

Automotive
Energy & Power Analysis
Field Service
Environmental
Research & Development

DEWE-IRIG-CLOCK

Technical reference manual



ISO9001

... the precision signal conditioning company



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Technical Reference

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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.

Support

For any support please contact your local distributor first or DEWETRON directly.

For Asia and Europe, please contact:

DEWETRON Ges.m.b.H.
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Tel.: +43 316 3070
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Monday to Friday between
08:00 and 17:00 GST (GMT -5:00)

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Safety instructions

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.

Safety instructions for all DEWETRON systems

- The DEWETRON data acquisition systems may only be installed by experts.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- 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 or supplied power cable.
- DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.
- 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 safe operation can be verified by service-trained personnel. If necessary, return the product to a DEWETRON sales and service office for service and repair to ensure that safety features are maintained.
- Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.
- No modifications are allowed at the instrument. The fuse in the power module has to be replaced by the same type. For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holder labels and print on the power module may not be removed.
- DO NOT service or adjust alone. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a DEWETRON sales and service office for service and repair to ensure that safety features are maintained.
- Before opening the instrument (experts only) or exchanging the fuse in the power module disconnect power!
- Don't touch internal wiring!
- Don't use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- Install filler-panels in unused slots.
- The power-cable and -connector serve as Power-Breaker. The cable must not exceed 10 feet, disconnect function must be possible without tools.
- Safety of the operator and the unit depend on following these rules.

General System Information

Environmental Considerations

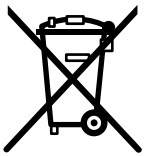
Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a DEWETRON system:

System and Components Recycling

Production of this 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.

IRIG synchronized time base generator

Features:

- Absolute time accurate synchronisation between data acquisition systems
- **Clock output:**
 - Output clock rate of up to 10 MHz
 - Synchronization of DEWE-ORION-1624 systems
 - Continuous synchronization to IRIG time
 - Absolute long time stable
 - High frequency accuracy without IRIG signal



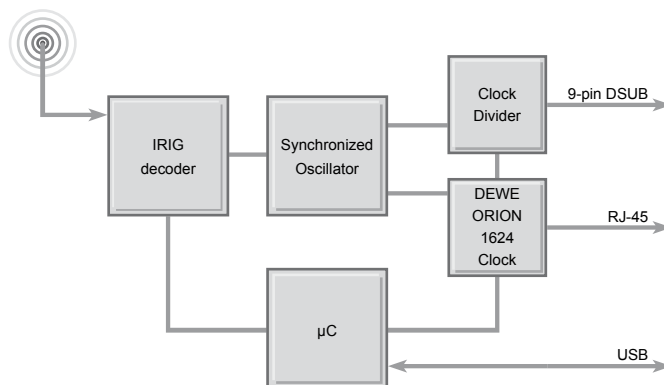
Specifications

DEWE-IRIG-CLOCK		IRIG synchronized time base generator	
Timing specifications			
Adjustment range:		±150 ppm	
Clock acc. IRIG locked		without drift	
Clock acc. IRIG unlocked		< 1 ppm	
System specifications			
Input:		IRIG code A or B; AM or DC	
AM code:		0.5 Vp-p to 10 Vp-p	
Ratio (AM):		3:1 ±10 %	
Impedance:		20 kΩ	
Compatibility:		DC Level Shift TTL / CMOS Compatible	
Connector:		BNC female	
Output:		Clock and Trigger for DAQ-systems	
Trigger:		PPS (p ulse p er s econd), rising edge on time, 75 msec high time, TTL level compatible	
Scan clock:		10 Hz to 10 MHz, rising edge synchronized, 50 % duty cycle, TTL level compatible	
ORION-1624-SYNC:		LVDS compatible synchronisation bus for ORION-xx24 series	
Power supply:		USB powered, max. current 250 mA	
Operation temperature:		-5 °C to +70 °C	
Storage temperature:		-20 °C to +85 °C	
Humidity:		10 % to 80 %; non condensing	
Vibration test:		EN 600068-2-6	
Shape:		Sine	
Frequency:		10 Hz to 150 Hz	
Power spectral density:		1 m/s² / Hz from 10 – 200 Hz	
Duration:		30 Minutes per axis	
Vibration test:		EN 60721-3-2 Class 2M2	
Shape		Random	
Frequency range		10 - 200 Hz	
Power spectral density		1 m/s² / Hz from 10 – 200 Hz	
Duration		30 Minutes per axis	
Shock:		EN 60068-2-27	
Shape:		Half-sine	
Acceleration amplitude:		15 g	
Duration:		11 ms	
Test in 3 axis, 3 shocks in each axis and direction			
Dimensions:		140 x 95 x 35 mm (5.5 x 3.7 x 1.3 in.)	
Weight:		740 g (1.63 lbs)	

