Automotive
Energy & Power Analysis
Aerospace & Defense
Transportation
General Test & Measurement

DEWE-5x-USB2-xx

Technical reference manual

ISO9001

Re-inventing Data Acquisition

worldwide
DEWETRON
www.dewetron.com

Thank you!

Thank you very much for your investment in DEWETRON's unique data acquisition systems. These are top-quality instruments which are designed to provide you years of reliable service. This guide has been prepared to help you get the most from your investment, starting from the day you take it out of the box, and extending for years into the future.

This guide includes important startup notes, as well as safety notes and information about keeping your DEWETRON system in good working condition over time.

We strongly suggest that you read this entire manual, especially the safety and care sections, as well as to avoid damaging your DEWETRON system.

What is the DEWE-5x-USB2-xx?

This product is used for measuring of different physical and/or electrical sizes (depending on model or configuration). The connection is depending on model or configuration and takes place via safety banana plugs, BNC connectors (± 50V max.), D-SUB connectors (± 50V max.), thermocouple connectors (± 50V max.), BINDER® connectors (± 50V max.) or LEMO® connectors.

Preface

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Training

DEWETRON offers training at various offices around the world several times each year. DEWETRON headquaters in Austria have a very large and professional conference and seminar center, where training classes are conducted on a regular basis starting with sensors and signal conditioning, A/D technology and software operation. For more information about training services, please visit:
http://www.dewetron.com/support/training

Dewetron Inc. in the USA also has a dedicated training facility connected to its headquarters, located in Rhode Island. For more information about training services in the US, please visit:
http://www.dewamerica.com/support/training

Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your DEWETRON data acquisition system is delivered, it is calibrated at our DEWETRON headquater. Each of this system is delivered with a certificate of compliance with our published specifications. Detailed calibration reports from our calibration system are available for purchase with each order. We retain them for at least one year, so calibration reports can be purchased for up to one year after your system was delivered.

Support

DEWETRON has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or DEWETRON directly.

For Asia and Europe, please contact:

DEWETRON Ges.m.b.H.
Parkring 4
A-8074 Graz-Grambach
AUSTRIA
Tel.: +43 316 3070
Fax: +43 316 307090
Email: support@dewetron.com
Web: http://www.dewetron.com

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 CET (GMT +1:00)

For the Americas, please contact:

DEWETRON, Inc.
10 High Street, Suite K
Wakefield, RI 02879
U.S.A.
Tel.: +1 401 284 3750
Toll-free: +1 877 431 5166
Fax: +1 401 284 3755
Email: support@dewamerica.com
Web: http://www.dewamerica.com

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 GST (GMT -5:00)

Service/repairs

The Team of DEWETRON also performs any kinds of repairs to your system to assure a safe and proper operation in future. For information regarding service and repairs please contact your local distributor first or DEWETRON directly.

Notice

The information contained in this document is subject to change without notice.

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Warranty Information

A copy of the specific warranty terms applicable to your DEWETRON product and replacement parts can be obtained from your local sales and service office.

Restricted Rights Legend

Use austrian law for duplication or disclosure.

DEWETRON GesmbH
Parkring 4
A-8074 Graz-Grambach / Austria

Printing History

Please refer to the page bottom for printing version.

Safety symbols in the manual

Indicates hazardous voltages.

WARNING	*Calls attention to a procedure, practice, or condition that could cause bodily injury or death.*
CAUTION	*Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.*

WARNINGS

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. DEWETRON Elektronische Messgeraete Ges.m.b.H. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as option and will not be shipped as standard parts.

For safety reasons max. 50 V may be applied to the BNC input-connectors!
Refer to the regulation of maximum allowable touch potential.

Safety instructions

Your safety is our primary concern! Please be safe!

General safety and hazard warnings for all DEWETRON systems

- Use this system under the terms of the specifications only to avoid any possible danger.
- Maintenance will be executed by qualified staff only.
- During the use of the system, it might be possible to access another parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advices for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- The system is grounded via a protective conductor in the power supply cord. To avoid electric shocks, the protective conductor has to be connected with the ground of the power network. Before connecting the input or output connectors of the system, make sure that there is a proper grounding to guarantee potential free usage. For countries, in which there is no proper grounding, please refere to your local legally safety regulations for safety use.

  DC systems: Every DC system has a grounding connected to the chassis (yellow/green safety banana plug).
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please carefully read the corresponding specifications in the product manual.
- The inputs are not, unless otherwise noted (CATx identification), for connecting to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorised personnel only.
- Any use in wet rooms, outdoors or in adverse environmental condition is not allowed!
  Adverse environmental conditions are:
  - Moisture or high humidity
  - Dust, flammable gases, fumes or dissolver
  - Thunderstorm or thunderstorm conditions (except assembly PNA)
  - Electrostatic fields, et cetera.
- The measurement category can be adjusted depending on module configuration.
- Any direct voltage output is protected with a fuse against short cut and reverse-polarity, but is NOT galvanically isolated (except it is explicit marked on the system).
- The system must be connected and operated to an earthed wall socket at the AC mains power supply only (except for DC systems).
- Any other use than described above may damage your system and is attended with dangers like shortcut, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened (except for changing DAQ, DAQP, PAD modules).

- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore, if
  - the system is damaged obviously or causes strange noises.
  - the system does not work anymore.
  - the system has been exposed to long storage in adverse environmental.
  - the system has been exposed to heavy shipment strain.
- DO NOT touch any exposed connetors or components if they are live wired. The use of metal bare wires is not allowed. There is a risk of short cut and fire hazard!
- Warranty void if damages caused by disregarding this manual. For consequential damages NO liability will be assumed!
- Warranty void if damages to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE). Exception: changing modules like DAQ, DAQP or PAD.
- The assembly of the system is equivalent to protection class I. For power supply, only the correct power socket of the public power supply must be used, except the system is DC powered.
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short cut and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy overvoltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated curcuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of:
  - high magnetic or electromagnetic fields
  - transmitting antennas or high-frequency generators

  For exact values please refere to enclosed specifications.
- Use measurement leads or measurement accessories aligned to the specification of the system only. Fire hazard in case of overload!
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might charged, even the system has been removed from the power supply.
- The electrical installations and equipments in industrial facilities must be observed by the security regulations and insurance institutions.

Safety instructions

- The use of the measuring system in schools and other training facilities must be observerd by skilled personnel.
- The measuring systems are not designed for use at humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already lower level may damage your system. For exact values please refere to enclosed specifications.
- Please also consider the detailed technical reference manual as well as the security advices of the connected systems.

This product has left the factory in safety-related flawless and proper condition.
In order to maintain this condition and guarantee safety use, the user has to consider the security advices and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1. Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for protection of buildings, are excluded from the scope of IEC 61326-3-1.

CAUTION

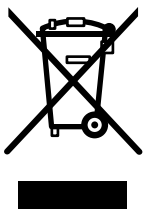
- The system BIOS is protected by password. Any change in the BIOS may cause a system crash. When the system is booting, do not press ESC-button on keyboard. This may clear the BIOS settings and cause system faults.
- Any change in the file structure as deleting or adding files or directories might cause a system crash.
- Before installing software updates contact DEWETRON or your local distributor. Use only software packages which are released by DEWETRON. Further informations are also available in the internet (http://www.dewetron.com).
- After power off the system wait at least 10 seconds before switching the system on again. Otherwise the system may not boot correct. This prolongs also the life of all system components.

Windows updates and antivirus/security software

Before installing Windows software updates consult with DEWETRON for compatibility guidance. Please also keep in mind that the use of any antivirus or other security software may slow down your system and may cause data loss.

Problematic network stacks

Often intrusive IT software or network processes can interfere with the primary function of the DEWETRON system: to record data. Therefore we recommend strongly against the installation of IT/MIS software and running their processes on any DEWETRON data acquisition system, and cannot guarantee the performance of our systems if they are so configured.



Environmental Considerations

Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a DEWETRON system:

System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at it's end of life! Please recycle this product in an appropriate way to avoid an unnecessary pollution of the environment and to keep natural resources.

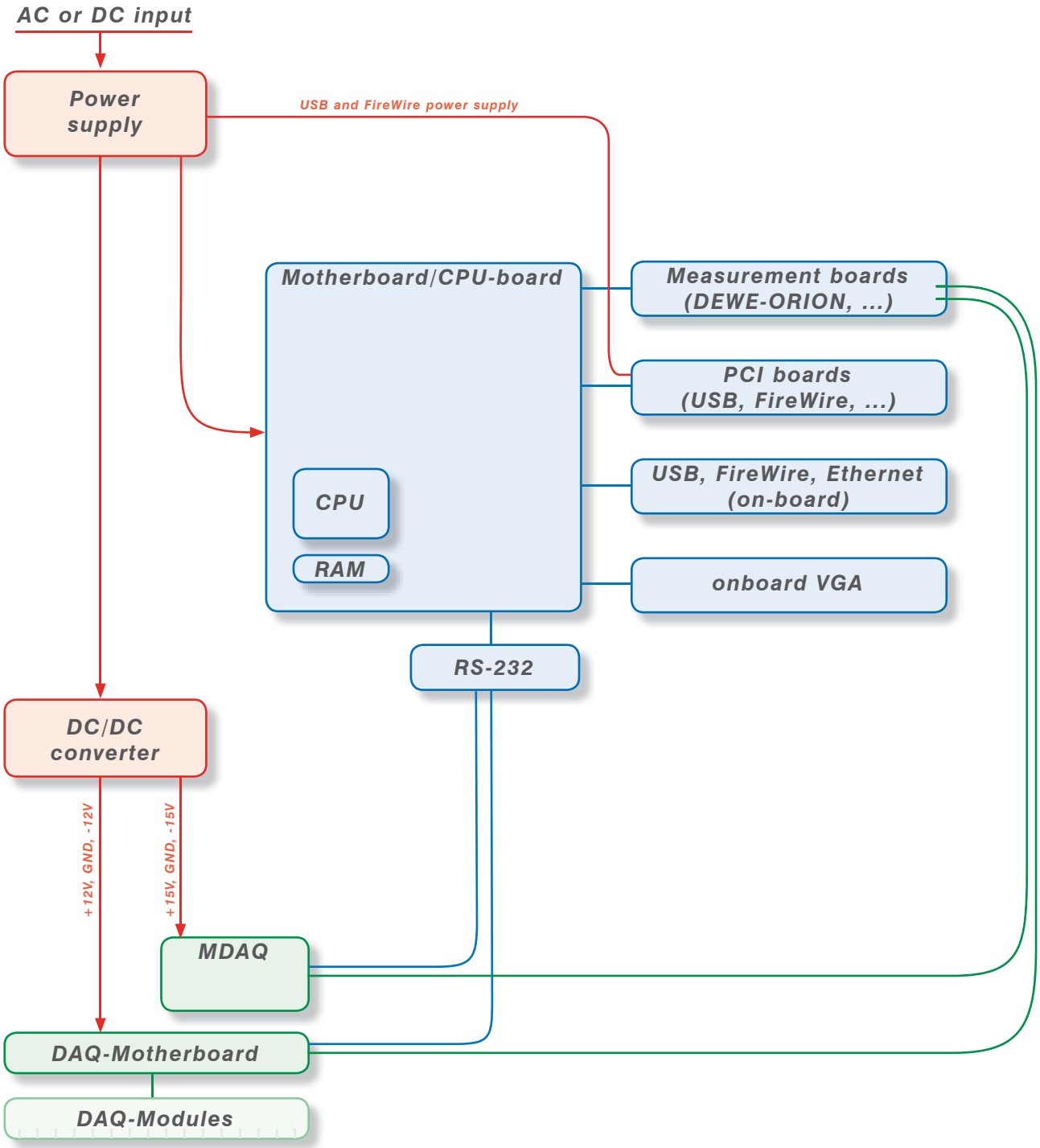
This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further informations about recycling on the DEWETRON web site
www.dewetron.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive. This product is known to contain lead.

