

TECHNICAL REFERENCE MANUAL

DS-IRIG-CLOCK V20-1



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2. About this document

2.1. Legend

The following symbols and formats will be used throughout the document.



Important

It gives you important information about the subject.
Please read carefully!



Hint

It gives you a hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

3. Specifications

IRIG Input Specifications	
Supported codes	IRIG code A or B / AM or DC
Compatibility (AM code)	0.5 Vpp to 10 Vpp
Ratio (AM)	3:1 ±10 %
Compatibility (DC code)	DC Level Shift TTL / CMOS compatible
Impedance	5 kΩ
Isolation	150 VDC
Trigger accuracy	1 μsec
IRIG output specifications	
Supported codes	IRIG code B, DC
Output level	High / Low: 5 / 0 Vdc
Isolation	150 VDC
Accuracy	< 1 μsec (delay to GPS PPS)
System specifications	
Clock accuracy locked	without drift
Clock accuracy unlocked	< 10 ppm
Input	BNC for IRIG I/O
Power supply	USB powered, max. current 500 mA
Environmental specifications	
Operation temperature	-5 °C to +70 °C
Storage temperature	-20 °C to +85 °C
Humidity	10 % to 80 %; non condensing
Dimensions (W x D x H)	149 x 88 x 47 mm housing 149 x 100 x 47 mm with connector
Weight	430 g

3.1. Shock & Vibration

	Vibration Tests		Shock Test
European Standard	EN 600068-2-6	EN 60721-3-2 Class 2M2	EN 60068-2-27
Shape	Sine	Random	Half-sine
Frequency	0 Hz to 150 Hz	10 - 200 Hz	
Power spectral density	1 m/s ² / Hz from 10 – 200 Hz	1 m/s ² / Hz from 10 – 200 Hz	
Acceleration amplitude			15 g
Duration	30 Minutes per axis	30 Minutes per axis	11 ms
Test in 3 axis, 3 shocks in each axis and direction			

4. Device overview

4.1. IRIG based operation

The IRIG signal contains the binary-coded time (year, day of year, hours, minutes, seconds, fractions of a second) modulated on a sine wave carrier. This signal is decoded to the PPS and the drift-free 40 MHz clock.

The following IRIG time codes are supported:

- IRIG-A (10 Hz)
- IRIG-B (1 Hz)


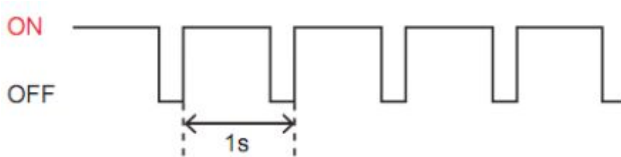
4.2. LED Description

4.2.1. Power

The power LED is solid green when the DS-IRIG-CLOCK is in normal operation. The device is powered with the USB cable.

4.2.2. Status

The status LED indicates the current status of the device:

<p>At normal operation - when DS-IRIG-CLOCK is locked to the selected time source - it shortly blinks once a second.</p>	 <p><i>Image 1: LED: Normal Operation</i></p>
<p>When the time source signal is missing (IRIG time code signal), the device automatically goes to flying-wheel operation. This is indicated by inverted blinking.</p>	 <p><i>Image 2: LED: Missing Signal</i></p>

4.3. Scope of supply

When ordering the DS-IRIG-CLOCK the following supply is also included in the package:

- 0.5m 4-pin sync cable, for the synchronization of the system
- USB-mini cable for connecting the device to the SBOX or PC



Image 3: Scope of supply

4.4. Connection

4.4.1. Connectors



Image 3: Connectors

4.4.1.1. LEDs

See chapter [LED Description](#)

4.4.1.2 IRIG connector

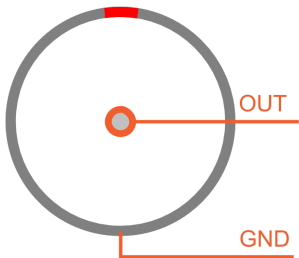


Image 4: IRIG connector

Pin	Description
1	IN / OUT
2	GND

4.4.1.2. SYNC connector

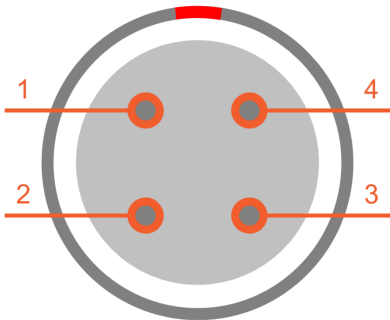


Image 5: Sync connector: pin-out (4-pin LEMO female)

