

SIRIUS®

 DEWESoft®

TECHNICAL REFERENCE MANUAL

SIRIUS® V25-1



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2. About this document

This is the Technical Reference Manual for SIRIUS® Systems.

SIRIUS is a versatile data acquisition hardware line which comes in many different form factors and can be equipped with a wide range of different amplifiers, so that you can use it for virtually any measurement task. Each system also includes a professional license for our award-winning Dewesoft data acquisition software.

The manual is divided into several chapters. You will find:

- A detailed description of the SIRIUS hardware and the main combination and expansion options
- A description of the connection variants and the pin assignments on the inputs and outputs
- A comprehensive introduction to the configuration of the modules using DewesoftX®
- Detailed technical data: Specifications, etc.

2.1. Legend

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



Important

Gives you important information about a subject.
Please read carefully!



Hint

Gives you a Hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

4.4.1.6. SYNC connector



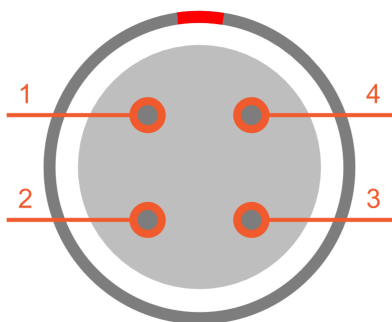
Sync cable

The sync connectors are required when you want to use multiple SIRIUS® USB slices for the same measurement. The signal that is transferred over this cable makes sure that the measurement data of the different slices are perfectly synchronized to each other.

Sync connectors have 2 use-cases:

- SBOX: When you have an SBOX with GPS option, you can use the SBOX as a clock master. In this case the SBOX will use the GPS signal to generate the synchronization signal for the attached measurement modules: e.g. the SIRIUS-SBOXe has one sync connector at the front.
- SIRIUS® USB slices: When there are 2 connectors it's easy to chain several SIRIUS® chassis (or DEWE-43, DS-CAN2, etc.) together.

Note that there is no distinction between the IN and OUT – it does not matter which connector you use.



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

Pin	Name	Description
1	CLK	Clock
2	Trigg	Trigger
3	GPS-PPS	GPS - PPS
4	DGND	Digital Ground

Interface connector: EEG.00.304.CLL

Mating connector: FGG.00.304.CLAD27Z



Important

When IRIG-synchronization is used, the IRIG differential signals are on pins 1, 2.

When Clock / Trigger is used, the signals are on pins 1, 2.

When PPS-GPS synchronization is used, the PPS signal is on pin 3.

4.4.2. SBOX common connectors

4.4.2.1. GPS connector (DSUB-9)

Used for connecting RTK modem or display:

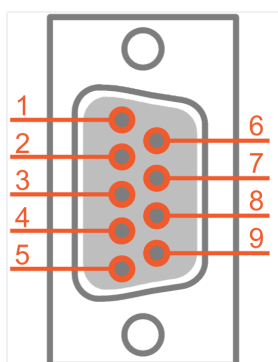
- External VGPS-DISP can be connected to receive and display NMEA parameters if internal GNSS receiver is used (TOPCON)GPS
- RTK modem (RF or LTE) can be connected to receive or transmit RTK corrections if RTK license is available on the receiver
- GNSS receiver can work as an RTK rover (receive RTK data) or as a base station (transmit RTK data)



Important

GPS port A is used for VGPS-DISP or for the RTK-modem when the RTK option is in use.
GPS port-D is reserved. Do not connect!

4.4.2.1.1. 10Hz GPS option

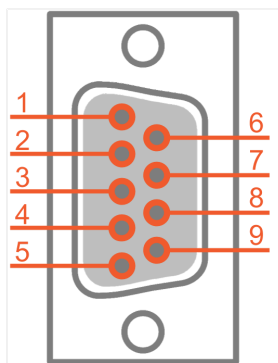


GPS connector: pin-out (DSUB-9 female)

Pin	Name	Description
1	+5V	+5 V (max. 0.5 A) See 1.
2	Tx Ch A	RS232 display (NMEA)
3	Rx Ch A	Not connected
4	PPS	GPS PPS
5	GND	Ground
6	Remote-On	Remote-On (see 2)
7	Rx Ch D	Not connected
8	Tx Ch D	Not connected
9	+12V	+12 V (max. 0.5 A) (see 1)

1. The voltages and the Remote-On features are always available, but the GPS data and PPS are only available when you have one of the GPS options.
2. Apply a voltage between 4 V and 30 V to the Remote-On pin. To power off the system reduce the voltage on Remote-On below 0.5 V for more than one second.

