

syncboxBLUE

GPS RS485 Serial Time Source

User Manual

Version 1.1



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The syncboxBLUE GPS RS485 Serial Time Source is guaranteed against failure due to faulty parts or workmanship for a period of five (5) years from date of purchase.

In the event of product failure due to faulty parts or workmanship within the warranty period, World Time Solutions Limited, at its own discretion, will either (a) repair the product, (b) supply a replacement product, (c) supply a functionally equivalent replacement product, or (d) refund the purchase price of the product.

The limited warranty will not apply if (a) the product has not been installed or operated as per our instructions, (b) the product has been modified in anyway.

In the event of failure, the syncboxBLUE should be returned to the manufacturer for inspection and repair. Please visit our support pages for further details:

www.worldtimesolutions.com/support.html

TECHNICAL SUPPORT

To obtain help with the installation or operation of the syncboxBLUE, please visit our web site at:

www.worldtimesolutions.com/support.html

1 - Introduction

The World Time Solutions syncboxBLUE is a highly accurate GPS time receiver. The unit is designed to synchronise to the GPS navigation network and provide RS485 level serial time and date information for transmission over long cable runs.

The syncboxBLUE incorporates a high sensitivity GPS engine with excellent interference rejection and low noise operation, enabling the system to acquire a GPS lock in low signal areas. Please refer to section 2 for installation recommendations and section 3 for details of confirming system operation.

1.1 - Package contents

The syncboxBLUE is supplied with the following component parts:

- syncboxBLUE GPS RS485 Serial Time source
- UK style power adapter
- User manual

1.2 - syncboxBLUE front view

The drawing below shows the front view of the syncboxBLUE.

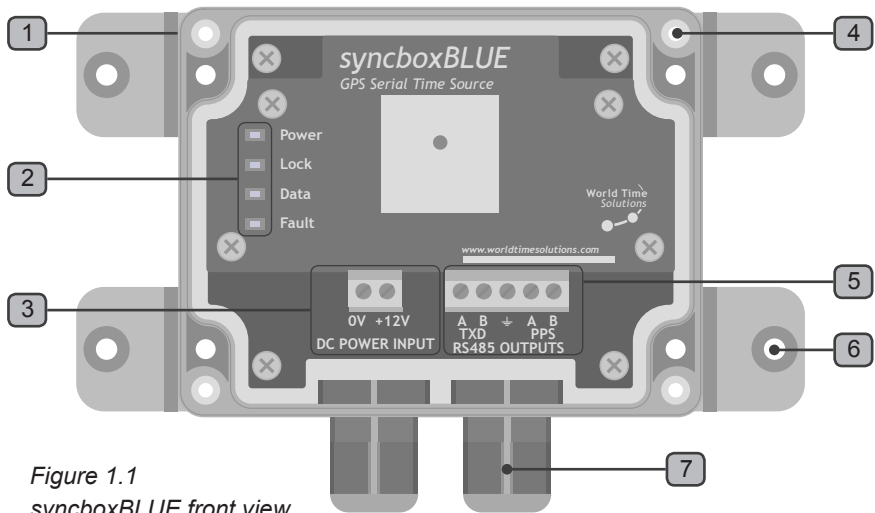


Figure 1.1
syncboxBLUE front view

No.	Function	No.	Function
1	IP66 (NEMA 4X) polycarbonate enclosure with clear cover	5	RS485 level serial and PPS outputs
2	Status LEDs	6	Case fixing points (x4)
3	12V DC power input	7	Cable grommets (x2)
4	Cover fixings (x4)		

Table 1.1 - syncboxBLUE functions

2-Installing the syncboxBLUE

The syncboxBLUE should be installed in a suitable location following the recommendations in section 2.1 below. The system should be securely fixed in place, connected to the synchronisation slave system using a suitable cable (not supplied) and then powered via the supplied power adapter.

If required, the power cable may be extended by following the recommendations in section 2.4. Special care should be taken to follow these recommendations if the unit is to be installed externally.

2.1 - Recommended installation locations

To achieve the most reliable operation, the syncboxBLUE should be installed in the following optimum location:

- On the roof of a building, laying flat facing the sky. *(The unit should have a clear unobstructed view of the sky).*

If installation on the roof of the building is not practical, one of the following acceptable alternative installation locations may be used:

- Flat to the side of a building facing the horizon with a partial view of the sky. *(The unit should be installed on the side of the building facing towards the equator).*
- Mounted internally looking out of a non-obstructed window. *(The window should be on the side of the building facing towards the equator. Ensure the window is not coated with a metallised film as this may disrupt the GPS signals).*

PLEASE NOTE THAT THE SYNCBOXBLUE SHOULD NOT BE INSTALLED IN A LOCATION SUSCEPTIBLE TO A DIRECT LIGHTNING STRIKE.

