



**GXR-GPS  
GXR-GPS-485**

**User Manual**

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## Document Revision

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## Warnings and Safety

-  ***The GPS system is operated by the government of the United States of America, which is solely responsible for its accuracy and maintenance.***
  
-  ***GPS provides only UTC time at 0° Greenwich meridian without summer time adjustment.***

## Symbols and Abbreviations

Instrument	GeoSIG Recorder, Digitiser or Data Acquisition system
GPS	Global Positioning System
UTC	Coordinated Universal Time

## 1. Introduction

This document describes the principle of operation and installation instructions of the GXR-GPS GPS family, which is a GPS module based on a Garmin GPS type GPS-35-HVS.

GXR-GPS is used with GeoSIG Instruments to provide the global coordinates of the GPS antenna and accurate date and time to the Instruments. It's very useful for having one or several interconnected Instruments precisely synchronised.

 **GPS provides only UTC time at 0° Greenwich meridian without summer time adjustment.**

GXR-GPS is provided in a box with a cable length to be defined at the time of order or provided by the customer. Upto 70 m cable length is possible with the standard GXR-GPS, upto 1'000 m with the optional GXR-GPS-485.

All instructions within this User Manual also apply to the GXR-GPS-485, whenever only GXR-GPS is mentioned.


 **GeoSIG standard cable type: XY DIN 5 x 0.25 mm<sup>2</sup> gr UL style2464.**



Figure 1. GXR-GPS assembled with 20 m of cable for an Instrument

## 2. Electrical Connection

### 2.1. GPS Main Connector Pin Assignment

The GXR-GPS is provided with an 8 pin main connector inside the box.

Before connecting the connector, the cable should be passed through the cable inlet assembled on the housing.

The cable end sleeves should be used for a proper connection of the cable on the connector.

Table 1. Electrical connections of the GXR-GPS connector

Pin	Signal	Standard cable colors	Comment
1	GPS_RXD	White	Transmit signal of GSR
2	GPS_TXD	Brown	Reception signal of GSR
3	GPS_1PPS	Green	1 PPS signal from GPS
4	V_MAIN	Yellow	12V power from instrument
5	GPS_STDBY	N/A	Usually not connected
6	GND	Grey	Ground from instrument
7	GND	N/A	Usually not connected
8	GND	N/A	Usually not connected

Table 2. Electrical connections of the GXR-GPS-485 connector

Pin	Signal	Standard cable colors	Comment
1	TX_H	White	Transmit signal of CR-5P
2	RX_H	N/A	Usually not connected
3	TX_L	Brown	Reception signal of CR-5P
4	RX_L	N/A	Usually not connected
5	GPS_SYNC	Green	1 PPS signal from GPS
6	V_MAIN	Yellow	12V power from instrument
7	GND	Grey	Ground from instrument
8	GND	N/A	Usually not connected



Figure 2. Connector pin out GXR-GPS



Figure 3. Connector pin out GXR-GPS-485



Figure 4. Connector wiring GXR-GPS

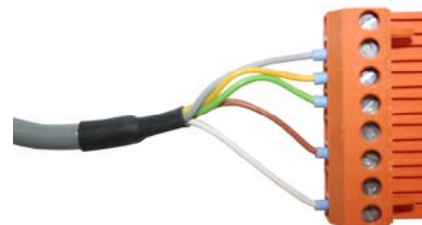


Figure 5. Connector wiring GXR-GPS-485

## 2.2. Mating Connector at the Instrument Side

For connecting the GXR-GPS to an Instrument, a mating connector must be used. This connector is provided with the Instrument.

With a GSR-xx, the connector must be connected to the OPTION connector of the instrument, if not otherwise specified.

With a CR-5P, the connector must be connected to the SYN in connector of the instrument.