4.4.2.1.2. 100Hz GPS option



GPS connector: pin-out (DSUB-9 female)

Pin	Name	Description
1	+5V	+5 V (max. 0.5 A) See 1.
2	Tx Ch A	TXD GPS port A
3	Rx Ch A	RS232 RTK
4	PPS	GPS PPS
5	GND	Ground
6	Remote-On	Remote-On
7	Rx Ch D	RXD GPS port D
8	Tx Ch D	TXD GPS port D
9	+12V	+12 V (max. 0.5 A) See 1.

1. The voltages and the Remote-On features are always available, but the GPS data and PPS are only available when you have one of the GPS options.

4.4.2.2. GPS antenna connector

GPS is only available when you have an SBOX with GPS Option.

Connect the GPS Antenna to the GPS ANT RP-SMA Female Jack connector and make sure that there is an unobstructed line of sight to four or more GPS satellites.

The Global Positioning System is a satellite-based radionavigation system. It is one of the global navigation satellite systems (GNSS) that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.

4.4.2.3. Ethernet connector (RJ45)

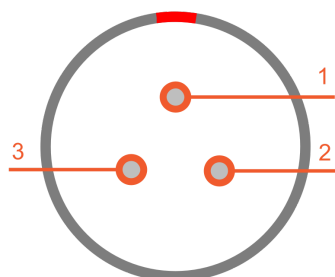
The standard Ethernet Connector can be used to connect your SBOX to LAN network.

When you use a Power Junction box you can also use the standard Ethernet connector to operate EtherCAT® devices (e.g. SIRIUS® EtherCAT® Slices or KRYPTON®).

4.4.2.4. Power in connectors

Please see specifications of individual SBOX models for details.

4.4.2.4.1. SBOX power in connector



Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	Remote - On	Remote - On pin

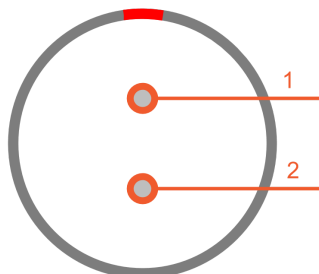
Power in connector: pin-out (3-pin LEMO male)

Power connector (on the SBOX): ECJ.2B.303.CLA

Mating connector (for the cable): FGJ.2B.303.CLLDxx

To power the system on / off, press the Power switch, or use the Remote-On pin on the Power or GPS connector.

4.4.2.4.2. SBOXre power in connector



Pin	Name	Description
1	V +	Supply
2	GND	Ground

Power in connector: pin-out (2-pin LEMO male)

Power connector (on the SBOX): ECJ.2B.302.CLA

Mating connector (for the cable): FGJ.2B.302.CYMD92



Important

Only for R8, R8D, R8B and R8DB instruments.

4.4.2.5. Remote-On

If the SBOX system is used, the remote mode can be used to turn the SBOX on or off from the remote distance.



Important

To power the system on, press the Power switch OR apply a voltage between 4 V and 30 V to the Remote-On pin. To power off the system press the Power switch or reduce the voltage on Remote-On below 0.5 V for more than one second.

Remote-On functionality can be set to various options, see details below.

SBOXwe system	
Serial number	D00C9BD43B
System serial number	
Hardware version	2.5.0.0
Firmware version	3.7
Remote mode To power on/off the system on remote external pin	Disabled

DewesoftX® settings, SBOX system

Remote mode To power on/off the system on remote external pin	Disabled
	Disabled
	Remote power on on external pin
	Remote power on and off on external pin

- Disabled - If the remote mode is disabled, SBOX can only be turned on or off by pressing the power button on the device.
- Remote power ON on external pin - The SBOX can be remotely turned on. "Remote on" HIGH signal level (>4V) will turn the SBOX on and boot operating system. SBOX can only be turned off by pressing the power button on the device.
- Remote power ON and OFF on external pin - The SBOX can be remotely turned on or off. "Remote on" HIGH signal level (>4V) will turn the SBOX on and boot operating system. The signal must remain HIGH during operation. "Remote on" LOW signal level <0.5V will safely shutdown the operating system and turn the SBOX off.



Important

After the Remote mode option is changed, a total reset of the device is required. The SBOX needs to be shut down and disconnected from the power supply. If the SBOX is also powered by batteries (e.g. R1DB, R8B,..) then the batteries need to be removed as well. The setting will become permanently enabled after a total reset.

4.4.3. VGPS-DISP

Display is compatible with 10Hz and 100Hz GPS receivers.

