Q.station 101

Test Controller

The Q.series has been designed for demanding measurements found in today's most industrial measuring and testing environments. The range of applications starts from single standalone solutions up to networked multi-channel applications in the field of component testing, engine testing, process performance testing and structural monitoring.

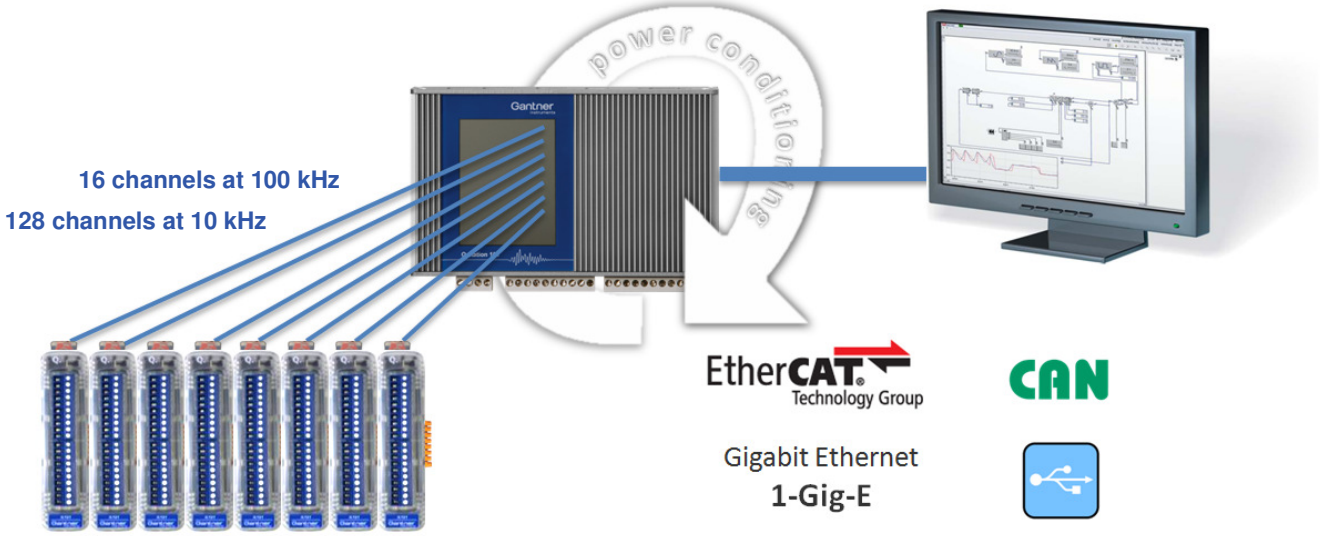
The range and flexibility of the modules allows an optimized solution for each single task: Dynamic signal acquisition up to 100 kHz, in/outputs for all types of signals, galvanic isolation of in/outputs, multi-channel solutions, high density packaging and intelligent signal conditioning.

Data exchange between Test Controller and automation level is communicated via Ethernet TCP/IP, CAN or fieldbus system EtherCAT as well as master or slave. Further Ethernet based industrial standards are in preparation.

Most important features:

- **Very high data rates up to 100 kHz each channel**
  100 kHz at 16 channels, 10 kHz at 128 channels
- **64 Q.bloxx modules connectable**
- **Ethernet interface for configuration and data output**
  1 Gig-E, TCP/IP, UDP, up to 16 MB/s
  Modbus TCP/IP, ASCII, High Speed Port
  Web server, web client and e-mail
- **Fieldbus interface**
  EtherCAT-Slave, 1024 variables read and write at 10 kHz
  1 x CAN, 2 x USB 2.0, 4 MB/s
- **Synchronization and time stamp of measurement values**
  IRIG 2 based master slave principle on RS485 standard
  system synchronization ±1 µs applicable
- **Data buffer memory dyn. 500 MByte, stat. 4 GByte**
  expandable over USB (up to 1000000 measurements/s) and SD card
- **8 digital I/O**
  direct connection of encoder for fast angle measurement
  frequency , PWM and counter measurements, state signals
- **Display (D versions)**
  3.5" full VGA 480 x 640 pixel
- **PAC functionality with extensive library (T versions)**
  fast PID controllers, process control, data logging, transfer functions, mathematics, Boolean combinations, function generators
- **Versions**

	display, 3,5" VGA, 480x640, touch screen	PAC graphical programming test.con, incl. HMI designer
Q.station		
Q.station T		x
Q.station D	x	
Q.station DT	x	x



