

# Digital Standards Conversion Products



Standards conversion or “frame rate conversion” is becoming more of a requirement as the interchange of SD and HD programming takes place worldwide.

Harris offers two standards conversion solutions:

- A modular solution for the NEO<sup>®</sup> advanced modular frames
- An option for the X85<sup>™</sup> multiple application video/audio platform

Standards conversion technology from Harris is an industry-leading linear frame rate conversion that minimizes judder and blurring effects seen in other

linear frame rate conversion technologies. In both Harris standards conversion solutions, all broadcast television formats are accommodated when combined with the up-, down- and cross-conversion capabilities of NEO and X85.

Supported formats include:

- 1080p-59.94/50 Level A and Level B
- 1080i-59.95/50
- 720p-59.95/50
- 576i-25
- 480i-29.97

## Feature Summary Between XRC-3901 and X85OPT-SC

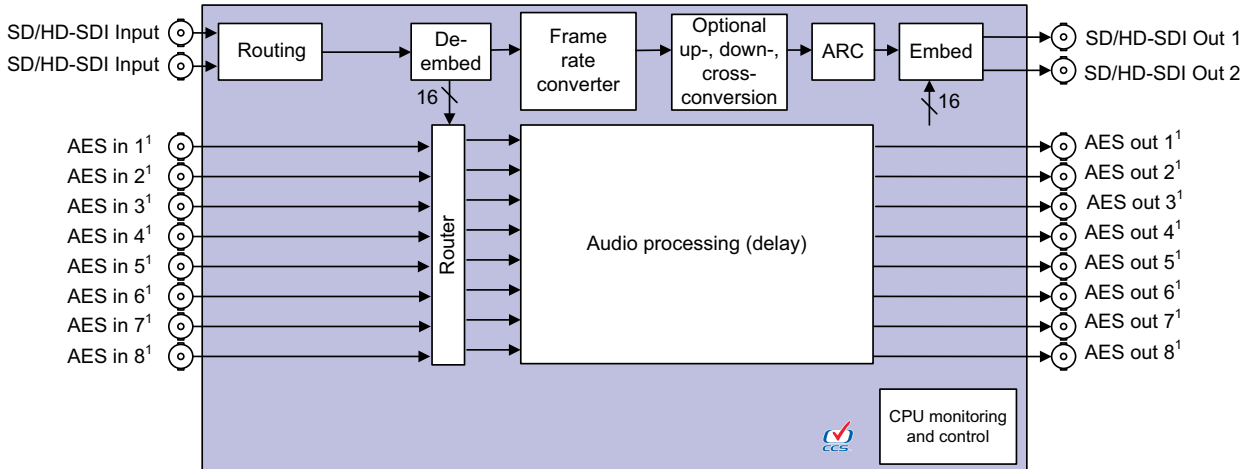
Standards Conversion Features	NEO Modular — XRC-3901	1RU Platform — X85
Standard-definition version (no frame sync, no proc amp)	XRC-3901-SD (no frame sync, no proc amp)	Includes frame sync and proc amp, option for X75HD or X85-3G models: X85OPTSC-SD-M2
High-definition version (no frame sync, no proc amp)	XRC-3901-HD (no frame sync, no proc amp)	Includes frame sync and proc amp, option for X75HD or X85-3G models: X85OPTSC-HD-M2
Standard-definition version (with frame sync and proc amp)	With frame sync and proc amp, XRC-3901-SD and XHD-3903-A-AES	
High-definition version (with frame sync and proc amp)	With frame sync and proc amp, XRC-3901-SD and XHD-3903-XHD-AES	Includes frame sync and proc amp, option for X75HD or X85-3G models: X85OPTSC-HD-M2
Analog composite input	Not available	Add X75OPTA3D option
Analog composite output	Not available	Built-in
Analog audio input/output	Not available	X85 models include X75OPT-AS-16 option with 4 analog I/O and 5 AES I/O
AES input/output	8 AES inputs and outputs provided	X85 models include X75OPT-AS-16 option with 4 analog I/O and 5 AES I/O, X85-3G modules include X75OPT-AS-32 option with 8 AES I/O
Dolby <sup>®</sup> Digital AC-3	Passes Dolby <sup>®</sup> Digital AC-3 with delay	Passes Dolby <sup>®</sup> Digital AC-3 with delay, optional X75OPT-DOLBY-1 decoder and X75OPT-DOLBY-3 encoder
Dolby <sup>®</sup> E	Future support	Passes Dolby <sup>®</sup> E when the following options are add: X75OPT-DOLBY-1 decoder and X75OPT-DOLBY-2 encoder
Supports 1080p	Future support	X85-3G model or X85HD with X85OPT-3G software key option

