

4K UHD-1 Motion Comp Standards Converter Solutions Installation Guide



**Modular Infrastructure &
Conversion**



Version History

Table 1: Version Table

1. Date	2. Revision	3. Released by	4. Reason for Change
04/05/2016	1.0	Nik Katsampekis	Initial release
05/07/2016	1.1	Nik Katsampekis	UHD1000 Website and Manual Links added

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1. Introduction

SAM's offers a variety of existing motion compensated converters that can handle the most challenging material even UHD-1 4K conversions:

- **Alchemist Ph.C-HD Live™**- World-leading format & frame rate converter offering Gold standard frame rate conversion, so much so, that content owners around the world demand Alchemist™ by name because it delivers the best quality, cleanest and most detailed conversions – even with highly dynamic content. Alchemist Ph.C™-HD utilizes unique phase correlation-based motion estimation to produce images that are clear, sharp and free from motion artifacts.
- **KudosPro™** is the compact and cost-effective image processing platform from SAM. Still capable of punching well above it's size and price tag in delivering high-quality format and frame rate conversion in a compact 19" x 1RU package.

Both product lines offer a superior quality conversion for a range of content. Usually many types of content such as news, drama, current affairs and talk shows contain relatively large objects with slow, regular motion, which does not challenge a frame rate converter. Where motion becomes faster, more complex, and where there are multiple small moving objects in the scene, the requirements placed on the frame rate converter become more demanding. Particularly difficult are fast action sports and music clips where there are rapid dance movements.

Our extensive tests have proven that using 2SI (2 sample interleave) quad link signals prior to frame rate conversion provides a superior result rather than using square division (SQD quadrant mode). This is because the motion processing is still working across the whole frame even though the resolution is a lot lower, and so eliminates any artefacts that might occur at the edge of the quadrants if using square division mode. As most applications today use square division quad split links for 4K transport SAM offers a solution for translating between SQD and 2SI modes (Kudos Pro UHD1000) to be combined with any of the above products.

1.1 Purpose

The purpose of this document is to demonstrate how to successfully cable and setup the associated hardware for both the Alchemist PH.C-HD Live™ and the KudosPro™ solutions when used in a 4K UHD-1 workflow.

1.2 Assumptions

- A suitable PC is available with access using the local display, keyboard and mouse, or via remote console access.
 - The PC has installed a suitable and up to date web-browser e.g Chrome
(<https://www.google.com/chrome/browser/desktop/index.html>)
 - The PC has installed up to date Java software.
(<https://java.com/en/download/>)
 - RollCall™ Control Panel software is installed on the machine and the user has a sufficient knowledge base on how to drive the application.
(<https://s-a-m.com/support/software-updates/>)

2. Hardware and Software Advanced Information

It is advised that users first become familiar with the individual products installation and operations guides prior to powering up any equipment and proceeding with this installation guide.

Material Accessed via the SAM Website:

- **Alchemist Ph.C-HD Live Motion compensated standard convertor for HD & 3G**
<https://s-a-m.com/products/alchemist-ph.c-hd-live-motion-compensated-standard-convertor-for-hd-3g/c-24/p-210>
- **KudosPro MC- Comprehensive compact frame rate converter**
<https://s-a-m.com/products/kudospro-%e2%80%93-comprehensive-compact-format-framerate-converter/c-24/p-208>
- **UHD1000-4K UHD Converter**
<https://s-a-m.com/products/kudospro-%e2%80%93-comprehensive-compact-format-framerate-converter/c-24/p-208>
- **RollCall Control and Monitoring System**
<https://s-a-m.com/products/rollcall-control-and-monitoring-system/c-24/p-176>

Manuals and operators Instructions for:

- **Alchemist Ph.C-HD Live Motion compensated standard convertor for HD & 3G**
http://handbooks.s-a-m.com/manuals/conversion_restoration/Alchemist_Ph.C-HD_LIVE_Operator's_Manual.pdf
http://handbooks.s-a-m.com/manuals/conversion_restoration/Alchemist_PhC_HD_Installation.pdf
http://handbooks.s-a-m.com/manuals/conversion_restoration/Alchemist_PhC_HD_Operation.pdf
- **KudosPro MC- Comprehensive compact frame rate converter**
http://handbooks.s-a-m.com/manuals/conversion_restoration/KudosPro_MC1000_MC2000_Operator's_Manual.pdf
http://handbooks.s-a-m.com/manuals/modular_infrastructure/IQ/IQMCC30_3G_HD-SDI_Motion_Compensated_Standards_Converter.pdf
- **UHD1000-4K UHD Converter**
https://handbooks.s-a-m.com/manuals/conversion_restoration/KudosPro_UHD1000_User_Manual.pdf
- **RollCall Control and Monitoring System**
http://handbooks.s-a-m.com/manuals/control_monitoring/RollCall/RollCall_V4_Suite_Introduction.pdf
http://handbooks.s-a-m.com/manuals/control_monitoring/RollCall/RollCall_Control_Panel_Operation.pdf

