

catman Enterprise

DAQ SOFTWARE FOR HIGH CHANNEL COUNT SYSTEMS

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BUSINESS DOCUMENT

Focus Applications

MGCplus (been around for 30+ years) focuses on...

Structural Durability Testing

- ▲ Hundreds up to thousands of channels
- ▲ High channel per volume density
- ▲ Easy integration into control systems
- ▲ Precise synchronization
- ▲ Smart wiring schemes
- ▲ Intelligent data management

Precision Testing

- ▲ Calibration, wind tunnel testing, center of gravity testing
- ▲ Accuracy level of up to 0.0025 (25 ppm)
- ▲ Noise immunity through carrier frequency
- ▲ Full bridge in 6-wire configuration
- ▲ Proven reliability

MGCplus – Modular System Setup



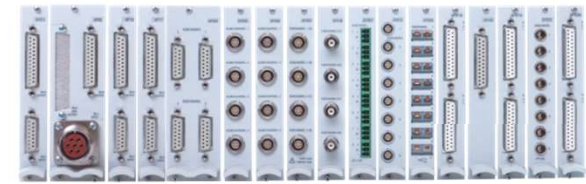
Housing types:
2, 6, 16 slots desktop housing
16 slots 19" rack
optional: with display unit



Communication processor

















Amplifier boards for
1, 4 or 8 analog channels
or special tasks



Connection boards for
1, 4 or 8 analog channels
or special tasks

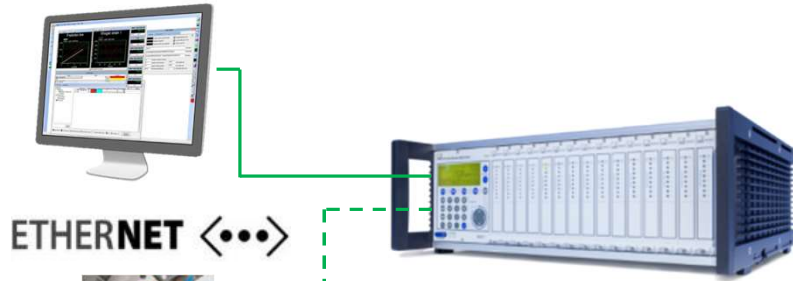


Connectable Sensor Types

Symbol	Input	To Measure
	Standardized voltage/current	Active transducers
	Voltage	75 mV, 1 V, 10 V, 60 V
	Thermocouples (K, J, T), Pt100	Temperature
	Resistance	5 kOhm range
	Strain gage (full bridge)	Force, pressure
	Inductive bridges, LVDTs, Potis	Displacement
	Strain gage bridges	Strain
	Velocity, Speed, Position, etc.	Frequency, Counter, PWM, etc.
	Acceleration, vibration	IEPE, Piezoresistive
	Frequency	Frequency input
	Digital	Torque
	CAN bus	CAN bus
	Digital (TTL)	Status information
	Measurement value output	Analog, digital, PROFIBUS

CP52 News

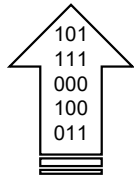
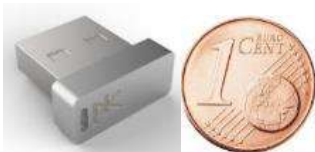
2 native Ethernet interfaces with enhanced connectivity (HBM Scan and DHCP)



UDP

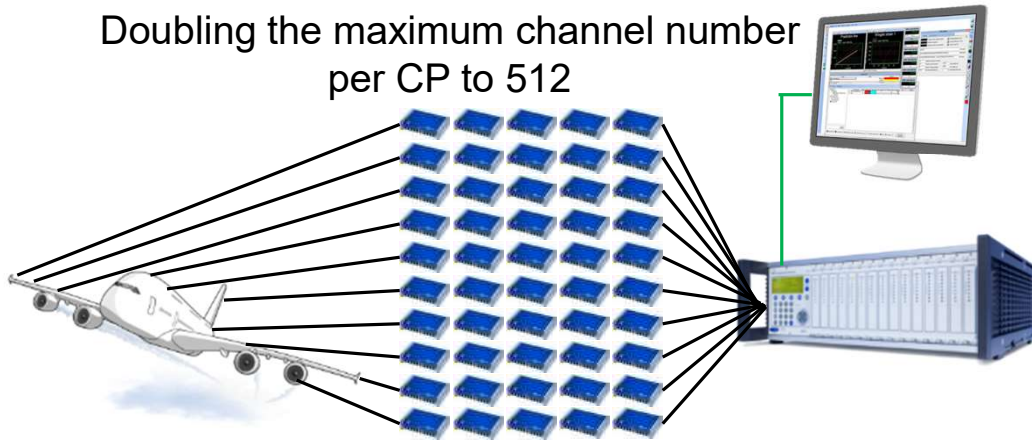
Easy measurement value output via UDP

Data recording with USB

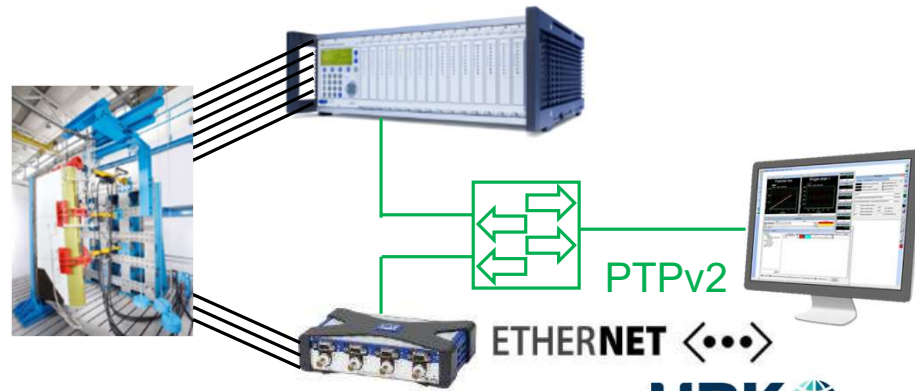


new FW update mechanism

Doubling the maximum channel number per CP to 512



PTPv2 synchronization to synchronize with other hardware like HBM's QuantumX product line or cameras