DEWE-IRIG-CLOCK

Device overview

With the DEWE-IRIG-CLOCK DEWETRON offers an IRIG synchronized time base generator. This allows completely synchronized data acquisition of multiple systems located on different places. The time synchronization is supported for the whole DEWE-ORION series and also for many 3rd party A/D boards. The diagram below gives a basic idea about the DEWE-IRIG-CLOCK functionality.



The IRIG-DECODER engine generates one pulse per second (PPS) which is used to synchronize a 40 MHz oscillator with software PLL (phase locked loop). The result is an ultra stable 40 MHz clock source which is completely free of drift over time.

Out of this 40 MHz base clock, the programmable clock divider generates the clock frequency for the data acquisition system. Due to the over-clocking of delta sigma converters, a special output clock is required for synchronized sampling. This is available on a RJ45 connector for clocking the DEWE-ORION-1624. The communication to the host is provided over native USB interface.

Functionality of the LEDs



Power (red LED)

indicates the power and hardware status. At power-on this LED flashes for approx. 3 seconds until the hardware is recognized which is indicated by a solid LED.

Status (green LED)

indicates current status of device. At normal operation – when IRIG signal is recognized - it shortly blinks once a second. The device goes automatically to flying-wheel operation when IRIG signal is missing. That is indicated by inverted green LED blinking (it goes off for a while every second).

DEWE-IRIG-CLOCK

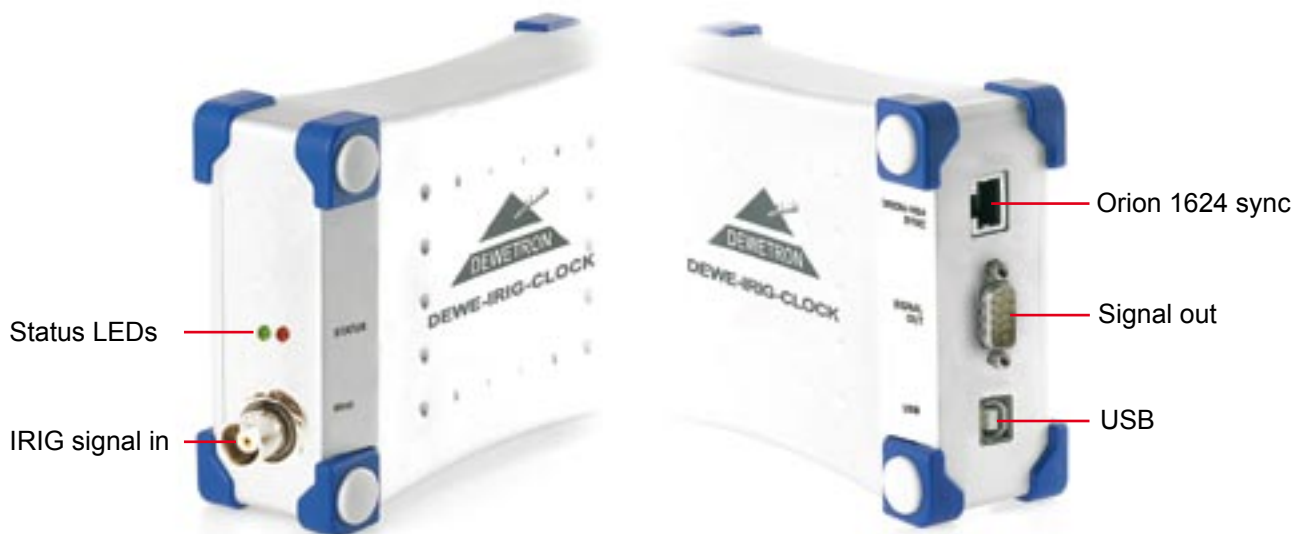
Scope of supply



- DEWE-IRIG-CLOCK
- USB cable
- DB9 - DB37 cable
- 1624-CLOCK cable

Connection

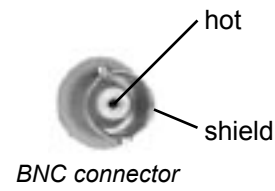
Connector overview:



DEWE-IRIG-CLOCK

IRIG connector

Connect the IRIG signal to the BNC connector.