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Micro Controller	
Typ	Atom Z530; 1,6 GHz
RAM	1 GByte, 500 MByte available for data memory
Flash	4 GByte
Real Time Clock (RTC)	Battery buffered
Watchdog	programmable
OS	Real Time Linux
Ethernet Interface	
Number of channels	2048 Byte Data (512 variable read and 512 variable write)
Baud Rate	1 Gigabit/s (1-Gig-E)
Data rate	Online and block transfer up to 16 MByte/s (32 variables at 100 kHz)
Protocolls	TCP/IP, UDP, Modbus/TP/IP, ASCII, High Speed Port
	Webserver and WebClient
Isolation voltage	500 V
EtherCAT Interface - Slave	
Standard	Ethernet
Number of channels	1024 Byte Data (253 variables read and 253 variables write)
Baud Rate	100 Mbps
Cycle time	≥100 µs
Isolation voltage	500 V
CAN Interface	
Number	1
Kind	pure CAN
Configuration	per DBC files
Optional	CANOpen
RS 485 Slave Interfaces	
Number	4
Baud rate	9,6 kbps up to 48 Mbps (500.000 measurements/s)
Connectable devices	max. 16 modules at one UART
Isolation voltage	500 V
USB Interface	
Number	2
Version	USB 2.0
Data rate	Up to 4 MByte/s (up to 1.000.000 measurements/s)

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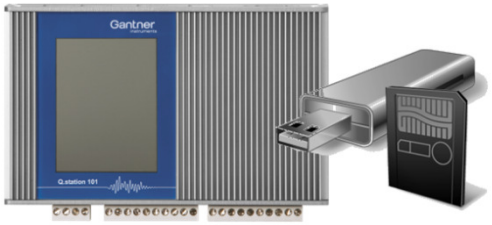
SD-Card Slot	
Use	Interface for data logging, Interface for firmware update
Logging without Limits	 **500 MByte RAM** **4 GByte Flash** **2 x USB; 4 MByte/s** **SD Card**
Digital Inputs	
Number	8
Function	configurable counter, frequency, PWM and state signals digital encoders focusing with angle synchronous measurement
Input voltage / Input current	max. 30 VDC / max. 1.5 mA
Upper switching threshold	>3,5 V (high)
Lower switching threshold	<1,0 V (low)
Digital Outputs	
Number	4
Function	configurable watchdog and dead man function
Type of output	Open Drain p-channel MOSFET
Output voltage / Output current	max. 30 VDC / max. 100 mA
Synchronization of a Multi Test Controller System	
Interface	RS485 Standard
Mode	Master Slave Prinzip, IRIG 2 Standard
	Synch. master and slave
Accuracy	System synchronization ±1 µs
Power Supply	
Power supply	10 to 30 VDC, over voltage and overload protection
Power consumption	approx. 12 W
Electromagnetic Compatibility	
According	EN 61000-4 and EN 55011