MX430B



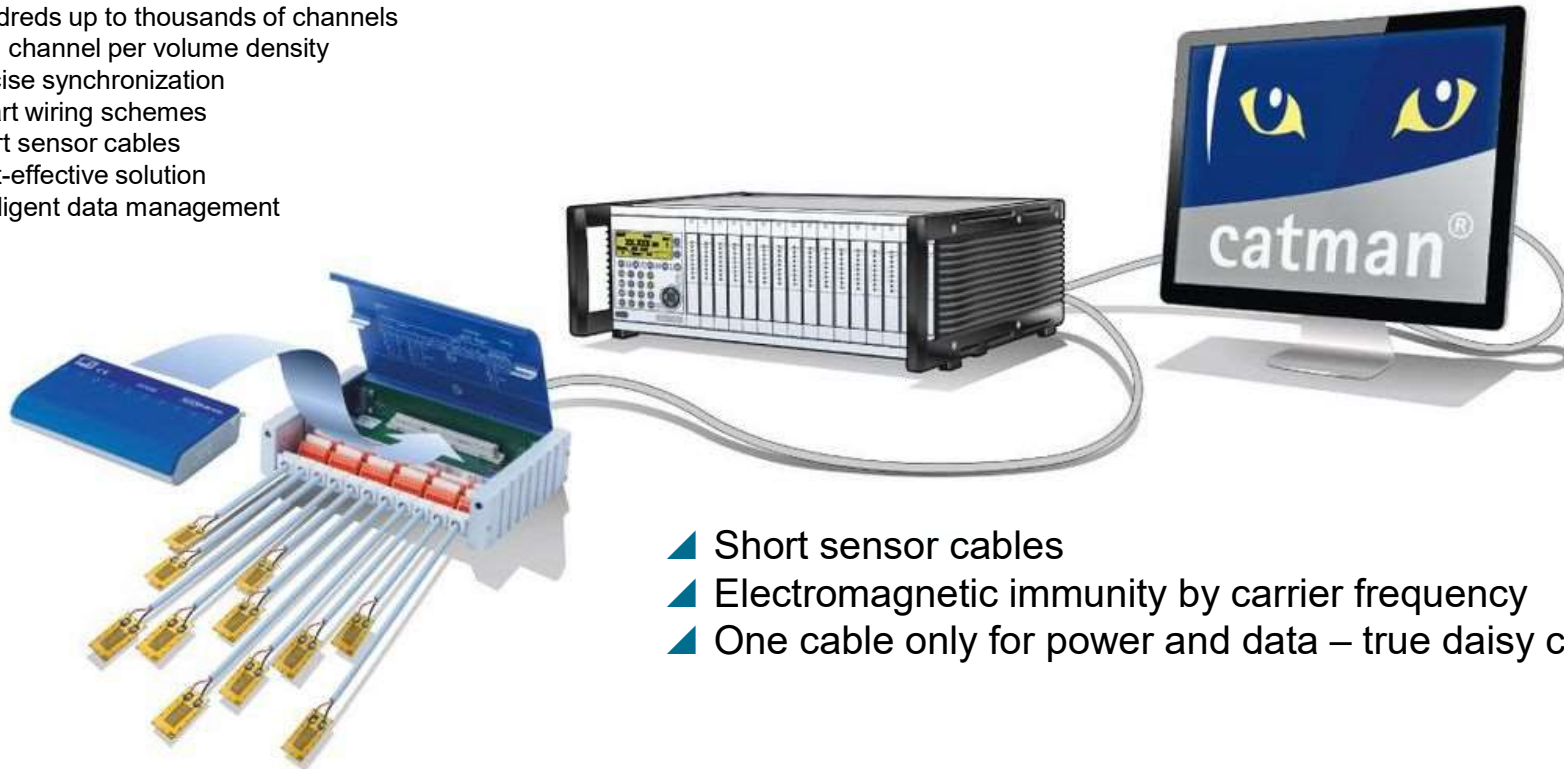
MGCplus Benefits for High-channel Count

- ▲ Patented 3-wire or 4-wire connection for strain gauges with cable resistance compensation and high-quality D-sub connectors
- ▲ 5-wire connection for half bridges and 6-wire connection for full bridges
- ▲ Autocalibration and autoadjustment routines
- ▲ Individual shunt resistors for each strain gauge bridge channel
- ▲ Wide variety of sensor inputs incl. LVDTs, IEPs, thermocouples
- ▲ Easy system topology
- ▲ Scalable in multiples of 8 channels




CANHEAD – the Natural Extension of MGCplus

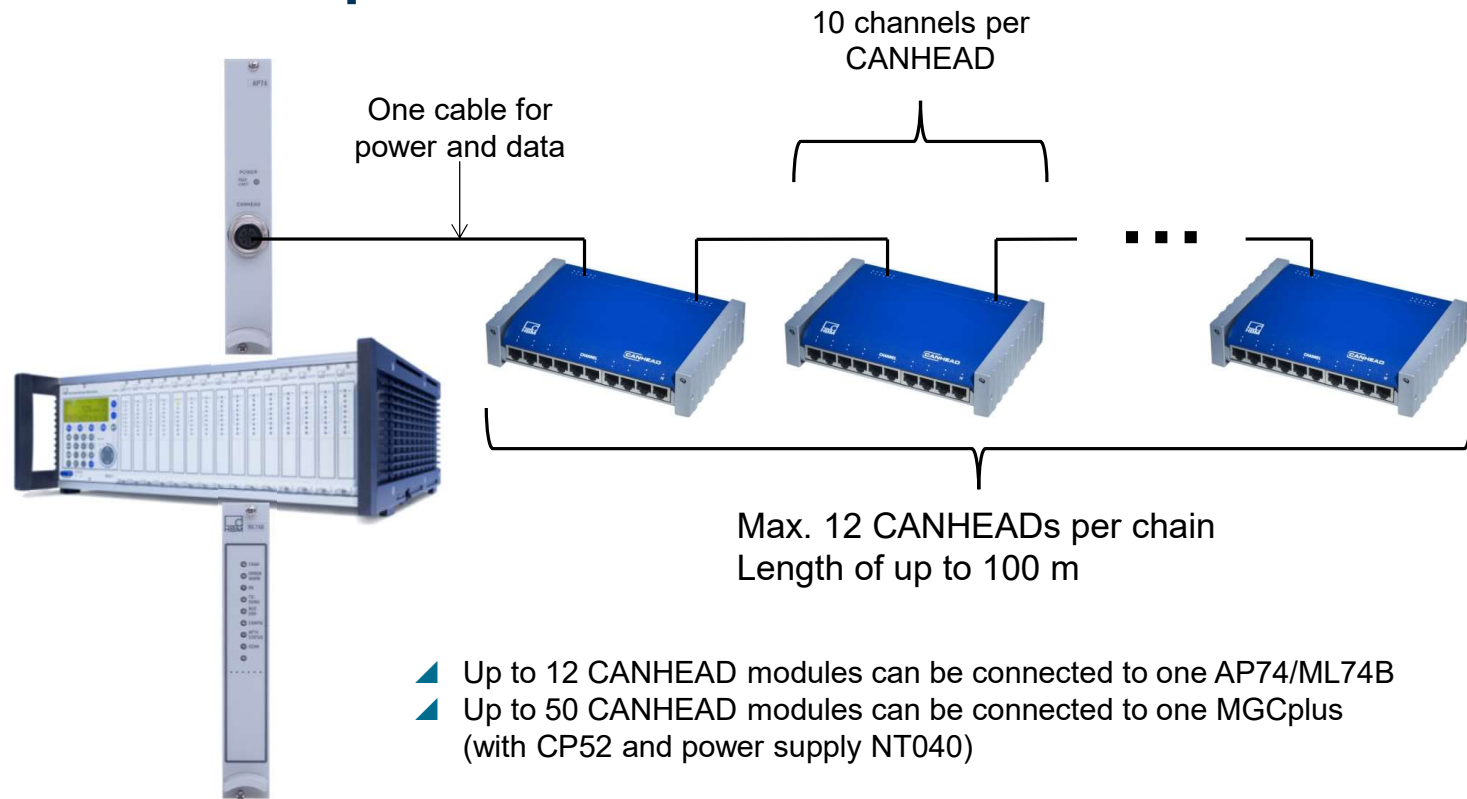
- ▲ Hundreds up to thousands of channels
- ▲ High channel per volume density
- ▲ Precise synchronization
- ▲ Smart wiring schemes
- ▲ Short sensor cables
- ▲ Cost-effective solution
- ▲ Intelligent data management