Table 3. Electrical connections of the GXR-GPS input connector of an instrument

Pin	Signal	Standard Cable Colors	Comment
1	GSR_G_TXD	White	Transmit signal of GSR
2	GSR_G_RXD	Brown	Reception signal of GSR
3	N/A	N/A	Not connected
4	N/A	N/A	Not connected
5	GSR_G_1PPS	Green	1 PPS signal from GPS
6	GSR_G_12V	Yellow	12V power from instrument
7	GSR_G_GND	Grey	Ground from instrument

Table 4. Electrical connections of the GXR-GPS-485 input connector of an instrument

Pin	Signal	Standard Cable Colors	Comment
1	N/A	N/A	Not connected
2	SYNCI_RX+	White	Transmit signal of CR-5P
3	N/A	N/A	Not connected
4	SYNCI_RX-	Brown	Reception signal of GSR
5	GPS_1PPS	Green	1 PPS signal from GPS
6	V_EXT_GPS	Yellow	12V power from instrument
7	GND_EXT	Grey	Ground from instrument



Figure 6. Mating Binder connector

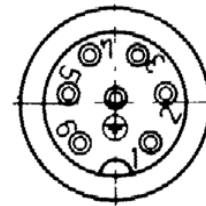


Figure 7. Connector pin out



Figure 8. Wiring inside the connector

2.3. Cable Connection GXR-GPS

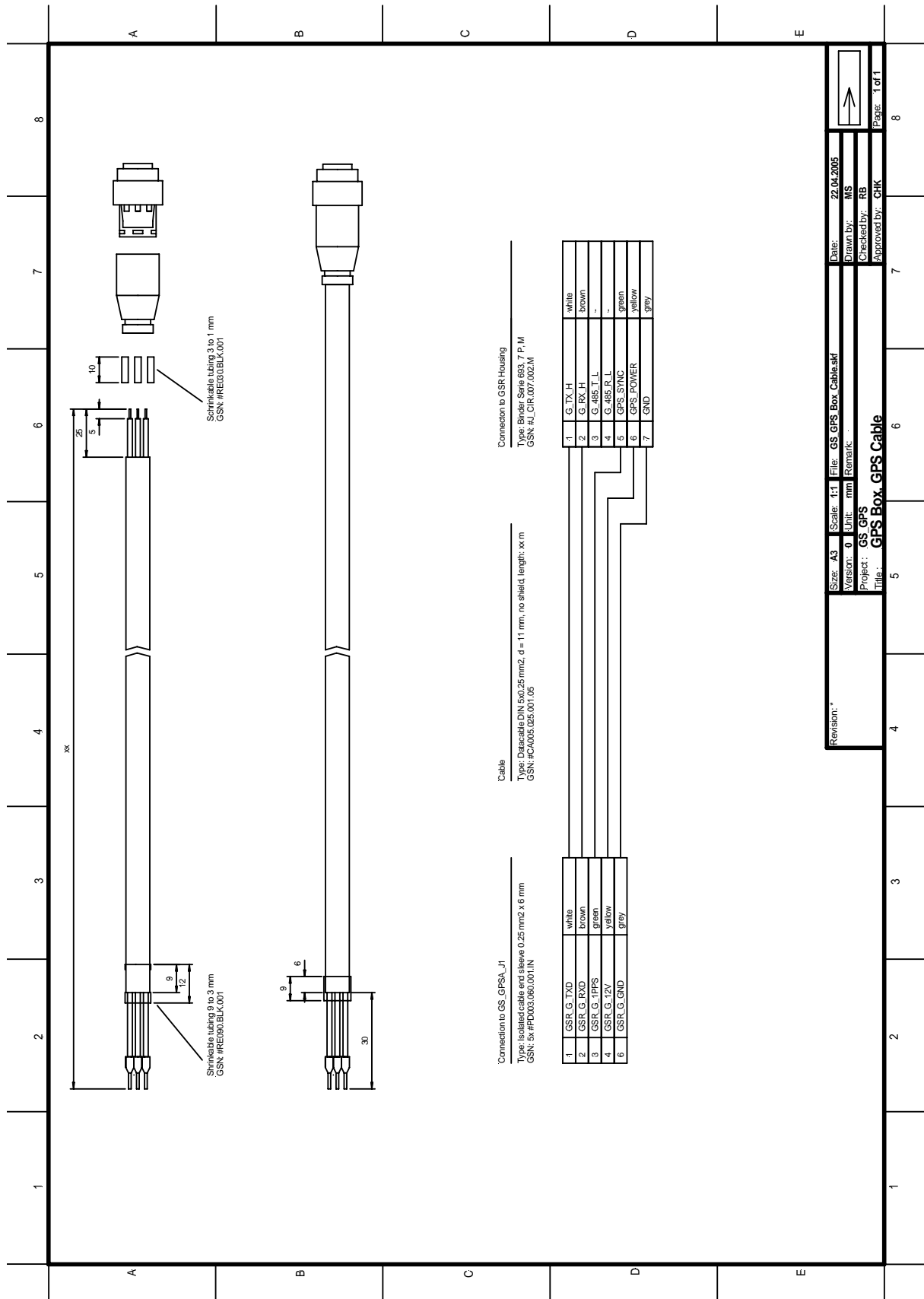


Figure 9. Cable connection GXR-GPS



2.4. Cable Connection GXR-GPS-485

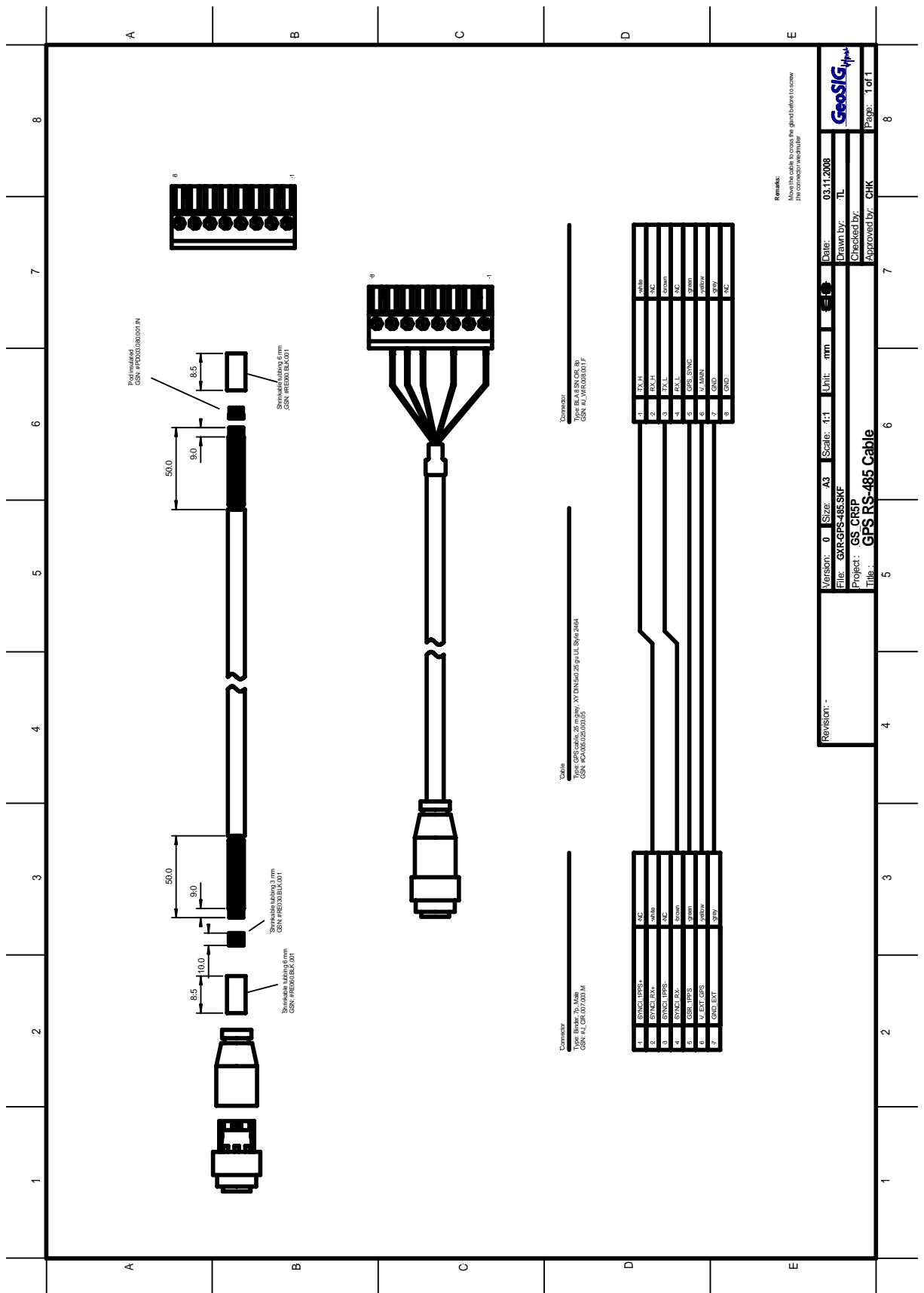



Figure 10. Cable connection GXR-GPS-485

## 2.5. Mounting the GPS Box

 ***It is recommended to perform a check of the GPS function before mounting the box to its final location, as described in section 3.***

The GXR-GPS box can be fixed to various locations. The position of the box should be defined according to a position where GPS antenna can easily get the satellite signals. Typically the box is fixed on an outside wall or on a roof. This is an important point since for the synchronisation of the instrument, the antenna should receive at least signals from 3 satellites.