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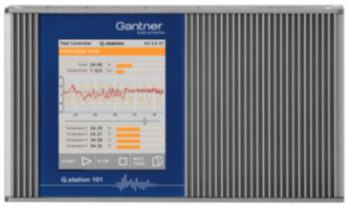
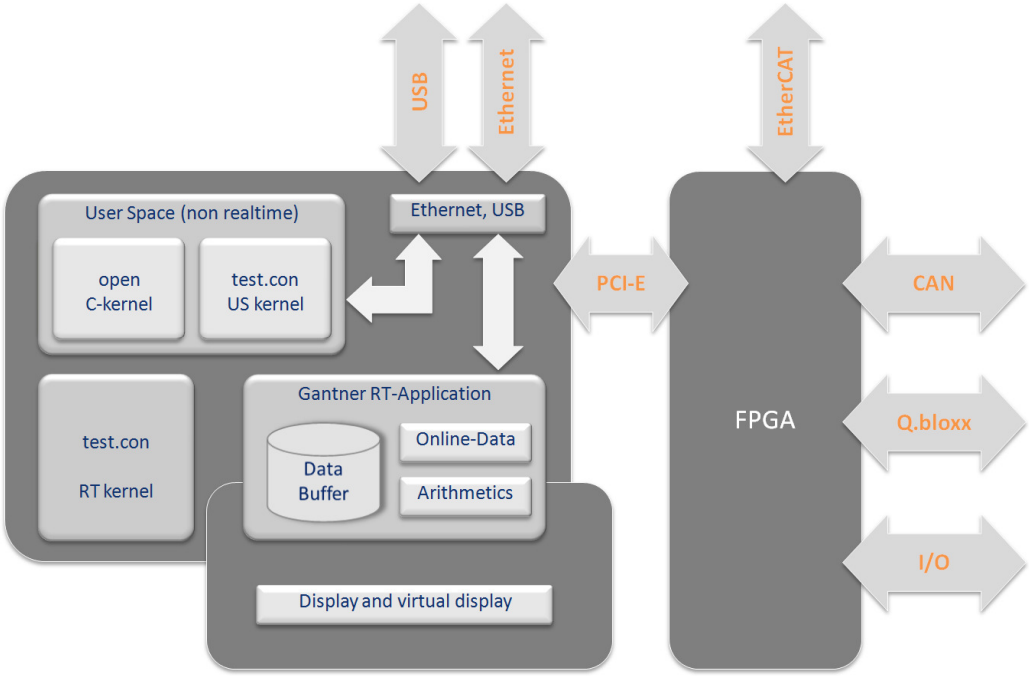
Display (optional)	
Display	3.5“ full VGA, 480 x 640 dots
Screen	Capacitive touch screen behind real glass
Configurable	Programmable display content by using test.con Studio
VNC support external display connection optionally	 **Full VGA (D version) capacitive touch screen programmable display content (DT version)** 
Environmental	
Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +85°C
Relative humidity	5 % to 95 % at 50°C, non condensing
Mechanical	
Case	Aluminium
Dimensions (W x H x D)	(175 x 110 x 55) mm
Weight	900 g
Mounting	DIN EN rail