- ▲ Short sensor cables
- ▲ Electromagnetic immunity by carrier frequency
- ▲ One cable only for power and data – true daisy chain

Acquire  in static and quasi-static tests with up to 300 S/s*.

Connection to MGCplus

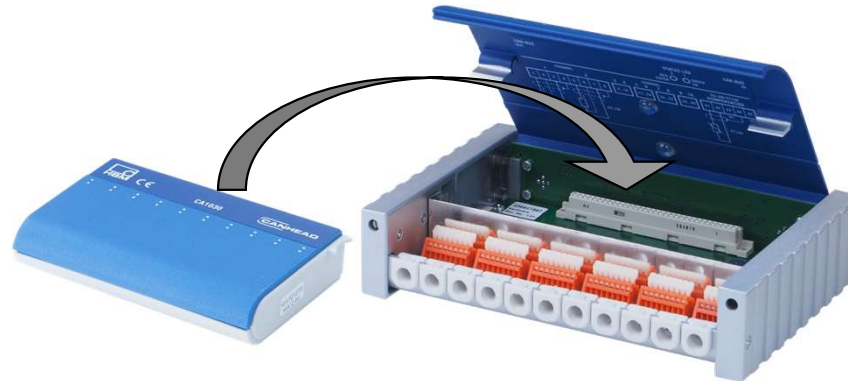


- ▲ Up to 12 CANHEAD modules can be connected to one AP74/ML74B
- ▲ Up to 50 CANHEAD modules can be connected to one MGCplus (with CP52 and power supply NT040)

MGCplus with

- ▲ CP52
- ▲ AP74
- ▲ ML74B

CANHEAD – System Configuration



Modular system concept



Base modules defining

- ▲ Sensor types
- ▲ Connector types



Amplifier modules

- ▲ Universal
- ▲ Hot swappable

Type Overview



Quarter bridge input



- ▲ CB1014-120 and CB1014-350
3-wire configuration
spring terminal connectors
- ▲ CB1015-120 and CB1015-350
3-wire configuration
spring terminal connectors