 ***Make sure that at least 75% of the sky is visible at all times over the GPS box.***

Fixation of the housing should be done with M4 screws. With spacings and locations as shown in Figure 11, Figure 12 and Figure 13. Type of screws depends on the type of surface where box is going to be fixed.

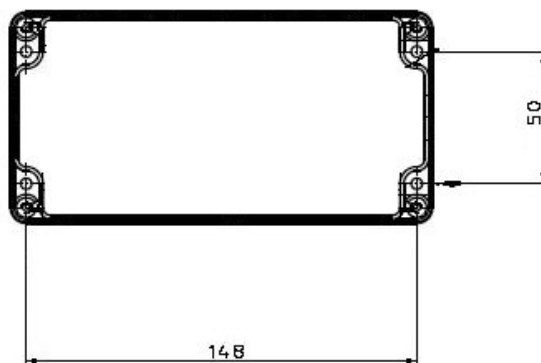


Figure 11. Mechanical fixation of housing



Figure 12. Inside view of the GXR-GPS housing




Figure 13. Inside view of the GXR-GPS-485 housing

### 3. Configuration and Checking

#### 3.1. With a GSR-xx


In order to synchronise a GeoSIG GSR-xx with the GPS, appropriate configuration should be made in the Instrument. Once power supply, computer and GPS are connected to the Instrument, such configuration and checks can be performed using GeoDAS and logging into the Instrument.

 For more details about the GPS options, please consult GeoDAS and relevant Instrument manuals.

 At first installation or after a major (>2'000 km) relocation, it may take upto 5 minutes for the GPS to correctly compute the exact location of the antenna.

The following is a brief recipe to check whether everything is operational in terms of the GPS:

- On "Instrument" tab, "Garmin GPS" option should be ticked as a peripheral device as shown on Figure 14.
- On the "Date and Time" tab, as shown on Figure 15, GPS status should read "Enabled", if not, press the "Enable GPS" button.

 Note that if GPS is enabled, this button reads "Disable GPS".

- When GPS is synchronised, the date and time of the GPS can be seen in the "Date and Time" tab and the global coordinates of the GPS antenna can be seen in the "Station" tab, as shown on Figure 16.

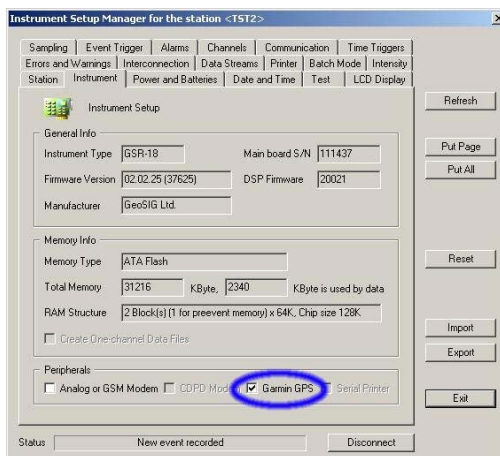


Figure 14. Selecting GPS as peripheral device

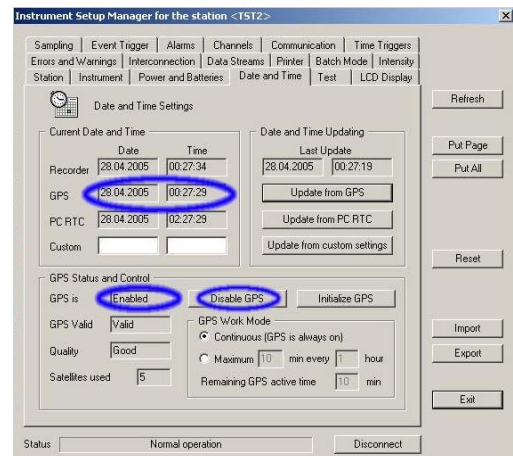



Figure 15. GPS enabling and checking



Figure 16. GPS time and position checking

### 3.2. With a CR-5P


In order to synchronise a GeoSIG CR-5P with the GPS, appropriate configuration should be made in the Instrument. Once power supply, computer and GPS are connected to the Instrument, such configuration and checks can be performed using GeoDAS and logging into the Instrument.