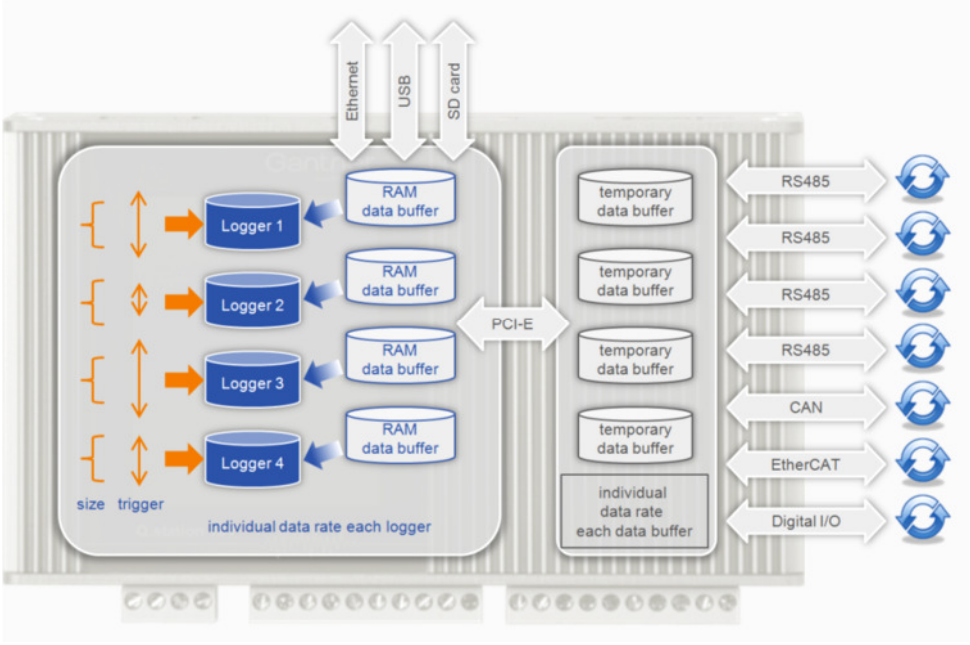
Functional Diagram



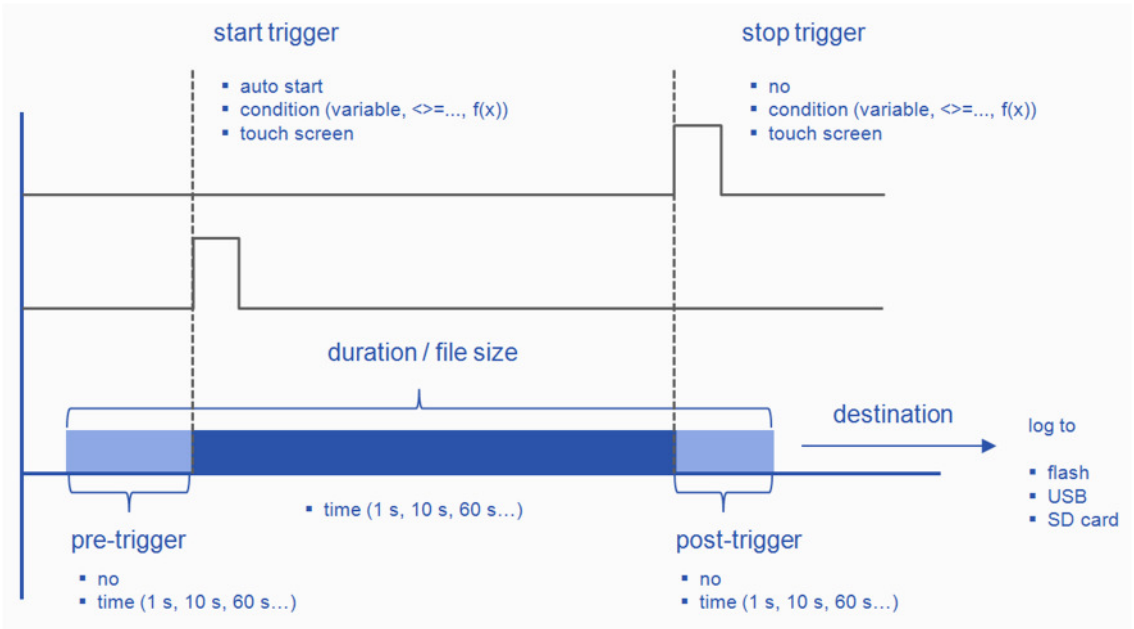
Logging function

With Test Controller Q.station a very flexible and powerful data logging is possible.

Four data buffers (RAM) with different configurable data rates can be assigned to the measurement and I/O signals.



According to the configuration of up to 4 loggers occurs the logging of the buffer data at a selectable medium (intern. Flash, USB, SD-Card) with selectable logging rates, storage duration, start and stop trigger (auto start, condition, touch) with or without pre- and post-trigger.