Pin	Name	Description
1	CLK	Clock
2	Trigg	Trigger
3	N.C.	N.C.
4	DGND	Digital Ground

Interface connector: EEG.00.304.CLL
Mating connector: FGG.00.304.CLAD27Z

4.5. USB connector

Usb-mini connector is used for powering the device and connecting it to the PC or SBOX.

4.6. Installation

The hardware drivers for the DS-IRIG-CLOCK are automatically installed together with DewesoftX®. There is no additional SW needed. You can start the software in the Windows start menu or use the icon created on your desktop. For more information about the DewesoftX® installation please refer to the DewesoftX® Software User's Manual.

4.7. Connecting the DS-IRIG-CLOCK to the DAQ-System

4.7.1. Synchronization to system with Clock and Trigger

To synchronize standard data acquisition systems a start trigger and the possibility of external clocking is required. This input needs to be connected to the output of the DS-IRIG-CLOCK sync signals.

4.8. Configuration of DewesoftX® for the DS-IRIG-CLOCK

When the DS-IRIG-CLOCK is connected it will be automatically recognized in DewesoftX® Device settings menu:

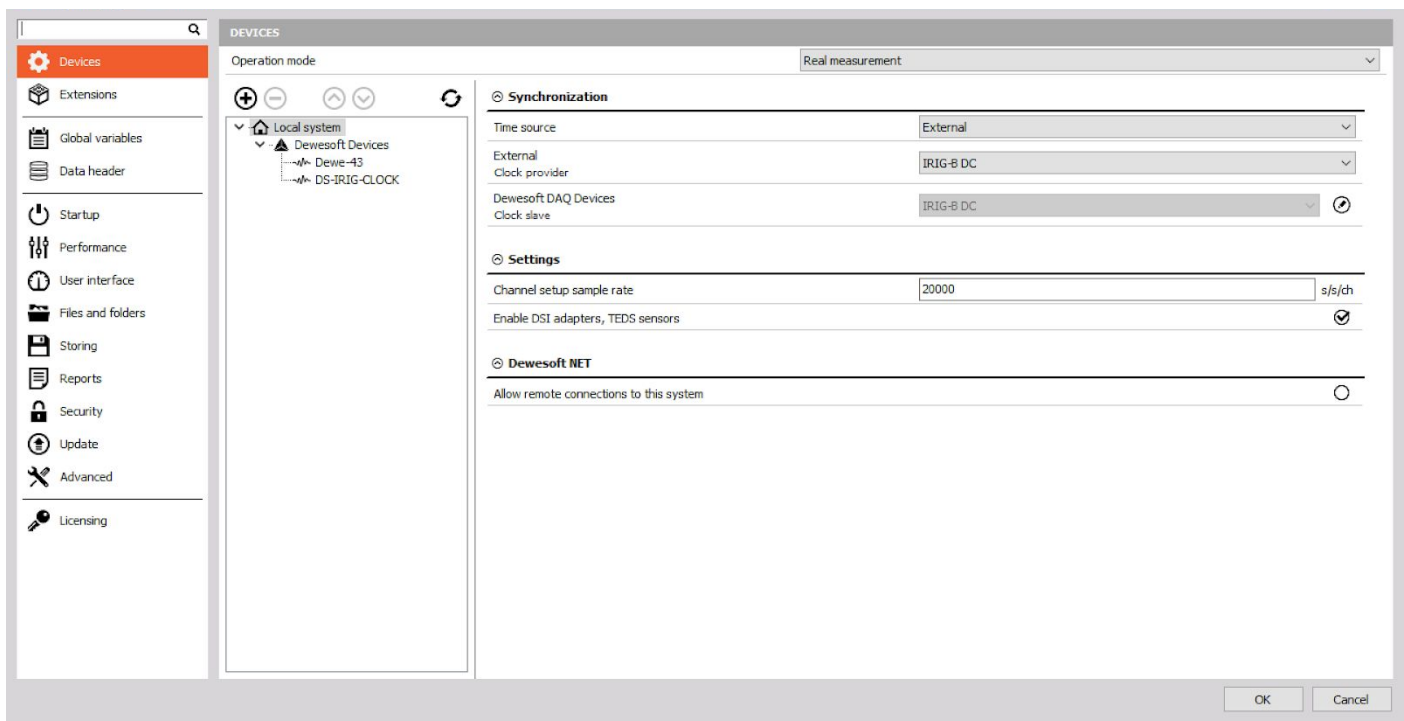


Image 6: Dewesoft device settings

4.8.1. Update rate

The update rate is fixed at 1 Hz.