## NEO Modular Standards Converter

The XHD-3903 is available in two versions — an SD version for the standard conversion of SD-SDI (525/59.94) and SD-SDI (625/50) programs, and an SD/HD version that adds HD-SDI 1080i-50/59.94 and HD-SDI 720p-50/59.94

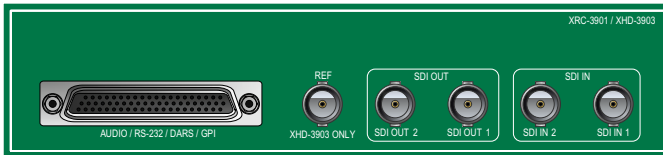
capabilities. Audio can be processed as either AES or embedded, and the proper delay is added to maintain lip sync.

## XRC-3901 Block Diagram



<sup>1</sup>Available via breakout cable (included)

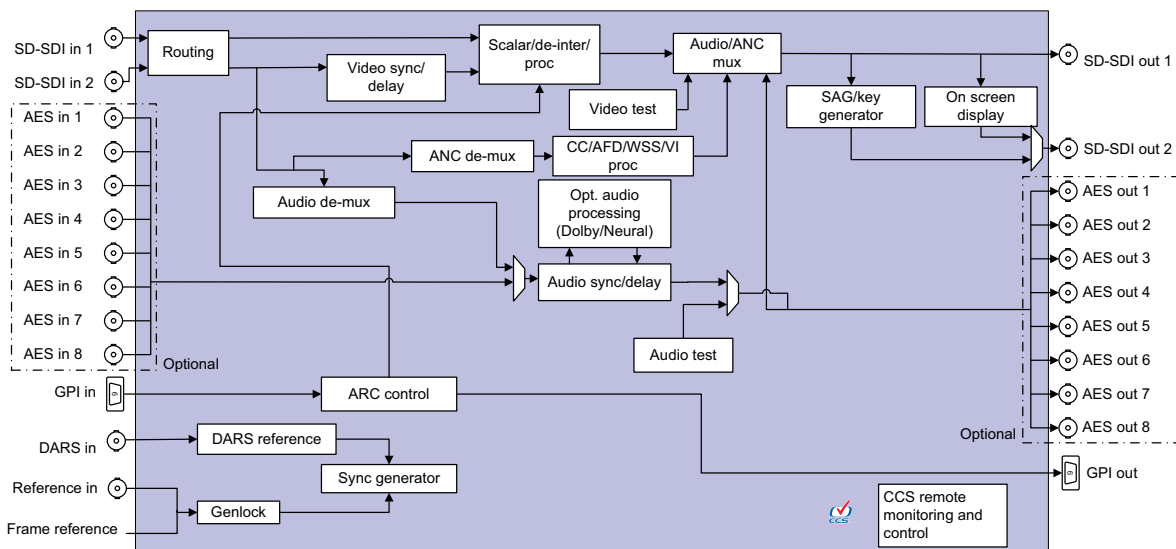
## XRC-3901-SD and XRC-3901-HD Back Module



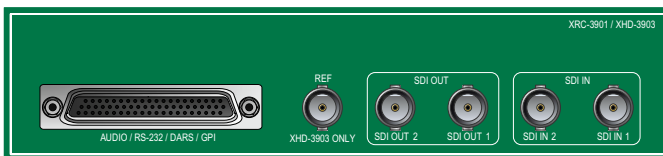
If frame synchronization is required, the XHD-3903 video and audio processing module can be easily added.

Other options that can be added include graphics keying ability, and 3 Gb/s Level A and Level B.

