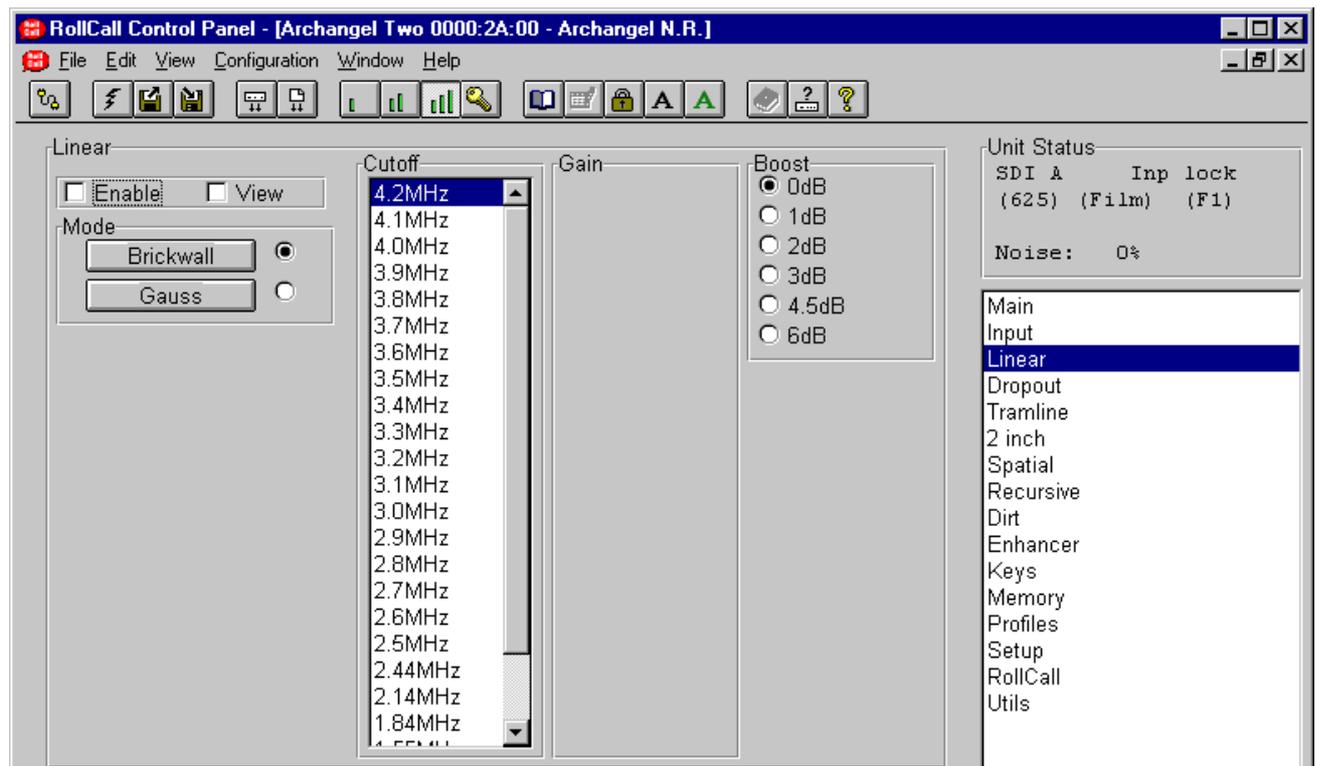
Mode

The Archangel Two has automatic detection of film originated and video material. This may be manually overridden using this control.

Fld Dom (Field Dominance 625)

The Archangel Two has automatic field dominance/film phase detection. This function may be manually overridden if required by checking the appropriate box.

Linear

**Linear (Enable)**

This function will enable a suite of linear filters that allows fine control of the horizontal bandwidth of the luminance signal.

Linear (View)

The linear view control allows the user to directly view the difference between the input and the output from the linear filter. The signal represents the value of the correction which would be applied to the picture. The polarity of the output signal can be either positive or negative depending on the polarity of the picture so the output is displayed on a grey pedestal. Positive correction values will extend towards white and negative correction values will extend towards black.

Mode

This function allows two filter modes, Brickwall or Gaussian, to be selected.

Brickwall

The brickwall low-pass filter mode is employed to reduce noise resident in the high frequency region of the luminance spectrum.

Cutoff

This mode has 18 user selectable cut-off frequencies (specified at -6 dB) ranging from 4.2 MHz down to 2.5 MHz in 0.1 MHz steps. The stop-band performance is -34 dB or better with no boost.

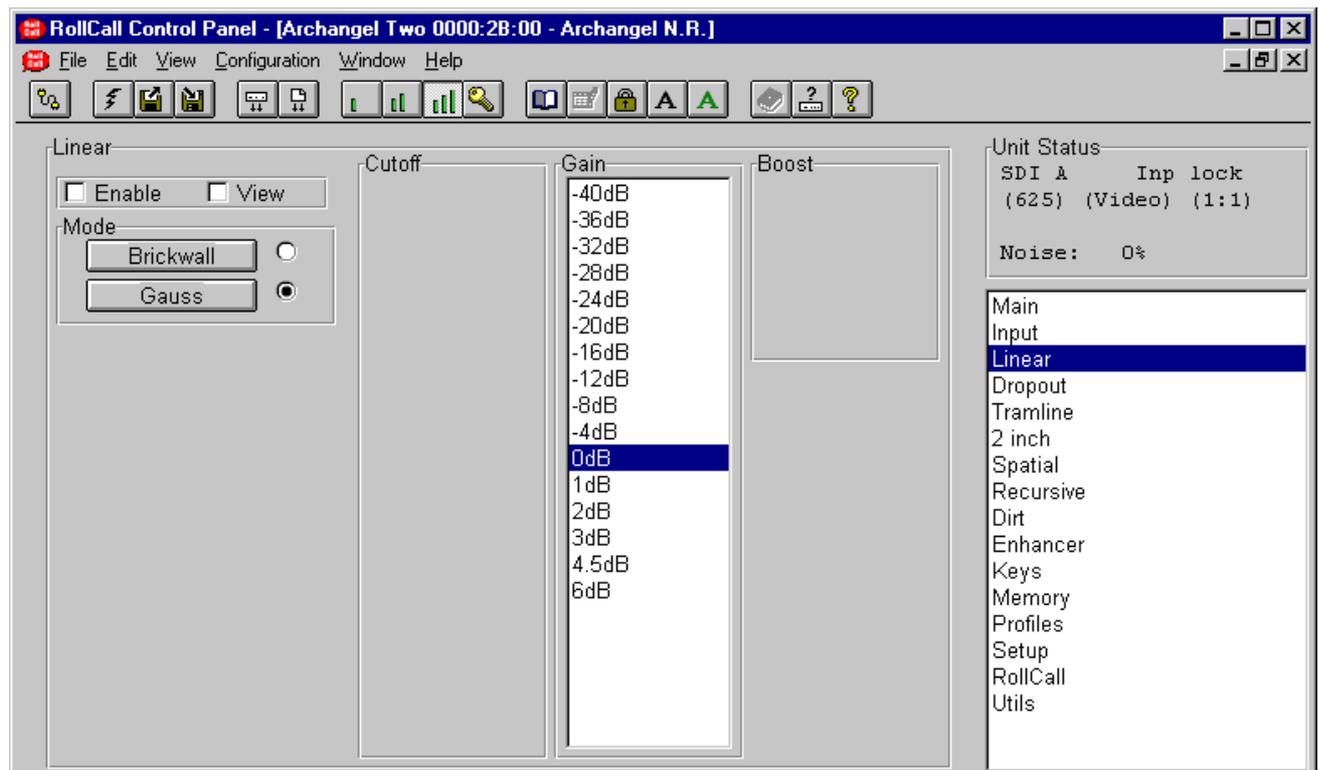
In addition to the selectable cut-off frequencies the user can also select a given boost at each cut-off: 0 dB (no boost), 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

There are a further 6 Extra Low Pass filters with cutoffs from 2.44MHz to 0.92MHz, the boost at the cut off frequency is not available for these filters.

Boost

The boost value selected is the amount of gain applied to the filter response at the chosen cut-off frequency. The selectable boost facility is incorporated to allow the user to increase the perception of sharpness in the picture by boosting the contrast.

The sharpness of a picture can sometimes be significantly reduced by filtering the high luminance frequencies so the inclusion of the extra boost helps to restore some of the sharpness to the picture. A boost of 6 dB will result in the cut-off frequency being increased by up to 0.4 MHz. The actual amount of boost selected will be a trade-off between cut-off and picture sharpness.

Linear (continued)**Gain**

This mode has 10 user selectable levels at 6.75 MHz ranging from -4dB to -40dB in -4dB steps.

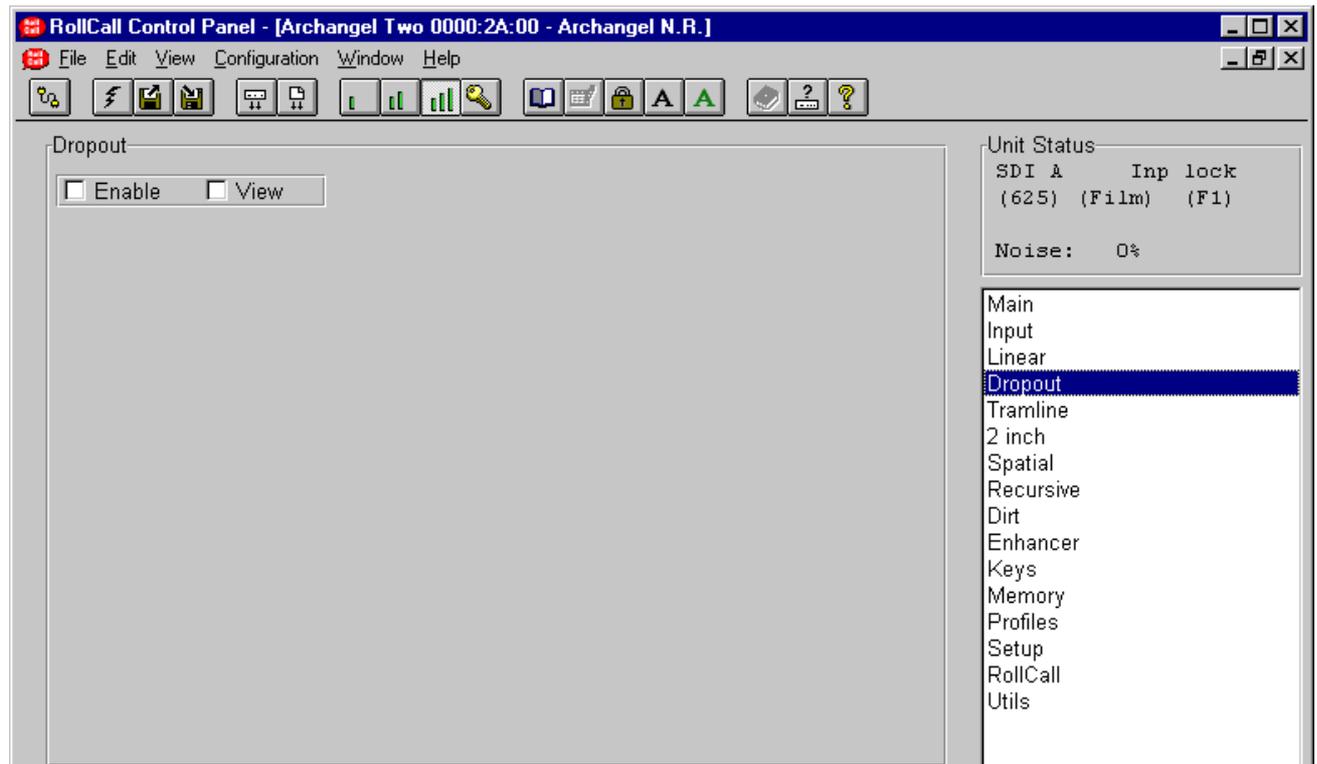
Gaussian Low Pass

The low-pass filter mode is employed to noise reduce with less severity than the brickwall filter and/or to compensate for any irregularities in the luminance signal such as inherent high frequency gain.

Gaussian High Pass

The high-pass filter mode is employed to compensate for high frequency attenuation in the luminance spectrum. This high frequency attenuation may be mainly caused by stray capacitance inherent throughout the cables of an installation. This mode has 5 user selectable levels at 6.75 MHz: 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

Dropout



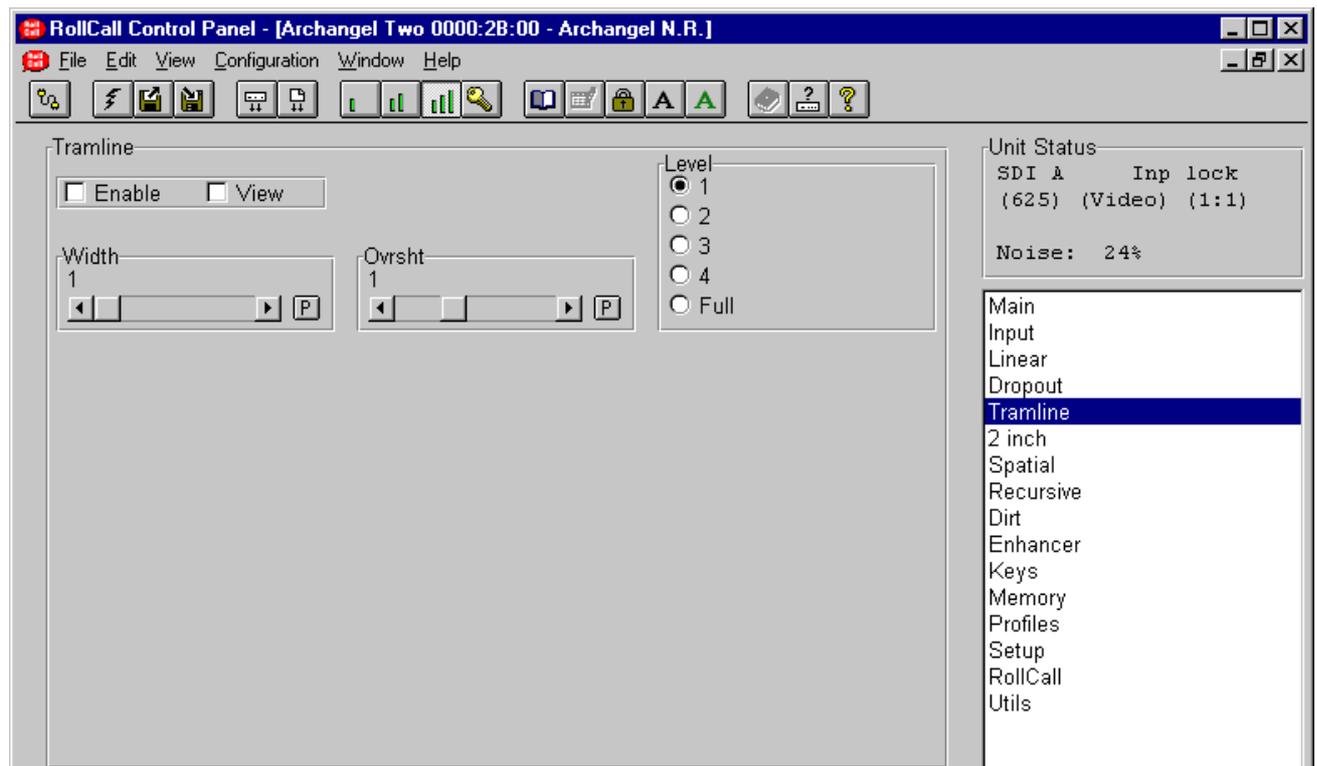
Dropout (Enable)

This function may be toggled to enable and disable the dropout filter.

Dropout (View)

This control allows the user to directly view the effectiveness of the detection/correction algorithm. The difference between the input and the corrected output is shown when view is active. Another way to consider this signal is that it represents the detected impairment that is subtracted from the input when view is turned off.

The polarity of the output signal can be either positive or negative depending on the polarity of the dropout so the output is displayed on a grey pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To obtain the "view" image, the filter must be enabled.

Tramline**Tramline (Enable)**

This function may be toggled to enable and disable the Dirt filter.

Tramline (View)

The tramline filter controls allow the user to improve the selectivity of the automatic detection and concealment.

Tramline View

The tramline "View" control allows the user to directly view the output from the detection/correction algorithm. The signal represents the value of the correction that would be applied to the picture to correct the scratch. The polarity of the output signal can be either positive or negative depending on the polarity of the original scratch so the output is displayed on a gray pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To see the "view image" the filter must be enabled. To use the "view" associated with an individual key, the tramline view and the key filter must both be enabled.

Width

This is the most important of the tramline filter controls. It restricts the algorithm to detect scratches of the selected width and narrower. By restricting the algorithm to narrower scratches it substantially reduces the probability of false alarm caused by picture detail.