Signal processing

Blockdiagram of the internal signal processing

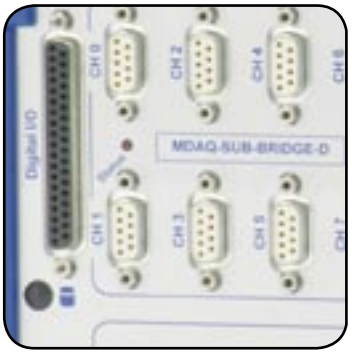


First steps

1

Power-on your system.

2



Connect your sensors to the system.

3

Run DEWESoft usually via "Start" >"Programs" > "Dewetron" > "DEWESoft x.x" > "DEWESoft x.x"

4

Start recording your data!

First steps

Notes

DEWE-5x-USB2-xx - USB solution for your computer

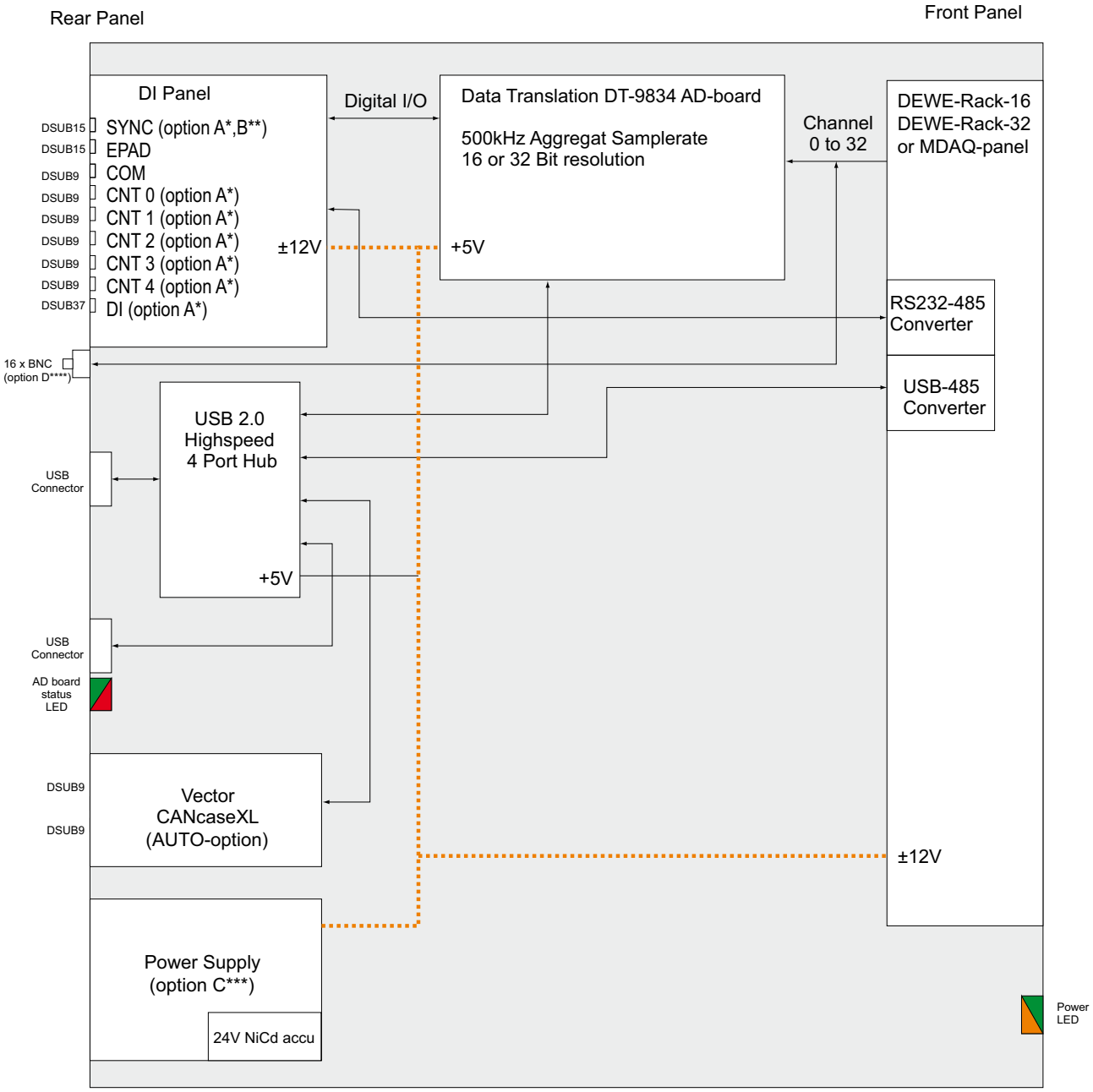
Features:

- Prepared for up to 32 DAQ or PAD modules
- Prepared for up to 32 MDAQ modules
- USB interface, easy to use, cable lenght up to 5 m
- 12-bit with 100 kS/s or 16-bit up to 500 kS/s (all multiplexed)
- Synchronization of several systems
- **Optional (DEWE-5x-USB2-xx-AUTO)**
- 2 x synchronized CAN-bus (up to 1 MBit/s)
- 5 x counter / encoder channels (isolated)
- RS485 interface for EPAD series modules
- DC power supply with integrated battery

Specifications

DEWE-5x-USB2-xx																
	MDAQ-DIRECT	MDAQ-V-10	MDAQ-V-100	MDAQ-SUB-V-200	MDAQ-SUB-ACC-x	MDAQ-SUB-ACC-A-x	MDAQ-SUB-BRIDGE	MDAQ-SUB-STG	MDAQ-BASE-5	MDAQ-BASE-10	MDAQ-FILT-5-BU	MDAQ-FILT-5-BE	MDAQ-FILT-5-BU-S1	MDAQ-FILT-10	MDAQ-FILT-10-S1	MDAQ-AAF4-5-BU
Channel 0 to 7 Channel 8 to 15	❑	❑	❑	❑ ❑	❑ ❑	❑ ❑	❑ ❑	❑ ❑	❑	❑	❑	❑	❑	❑	❑	❑
Channel 16 to 23 Channel 24 to 31	❑	❑	❑	❑ ❑	❑ ❑	❑ ❑	❑ ❑	❑ ❑	❑	❑	❑	❑	❑	❑	❑	❑
Power supply:	❑ 160 W DC NET-202 + accu power supply (10 to 32 V) ❑ 60 W AC SPS-060-D3 (100 to 250 V) ❑ 100 W DC EHB power supply (9 to 36 V) ❑ 50 W DC standard power supply (9 to 36 V) for details see next pages															
Signal input:	DEWE-DAQ series moduels DEWE-PAD series moduels DEWE-EPAD series moduels DEWE-CPAD series modules (opt. for AUTO)															
Interface:	USB2 High-speed															
Operating temperature:	-0 °C to 55 °C															
Storage temperature:	-20 °C to 85 °C															
Humidity (operating):	10 % to 80 %, non condensing															
Dimensions (W x D x H):	approx. 438 x 253 x 135 mm (17.2 x 10 x 5.3 in.)															
Weight:	typ. 7 kg (15.4 lbs), without modules typ. 8.8 kg (19.3 lbs) fully equipped with DAQP-V-B															

Internal wiring including all options



* option A: 5x-USB2-DIO-PANEL-1
** option B: 5x-USB2-SYNC
*** option C: 5x-DC-POW (external 115 or 230 VAC power supply)
**** option D: 5x-USB2-xx-OUT-5
5x-USB2-xx-OUT-10

DT 9834 AD-board

Analog input specifications

Analog input			
Number of inputs	up to 32 SE		
Resolution	16-bit		
Programmable gain	1,2,4,8		
Range	16-bit		
Effectiv number of bits	±10 V, 5 V, 2.5 V, 1.25 V		
A/D throughput	Successive approximation (SAR)		
Single channel	500 kS/s		
Multiple channel	500 kS/s (aggragate) ±0.05 %		
A/D conversion time	2 µs		
Channel acquisition time	±1/2 LBS, 1 µs typ.		
Sample and hold aperture uncertainty	2 ns typ.		
Sample and hold aperture delay	50 ns typ.		
System accuracy (% of FSR)	500 kS/sec	400 kS/sec	250 kS/sec
Gain = 1	±0.05 %	±0.03 %	±0.01 %
Gain = 2 (5 V Range, default range)	±0.06 %	±0.04 %	±0.02 %
Gain = 4	±0.07 %	±0.05 %	±0.02 %
Gain = 8	±0.09 %	±0.07 %	±0.03 %
Bipolar input range	±10 V		
Common Mode Input Voltage	±11 V		
Common Mode rejection ratio	Gain = 1 @ 1 kΩ 74 dB 80 dB		
Maximum input voltage without damage			
Power on	±35 V		
Power off	± -20 V		
Input impedance	< -93 dB		
Off channel	100 MΩ, 10 pf		
On channel	100 MΩ, 10 pf		
Bias current	±20 nA		
Nonlinearity	<1/2 LSB		
Differential Nonlinearity	1/2 LSB		
Inherent quantizing error	1/2 LSB		
A/D zero drift	±10 µV / °C		
Gain drift (of FSR / °C)	±30 ppm / °C		
Differential Linearity drift (of FSR / °C	±3 ppm ±2 ppm		

Analog output specifications (optional)

Analog output	DT 9834 AD-board
Number of outputs	4 (routed to Pin 7 of channel 12 to 15)
Resolution	16-bit
Range	±10 V
Throughput	500 kS/s/channel
FIFO	128 kS
Current output	5 mA maximum load
Output impendance	0.1 Ω
Protection	short circuit to ground
Slew rate	10 V / µs
Nonlienarity	1 LBS
Differential nonlinearity	1 LBS
Acuuracy	0.1 % FSR (adjustable)
Offset drift	±10 ppm of FSR / °C
Gain drift	±30 ppm

Power supply

DC NET-202 + accu power supply

The power supply supports DC-UPS function. When the DC supply is lost, the Power LED on the front turns from green into orange. 30 seconds before the book shuts down, an acoustic beep signal occurs.