- ▲ CB1016-120 and CB1016-350
4-wire configuration
RJ45 connectors

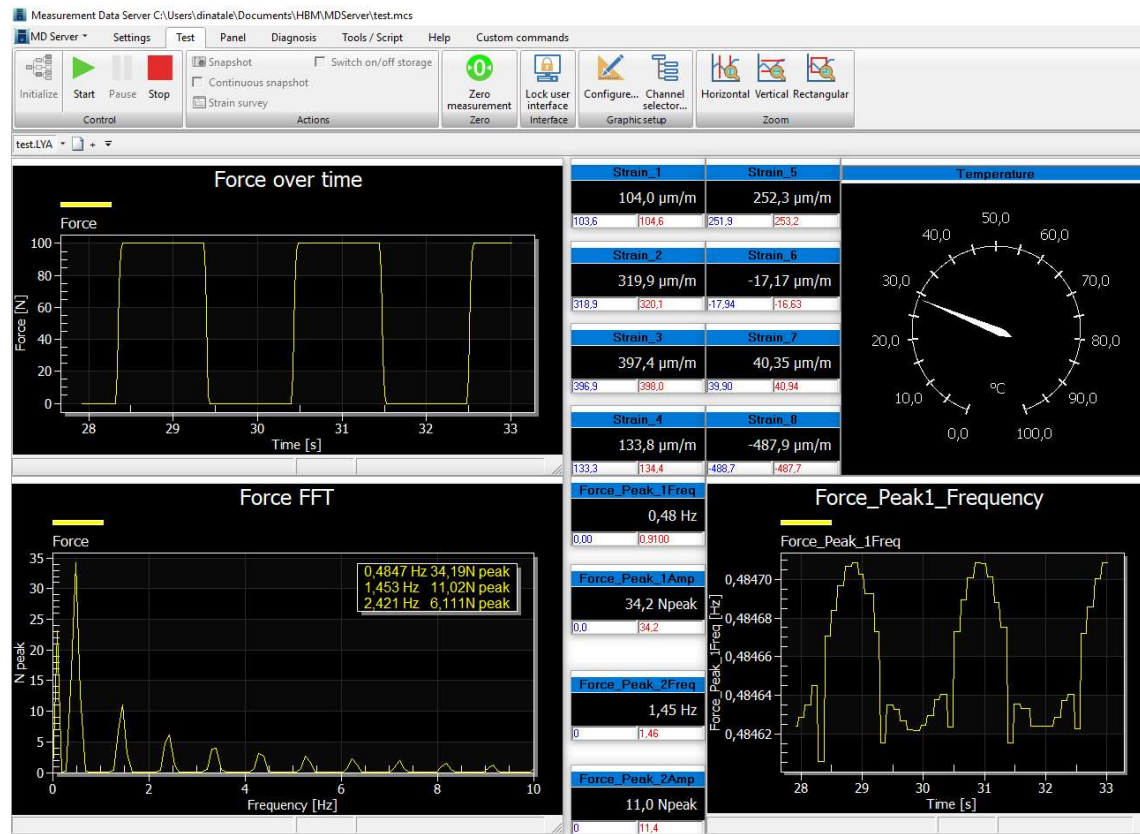


Full and half bridge input
High level (voltage) input

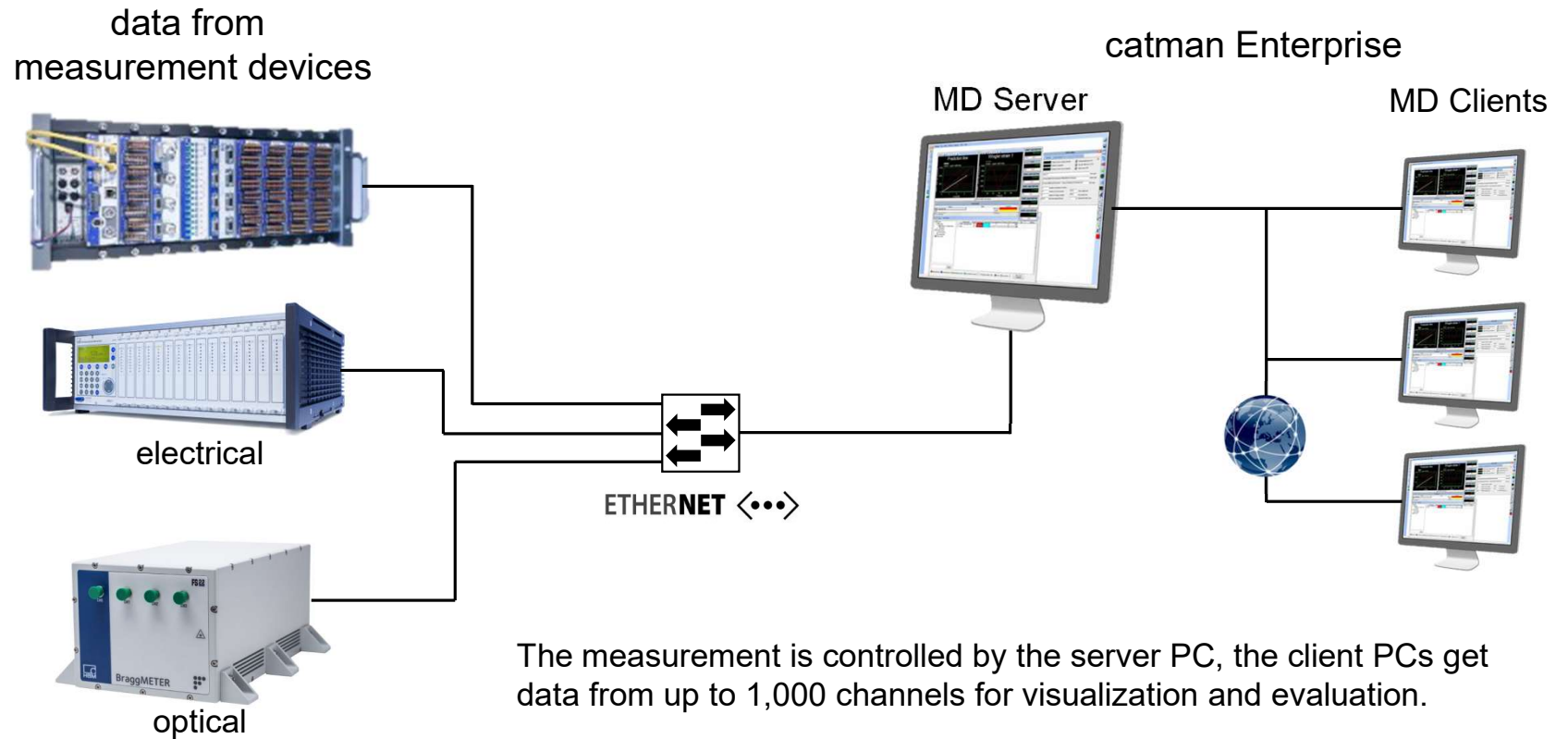


- ▲ CB1010
5-wire configuration for half bridges
6-wire configuration for full bridges
RJ45 connectors