4.8.2. Timing settings

When you want to use the DS-IRIG-CLOCK as a high precision timing device for synchronized data acquisition, you need set the Time source as External.

a.) IRIG-B-DC input

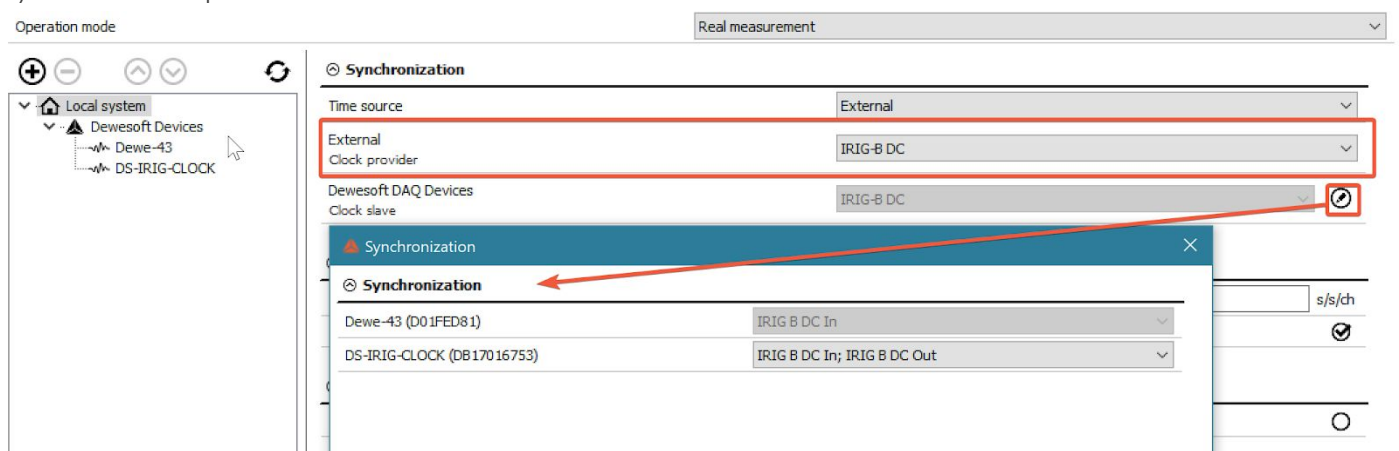


Image 7: IRIG as external source

b.) IRIG-B-AC input



Image 8: IRIG as external source

4.8.3. Input settings

Time source

Here you can select which input signal (External or Dewesoft DAQ device) is used for the time source.

Code type

If External mode is selected as a time source, this drop-down menu defines the used code type (Clock/Trigger, IRIG-B-DC, IRIG-A-AC, IRIG-B-AC, IRIG-G-AC, or NTP or GPS-PPS).

Modulation

This selects the modulation type (AC or DC) of the IRIG input signal.

Please note that only IRIG-B with DC modulation is supported as output signal.

4.9. Measurement setup

When the DS-IRIG-CLOCK is used as a timing device and you switch to the measurement screen you will see the actual time from the DS-IRIG-CLOCK shown in the top right corner of the screen. A green clock next to this time indicates that the DS-IRIG-CLOCK is locked to the IRIG time whereas a red Clock and Sync lost message indicates that the DS-IRIG-CLOCK is in free-run mode.



