OPTO 22 Technical Innovation

OPTO 22 is a leader in Automation Systems Hardware and Software.

In 2021, their current technology offerings are truly impressive.

Their Flag Ship is groov EPIC the only true Edge Programmable Industrial Controller.

Edge is Industry 4 or IIOT 4 thinking and progress for Automation.

Historically Automation and Data Acquisition systems have not been linked to the Corporate IT systems in a unified way.

The EDGE, that is the boundary between the two worlds.

There is need for an appliance of some sort that can link these worlds together so they can talk to one another. This appliances must be able to work equally well in both environments.

Enter OPTO 22's groov EPIC. (Edge Programmable Industrial Controller).

EPIC knows both worlds and can interact in the multitude of industrial and IT data formats and multitude of communication methods and standards that have been developed to date.

This Linux based ARM EDGE Industrial Controller is truly astounding in its current abilities.

Groov EPIC can morph into many uses according to Corporate needs.

It can become "The Computer/Controller Appliance on the Edge".

A Dual Function, on the Edge of two disparate worlds.

Pumping Automation Data to IT Corporate systems.

EPIC assembles this data from sitting over the top of an Automation system.

EPIC links to these systems using many Industry standard Automation comms methods.

EPIC then can crunch the Automation data into Corporate data before passing it on, acting as a data Processor.

Or

EPIC can run the whole show and do the corporate stuff like Database, Cloud, Node Red reports, MQTT comms for security and also run Ignition to make a beyond modern Super SCADA with remote Sub HMIs.

EPIC can be all of that above but add in an Automation Backplane full of Industrial Interfacing Modules and now control the Automation and Data Acquisition directly.

If you want expansion to 1000's of IO, just add some distributed OPTO 22 PACs with IO or more EPIC's with IO and you have a very sophisticated DCS.

Or

A variation on this.

Sit EPIC on top of a disparate Automation system from another manufacturer and bring all of that data from that back to the IT Corporate systems, plus supervise the Automation.

You can read about EPIC in the World Automation Industry Press.

Just do a Google and have a read in Automationworld.com, Automation.com, even InductiveAutomation.com home of Ignition software, and many more.

They have also released the groov RIO, the smaller relative of EPIC, a truly amazing Industrial innovation, that allows Field Devices any where or just in the cloud with no Industrial Controller required.

Each RIO has thousands of Field IO Combos. Simple Digitals and Analogs, PIDs, EU conversion and much more. It can run off PoE, so no Power Supplies or the need for AC outlets in the site. For sites with 24VDC piped around, RIO will run on 10-32 VDC, so fit in immediately.

RIO allows publishing of Data directly to all current IT systems, that maybe on premise via Ethernet, (Modbus, MQTT, Node Red, Ignition), or in the cloud or in a device/s somewhere.

Extend temperature operation range -20 to 70 Deg C + Hazardous locations, small foot print and DIN Rail.

OPTO 22 s present hardware line up is:

EPIC and RIO plus Backplane PACs (lots) and Backplane Industrial IO modules (tough ones, more than lots, heaps.)

OPTO 22's software is just as impressive.

Program all of the above hardware using Applications using Flow Charts, Scripts, IEC standard languages or if you are doing something really intensive use C++, C# or Python.

SoftPAC is part of the software available.

SoftPAC allows you to develop Automation Strategies using flow charts or scripts and then run them on a Win 10 PC or a Hardened Win 10 PC or one of the PACs.

If you use a Win 10 PC as a PAC Controller, it is like making a Super PAC, because a PC (Pick you Power PyP) can crunch, pump and store data with performance way beyond a PAC of any type.

The big question you could ask, is how did OPTO 22 become so formidable in this Automation Arena?

If you do a cursory look back inside Google, you will find a long list of technology firsts that OPTO 22 developed and these finally lead to this Technology offering of today.

OPTO 22 pioneered the use of PCs in Automation systems back in the late 80s, using technologies based around interfacing hardware cabling systems, namely using direct PC Parallel Ports, Pamux and OPTOMux (all methods became industry standard).

These systems allowed PC Controlled Distributed IO systems to be built, using standard programming languages like Pascal, Basic and C.

All three methods used OPTO 22's Isolated Digital and Analog plug in Modules inserted in backplanes.

The Isolated AC and Digital Input and Output Interfacing modules, these are the Red, Black, Yellow and White modules became another industry standard component. Many manufacturers still mimic and copy this technology to this day.

With time these backplane plug in modules options expanded and also shrunk in size from Gen 1 to Gen 4.

The next step was removing the PC as the controller and develop programmable embedded tough PCB controllers that can be programmed in Basic or an expanded Forth.