Catman Enterprise 8.X.X

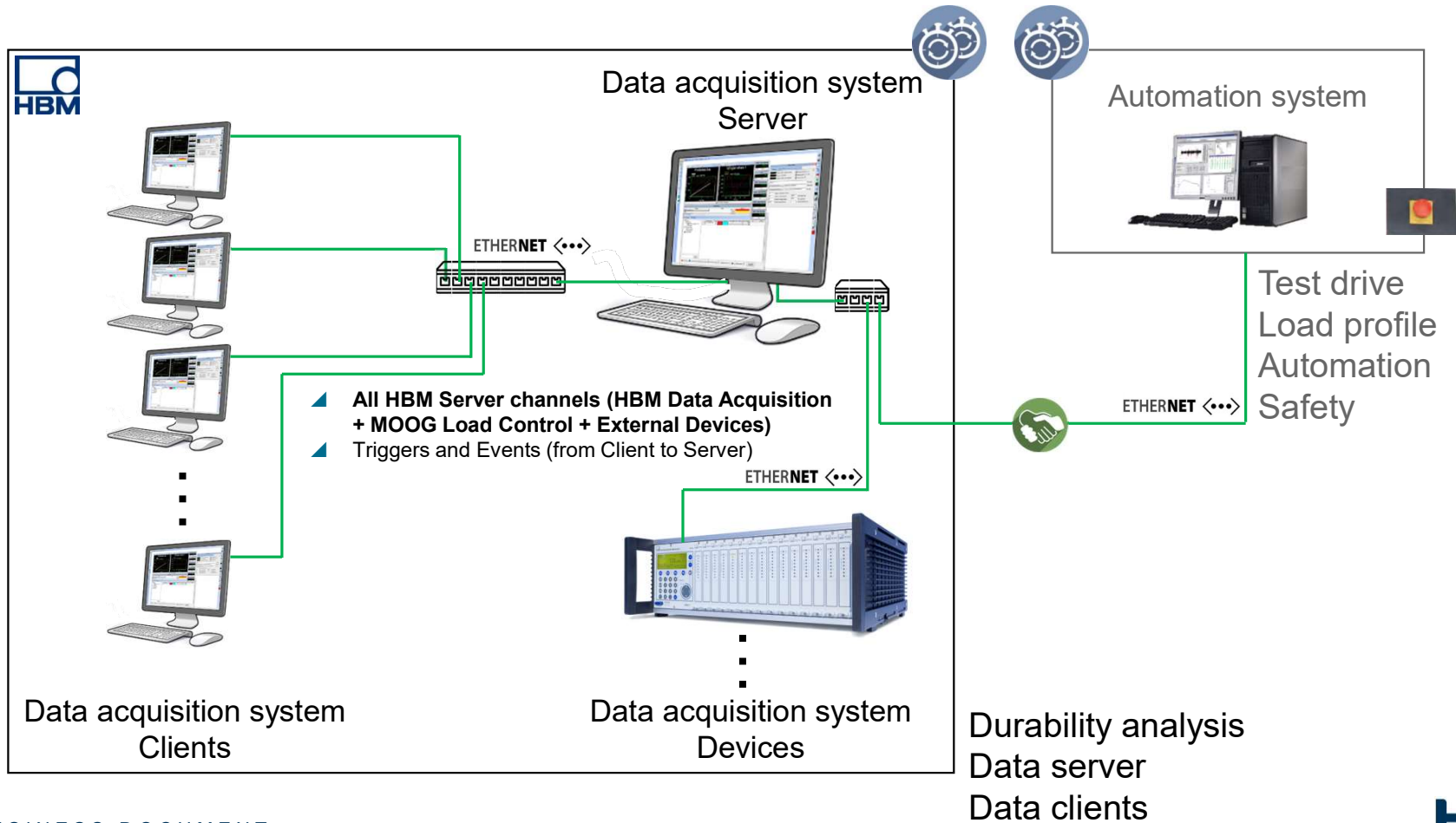


Client / Server Architecture Allows for Sharing Data.

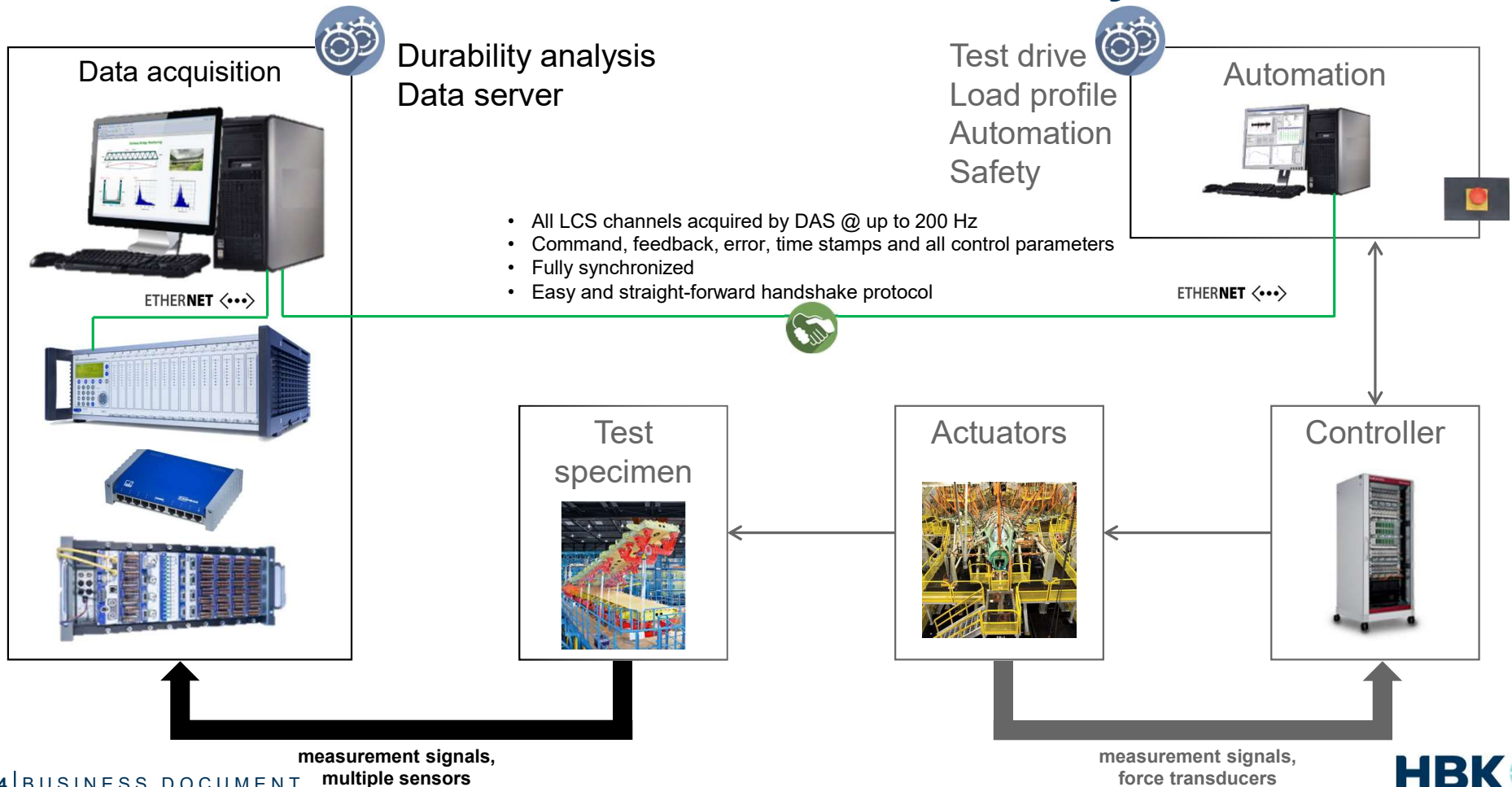


The measurement is controlled by the server PC, the client PCs get data from up to 1,000 channels for visualization and evaluation.