3. Architecture & Wiring

3.1 Alchemist Ph.C-HD Solution for a square division workflow

The wiring diagram of Fig.1 shows how to connect four Alchemist Ph.C-HD units in parallel to process a set of 4K UHD-1 SQD quad split links. The diagram also includes two UHD1000 units to provide the translation between SQD ⇄ 2SI.

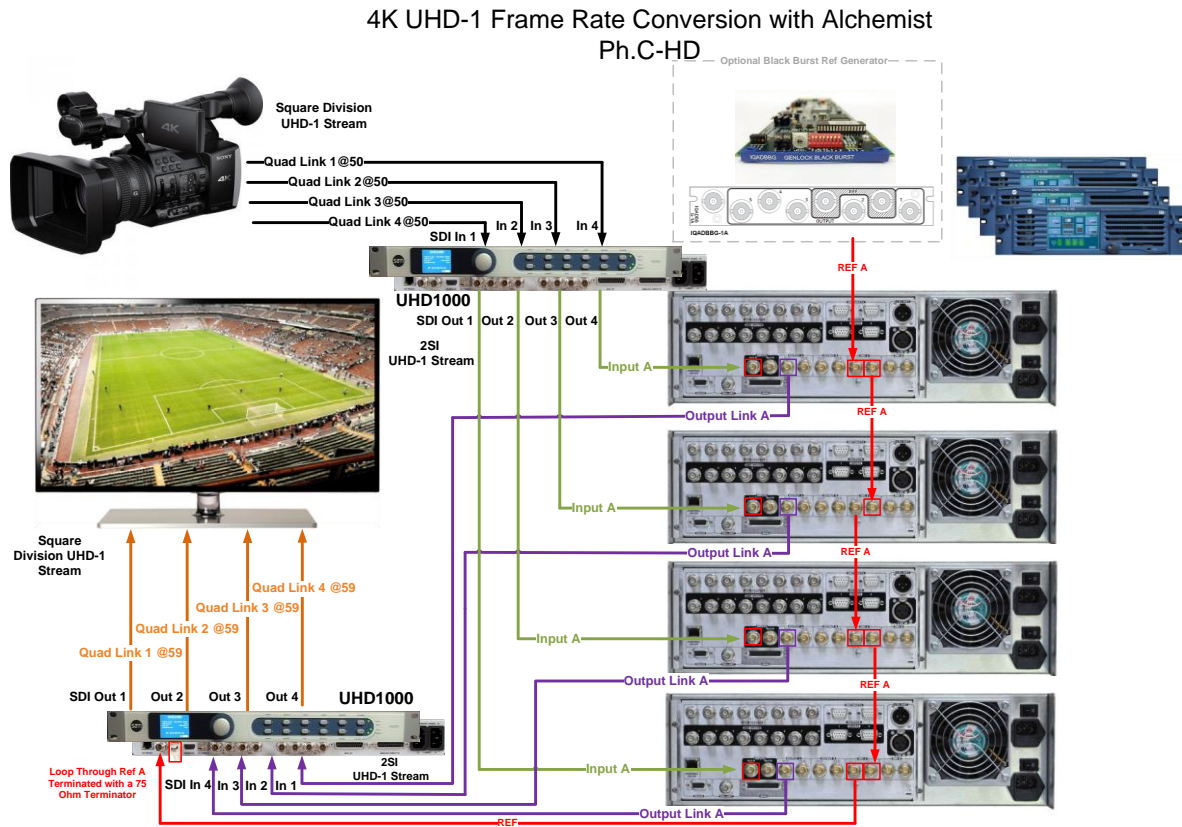


Figure 1: Alchemist Ph.C-HD architecture and wiring with UHD1000 used for the translation between SQD ⇄ 2SI

The Quad UHD-1 Source links (1 to 4) are wired to the first UHD -1000 unit's inputs (SDI IN -1-4 BNC connectors) that will provide the translation from SQD to 2SI and the retrospective outputs (SDI OUT-1-4 BNC connectors) are wired to Input A (LKA) of the allocated Alchemist Ph.C™-HD unit to process each link.