Develop on a PC and download into the embedded controller. Disconnect the PC and the Embedded Controller runs the Automation with the IO.

This technique expanded to allow multi drop controllers, making building large IO count automation possible.

In the early 90's OPTO 22 released an software Application called Cyrano that ran on DOS PCs. This Cyrano was the magic that allowed untrained engineers to program the OPTO 22 controllers without having to learn a programming language. Instead, develop using Cyrano's flow charts and simple scripts and then compile and download into the embedded controller and then Debug the Embedded program in the PC. This was advanced technology for this time.

Not only was it advanced, it also allowed multitasking on the Embedded Controllers. These early real time Embedded Controllers used time slices of 1 msec to run multiple charts or programs at the same time. Very slick.

Other manufacturers at that time were struggling to use DOS to do anything meaningful.

Z world had C Development Embedded Controllers. But you had to learn C, difficult.

Even National Instruments at that time had LabWindows DOS which was not an application builder but a simple code generator for some DAQ and Instrument tasks.

This was all on 16 bit technology, with small memories, poor graphics, limited databases and almost no reporting systems and yet the Cyrano systems ran quite sophisticated Automation Systems world wide at that time.

OPTO 22 did not stand still for long but jumped to 32 bit technology and released Cyrano 32 bit with newer and faster 32 bit Controllers, expanded IO and this time with Database and HMI Display. Again firsts.

Right from the beginning OPTO 22 had a “one tag database” environment to allow building strategies without all the IO confusion of the time.

When Win 95 came out the OPTO 32 bit systems jumped to allow Access and SQL databases and they could use Excel for reports and printing.

One of the very important technologies that OPTO 22 pioneered, starting with Cyrano, was to insert Embedded Brains on each IO backplane. These Brains (micros) did a lot of work with the backplane modules data, such as Engineering Unit conversion, Pulse Counting, Latching, PIDs, Linearisation, Pulse width modulation, quadrature encoding, and eventing and interrupts back to the controller.

This Backplane Embedded Brain technology lifted a burden off the Embedded Controllers. The Controllers were freed of the Modules trivia and could gather and control data at an EU abstracted level, HMI display, database, print and report it.

These OPTO 22 types of Automation systems run on data exceptions, events and interrupts, it does not use a Scanner IO systems like PLCs. Action happend when Data indicates it needs to happen.

A giant step for OPTO 22 happened when they jumped their Serial and Parallel Comms systems to Ethernet. They were again the first to use it extensively in Automation.

Ethernet also allowed for a different approach to Automation. It became IT centric in many ways and they were able to leverage all the developing IT technology of the time right onto the Factory Floor Automation.

As technology shrank, so did the OPTO 22 components.

The current technology shape is called SNAP with Backplanes, which again is a combination of Backplanes, Embedded Controllers (that also now have the Brain Technology built in) and an array of high density Isolated IO Modules.

The original Cyrano Software morphed through several iterations but with the same basic idea, just expanding with each new version to use all the developing technology available at the time.

Factory Floor replaced Cyrano, Ultimate IO replaced Factory Floor and the present version is PAC Project.

OPTO 22 was quick to embrace the idea of PACs as they had been doing this from the beginning, not PLCs.

The documentation for all of this technology is huge but not ponderous and nicely laid out in OPTO 22 sheets that are focused and specific.

Their web site is complete. Their support is free for life. Most of their IO modules are guaranteed for life. Training is free if you go the USA factory.

However, their personal training courses with manuals and hardware kits are all that is really needed to get going.

Once you are into your project details, Facebook has endless videos describing and showing exactly what you want and need to work your project up to a very very advanced level of Automation quickly.

The cost of OPTO 22 systems in many cases will prove to be less expansive and more flexible and more powerful than any others and you can intermix manufacturers hardware easily.

If you already have a PLC based system, you can put EPIC over the top and lift the whole system up into more modern Automation Framework that will do what IIOT4 is meant to do, and that is help the whole company perform more efficiently and timely.

The Industrial 4 plan is to link any IO Automation system producing Data (information) to the Corporate world that uses IT premises or Cloud systems.

This will allow production, performance, inventory, costings, scheduling, invoicing, purchasing, sales, logistics, marketing, design, web commerce to finally interconnect and make the gains promised.

OPTO 22 is one of the major leader in this technology drive and endeavour.

groov EPIC is the indicator OPTO 22 is not stopping innovation any time soon.

I am sure that they have more innovation on the drawing board and in mind (maybe several minds), of what is next.

Talk to MasTec Ltd about your Automation and Data Acquisition plans and needs.

We can work through this and find a good solution and outcome.