Ovrshst

Most tramline scratches have an associated overshoot adjacent to the scratch. Hence a black scratch will have a white overshoot and vice-versa. However, the amount of overshoot is quite variable depending on the depth of the scratch, hence this control allows the user to vary the amount of overshoot correction which is applied.

Level

The tramline sensitivity control effectively determines the limits of detection of the algorithm. Some scratches are easier to detect than others and in such cases a low sensitivity setting could be used but where the scratch is vertically skewed or inconsistent throughout the frame, a higher sensitivity setting is required. Generally, the lowest sensitivity setting should be used to reduce the probability of false alarms.

Tramline (continued)**Tramline Keys**

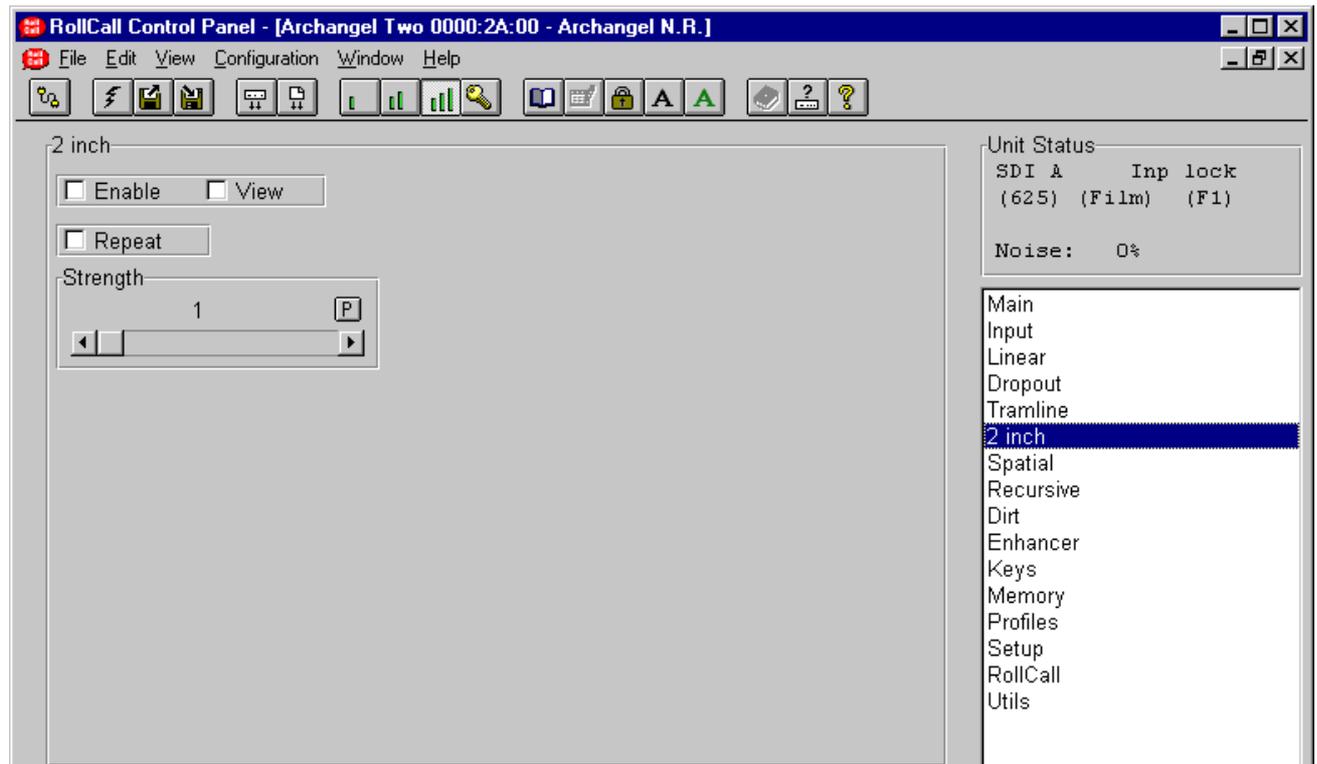
Even though Archangel Two contains a sophisticated automatic scratch detection algorithm, there will still be some instances where picture detail matches the selected scratch criteria. In these cases, a key can be defined to restrict the range of detection and concealment of the algorithm.

For details please see page 32.

Using the Tramline filter

The following procedure is a useful guide to using the scratch filter.

1. Ensure that all keys are off so that the entire picture is filtered
2. Select the maximum sensitivity (level)
3. Select maximum overshoot
4. Starting from the narrowest scratch width, gradually increase the setting until the scratch disappears. This adjustment can also be made in the View mode by adjusting the width control until the correction signal is clearly visible.
5. Reduce the sensitivity setting until the scratch becomes visible and then increase the setting by 1 level.
6. Reduce the overshoot range until the overshoots become visible as tramlines adjacent to the scratch and then increase the overshoot correction by one level to conceal the overshoots.

2 inch**2 Inch (Enable)**

This function may be toggled to enable and disable the 2 Inch filter.

2 Inch (View)

This control allows the user to optimally adjust the level setting by viewing where the scratches have been detected. To obtain the "view" image, the filter must be enabled.

Where the image is heavily damaged the following controls may be used:

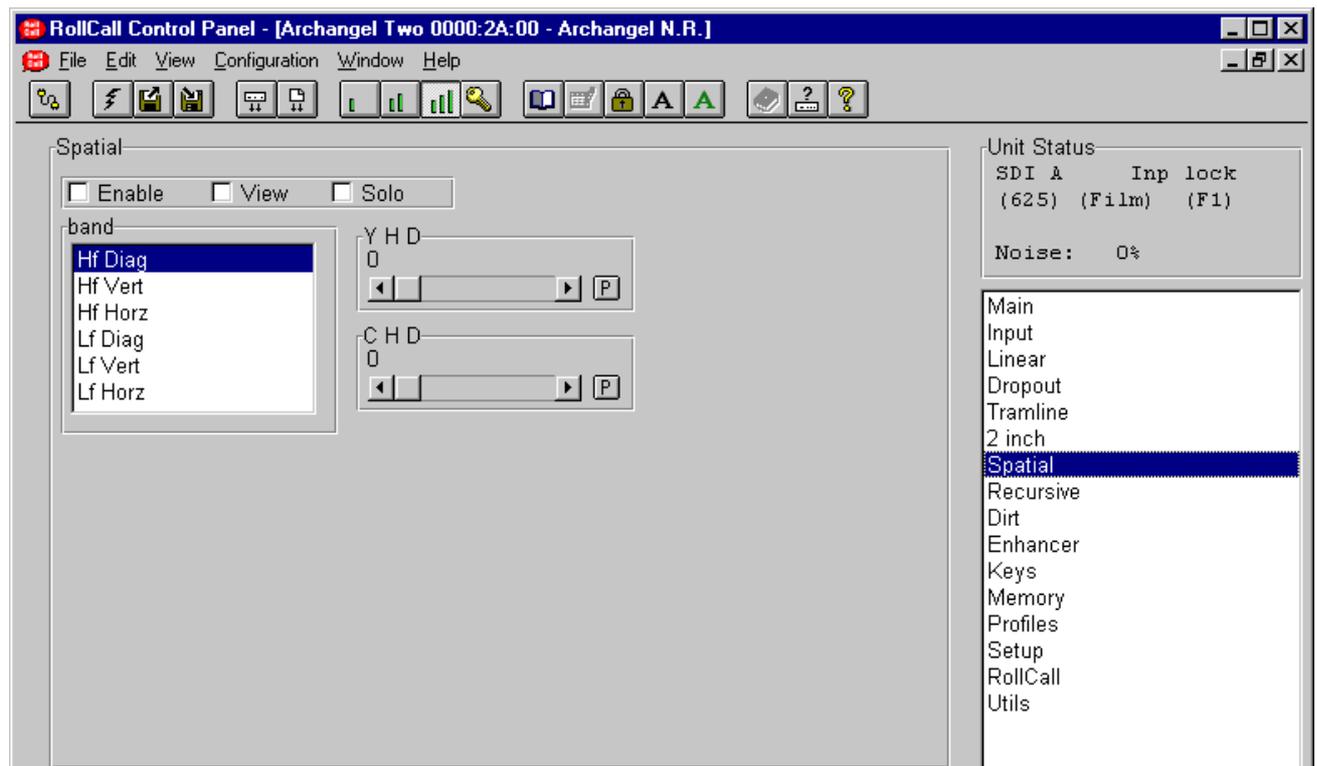
Repeat

This control allows the user to use a stronger filter to remove correlated scratches, adjusted by the Strength control. This mode would not normally be needed.

Strength

This control allows the user to control the sensitivity of the filter. A low number means that the filter is not very sensitive, and may not detect many scratches. A high number means that the filter is able to detect many scratches, however there may be false alarms where periodic image detail is detected.

Spatial



Spatial (Enable)

This function may be toggled to enable and disable the spatial filter.

Spatial (View)

This allows the user to see how much of the impairment is being removed by the spatial filter. This facility makes it easier to select the appropriate level and band to specifically target the impairment whilst preserving the image detail. To see the overall effect of the spatial band filtering (all bands) the "View" must be selected and the "Solo" disabled.

Solo

This allows the user to view the noise reduction in an individual band. The band is selected using the "BAND" control. To view this single band's contribution, both "Enable" and "View" must be selected.

Band

This control selects the active band of the filter for control and adjustment purposes. To check the level of the nine bands use this control to scan through each band in turn. This control is also used to determine which band will be active when "Solo" is enabled. The bands are:-

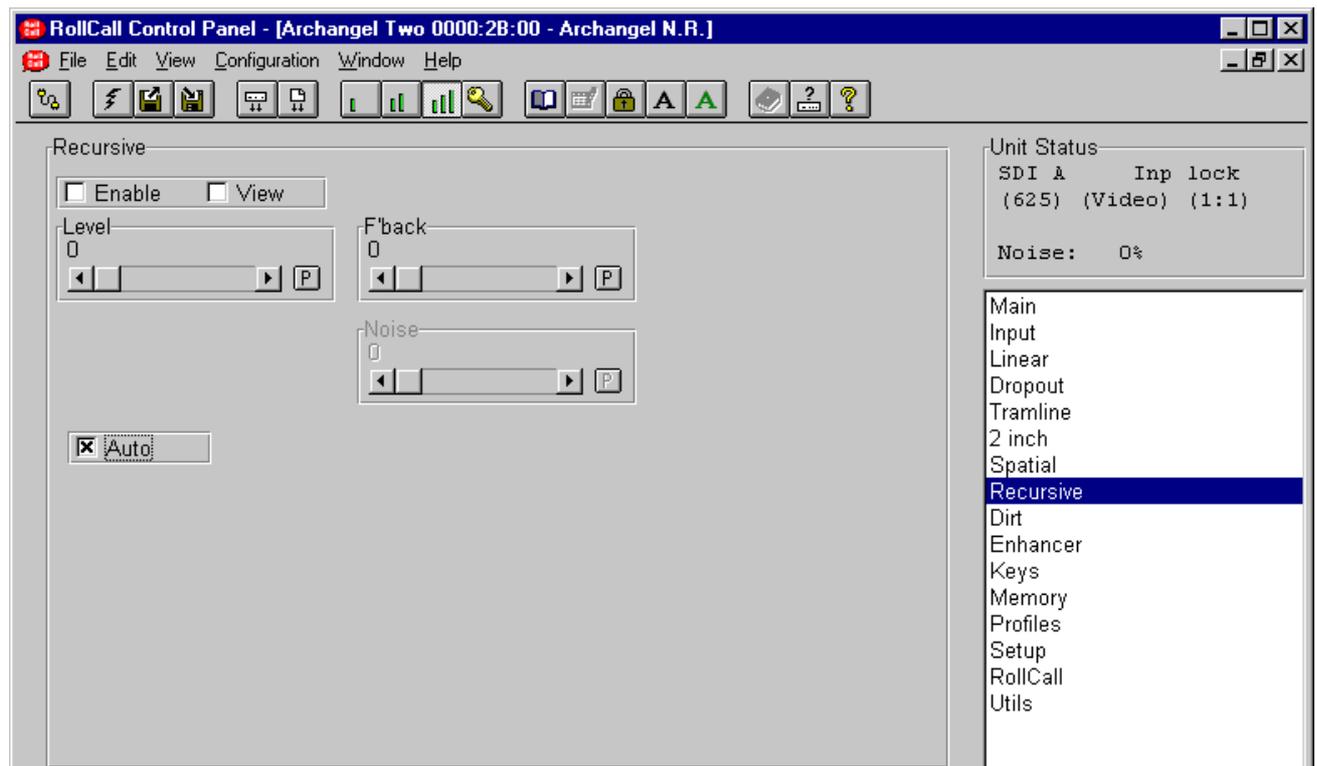
Band	Luma Level	Chroma Level	Description
H-D	Y H-D	C H-D	High Frequency Diagonal
H-V	Y H-V	C H-V	High Frequency Vertical
H-H	Y H-H	C H-H	High Frequency Horizontal
L-D	Y L-D	C L-D	Low Frequency Diagonal
L-V	Y L-V	C L-V	Low Frequency Vertical
L-H	Y L-H	C L-H	Low Frequency Horizontal

Luma and Chroma Level

The level of filtering in each band can be individually controlled for luma and chroma. To adjust the level in the specific band, use the "BAND" control to select the desired band then adjust the level to achieve the desired level of filtering. The title above the scroll bar of the level indicates (with an abbreviated name) which band has been selected.

A level of 0 means no filtering is applied. Increasing the level increases the filtering; 31 is the maximum.

Recursive

**Recursive (Enable)**

This function may be toggled to enable and disable the Recursive filter.

Recursive (View)

This control allows the user to directly view the difference between the current and previous pictures in effect the amount of noise reduction the recursive filter is currently achieving. To see the "view image" the filter must be enabled.

Level

This control changes the amount of noise reduction for both luminance and chrominance by limiting the maximum level of noise reduction, where 15 is maximum and 0 is minimum. The actual level of noise reduction is dynamically adjusted on a pixel-by-pixel basis with regard to the noise reduction setting for the same pixel in the previous frame. Other factors such as movement contribute to the current pixel setting. This mechanism ensures that the optimum level of noise reduction is applied to each pixel.

F'back (Fallback)

This control adjusts the level, or strength, of spatial filtering used in the spatial/recursive blend. It does not adjust the ratio of the blend; this is done automatically to give the optimum results.

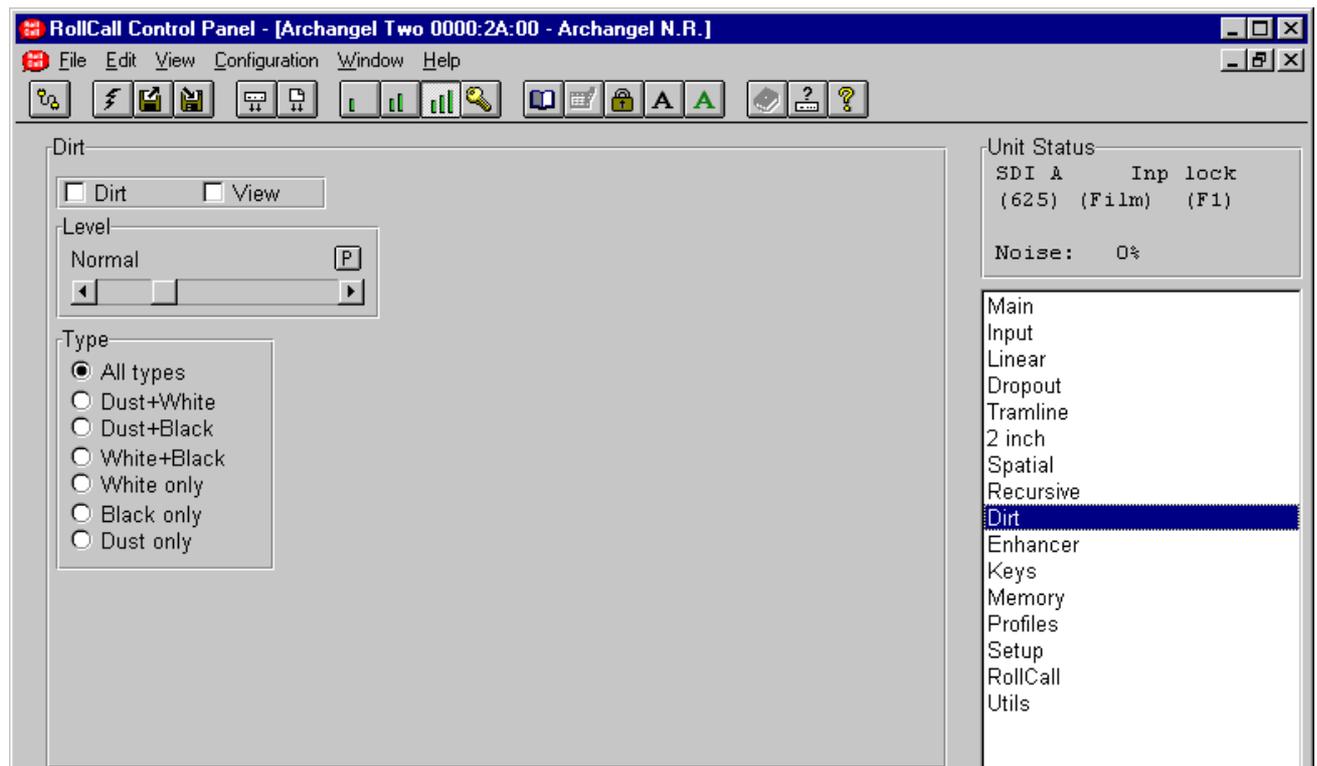
Auto

When this item is checked the threshold for the motion detector is dynamically set to an appropriate value for the current input noise level. When unchecked the Noise function becomes available sets the threshold for the motion detector.