UHD1000 Rear View

Alchemist Ph.C-HD Rear View

The frame rate converted Outputs e.g Output A (LKA) from the retrospective Alchemist Ph.C-HD unit can then be passed onwards in the chain to the second UHD1000 unit to perform the 2SI to SQD translation.

All Alchemist Ph.C-HD units and the second UHD1000 must be referenced to the same source utilising the unit's on-board Loop through reference BNC connectors.



Alchemist Ph.C-HD Rear View

3.2 KudosPro-IQ™ Solution for a square division workflow

The KudosPro-IQ topology allows up to two SAM IQ modules to be added to a KudosPro unit. Thus enabling access to a huge range of extra features and functionality from the IQ Modular range.

The wiring diagram of Fig.2 shows how to utilise one MC2000-IQ KudosPro unit equipped with two IQMCC30 modular Frame rate converter cards to process a set of 4K UHD-1 quad split links, by also utilizing two UHD1000 units to provide the translation between SQD ⇄ 2Si.

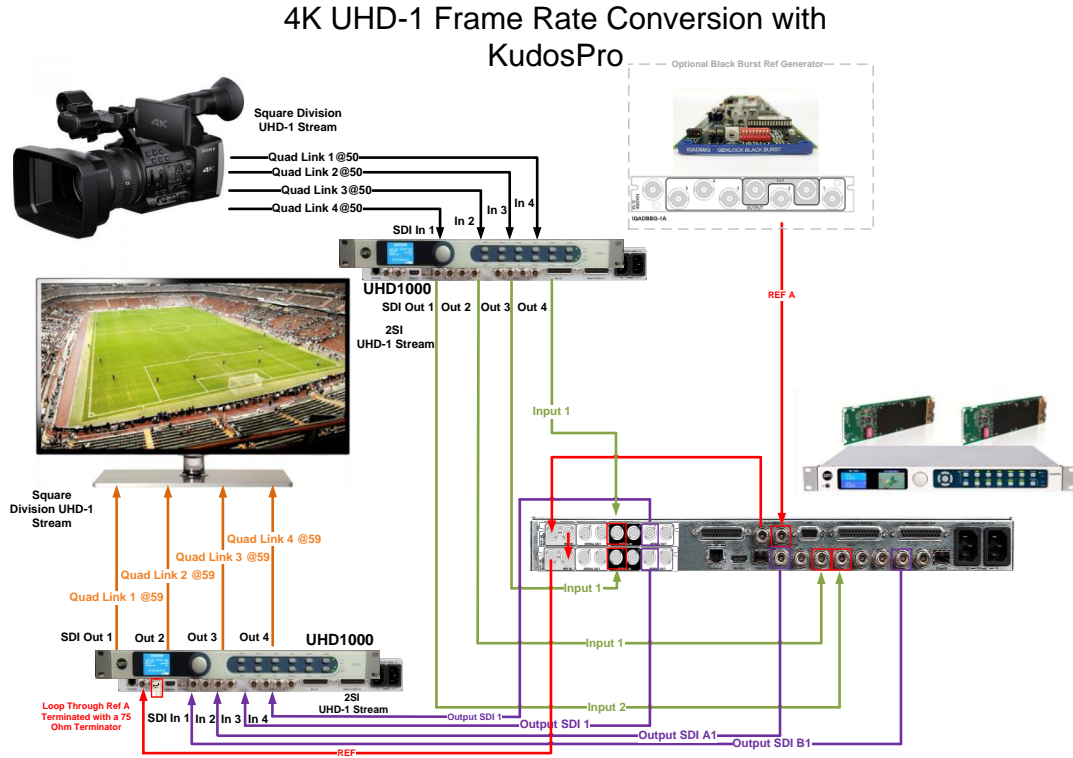


Figure 2: KudosPro architecture and wiring with UHD1000 used for the translation between SQD ⇄ 2Si

The Quad UHD-1 Source links (1 to 4) are wired to the first UHD -1000 unit's inputs (SDI IN -1-4 BNC connectors) that will provide the translation from SQD to 2Si and the retrospective outputs (SDI OUT-1-4 BNC connectors) are wired to Input 1 of the allocated MC2000-IQ unit and the IQMCC30 modules assigned to process each link .



UHD1000 Rear View



MC2000-IQ (2xIQMCC30) Rear View

The frame rate converted outputs from the retrospective MC2000-IQ unit and the IQMCC30 modules units are passed onwards in the chain to the second UHD1000 unit to perform the 2Si to SQD translation.