## XHD-3903 Block Diagram



## XHD-3903 Back Module



## XRC-3901/XHD-3903 Standards Converter Options

App #	Function	Input (Analog)	Input (Digital)	Model Number (s)	Output (Analog)	Output (Digital)	Audio	Video Option	Video Option	Audio Option
1	SD to SD Frame Rate Converter, Proc Amp		SD-SDI 480i-59.94	XRC-3901-SD		SD-SDI 576i-50	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
2	SD to SD Frame Rate Converter, Proc Amp		SD-SDI 576i-50	XRC-3901-SD		SD-SDI 480i-59.94	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
3	SD to SD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	XRC-3901-SD, XHD-3903-A		SD-SDI 576i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
4	SD to SD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 576i-50	XRC-3901-SD, XHD-3903-A		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
5	HD to HD Frame Rate Converter, Proc Amp		HD-SDI 1080i/720p-59.94	XRC-3901-HD		HD-SDI 1080i/720p-50	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
6	HD to HD Frame Rate Converter, Proc Amp		HD-SDI 1080i/720p-50	XRC-3901-HD		HD-SDI 1080i/720p-59.94	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
7	HD to HD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	XRC-3901-HD, XHD-3903-UC		HD-SDI 1080i/720p-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
8	HD to HD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	XRC-3901-HD, XHD-3903-UC		HD-SDI 1080i/720p-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
9	SD to HD Frame Rate Converter, Proc Amp		SD-SDI 480i-59.94	XRC-3901-HD		HD-SDI 1080i/720p-50	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
10	SD to HD Frame Rate Converter, Proc Amp		SD-SDI 576i-50	XRC-3901-HD		HD-SDI 1080i/720p-59.94	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
11	SD to HD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	XRC-3901-SD, XHD-3903-UC		HD-SDI 1080i/720p-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
12	SD to HD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 576i-50	XRC-3901-SD, XHD-3903-UC		HD-SDI 1080i/720p-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
13	SD to HD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	XRC-3901-HD, XHD-3903-UC		HD-SDI 1080i/720p-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
14	SD to HD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 576i-50	XRC-3901-HD, XHD-3903-UC		HD-SDI 1080i/720p-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
15	HD to SD Frame Rate Converter, Proc Amp		HD-SDI 1080i/720p-59.94	XRC-3901-HD		SD-SDI 576i-50	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
16	HD to SD Frame Rate Converter, Proc Amp		HD-SDI 1080i/720p-50	XRC-3901-HD		SD-SDI 480i-59.94	16 embedded channels, 8 AES	I-WINGS	2nd Frame Sync	
17	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	XRC-3901-HD, XHD-3903-A		SD-SDI 576i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
18	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	XRC-3901-HD, XHD-3903-A		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
19	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	XRC-3901-HD, XHD-3903-D		SD-SDI 576i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES

## XRC-3901/XHD-3903 Standards Converter Options Continued

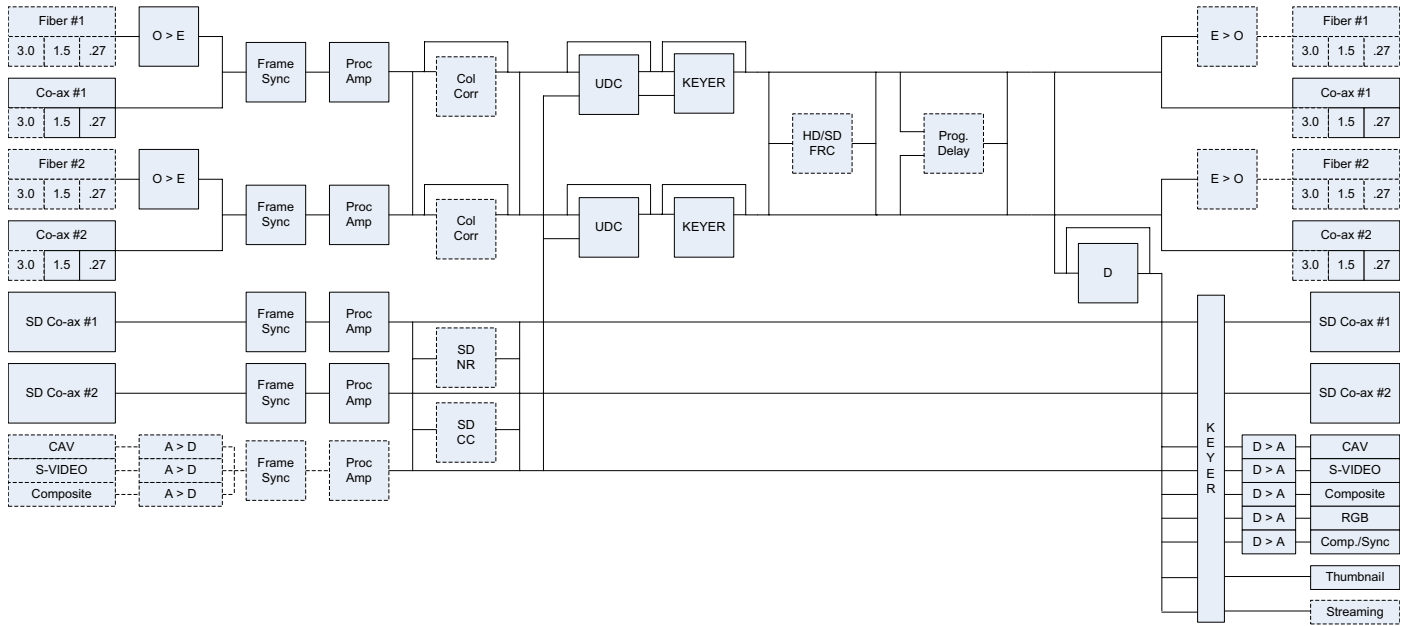
App #	Function	Input (Analog)	Input (Digital)	Model Number (s)	Output (Analog)	Output (Digital)	Audio	Video Option	Video Option	Audio Option
20	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	XRC-3901-HD, XHD-3903-D		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
21	3G to SD Frame Rate Converter, Proc Amp		3G-SDI 1080p-59.94 (A/B)	XHD-3903-D, XHD390PT-D-3G, XRC-3901-SD		SD-SDI 480i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
22	3G to SD Frame Rate Converter, Proc Amp		3G-SDI 1080p-50 (A/B)	XHD-3903-D, XHD390PT-D-3G, XRC-3901-SD		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
23	3G to SD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-59.94 (A/B)	XHD-3903-D, XHD390PT-D-3G, XRC-3901-SD, XHD-3901-A		SD-SDI 480i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
24	3G to SD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-50 (A/B)	XHD-3903-D, XHD390PT-D-3G, XRC-3901-SD, XHD-3901-A		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
25	3G to HD Frame Rate Converter, Proc Amp		3G-SDI 1080p-59.94 (A/B)	XHD-3903-UC, XHD390PT-3G, XRC-3901-HD		SD-SDI 480i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
26	3G to HD Frame Rate Converter, Proc Amp		3G-SDI 1080p-50 (A/B)	XHD-3903-UC, XHD390PT-3G, XRC-3901-HD		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
27	3G to HD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-59.94 (A/B)	XHD-3903-UC, XHD390PT-3G, XRC-3901-HD, XHD-3903-A		SD-SDI 480i-50	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
28	3G to HD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-50 (A/B)	XHD-3903-UC, XHD390PT-3G, XRC-3901-HD, XHD-3903-A		SD-SDI 480i-59.94	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
29	HD to 3G Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	XRC-3901-HD, XHD-3903-UC, XHD390PT-3G		3G-SDI 1080p-50 (A/B)	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
30	HD to 3G Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	XRC-3901-HD, XHD-3903-UC, XHD390PT-3G		3G-SDI 1080p-59.94 (A/B)	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
31	SD to 3G Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	XRC-3901-HD, XHD-3903-UC, XHD390PT-3G		3G-SDI 1080p-50 (A/B)	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES
32	SD to 3G Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 576i-50	XRC-3901-HD, XHD-3903-UC, XHD390PT-3G		3G-SDI 1080p-59.94 (A/B)	16 embedded channels	I-WINGS	2nd Frame Sync	8 AES