Noise

This control sets the threshold for the motion detector. The lowest level of 0 gives the greatest sensitivity to motion, but allows more noise to break through, while 15 gives the greatest noise reduction but can lead to excessive filtering of low-level textures. When this is set to auto the threshold is dynamically set to an appropriate value for the current input noise level.

Dirt

**Dirt (Enable)**

This function may be toggled to enable and disable the Dirt filter.

Dirt (View)

This control allows the difference between the input and the output from the Dirt filter to be viewed.

Level

The default value for this control is **Normal** and should be used most of the time. It is an optimized setting.

If some low contrast picture content (such as helicopter rotor blades for example) is being damaged, then levels -1 to -3 can be used to correct this artifact.

On the other hand, if some residues or shadow of dirt are still present, then levels 1 to 3 can be used to reduce them.

Levels 5 to 9 are respectively more aggressive settings that can be used on pictures with slow or no movement when the level of dirt concealment with the Normal setting is not satisfactory.

Please note that with the "Dust only" setting, the level setting has no effect.

Type

In many materials the types of dirt include black dirt, white dirt and dust. In this case the "All types" setting should be used. If there is only one type of dirt present, then there is no need to try to remove other types since it could lead to the introduction of artifacts. In this case, just select the type of dirt you want to remove. For example, if the material only contains small pieces of dirt (up to around 10 pixels wide in any direction), then the "Dust only" type should be used.

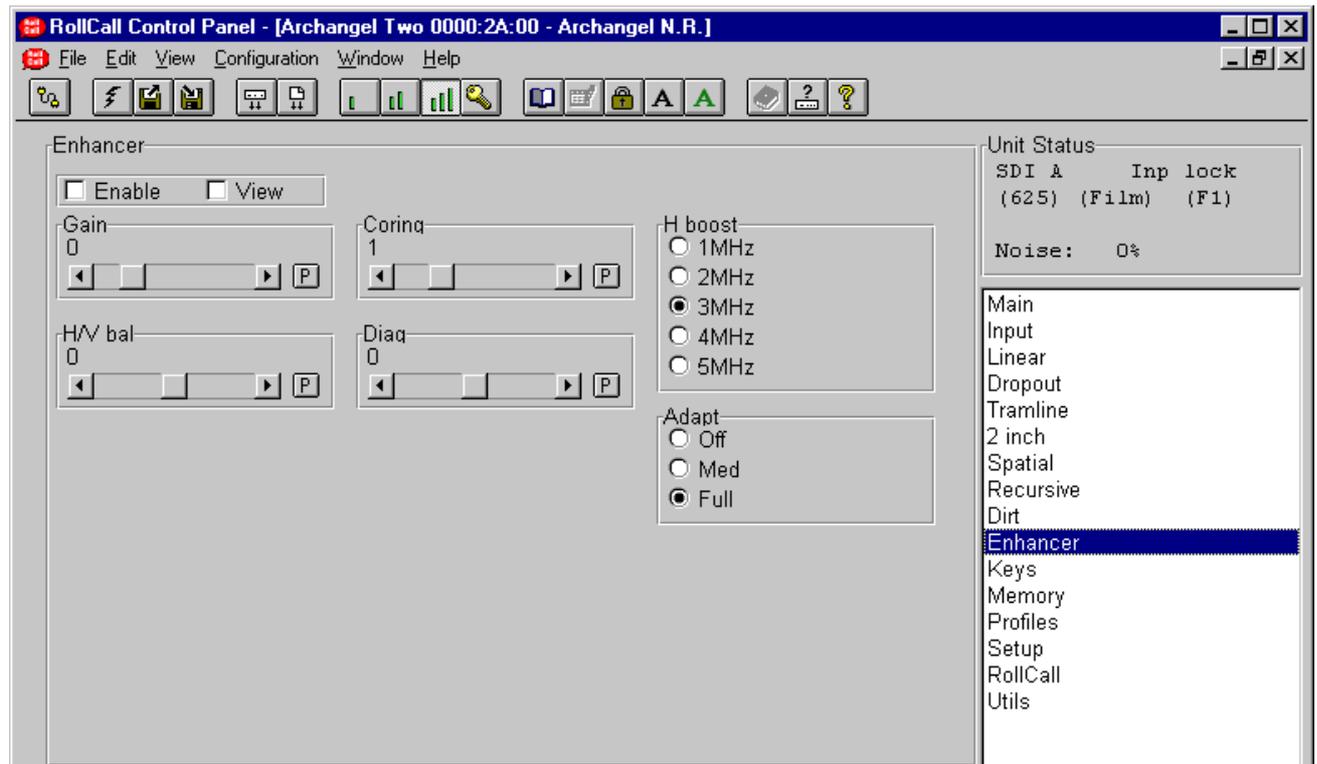
If the Normal level setting causes damage to complex or fast motion, one of two remedies may be used. If large pieces of dirt are present in these pictures, use the keys to disable the dirt filter in the area where the damage is occurring. If no large pieces of dirt are present, change the type setting to "Dust only".

The "Dust only" setting should be artifact free, but in the very unlikely case of some very small moving objects (such as lights, buttons or small details) disappearing or flashing, disable the dust by using from among the "White only", "Black only" and "White + Black" settings the one corresponding to your case.

Dirt (continued)**Dirt Keys**

Even though Archangel Two contains a sophisticated automatic dirt detection and repair algorithm, there will still be some instances where picture content matches the characteristics of dirt. In these cases, a key can be defined to restrict the area of detection and concealment of the algorithm within the picture. When processing a picture where the horizontal or vertical blanking extends into the normal active picture area, for example letterbox, a key can be assigned to the dirt to define the edge of picture. Please see page 32 for details.

Enhancer

**Enhancer (Enable)**

This function may be toggled to enable and disable the enhancer.

Enhancer (View)

This is provided to visualize the enhancer signal in isolation. To obtain the "view" image, the enhancer must be enabled.

Gain

This control defines the amount of enhancement required. A positive value provides enhancement, whereas a negative value provides de-enhancement. The higher the value, the greater the amount of enhancement. Too high a value is likely to result in unwanted artifacts.

Coring

The purpose of the Coring control is to reduce or prevent the enhancement of noise in the picture. The noisier the material, the higher the coring level.

H Boost

This control defines from which horizontal frequency the horizontal enhancement applies.

H/V bal

This control determines the horizontal and vertical enhancement ratio. A positive value provides more enhancement in the horizontal than in the vertical, whereas a negative value provides more enhancement in the vertical than in the horizontal.

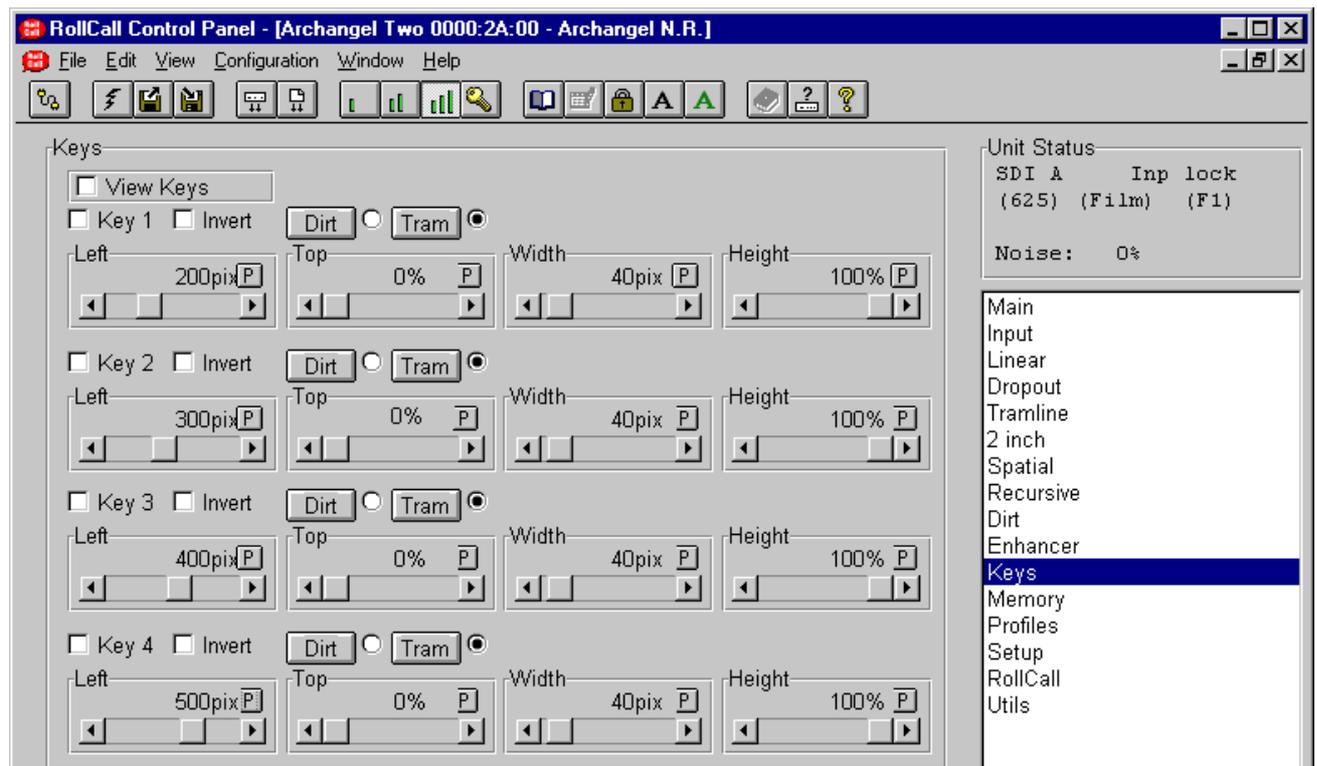
Diag

This control determines diagonal enhancement. A null value provides as much enhancement in the diagonal as in the horizontal and vertical. A positive value provides more enhancement in the diagonal, and a negative value provides less enhancement in the diagonal than in the horizontal and vertical direction.

Adapt

This control allows the user to control bright and dark adaptation. Enhancement is often not desired in the very bright and very dark areas of the pictures since it would result in unwanted artifacts. In order to lower the level of enhancement according to the brightness and darkness of the picture, three level of adjustment are provided: OFF, MID, FULL.

Keys

**Keys (Overview)**

Archangel Two provides up to four user-definable rectangular keys that can be used to restrict the range of detection and concealment of the Dirt and Tramline filters. The keys are prioritized to allow overlapping and more complex shapes if necessary and are directly accessible from the front panel.

View Keys**Key 1 to Key 4**

Checking this box will enable the associated key function.

Invert

Checking this box will enable the inverted mode.

Dirt, Tram

Checking these boxes will enable the associated key.

For each Key, the user may select either the Dirt filter or the Tramline filter.

If Key View and Tramline View is selected the Key view overrides the tramline view.

If Key View and Dirt View is selected, the Dirt View is visible, with a chroma outline on the left and right.

Tramline Keys

In normal operation the key color overlay includes a soft edge to minimize the visibility of the scratch filter as it turns off an on at the key edge. The key includes the partially filtered area to indicate to the user the overall extent of the filter, which effectively extends the filtered area by 7Y pixels each side.

In the inverted mode, which is used to protect an area of the picture, the key width is deliberately modified (reduced by 7Y pixels each side) to indicate the area which is fully protected. If the key width were not reduced, then there would possibly be some damage to the periphery of the keyed area caused by the partial filtering of the soft edge.

Left The range of control is from 1 to 719 pixels.

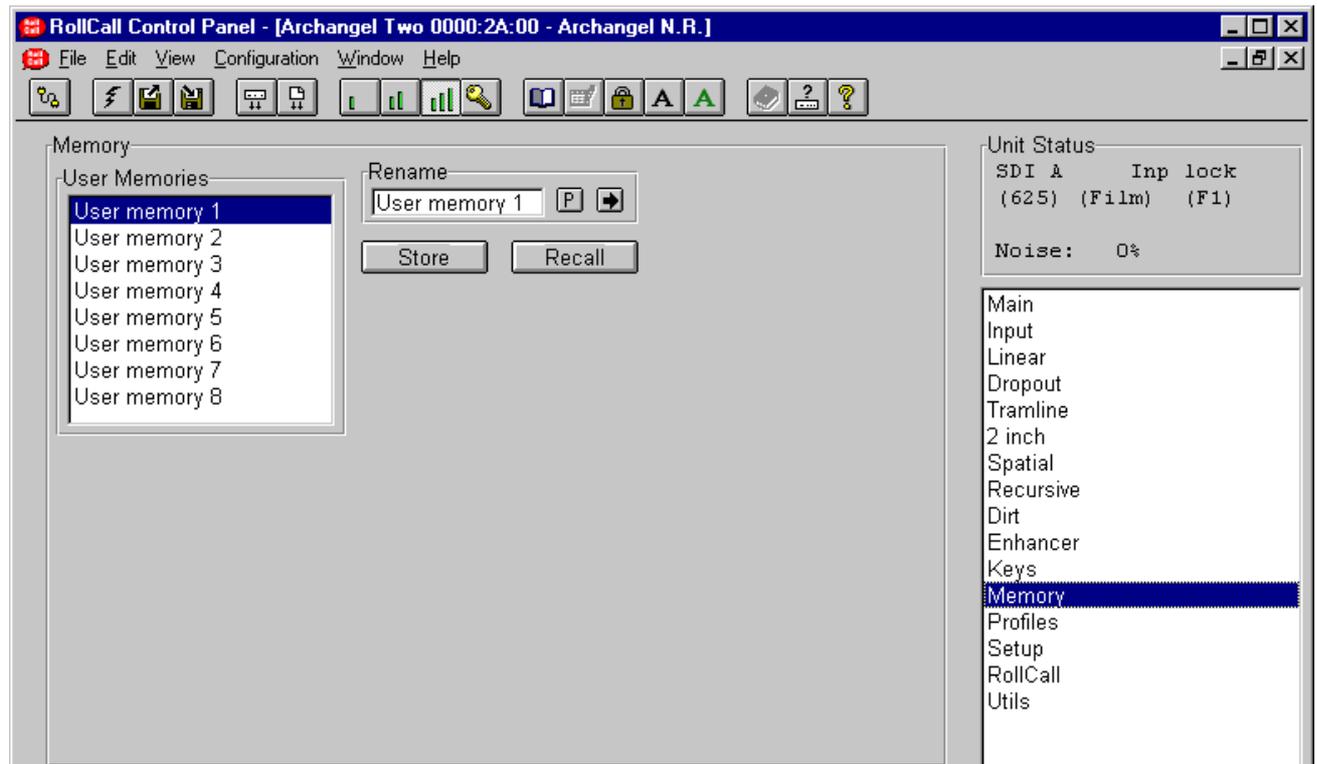
Top The range of control is from 0 to 100%.

Width The range of control is from 2 to 720 pixels.

Height The range of control is from 100 to 0%.

Preset values are as illustrated above.