The MC2000-IQ unit, the IQMCC30 modules and the second UHD1000 must be referenced to the same source utilising the unit's on-board loop through reference BNC connectors.

4. Configuration Settings.

For the purpose of this installation guide, we are assuming that all RollCall enabled units are accessible and visible either via the RollCall Control panel Interface or via a web interface and already set to perform frame rate conversion of live material from 50Hz to 59Hz frame rate.

4.1 UHD1000 Settings

In the case of the two UHD1000 units utilised to provide the translation between SQD⇔2SI, each unit must be accessible via a Web-Browser and set to perform the relevant translation e.g

Input/Output

Input

Input	Standard	UHD Connection
Input 1	1080 50p-A	SQD
Input 2	1080 50p-A	SQD
Input 3	1080 50p-A	SQD
Input 4	1080 50p-A	SQD
UHD input	2160 50-A	OK

UHD Interface: Auto SQD 2SI
 UHD Colorimetry: Auto BT.709 BT.2020

Output

Output standard (with SD/HD input): 1080 50p-A
 Output standard (with UHD input): UHD
 Output standard: 2160 50-A

UHD Interface: SQD 2SI
 UHD Colorimetry: BT.709 BT.2020
 Sample interleaved PID: UHD HD/3G
 UHD ANC Embed: Link 1 All links

Legalization: Off
 Test patterns: Off

Figure 3: UHD1000#1: Set to perform SQD to 2SI translation.

Input/Output

Input

Input	Standard	UHD Connection
Input 1	1080 50p-A	2SI
Input 2	1080 50p-A	2SI
Input 3	1080 50p-A	2SI
Input 4	1080 50p-A	2SI
UHD input	2160 50-A	OK

UHD Interface: Auto SQD 2SI
 UHD Colorimetry: Auto BT.709 BT.2020

Output

Output standard (with SD/HD input): 1080 50p-A
 Output standard (with UHD input): UHD
 Output standard: 2160 50-A

UHD Interface: SQD 2SI
 UHD Colorimetry: BT.709 BT.2020
 Sample interleaved PID: UHD HD/3G
 UHD ANC Embed: Link 1 All links

Legalization: Off
 Test patterns: Off

Figure 4: UHD1000#2: Set to perform 2SI to SQD translation

On the Genlock page, the user can make Horizontal and Vertical Timing adjustments to the output signals timing in relation to the reference signal utilised (for the purpose of this example for the UHD1000#2 an 525i Black burst source in Ref is required).

Genlock

Source

Reference
 Input
 Free run

Status

Reference: 525 59i
 Mode: Reference: 525 59i: Genlock

Timing

Horizontal: 0 pxs [Slider] [Default]
 Vertical: 0 lines [Slider] [Default]

Figure 5: UHD1000#2: Set to perform 2SI to SQD translation

4.2 Alchemist Ph.C-HD™ Solution Settings

The Alchemist Ph.C-HD being a trully powerfull standards converter offers a variety off tools and controls for signal and workflow tailoring. This installation guide will only address the menus required to correctly process the SQD UHD-1 links.

The RollCall Menus of interest for this exercise can be found under the Conversion Page and the Reference Page as it can be seen in the two screens below:

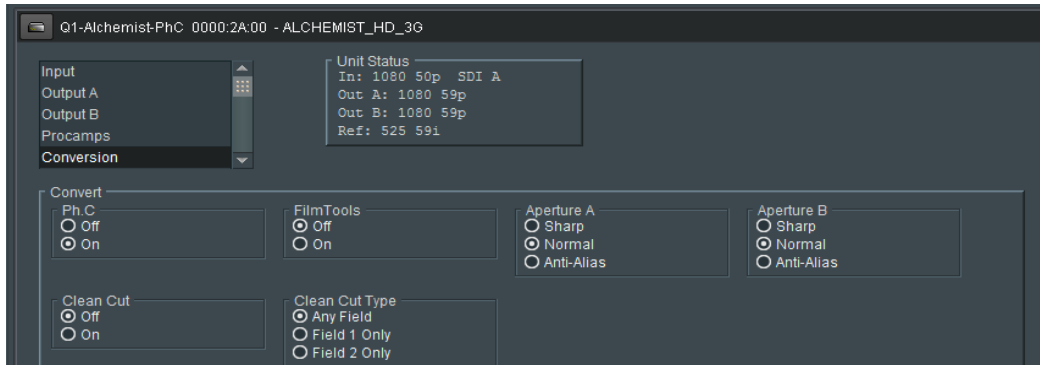
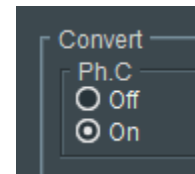


Figure 6: Alchemist Ph.C-HD RollCall Menus –Conversion Page

On this page, we can switch motion compensation on and off.