DC Power supply	NET-202 DC + Accu
Input:	
DC and battery input:	10 to 32 V_{DC}
Max. input current:	startup peak up to 25 A
Input power:	160 W
Input voltage priority:	1. DC voltage 2. Accu
Battery type:	NiCd, 24 V_{DC}, 600 mAh
Output:	
Output power:	160 W
Output voltages:	+5 V (max. 20 A) -5 V (max. 0.3 A) +12 V (max. 5 A) -12 V (max. 0.4 A)
Power LED:	
dim green:	DC connected to system, system powered off
bright green:	DC connected to system, system powered on
orange:	system powered on, working via accu
red:	starts 30 sec. before accu is getting low together with beep signal

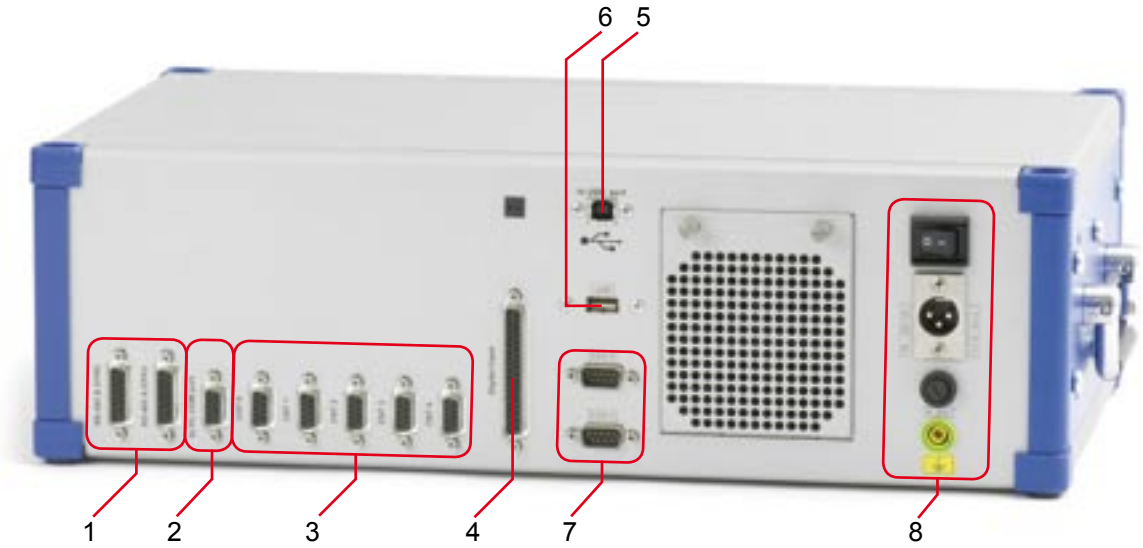
DC AVP-2B/K (standard power supply)

DC Power supply	AVP-2B/K
Input:	
DC input:	9 to 40 V_{DC}
Max. input current:	5.6 A
Input power:	160 W
Output:	
Output power:	max. 51 W
Output voltages:	+12 V (max. 2 A) -12 V (max. 2 A)
Protection:	Overvoltage protection, excess temperature protection, polarity reversal protection
Fuse:	6.3 A

AC SPS-060-D3 power supply

60 W AC power supply	SPS 060P-D3
Input:	
Input range:	100 to 250 V_{AC}
Input frequency:	47 to 63 Hz or DC
Max. input current:	1.8 A @ 230 V_{DC}
Output:	
Output power:	60 W
Output voltages:	+12 V (max. 3.4 A) -12 V (max. 3.4 A)

Rear connectors

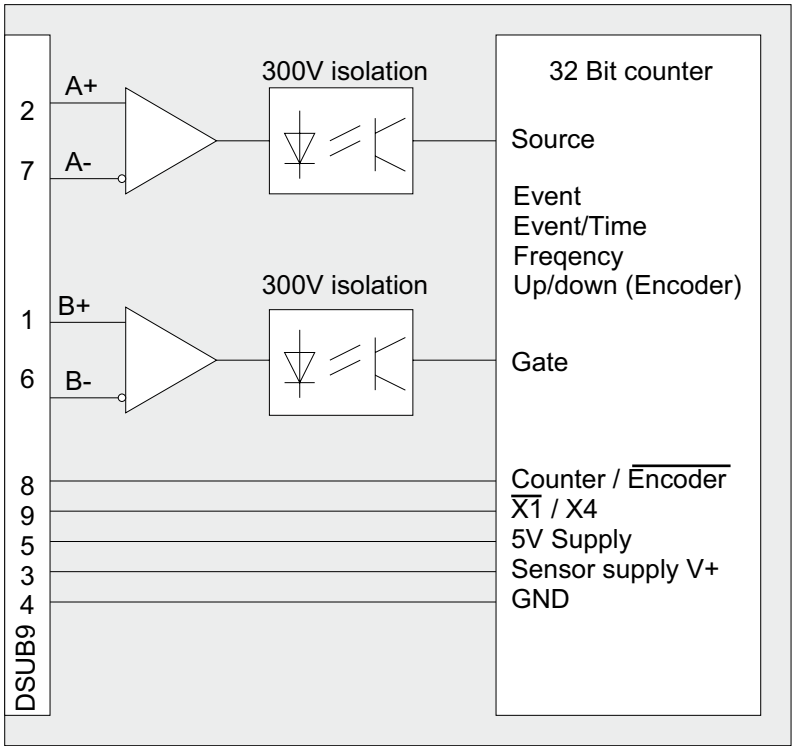


Typical DEWE-50-USB2-16-AUTO rear view

1.) RS485 & synchronization connector
2.) Serial port
3.) Counter input
4.) Digital input
5.) USB2 interface (connect to the PC)
6.) free USB2 port (for webcam or dasy chaining)
7.) 2 CAN ports (manufacturer vector)
8.) Power connector

Note: The location of the connectors might vary from system to system and depends on system configuration!

Counters



Block diagram of counter 0 to 7

Electrical characteristics

Counter / encoder input pairs (A+; A-; B+; B-)

Pins:

PIN 1	B+
PIN 2	A+
PIN 6	B-
PIN 7	A-

Logic low: 0 to 2 V
Logic high: 4 to 50 V
Bandwidth: 5 MHz
Galvanic isolated (300 V)

Selection pins

PIN 8	Counter to encoder selection (not connected is counter)
PIN 9	X1 / X4 selection (not connected is X4 mode)

maximum input voltage: TTL

Supply voltage:

Pins:

PIN 3	V+ (DEWE-50: 12 V DEWE-51: 15 V)
PIN 4	GND
PIN 5	+5 V

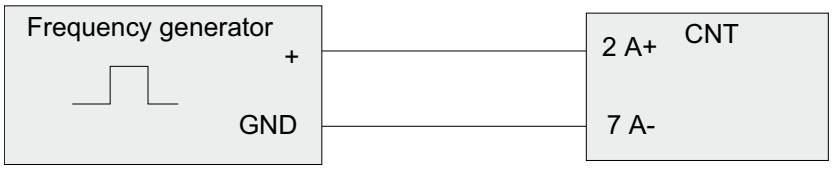
Counter modes

Event counting

The counter counts every rising edge of the source pin; the gate input has to be logical high.

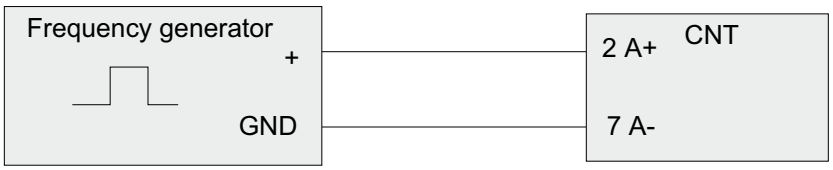
Event per time counting

- 100 ms
- 200 ms
- 500 ms
- sample rate



Frequency measurement with selectable gate time

- 100 ms
- 200 ms
- 500 ms
- 1 s



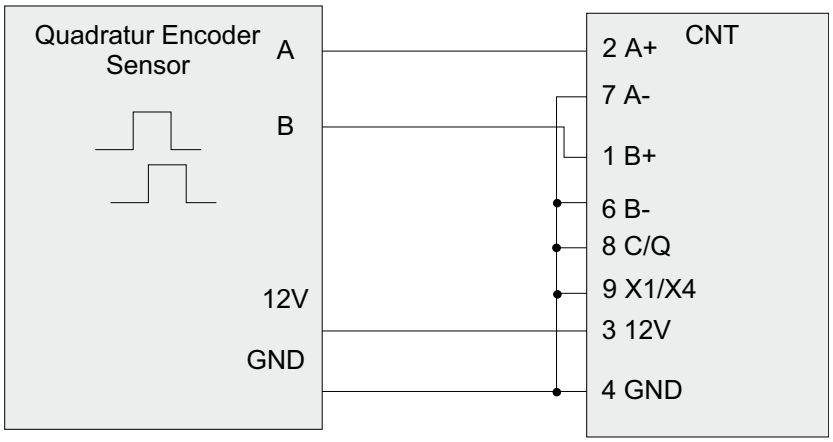
Up / down counting

Depending on the state of the gate input; the counter counts up if it´s high and down if it´s low.

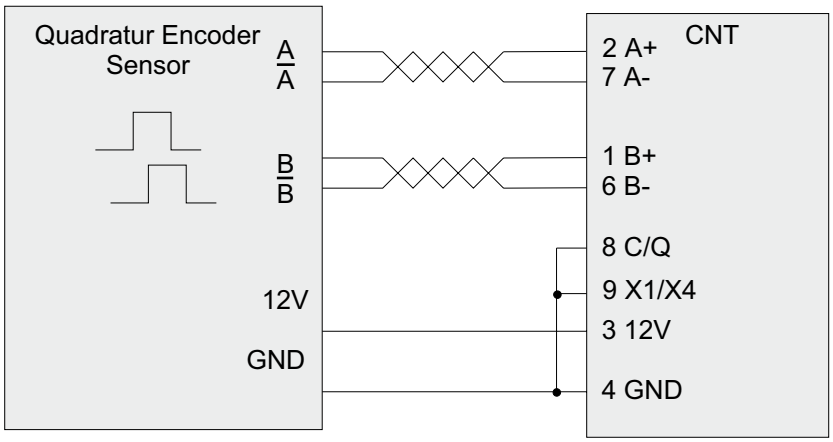
Encoder measurement X1 or X4 mode

Therefore a wire bridge in the input connector of the counter has to be set up.
Connect PIN 4 to PIN 8 to activate the encoder mode.
Also connecting PIN 9 to GND, the encoder changes from X4 to X1 mode.