Memory



User Memories

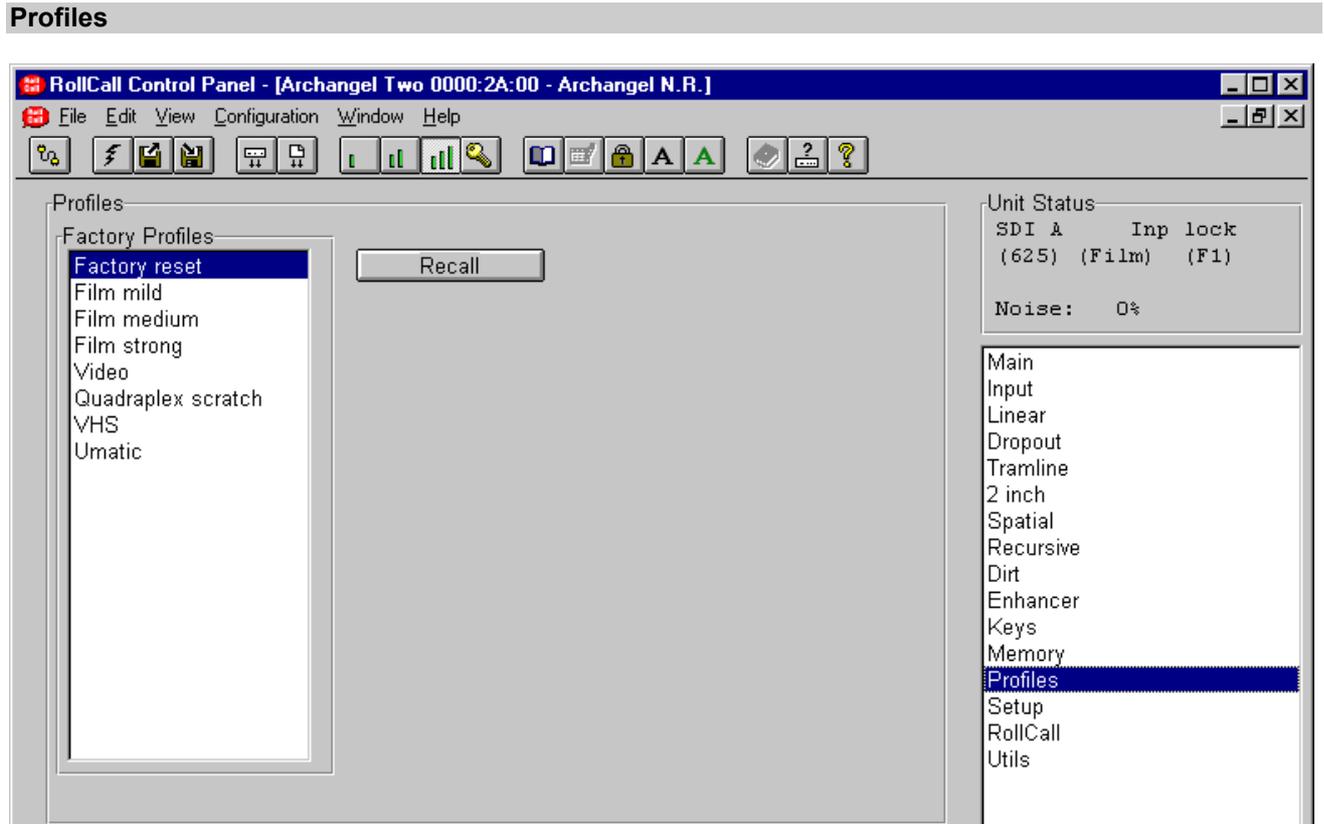
This function allows unit configurations to be stored and recalled. There are eight initially empty memory slots. The **Store** button stores the unit configuration in the highlighted slot, and the **Recall** button recalls the unit configuration previously stored in the highlighted slot.

Rename

This allows the name of the memory slot to be changed.

Once a name for the memory slot has been set selecting the  symbol will save the new name.

The  symbol represents the Preset function and will return the name to the default name.

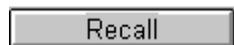


Profiles

This function allows preset unit configurations to be recalled.

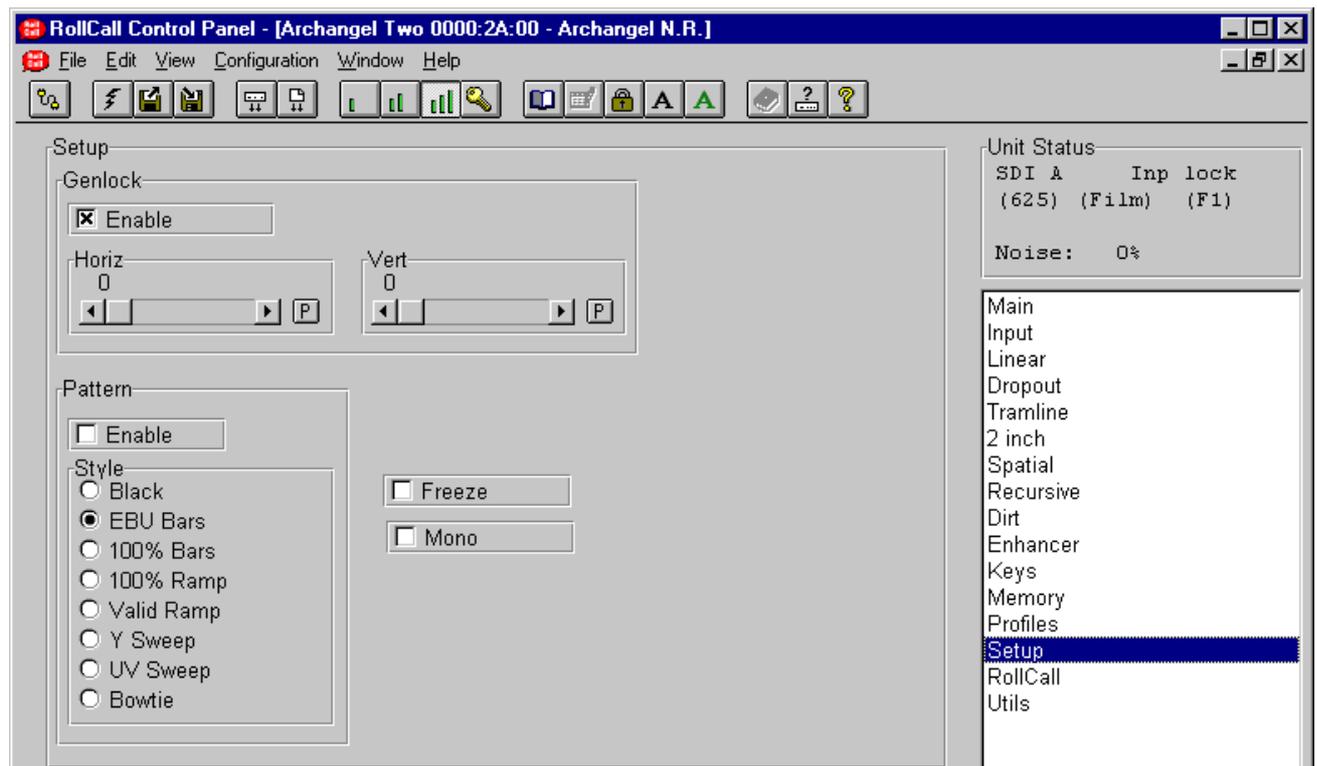
Factory Profiles

This item lists the available profiles.



This button recalls the unit configuration stored in the highlighted slot of the **Factory Profiles** selection.

Setup



Genlock

Incorporated onto the noise reduction card is a full frame synchronizer that allows the selected input to be referenced to a signal of the same line standard.

This function allows genlock to be enabled and the reference source selected.

Enable

When **unchecked** the output video will *not be locked* to the input or the reference video signal. This is sometimes referred to as “free-running”. If the input and output were to be viewed on an oscilloscope the two traces would be seen to be moving one past the other.

When **checked** the genlock mode to be enabled. This mode forces the output to be locked to an analogue video signal of the same line standard.

Usually Genlock On will force the output to be locked to the signal that is connected to the reference input.

However, if the reference signal is invalid, or of a different line standard to that of the input, the synchronizer will lock the output to the input.

The status display will always indicate the mode of operation for the synchronizer.

In the event of an input loss (with the unit Genlocked to the input), the output will be momentarily disrupted when the input is returned. This effect can be minimized by ensuring the system is Reference Locked.

Genlock Offsets

Provision has been made to allow the horizontal and vertical timing of the output to be varied in relation to the “referenced” signal, whether it be the input or the reference. This facility is useful when the output needs to be in synch with other units such as in a studio system. This will allow clean switching between multiple sources which may have different phase relationships.

Horiz (Horizontal Genlock Offset)

525 line standard		
Sample Range		0 to 1715
625 line standard		
Sample Range		0 to 1727
Duration of Sample		37ns
Preset		0 Samples

Vert (Vertical Genlock Offset)

525 line standard		
Line Range		0 to 524
625 line standard		
Line Range		0 to 624
Preset		0 Lines

Setup (continued)**Pattern**

When the **Enable** item is checked the output will become the pattern that is checked in the adjacent style list.

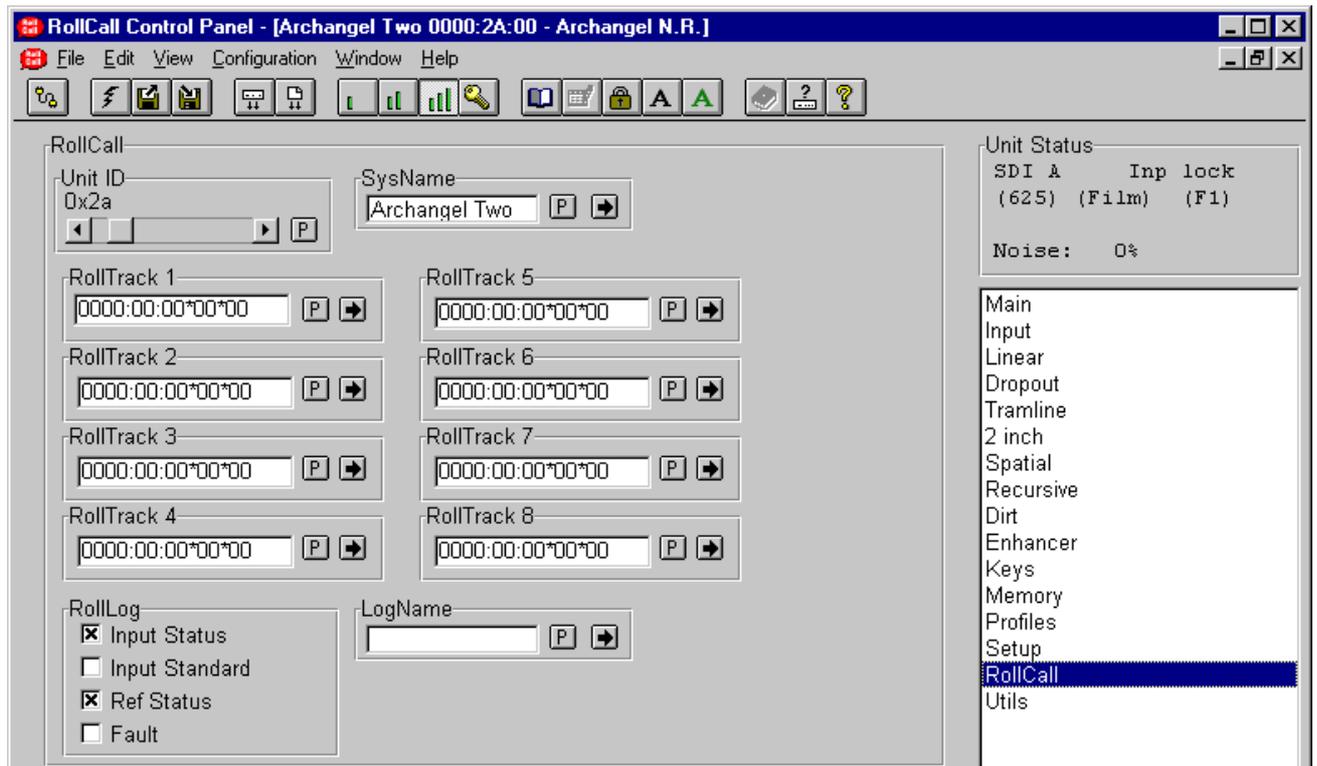
Freeze

When this item is checked the picture will become frozen.

Mono

When this item is checked the picture will become monochrome.

RollCall



This allows various RollCall functions to be setup.

Unit ID

This is the RollCall address of this item of equipment. The unit number must be unique on each physical network segment. The Unit number must be set to 42 to allow a third party controller to control Archangel Two.

SysName

The item allows the user to change the name by which this item of equipment will be seen on the Rollcall network.

RollTrack 1 to 8

This function allows the value of the delay time produced by Archangel to be sent, via the RollCall™ network, to audio delay units connected on the same network. This enables compatible audio delay units to produce an audio delay dependent on this and other similar units. The audio delay unit will dynamically follow or track the received delay-time information allowing processed video signals to be timed correctly with audio signals. This automatic tracking system via the RollCall™ network is call RollTrack.

The destination for the delay information is set by the network code address as follows:

Up to 8 units (mainframes enclosures etc.) may be selected as a destination. The code is set up using by entering numbers in the text box.

For more detailed information see the RollTrack section of this manual.

The full network address has four sets of numbers. For example: 0000:10:01*14
 The first set (0000) is the network segment code number.
 The second set (10) is the number identifying the (enclosure/mainframe) unit.
 The third set (01) is the slot number in the unit.
 The fourth set (14) separated by an * is the channel number.

Note that only channel numbers 14, 15, 16 & 17 should be used for audio delay cards.

Once the address has been set selecting the  symbol will save the address.

The  symbol represents the Preset function and will return the code to the default address.

RollCall (continued)**RollLog**

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

This item allows information about 4 parameters to be made available for logging.

Input Status

When checked, a loss of input signal condition will be available for the logging device.

Input Standard

When checked, a change of input standard will be available for the logging device.

Ref Status

When checked, a loss of External reference signal condition will be available for the logging device.

Fault

When checked a fault report will be available for the logging device.

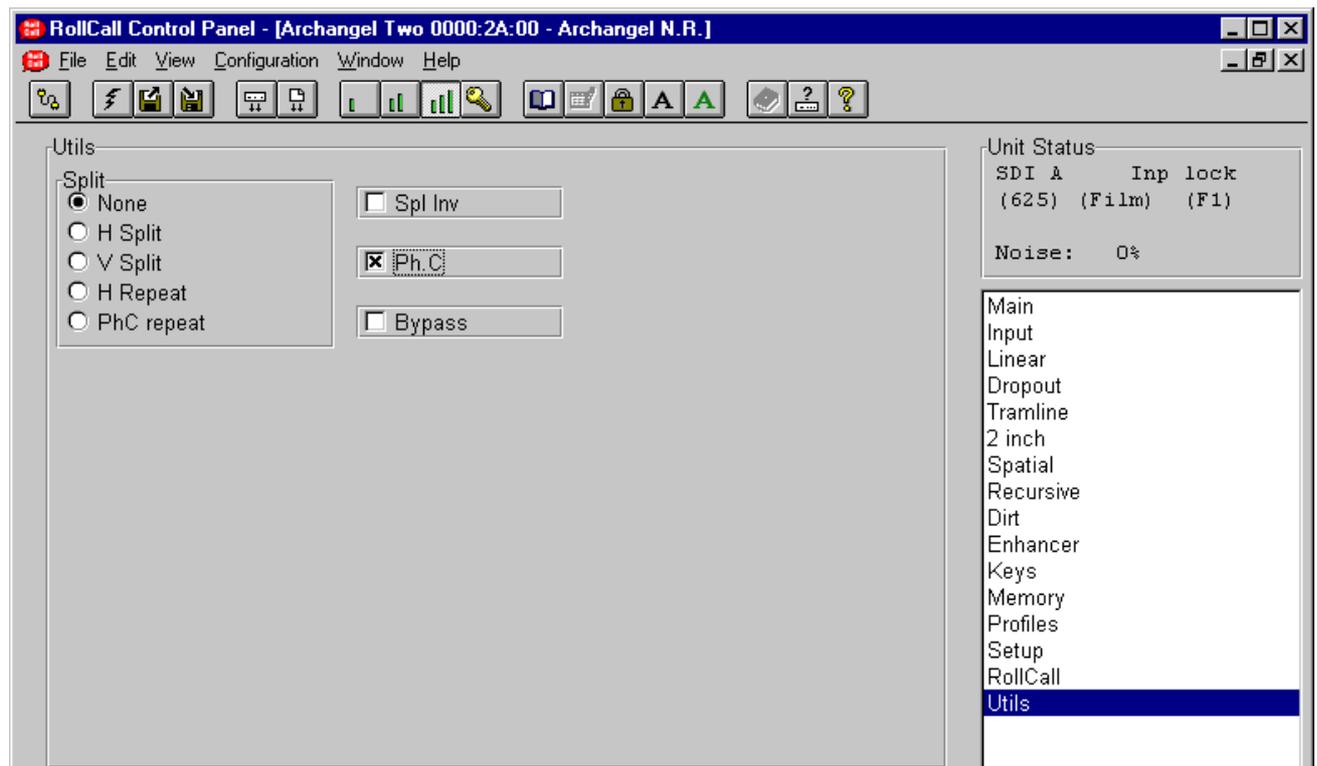
LogName

The name of the logserver can be entered here.

Once the name has been set selecting the  symbol will save the name.

The  symbol represents the Preset function and will return the name to the default name.

Utils

**Split**

This allows the screen to be split into two.

None

The screen will be normal i.e. not split.

H Split

When checked the right hand half of the screen is filtered.

V Split

When checked the lower half of the screen is filtered.

H Repeat

When checked the picture on the left hand half of the screen is repeated on the right hand half of the screen; the right hand half is filtered.

PhC Repeat

When checked the picture on the left hand half of the screen is repeated on the right hand half of the screen; the right hand half is filtered.

Spl Inv

When checked, the split is inverted so that the left hand half of the screen is filtered for a setting of H Split or H Repeat, and the upper half of the screen is filtered for a setting of V Split.

PhC

When checked, Phase Correlation is used to optimize the performance of the enabled filters.

