EPICS IN A BOX: THE μIOC

R. Sabjan, D. Golob, A. Pucelj (Cosylab d.o.o)
D. Vermeulen

The Experimental Physics and Industrial Control System (EPICS) [1] has become a widely recognized standard for particle accelerators and is also used at SLS. Being a product of a large scientifically based collaboration, the required knowledge and experience to start working with EPICS represents a significant entry barrier. Furthermore, the traditional VME hardware is very costly for small, dedicated applications. By introducing a product which serves as a plug & play Input Output Controller (IOC) and provides effortless integration in the control system, the μIOC (micro IOC) is a significant step forward in making EPICS more user-friendly.

INTRODUCTION

EPICS is a control system toolkit, created and maintained by a large international collaboration, consisting mostly of scientific institutes and research centres. Due to this, it is not packaged like a product and it requires a significant effort for every EPICS site to prepare and maintain the environment.

Traditional VME hardware with the vxWorks operating system offers a very good solution for large systems with high signal density and real-time requirements. However, it can also be seen as quite an overhead in terms of performance and especially price when it comes down to small installations or dedicated systems. Fortunately, recent developments have enabled EPICS to run on other platforms as well. Most popular is the Linux operating system on PC hardware platforms.

NEED FOR A STANDALONE IOC

Clear cases exist in every control system, which require a dedicated controller:

- Close proximity to the controlled instrument is needed (e.g. cable lengths)
- Sensitive devices are being controlled – minimize possible influence of other systems
- Problematic devices – minimize the influence on other systems (example: the GPIB interface can hang up the whole VME crate)

In addition to that, systems with limited number of channels and no hard real-time demands (like serial and GPIB interfaces) can be better (cheaper) be covered by such a controller.

THE μIOC

The μIOC is a product from Cosylab [2], built after ideas from various accelerator labs, especially SLS. The main features of the controller are:

- PC (x86) platform
- Industrial grade components and no moving parts (fan, hard drive) increase robustness and lifetime
- All software is stored locally on flash disk to reduce network dependency
- 2 Ethernet ports
- Runs the Linux operating system
- Supports serial and GPIB I/O
- *Asyn driver* is used for device support

Two μIOCs are already in use at SLS and are controlling a phase shifter device over an RS232 interface. 25 μIOCs will be used for the booster control system of the Australian Synchrotron Project, interfacing equipment over Ethernet, RS232, RS422, RS485 and GPIB.

Fig. 1: The μIOC for a serial device control.

CONCLUSIONS AND FUTURE PLANS

A stream device will be added as device support as soon as it is released for *Asyn driver*, thus allowing supporting serial and GPIB devices without any need for compiling.

Future development will focus mostly on the new software features, mainly used for configuration, which will make life of a device integrator easier. Furthermore we will add additional I/O types.

REFERENCES

[1] www.aps.anl.gov/epics

[2] www.cosylab.com