

CoaXPress

news update

November 2010

The story so far...



VISION Award 2009
★ **WINNER** ★

It has been a year now since CoaXPress won the Vision Award in Stuttgart, November 2009 represented by a consortium led by Jochem Herrmann of Adimec. This update gives an overview of what has happened since as well as an insight into the plan towards standardization.

What is CoaXPress?

CoaXPress is a digital transmission specification that allows the transmission of high speed data from a device, for example a camera, to a host such as a frame grabber in a PC, at a high speed of up to 6.25Gbps over a single coax cable with power and control. The device need not be a single camera – it could, for example, be an interface device that concatenates data from several cameras – since CoaXPress has the ability to carry many channels of image data and meta-data. For communication from host to device, there is a 20Mbps “uplink” that allows for control and configuration data. For even higher speeds, links may be concatenated to provide multiples of the single coax bandwidth. Finally there is also power provided over the cable at 24V, up to 13W per cable.

As well as the simplicity of coax, of which there are many types available on the market, CoaXPress works over relatively long cable lengths, depending on the precise cable type – up to 40m at 6.25Gbps and much further at lower speeds.

Further details about the specification may be found at www.coaxpress.com in the various white papers.

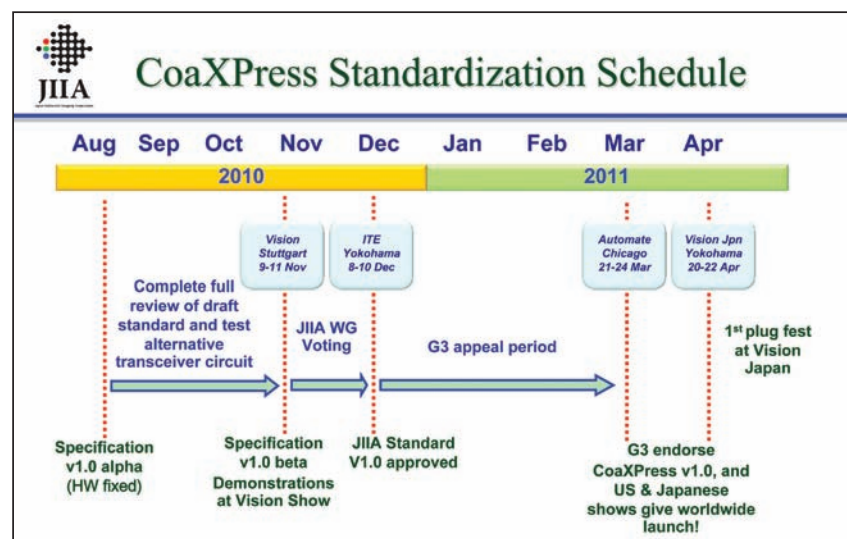
JIIA hosts CoaXPress as a future standard

The Japan Industrial Imaging Association (JIIA) is hosting CoaXPress as a future standard. Significant progress has been made over the last year with the development of the draft specification – in particular the formation of working groups - the Automated Imaging Association (AIA) and European Machine Vision Association (EMVA) have formed a “CoaXPress Liaison Group”, with representation (at time of press) from over 40 organizations, to participate in the standardization process by providing feedback to JIIA. The JIIA Working Group, with representation from many Japanese industrial companies, is also working on alternative circuits to the currently (single sourced) CoaXPress physical interface solution from Eqcologic, as well as putting an Escrow in place with Eqcologic for

the protection of CoaXPress adopters. The draft specification may be obtained via these groups for companies that are

a member of any of the above industrial organisations.

Proposed Standardization Schedule (by kind permission of JIIA)



The next generation digital interface



360° vision

One of the great benefits of CoaXPress is the ability to use rotary joints and sliprings. These are typically used in defense, robotic, surveillance and broadcast applications where continuous panning can be a requirement. The availability of low cost high bandwidth rotary joints, such as the one shown right opens up many options for high resolution and multiple image/ data channels in continuous panning applications. The significant interest in this from markets outside machine vision has led to the formation of an "Adopters Group" whereby organisations for which machine vision is not a significant part of their business may gain access to the CoaXPress specification. Typical organisations in this category include



Rotary joint for continuous panning applications (BNC shown for scale)

large defense contractors and companies in the medical and security markets. Of course the adoption of CoaXPress beyond machine vision and in somewhat

larger markets is great news for driving down pricing and providing a broader spectrum of compatible products.

Comparison: CXP with Current Standards

	CoaXPress	Camera Link	GigE Vision	IEEE-1394B	HD-SDI 3G-SDI
Single Speed	1.25 Gbps - 6.25 Gbps	2 Gbps (Base, 1 cable)	1 Gbps	768 Mbps	1.45 Gbps (HD-SDI)
Max Speed	N x 6.25 Gbps (N cables)	6 Gbps (Full, 2 cables)	2 Gbps (2 cables)	1.6 Gbps (2 cables)	2.9 Gbps (3G-SDI)
Link Cost	Medium	Medium	Medium / High	Low	Medium
Complexity	Medium	Low	High	Medium	Medium
Cabling	Coax	Custom multi-core	Cat-6	Complex, mass produced	Coax
Max Length	130 m / 40 m	10 m / 7 m	100 m	4.5 m	130 m / 100 m
Data Integrity	CRC	None	CRC / Resend	CRC	CRC
Real Time Trigger	Yes	Yes	No	No	No
Power over Cable	13 W / cable	PoCL: 4 Watt	PoE: 13 W	45 W	No

Note: HD-SDI supports standard broadcast video resolutions only

Comparison: CXP with Future Standards

	CoaXPress	10 GigE Vision	HS Link	USB-3
Single Speed	1.25 Gbps - 6.25 Gbps	10 Gbps	3.125 Gbps	5 Gbps
Max Speed	N x 6.25 Gbps (N cables)	40 Gbps (4 cables)	N x 3.125 Gbps (N cables)	5 Gbps
Link Cost	Medium	High	Medium	Low (?)
Complexity	Medium	High	Medium	Low
Cabling	Coax	Cat-6 / Cat-6a / Cat-7	CX-4	Complex, but mass produced
Max Length	130m / 40m	37m / 100m / 100m	15m	3m
Data Integrity	CRC	CRC / Resend	CRC / Resend	CRC
Real Time Trigger	Yes	No / planned	Yes	No
Power over Cable	13 W / cable	Planned	No / Planned	Yes

Note: It is not clear yet whether USB3 will support a sustained 5 Gbps and what the CPU load might be. However it is anticipated that a CoaXPress to USB3 adapter will be able to sustain 3.125 Gbps

How does CoaXPress compare?

One of the questions of most interest to potential adopters is how does CoaXPress compare to other standards? Left are two tables which list the key comparators to existing and other potential future standards.

The future's bright

There are many interesting areas beyond the basic v1.0 specification that are now being considered. For example CoaXPress can relatively easily be used over fiber since it is already a serial protocol – just a different physical interface is required. Micro-connectors and miniature multi-way connectors are being considered for super high bandwidth applications. Similarly as faster serial technology becomes available, it is likely that 10Gbps or even faster will become a possibility in the not too distant future over a single coax!

Update compiled and written by Colin Pearce of Active Silicon and Jochem Herrmann of Adimec