Comprehensive Test Setup



Software Communication with Load Control System



All Hardware at a Glance

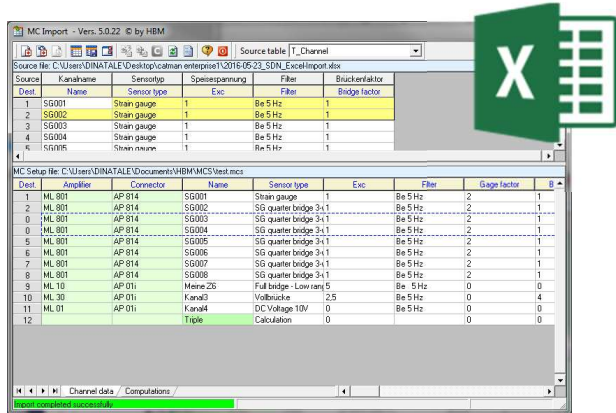
- ▲ The matrix-like hardware overview shows the available DAQ system in a clear structure.

MC Setup 7.0.6 E:\test\TestWinServ2012\alltest2.mcs

File Help

IP address	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8	Slot 9	Slot 10	Slot 11
MGCplus_1 172.19.160.101	ML 801 AP 836	ML 801 AP 815	ML 801 AP 801	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 409	ML 801 AP 815	ML 801 AP 835	ML 801 AP 815
MGCplus_2 172.19.160.103	ML 74 AP 74	ML 74 AP 74	ML 74 AP 74	ML 74 AP 74							
MGCplus_3 172.19.160.104	ML 801 AP 801	ML 801 AP 814	ML 801 AP 810	ML 801 AP 801	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815
MGCplus_4 172.19.160.105	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 836	ML 801 AP 801
MGCplus_5 172.19.160.106	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 815	ML 801 AP 810	ML 801 AP 810	ML 801 AP 810	ML 801 AP 810	ML 801 AP 836
CX27_V-SK_2 172.19.160.111											
MX410_1 172.19.160.111	MX 410 ---	MX 410 ---	MX 410 ---	MX 410 ---							
MX410_2 172.19.160.111	MX 410 ---	MX 410 ---	MX 410 ---	MX 410 ---							
MX460_1 172.19.160.111	MX 460 ---	MX 460 ---	MX 460 ---	MX 460 ---							
MX460_2 172.19.160.111	MX 460 ---	MX 460 ---	MX 460 ---	MX 460 ---							
MX460_5 172.19.160.111	MX 460 ---	MX 460 ---	MX 460 ---	MX 460 ---							
MX840_12 172.19.160.111	MX 840 ---	MX 840 ---	MX 840 ---	MX 840 ---	MX 840 ---	MX 840 ---	MX 840 ---	MX 840 ---			

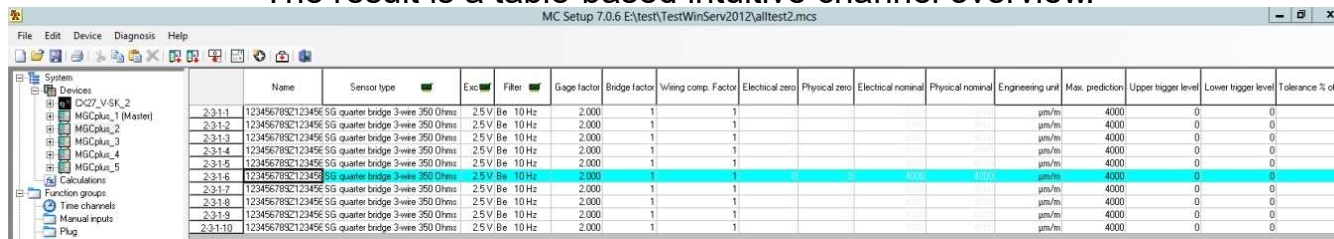
Easy Channel Parameterization Saves Time.



Predefined and spreadsheet-imported channel parameters are merged with the hardware.

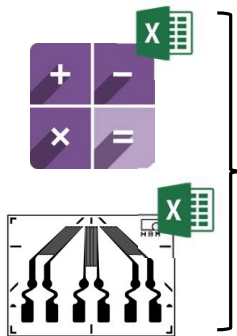


The result is a table-based intuitive channel overview.



Clear Structures Help to Focus.

User-specific calculations can be created in a context menu or spreadsheet-imported.



MC Setup 7.0.6 E:\test\TestWinServ2012\alltest2.mcs

Name	Sensor type	Exc	Filter	Gage factor	Bridge factor	Wiring comp. Factor	Electrical zero	Physical zero	Electrical nominal	Physical nominal	Engineering unit	Max. prediction	Upper trigger level	Lower trigger level	Tolerance % of pre
2-3-1-1	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-2	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-3	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-4	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-5	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-6	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1			4000	4.000	µm/m	4000	0	0	
2-3-1-7	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-8	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-9	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	
2-3-1-10	1234567892123456 S/G quarter bridge 3-wire 350 Ohms	2.5 V Be	10 Hz	2.000	1	1					µm/m	4000	0	0	

left wing

right wing

Intuitive search functions help to find single channels among 1,000s.

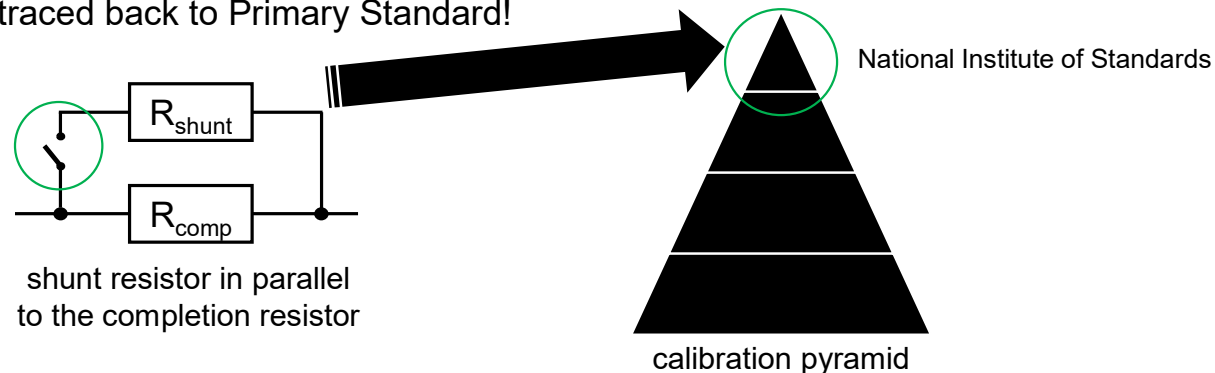
By logical channel grouping engineers can easily focus on their relevant components.