Simple Encoder with TTL output:



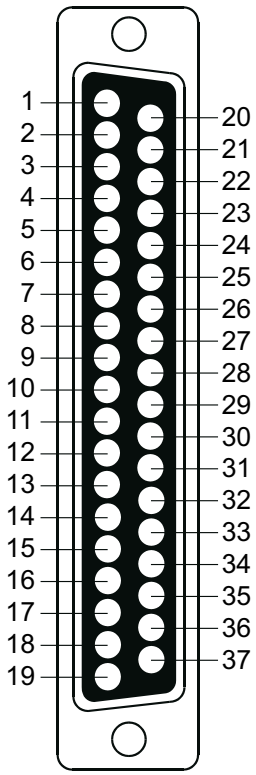
High speed encoder with differential output:



Digital input (optional)

Electrical characteristics:

Number of DIO:	16
Logic family:	LVTTL
Input type:	Level sensitive
Input termination:	Input tieds to +3.3 V with 15 kΩ pullup resistors
Input logic load:	1 LVTTL load
Logic high input voltage:	2.0 V minimum
Logic low input voltage:	0.8 V maximum
Logic low input current:	-0.4 mA maximum



37-pin female DSUB connector

PIN 1:	Digital Input 00
PIN 2:	Digital input 01
PIN 3:	Digital input 02
PIN 4:	Digital input 03
PIN 5:	Digital input 04
PIN 6:	Digital input 05
PIN 7:	Digital input 06
PIN 8:	Digital input 07
PIN 9:	Digital input 08
PIN 10:	Digital input 09
PIN 11:	Digital input 10
PIN 12:	Digital input 11
PIN 13:	Digital input 12
PIN 14:	Digital input 13
PIN 15:	Digital input 14
PIN 16:	Digital input 15
PIN 17:	n.c
PIN 18:	+5 V
PIN 19:	V+
PIN 20:	Digital GND
PIN 21:	Digital GND
PIN 22:	Digital GND
PIN 23:	Digital GND
PIN 24:	Digital GND
PIN 25:	Digital GND
PIN 26:	Digital GND
PIN 27:	Digital GND
PIN 28:	Digital GND
PIN 29:	Digital GND
PIN 30:	Digital GND
PIN 31:	Digital GND
PIN 32:	Digital GND
PIN 33:	Digital GND
PIN 34:	Digital GND
PIN 35:	Digital GND
PIN 36:	n.c
PIN 37:	Digital GND

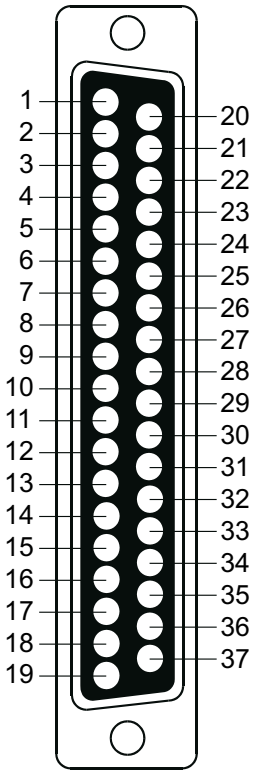
Galvanically isolated digital input (optional)

Electrical characteristics:

U_{off}	< 1.8 Volt	T_{ON}	< 160 nsec
U_{on}	> 3.2 Volt	T_{OFF}	< 160 nsec
Input current:		Bandwidth	> 3MHz
U_{IN}= 5 Volt	< 3.5 mA		
U_{IN}= 30 Volt	< 7 mA	**Isolation voltage:**	
U_{IN} max. continuous:	35 Volt	Channel to Channel	100 VDC
U_{IN} max. peak:	65 Volt	Input to Output	250 VDC

Input Levels:

L= Low
H= High

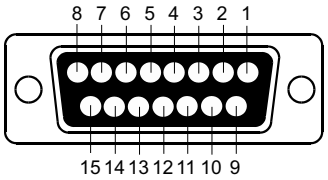


37-pin female DSUB connector

PIN 1:	Digital Input 00 H	PIN 31:	Digital Input 11 L
PIN 2:	Digital input 01 H	PIN 32:	Digital Input 12 L
PIN 3:	Digital input 02 H	PIN 33:	Digital Input 13 L
PIN 4:	Digital input 03 H	PIN 34:	Digital Input 14 L
PIN 5:	Digital input 04 H	PIN 35:	Digital Input 15 L
PIN 6:	Digital input 05 H	PIN 36:	n.c.
PIN 7:	Digital input 06 H	PIN 37:	Digital GND
PIN 8:	Digital input 07 H		
PIN 9:	Digital input 08 H		
PIN 10:	Digital input 09 H		
PIN 11:	Digital input 10 H		
PIN 12:	Digital input 11 H		
PIN 13:	Digital input 12 H		
PIN 14:	Digital input 13 H		
PIN 15:	Digital input 14 H		
PIN 16:	Digital input 15 H		
PIN 17:	n.c.		
PIN 18:	+5 V		
PIN 19:	n.c.		
PIN 20:	Digital Input 00 L		
PIN 21:	Digital Input 01 L		
PIN 22:	Digital Input 02 L		
PIN 23:	Digital Input 03 L		
PIN 24:	Digital Input 04 L		
PIN 25:	Digital Input 05 L		
PIN 26:	Digital Input 06 L		
PIN 27:	Digital Input 07 L		
PIN 28:	Digital Input 08 L		
PIN 29:	Digital Input 09 L		
PIN 30:	Digital Input 10 L		

RS485 & sync

For detailed information about synchronizing more devices refer to page 25.

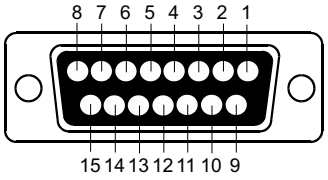


15-pin DSUB female connector

PIN 1:	RS485A	PIN 9:	n.c
PIN 2:	RS485 B	PIN 10:	n.c
PIN 3:	Digital GND	PIN 11:	n.c
PIN 4:	EXT AD-trigger	PIN 12:	n.c
PIN 5:	Digital GND	PIN 13:	n.c
PIN 6:	AD-Clock out	PIN 14:	n.c
PIN 7:	n.c	PIN 15:	n.c
PIN 8:	n.c		

RS485 & EPAD

This connector can be used to supply up to 8 EPAD moduels

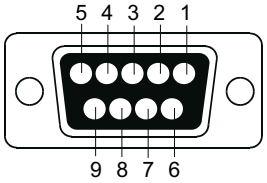


15-pin DSUB female connector

PIN 1:	RS485A	PIN 9:	n.c
PIN 2:	RS485 B	PIN 10:	n.c
PIN 3:	Digital GND	PIN 11:	n.c
PIN 4:	n.c	PIN 12:	n.c
PIN 5:	n.c	PIN 13:	n.c
PIN 6:	n.c	PIN 14:	GND
PIN 7:	n.c	PIN 15:	V+ (max. 800 mA)
PIN 8:	n.c		

COM port

The COM port can be used to control the DEWETRON modules instead of the internal USB to RS485 converter. In special cases it could also be used as a serial configuration port.



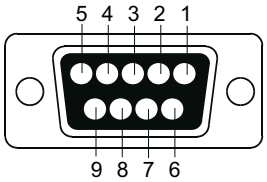
9-pin DSUB female connector

PIN 1:	n.c	PIN 6:	n.c
PIN 2:	to PC RX	PIN 7:	n.c
PIN 3:	to PC TX	PIN 8:	n.c
PIN 4:	n.c	PIN 9:	n.c
PIN 5:	to PC GND		

CAN bus (AUTO option)

The used CAN device is a vector CANCaseXL.
For detailed information regarding the CAN interface refer to the Vector CANCaseXL manual.

Specifications	
Microcontroller:	ATMEL AT91 (ARM7 TDMI 64 Mhz)
CAN controller:	2 x Phillips SJA 1000
CAN version:	CAN 2.0B
PC interface:	USB2.0
Operatin system:	Windows 2000, XP
Error frame / Remote frame:	Detection & generation
Board dimension approx.:	105 x 85 x 32 mm (4.1 x 3.3 x 1.3 in.)
Current consuption typ.:	250 mA
Supply voltage:	7 to 33 V
Standard piggyback:	CAN 1050 OPTO



9-pin DSUB female connector

PIN 1: n.c
PIN 2: CAN low
PIN 3: GND (Vb-)
PIN 4: reserved
PIN 5: shield
PIN 6: n.c
PIN 7: CAN high
PIN 8: reserved
PIN 9: n.c

DEWE-5x-USB2-xx installation guide

System requirements

- Windows 2000 / XP
- Intel Pentium 4, 1 GHz processor or higher
- 512 MB RAM
- 50 MB free hard disk space
- USB2.0 port

Hardware driver installation

CAUTION: do not connect the DEWE-5x-USB2-xx to the PC until all the drivers are installed!

- Insert the DEWE-System DVD
- Change to the directory \Install\Drivers\6_DAQBoards\DT
- Start the SetupOEMWin32.exe and follow the instructions.
- This will install the basic AD-board driver to your computer.
- Change to \Install\Drivers\7_Communication\USB_RS485
- Start Setup.exe
- This will install the internal USB to RS485 converter driver.
- Change to \install\Drivers\X_Various\Vektor_CAN, start setup.exe, select CANcaseXL and press "Install" (Only for systems with CAN interface).
- Connect the DEWE-5x-USB2 to the power supply and turn it on.
- Connect the DEWE-5x-USB2 to a USB2.0 port of the PC.
- The operating system will automatically detect the new device and install the appropriate driver.
- Follow the individual driver setups from the AD-board and the USB-serial-converter.
- After finishing restart your computer.
- Check in the device manager if everything is installed properly. If there is a device missing or marked with a yellow sign proceed with trouble shooting on page..
- Keep the COM port number of the USB-serial-port within mind. It is the port that has to be selected in DEWESoft.

Vector CAN driver setup

Device manager

WARNING: It is strongly recommended to connect the DEWE-5x to the same USB connector of the computer all the time. Otherwise the COM port number changes and the installation becomes slow.