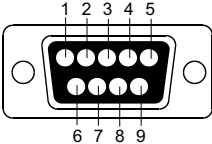


Signal out connector

The 9-pin DSUB 9 (male) connector is configured as output connector for following signals:



9-pin SUB-D
connector (male)



Schematic

Pin assignment

- 1: PPS (pulse per second)
- 2: Scan clock output
- 3: reserved
- 4: reserved
- 5: reserved
- 6: GND (Ground)
- 7: GND (Ground)
- 8: GND (Ground)
- 9: GND (Ground)

USB connector

The USB interface connectors meets standard USB pin assignment.



4-pin USB connector



Schematic

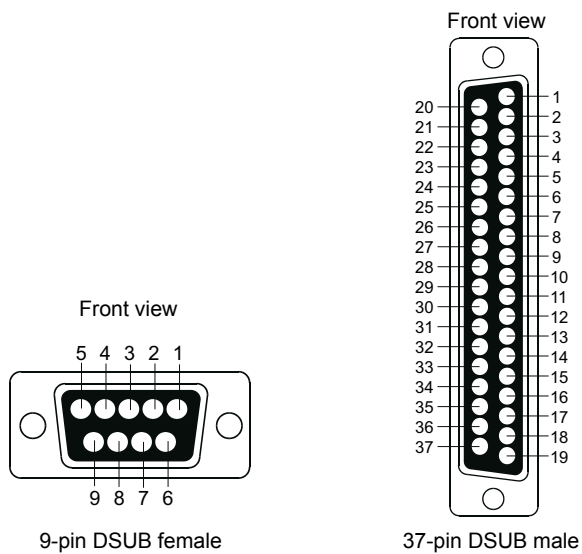
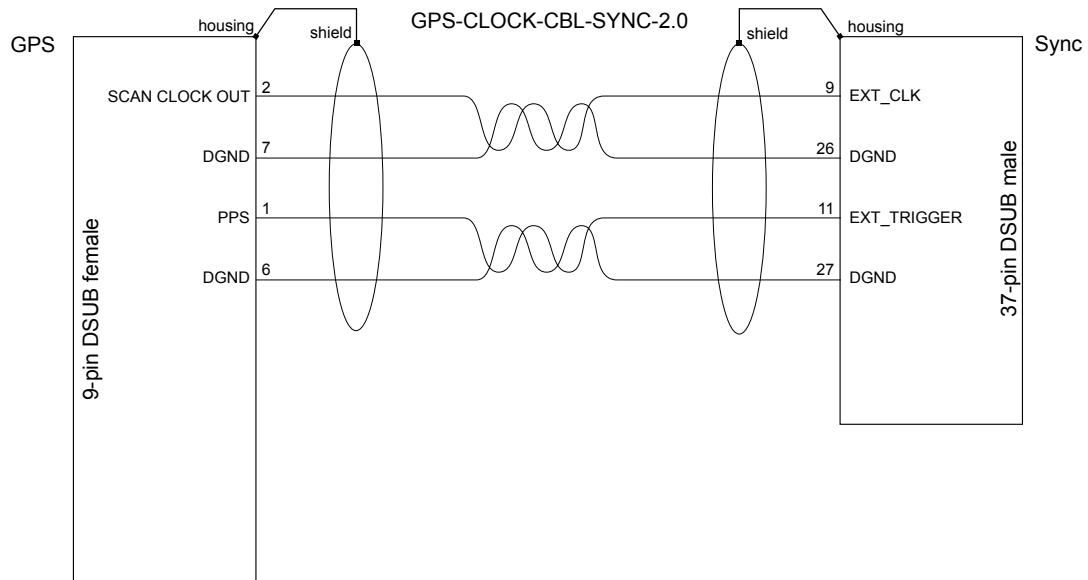
Pin assignment

