

TECH NOTE :: QuantumX and Charge based Sensors

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Abstract

This Tech Note describes how to connect a charge based sensor to QuantumX MX440A, MX840A or MX410. This amplifiers support active reset on pin 15 which is necessary when working with charge sensors. With only a few steps this reset can be automatically activated from the software just before acquiring data.

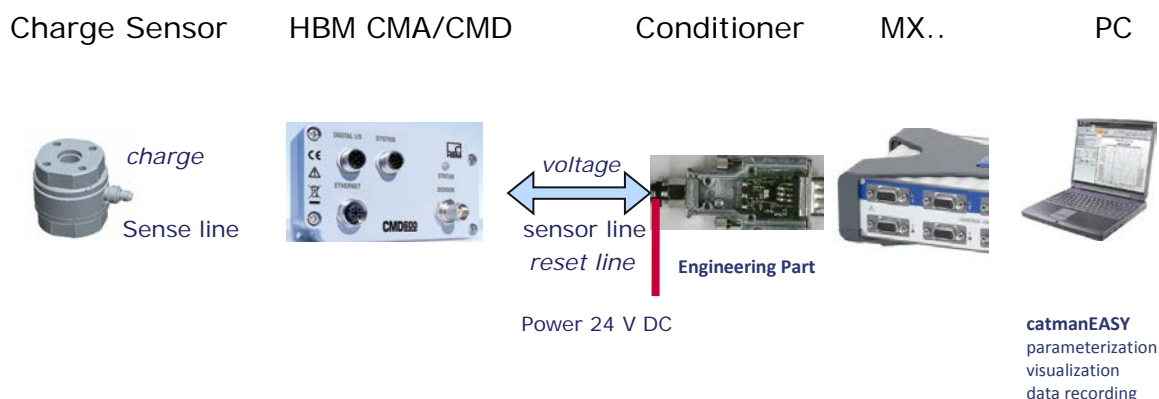
Intro

QuantumX is a modular distributable data acquisition solution from HBM for measurement and testing solving demanding engineering tasks. The modules offer highly accurate inputs acquiring physical quantities in the wide field of **mechanical, hydraulics, thermal and electrical or mixed systems** with data rates from 0.1 to 100 kS/sec and channel. QuantumX acquires sensor or transduce inputs measuring **force, strain, torque, pressure, temperature, displacement, speed, position, acceleration, flow, voltage, current and man more**. QuantumX offers superb A/D inputs supporting voltage, current, bridge based inputs for strain gage or inductive transducers, LVDT, resistive, thermocouple, digital pulses and can acquire pure digital data from **CAN bus parallel and time synchronous** to all other inputs. All this inputs can be re directed to outputs like analog, CAN, EtherCAT or digital out.

Charge based sensors are not supported natively. To connect a charge based sensor to QuantumX the following items are necessary:

- Charge pre amplifier CMA / CMD from HBM
(TEDS not tested and not recommended because of too many adapters)
- Device plug including the capability to reset the pre amplifier when starting data acquisition
- Software supporting QuantumX like catmanEASY

Parts and Data Flow

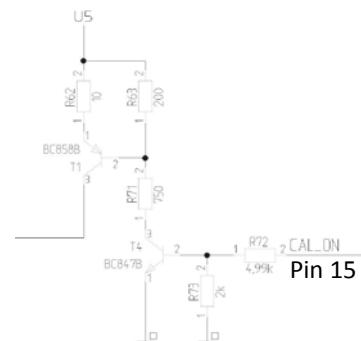


How to build up a conditioner?

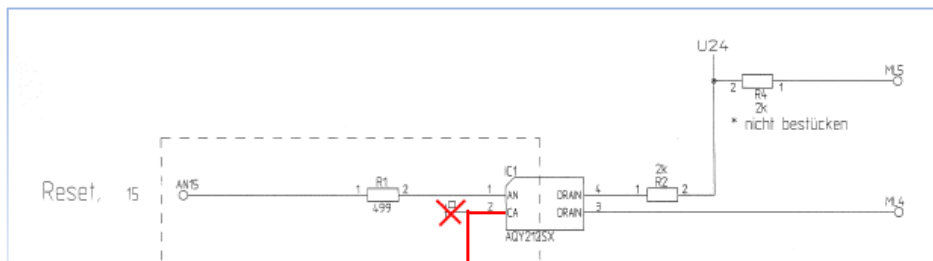
Both, CMA or CMD need a voltage supply of 18 – 30 V DC and need to be parameterized according to its sensor type. The reset signal has to be in the range between 12 ... 30 V DC. The QuantumX amplifiers MX440A, MX840A or MX410 offer on pin 15 and an “active digital output” to reset the external charge amplifier but needs to be conditioned to 12 ... 30 V DC - for example 24 V.

Sense line and pulled up digital output can be built into a conditioner plug. The following information is good for this DIY job.

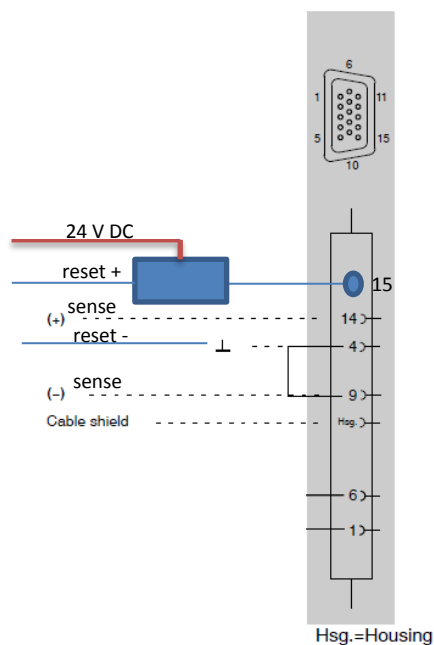
Logic State	MX410 pin 15 see CAL_ON in schematic	MX840A/MX440A pin 15
Active Low	high impedance	high impedance
Active High Reset CMA / CMD	5 V, max. 28mA	3,3 V, max. 28mA



For pulling up the voltage of this active digital output (pin 15) we recommend using an OPTO MOS FET type AQY212SX from Panasonic with a max gate current of 7mA and use it as a SubHD build in solution.



