KudosPro Application Note # 9

Recommended Modules for KudosPro-IQ units

Introduction

KudosPro is available in a form that is customizable with IQ Modular solutions. These products are called KudosPro-IQ and have a different physical chassis to standard KudosPro units. Product names are MC2000-IQ, MC1000-IQ, LC4000-IQ, LC2000-IQ, SV4000-IQ and SV2000-IQ. The CVBS option is not available in KudosPro-IQ products.

The purpose of this document is to describe suitable IQ Modules that would enhance the features of the KudosPro product into which they are installed. However, it should be considered that any single width, or double width IQ Module may be installed into the KudosPro frame and used as a stand-alone product.

The IQ Modular variant of the KudosPro includes two single-width IQ Modular slots that are accessed via the rear panel. Alternatively, a double-width module may be installed in the lower slot. Note that a double-width IQ Module will physically take up both slots, so in this instance only that double-width IQ Module can be installed.

Connectivity between the KudosPro interface and the IQ Module must be achieved via external connection.

The installed IQ modules can be controlled and monitored by RollCall in the same way as KudosPro, however control of the modules from the KudosPro front panel is not available.

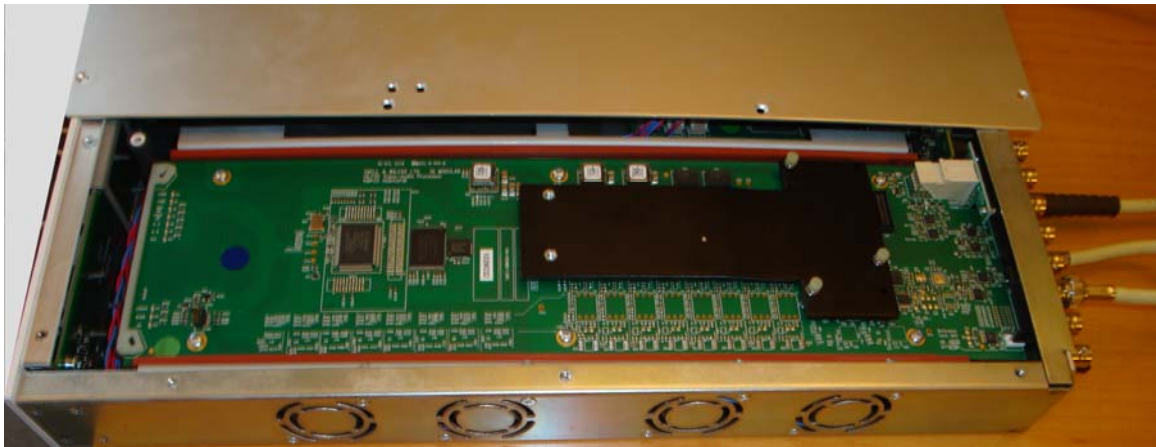There is no IQ Modular variant available for the KudosPro MC500.

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Distribution

IQSDA30 - Dual Channel 3G/HD/SD-SDI Re-clocking Distribution Amplifier

The IQSDA30 provides dual inputs with 3 outputs per input for distribution of HD-SDI 3 Gbit/s, 1.5 Gbit/s or 270 Mbit/s SD-SDI signals in a single width package. Its 80m 3G, 180m HD input equalization performance and non re-clocking distribution of wideband signals make it ideal for all distribution applications.

KudosPro Application: The IQSDA30 may be integrated into any multi-channel KudosPro model. The application of this model allows two KudosPro SDI outputs to each be multiplied to three outputs.
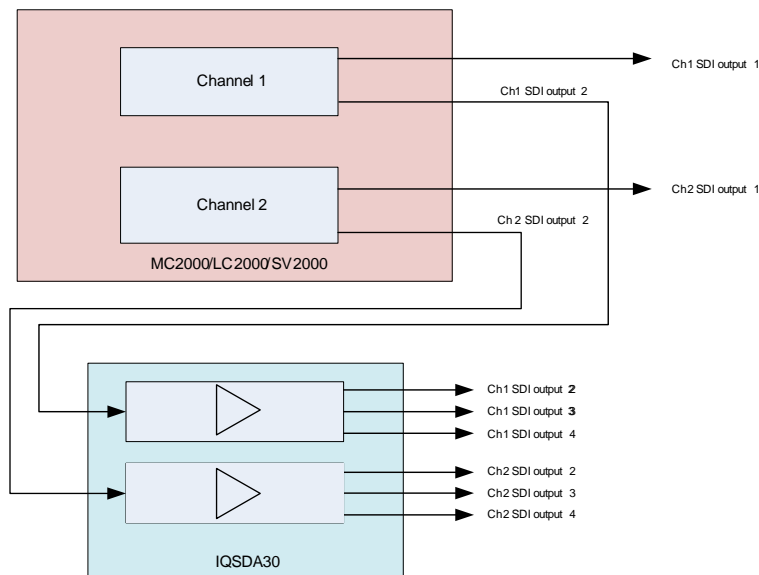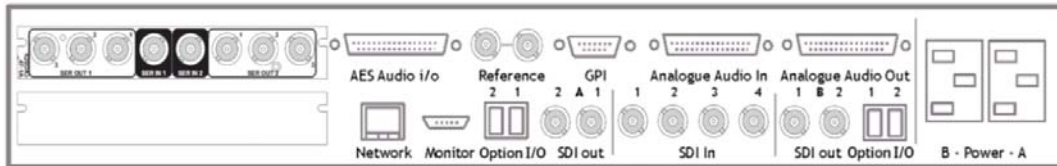

Figure 1: A two channel KudosPro model with IQSDA30 installed

The IQSDA30 is a single width module. Useful for the 4 channel KudosPro models. Up to two modules maybe installed into the KudosPro chassis.
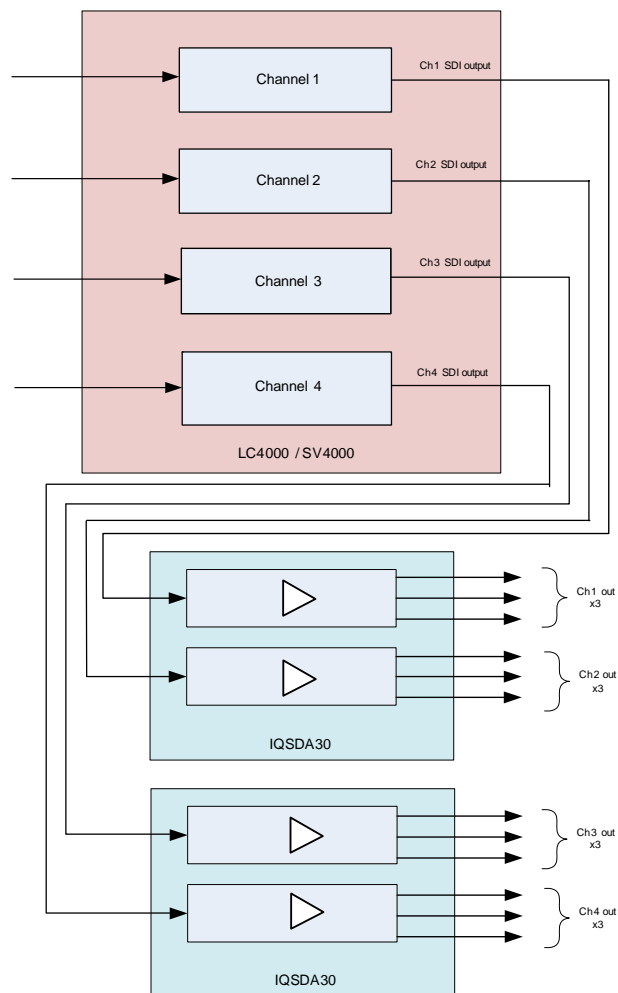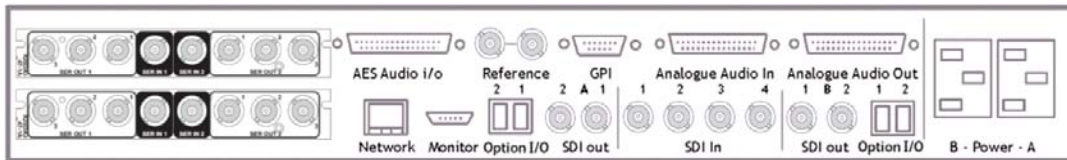

Figure 2: A four channel KudosPro model with two IQSDA30 modules installed

IQSDA32 - 3G/HD/SD-SDI Re-clocking Distribution Amplifier with RollCall

The IQSDA32 is a distribution amplifier for HD-SDI 3 Gbit/s, 1.5 Gbit/s or 270 Mbit/s SD-SDI signals providing 7 equalized and re-clocked outputs of the input in a single width package. Its 80m 3G, 180m HD input equalization performance and non re-clocking distribution of wide-band signals make it ideal for all distribution applications.