 For more details about the GPS options, please consult GeoDAS and relevant Instrument manuals.

 **At first installation or after a major (>2'000 km) relocation, it may take upto 5 minutes for the GPS to correctly compute the exact location of the antenna.**

The following is a brief recipe to check whether everything is operational in terms of the GPS:

- While adding the CR-5P under “Channels of Digitizers”, make sure ‘External SYNC Signal’ is selected as Time source, as shown in Figure 17.
- After adding the CR-5P to GeoDAS restart the Software and the Window “Stations: Data Stream” will appear.
- When GPS is synchronised, the ‘GPS status’ will read “Locked to GPS”, as shown in Figure 18. The Data Stream in the ‘Data Monitor’ will be in yellow, as shown in Figure 19.

 Note that if no GPS is connected, GPS status will read “No Lock” and the colour of the Data Stream will be white.

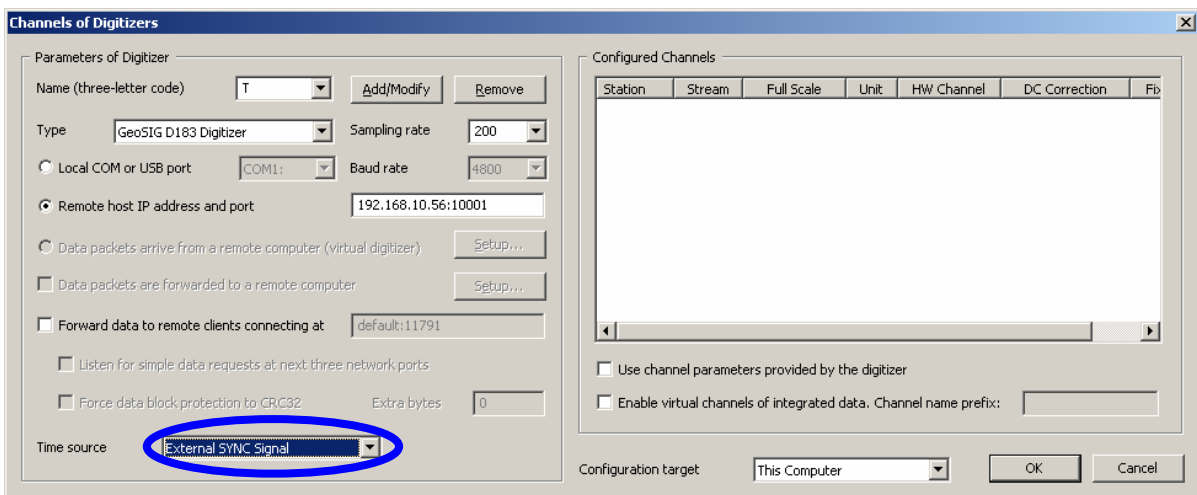


Figure 17. Set ‘External SYNC Signal’ as Time source

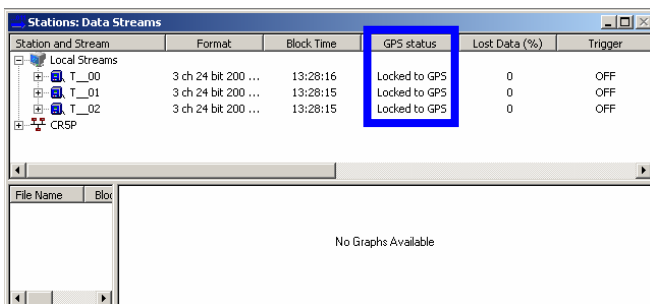


Figure 18. GPS status as ‘Locked to GPS’

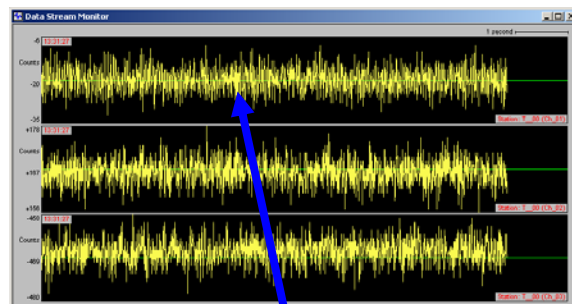


Figure 19. Data Stream is in yellow