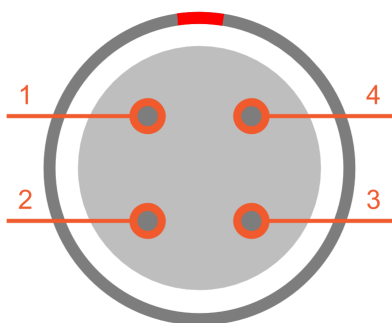


VGPS-DISP external display

The VGPS-DISP display can be directly connected to any of our GPS devices and will display:

- speed,
- heading,
- altitude,
- time, and
- number of satellites in reach.

4.4.3.1. VGPS – Display connector



*VGPS-DISP connector: pin-out
(4-pin LEMO female) EXG.1B.304.HLN*

Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	Tx Ch A	TXD
4	Rx Ch A	RXD

4.5. SIRIUS-SBOX

The SIRIUS-SBOX is an integrated powerful PC in a rugged SIRIUS® chassis: with an Intel® Core™ processor and a fast SSD drive. The SIRIUS-SBOX is available in different versions and enclosures: as a standalone single slice or integrated in a Boxed Solution, Rack, etc. The following chapters will describe the different versions in detail.

General SBOX features:

- High speed CPU Powerful Intel® Core™ processor
- High speed interfaces
USB 3.0 (nearly 10 times faster than USB 2.0) and LAN interfaces provide highest bandwidth for data-transfer
- EtherCAT® interface
Directly connect SIRIUSe devices. You only need one cable for power, synchronization and data.
- Removable High speed SSD
The high-speed Solid State Disk is fast enough for transient recording of measurement data and external high-speed videos at the same time.
- Flash option
For even better performance and maximum safety and convenience, we recommend separating the operating system from the measurement data.
With the SBOX-FLASH250 option, the operating system is stored on an internal flash disk with 250 GB, while the measurement data is stored on the exchangeable SSD. This allows you to quickly change the SSD (where your valuable data is stored). This feature also allows users to continue storing on a new media immediately.



SBOXe with removable SSD

4.5.2. SIRIUS-SBOXe: Front side



SIRIUS-SBOXe: Connectors at the front side

Name	Description
USB 3.0	4 x USB 3.0 connector
LAN	1x LAN Ethernet (GLAN or 2.5GLAN), RJ45 connector
SSD	Removable Solid State Disk
PWR LED light	Green when Power is available and switch on
PWR switch	Power On rocker switch

4.5.3. SIRIUS-SBOXe: Rear side



SIRIUS-SBOXe: Connectors at the rear side

Name	Description
POWER 9-36V	3-pin LEMO male connector
POWER OUT	2-pin LEMO female connector
GPS	Connection for external GPS display, PPS, Remote ON
LAN	1x LAN Ethernet (GLAN or 2.5GLAN), RJ45 connector
USB 2.0	2 x USB 2.0 connector
WLAN	RP-SMA Female WLAN antenna: WiFi 802.11 b/g/n
GPS ANT	SMA Female GPS antenna
DVI	DVI video out (VGA and HDMI compatible)
EtherCAT	8-pin LEMO female connector
SYNC	4-pin LEMO female sync connector

4.5.4. SIRIUS-SBOXfe: Front side

The SIRIUS-SBOXfe version is an SBOX with EtherCAT® interface. It is available for the Modular Solution. It includes the Intel® Core™ i7 high speed CPU which is the most powerful processor of the Intel® Core™ processor family for fanless operation.



SIRIUS-SBOXfe Front side

Name	Description
PWR LED light	Green when Power is available and switch on
PWR switch	Power On rocker switch
SSD	Removable Solid State Disk
LAN	1x GLAN Ethernet, RJ45 connector
USB 3.0	4x USB 3.0 connector

4.5.5. SIRIUS-SBOXfe: Rear side



SIRIUS-SBOXfe Rear side

Name	Description
SYNC	4-pin LEMO female sync connector
EtherCAT	8-pin LEMO female connector
DVI-D	DVI video out (VGA and HDMI compatible)
GPS ANT	SMA Female GPS antenna
WLAN	RP-SMA Female WLAN antenna: WiFi 802.11 b/g/n
USB 2.0	2x USB 2.0
LAN	1x GLAN Ethernet, RJ45 connector
GPS	Connection for external GPS display, PPS, Remote ON
POWER OUT	2-pin LEMO female connector
GND	M4 grounding insert
POWER 9-36V	3-pin LEMO male connector

10.2.3. 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.

10.2.4. General safety and hazard warnings for all Dewesoft systems

The 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 any 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 of 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 the 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 the 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 applications 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!
- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from our homepage: <http://www.dewesoft.com/download>.
- 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. Acclimatize 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.