

TECH NOTE :: How to use the Digital Output of a QuantumX Amplifier

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Abstract

The QuantumX measurement amplifiers MX440A/B, MX840A/B, MX410/B or MX460/B or in general amplifiers with SubHD15 connector offer the possibility a digital output on pin 15 of the SubHD-15 connector which can be activated by the PC software like catmanEasy.

In general the Multi IO module MX879B offers 32 digital input or outputs which can be uses in real-time or online via PC software.

The digital output on the sensor connector makes sense in the following applications:

- Resetting a charge pre-amplifier from the PC software just before acquiring data
- Activating an external shunt for a channel health check or for calibration purposes
- Shunt of a HBM torque flange
- Alarm or limit switch based on a PC calculated alarm level

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 voltage, CAN or EtherCAT.

Charge Sensors

QuantumX supports IEPE (ICP®) and piezo-resistive type of sensors with the modules MX410/B, MX1601/B, MX840B and MX440B. Charge sensors are not supported natively but can be connect to a charge pre-amplifier like CMA or CMD from HBM. One effect of using a charge type sensor needs to be eliminated and this is drift. This drift needs to be reset cyclically or on measurement start when using pre-amplifiers.

The following set is necessary:

- Charge sensor
- Charge pre amplifier CMA / CMD from HBM
(TEDS not tested and not recommended because of too many adapters)
- Special QuantumX device plug including reset electronics
- Software catmanEASY performing this reset automatically or cyclically

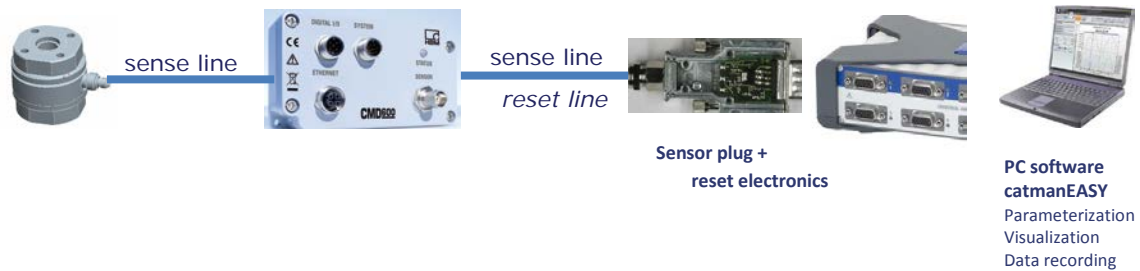
The measurement chain

Charge Sensor

HBM CMA/CMD

MX..

PC

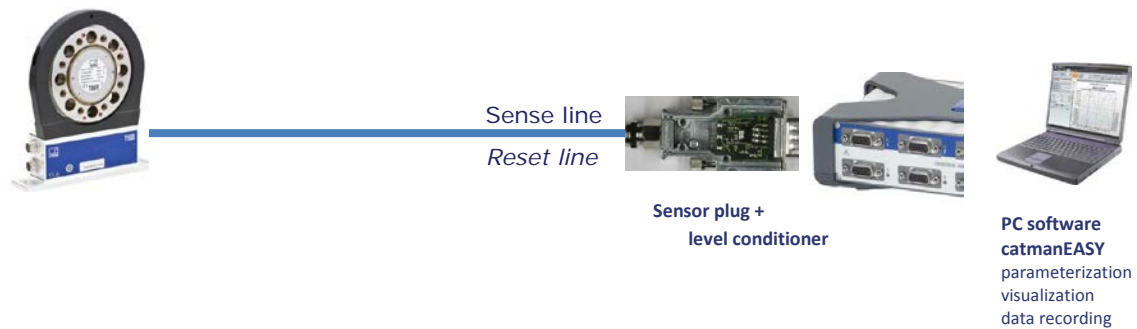


HBM Torque Sensors

Torque flange

MX..

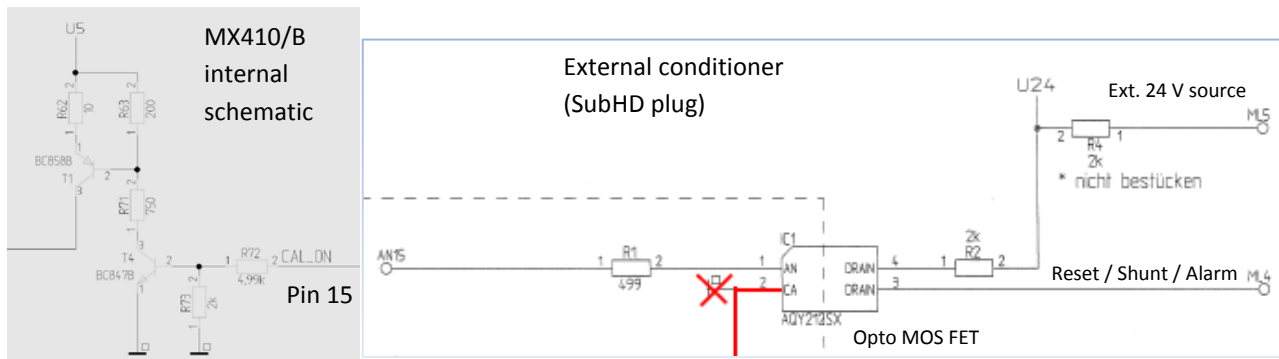
PC



Sensor plug including Reset Electronics

Both, CMA or CMD need a voltage supply of 18 – 30 V DC and need to be parameterized according to its sensor type. Reset signal needs to be in between 12 ... 30 V DC. For HBM torque flanges this voltage range is also acceptable. The above listed amplifiers offer an “**active digital output**” on low level (3,3 or 5 V) on pin 15 which needs to be conditioned to for example 24 V DC.

Logic State	MX410/B pin 15 see CAL_ON in schematic	MX460/B, MX440A/B, MX840A/B pin 15
Active Low	high impedance	high impedance
Active High Reset CMA / CMD	5 V, max. 28mA	3,3 V, max. 28mA



HBM can offer this adapter as service solution. Please go in contact with your sales responsible.

We recommend using an OPTO MOS FET type AQY212SX from Panasonic with a max gate current of 7mA. The complete conditioner can be soldered into a SubHD connector.

Y cable:

- 1) 24 V supply from external supply
- 2) Connection to CMA / CMD / torque flange
 - a. power supply from external supply
 - b. sense line
 - c. reset line (output from MOS FET)

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

Hint: only MX410/B 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. 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