KudosPro Application: The IQSDA32 may be integrated into any KudosPro IQ model. The application of this model allows each single KudosPro SDI output be multiplied to seven outputs. Being a single-width module, up to two modules may be installed in a KudosPro chassis, allowing that any two SDI outputs to be separately distributed to seven outputs.
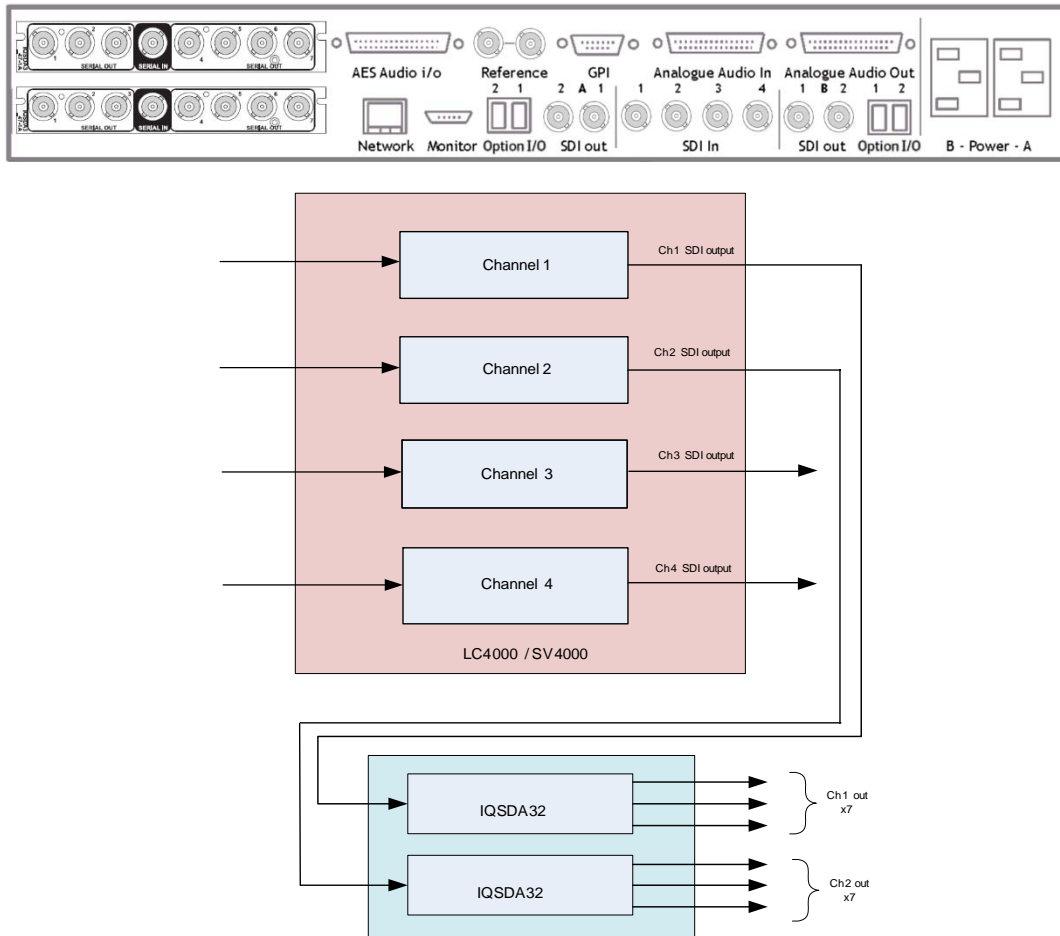
Figure 3: A four channel KudosPro model with two IQSDA32 modules installed.

IQSDA34 - Triple Channel 3G/HD/SD-SDI Re-clocking Distribution Amplifier with RollCall

The IQSDA34 provides three inputs with 4 outputs per input for distribution of 1080p 3 Gbit/s SDI, HD-SDI 1.5 Gbit/s or 270Mbit/s SD-SDI signals in a double width package. Its 70m 3G, 140m HD-SDI input equalization performance and non re-clocking distribution of wide-band signals makes it ideal for all current distribution applications.

KudosPro Application: The IQSDA34 is suited to be integrated into any 4 channel KudosPro model. The application of this model allows three of the four KudosPro SDI outputs to each be multiplied to four outputs.

The IQSDA34 is only available as a double width module. Only one IQSDA34 can be installed in a KudosPro Chassis.
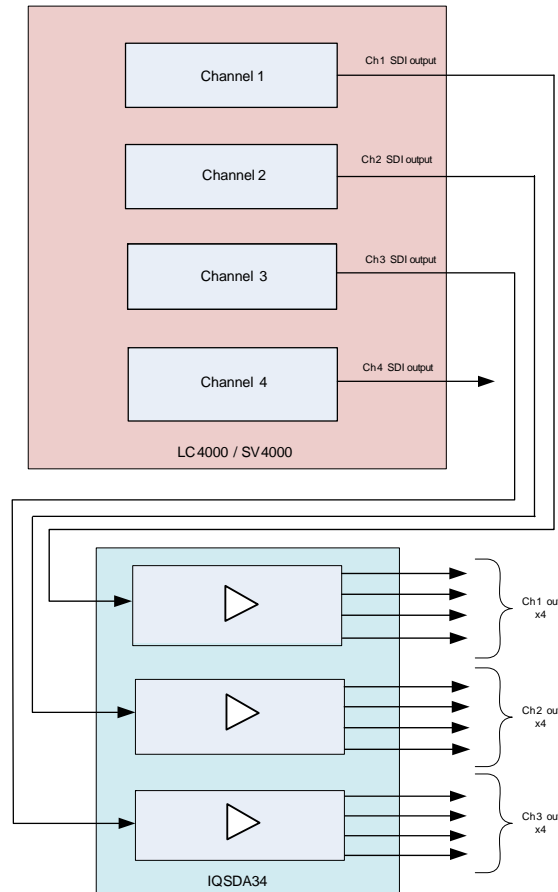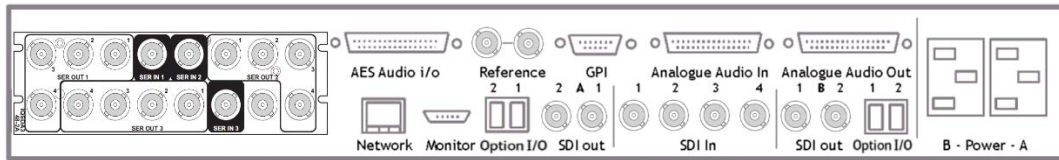

Figure 4: A four channel KudosPro model with an IQSDA34 module installed.

High Quality Composite Decoding

IQDEC04 - Golden Gate Decoder, Synchronizer with Noise Reduction

The IQDEC04 provides 12 bit composite decoding, synchronization and noise reduction in one compact module. Advanced 3-D decoding algorithms are what make the IQDEC04 so powerful for these applications. Employing updated patented Golden Gate technology they will extract more original information from the analog picture source than other decoders. This makes the IQDEC04 an ideal choice for the transition from analog to digital or, when paired with an up-converter, from analog to HD.

The IQDEC04 handles most composite analog signal formats including PAL, NTSC and SECAM. The full frame synchronizer with horizontal and vertical phasing controls allows the output to be timed to your house or studio reference. Proc. amp controls and a powerful built-in noise reducer complete the specification. Noise reduction is targeted at preserving the original content while eliminating the objectionable artifacts of analog working, and the algorithms are tuned to ensure optimum quality and lowest bit rates if the signal is subsequently compressed.

KudosPro Application: The IQDEC04 is a single width module. Up to two modules may be installed into any KudosPro chassis, so adding Broadcast Quality decoding for up to two Composite or YC inputs.
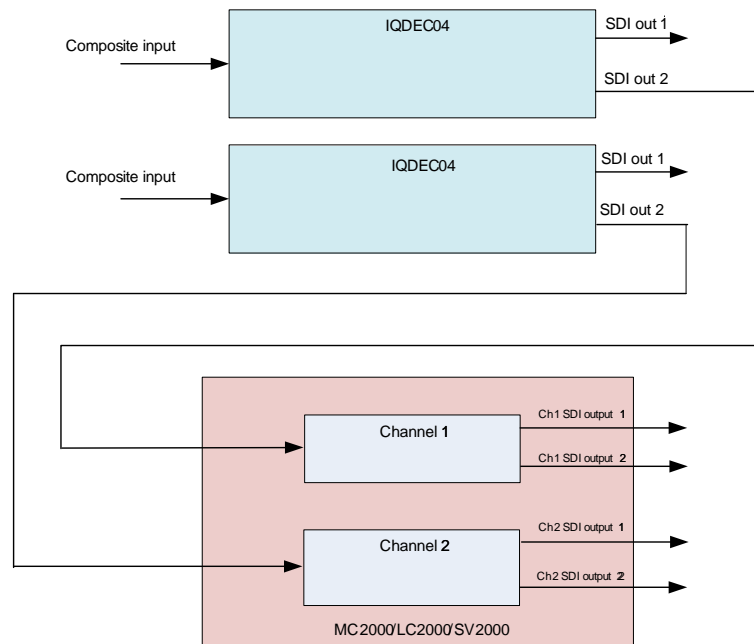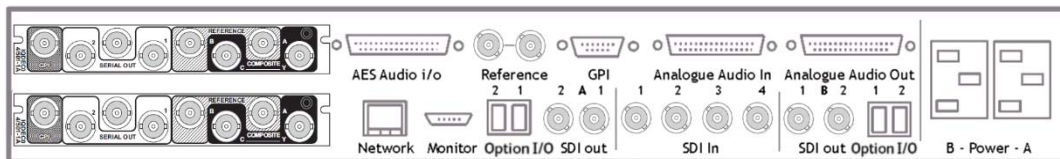

Figure 5: A two channel KudosPro with two IQDEC04 modules installed.