Bypass

When checked the filters will be disabled.

Unit Status

```
Unit Status
SDI A      Inp lock
(625) (Film) (F1)

Noise:    0%
```

This area of the screen shows abbreviated data about the status of the unit.

Details

```
Unit Status
SDI A
```

The first item of line 1 shows, which input source, has been selected. It may show either SDI A or SDI B.

```
Unit Status
      Inp lock
```

The second item of line 1 shows the Genlock status
 It may show: -
 Inp Lock - Locked to Input
 RefLock - Locked to reference
 Free Run - Free running

```
(625)
```

The first item of line 2 shows the standard of the input. It may show either 625,525,loss or error.

```
Film)
```

The second item of line 2 shows the type of input material that is being processed. It may show either Film, Video or err. If err is shown it means that the selected type is different to the detected type.

```
(F1)
```

The third item of line 2 shows the field dominance setting in film mode. It may show either F1,F2,3:2 or err. If err is shown it means that the selected type is different to the detected type. In video mode it will show 1:1

```
Noise:    0%
```

The fourth line shows the automatic noise measurement used by the Recursive filter.

ARCHANGEL CONTROLS FROM SYNERGY TIMELINE CONTROLLER

This section details the layout and types of control for the Archangel that can be used from the Synergy timeline controller. For full details on how to use the Synergy system please see the Synergy User Manual from Tangent Devices.

The pages of controls available are listed below; they are grouped into sets of six.

Page 1

Set 1	Setup Archangel One, Flicker
Ustdy	Unsteadiness
Regn	Unsteadiness Region
Blank	Unsteadiness Blanking
ProcA	Proc Amp functions
Color	Color Balance functions

Page 2

Set 2	Setup Archangel Two
Input	Input Parameters Archangel Two
Utils	Utility Functions Archangel Two
Linear	Linear Filter
Spat 1	Spatial Filter main controls
Spat 2	Spatial Filter Level controls

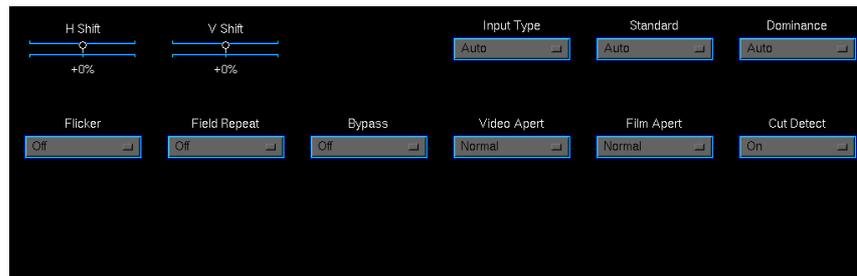
Page 3

Dirt	Dirt Filter
TramL	Vertical Tramline Scratch Filter
Key 1	Key 1 controls
Key 2	Key 2 controls
Key 3	Key 3 controls
Key 4	Key 4 controls

Page 4

Recur	Recursive Filter
2 Inch	2 Inch Filter
DropO	Dropout Filter
Enhan	Enhancer
View	Fast access to filter view function
Quick	Quick acces to filter enable functions

Set 1

**Setup - Archangel One**

The controls on this page set up the input, flicker and some of the unsteadiness and general parameters for Archangel One.

V Shift

The amount of Offset may be varied by ± 100 . This is only available in Unsteadiness Horizontal Mode Only.

H Shift

The amount of Offset may be varied by $\pm 100\%$. This is only available in Unsteadiness Vertical Mode Only

Flicker

The flicker correction may be enabled with this control. No further configuration is required for the flicker correction.

Field Repeat

If the fields of the picture are misaligned or one field is corrupted, one of the input fields may be discarded and the remaining field repeated. Select f1:f1 or f2:f2 for field 1 repeat or field 2 repeat respectively.

Note that Unsteadiness correction will not be active when the Field Repeat mode is active.

Bypass

When the bypass function is enabled the video will pass through the unit with certain functions disabled, in accordance with the configuration selected from the front panel.

Cut Detect

The cut detector may be switched Off using this control.

Set 1 (continued)**Input Select**

This allows either the SDI-A or SDI-B input to be selected.

Input Standard

This allows the input standard to be selected.

Selections are force to PAL, force to NTSC or Auto. The force positions may be used where the input standard is known otherwise the Auto position (which automatically senses the input standard) should be used.

Input Type

The Archangel One has automatic detection of film originated and video material. This may be manually overridden using this control.

While in Auto mode, a good general-purpose interpolation aperture will be used.

If Video or Film is selected, an additional menu will become available, allowing manual selection of interpolation apertures.

Video Filter Aperture

This function will be available when **Video** is selected via the **Input Type** item. The following options are then available:

- Video For use with video or mixed film and video.
- Video-to-Film Takes video material and field pairs to create a 'film look'.
- Video Anti-Alias Reduces the video aliasing.

Film Filter Aperture

In this mode, the following options are available:

- Film (Normal) Film Aperture – tolerant of changing field dominance and non frame locked edit points.
- Film (Very Sharp) Sharp Progressive Film Aperture. Dependent on constant field dominance and frame edit points.
- Film (Anti-Alias) Film Aperture with optimized to reduce vertical alias components.

Field Dominance

The Archangel One has automatic field dominance/film phase detection for use when stabilizing film originated material.

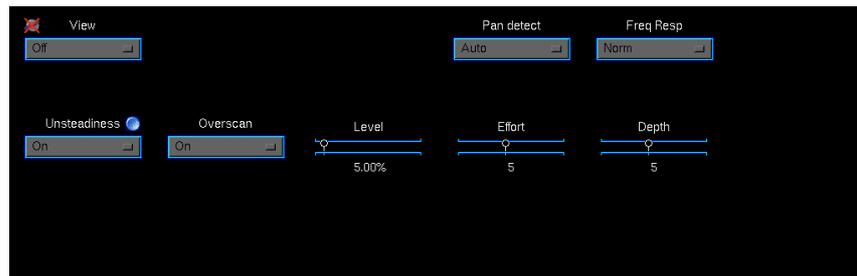
In **625/50** this can be manually overridden with the following selections:

- f1 > f2 Field one dominant
- f2 > f1 Field two dominant

In **525/60**, automatic 3:2 pulldown detection is employed and the manual selection mode is not available.

Note that this function is not available in video mode.

Ustdy



Unsteadiness Process

Off/Vertical/Horizontal/On

This allows the unsteadiness process to be turned Off or On. Correction may also be applied only in the horizontal or vertical direction.

If unsteadiness is not enabled in a particular direction, an offset may be manually applied for that direction; e.g. a vertical offset may be applied if only horizontal unsteadiness is being corrected.

Overscan

When set to On this mode allows correction without overscanning. This may be useful for very unstable images where ultimate correction is required. Note that blanking areas will enter the image, up to a limit set by the correction factor.

The maximum amount of unsteadiness that can be taken out of the video images is determined by the correction factor. The correction factor is also proportional to the overscan applied to the video, unless the overscan is defeated.

Level

The higher the unsteadiness correction factor, the more severe the unsteadiness that can be removed, at the expense of losing more of the picture due to overscanning. The level may be adjusted over a range of 0.00 % to 60.00 %.

View

Four markers are superimposed on the input picture. After processing through Archangel One, the amount of movement of the markers is indicative of the amount of correction Archangel One is performing. This is especially useful for demonstrating the effectiveness of Archangel One with a single monitor.

Effort

This setting determines the effort the unsteadiness applies to the screen. It is useful to put this into max mode if there are two or more objects with different speeds within the picture. i.e. a vehicle moving against a background, etc.

Depth

Increasing the field depth setting is useful for scenes with high levels of perspective, such as a camera mounted on the front of a moving vehicle, or scenes where there is a combination of close foreground and distant background objects.

Pan Detect

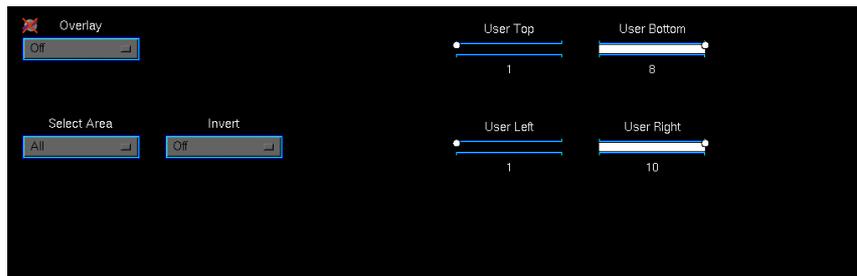
Normally the unsteadiness process detects pans and tilts automatically. This control may be manually overridden. In steady mode, the image will ignore pans, until the edge of the correction window is reached. This may be useful where ultimate stability is required at the cost of the occasional re-framing of the image.

Freq Resp

The response of the unsteadiness correction system to different frequencies of motion may be changed if required. This will alter the range of motion speeds that the unit regards as unsteadiness.

The Normal setting is sensitive enough to differentiate pans from unsteadiness in most cases. The Very Low or Steady frequency response settings may be useful to remove particularly slow film weave, which the unsteadiness process would normally consider as camera re-framing. This is also useful when combined with the pan detection control.

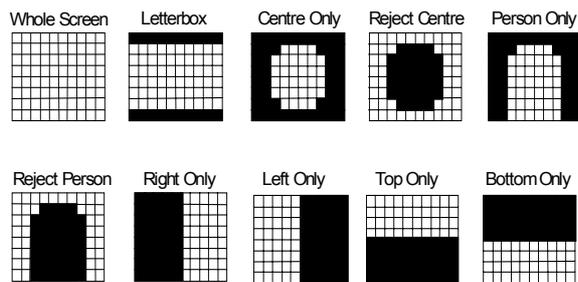
Regn



The Page allows a region to be defined for the unsteadiness detection algorithm.

Select Area

The area of the image to lock to may be selected using this control. This is very useful in situations where multiple moving objects are present within the picture, allowing the user to select which area to stabilize.



Overlay

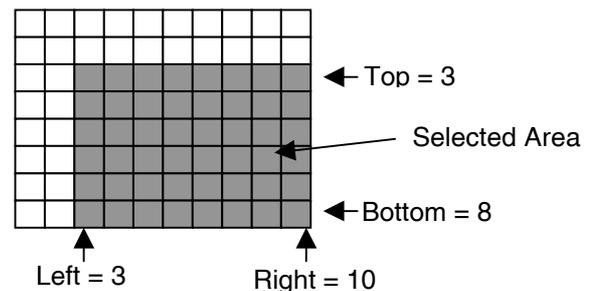
An overlay can be added to the output of the unit to show the approximate area of the input image that the unsteadiness process is using to calculate the unsteadiness. This is particularly useful when setting up the user defined region.

Note that Correction is disabled when the overlay is on the screen.

User Defined Region

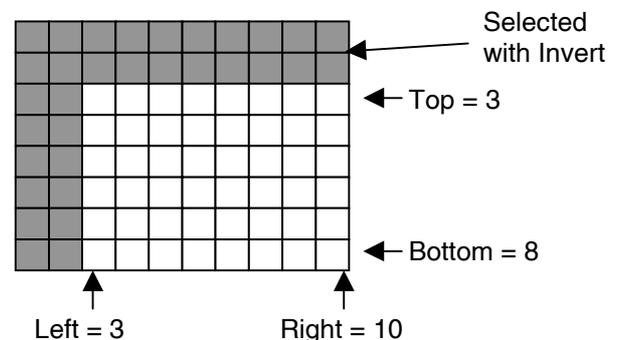
User Top/Bottom/Left/Right

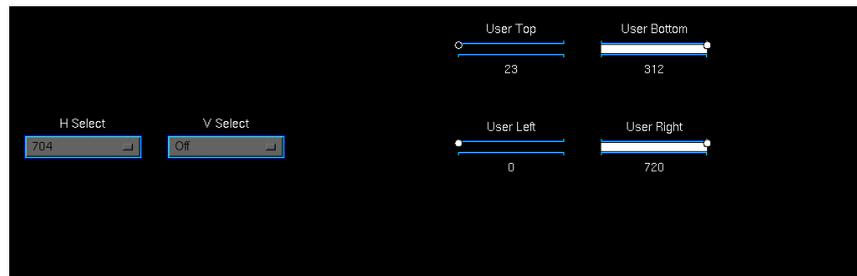
This allows a user selection area of rectangular shape to be defined. There are 8 blocks vertically and 10 blocks horizontally. Using 'top' you can select which of the 8 rows vertically is the top of the selected rectangle. Similarly, bottom, left and right allow you to define the bottom, left and right of the box. For example:



User Invert

The selection may be inverted using this selection. In this case only the blocks outside the defined area will be active, for example:



Blank

This page controls the horizontal and blanking parameters for the Unsteadiness processing in Archangel One.

Blanking Overview

As the unsteadiness correction works by moving the picture around, it is vital to the correct operation that the blanking positions are correctly set. If the blanking positions set are outside those of the input video, then it is possible that blanking will be moved into the active picture area. To prevent this, it is recommended that new source material presented to the unit be inspected to determine the blanking positions. These positions should then be set in the user-settings in the Horiz Blanking and Vert Blanking controls, which will prevent edge effects occurring.

H Select (Horizontal Blanking)

It is recommended that the output is blanked to at least the analog (704) blanking position. Additional tighter blanking positions are also given. This blanking may also be turned to the digital blanking position (Off = 720). Preset for this item is Off.

When User Defined is selected the blanking can be defined to the nearest pixel (Left User Defined Blanking, Right User Defined Blanking).

Left User Defined Blanking may be adjusted over a range of 0 to 720.

Right User Defined Blanking may be adjusted over a range of 720 to 0.

V Select (Vertical Blanking)

Archangel One is designed to work with pre-recorded or live material. Some pre-recorded material may be letter-boxed. Archangel One is designed to work with material in 4:3, 14:9 and 16:9 letterbox modes. These can be selected from the output menu. Preset for this item is Off.

When User is selected, the blanking can be defined to the nearest line (Top User Defined Blanking, Bottom User Defined Blanking).

Top User Defined Blanking may be adjusted over a range of 23 to 312 lines.

Bottom User Defined Blanking may be adjusted over a range of 312 to 23 lines.

Note that the numbers refer to the first/last active line, i.e. if Blank Top is 23 then line 23 will be passed and line 22 will be blanked

ProcA

**ProcAmp**

This page can be used to make level adjustments to the video signal. These controls are live, but are list based for convenience.

Video Gain

The video gain may be adjusted over a range of ± 6 dB.

Note that this can produce output signals above standard levels.

Chroma Gain

The chroma gain may be adjusted over a range of ± 6 dB.

Black Level

The black level of the output signal may be adjusted over a range of ± 88 mV.

YC Delay

The relative timing between the luminance signal and the chrominance signal may be adjusted with these controls.

The Delay Horiz will change the horizontal timing (left/right) by +600 ns to -450 ns.

A positive value of delay will shift the chrominance signal to the left of the picture and a negative value will shift the chrominance to the right of the picture.

The luminance signal will remain stationary.

Luma Clip

When checked the luminance clipper will be switched on.

Gamut Limit

When checked the color Gamut limiter will be switched on.

Mono

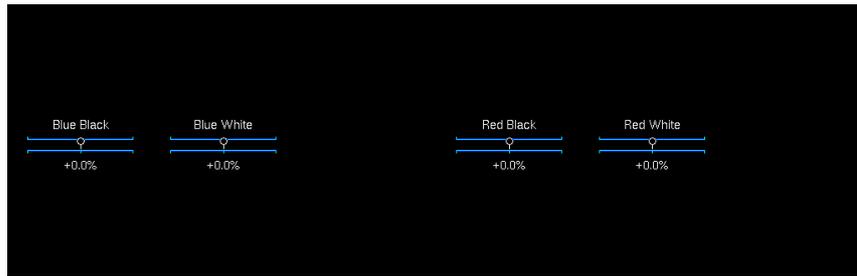
When checked the chroma content of the picture will be removed and the picture will become monochrome.

Freeze

When the freeze item is checked the picture will become frozen. Either a frozen Field or a frozen Frame may be selected.

Pattern

When the Pattern item is checked the output will become the pattern that is selected by the front panel menu system.

Color

This page is used to set the Blue and Red color settings in Archangel One. These controls are live, but are list based for convenience.

Color Balance

The color balance of the picture may be adjusted using these controls. There are two controls to adjust the amount of red in the picture and two for the amount of blue.

Blue/White and Blue/Black

The Blue/White control will adjust the amount of blue in the highlights (near peak level) and the Blue/Black will adjust the amount of blue in the lowlights (near black level)

The range of control is $\pm 25\%$.

Red/White and Red/Black

The Red/White control will adjust the amount of red in the highlights (near peak level) and the Red/Black will adjust the amount of red in the lowlights (near black level)

The range of control is $\pm 25\%$.

Set 2**Setup - Archangel Two**

This page controls the setup parameters available for Archangel Two.

Freeze

When this item is checked the picture will become frozen.

