

Leutron's has launched a range of PoCL-compliant cameras and frame grabbers.

# Power over Camera Link

Several months on from its formal ratification by the AIA, Power Over Camera Link is here to stay, as **Warren Clark** discovers

**For what is a relatively small industry, vision** appears to have more than its fair share of standards and protocols. When working in a high technology arena, this is only to be expected, one might argue.

The latest standard to make it to mainstream is Power over Camera Link (PoCL) which, as the name suggests, enables power to be transported along the same cable as data. Ultimately, this has the effect of reducing the number of interfaces required on the back of a camera and, of course, eliminates a cable.

Dwayne Crawford of Matrox was on the AIA committee that developed the PoCL standard: 'We have been able to deliver power and data over the same cable by retasking some of the drain wires to make them suitable for camera power. It is designed to replace external power supplies and ensures that there is at least one less connector on the back of a camera. The concept

is very similar to USB-powered devices for computers, with the power in this case being generated via a frame grabber. There are some limitations, in that power provided is only up to 4W, but this is still sufficient to power most cameras and satisfy the needs of many vision applications. There is no impact on the quality of the data coming from the camera, and it does help to reduce the size and cost of the system.'

Originally, pins 1, 13, 14 and 26 were dedicated to ground. With PoCL, pins 1 and 26 are reassigned for power of up to 333mA at 12V or 400mA at 10V. Dedicated PoCL cables are required. Also, currently the PoCL standard only applies to Base mode Camera Link and not to Medium or Full mode. Base mode allows 3 x 8 bits to be transmitted in parallel via the cable. It has also necessitated changes to frame grabbers.

'As a frame grabber provider,' continues Crawford, 'we have had to make some changes

to our product design in order to incorporate the power supply. During the formulation of the PoCL standards, there was some debate over whether the power should be "safe power" or "dedicated power". The major difference between the two is that with safe power, there is additional sensor circuitry that can detect that a PoCL-compliant camera and cable are being used – if not, the power is not applied. With dedicated power, the power is always on, so fuses are needed. Many were pushing for the standard to back only safe power, but there was a strong contingent in favour of dedicated power. In the end, the final standard voices a strong recommendation for safe power, but dedicated power is also permitted.

There are many advantages brought about by the advent of PoCL. 'There are cost savings, because no separate power supply or additional cable is required,' says Meinrad Sinnacher of Leutron Vision. 'Using PoCL cameras and dedicated cables, we can compete with – or in some cases undercut – prices of comparable analogue cameras.

‘It’s not just the cost. In many cases, it is simply not possible to incorporate a second cable or power supply into a system. We had one example in which a resolution upgrade was required in laboratory equipment that had been installed for photogrammetric surveying and colour analysis of glass. Analogue cameras were unsuitable, and a number of other contributing factors meant that a frame grabber solution was the best option.

‘Neither GigE or USB 2.0 were suitable. The camera in the laboratory equipment was located in plastic housing and was connected to the measuring device by a two-metre cable. Modification of the housing would have been too costly, but our PicSight-CL model was small enough to fit easily into the housing. An additional requirement was that only one cable could be fitted between the camera mounting and the measuring device. Our PoCL version was therefore able to fulfil all these conditions perfectly.’

Distributors are well placed to monitor how well PoCL is being received. FirstSight Vision’s Mark Williamson says: ‘We now have suppliers on both sides of the PoCL standard, from the frame grabber and the camera side. So far the big issue has been that PoCL has a limited level of power delivery. The higher-speed, faster cameras [such as three-chip on-line scan cameras] would draw too much current, so they will stay with the [old] Camera Link interface. Another disadvantage is that the cable length is reduced from normal

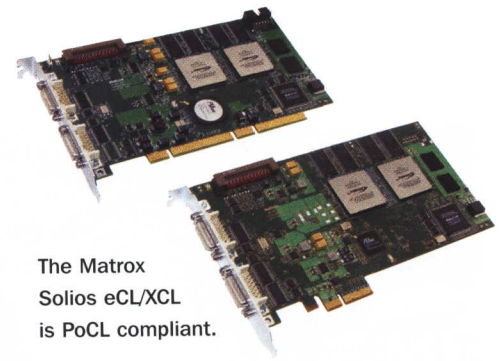
Camera Link. It’s being used with the Mini Camera Link interface, which is limited to five rather than 10 metres.’