- 1: +5 V
- 2: D-
- 3: D+
- 4: GND

DEWE-IRIG-CLOCK

Sync output

Type of cable: 2 x 2 x 0.25 shielded



DEWE-IRIG-CLOCK

Installation of the DEWESoft measurement software

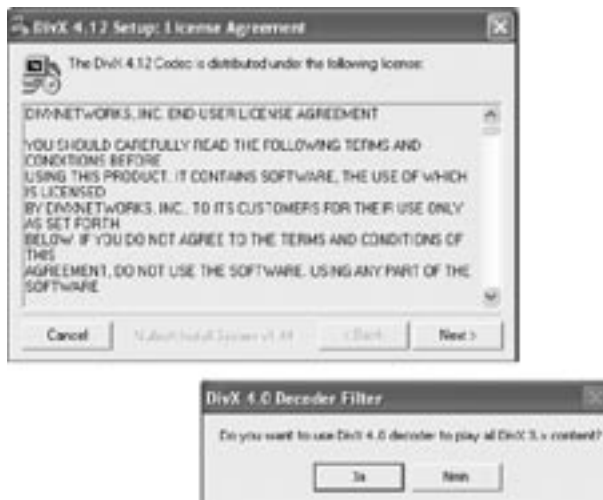
Start the installation software on the CD, shipped with the system.

Follow the instructions of the install program according to your license.



DEWE-IRIG-CLOCK

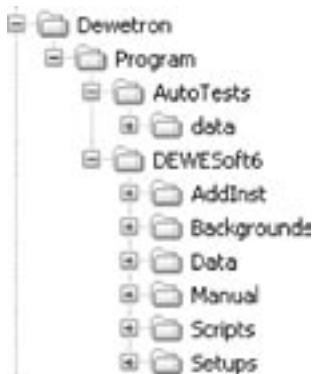
Optionally you can install the DivX codec to compress video data.



The installer creates an icon called "DEWESoft6" on your desktop.



The software also creates some directories on your hard disk (C:\Dewetron\Program\...).



DEWE-IRIG-CLOCK

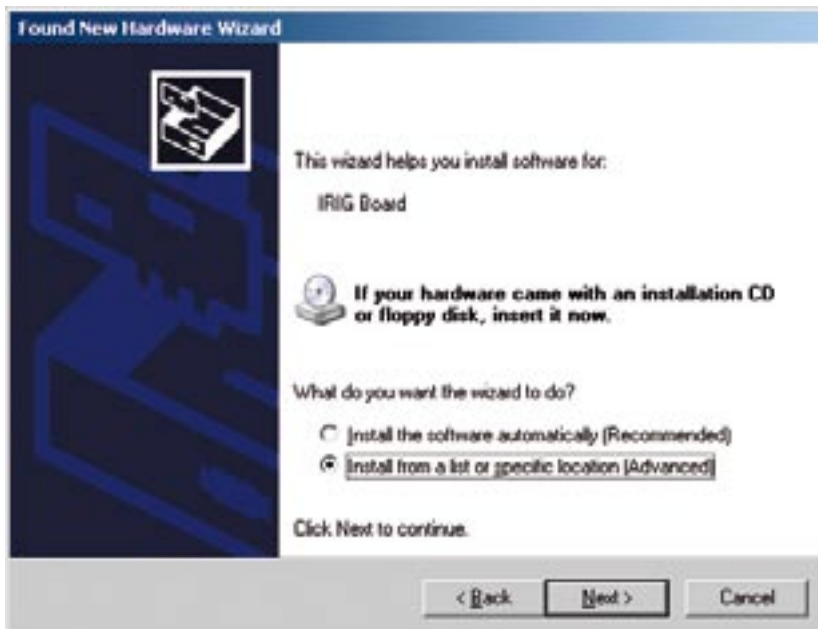
Installation of the DEWE-IRIG-CLOCK drivers

To install the driver of IRIG-CLOCK, connect the device to the USB port of the PC using the shipped USB cable. The following message should appear:

Choose "No, not this time" and click "Next" to continue.