Pattern

When the Enable item is checked the output will become the pattern that is checked in the adjacent style list.

Style

This selects the test pattern to be displayed.

Mono

When this item is checked the picture will become monochrome.

Input**Input Settings - Archangel Two**

This page controls the input settings for Archangel Two.

Mode

The Archangel Two has automatic detection of film originated and video material. This may be manually overridden using this control.

Dominance

The Archangel Two has automatic field dominance/film phase detection. This function may be manually overridden if required by checking the appropriate box.
Std (Standard)

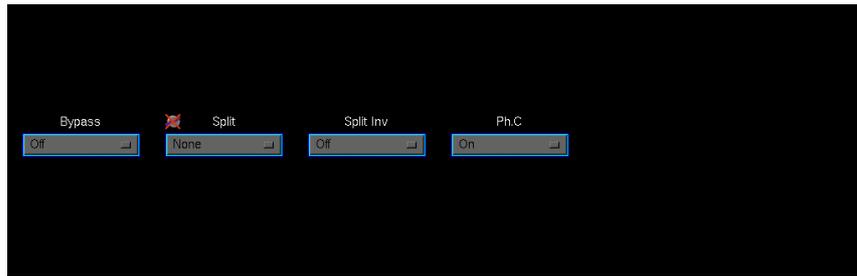
Fld Phase

This parameter is not used.

Standard

Selections are force to 625 lines, force to 525 lines or Auto. The force positions may be used where the input standard is known otherwise the Auto position (which automatically senses the input standard) should be used.

Utils



Utility Functions

This page allows the utility functions on Archangel Two to be controlled.

Bypass

This function may be toggled to enable and disable the filters.

Split

This allows the screen to be split into two for demonstration purposes.

- None

The screen will be normal i.e. not split.

- H Split

When checked the right hand half of the screen is filtered.

- V Split

When checked the lower half of the screen is filtered.

- H Repeat

When checked the picture on the left hand half of the screen is repeated on the right hand half of the screen; the right hand half is filtered.

- PhC Repeat

When checked the picture on the left hand half of the screen is repeated on the right hand half of the screen; the right hand half is filtered.

Spl Inv

When checked, the split is inverted so that the left hand half of the screen is filtered for a setting of H Split or H Repeat, and the upper half of the screen is filtered for a setting of V Split.

PhC

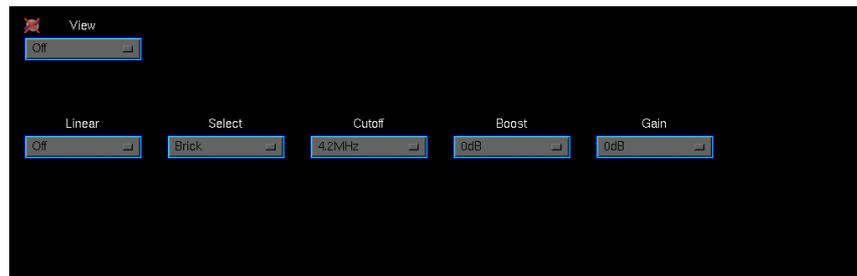
When checked, Phase Correlation is used to optimize the performance of the enabled filters.

RT Delay

This is used to adjust the real-time packet delay in Archangel Two, and should not normally be needed to be adjusted.

This is set to 13 in PAL and to 15 in NTSC.

Linear



Linear Filter

This page controls the Linear filter.

Linear

This function may be toggled to enable and disable the linear filter.

View

The linear view control allows the user to directly view the difference between the input and the output from the linear filter. The signal represents the value of the correction that would be applied to the picture. The polarity of the output signal can be either positive or negative depending on the polarity of the picture so the output is displayed on a gray pedestal. Positive correction values will extend towards white and negative correction values will extend towards black.

Select

This function allows two filter modes, Brickwall or Gaussian, to be selected.

- **Brickwall**

The brickwall low-pass filter mode is employed to reduce noise resident in the high frequency region of the luminance spectrum.

- **Gaussian**

These high and low pass filters have a smoother rolloff compared to the brickwall

Cutoff (Brickwall)

This mode has 18 user selectable cut-off frequencies (specified at -6 dB) ranging from 4.2 MHz down to 2.5 MHz in 0.1 MHz steps. The stop-band performance is -34 dB or better with no boost.

In addition to the selectable cut-off frequencies the user can also select a given boost at each cut-off: 0 dB (no boost), 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

There are a further 6 Extra Low Pass filters with cutoffs from 2.44MHz to 0.92MHz, the boost at the cut off frequency is not available for these filters.
Boost

Boost (Brickwall)

The boost value selected is the amount of gain applied to the filter response at the chosen cut-off frequency. The selectable boost facility is incorporated to allow the user to increase the perception of sharpness in the picture by boosting the contrast.

The sharpness of a picture can sometimes be significantly reduced by filtering the high luminance frequencies so the inclusion of the extra boost helps to restore some of the sharpness to the picture. A boost of 6 dB will result in the cut-off frequency being increased by up to 0.4 MHz. The actual amount of boost selected will be a trade-off between cut-off and picture sharpness.

Gain (Gaussian)

This mode has 10 user selectable levels at 6.75 MHz ranging from -4 dB to -40 dB in -4 dB steps

- **Low Pass**

The low-pass filter mode is employed to noise reduce with less severity than the brickwall filter and/or to compensate for any irregularities in the luminance signal such as inherent high frequency gain.

- **High Pass**

The high-pass filter mode is employed to compensate for high frequency attenuation in the luminance spectrum. This high frequency attenuation may be mainly caused by stray capacitance inherent throughout the cables of an installation. This mode has 5 user selectable levels at 6.75 MHz: 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

Spat 1



Spatial Filter

This page controls the main features of the spatial filter.

Spatial

This function may be toggled to enable and disable the spatial filter.

View

This allows the user to see how much of the impairment is being removed by the spatial filter. This facility makes it easier to select the appropriate level and band to specifically target the impairment whilst preserving the image detail. To see the overall effect of the spatial band filtering (all bands) the "View" must be selected and the "Solo" disabled.

Solo

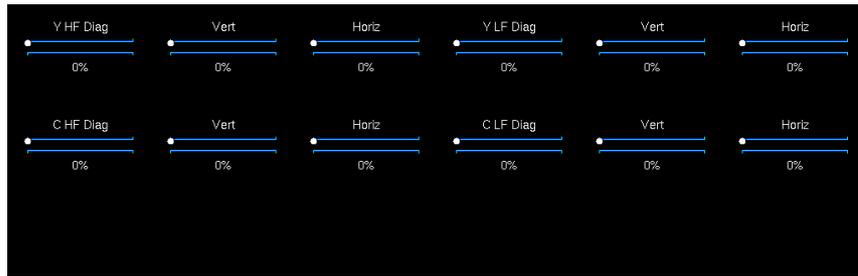
This allows the user to view the noise reduction in an individual band. The band is selected using the "BAND" control. To view this single band's contribution, both "Enable" and "View" must be selected.

Band

This control selects the active band of the filter for control and adjustment purposes. To check the level of the nine bands use this control to scan through each band in turn. This control is also used to determine which band will be active when "Solo" is enabled. The bands are:-

Band	Description
HF Diag	High Frequency Diagonal
HF Vert	High Frequency Vertical
HF Horiz	High Frequency Horizontal
LF Diag	Low Frequency Diagonal
LF Vert	Low Frequency Vertical
LF Horiz	Low Frequency Horizontal

Spat 2



This page controls the levels of each of the bands in the spatial filter.

Luma and Chroma Level

The level of filtering in each band can be individually controlled for luma and chroma. A level of 0 means no filtering is applied. Increasing the level increases the filtering.

The Luma band controls are on the top row and the chroma band controls are on the bottom row.

Panel Name	Y HF Diag	Vert	Horiz	Y LF Diag	Vert	Horiz
Description	Luma High Frequency Diagonal	Luma High Frequency Vertical	Luma High Frequency Horizontal	Luma Low Frequency Diagonal	Luma Low Frequency Vertical	Luma Low Frequency Horizontal
Panel Name	C HF Diag	Vert	Horiz	C LF Diag	Vert	Horiz
Description	Chroma High Frequency Diagonal	Chroma High Frequency Vertical	Chroma High Frequency Horizontal	Chroma Low Frequency Diagonal	Chroma Low Frequency Vertical	Chroma Low Frequency Horizontal

Dirt**Dirt filter****Dirt**

This function may be toggled to enable and disable the Dirt filter.

View

This control allows the difference between the input and the output from the Dirt filter to be viewed.

Type

In many materials the types of dirt include black dirt, white dirt and dust. In this case the "All types" setting should be used. If there is only one type of dirt present, then there is no need to try to remove other types since it could lead to the introduction of artifacts. In this case, just select the type of dirt you want to remove. For example, if the material only contains small pieces of dirt (up to around 10 pixels wide in any direction), then the "Dust only" type should be used.

If the Normal level setting causes damage to complex or fast motion, one of two remedies may be used. If large pieces of dirt are present in these pictures, use the keys to disable the dirt filter in the area where the damage is occurring. If no large pieces of dirt are present, change the type setting to "Dust only".

The "Dust only" setting should be artifact free, but in the very unlikely case of some very small moving objects (such as lights, buttons or small details) disappearing or flashing, disable the dust by using from among the "White only", "Black only" and "White + Black" settings the one corresponding to your case.

Level

The default value for this control is Normal (25%) and should be used most of the time. It is an optimized setting.

If some low contrast picture content (such as helicopter rotor blades for example) is being damaged, then levels -1 (0%) to -3 (17%) can be used to correct this artifact.

On the other hand, if some residues or shadow of dirt are still present, then levels 1 (33%) to 3 (50%) can be used to reduce them.

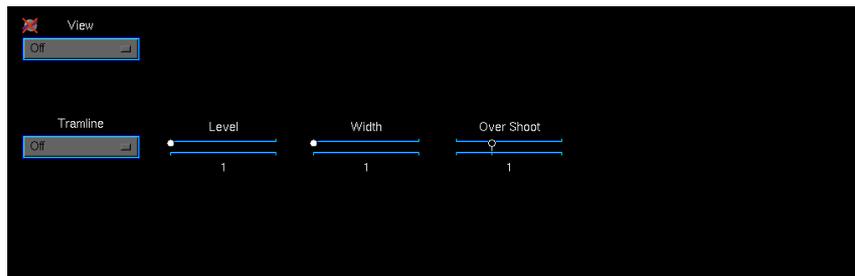
Levels 5 (58%) to 9 (100%) are respectively more aggressive settings that can be used on pictures with slow or no movement when the level of dirt concealment with the Normal setting is not satisfactory.

Please note that with the "Dust only" setting, the level setting has no effect.

Dirt Keys

Even though Archangel Two contains a sophisticated automatic dirt detection and repair algorithm, there will still be some instances where picture content matches the characteristics of dirt. In these cases, a key can be defined to restrict the area of detection and concealment of the algorithm within the picture. When processing a picture where the horizontal or vertical blanking extends into the normal active picture area, for example letterbox, a key can be assigned to the dirt to define the edge of picture. Please see page 17 for details.

TramL



Tramline Filter

This function may be toggled to enable and disable the Tramline filter.

View

The tramline filter controls allow the user to improve the selectivity of the automatic detection and concealment.

The tramline “View” control allows the user to directly view the output from the detection/correction algorithm. The signal represents the value of the correction that would be applied to the picture to correct the scratch. The polarity of the output signal can be either positive or negative depending on the polarity of the original scratch so the output is displayed on a gray pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To see the “view image” the filter must be enabled. To use the “view” associated with an individual key, the tramline view and the key filter must both be enabled.

Level

The tramline sensitivity control effectively determines the limits of detection of the algorithm. Some scratches are easier to detect than others and in such cases a low sensitivity setting could be used but where the scratch is vertically skewed or inconsistent throughout the frame, a higher sensitivity setting is required. Generally, the lowest sensitivity setting should be used to reduce the probability of false alarms.

Width

This is the most important of the tramline filter controls. It restricts the algorithm to detect scratches of the selected width and narrower. By restricting the algorithm to narrower scratches it substantially reduces the probability of false alarm caused by picture detail.

Ovsht

Most tramline scratches have an associated overshoot adjacent to the scratch. Hence a black scratch will have a white overshoot and vice-versa. However, the amount of overshoot is quite variable depending on the depth of the scratch, hence this control allows the user to vary the amount of overshoot correction which is applied.

Tramline Keys

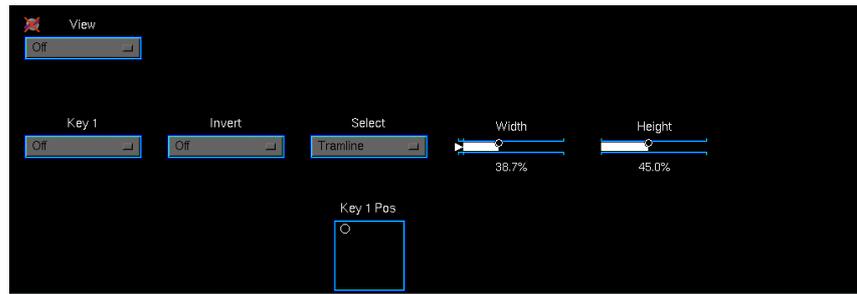
Even though Archangel Two contains a sophisticated automatic scratch detection algorithm, there will still be some instances where picture detail matches the selected scratch criteria. In these cases, a key can be defined to restrict the range of detection and concealment of the algorithm.

For details please see page 17.

Using the Tramline filter

The following procedure is a useful guide to using the scratch filter.

1. Ensure that all keys are off so that the entire picture is filtered
2. Select the maximum sensitivity (level)
3. Select maximum overshoot
4. Starting from the narrowest scratch width, gradually increase the setting until the scratch disappears. This adjustment can also be made in the View mode by adjusting the width control until the correction signal is clearly visible.
5. Reduce the sensitivity setting until the scratch becomes visible and then increase the setting by 1 level.
6. Reduce the overshoot range until the overshoots become visible as tramlines adjacent to the scratch and then increase the overshoot correction by one level to conceal the overshoots.

Key 1**Key 1 to Key 4**

These will enable the associated key function; four separate key menus are available.

View

This enables the key view function and is used to indicate the position of the key.

Invert

This will enable the inverted key mode.

Select

For each Key, the user may select either the Dirt filter or the Tramline filter.

If Key View and Tramline View is selected the Key view overrides the tramline view.

If Key View and Dirt View is selected, the Dirt View is visible, with a chroma outline on the left and right.

Left The range of control is from 1 to 719 pixels.

Top The range of control is from 0 to 100%.

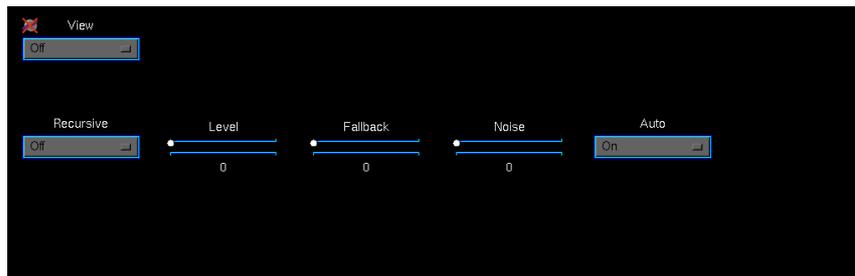
Width The range of control is from 2 to 720 pixels.

Height The range of control is from 100 to 0%.

Tramline Keys

In normal operation the key color overlay includes a soft edge to minimize the visibility of the scratch filter as it turns off an on at the key edge. The key includes the partially filtered area to indicate to the user the overall extent of the filter, which effectively extends the filtered area by 7Y pixels each side.

In the inverted mode, which is used to protect an area of the picture, the key width is deliberately modified (reduced by 7Y pixels each side) to indicate the area which is fully protected. If the key width were not reduced, then there would possibly be some damage to the periphery of the keyed area caused by the partial filtering of the soft edge.

Recur**Recursive Filter**

This function may be toggled to enable and disable the Recursive filter.

View

This control allows the user to directly view the difference between the current and previous pictures in effect the amount of noise reduction the recursive filter is currently achieving. To see the "view image" the filter must be enabled.

Level

This control changes the amount of noise reduction for both luminance and chrominance by limiting the maximum level of noise reduction, where 15 (100%) is maximum and 0 (0%) is minimum. The actual level of noise reduction is dynamically adjusted on a pixel-by-pixel basis with regard to the noise reduction setting for the same pixel in the previous frame. Other factors such as movement contribute to the current pixel setting. This mechanism ensures that the optimum level of noise reduction is applied to each pixel.

Fallback

This control adjusts the level, or strength, of spatial filtering used in the spatial/recursive blend. It does not adjust the ratio of the blend; this is done automatically to give the optimum results.

Auto

When this item is checked the threshold for the motion detector is dynamically set to an appropriate value for the current input noise level.

When unchecked the Noise function becomes available sets the threshold for the motion detector.