Channel Health Check

- With the channel health check a quick diagnosis for all quarter bridge amplifiers is just a click away.
- Beyond the correct wiring, OK/NOK gives feedback if the amplifier is still working correctly.

	Conn. plate number	Check sensor wiring Channel name	Reading MEAS (Net)	Reading absolute	Cable length comp.	Reading ZERO	Reading CAL	Reading shunt	Shunt nominal	Wiring OK/NOK (0.50%)	Error status
1-1-1	191024008	SG001	663 µm/m	663 µm/m	NA			2012 µm/m	2016 µm/m	OK	No Error
1-1-2	191024008	SG002	-17629 µm/m	-17629 µm/m	NA			2014 µm/m	2016 µm/m	OK	No Error
1-1-3	191024008	SG003	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-1-4	191024008	SG004	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-1-5	191024008	SG005	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-1-6	191024008	SG006	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-1-7	191024008	SG007	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-1-8	191024008	SG008	OVFL		NA			OVFL	2016 µm/m	NOK	GROSS OVERFL
1-2-1	801043597028	Channel_01_02_001	OVFL		NA			NA NA		NA	TRANSDUCER ERR
1-3-1	801043597022	Meine Z6	-0.00790 kg	-0.00790 kg	NA			NA NA		NA	No Error
1-4-1	801032595014	Channel4	2.906 Volt	2.906 Volt	NA			NA NA		NA	No Error

An in-built precision shunt resistor for each quarter bridge channel generates a well-known measurement signal – traced back to Primary Standard!



Several Trigger Options Ensure to Capture All Important Events.

Standard triggers

Value > threshold
 Value < prediction line

Dig In

Peak Detect



Snapshot (single, continuous)

Message

Dig Out

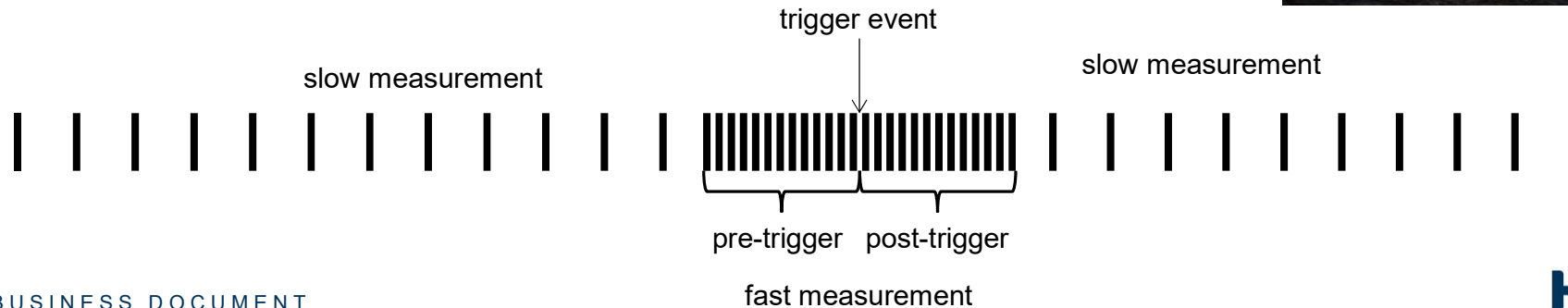
E-mail

Log entry

VB Script

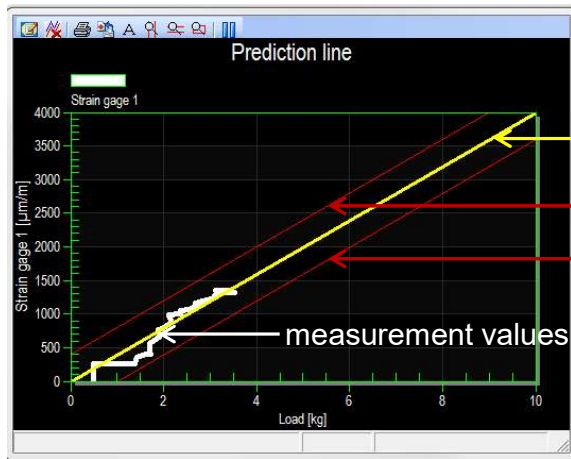
Special feature fast trigger:

While for the most time lower sample rates are adequate, in case of sudden events a more detailed time resolution is needed.



Application-specific Visualizations

Besides standard visualization objects like digital indicators or real-time graphs catman Enterprise offers a lot more...



prediction line

tolerance band

measurement values

monitoring expected strains vs. applied load

Configure load level visualization

Channel	100 %	Load level	Color
1 Load	10	1	Green
2 Strain gage 1	500	2	Yellow
3 Strain gage 2	1000	3	Orange
4 Voltage 1	10	4	Red
5		5	
6		6	

Buttons: Help, OK, Cancel

Load levels

Channel	Signal	Load level
Load	7.238 kg	Red
Strain gage 1	315.3 µm/m	Yellow
Strain gage 2	316.0 µm/m	Orange
Voltage 1	0.0000312 V/m	Green

indication of several load levels in one shot

Limit Checking

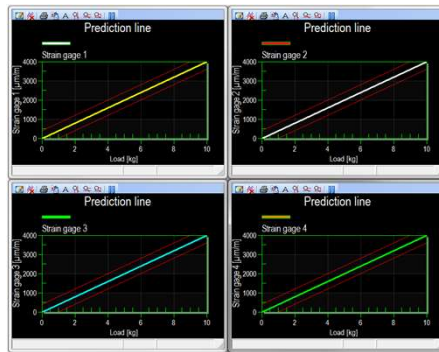
Channel name	Check	Upper level	Lower level	Check: prediction line	Tolerance %	Max. prediction	Unit	VB Proc
1 Strain gage 1	✓	Red	Cyan	✓	10	4000		
2 Strain gage 2	✓	Red	Cyan	✓		4000		
3 Load	✓	Yellow	Blue		0	10		
4 Voltage 1	✓	Yellow	Blue		0	100		

Legend: Upper limit active (Red), Lower limit active (Blue), Upper limit once active (Yellow), Lower limit once active (Cyan), Checking overflow value (Grey), active (Brown), once active (Orange), Show active channels