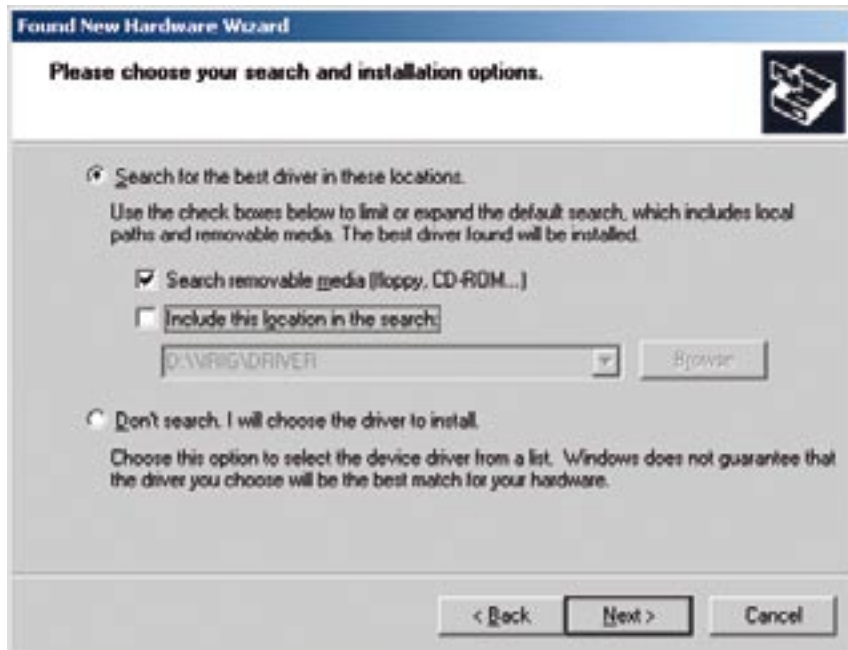


Select "Install from a list or specific location (Advanced)" option and click "Next".



DEWE-IRIG-CLOCK

The driver should be located in **CDDRIVE:\install\driver\IRIG-CLOCK\driver** folder on the system CD. You can either point out this location or just simply select "Search removable media".



The installation procedure should install the driver.



DEWE-IRIG-CLOCK

Finish the Wizard with the "Finish" button.

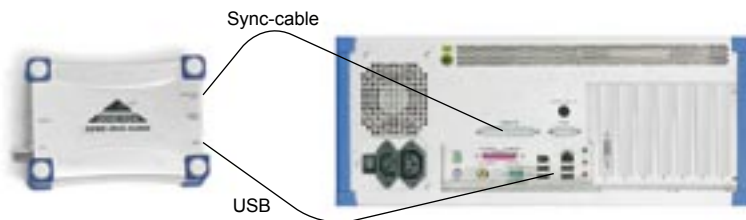


The driver has been successfully installed.

Connecting the DEWE-IRIG-CLOCK hardware to the DAQ-System

Synchronization to standard A/D-boards

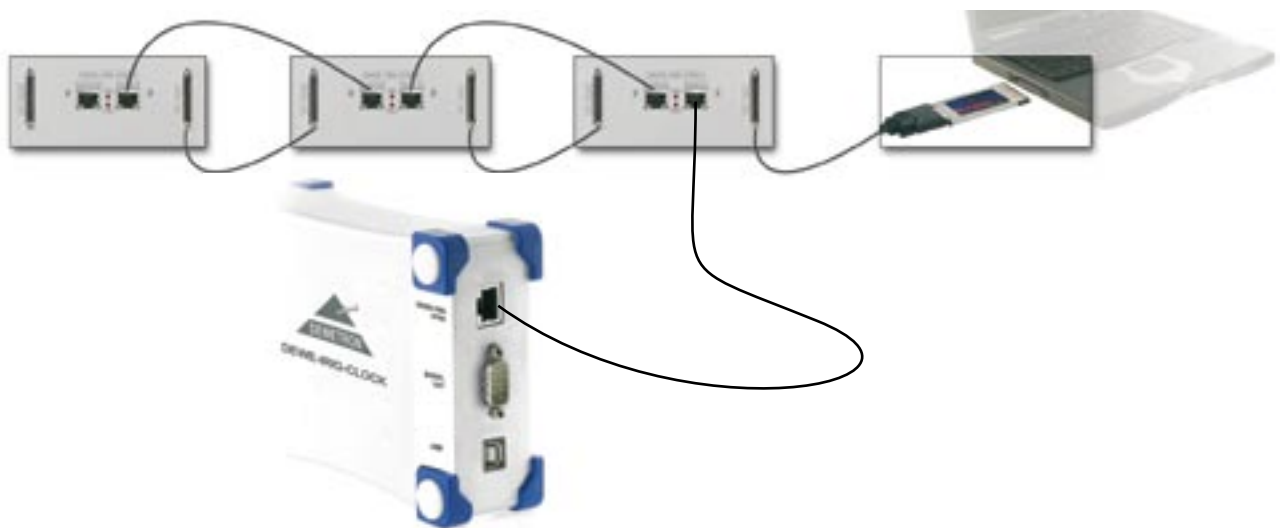
To synchronize standard data acquisition systems a start trigger and the possibility of external clocking is required. Usually DEWETRON data acquisition systems are equipped with a 37-pin DSUB connector. This digital multi function connector contains the required clock and trigger input for easy connection to the clocking unit.