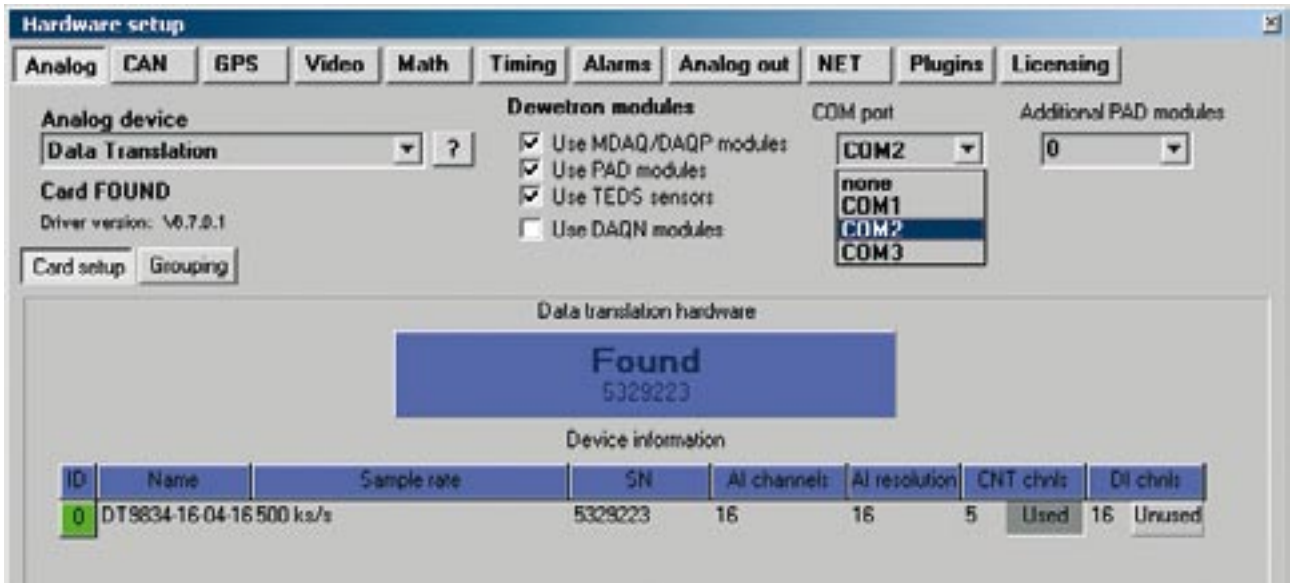
DEWESoft configuration

- *To configure your modules in the DEWETRON-system please install the software "DEWESoft" from your system-DVD and choose the option "DEWESoft for DEWEConfig mode" After the installation please start DEWESoft and enter the COM port where your modules are connected. (Note: Please don´t change the setting "Analog device" - it should be set to "No A/D Hardware"). Confirm the new settings with "OK", exit this menu and choose "Setup". Inthis overview you can add / remove modules and change the ranges and the addresses. (A detailed description can be found in the online manual of DEWESoft.)*

NOTE: This steps above only have to be made if you did not order DEWESoft with your DEWE-5x-USB2-xx and want to install your system afterwards. Otherwise refer to the following steps of the DEWESoft configuration chapter.

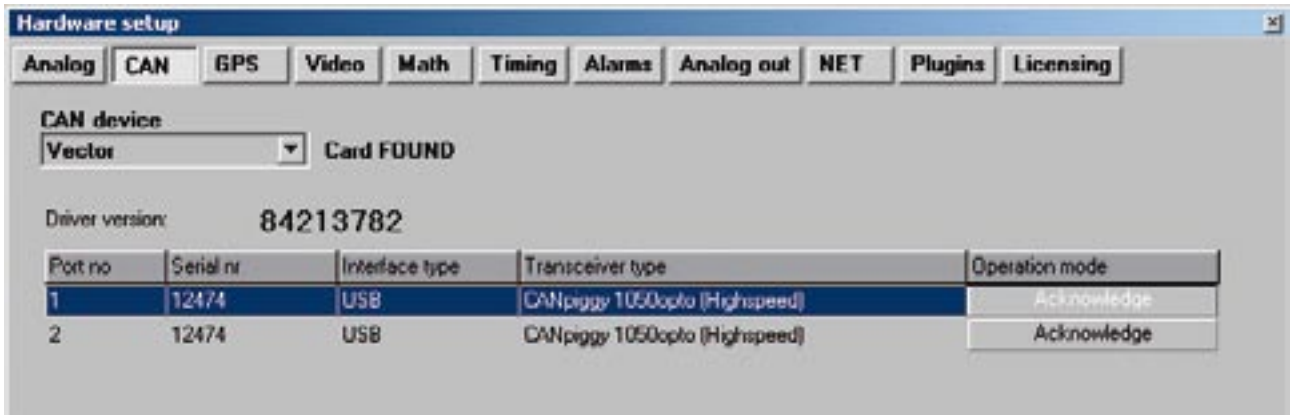
After installing DEWESoft you have to make following settings in the hardware setup:

- Select as analog device "Data translation"
- Select as COM port the internal USB-serial-port of the DEWE-5x-USB2-xx. It is listed as "USB-serial-port" in your device manager



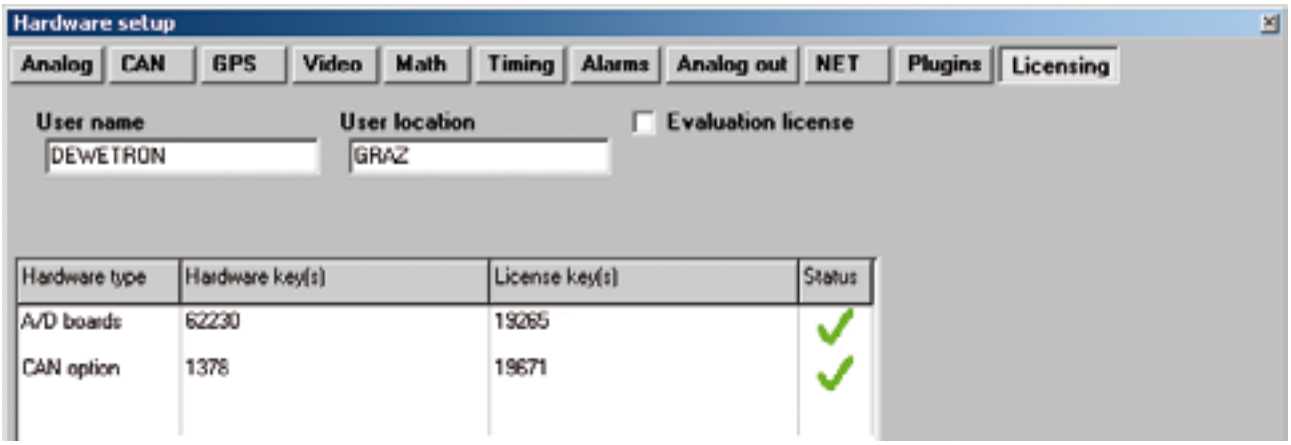
CAN setup (AUTO option)

Select the vector CAN driver in DEWESoft



DEWESoft licensing

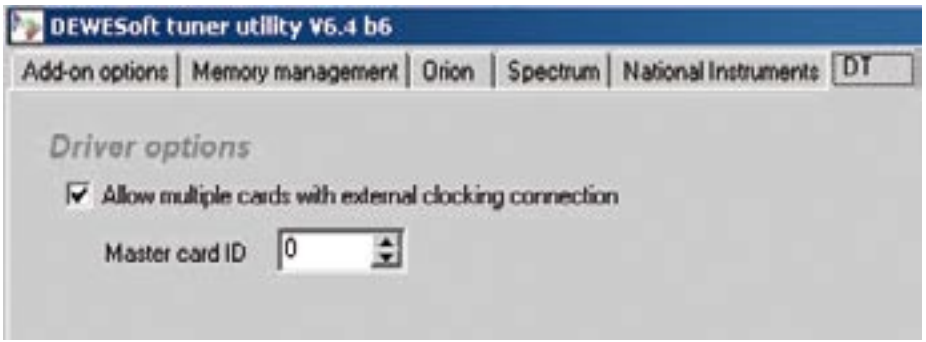
Enter in the hardware setup of DEWESoft the license keys from the license certificate you got with your DEWESoft.



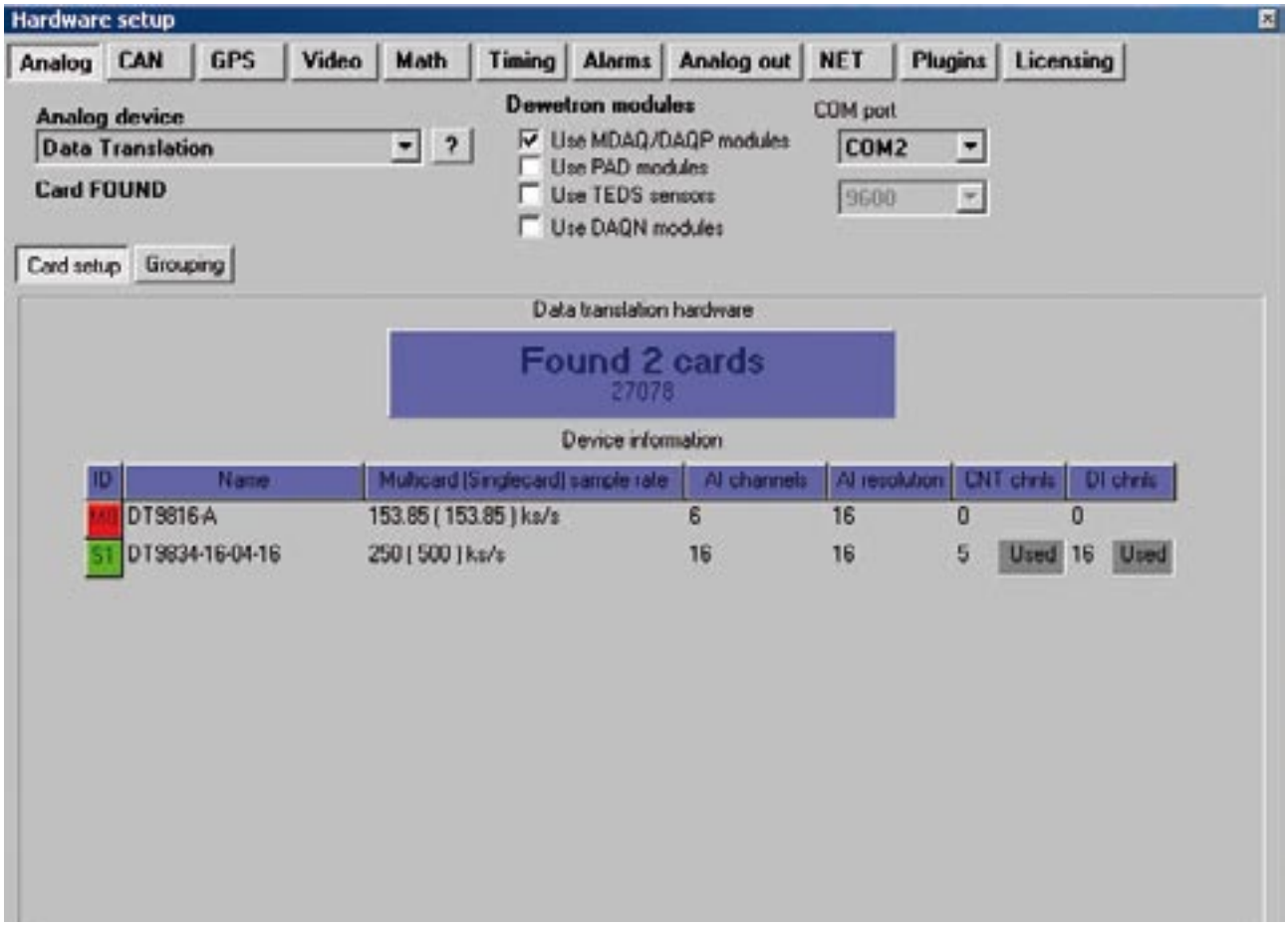
DEWESoft settings

DEWESoft automatically changes to the multi-board-mode if it detects more than one device installed in the system. If you do not want to do this, it is possible to deactivate it in the DEWESoft tuner located in the DEWESoft directory. Also the master board can be changed there.