Noise

This control sets the threshold for the motion detector. The lowest level of 0 (0%) gives the greatest sensitivity to motion, but allows more noise to break through, while 15 (100%) gives the greatest noise reduction but can lead to excessive filtering of low-level textures. When Auto is ON the automatic threshold is adjusted dynamically and set to an appropriate value for the current input noise level.

2 Inch**2 Inch Filter**

This function may be toggled to enable and disable the 2 Inch filter.

View

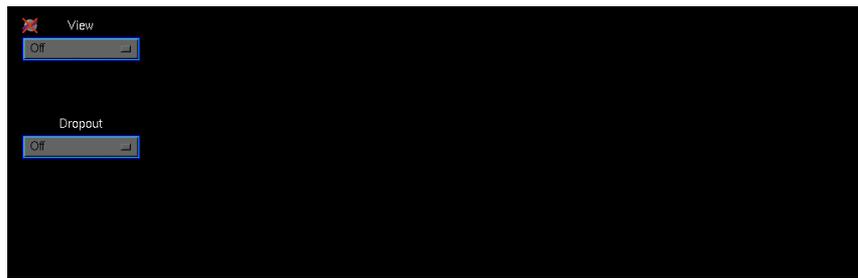
This control allows the user to optimally adjust the level setting by viewing where the scratches have been detected. To obtain the "view" image, the filter must be enabled. Where the image is heavily damaged the following controls may be used:

Repeat

This control allows the user to use a stronger filter to remove correlated scratches, adjusted by the Strength control. This mode would not normally be needed.

Repeat Lvl

This control allows the user to control the sensitivity of the filter. A low number means that the filter is not very sensitive, and may not detect many scratches. A high number means that the filter is able to detect many scratches, however there may be false alarms where periodic image detail is detected.

DropO**Dropout Filter**

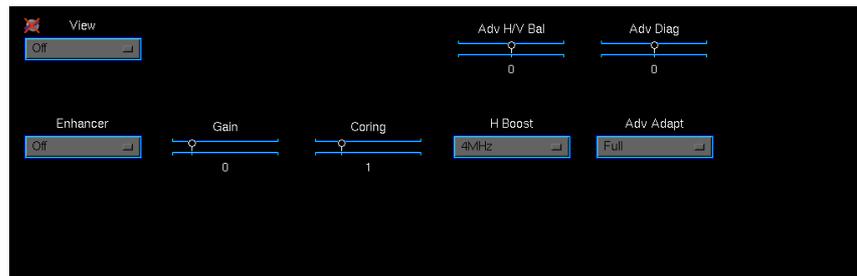
This function may be toggled to enable and disable the dropout filter.

View

This control allows the user to directly view the effectiveness of the detection/correction algorithm. The difference between the input and the corrected output is shown when view is active. Another way to consider this signal is that it represents the detected impairment that is subtracted from the input when view is turned off.

The polarity of the output signal can be either positive or negative depending on the polarity of the dropout so the output is displayed on a gray pedestal. Positive correction values will extend towards white and negative correction values will extend towards black. To obtain the "view" image, the filter must be enabled.

Enhan



Enhancer

This function may be toggled to enable and disable the enhancer.

View

This is provided to visualize the enhancer signal in isolation. To obtain the "view" image, the enhancer must be enabled.

Gain

This control defines the amount of enhancement required. A positive value provides enhancement, whereas a negative value provides de-enhancement. The higher the value, the greater the amount of enhancement. Too high a value is likely to result in unwanted artifacts.

Coring

The purpose of the Coring control is to reduce or prevent the enhancement of noise in the picture.

The noisier the material, the higher the coring level.

H Boost

This control defines from which horizontal frequency the horizontal enhancement applies.

Adv H/V bal

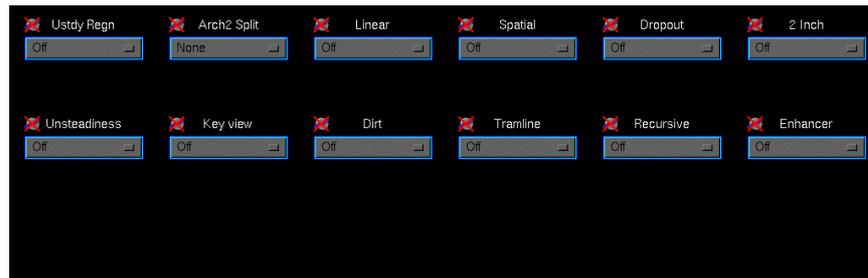
This control determines the horizontal and vertical enhancement ratio. A positive value provides more enhancement in the horizontal than in the vertical, whereas a negative value provides more enhancement in the vertical than in the horizontal.

Adv Diag

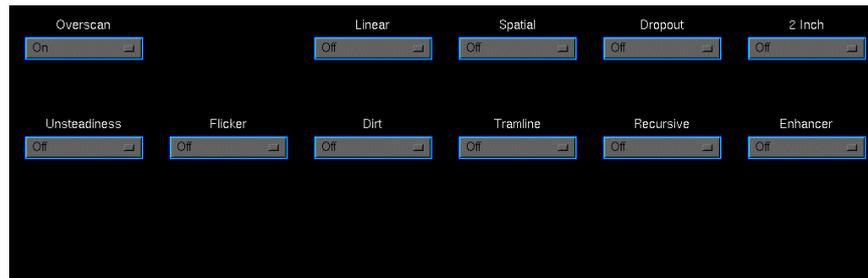
This control determines diagonal enhancement. A null value provides as much enhancement in the diagonal as in the horizontal and vertical. A positive value provides more enhancement in the diagonal, and a negative value provides less enhancement in the diagonal than in the horizontal and vertical direction.

Adv Adapt

This control allows the user to control bright and dark adaptation. Enhancement is often not desired in the very bright and very dark areas of the pictures since it would result in unwanted artifacts. In order to lower the level of enhancement according to the brightness and darkness of the picture, three level of adjustment are provided: OFF, MID, FULL.

Views**Views**

This page allows quick access to the view functions and demo facilities for the Archangel system. The controls on this page are a duplicate of the controls from previous pages and are grouped in one place for ease of use.

Quick**Quick**

This page allows fast access to the major filter enable controls for the Archangel system. The controls on this page are a duplicate of the controls from previous pages and are grouped in one place for ease of use. This grouping allows operators to see at a glance which filters are active; fine tuning of the filters can be achieved by moving to the relevant page for the desired filter.

System Overview – Archangel One

Archangel One Ph.C is a fully digital image stabilizer and flicker corrector.

Archangel One performs a 4-stage process for removing image instabilities.

1. **Phase Correlation**
2. **Analyses of vectors to give camera/film motion, film/video detection and film phase.**
3. **Identification of unsteadiness**
4. **Unsteadiness correction.**

1. Phase Correlation. (Ph.C)

The first stage of the Archangel One process is to measure the movement within the entire image using Phase Correlation (Ph.C).

Phase Correlation is the most advanced motion estimation technique available. It operates on a unique and powerfully effective principle.

Using an advanced mathematical technique based on Fourier transforms, Ph.C converts the picture from its usual spatial domain into the frequency domain. Once in the frequency domain, the phase component of the signal can be extracted.

The phase difference between successive images is calculated where the difference represents motion. The result is the identification of the motion of every individual object within the picture to an accuracy of 1/32 of a pixel and 1/32 of a picture line.

This level of performance can only be achieved in real time in a compact package by using Snell & Wilcox's custom ASICs.

In addition to its accuracy, Phase Correlation has a number of unique benefits that make it the most powerful and advanced motion estimation technique for real time processing of television pictures. Phase Correlation is for example immune to the effects of luminance variation, such as objects moving into shadow or luminance flicker commonly found on old film. It also has high noise immunity. This allows Archangel One to stabilize even very noisy or dirty archive material.

Phase Correlation technology has been used for many years in Snell & Wilcox's Alchemist Ph.C, the industry standard motion compensated standards converter specified by top program makers around the world.

More information on Phase Correlation can be found in the Snell & Wilcox publication "An Engineers Guide to Motion Compensation" which can be found on the Snell & Wilcox web site (<http://www.snellwilcox.com>).

2. Analysis of vectors to give camera/film motion, film/video detection and film phase

The very high quality motion vector information generated by the Phase Correlation Engine, is statistically analyzed to find the camera motion.

Advanced statistical techniques identify and categorize each of the reported moving objects within the picture. This information is used to identify the movement of the image to an accuracy of 1/32 of a pixel.

The analysis of the motion vector information also allows us to accurately detect shot changes or cuts in edited material as well as identifying film and video based material, and where appropriate, film phase.

Occasionally, when using the default settings, the system will be unable to determine the camera motion, and in this case, the camera is assumed to be static. This may occur if there is more than one significant moving object within the picture or if there is a lot of perspective. The user can adjust many parameters, for example, 'select area', 'effort', or 'field depth' to improve performance on these more difficult scenes if they are of critical importance.

3. Identification of unsteadiness

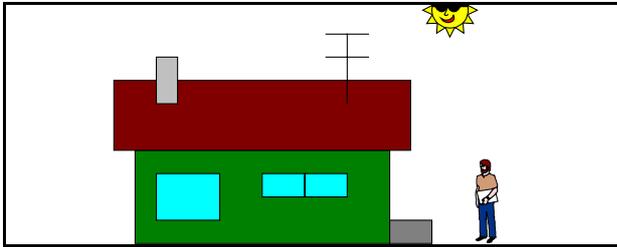
We analyze the detected camera or film motion over a period of time, to identify whether the motion is wanted, in the case of a zoom, pan or tilt, or unwanted as in camera shake, film weave or hop or processing faults.

This allows us to calculate an unsteadiness correction vector, with both horizontal and vertical components, to sub-pixel accuracy.

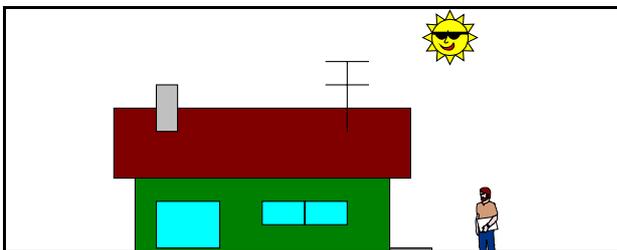
The user may override the automatic pan detection and frequency response of the unit from the default settings, to gain a higher performance.

4. Unsteadiness Correction

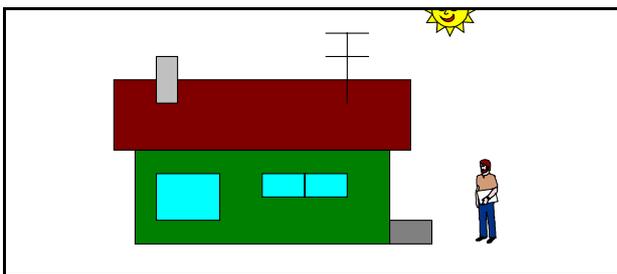
The unsteadiness correction vector is used to remove the unsteadiness from the picture. It does this by pulling the image in the opposite direction to the detected unsteadiness, and bringing the image back to the right place.



Field 1



Field 2 With Upward Camera Motion



Repositioned Field 2

Obviously, if we move the image up four lines to compensate for the unsteadiness, we will find that the bottom four lines of the corrected image are going to be blank.

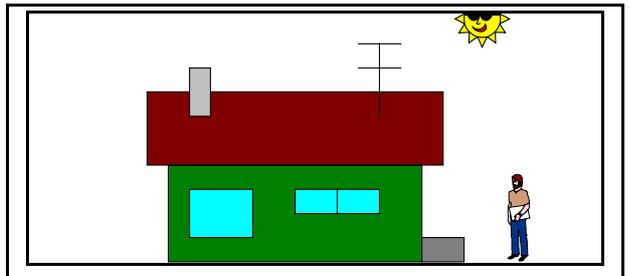
Normally this is unacceptable, so the image is overscanned to allow us to move the image around in space without introducing blanking on the sides. The overscan may be turned off if desired.

In order to move and overscan the image, we use a very high quality globally motion compensated temporal-spatial interpolation using propriety Snell & Wilcox apertures for the best possible picture quality even on shaky video material.

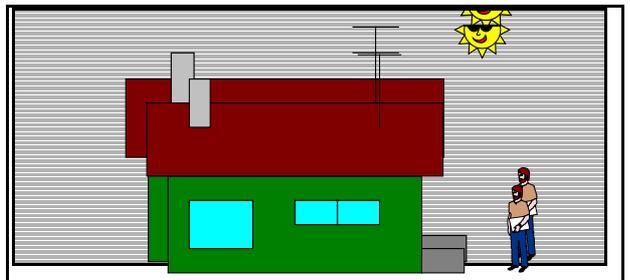
The algorithm is designed so that the blanking can never enter the picture.

If the unsteadiness in the picture is larger than the movement range allowed by the overscan setting, then the unsteadiness will not entirely be removed.

Archangel One has been designed to allow the user to select very accurately how much overscan they are prepared to accept. The larger the selected overscan, the more unsteadiness that can be removed. This will be dependent on the artifact. An overscan as small as 1/2% may be enough to compensate for telecine or printing errors on a relatively modern print, whilst extreme camera shake may call for an overscan of 30% or more. The overscan ranges are fully adjustable.

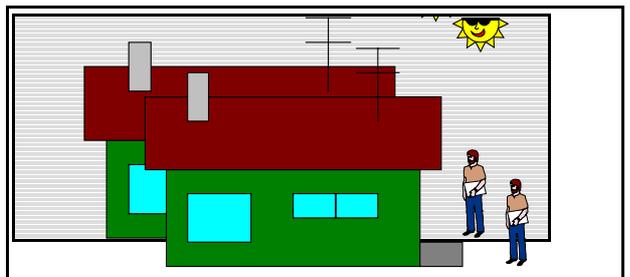


Normal



Low amount of Shake

Requires a small amount of overscan to accommodate correction



Large amount of Shake

Requires a larger amount of overscan to accommodate correction

Other features:

In addition to the unsteadiness correction process, Archangel One also features a luminance flicker reducer, frame synchronizer, test pattern generator, and fully 10 bit digital proc-amp, color correction and edge enhancement utilities.

System Overview – Archangel Two

Archangel Two Ph.C is a fully digital restoration system.

Archangel Two has a number of tools to repair a wide variety of artifacts and impairments.

Recursive Filter

Recursive filters reduce noise by temporally averaging successive pictures. Utilizing a delay of exactly one picture or frame, noise can be reduced in stationary areas without loss of spatial (horizontal and vertical) resolution.

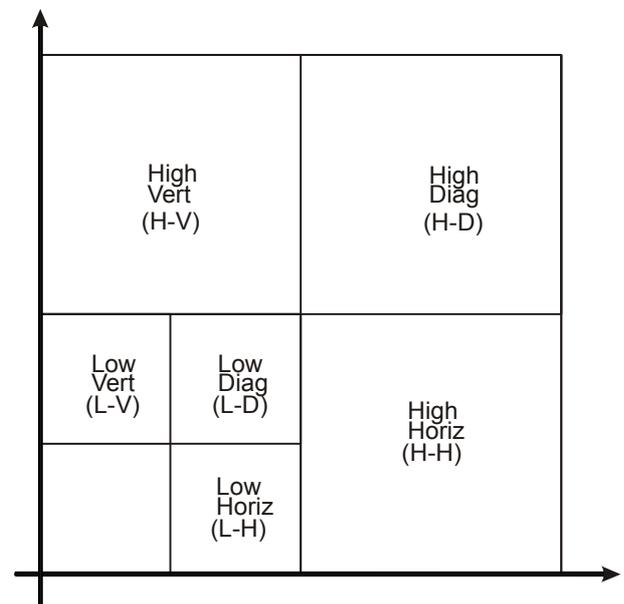
Until now, areas of movement in the picture have resulted in the recursive filter adapting its noise reduction level using sophisticated control logic in order to ensure that picture detail is preserved, and artifacts are avoided. However, by building on this existing control logic and introducing PhC motion compensation, areas of movement can now be temporally noise reduced just as effectively as stationary areas. This is the difference between motion adaptive, and motion compensated noise reduction, and is one of the reasons why this recursive filter gives such impressive results.

Another feature unique to this recursive filter is its sophisticated spatial fallback option. Previously, spatial filtering has been cascaded with recursive filtering such that the spatially filtered video is used as the input to the recursive filter. Now, for the first time, the recursively-filtered picture is blended with a spatially filtered picture. This technique allows a higher level of noise reduction when the recursive is unable to perform optimally, for example after a scene change as the recursive filter builds up to an optimum level after a few fields. In this case, the spatially filtered video takes precedence, and over a few fields the spatial contribution decreases as the recursive contribution increases. This blending function is controlled by complex logic to allow a seamless transition, thus resulting in a uniform level of noise reduction across the entire picture.

Moreover, a complex noise-floor measurement algorithm is introduced to allow automated adjustment of the threshold control to a level that is just above the noise floor. This allows optimum noise reduction over any noisy source material.