### The future for PoCL

There is an ongoing debate about just how far PoCL will go. ‘It is our belief that PoCL will very soon become the norm on all Camera Link cameras and frame grabbers,’ says Matrox’s Crawford. ‘There are no significant drawbacks, other than it is a standard that only applies to Base Camera Link – though even then there are discussions to extend it to Medium and Full modes. The development of PoCL certainly gives Camera Link a little more life. GigE can provide power over the cable, but it is very expensive and is not something that has been implemented in any significant manner within the vision industry.’

‘Our families of PoCL frame grabbers, thanks to better price positioning, have established themselves very well on the market,’ says Leutron’s Simnacher. ‘We expect a greater proportion of our sales to shift towards digital

**‘I’m not getting customers shouting “I need Power over Camera Link” – Mark Williamson, FirstSight**



The Matrox Solios eCL/XCL is PoCL compliant.

frame grabbers in the near future.’

FirstSight’s Williamson is a little more cautious. ‘PoCL is good for standard speeds,’ he says. ‘However, if we look three years down the line, many of these smaller cameras will have moved away from Camera Link to GigE Vision data transfer. This is due to the GenICam interface, which provides the prospect of plug and play. In the long term I think PoCL is limited.

‘This won’t be a rapid transition. GigE Vision is still at an early stage in its cycle; with software implementations still in their infancy and thus the standard needs to settle down a bit, so PoCL does fit for one-off applications at the moment.

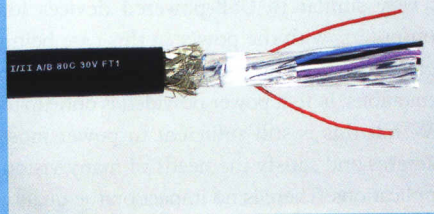
‘I’m not getting customers shouting “I need Power over Camera Link”. PoCL does have its place, but it’s not revolutionary in the same way that GigE vision was. I believe the big market for PoCL is Asia, where customers are more conservative about uptaking new technology, and may want to wait before they convert to GigE vision.’

## THE CABLING PERSPECTIVE

Bud Brown, director of new business development at Northwire, says: ‘The addition of power capabilities to the Camera Link cable was thoughtfully planned by the Camera Link Committee. The new PoCL cable design not only carries the current necessary to power many of the new smaller cameras (~400mA with up to 1 amp under fault conditions), but is also suitable for conventional Camera Link applications.

‘The conventional Camera Link cable design consists of 11 individually shielded 28awg twisted pairs and four drain wires and maintains an overall diameter of approximately 9mm (the diameter requirement is not part of the standard). The minor design changes instituted by the Committee for PoCL made the changeover of cable fabrication quite easy. By keeping the electrical and core design requirements

The red cables transmit the power in this PoCL cable.



of the cable in place and simply replacing two of the drain wires with insulated wires for power, the PoCL cable cost and physical characteristics (including flex life) could remain approximately the same as the conventional Camera Link cable. These key attributes plus the fact that the PoCL cable is backward compatible and can be used for either application could help make cable availability much easier in the future.

‘Versions of the PoCL cable with the 28awg power conductors are also available in 30awg and 32awg pair versions to help reduce cable diameter for very small cameras. However it should be noted that the smaller wire gage will reduce the transmission length of the Camera Link signals.

‘The primary issue with the two similar standards is how a non PoCL camera might be damaged by a powered frame grabber or how any component of a PoCL system would be affected if a conventional cable was mistakenly attached. These issues appear to be adequately addressed in the current specification, but in order to prevent any problems PoCL cable and PoCL assemblies are required to be clearly marked to avoid confusion and potential damage issues.’