2.2 - Physical installation

The syncboxBLUE should be secured in position using the four 4.5mm (0.178") case fixing points (see figure 1.1). Care should be taken to ensure the fixings used (not supplied) are suitable for the application.

2.3 - Connecting the RS485 outputs

The syncboxBLUE has dual RS485 level outputs to enable PPS and serial timing information to be transmitted over long cable runs (in excess of 1 km). Both the 'A' (non-inverting) and 'B' (inverting) terminals of each output should be connected to the slave equipment using a suitable cable (not supplied).

When installing the cable, care should be taken to ensure that the cable grommet at the data cable exit point is fastened securely and

any joints in the cable are housed within a water tight enclosure.

2.4 - Power connection

Once the unit has been secured in place and the RS485 output connected, power may be applied to the syncboxBLUE. The power adapter should be connected to a local mains power supply.

WARNING! ENSURE THE POWER SUPPLY IS OF THE CORRECT VOLTAGE FOR OPERATION WITH YOUR LOCAL MAINS POWER SUPPLY.

The power adapter and connected cable are suitable for internal use only. If the syncboxBLUE is being installed externally, a suitable DC power cable extension should be used for the duration of the external cable run. The cable extension should be selected by a suitably qualified person.

When connecting the replacement power cable, care should be taken to ensure that the cable grommet at the power cable entry point is fastened securely and any joints in the cable are housed within a water tight enclosure.

2.5 - Optional syncboxSDC converter

The system may be optionally supplied with a syncboxSDC RS485 to RS232 level converter. This unit should be connected at the end of the RS485 cable providing RS232 level data outputs.

All five 'RS485 OUTPUT' terminals on the syncboxBLUE should be directly connected to the corresponding 'RS485 IN' terminals on the syncboxSDC, connecting the TXD output (syncboxBLUE) to the RXD input (syncboxSDC).

The syncboxSDC is supplied with a power adapter similar to the adapter described in section 2.4 above.

3 - System operation

Once the system has been correctly installed (*see section 2*) and the power adapter connected to the local mains power supply, the syncboxBLUE will automatically search for GPS signals.

For a typical installation, system lock from a cold start should take under 10 minutes. Once the syncboxBLUE has synchronised to the GPS satellites, the unit will automatically output RS485 data. Depending on the software version of each individual syncboxBLUE, RS485 data may be output before the system has synchronised to the GPS signals.

3.1 - syncboxBLUE status information

The operational status of the syncboxBLUE may be visually confirmed via the status LEDs (*see figure 1.1*). The table below lists the function of the different LEDs.

LED	Status
Power	Green LED illuminates continuously when power is applied to the syncboxBLUE and the system is running
Lock	Green LED illuminates continuously when the syncboxBLUE is synchronised to the GPS satellites
Data	Green LED flashes to indicate communication between the GPS engine and the main processor
Fault	Red LED illuminates upon detection of a fault condition

Table 3.1 - Status LEDs

3.2 - Serial data format

The syncboxBLUE is available with different software versions, each generating an RS485 level serial output in a different data format. The output data is specified by the customer at time of order. This syncboxBLUE has been supplied to output the following serial format:

A - Specifications

Typical Performance Specifications:	
PPS accuracy:	100 nanoseconds

GPS Module Specifications:	
GPS engine:	14 parallel channel L1
RF Reception Sensitivity:	-160dBm tracking, -142dBm acquisition (autonomous), -155dBm acquisition (assisted)

I/O Connections:	
Serial ASCII output:	RS485 level serial data output (as detailed in section 3.2)
PPS output:	RS485 level one pulse per second output
Power input:	12 VDC power input, supplied with 230 VAC power adapter

Mechanical & Electrical Specifications:	
Dimensions:	158 x 90 x 55 mm (6.22" x 3.54" x 2.17") (including removable wall brackets, excluding cable grommets)
Weight:	1 kg
Enclosure:	IP66 / NEMA 4X rated, UV stabilised polycarbonate enclosure. Light grey body and clear cover.

Environmental Specifications:	
Operating temperature:	-30 to +50 °C
Relative humidity:	0% - 95%, noncondensing

Standards Compliance:	
Electrical Safety:	BS EN 60950-1:2006
Radio Disturbance:	BS EN 55022:2006
Immunity Characteristics:	BS EN 55024:2003

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