On the Reference page, the user can make Horizontal and Vertical Timing adjustments to the output signals timing in relation to the reference signal utilised (for the purpose of this example an 525i Black burst source in Ref A).

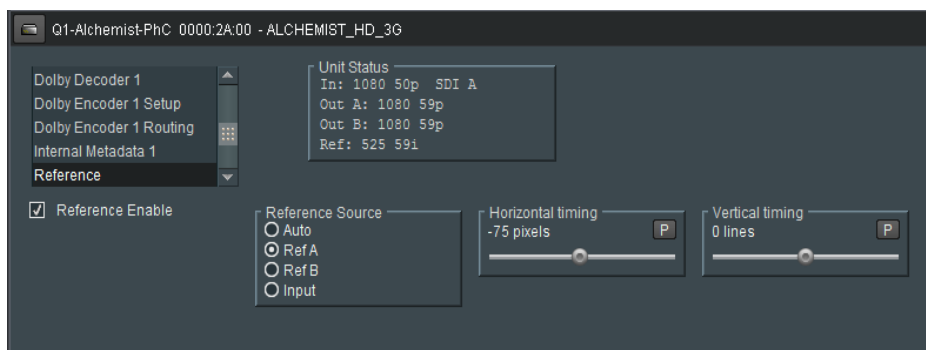


Figure 7: Alchemist Ph.C-HD RollCall Menus –Reference Page

The same controls and adjustments must be applied appropriately across all four links.

4.3 KudosPro-IQ™ and IQMCC30 Solution Settings

The KudosPro-IQ and IQMCC30 products offer a variety of tools and controls for signal and workflow tailoring. This installation guide will only address the menus required to correctly process the UHD-1 links.

Due to the nature of this topology e.g four channels of processing composed via a mainframe enclosure directly linked to Channel 1 and Channel 2 cards and the two additional IQMCC30 modular cards being independent to the enclosure, this guide will refer to the specific RollCall menus of the KudosPro-IQ and the IQMCC30 products where applicable separately.

The image below demonstrates how the units are listed in the RollCall control panel once connected to the KudosPro-IQ enclosure being populated with the two additional IQMCC30 modules:

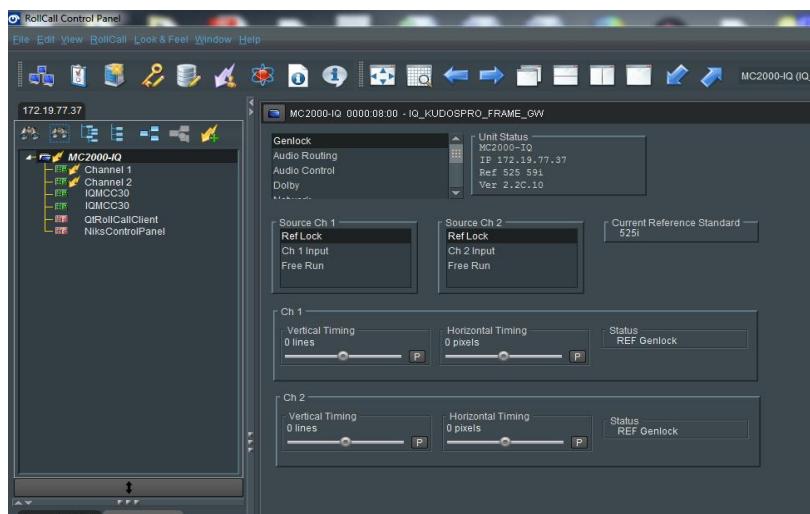


Figure 8: KudosPro-RollCall Menus –Network Topology and Ch1&Ch2 Genlock Page via Enclosure

To perform timing adjustments for Link 1 and Link2 it is necessary to connect to the KudosPro-IQ (Fig 8).Extracting the frame template menus shows the available controls. Under the Genlock page (as shown above) the user can make Horizontal and Vertical Timing adjustments to the output signal timing of Channel 1 and Channel 2 .