Composite Encoding

IQDMSES - Multi-standard Encoder with Synchronizer

The IQDMSES provides full broadcast quality serial 4:2:2 to composite analog encoding. Full Genlock and gamut limiter come as standard. A 12-bit over-sampled DAC ensures highest quality reconstruction. KudosPro Application: The IQDMSES module is available in both single-width and double-width variants. Up to two, single-width variant modules, or a single double-width variant may be installed into any KudosPro model.

In single-width form, any KudosPro SDI output may be distributed up to 3 composite outputs.

In double-width form, any KudosPro SDI output may be distributed up to 5 composite outputs.

The introduction of the IQDMSES adds the capability of full Genlocking, including subcarrier locking. This Genlock feature is totally independent of the Genlock feature offered by the main KudosPro unit. This Genlock feature extends to the re-clocked SDI output and effectively adds the ability of the product to properly Genlock two differing frame-rate outputs.
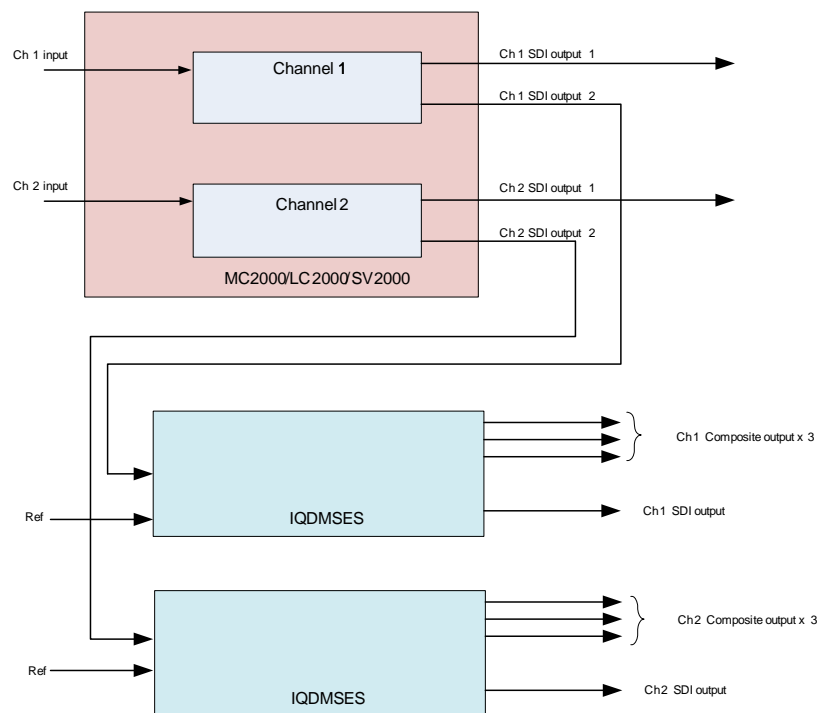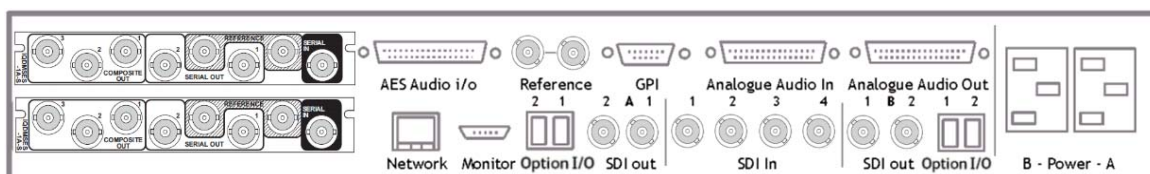
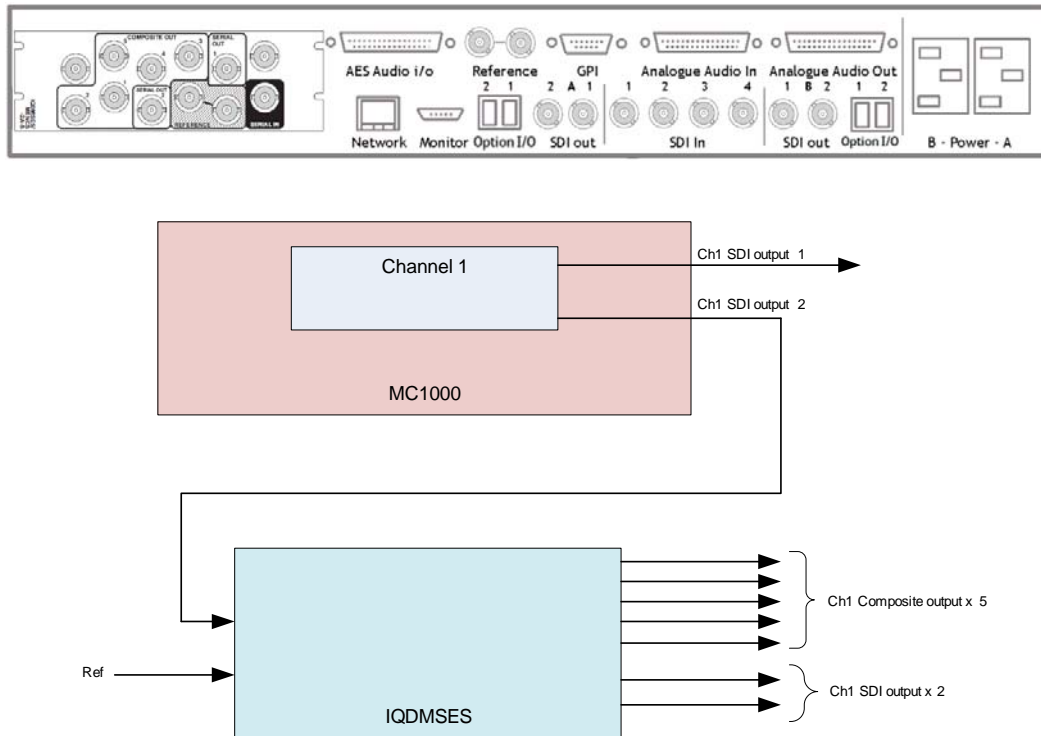**Figure 6: A two channel KudosPro with two IQDMSES modules installed**

Figure 7: A single channel KudosPro with a double-width IQDMSES installed

Insertion

IQLOG00 - HD/SD-SDI Logo Inserter

The IQLOG00 provides logo insertion for HD-SDI 1.5 Gbit/s or SD-SDI 270 Mbit/s signals. The unit is capable of adding up to 2 x HD or 4 x SD static 10-bit color logos into the SDI stream at any point within 4:2:2 boundaries of the active picture. Up to 2.6M pixels of logo storage is available. Logo control is via RollCall template, GPI or RollTrack triggers, and logos can be efficiently downloaded over the RollCall network via a PC application and stored in non-volatile memory. The module also doubles as a 1 in, to 4 out, distribution amplifier.