Synchronization to DEWE-ORION-1624

One of the unique features of the DEWE-IRIG-CLOCK is the possibility to synchronize also data acquisition systems using delta sigma ADC technology like DEWE-ORION-1624. The main challenge is to produce the up to 256 times over sample clock used for these types of analog to digital converters. For this purpose the DEWE-IRIG-CLOCK is equipped with a RJ45 connector for connection to the DEWETRON data acquisition system. A standard CAT5e or CAT6 Ethernet cable with up to 30 m can be used for connection.

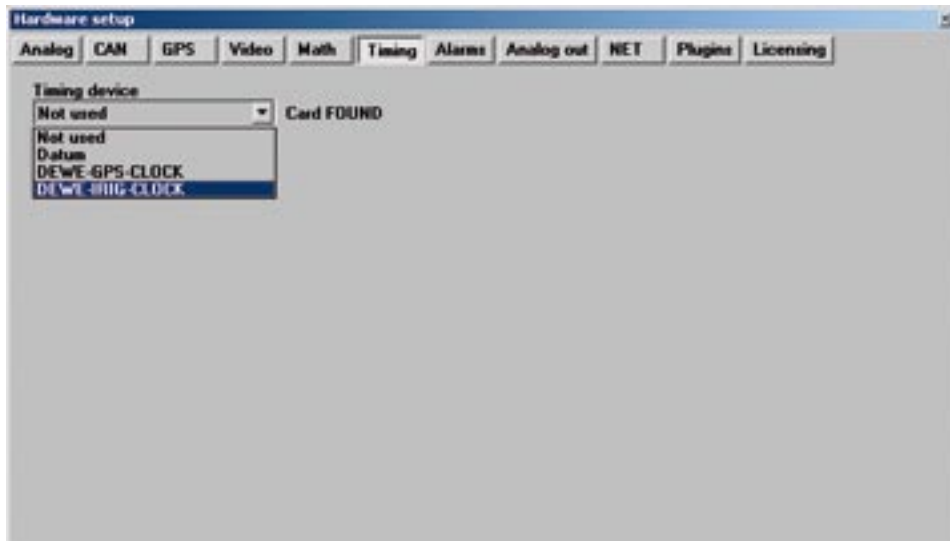
Please note: also the data acquisition has to be provided ORION-1624-SYNC option for having access to the sync bus of the board.