Image 9: Sync OK

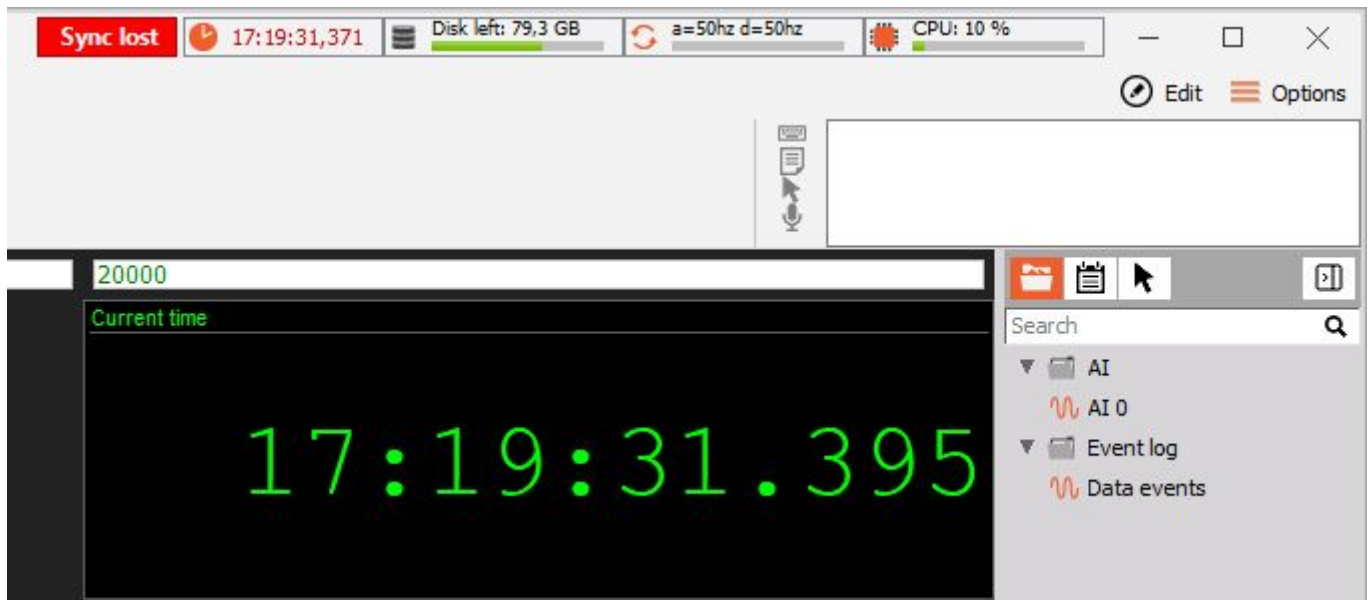


Image 10: Sync lost

By default the local time is stored inside the data file, but if the measurement results from multiple systems located in different time zones should be analysed it is recommended to set to UTC or GPS time. This can be done in the Global settings of DewesoftX® (Settings Global settings Displays). Doing so, the data from all data acquisition systems are containing the same absolute time stamp.

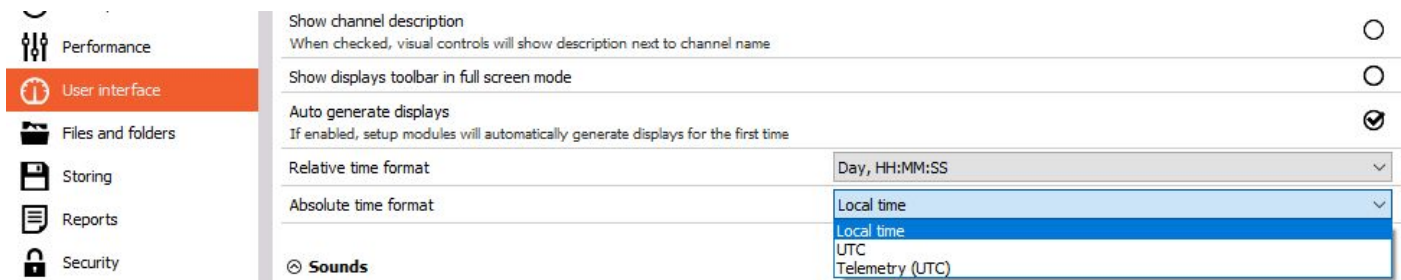


Image 11: Global Time Settings

4.10. Decode 2nd part of IRIG

The IRIG synchronization signal consists of two parts. In the first part the time information is encrypted and the second part is available for user-defined "control functions".