KudosPro Application: The IQLOG00 is a single width module. Up to two modules may be installed into any KudosPro chassis, so adding the ability to insert independent Logos into any two SDI outputs.
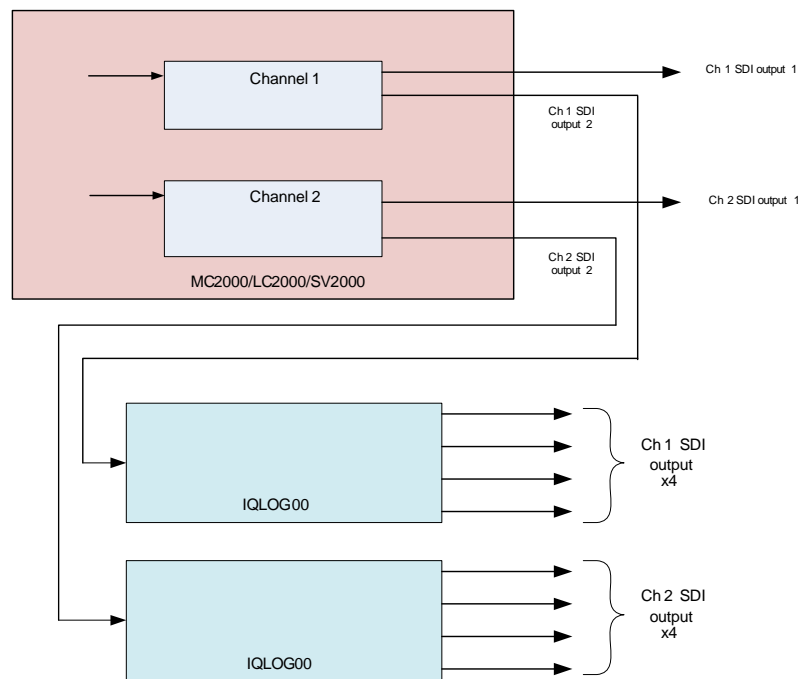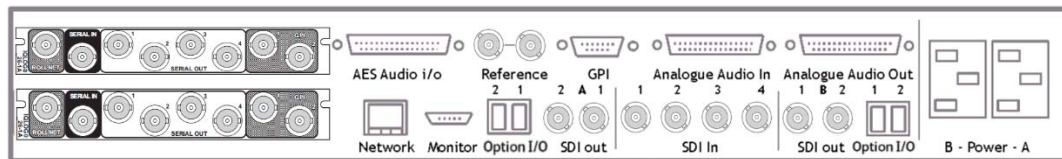

Figure 8: A two channel KudosPro with two IQLOG00 modules installed

Note: The IQLOG00 module requires a dedicated RollNet connection (via BNC) for communication and for downloading the Logos via the PC application.
In this case unit access and control can be provided via a neighboring networked IQ Frame RollNet BNC connection.

IQDSK00 - HD/SD-SDI Linear Keyer

The IQDSK00 provides a simple and straightforward linear or luma keying capability for HD/SD-SDI video streams. The unit provides a dedicated program output along with selectable preview/program outputs which include a clean feed option. Being transparent to ancillary data allows the IQDSK00 to pass any embedded audio or Metadata and this combined with a short signal delay makes the module suitable for all operational environments. As well as operating with the RollCall control and monitoring system the IQDSK00 can interface with external systems using RS-422 control. When combined with Snell Kahuna switcher this allows seamless integration via the Kahuna control GUI enabling direct keying control and reporting.

KudosPro Application: The IQDSK00 module is available in either single width, or double width variants. Up to two single-width modules maybe installed into any KudosPro Chassis, or just one double-width variant maybe installed.

Installation of the single width variant, up to two of the KudosPro SDI video channels can have a keyed logo added to the output signal. Each IQDSK00 module will output 1x Program output plus 2x Preview outputs.

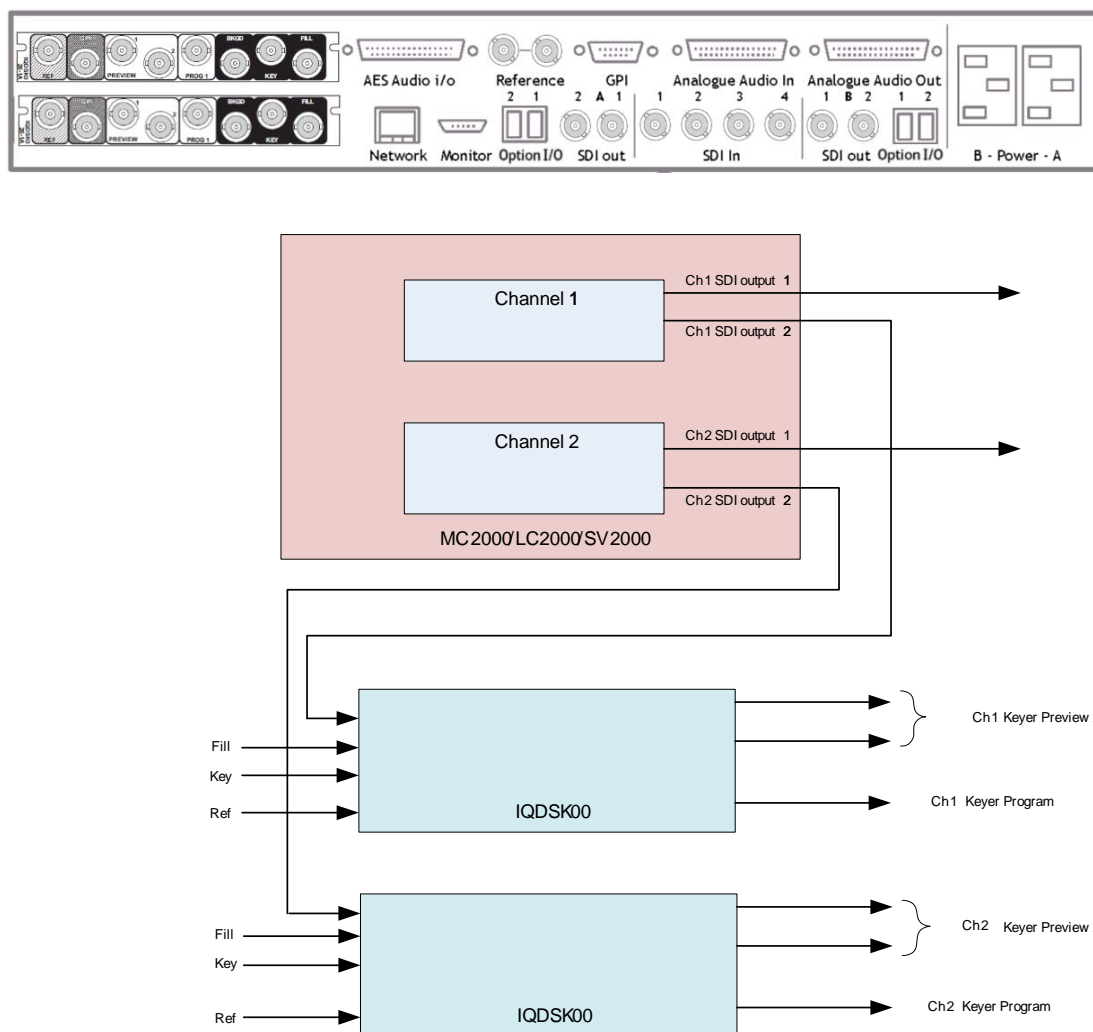For full operational description please see the IQDSK00 Brochure and User Manual.

Figure 9: A two channel KudosPro with two IQDSK00 modules installed

Synchronisation

IQSYN10 - 3G/HD/SD-SDI Frame Synchronizer

The IQSYN10 provides frame synchronization for HD-SDI at 3Gbit/s or 1.5 Gbit/s, or SD-SDI 270 bit/s. Including 2 SDI inputs with clean-switching functionality, agile synchronization, video delay and a video proc. amp to provide complete control over the video levels and video distribution (1 in, 4 out).

KudosPro application: All KudosPro models, as standard, only have a single reference input. This can be a limiting factor on multi-channel models, where different frame-rate outputs are configured. Since only one reference can be applied, only the corresponding output standard can be Genlocked. The output with a different frame-rate, to that of the reference signal, will only be clock-locked.