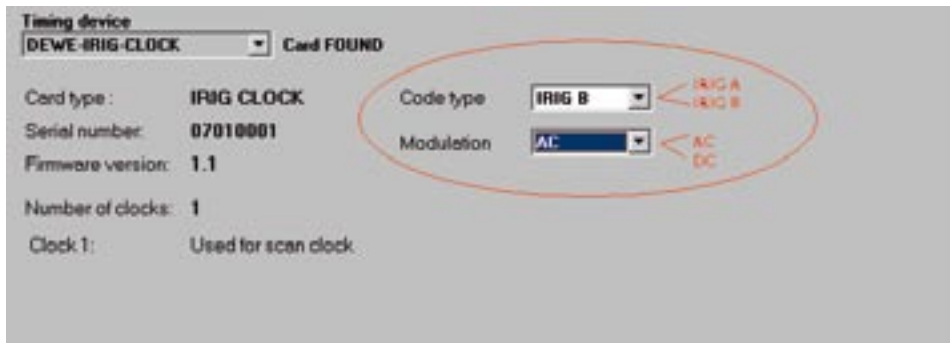
DEWE-IRIG-CLOCK

Configuration of DEWESoft for the DEWE-IRIG-CLOCK

Open "System" → "Hardware setup" and at the "Timing" tab select DEWE-IRIG-CLOCK

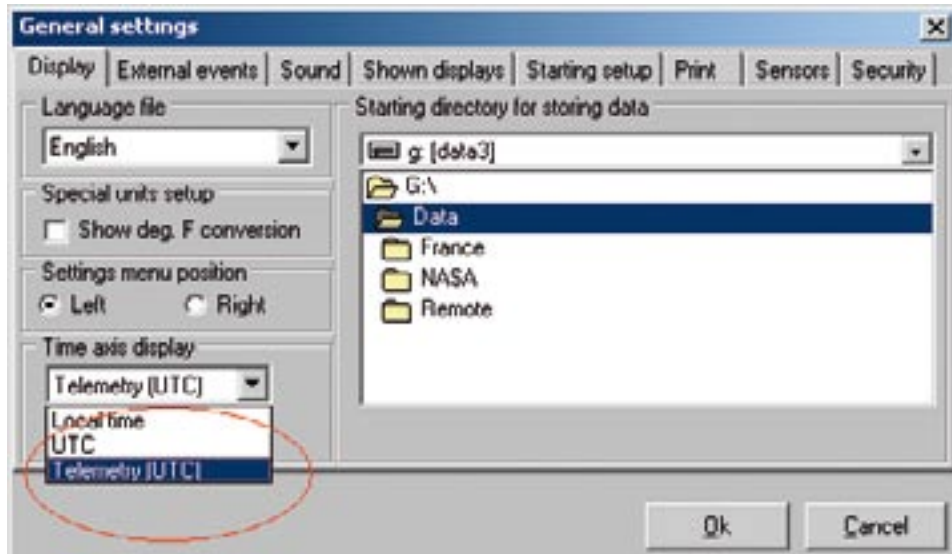


When hardware is successfully found, you can select either IRIG A or IRIG B as Coding type and AC or DC as Modulation.



DEWE-IRIG-CLOCK

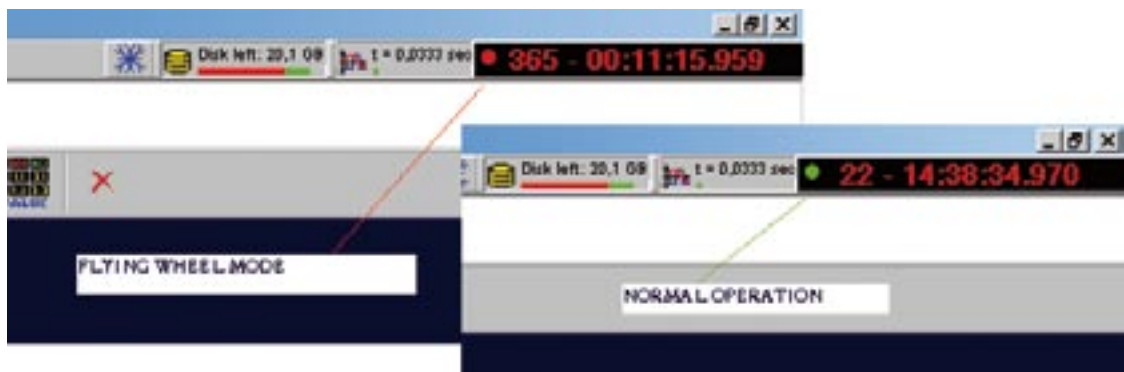
Open "System" → "General settings" and select "Telemetry" (UTC from Time axis display)



You will see following message after starting measurement:



which ensures that measurement really starts exact on second. During measurement you see day of year, current time and status in upper right corner.



A green status light indicates that an IRIG signal is received, so the DEWE-IRIG-CLOCK is in normal operation. In this case, the measurement data is fully synchronized.

A red status light indicates that the IRIG signal is NOT received, so the DEWE-IRIG-CLOCK is in "Flying Wheel Mode". In this case, the measurement data is not fully synchronized and will drift away over time.

When the IRIG signal is lost (indicated by the status light) during measurement, the DEWE-IRIG-CLOCK will switch into "Flying Wheel Mode". When the IRIG signal can be received again, the DEWE-IRIG-CLOCK switches into "Normal Operation Mode" and automatically creates a new data file. The nomenclature of the created datafile indicates that the IRIG signal was lost during measurement: <Original_Filename>.lostXXX.DSD where XXX represents a continuous number.