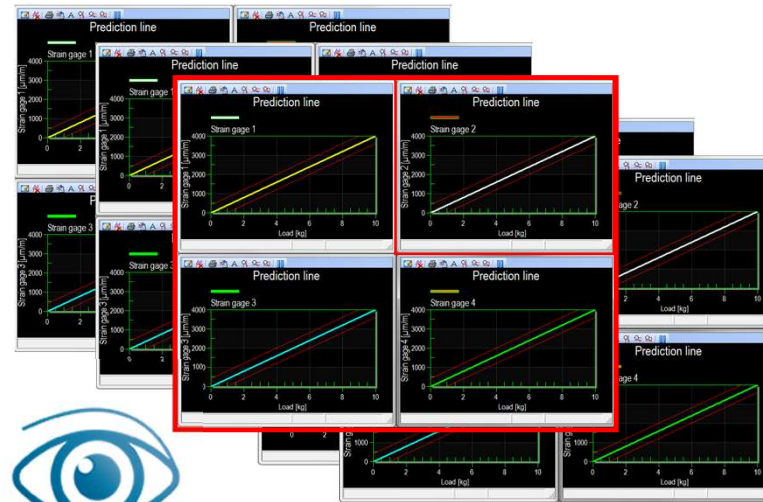
checking of pre-defined limits for many channels in one spreadsheet

MD Client Visualization Features

Multiplication of visualization panels and auto pop-up



Easy multiplication of visualization panels via *.csv saves time.



spotting the right channel among 1,000s

Limit Checking

Auto Pop-up

Channel name	Check	Upper level	Lower level	Check prediction line	Tolerance %	Max. prediction	Unit	VB Proc
1 Strain gage 1	<input checked="" type="checkbox"/>		0	<input checked="" type="checkbox"/>	10	4000		
2 Strain gage 2	<input checked="" type="checkbox"/>		0	<input checked="" type="checkbox"/>	0	4000		
3 Load	<input checked="" type="checkbox"/>		0	<input checked="" type="checkbox"/>	0	10		
4 Voltage 1	<input checked="" type="checkbox"/>		0	<input checked="" type="checkbox"/>	0	100		

Upper limit active
 Lower limit active
 Upper limit once active
 Lower limit once active
 Checking overflow value
 active
 once active
 Show active channels

auto pop-up of panels with channels exceeding user-defined limits

Easy Data Export and Analysis



export to various data formats



- catman standard format
- ASCII
- MS Excel
- NI DIAdem
- CAEMax RemusLAB
- FlexPro
- RPC III
- MDF 3
- MDF 4

Prenscia 

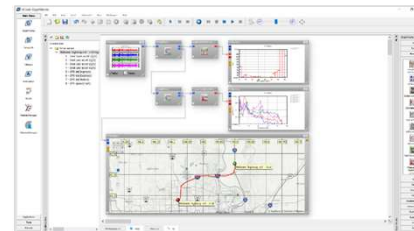


share and evaluate data



... and benefit from HBM Prenscia's first-class analysis tools

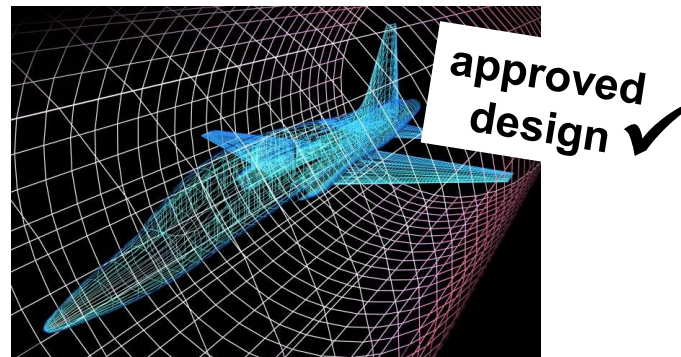
 **GlyphWorks**



 **Aqira**



measurement data

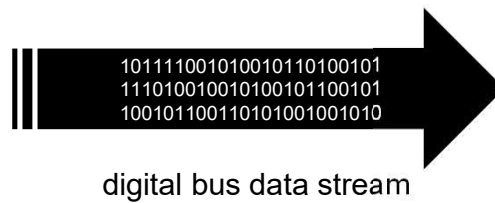


Integration of Avionics Buses

Digital bus data (ARINC 429 and MIL-STD-1553) can be acquired alongside physical sensor data in one system to get one data file with synchronized measurement values.



MIL-STD-1553 in military and spacecraft

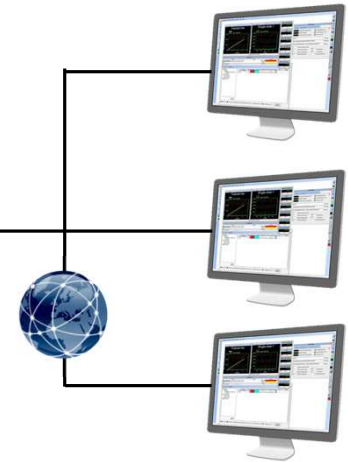


digital bus data stream



MD Server

catman Enterprise



MD Clients

For Whom Is catman Enterprise Designed?

For users who ...



have large numbers of measurement channels



want to share measurement data with others in real time



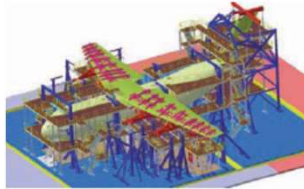
are typically active in the aerospace industry



mostly prefer turnkey solutions

Why Do These Users Choose catman Enterprise?

... because the software has been developed with and for them!



It has never been easier to configure, acquire and visualize 1,000s of measurement channels:

- + Intuitive channel structure (logical channel grouping, filter, search, health check)
- + Client / Server system
- + Communication with control system
- + Event logging / protocol
- + Special trigger mechanisms (fast measurement, snapshot)
- + Application-specific visualizations (prediction lines, load level visualization, limit checking)
- + Electrical and optical strain gages from one hand in one software
- + User administration
- + Enhanced customized functionality (Visual Basic Scripting Engine)

Questions?

- ▲ Please type any questions you have into the WebEx Q&A dialog
- ▲ You can open the Q&A window by selecting the “Q&A” icon in the WebEx toolbar at the top of your screen:



- ▲ Today’s presentation will be E-mailed to all attendees. The webinar will also be posted on our website: <http://www.hbm.com/en/3157/webinars/>
- ▲ If you have additional technical questions, feel free to contact our Americas technical support team at support@usa.hbm.com or the European technical support team at support@hbkworl.com.



Thank You