However, by integrating an IQSYN10 module, a condition can be configured whereby two different frame-rate outputs can both be set to a true Genlock condition. The addition of this module also adds the feature of Video Distribution (1 in, 4 out).
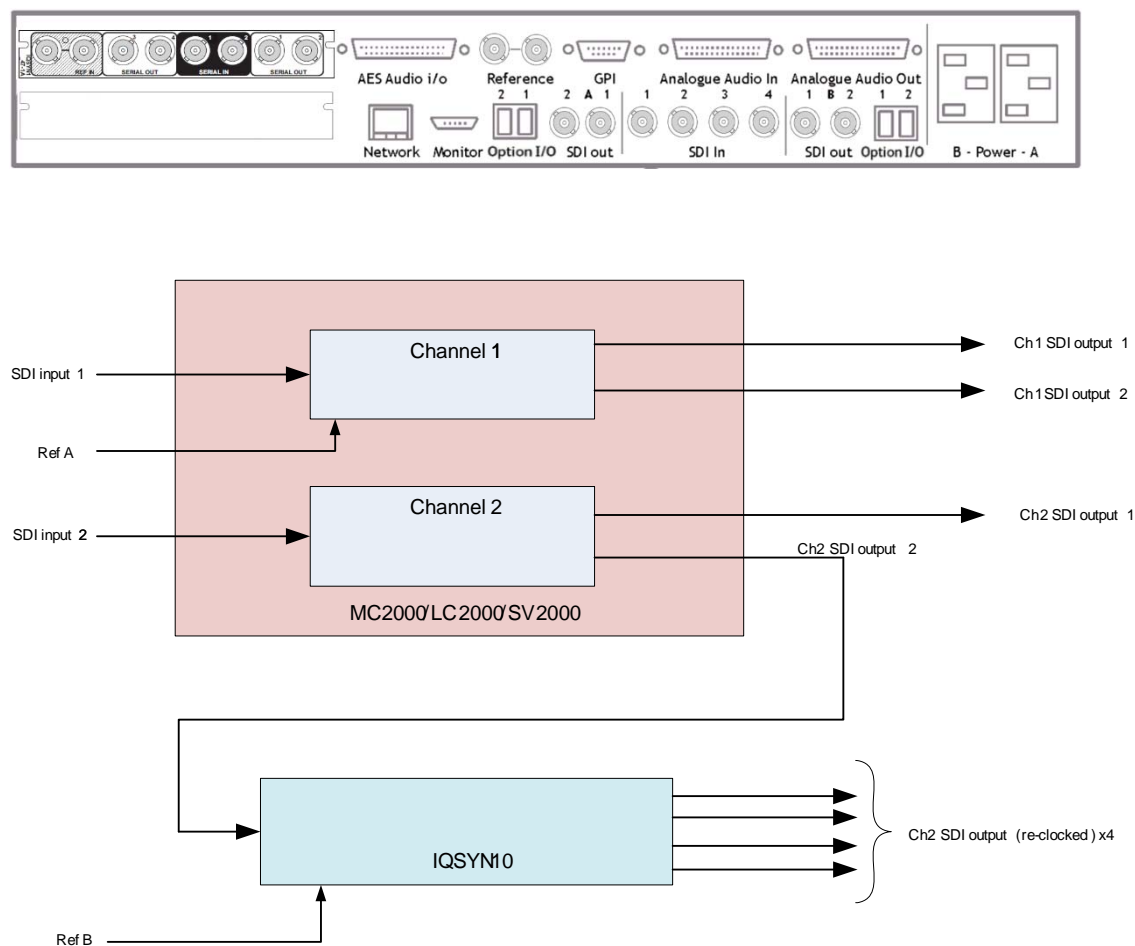
The IQSYN10 is a single width module.

Figure 10: A two channel KudosPro with a single-width IQSYN10 installed

Video Processing

IQTDA30 - 3G-SDI Signal Translator

The IQTDA30 provides signal translation between SMPTE 372M dual-link and SMPTE 425M single link sources allowing product integration into a single system standard.

KudosPro Application: KudosPro as standard supports 3G signals conforming to SMPTE 372M Level A and SMPTE 372M Level B. however, KudosPro does not support connectivity with true Dual-Link signal format.

Integration of the IQTDA30 module, allows KudosPro to integrate with true dual-link signal formats.

The IQTDA30 is a single-width IQ Module. Up to two IQTDA30 modules can be installed into any KudosPro IQ Chassis.

A module maybe used on the input making KudosPro compatible with dual-link signal sources, or maybe used as an output device making KudosPro capable of outputting dual-link signal formats.
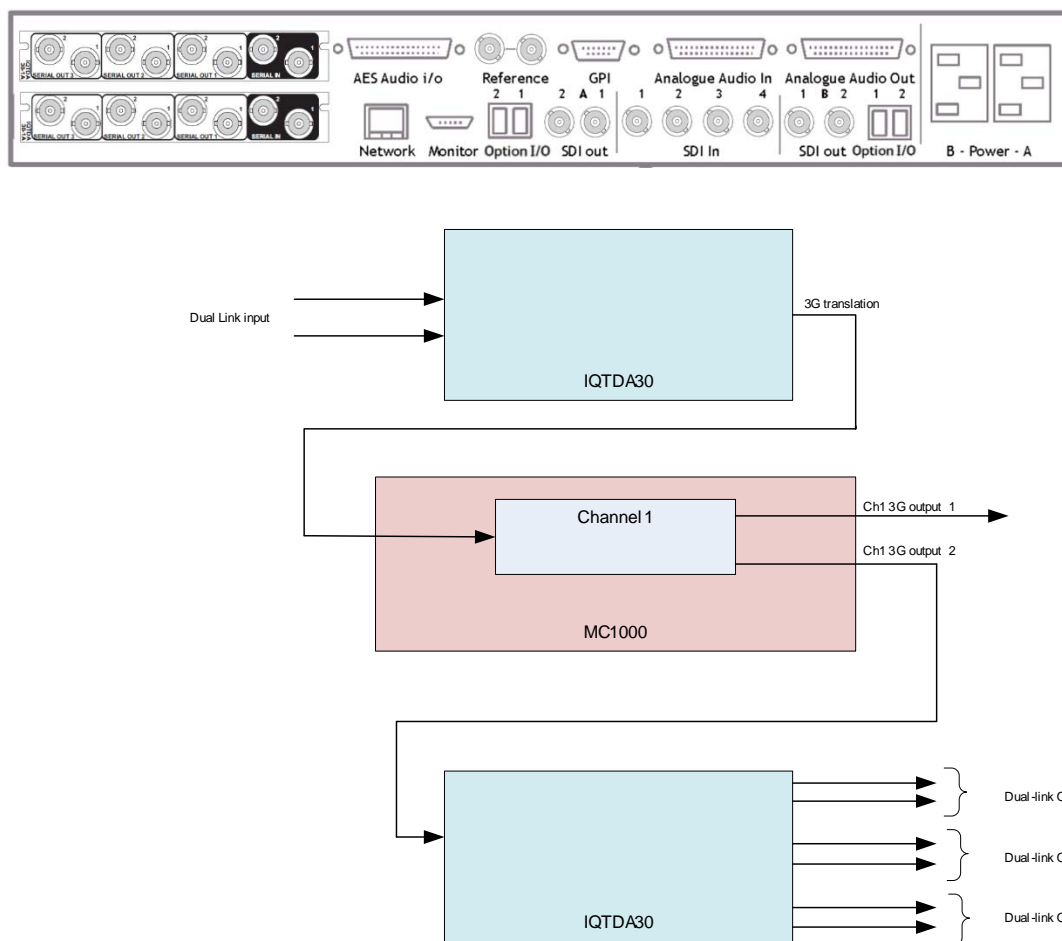

Figure 11: A single channel KudosPro with 2x IQTDA30 modules installed.

IQDLY30 - 3G/HD-SDI Delay module

The IQDLY30 module provides extended video delay in 3G/HD/SD-SDI systems for applications such as adding profanity delay or matching delays in virtual studios. IQDLY30 provides up to 6.5s of 3G-SDI delay, 13s of HD-SDI delay and 37s of SD-SDI delay and transparently passes all associated ancillary data including embedded audio and metadata.

KudosPro Application: the IQDLY30 is available in either single width or double width variants. Up to two, single-width variant modules, or a single double-width variant may be installed into any KudosPro IQ Chassis.

Integration of the IQDLY30 allows any KudosPro output to be delayed by up to 13 seconds (HD). Distribution and Synchronization are added benefits.
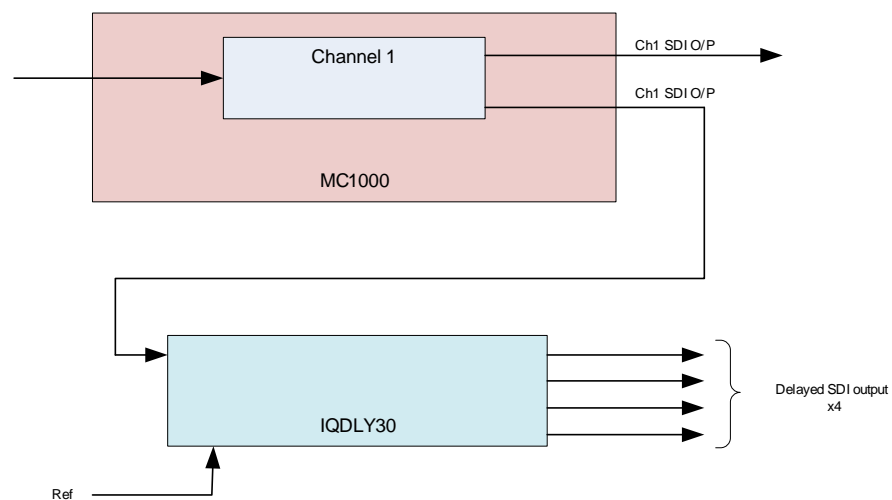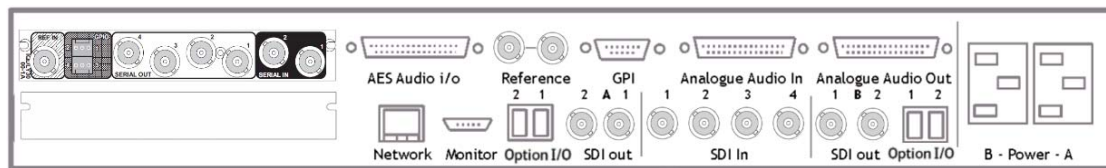

Figure 12: A single channel KudosPro with IQDLY30 module installed

Intelligent Monitoring

IQHIP10 Intelligent Monitor

IQHIP10 is an advanced monitoring module with revolutionary Hyperion content QC capability. Hyperion is designed to continuously and automatically monitor signal content providing verification of whether legal and technical obligations are being met and to provide guidance as to whether the content is within the required parameters to be considered as valid. For video factors such as motion level within the content, as well as the amount of darkness and amount of picture color are monitored. Audio factors reported include Dolby D/E or PCM audio presence, likeness and level information such as Silent, Quiet, Loud and Overload.

