



Experimental Physics and Industrial Control System



Home	1994	1995	1996	1997	1998	1999	Index	1994	1995	1996	1997	1998	1999
News	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005	
About	2006	2007	2008	2009	2010		2006	2007	2008	2009	2010		
Base	<== Date ==>						<== Thread ==>						

Base
Modules
Extensions
Distributions
Download
Eclipse
IRMIS
Tech-Talk

Subject: RE: Motion controls alternatives to MAXv?

From: <matthew.pearson@diamond.ac.uk>

To: <dirk.zimoch@psi.ch>, <tech-talk@aps.anl.gov>

Cc: DiamondMotionControlTeam@diamond.ac.uk

Date: Thu, 12 Aug 2010 15:48:40 +0100

Hi Dirk,

At Diamond our main motor controllers are the Delta Tau VME Turbo PMAC 2 and (more recently) the Delta Tau Geobrick LVM (which has an ethernet interface). We've also got quite a few Newport XPSs.

All three controllers have similar capabilities. They are actually overkill for most of what we do, but using the same controller for most axes (Delta Tau) simplifies the support structure. We mainly use the Newport XPS for Newport diffractometers, and a few other specific applications.

The Delta Tau Geobrick is basically a PMAC2 with integrated amplifiers in a 4U rack mount box. We currently have/deploying close to 100 of these on several beamlines both in operation and being built. On most beamlines they have proven very stable, but we have a number of problems:

1) Some susceptibility to noise. For example, we're currently awaiting new firmware from Delta Tau to fix a problem that always affects axis 2. It spontaneously changes it's amplifier configuration so it thinks it's a servo drive rather than a stepper.

2) On one beamline we have had a large number of controller watchdogs. This was never tracked down, and eventually we either replaced the Geobricks or simplified the software running on them. We still have this problem occasionally.

3) Initially there were a faulty Geobricks being delivered to us (10-20%). I'm not sure if this is still an issue though.

In general it's a reliable and stable controller. However the software interface is very difficult to use, and the documentation is large and complex. But over time we have built up our experience in using it, and

Mailman
Search
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Core-talk
Mailman
Search
Bugs

[Documents](#)[Links](#)[Google](#)[Licensing](#)[Format page
for printing](#)[Search Tech-talk](#)

our group now has several experts on PMAC coordinate systems and developing controller based 'PLC's.

The Newport XPS has similar capabilities to the Delta Tau Geobrick. It's also a similar form factor - 4U, ethernet, integrated amplifiers. The amplifiers are easily removable (unlike the Geobrick). And, in general, it's a better build quality. But we've also had a number of problems with this:

- 1) The main software interface to it (apart from an Epics driver) is a web server. This has been unreliable and frequently crashes.
- 2) Unexplained controller reboots.
- 3) Axes losing their homed status and going 'uninitialized'.
- 4) Corrupt data when gathering data during a trajectory scan.

And several others (enough to prompt us to create a separate document about them).

However, the software interface is orders of magnitude easier to use than the Delta Tau PMAC. To Newport's credit they have put a lot of effort into making the software intuitive and easy to set up. For standard Newport stages it's even easier with the 'ESP' type, which can tell the controller what type of stage it is and auto-configure the controller to drive it. We have found this useful when setting up temporary sample stages for example.

I'm sure some of the problems we have had are down to electrical noise issues on beamlines. We sometimes find it hard to reproduce problems in the lab. Some of the problems we have worked around, and some not.

By far the most reliable controller we have used on beamlines is the VME Delta Tau PMAC. However, the newer ethernet based systems are much easier to set up, are cheaper, and easier to interface to. But I think it's a fair to say it is still a developing technology.

We mostly use Linux soft IOCs to talk to our ethernet controllers.

If you decide to go down the Geobrick route, I can ask our motion team to give you more details on the hardware and tuning aspects. I mainly deal with the EPICS drivers and controller based programs.

Cheers,
Matthew

> -----Original Message-----

> From: tech-talk-bounces@aps.anl.gov

> [<mailto:tech-talk-bounces@aps.anl.gov>] On Behalf Of Dirk Zimoch

> Sent: 12 August 2010 14:48

> To: EPICS

> Subject: Motion controls alternatives to MAXv?

>

> Hi all,

>

> I am looking for an alternative to our current MAXv motion controller solution.

>

> Can anyone tell me about experiences with

>

> * DeltaTau pmac
> * Newport XPS
> * Galil
> * other systems?
>
> Dirk
>
>

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References:

[Motion controls alternatives to MAXv?](#) *Dirk Zimoch*

Navigate by Date:

Prev: [RE: Motion controls alternatives to MAXv?](#) *Mark Rivers*

Next: [Re: Motion controls alternatives to MAXv?](#) *J. Lewis Muir*

Index: [1994](#) [1995](#) [1996](#) [1997](#) [1998](#) [1999](#) [2000](#) [2001](#) [2002](#) [2003](#) [2004](#) [2005](#)
[2006](#) [2007](#) [2008](#) [2009](#) [<2010>](#)

Navigate by Thread:

Prev: [RE: Motion controls alternatives to MAXv?](#) *Mark Rivers*

Next: [Re: Motion controls alternatives to MAXv?](#) *J. Lewis Muir*

Index: [1994](#) [1995](#) [1996](#) [1997](#) [1998](#) [1999](#) [2000](#) [2001](#) [2002](#) [2003](#) [2004](#) [2005](#)
[2006](#) [2007](#) [2008](#) [2009](#) [<2010>](#)

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