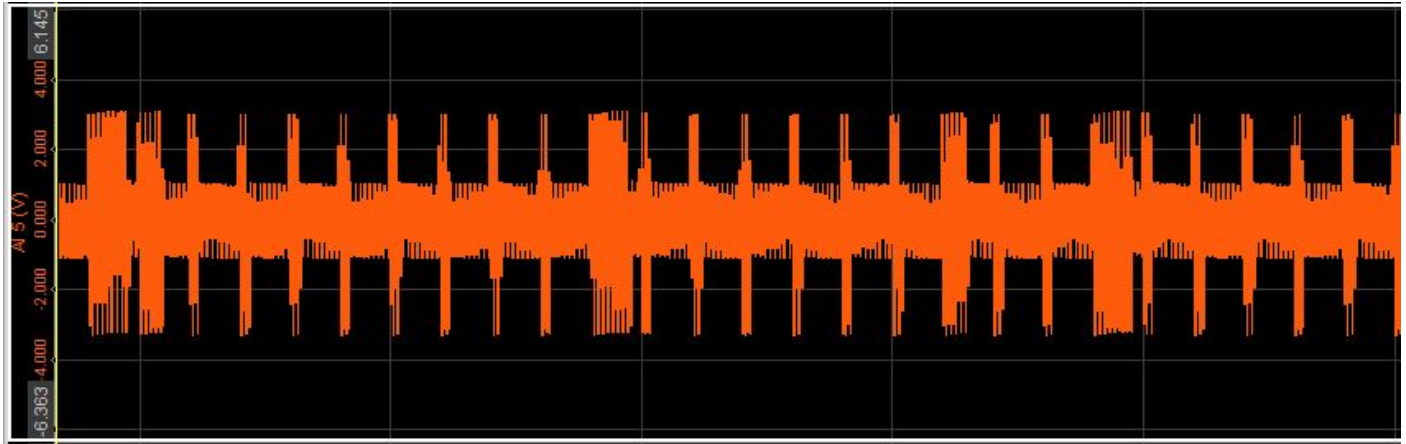


Image IRIG-B-AC signal

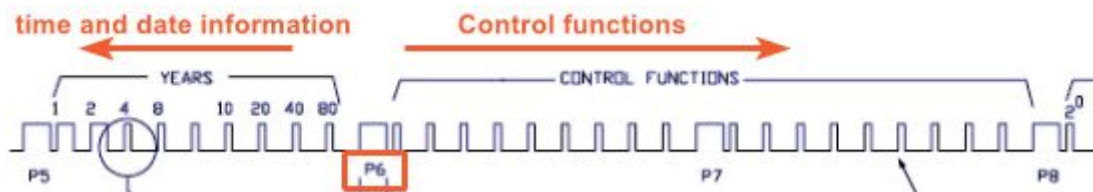


Image: part of IRIG-B-DC frame

4.10.1. Hardware and software requirements

Firmware: 5.0.24.16 or higher

Software: Dewesoft® X3 release or newer



Important

The device can only decode 2nd part of the **IRIG AC signal**

4.10.2. DewesoftX® usage

To enable this option go to Settings -> Advanced -> Hardware and enable the "Decode 2nd part of IRIG time frame" option.