Spatial Filter

The spatial filter is a wavelet based spatial decomposition filter. The image is decomposed to form 6 bands of different horizontal and vertical resolutions. Each band may be filtered at a different level; this allows the filter to effectively target impairments with specific spatial characteristics such as cross-color, whilst leaving other picture detail unaltered. The different bands of the filter can be seen in the diagram below



Linear Filter

A suite of linear filters allows fine control of the horizontal bandwidth of the luminance signal.

Brickwall low-pass filters ranging from 2.5MHz to 4.2MHz provide good band-limiting facilities for MPEG encoders that use half resolution processing. These filters also provide variable peaking or boosting at each of the selected cut-off frequencies. The overall perception of picture sharpness can be raised by boosting prior to brickwall filtering.

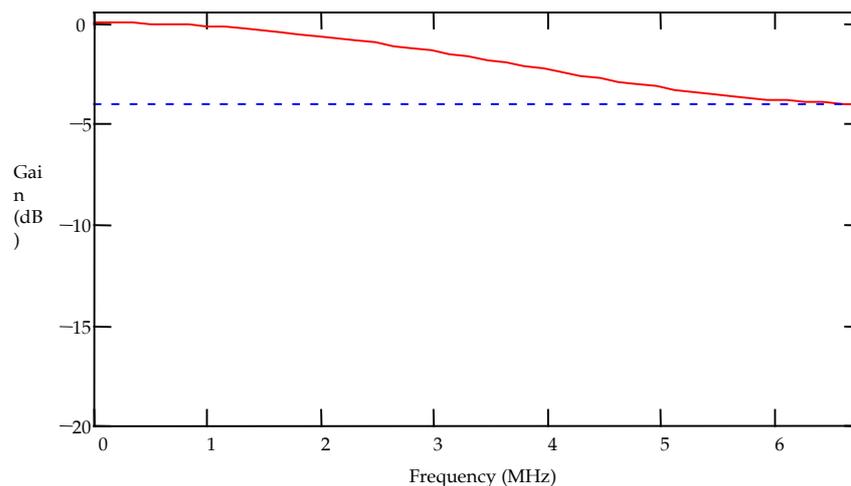
The ten sets of Gaussian low-pass filters gently attenuate high frequencies and can be used to correct material which has previously been boosted or enhanced as well as reducing high frequency noise.

Similarly, five sets of Gaussian high-pass filters provide variable correction of high-frequency luminance that may have been attenuated from faulty distribution links or analogue VTR processes.

Gaussian Low Pass

The low-pass filter mode is employed to noise reduce with less severity than the brickwall filter and/or to compensate for any irregularities in the luminance signal such as inherent high frequency gain.

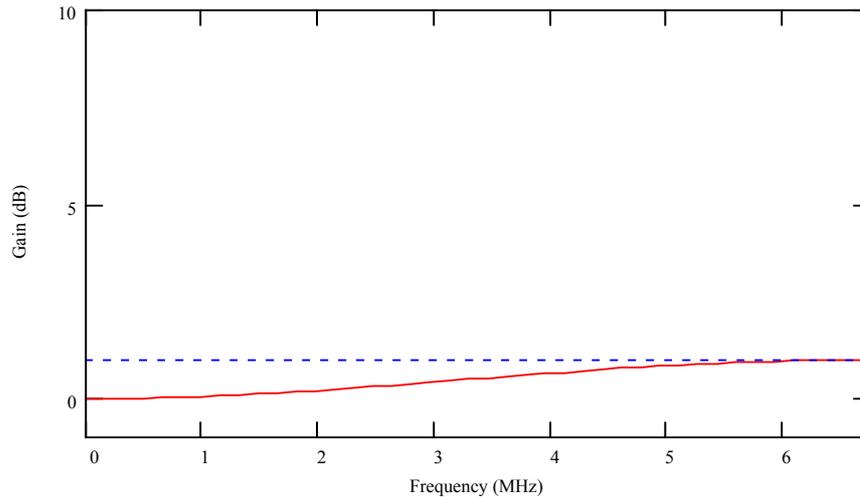
This mode has 10 user selectable levels at 6.75 MHz ranging from -4dB to -40dB in -4dB steps.



Gaussian Low Pass Filter with -4dB Gain

Gaussian High Pass

The *high-pass* filter mode is employed to compensate for high frequency attenuation in the luminance spectrum. This high frequency attenuation may be mainly caused by stray capacitance inherent throughout the cables of an installation. This mode has 5 user selectable levels at 6.75 MHz: 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.



Gaussian High Pass Filter with 1 dB Gain

Brickwall Low Pass

The *brickwall low-pass* filter mode is employed to reduce noise resident in the high frequency region of the luminance spectrum.

This mode has 18 user selectable cut-off frequencies (specified at -6 dB) ranging from 4.2 MHz down to 2.5 MHz in 0.1 MHz steps. The stop-band performance is -34 dB or better with no boost.

In addition to the selectable cut-off frequencies the user can also select a given boost at each cut-off: 0 dB (no boost), 1 dB, 2 dB, 3 dB, 4.5 dB, 6 dB.

There are a further 6 Extra Low Pass filters with cutoffs from 2.44MHz to 0.92MHz, the boost at the cut off frequency is not available for these filters.

The boost value selected is the amount of gain applied to the filter response at the chosen cut-off frequency. The selectable boost facility is incorporated to allow the user to increase the perception of sharpness in the picture by boosting the contrast. The sharpness of a picture can sometimes be significantly reduced by filtering the high luminance frequencies so the inclusion of the extra boost helps to restore some of the sharpness to the picture. A boost of 6 dB will result in the cut-off frequency being increased by up to 0.4 MHz. The actual amount of boost selected will be a trade-off between cut-off and picture sharpness.

Dirt

Dirt is a very common form of impairment in both old and new film and can have a wide diversity of characteristics. The keys can be used to restrict this filter to a user-defined area of the picture.

Tramline

Tramline scratches are very common in both old and new film and can have a wide diversity of characteristics depending on the history of the film. They are predominantly caused when a particle has become lodged in the gate mechanism in the telecine and scratches the outer layers of the film as it passes through the gate. The resulting damage appears as a vertical line on each of the damaged film frames and is roughly in the same horizontal position from one frame to the next. The extent of the damage is extremely variable since it depends on the nature of the particle causing the damage and the dynamics of the telecine.

To overcome this problem, telecine manufacturers developed a wet-gate process that utilizes a chemical substitute to fill-in the damaged surface of the film. Whilst this can be effective for small scratches, it has limitations for larger scratches and it is not an environmentally friendly process. Moreover, it conflicts with the objectives of archive preservers whose goal is to ensure the preservation of valuable archives without risking further damage by subjecting the film to a chemical process.

Archangel Two deals with scratches electronically, after the archives have been preserved onto a stable digital format.

Electronic detection of scratches requires a sophisticated algorithm because normal picture detail can appear to have the same characteristics as a scratch. Archangel Two utilizes a wide range of criteria to distinguish the scratch from normal picture detail. Information such as scratch width and color, as well as length and intensity are used to discern between real picture detail and scratches.

Dropout

Video dropout can occur as a consequence of poor signal to noise ratio in an FM transmission link. The effect is seen as white or black dropouts which can last for many pixels and may have a leading and trailing edge. The frequency of the impairment is variable depending on the quality of the signal but in extreme cases the picture can be severely affected by the dropouts.

Archangel Two utilizes a multilayer median filter to remove the dropout. It operates by rank filtering pixels from an odd number of aperture points yielding the median value.

When a pixel is judged to be in error it is replaced by the median value of the aperture and pixels judged not to be in error remain unaltered. The algorithm is very selective and will only repair pixels that match the specific profile of video dropouts. In fact, it is so selective that care must be taken to ensure that dropouts are concealed prior to unsteadiness correction. Otherwise overscanning the input (to allow correction of an unsteady source) would modify the dropout characteristics sufficiently to render the algorithm ineffective.

2 Inch

This filter is designed to remove the horizontal scratches caused by damage to two-inch tape. The filter works by looking for the periodic characteristics of this defect to differentiate between the scratch and picture detail. This type of defect can also affect the pedestal level of the picture.

Enhancer

Enhancement is concerned with the sharpening of certain features such as edges and textures and is employed to improve the visual appearance of the pictures. The Archangel Two features an advanced linear luma enhancer.

Key

Archangel Two provides up to four user-definable rectangular keys that can be used to restrict the range of detection and concealment of the Dirt and Tramline filters. The keys are prioritized to allow overlapping and more complex shapes if necessary and are directly accessible from the front panel.

APPENDIX: Archangel Synergy Troubleshooting Guide**Introduction**

This is intended as an aid to troubleshooting control problems between Archangel and Synergy. Before you start make sure that the system is set up correctly, all signals are connected correctly and all hardware has powered up correctly.

This guide is split into three parts.

Section 1 - simple trouble shooting guide.

Section 2 – basic things to test and check

Section 3 – advanced things to check

Section 1 – Troubleshooting**1.1 Can't control Archangel 1 and Archangel 2**

- 2.1 Syncs
- 2.8 TDLAN
- 2.6 RS422
- 2.7 Device Port Status
- 3.1 Verify that the Archangel device port is working properly
- 3.2 Checking the Archangel Cable

1.2 Can't Control Archangel 1

- 2.2 Archangel 1
- 2.4 Archangel Protocol
- 3.4 Test packets are being received and decoded correctly on Archangel 1.

1.3 Can't Control Archangel 2

- 2.3 Archangel 2
- 2.4 Archangel Protocol
- 2.5 IQ1U
- 3.3 Ensure Realtime packets are getting from RS422 to RollNet to Archangel 2.
- 3.5 Test packets are being received and decoded correctly on Archangel 2.

Section 2 - Basics

2.1 Syncs.

Check that syncs are connected to all device ports, the source and destination VTR and both Archangel units.

Check that the syncs are connected to the correct inputs on all device ports 'Bi-Sync'.

Check that Synergy is set to the correct sync frequency.

Check that Genlock is enabled on both Archangel units and both are locked to the external reference (this will be reported on the front panel of each unit)

2.2 Archangel 1

'Realtim' must be enabled on the utils menu

2.3 Archangel 2

The RollCall address must be set to **2A** hex

2.4 Archangel Protocol

Check this is set to V2 or V3 depending on what level of software the Archangel is fitted with.

Archangel protocol	Archangel both v2	Archangel v3
Archangel 1	OPI 7,8	OPI 9 onwards
Archangel 2	NRS 2.03	NRS 3.00 onwards

The Synergy system allows for different version of the Archangel real-time control protocol to be used. The protocol is selected from the 'System Configuration' menu section of the Synergy GUI. Select the device port controlling the Archangel and then check/select the protocol from the device pulldown button.

2.5 IQ1U.

The toggle switch to the left of the Power Switch (front left of IQ1U) should be down (RS422 comms, NOT RS485).

The following items should be set for the module
 Port – 38400
 System - blind ctrl

2.6 RS422

Check that the RS422 cables are connected to the 'serial main' connector on the device port, the middle part is connected to the IQ1U and right end is connected to Archangel 1.

2.7 Device Port Status

This can be checked from the Synergy PC GUI, by clicking on the, SYNC button (top right area of screen). This will indicate that the device ports have booted. If there is a sync error this will flash red. During boot up this button will indicate that the device ports are booting.

When booting the display on the device port will indicate that it is booting or uploading.

Check that the front panel of each device port when booted indicates "Archangel, Press square for menu "or" timecode, press square for menu"

On the top right hand corner of the display on the device port at character (Tdlogo) flashes when data is received.

2.8 TDLAN

Check that the hub connection to the device port is in the 'TDLAN' socket

The device ports must be connected to the TDLAN. Check that the LEDs on the device port RJ45 are: -

- One green led indicates contact with the hub
- One amber led indicates when data is received

2.9 Snapshots

Make sure a composite input of the correct standard is present at the input to the Linux PC and that capture snapshots is enabled.

2.10 Device Ports

Ensure that each device port is correctly connected to the appropriate device. The order in which the device ports are listed in the "system\configure" menu of the Synergy GUI defines the order of the devices in the processing chain, and this affects the timing of commands to the devices.

The Archangel system has three device ports, the first device at the top of the list is the source VTR.

The second device in the middle of the list is for the Archangel. The third and last device in the list is for the record VTR. If there are more devices in the list then you may have additional device ports. Please contact Snell & Wilcox or Tangent Devices if you require any advice on configuring your system.

Section 3 – Advanced Tests

3.1 Verify that the Archangel device port is working properly.

3.2 Checking the Archangel Cable

3.3 Ensure Realtime packets are getting from RS422 to RollNet to Archangel 2.

3.4 Test packets are being received and decoded correctly on Archangel 1.

3.5 Test packets are being received and decoded correctly on Archangel 2.

Note: Additional software maybe required for tests 3.3, 3.4 and 3.5. Please seek guidance from Snell & Wilcox personnel before proceeding.

3.1 Verify that the Archangel device port is working properly.

We know that we can control a VTR using one of the other device ports.

We can use the test the Archangel device port by controlling a VTR.

Disconnect the Archangel RS422 lead from the Archangel device port.

Disconnect the RS422 lead from one of the other device ports and connect it to the Archangel device port.

In the Synergy GUI go to the system\configure menu and configure the Archangel device port to be a VTR. The software will need to be restarted.

See if the VTR can be controlled.

See if the VTR timecode is displayed on the front panel

If the VTR can be controlled the Archangel device port is OK

If the VTR can't be controlled the device port may be faulty, BUT double check that the above instructions have been followed correctly.

3.2 Checking the Archangel Cable

Part of this can be checked by using it to control a VTR. Simply connect the end which normally gets connected to a device port to a device port controlling a VTR, and connect the middle connector to a VTR (the end which is normally connected to Archangel 1 should be left to dangle). You should still be able to control the VTR.

3.3 Ensure Realtime packets are getting from RS422 to RollNet to Archangel 2.

This requires the RollCall PC software.

This test needs a PC running the Rollcall software using a RollNet (ISA or PCMCIA) card.

- Start the RollCall software.
- Change the address of the RollNet card to **2A** in the **Commctrl** program.
- Shutdown the RollCall software to implement this change.
- Connect the Shoebox's Rollnet BNC to the RollNet card in the PC, not forgetting the two 75ohm terminations.
- Restart the RollCall software on the PC, and open the Commctrl window (This is minimized by default).
- Click on **Trace ->Receive** from the pulldown menus
- Click on **Enable Receive**
- Click on **Packet Type ->Select all**
- Click on **Packet Data ->Clear all**
- Close the **Receive Trace Filter Settings** window

You should now see **I_AM** packets being listed in Commctrl's window, sent every few seconds from the shoebox to the PC.

Using your control system (Tangent Synergy/Pandora Pogle) adjust any parameter on the Archangel system and you should see the packet details logged in Commctrl's window. These will be of type **SP_REALTIME**.

This proves the packet sent by the controller is a valid RollCall packet and that it's header identifies its payload as SP_REALTIME data.

To stop this debug being printed

- Click on **Trace ->Receive** from the pulldown menus
- Click on **Disable Receive**

3.4 Test packets are being received and decoded correctly on Archangel 1.

This requires the PCPanel software.

If your PC is a Laptop I suggest you run it from the Mains as some laptops shutdown most of the handshake lines on there serial interfaces to save power when in battery mode.

On Archangel 1, connect a COM2 of a PC running PCPanel to the 10 way IDC socket on the extreme left of the OPI card (the bottom one) of Archangel 1. The cable for this is a one-to-one male 9 way D to female 10 Way IDC cable.

Run up the PCPanel software

- Click on the 38k icon to set the baud rate press return a few times, and you should get a prompt like this: " OPI: "

- Type the command **verbose** and press return.

Immediately you should see debug info printed on the screen detailing the intrabox comms.

When you send Realtime packets you should also see a hexdump of the received packet and a packet length figure.

If you always see messages complaining about the packet length being incorrect, the version of software on the Realtime controller is most probably out of sync with the software on Archangel 1. If these messages are only occasional then it maybe just a communications (noise/hardware) problem.

Box 1 will clear the debug mode when its power is cycled.

3.5 Test packets are being received and decoded correctly on Archangel 2.

This requires the PCPanel software, and an RS232/RS422 adapter.

Plug the RS232 end of the adapter into COM1 of the PC and the other end, via a male-male 9 way D cable to the socket on the back of Archangel 2.

Run up the PCPanel software

- Click on the 57k icon to set the baud rate press return a few times, and you should get a prompt like this: "NRS->A: flash\$ "

- Now type **verbose +rt** and press return.

You should see no debug at first, however when you adjust a something on the Realtime controller you should see details of the timing of the dispatch of the realtime packet. If there are error messages about the packet version of length being incorrect then the controller probably has an incompatible software release for use with Archangel 2.

Any messages about *Realtime overrun* should be ignored as these are produced as a byproduct of the debug being enabled.

A more complete info of the packet received including a hexdump of the packet may be generated using the **verbose +setparam** command - this is bound to produce *Realtime overrun* errors - which should again be ignored.