Picture regions can be monitored to allow for animated logos and on-screen graphics such as News Tickers. Alarm thresholds can all be adjusted allowing profiles to be set by the user for different material types (genres). Content may be tracked through the broadcast chain by the insertion and reading of SMPTE UMIDs or Internal House Number, title and duration metadata. This data can be used to track content, verify that the correct content is being transmitted and even frame count the duration of every piece of content to ensure contractual obligations are being met. For ingest applications timecode information can also be interpreted and stamped on any Hyperion alarms to enable efficient location of QC alarms.

For remote content identification, delivery of video thumbnail images and audio level monitoring provide a secondary manual level of confidence that content is correct at both internal and remote locations. All alarms from this product can be integrated into the major video display wall processors to streamline alarm reporting and reported through RollMap Network Management system or via SNMP to other vendor Control and

KudosPro Application: The IQHIP10 is a single-width module. Up to two IQHIP10 modules can be fitted into any KudosPro-IQ unit, on the input side or output side. Each Hyperion fitted can add the Hyperion feature set to a KudosPro SDI or Fiber output or input. An added benefit of adding this module is the addition of SDI distribution (1 in, 6 out).
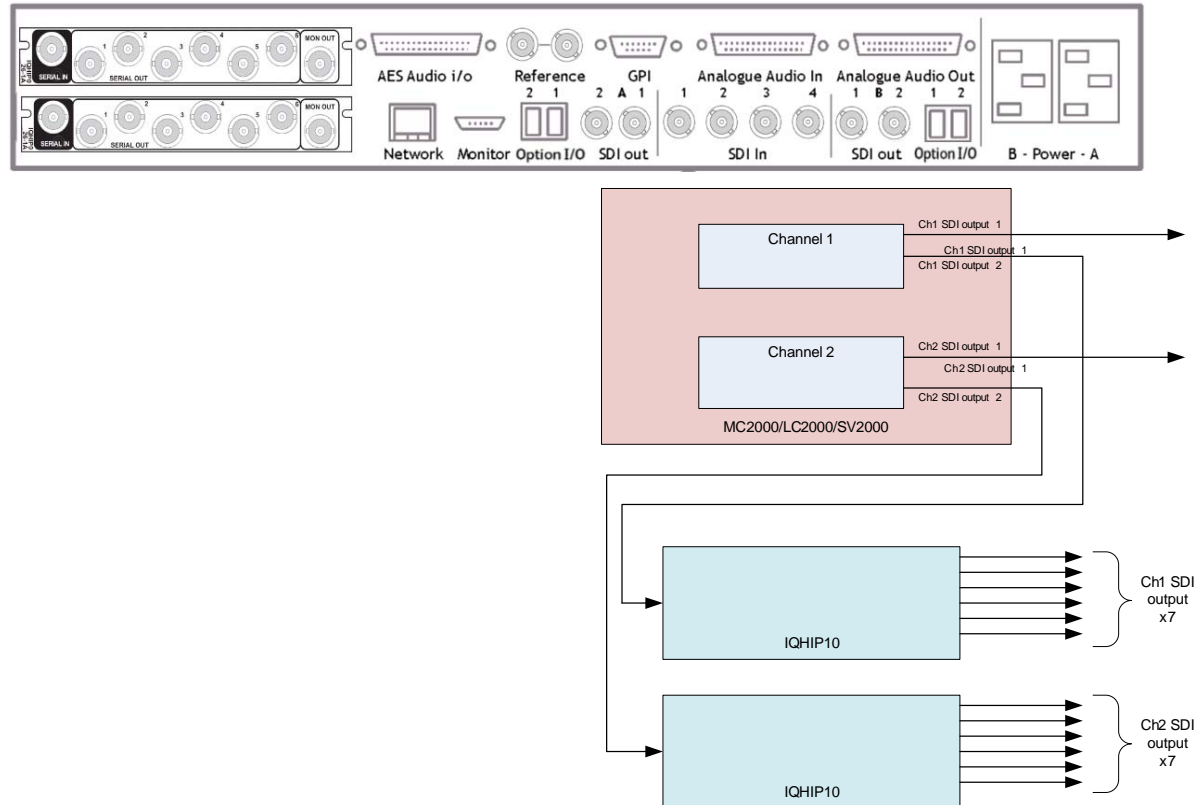

Figure 13: A two channel KudosPro with two IQHIP10 modules installed

IQHCO31 - 3G/HD/SD-SDI Synchronized Signal Protection Module.

The IQHCO31 provides back up protection for SDI signal paths with a clean switching feature. Based on input monitoring detection of signal errors an automatic change-over to a back up feed can be initiated on error state detection. A powerful rules engine is available to provide logical conditions for auto-switching, whilst GPI (or RollTrack) inputs can force the unit to switch independent of signal state. Additional features include monitoring of the unselected input for video and audio signal confidence with group selectable AES audio monitoring.

KudosPro Application: the IQHCO31 is available in either single width or double width variants. Up to two, single-width variant modules, or one double-width variant may be installed into any KudosPro IQ Chassis.

Where KudosPro products are used in Live environments, with the addition of the IQHCO31, powerful protection features are added to the KudosPro product.
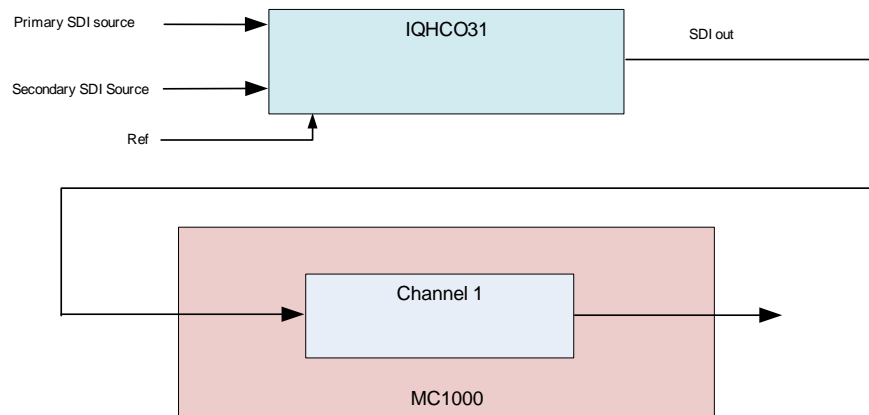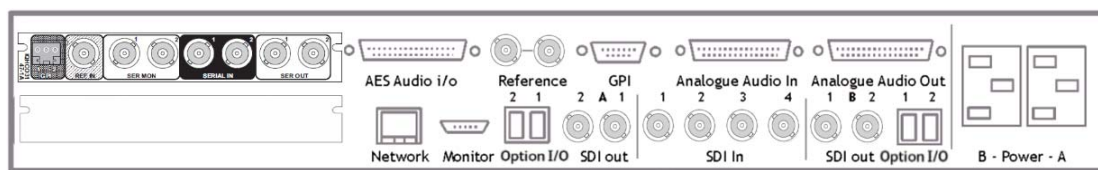

Figure 14: An MC1000 with IQHCO31 installed

IQQSM00 - Quad Split Monitor.

The IQQSM00 provides both SDI and HDMI monitoring outputs for up to four HD-SDI 3 Gbit/s, 1.5 Gbit/s or 270 Mbit/s SD-SDI inputs. Generated in a quad split format at resolutions up to 1920x1080 it enables convenient source monitoring on a single display with the option of feeding the SDI output into a router for remote monitoring applications. Designed as an easy to use entry level module, the IQQSM00 comes in a double width package with the added benefit of user definable on-screen captions for easy image identification.