Connection schematic for conditioner integrated in SubHD:



Connection to conditioner plug with a Y cable:

- 1) 24 V supply from outside
- 2) Connection to CMA with 24 V power supply, Reset line (output from MOS FET), 10 V input signal

This solution can be also ordered at HBM as engineering solution with any cable length.

Hint: only MX410 supports TEDS located in CMA and CMD.

Software operation with catmanEASY / EASYscript

To activate the reset of the charge pre amplifier over software a catmanEASY *Auto Sequence* or *Script* is used. This *Auto Sequence* can be activated for example over “push button” together with start of acquisition. The button can be found in the object library of the visualization tab. Describe it as “Reset & Start”.

When using channel no 1 of MX410 use the following script lines:

Sub Main

```
EA_IO.QuantumX.SetChargeAmpSig("MX410_0_CH 1", SIG_DISCHARGE)
```

```
Wait(1)
```

```
EA_IO.QuantumX.SetChargeAmpSig("MX410_0_CH 1", SIG_MEASURE)
```

```
EA_Job.Start 1
```

```
End Sub
```

When using channel no 1 of MX440A or MX840A use the following script lines:

Sub Main

```
Dim Param(1) As Long
```

```
Dim iRet As Long
```

```
Dim DevIdx As Integer
```

```
DevIdx = 1      'Device index of the MX840A
```

```
Param(0) = 1    'Connector 1
```

```
Param(1) = 1    'ON
```

```
iRet=EA_IO.QuantumX.ExecuteControl(DevIdx,"EXTCALSIGNAL",2,Param)
```

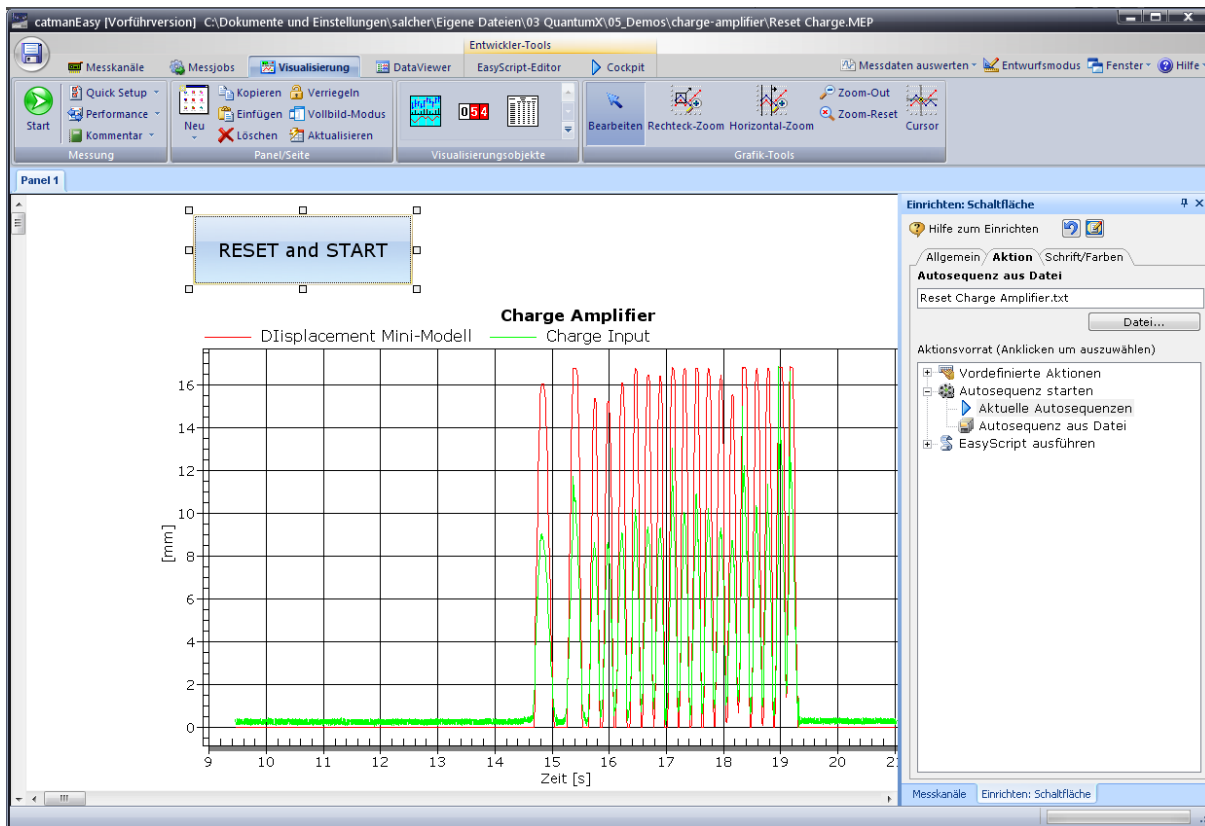
```
Wait 1
```

```
Param(0) = 1    'Connector 1
```

```
Param(1) = 0    'OFF
```

```
iRet=EA_IO.QuantumX.ExecuteControl(DevIdx,"EXTCALSIGNAL",2,Param)
```

```
End Sub
```



-- end

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