WARNING: If DEWESoft is in mutli-board-driver-mode and there is no external sync cable it would not measure. (Measured values will be zero all the time.)



Example of DEWESoft hardware setup

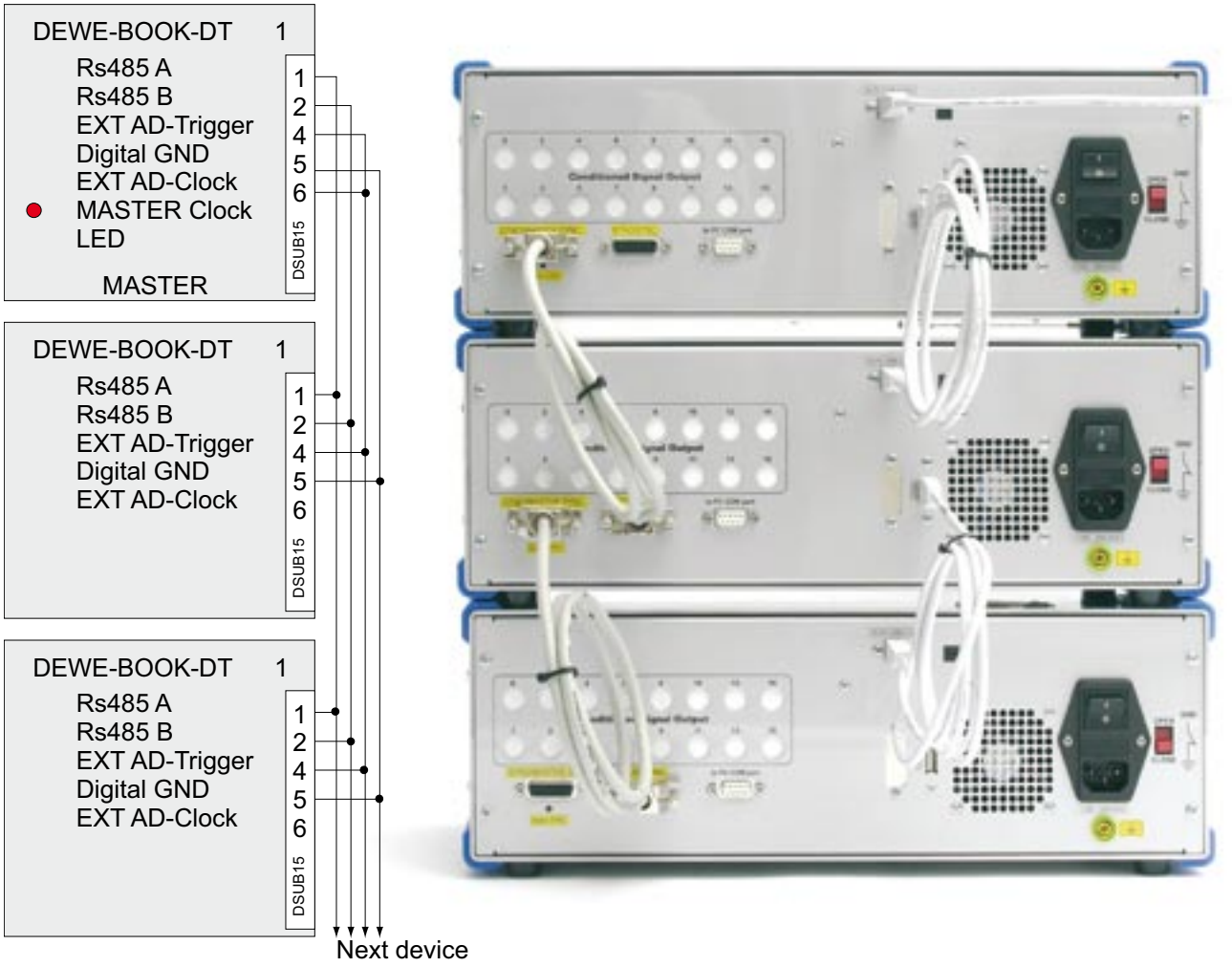


Synchronisation of more than one DEWE-5x-USB2-xx

How does it work

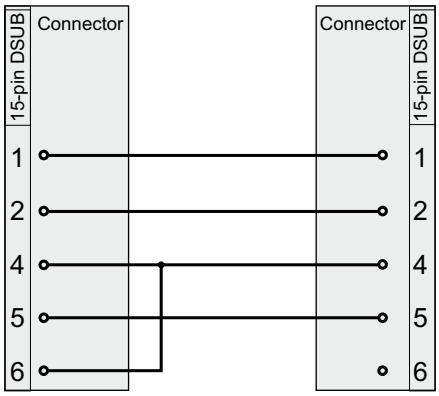
The synchronization of more than one DEWE-5x-USB2 device is realized by using counter 0 of the master device for generating the sample clock for all devices. This includes the following limitations. The maximum sample rate is the half sample rate of the slowest device that is synchronized. The counter 0 of the master board could not be used for anything else.

Wiring

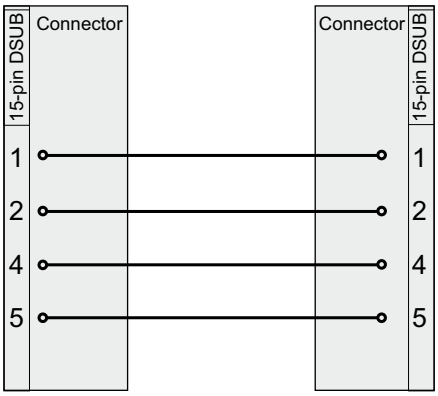


Cable

Masters sync cable



Sync cable



Trouble shooting

Q: ***DEWESoft doesn´t find the DAQP or PAD module. What can i do?***

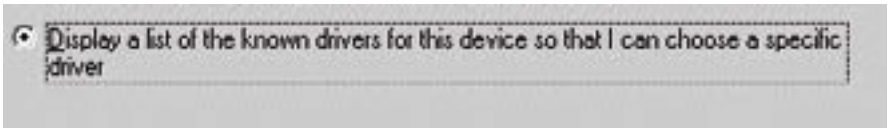
A: Be sure that the rigth COM port is selected in DEWESoft. It should be the one, which is mentioned as USB-serial port in the device manager.

Q: ***No USB-serial port is visible in the device manager. How can I reinstall it?***

