Connecting EPICS to TwinCAT

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Overview

- What is a TwinCAT system?
- Our EPICS Com Module for TwinCAT
- Using StreamDevice – Chopper (spinning disc)
- Using MotorRecord – Linear axis
- Ongoing developments
TwinCAT: a soft PLC system

PC
“Soft PLC”

“realtime” Fieldbus

SW

IO

IO

IO

IO
Connections to TwinCAT

TwinCAT

real time kernel

PLC

Motion

FB_DriveVirtual

Ethercat master

Motor

Encoder, switches

Control network: EPICS channel access

EPICS IOC

winsock

ADS

OPC

COM

Control network: EPICS channel access
EPICS Com Module

EPICS Com Module (realtime under TwinCAT)

winsock

EPICS IOC

TwinCAT

PLC

Motion

FB_DriveVirtual

Ethercat master

Motor

Encoder, switches
Low level debugging

```bash
$ telnet 192.168.88.48 200
Main.M1.bBusy?;\r
0;\r
```

EPICS TwinCAT

```
"Main.M1.fPosition=10.0;\n"
"OK;\n"
```
Disc synchronized with the 14 Hz pulse: Baby Chopper
Chopper Control Service Mode

Motor

Service Mode
Enable
Execute
Reset
Jog
Jog Fwd
Jog Bwd

Error
Speed
Position

0
0
0
0
0
0
MotorRecord:: move()

- TwincatMotorAxis::move(double position, int relative, double minVelocity, double maxVelocity, double acceleration)
- { /* status checking not shown */
  - stopAxisInternal();
  - setValueOnAxis("nCommand", relative ? 2 : 3);
  - setValueOnAxis("fPosition", position);
  - sendVelocityAndAccelExecute(maxVelocity);
  }

Single Axis
Ongoing developments - 1

• Single transaction: chain commands
  “Main.M1.bBusy?;Main.M1.fActPosition?;\n  "0;11.417835;\n”

• Retrieving complete motor status as a struct
  “Main.M1.stAxisStatus?;\n”
  “Main.M1.stAxisStatus: 1=0, 2=0, 3=0, 4=0,
  5=0,6=0.000000,7=0.000000,8=0.000000,9=0.000000, 10=0,
  11=0,12=1, 13=1,14=0.000000,15=0,...;\n”

• Read the “RAW” encoder value:
  ADR=16#3040020,16#80000049,2,18/
  ADSPORT=501/?;
Motion Control - TODO

• Optimize
• More homing procedures
  - Implement in the motion control unit (MCU)
  - Expose them via EPICS?
• configuration parameters
  - Which are needed in the MCU
  - which need to be exposed via EPICS?
    (Acceleration, Jerk, Soft limits)
• Health status/alarms
  - Internal alarms from the MCU
• More automated testing
  – python based, pyEpics, nose
Thanks

- Anders Sandström, MCAG
- EPICS community

- Question(s) ?