## X85 Standards Converter Options

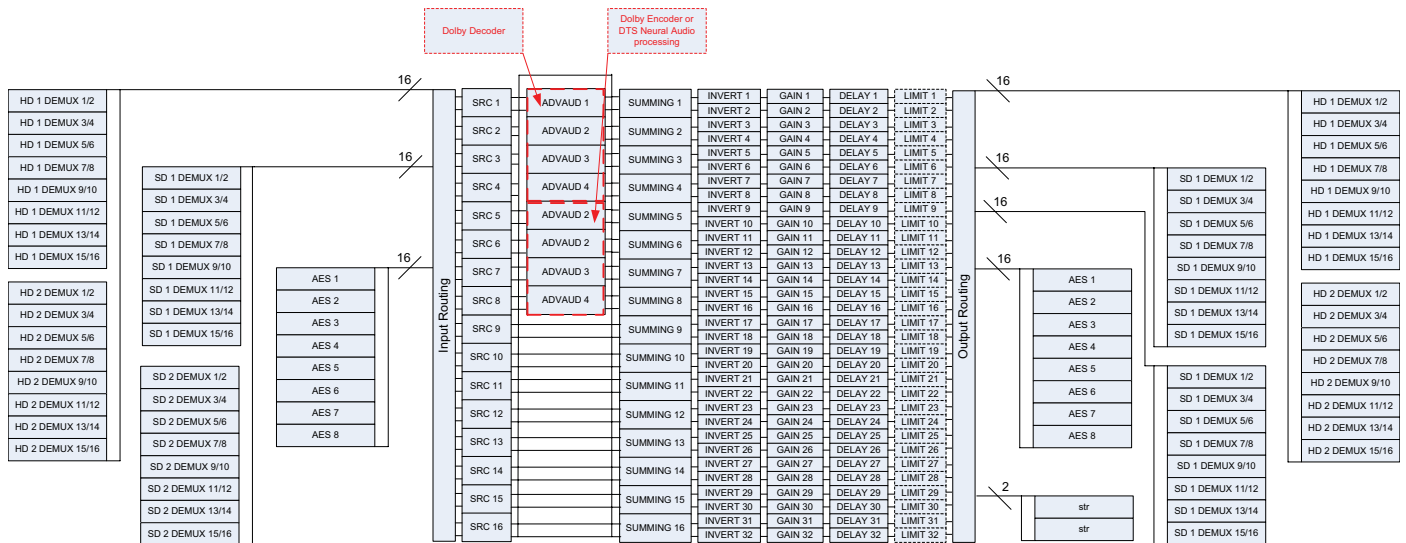
The 1RU X85 with the standards converter option is available for analog video inputs and outputs, optional color correction, optional Dolby® E/Dolby® Digital decoding and encoding, optional DTS Neural Surround™ Up/DownMix and DTS Neural Loudness Control processing.

There also is an option for 3 Gb/s Level A and Level B input and output. Although the X85 can support the standards conversion option and program delay option, only one may operate at a time.

## X85 Video Processing Block Diagram



## X85 Audio Processing Block Diagram



## X85 Back Panel



## X85 Standards Converter Options

App #	Function	Input (Analog)	Input (Digital)	Model Number (s)	Output (Analog)	Output (Digital)	Audio	Video Option	Audio Option
33	SD to SD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	X85HD-AV-2PS, X85OPTSC-SD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
34	SD to SD Frame Rate Converter, Proc Amp, Frame Sync	NTSC/PAL, YC, PrPb(SD)	SD-SDI 480i-59.94	X85HD-AV-2PS, X85OPTSC-SD-M2, X75OPT-A3D	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
35	HD to HD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	X85HD-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
36	HD to HD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	X85HD-AV-2PS, X85OPTSC-HD-M2, X75OPT-A3D	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
37	SD to HD Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	X85HD-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
38	SD to HD Frame Rate Converter, Proc Amp, Frame Sync	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	X85HD-AV-2PS, X85OPTSC-SD-M2, X75OPT-A3D	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
39	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-59.94	X85HD-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
40	HD to SD Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	X85HD-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 embedded channels, 4 analog audio, 5 AES	Color Corrector / Legalizer	Dolby® E
41	3G to 3G Frame Rate Converter		3G-SDI 1080p-50 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	3G-SDI 1080p-59.94 (A/B)	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
42	3G to 3G Frame Rate Converter		3G-SDI 1080p-59.94 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	3G-SDI 1080p-50 (A/B)	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
43	3G to SD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-50 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
44	3G to SD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-59.94 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	SD-SDI 576i-50	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
45	3G to HD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-50 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	HD-SDI 1080i/720p-50	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
46	3G to HD Frame Rate Converter, Proc Amp, Frame Sync		3G-SDI 1080p-59.94 (A/B)	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	HD-SDI 1080i/720p-59.94	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
47	HD to 3G Frame Rate Converter, Proc Amp, Frame Sync		HD-SDI 1080i/720p-50	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	3G-SDI 1080p-59.94 (A/B)	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
48	SD to 3G Frame Rate Converter, Proc Amp, Frame Sync		SD-SDI 480i-59.94	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	3G-SDI 1080p-50 (A/B)	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E
49	SD to 3G Frame Rate Converter, Proc Amp, Frame Sync	NTSC/PAL, YC, PrPb(SD)	SD-SDI 480i-59.94	X85-3G-AV-2PS, X85OPTSC-HD-M2	NTSC/PAL, YC, PrPb(SD)	3G-SDI 1080p-59.94 (A/B)	16 HD embedded channels, 16 SD embedded channels, 8 AES	Color Corrector / Legalizer	Dolby® E

For more information, please visit [www.broadcast.harris.com](http://www.broadcast.harris.com).

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