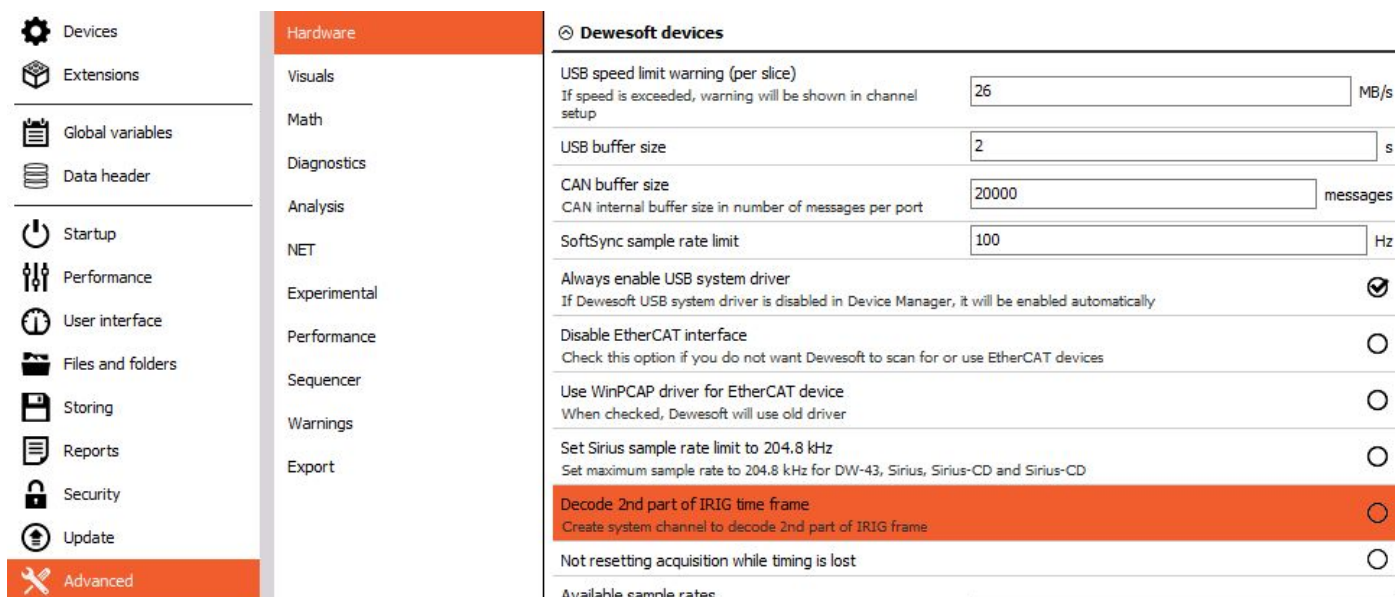


Image 12: Enable 2nd part of IRIG

This will generate an additional channel in the DewesoftX® system monitor which will show the value of the second part of the IRIG signal.

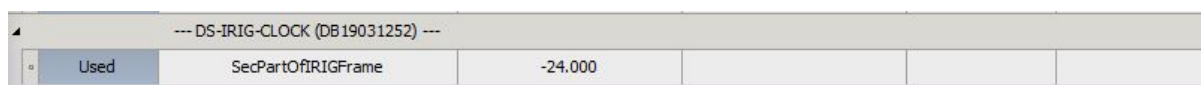


Image 13: Additional channel in system monitor



Important

Due to hardware limitations the 2nd part of the IRIG signal has a **2 seconds delay** in relation to the time signal.

5. Warranty information

Notice

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

Note:

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The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit <https://dewesoft.com/support/distributors>.

5.1. Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

5.2. Support

Dewesoft 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 Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300

Web: <http://www.dewesoft.com>

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

5.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

5.4. Restricted Rights

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

5.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

5.6. Copyright

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6. Safety instructions

Your safety is our primary concern! Please be safe!

6.1. Safety symbols in the manual



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

6.2. General Safety Instructions



Warning

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. Dewesoft GmbH assumes no liability for the customer's failure to comply with these requirements.

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

6.2.1. Environmental Considerations

Information about the environmental impact of the product.

6.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

6.2.3. 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 its end of life! Please recycle this product in an appropriate way to avoid 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 information about recycling on the Dewesoft web site www.dewesoft.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. However, we take care of our environment and the product is lead-free.

6.2.4. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other 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 advice 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.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.

- The inputs must not, unless otherwise noted (CATx identification), be connected 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 authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- 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 environments. the system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage 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).
- 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 be 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 circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). 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 circuits 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 refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with 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 be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in 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.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice 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 the protection of buildings, are excluded from the scope of IEC 61326-3-1.

7. Version History

Version	Date [dd.mm.yyyy]	Notes
V20-1	15.10.2020	<ul style="list-style-type: none">The NEW DS-IRIG-CLOCK Technical Reference Manual - Reworked and revised version

7.1. Previous versions history

Version	Date [dd.mm.yyyy]	Notes
1.0.0	04.09.2013	<ul style="list-style-type: none">Initial revision 1.0.0. (nr. 57, Last modified: Wed 04 Sep 2013, 11:02)