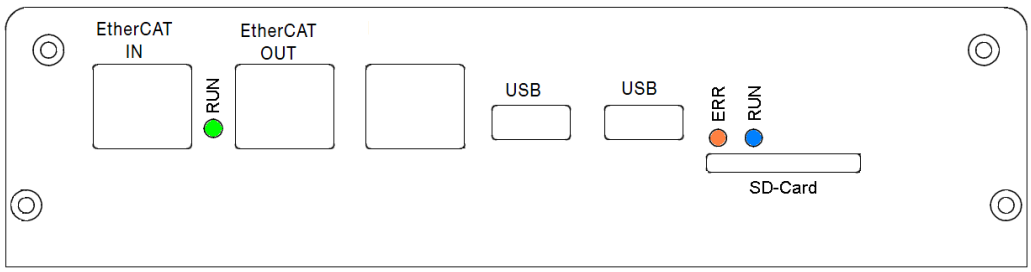


Exemplary logger configuration with the software test.commander

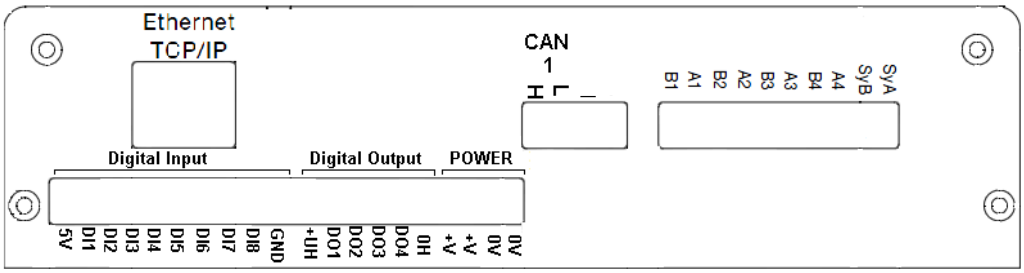
Sample rate	
Count:	1
Sample rate #1	
Name	fast
Sample frequency	10000 Hz
Buffer size [Bytes]:	5000000
Logging settings	
Number of separate loggers:	1
Datalogger #1	
Name	Logger 1
Logging to this buffer	activated
Data source	#1 ... fast
Logging rate	1000 Hz
File size	Seconds
Value	600
Logging duration	Seconds
Value	600
Logging destinations	
Count:	2
1st priority	USB
2nd priority	SD-Card
Start trigger	condition
Variable	Strain
Condition	>
Value	300
Pre-trigger	Seconds
Value	60
Stop trigger	condition
Variable	Strain
Condition	<
Value	100
Post-trigger	Seconds
Value	30

Connections:

Top view:



Bottom view:



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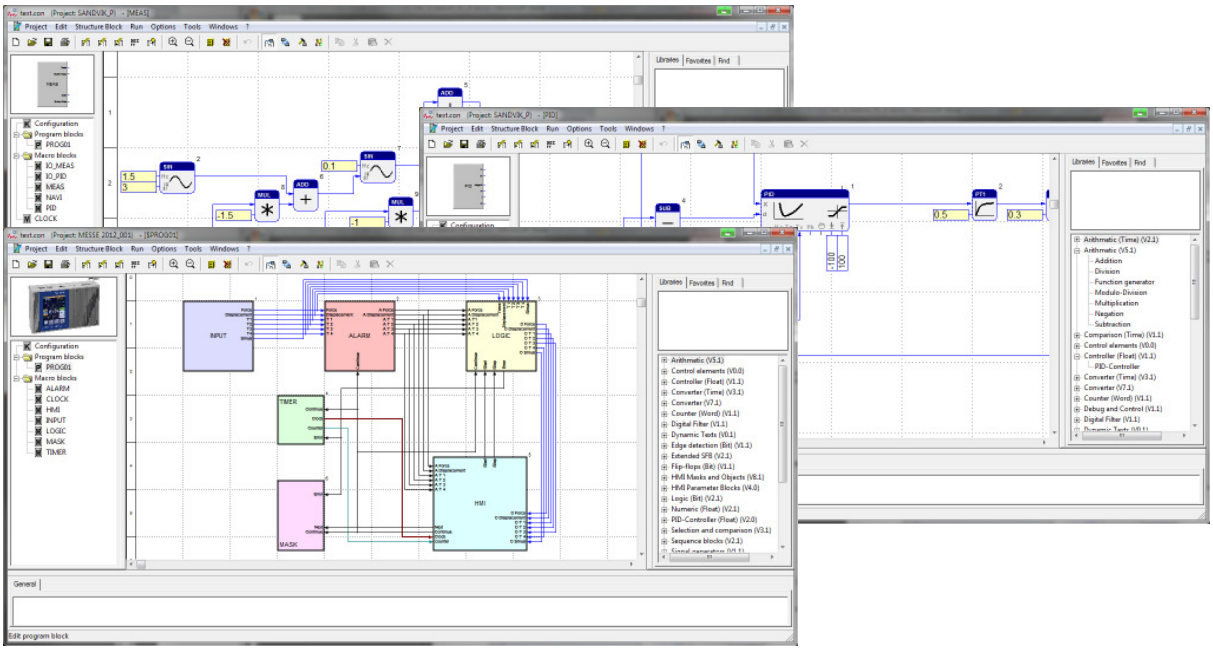
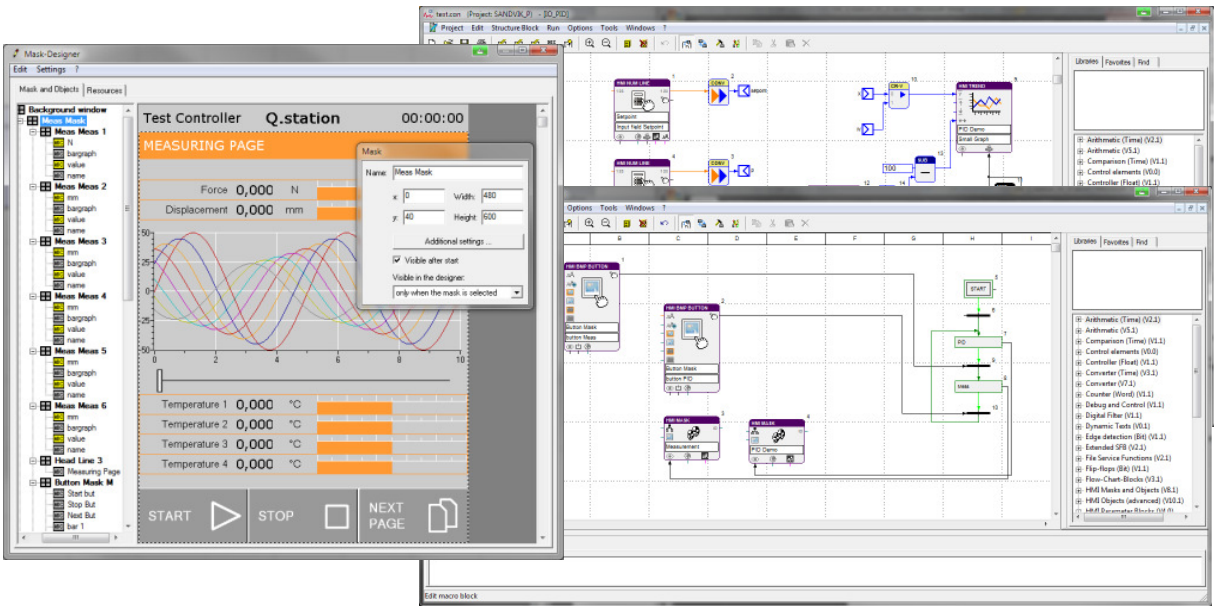
Graphical programming of real-time functions (T version) and additionally an individual display and touch function (DT version) with test.con Studio

With test.con Studio it is possible to program graphically application-specific functions (control flow calculations, calculations, controller, combinations etc), and to design an individual display and control panel (touch screen of the controllers or PC) and load this package into the Controller Q.station T or Q.station DT.

Create functionality using a library of function blocks:



Designing the display of the Q.station or the PC screen, followed by combining the signals with visualization and operating elements:



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Downloading the application into the test controller Q.station and/or into the PC to run on the run time version of test.con Studio.
Operation and visualization over Q.station, PC or mobile device via VNC:

Due to the separation of real time and user tasks of the controller (real time kernel, user kernel) it is warranted that pretentious high speed tasks like dynamic logging or fast PID will run stable and independent from the very flexible and individual tasks like visualization and operation.
No influencing of the real time kernel by the user kernel – a firewall in the device.