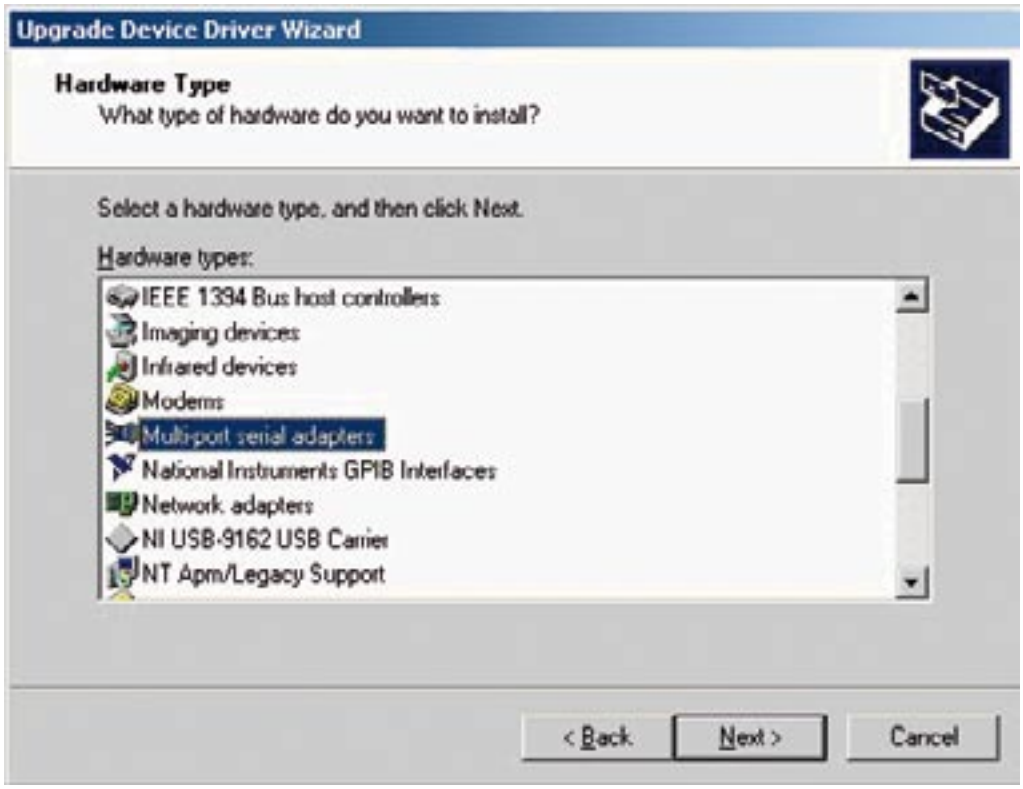
A: • Double click on the device

• Click on

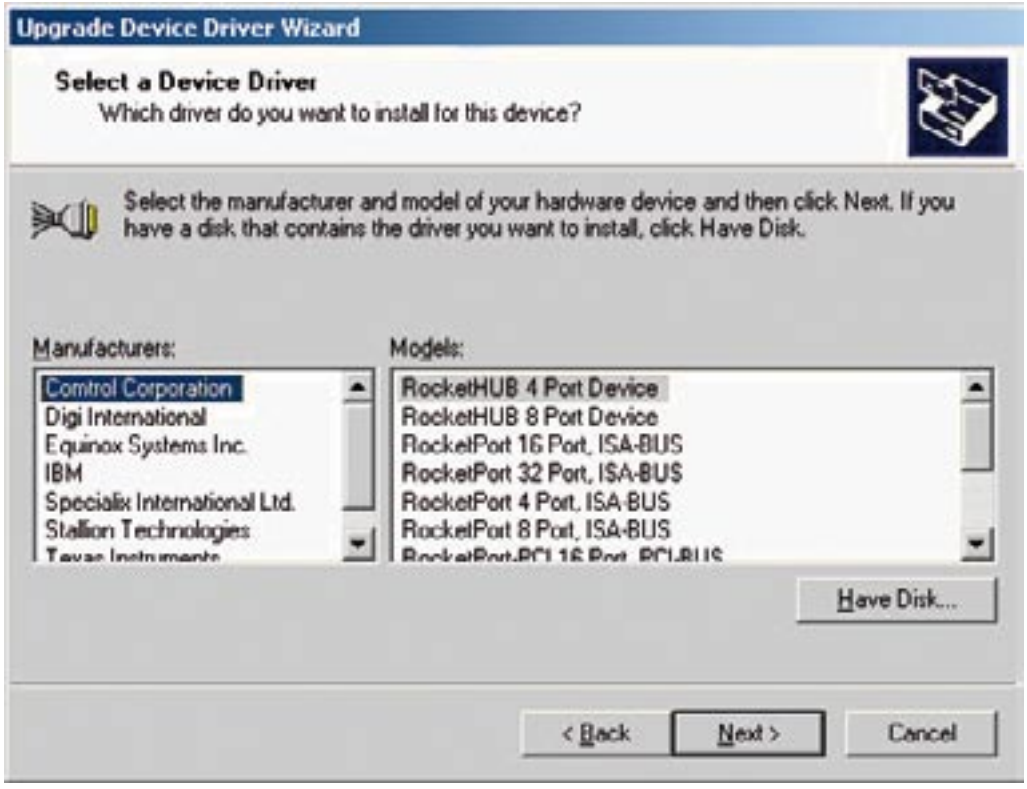
• Select



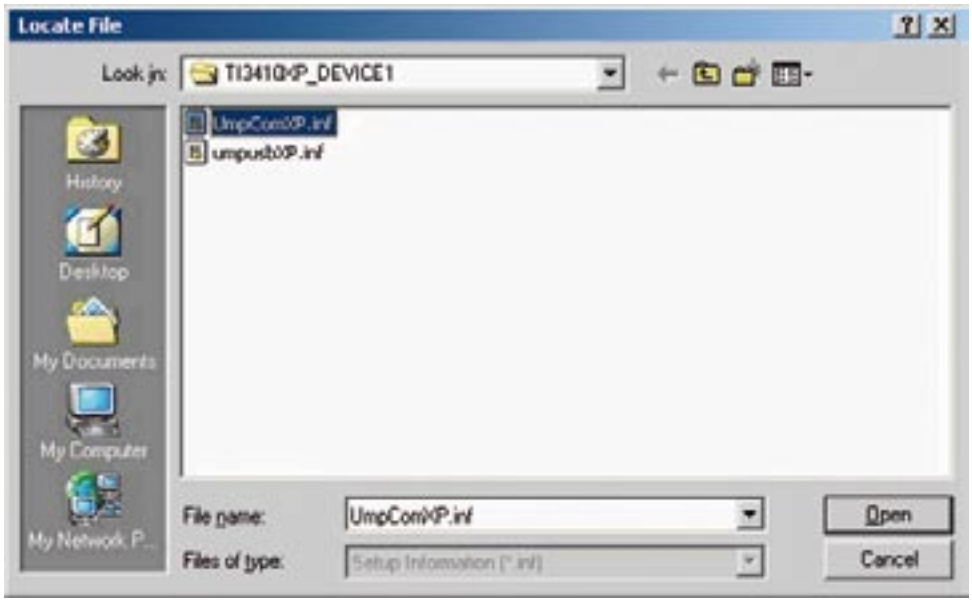
- Select multi-port serial adapter



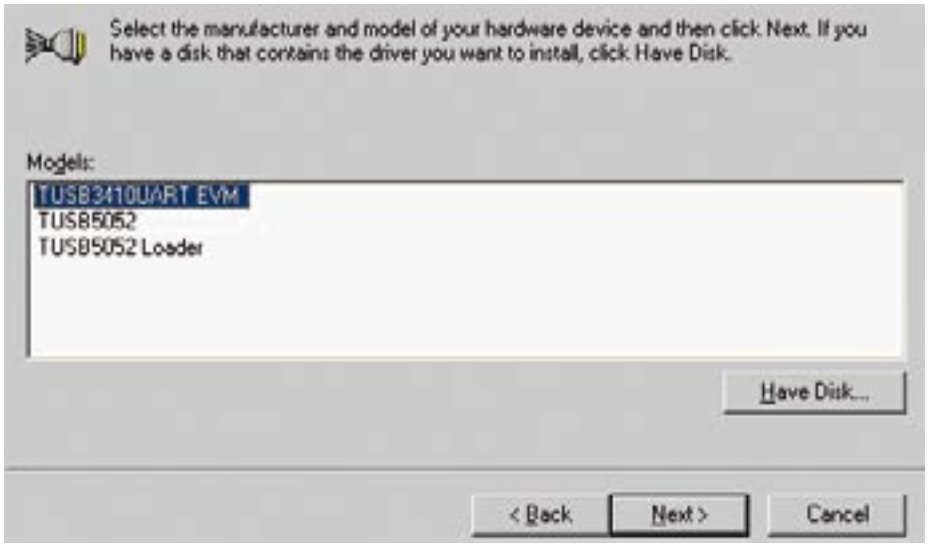
- Press on "Have disk"



- Select the following directory \DEWE-50-USB2\USB_RS485\DISK1\TI3410XP_DEVICE1
- Install UmpComXP.inf



- Install TUSB 3410UART EVM



- After succesfully installation the device manager shows the following picture

Q: An error messages occurs when using maximum sampling rate. What can I do?

A: The used USB connector might not be USB 2.0 standard

Q: CAN device not found! Why?

A: Insert the DEWE-System DVD in your system and go to the directory \Install\Drivers\X_Various\Vector_CAN_53 and install the drivers manually.

Notes

DEWESoft

DEWESoft Software Turns our Hardware into a Powerful Data Acquisition System

Our award-winning data acquisition package is second to none when it comes to both pure recording power and ease of use. Normally it is a difficult balancing act to provide lots of capability and performance, without making the user interface cumbersome and hard to learn. But with careful and innovative design, we have done exactly that!

The software can act as a simple multi-meter or recorder as well as a sophisticated combustion analyzer or power analyzer. Or anything in between these extremes, like a FFT analyzer, transient recorder, etc.

Over 10 years DEWESoft evolved into a great data acquisition software and is Nr.1 in synchronous acquisition of vastly different signals like analog, digital, CAN, GPS, PCM, counter, video, etc. In 2010 with the release of version 7, DEWESoft takes a big step toward become a very powerful data analysis tool for a wide range of test & measurement applications. Since many years you can utilize math channels in the measure mode for online calculations. Starting with version 7.0, captured data can be re-calculated in the analyze mode using the large suite of calculation (math) functions available in the measure mode. This eliminates the CPU performance limitations and thus provides unlimited offline calculation power.

Key Features of DEWETRON systems running DEWESoft

- *Fast and easy setup*
- *Perfect sync of vastly different signals like analog, digital, counter, CAN, XCP, GPS, Video, ARINC, 1553, etc.*
- *Powerful online data processing, MATH functions, filters, statistics, reference curves*
- *Attractive online display of all kind of data, creation of displays is a matter of seconds*
- *Analog, digital or CAN data output; powerful function generator, alarms, CAN messages*
- *Build test procedures in a form of workflow diagram by means of sequencer*
- *Fast data analysis, reload GByte files in seconds*
- *Post processing, large suite of calculation (math) functions*

Example: Performing a 10th order notch filter on 128 channels being sampled at 200 kS/s each. This is not possible online. But in analyze mode it´s easy. Simply record the data and then filter it afterwards (math functions are non-destructive, i.e., they do not affect the raw channels).

Another important new feature is the sequencer which provides a way to automate test procedures.

DEWESoft

Hardware Support

DEWESoft supports all DEWE-ORION series A/D cards as well as some third-party cards, like Spectrum cards for transient recording. Multiple cards of the same family are supported for high channel counts.

In front of the A/D cards typically comes signal conditioning units, and there is a huge range of DEWETRON conditioners which are all perfectly implemented into the software.

Besides the analog inputs DEWESoft supports the digital I/Os, counters and CAN interfaces of the DEWE-ORION series cards.

To acquire video streams in sync with the analog data there is a selection of DEWE-CAM cameras.

Further bus systems like PCM telemetry, XCP, ARINC, 1553, etc. are supported, too. DEWETRON offers the appropriate hardware for all of these.

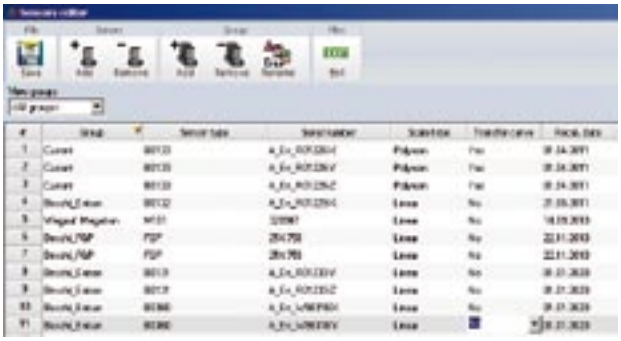
For position and speed measurements there is a choice of high performance DEWE-VGPS sensors. Or use low-cost sensor which is NMEA compatible for simple position plotting and mapping applications.

DAQx modules

DEWE-ORION A/D cards

Sensor Database and TEDS (Technical Electronic Data Sheet)

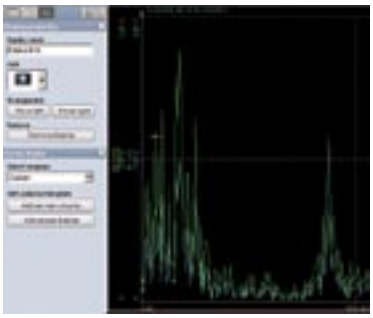
The DEWESoft data acquisition software suite was developed especially for measurement technicians, thus simple sensor "connection" is a major topic. Basic settings like sensor setup are easily done. TEDS technology of newer sensors is supported on both the hardware and software side, so that all settings follow automatically, preventing user errors and saving a huge amount of time. For sensors without TEDS, there are numerous options for manual scaling as well as an integrated sensor database to make settings as efficient as possible.



Video Recording

A camera is a perfect sensor for many applications and a lot of people like to use it in their data acquisition. Video is a useful test documentation, providing a visual record of the test conditions and setup. I can also be used for more in-depth analysis, as you can imagine. There is nothing quite like seeing your data replayed with synchronized video – this DEWETRON innovation provides a whole new level of context and understanding of your test data than you could ever imagine.