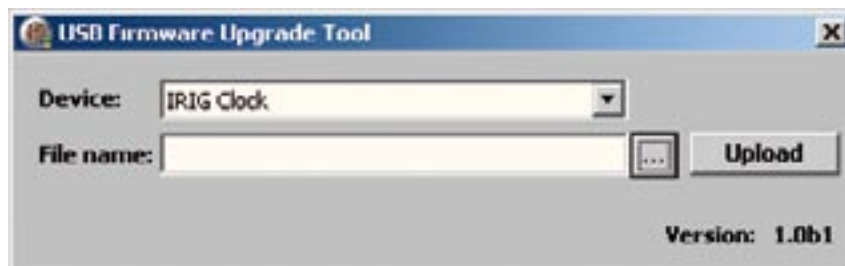
DEWE-IRIG-CLOCK

Firmware upgrade

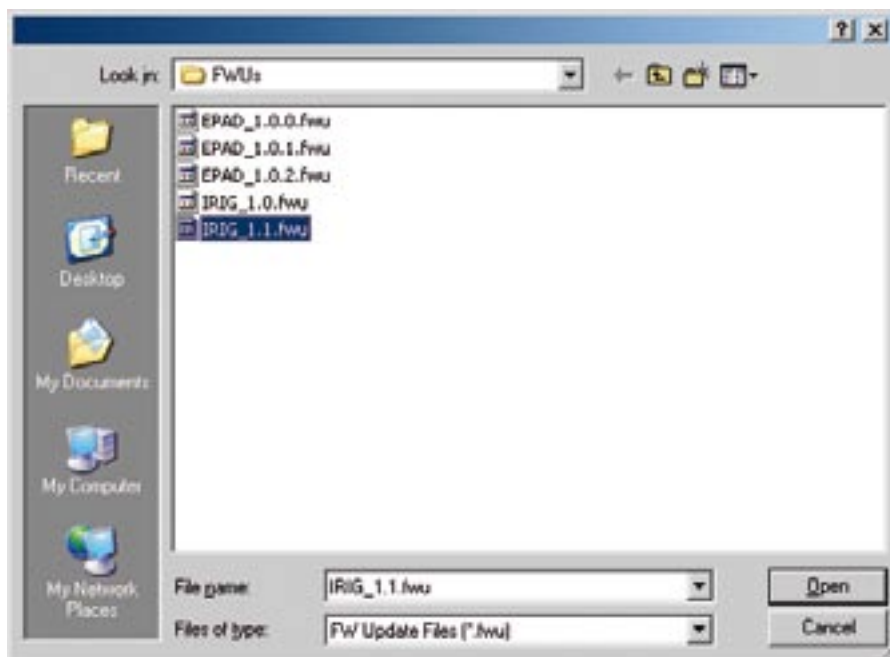
To make a firmware upgrade of the device, please connect DEWE-IRIG-CLOCK to power and then with the USB cable to the computer. It is assumed that the drivers are already installed.

Please download the latest firmware from Dewetron web site. Then run “USB Firmware Upgrade Tool” program from `cd_drive:\install\driver\IRIG\firmware`

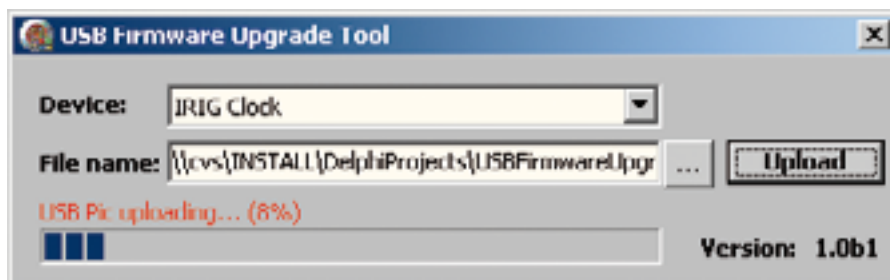
Next select IRIG in the “Device” combo box.



Press “...” button, select IRIG_xxx.fwu file and click open.



Press Upload button and wait until progress bar reaches 100%. Please don't interrupt this operation.



When upload is finished, press OK and new firmware is uploaded on the device. If this fails for any reason, repeat the upload process again.