To perform timing adjustments for Link 3 and Link 4 via the IQMCC30 modules it is necessary to connect to the IQMCC30 units (Fig 9). Extracting template menus for the units shows the available controls. Under the Genlock page as shown below the user can make Horizontal and Vertical Timing adjustments to the output signal timing of IQMCC30#1 and IQMCC30#2, in relation to the reference signal utilised.

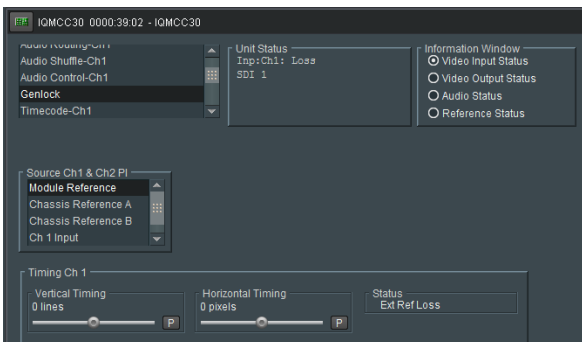


Figure 9: KudosPro-IQ RollCall Menus – Ch3&Ch4 Genlock Page via IQMCC30's

All units require the Motion processing to be enabled. The RollCall Menus of interest for this exercise can be found under the Conversion Page as can be seen in the examples below:

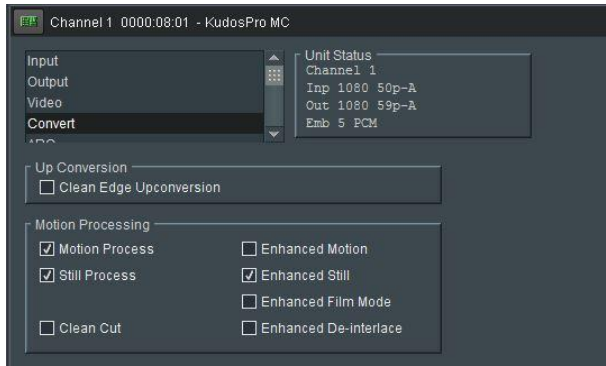


Figure 10: Link 1-MC2000#Channel1

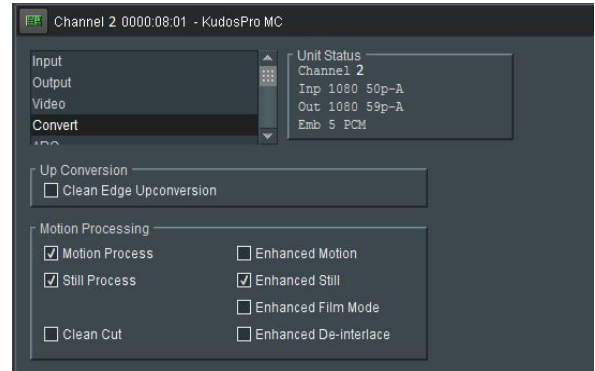


Figure 11: Link 2-MC2000#Channel2

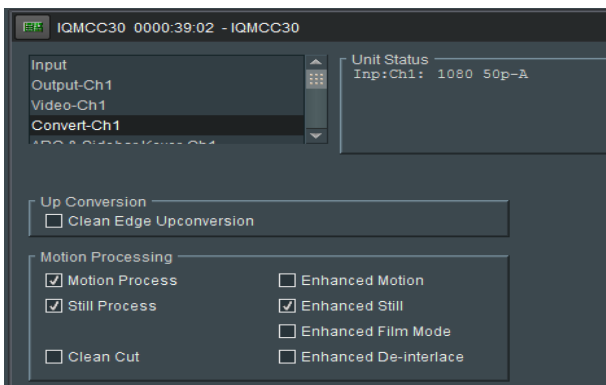


Figure 12: Link 3-IQMCC30#1

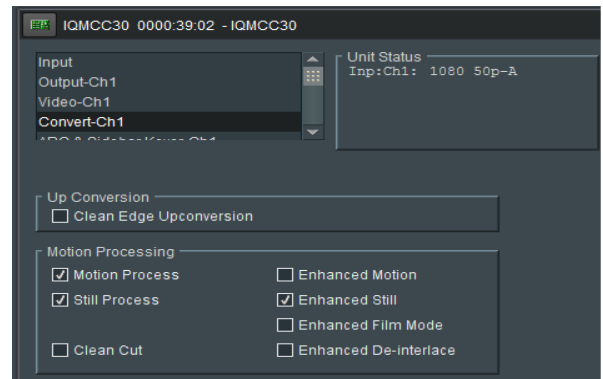


Figure 13: Link 4-IQMCC30#2