KudosPro Application: IQQSM can be added at the output stage of the KudosPro-IQ unit to enable simple and efficient monitoring of any incoming signal in circumstances that the fiber outputs are utilised for signal distribution, as shown in the diagram below. A facility may have a wide range of incoming signals, at different standards. For convenience of monitoring, KudosPro LC4000-IQ can convert all four incoming feeds to one standard, then pass them to IQQSM for a single display.
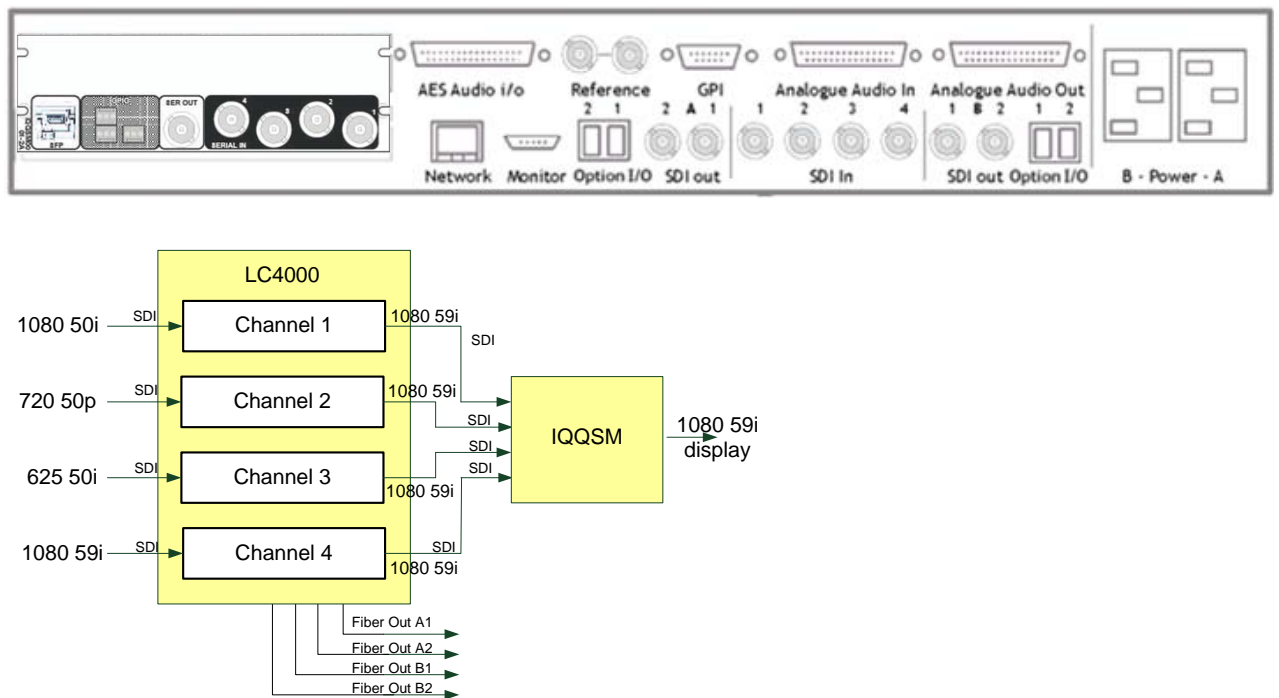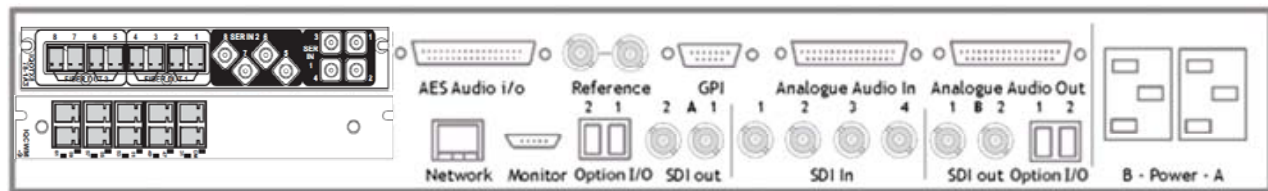

Figure 15: LC4000 with IQQSM installed

Fiber Extensions

IQOTX80 - 3G/HD/SD-SDI Multi-Channel Fiber Transmitter.

The IQOTX80-84 range converts eight 3G/HD/SD-SDI signals into single mode fiber optic signals. The unit is available in single or dual width versions with either DIN1.0/2.3, HDBNC or BNC connectors with a range of fiber wavelength transmitters suitable for CWDM applications.

KudosPro Application: IQOTX80-84 can be added at the output stage of the KudosPro-IQ unit to enable extension of the fiber transmission capabilities, in addition to the SFP fiber options available. KudosPro SFP TX options are limited to 1310nm so if the user wants other fiber capability such as 1550nm optical transmitters, 1270-1410nm CWDM optical transmitters or 1470-1610nm CWDM optical transmitters, addition of modules from the IQOTX80-84 range significantly enhances the fiber transmission capability.

The example below shows how you can add an IQCWDM09 and a single width IQOTX8079-1A3 (HD-BNC & LC/PC) or IQOTX8078-1A3 (DIN 1.0/2.3 & LC/PC). (Adaptor cables can be provided)

In the case that the CWDM is housed in a separate enclosure or a 3rd party device then the IQOTX8080-2A3 (double width) with BNC connectors can be used as an alternative.
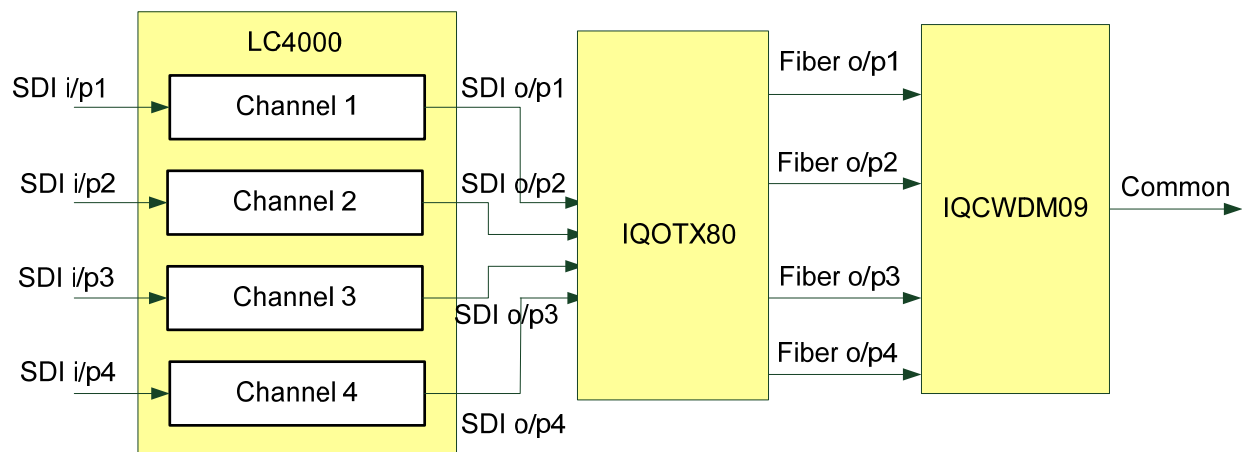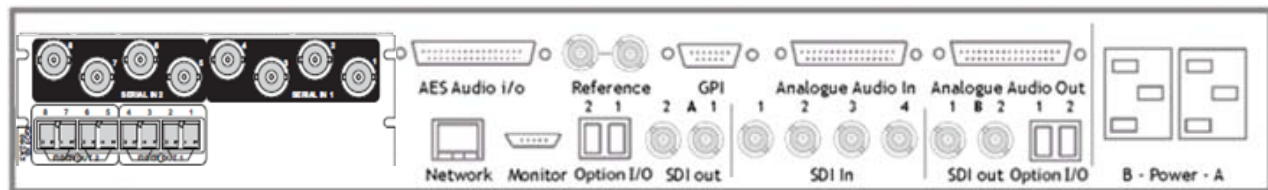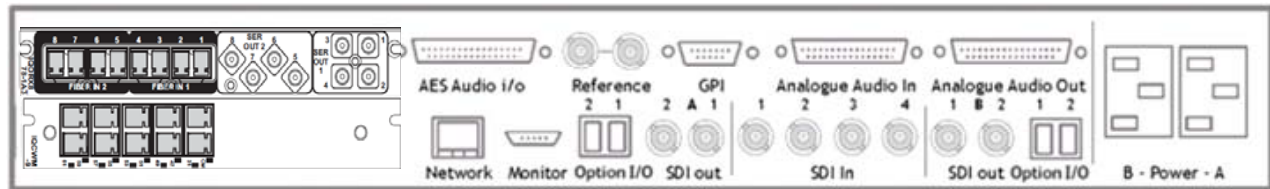

Figure 17: LC4000 with fiber extension using IQOTX80

IQORX80 - 3G/HD/SD-SDI Multi-Channel Fiber Receiver

The IQORX80 converts eight single mode fiber optic signals to 3G/HD/SD-SDI signals. The unit is available in single or dual width versions with either DIN1.0/2.3, HDBNC or BNC connectors with a wide band receiver suitable for CWDM applications.