3D Graph

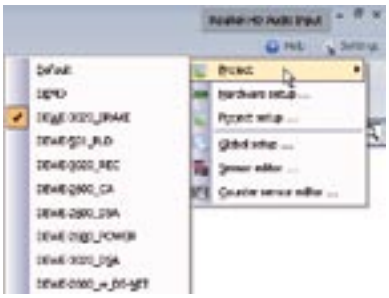


In the properties panel there is a function that allows you to edit the properties of the selected display, and to create new displays, and rearrange them. You can rename any display, and select a different icon for it. Of course you can add sub-displays to any main display.

Display Screens

One of the most powerful and yet easy to use aspect of DEWESoft is the creation of displays. Of course a few standard displays like Recorders, Oscilloscope, FFT, Meters, Bars, 2D and 3D graphs, etc. are built-in for you. But this is only the beginning. You simply can create custom displays according to the needs of specific test.

Project Setup



The project files setup the measurement instruments in seconds including complete hardware setup, measurement configuration, and sensor calibration.

Since DEWESoft version 7 you can create "Projects" at the hardware setup screen level, where each project contains all of the settings for any hardware that you own. You can have an unlimited number of hardware setups, which you can freely name and edit. When you start DEWESoft 7, it will automatically load the last hardware setup that you used, of course … but if you have changed the hardware, you can simply choose a different project from the "Settings" menu, and a completely different hardware setup will be loaded.

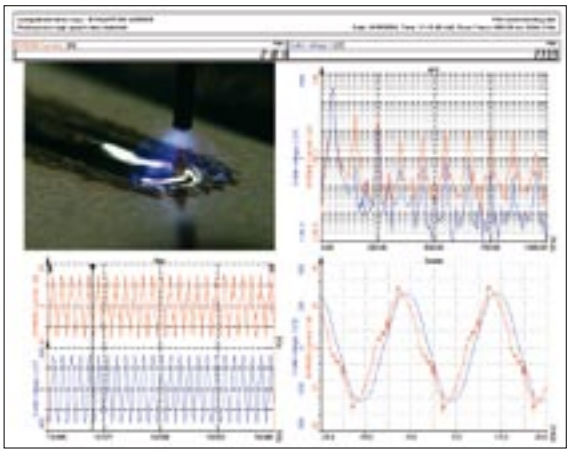
Even when using the same hardware, projects allows using different folders for setup, data and exported files. So you can create John and George projects for different users and work without interfering or you can create e.g. Road-Load and DSA projects for different tasks.

Recording

You can control recording as simple as pressing the START, STORE and STOP buttons. But there are also versatile trigger options to e.g. only store data if a trigger event occurs or to store at a slow rate usually but store at a fast rate at a trigger event with definable pre- and post times.

There is a large suite of calculation (math) functions which can be applied to any channels.

Analyze – Replay, Re-calculate, Export

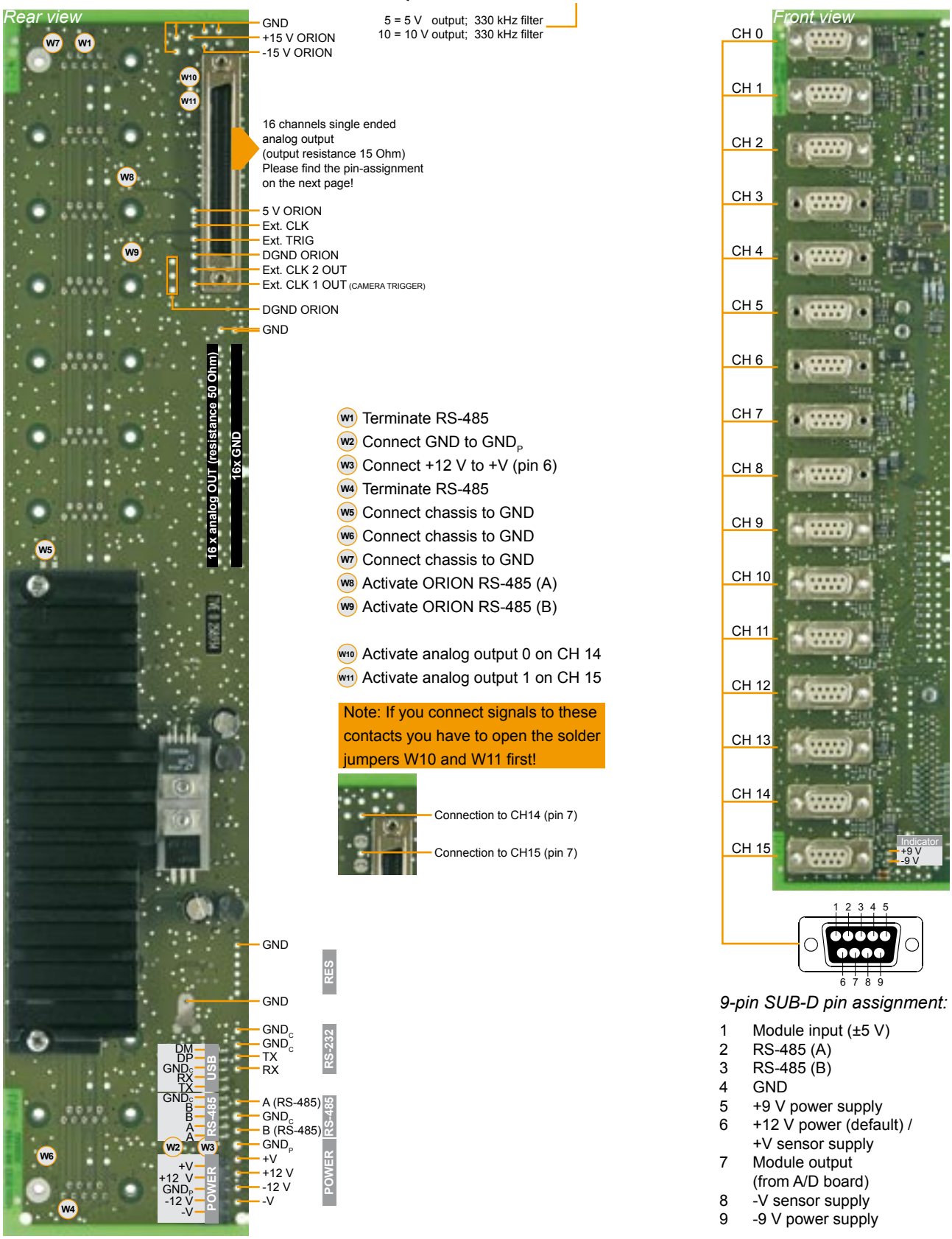


In Analyze mode you can replay any captured data file, zoom in, make cursor measurements, print reports and export the data to a wide variety of formats, like Flexpro, Excel, Matlab, Diadem and many more.

Since version 7 all the powerful math functions such as math formulas, filtering, statistics, power analysis, frequency response function, order tracking, torsional vibration, engine combustion analysis, sound analysis, human vibration analysis, and others can also be applied off-line to captured data. So you can simply store the raw data and do all the processing off-line, on any computer, anywhere. This allows you to work with the data as you were at the test bench or on the proving ground.

Notes

16 slot DEWE-MOTHERBOARD DAQ-MOTH-16-DE-x



9-pin SUB-D pin assignment:

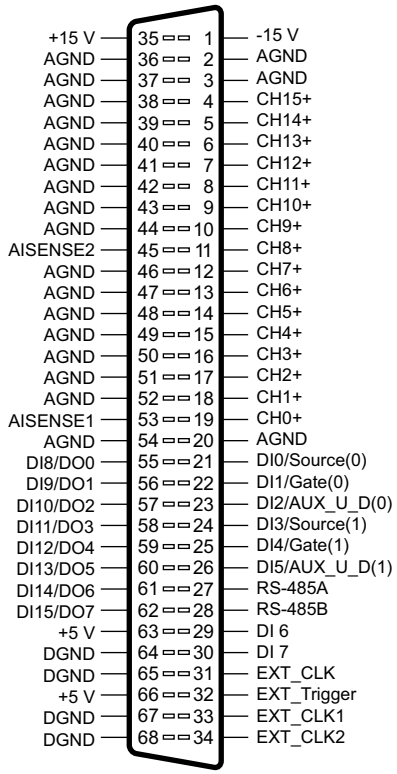
1	Module input (±5 V)
2	RS-485 (A)
3	RS-485 (B)
4	GND
5	+9 V power supply
6	+12 V power (default) / +V sensor supply
7	Module output (from A/D board)
8	-V sensor supply
9	-9 V power supply

The 16 slot DEWE-MOTHERBOARD receives the ±12 V_{DC} power supply via a DC/DC converter from the internal power supply.

Internal Wiring

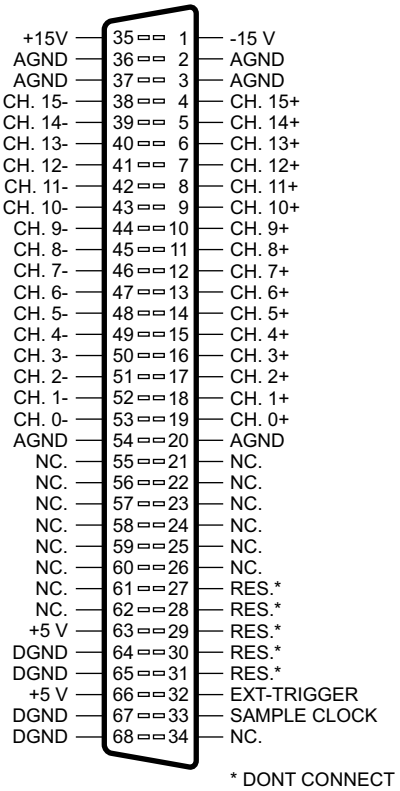
Analog output connector pin-assignment

Connector for DEWE-ORION-1616 cards



68-pin high density connector

Connector for DEWE-ORION-1624 cards



68-pin high density connector

CE-Certificate of conformity

CE

Manufacturer:

DEWETRON Elektronische Messgeraete Ges.m.b.H.

Address:

Parkring 4
A-8074 Graz-Grambach Austria

Tel.: +43 316 3070 0
Fax: +43 316 3070 90
e-mail: sales@dewetron.com
http://www.dewetron.com

Name of product:

DEWE-5X-USB2-XX

Kind of product:

Data acquisition instrument

The product meets the regulations of the following EC-directives:

73/23/EEC
"Directive on the approximation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits amended by the directive 93/68/EEC"

89/336/EEC
"Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility amended by the directives 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC

The accordance is proved by the observance of the following standards:

LV	**Safety**	IEC/EN 61010-1:1992/93 IEC/EN 61010-2-031	IEC 61010-1:1992/300 V CATIII Pol. D. 2 IEC 1010-2-031
EMC	**Emissions**	EN 61000-6-4	EN 55011 Class B
	Immunity	EN 61000-6-2	Group standard

Graz, October 14, 2008

Place / Date of the CE-marking

Dipl.-Ing. Roland Jeutter / Managing director

Notes