KudosPro Application: IQORX80 can be added as an input stage to the KudosPro-IQ unit to enable extension of the fiber reception capabilities, in addition to the SFP fiber options available on all KudosPro units. For example, a user may have configured their SFP options to be TX, so IQORX80 adds incoming fiber capability.

The example below shows how you can add an IQCWDM09 and a single width IQORX8079-1A3 (HD-BNC & LC/PC) or IQORX8078-1A3 (DIN 1.0/2.3 & LC/PC). (Adaptor cables can be provided)

In the case that the CWDM is housed in a separate enclosure or a 3rd party device then the IQORX8080-2A3 (double width) with BNC connectors can be used as an alternative.
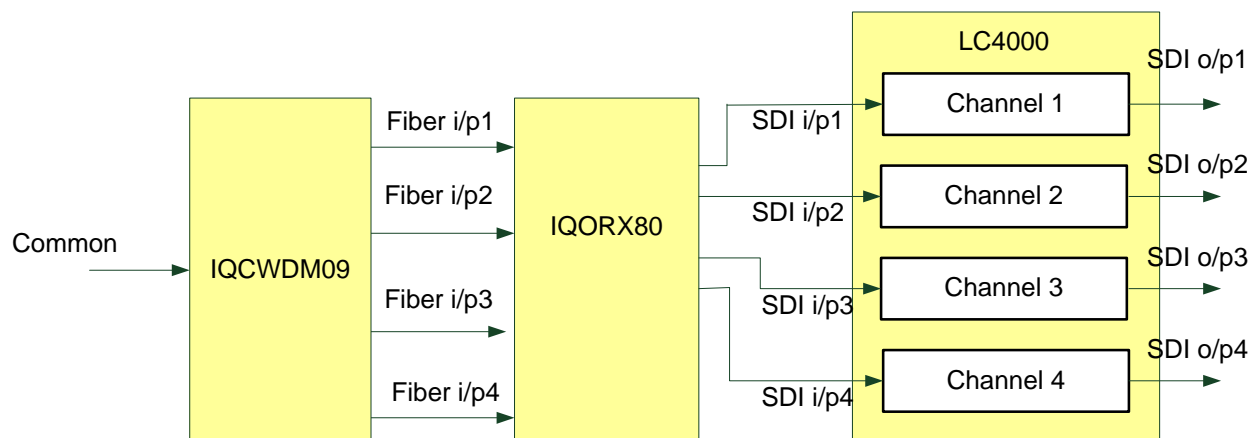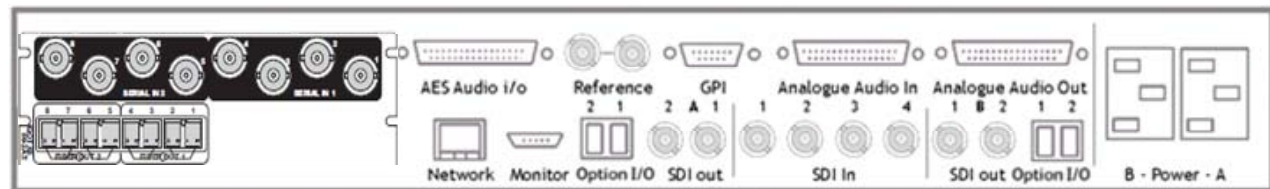

Figure 18: LC4000 with fiber extension using IQORX80

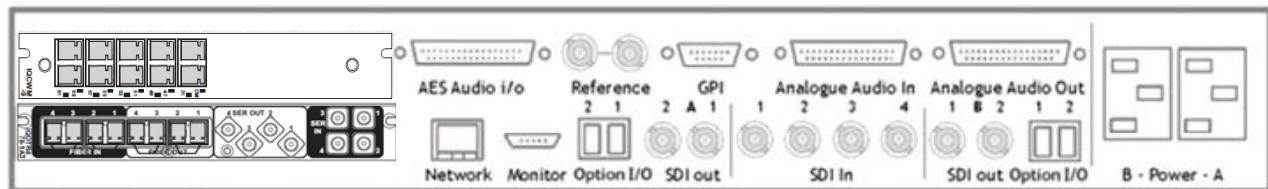**IQOTR40-45 -** 3G/HD/SD-SDI Multi-Channel Fiber Transceiver

The IQOTR40-45 range provides bi-directional conversion of four 3G/HD/SD-SDI signals to/from single mode fiber optic signals. The unit is available in single or dual width versions with either DIN1.0/2.3, HDBNC or BNC connectors with a range of fiber wavelength transmitters suitable for CWDM applications.

The IQCWM09, is a optical Coarse Wave Division Multiplexer/Demultiplexer modules. Occupying just a single slot of an IQ modular frame, the CWDM optical blocks themselves are completely passive devices and there are no other active components on the fully assembled modules. Connection to all ports are made at the rear of the modules using standard LC receptacles.

The IQCWM09 features 10 bi-directional optical paths (9 dedicated wavelengths + Common). The wavelength range for eight of the nine channels extends from 1470nm to 1610nm with 20nm separation between each. The wavelength for the ninth channel (often referred to as the 'Express Channel') is 1310nm

KudosPro Application: due to its versatility, IQTR40-45 can be added as an input or an output stage to the KudosPro-IQ unit to enable extension of the fiber reception/transmission capabilities and interconnectors offered. The IQOTR40-45 comes in single and double width rears, providing I/O in BNC, Din and HD BNC. For example, a user may choose to add either the Din or HD-BNC single width versions or the full BNC double width version depending the application.

The example below shows how you can add an IQCWDM09 and a single width IQOTR4079-1A3 (HD-BNC & LC/PC) or IQOTR4078-1A3 (DIN 1.0/2.3 & LC/PC). Both of the cards can be used to provide a solution in the input path or the output path. (Adaptor cables can be provided)

In the case that the CWDM is housed in a separate enclosure or a 3rd party device then the IQOTR4080-2A3 (double width) with BNC connectors can be used as an alternative.
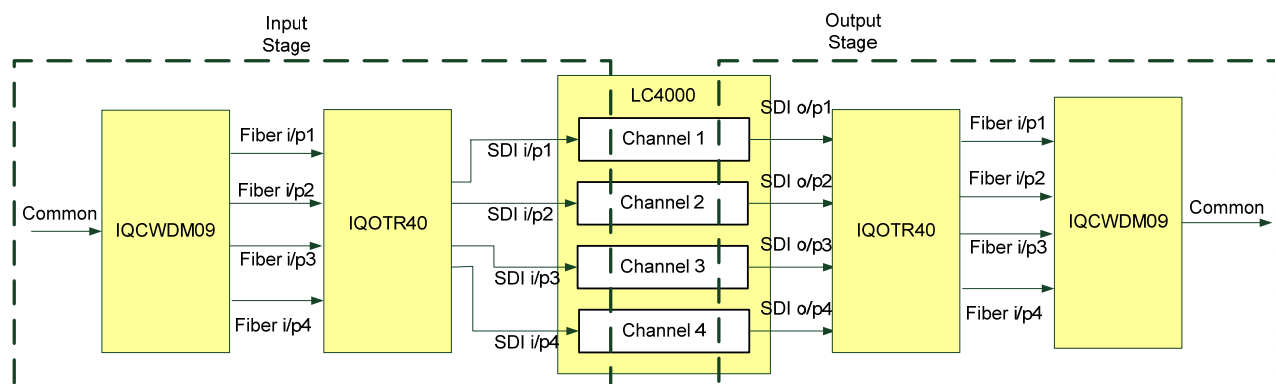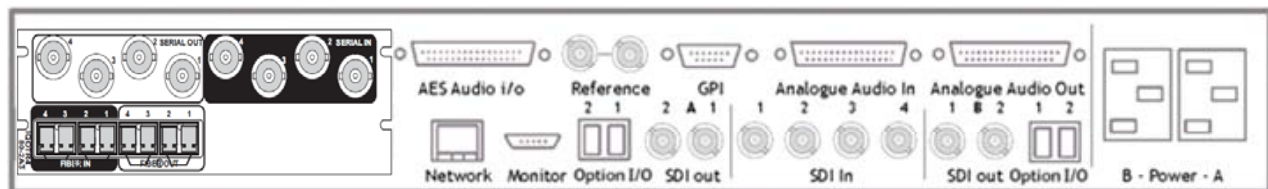

Figure 20: LC4000 with fiber extension using IQOTR40 and IQCWDM09