

Using a GTD on a Seabird 911 CTD

Connecting the GTD

The GTD nitrification sensor can run as either an autonomous logging unit or use the RS232 uplink.

If the uplink option is not available, using the provided cable will provide the +15VDC to operate the unit from any available AUX port. See Drawing 1 and also the end cap pinout in Appendix A.

Info needed here on recovering data

With the serial uplink available, use the cable as shown in Drawing 2 and connect a serial cable from the 11 deck unit to a computer that has the baud rate set to 19200 8N1. The GTD will be set to 9600. See appendix B for the Seabird manual page.

The 911 CTD is usually configured with two sets of Temperature (SBE3), Conductivity (SBE4), Oxygen (SBE43), and pumps (SBE5T). Some configurations also have a Wetlabs Fluorometer and an altimeter on auxiliary ports. It also allows for other instruments to be added to auxiliary ports. These are usually JT5 (AUX4 & AUX 5) and JT6 (AUX6 & AUX 7). See appendix A for the connections.

The 911 CTD has a limit of 1A at 15V for all sensors. This includes the default pairs of Temp, Conductivity, O2, and 5T pumps. **Because of this, the secondary set of T,C, O, and 5T pump must be removed when adding the GTD.**

Using the GTD Data

Work still needs to be done in this section to add parameters to the existing SeaSave Nitrogen input. Our hope is to allow real time GTD data to the SeaSave data collection window in real time.

This section contains general information re: adding a voltage output sensor to the 9 CTD.

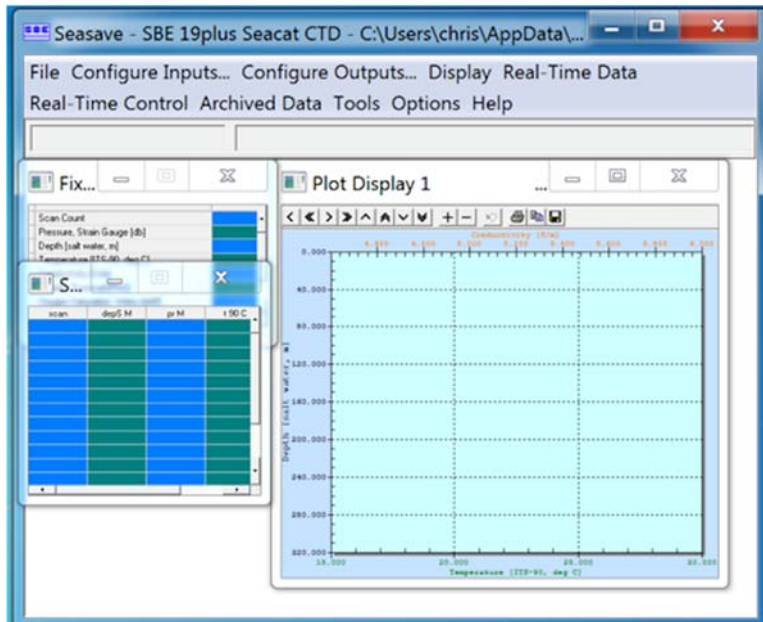


Image 1, Seasave Main Window

Choose Configure Inputs:

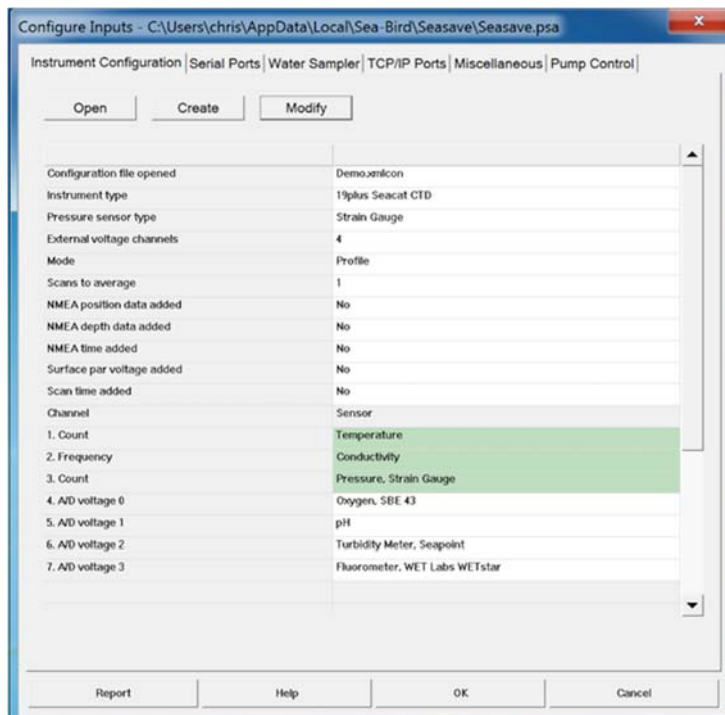


Image 2, Seasave Configure Inputs Main Window

Select Modify:

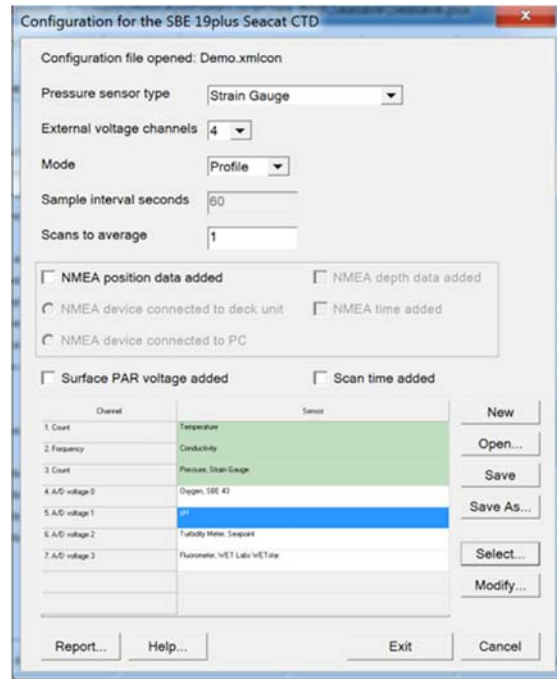


Image 3, Seasave Modify Window

Then choose Select for a channel:

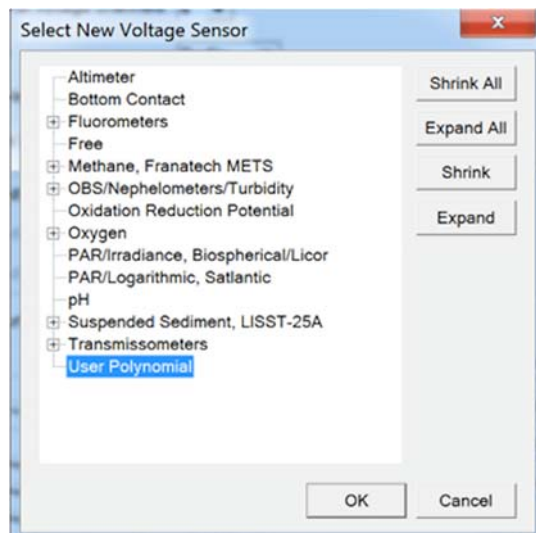


Image 4, New Sensor Select Window

Input the Sensor Parameters:

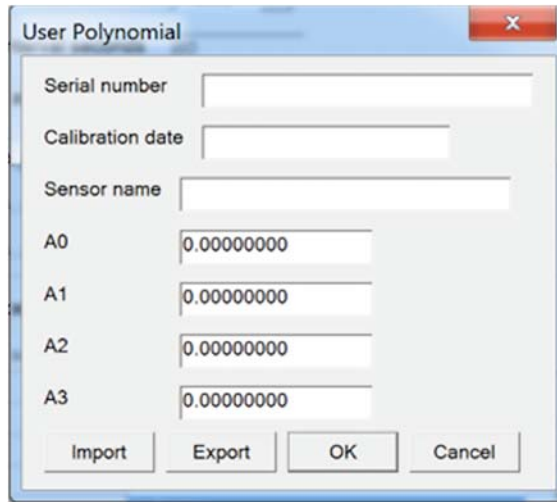
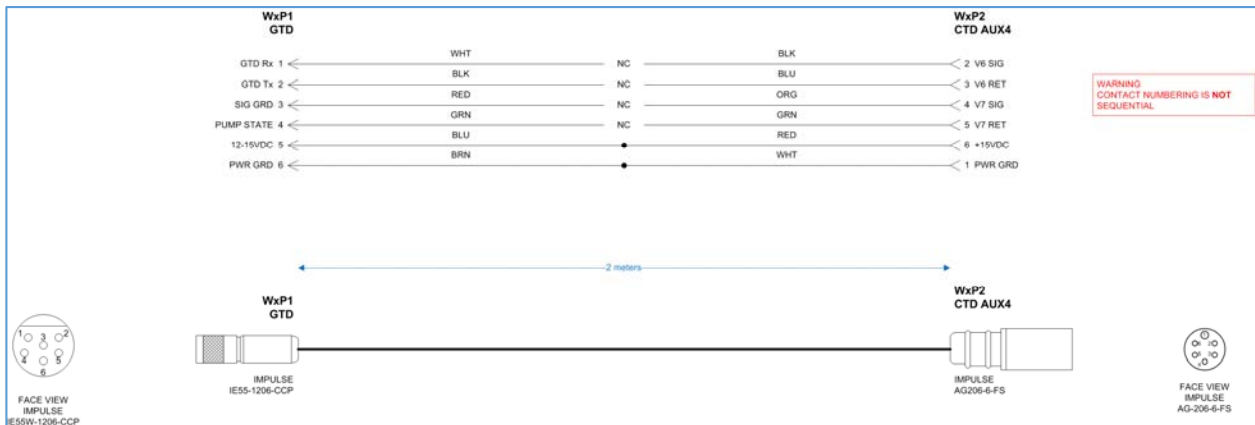
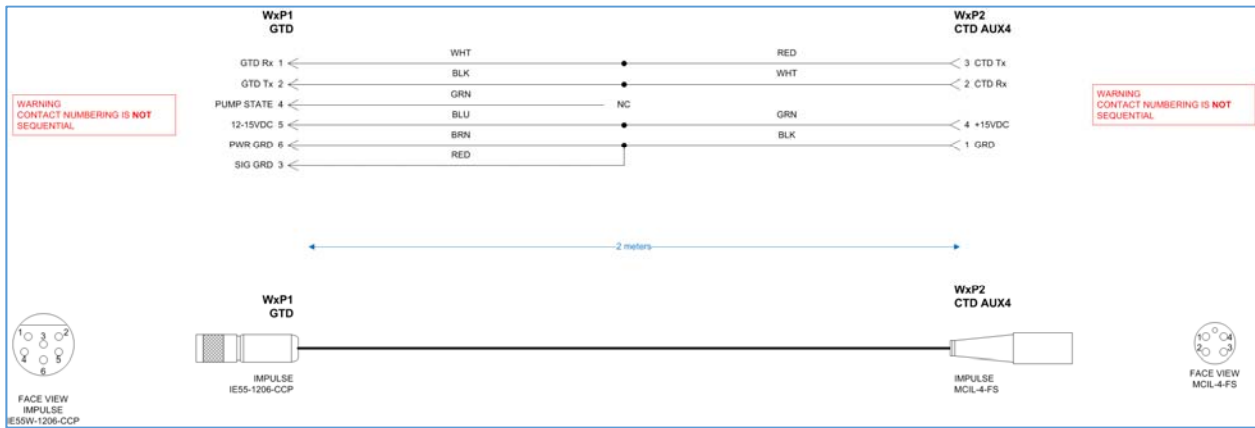


Image 5, User Polynomial Input Window

Drawing 1, GTD Cable on AUX Port with Only 15VDC



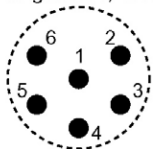
Drawing 2, GTD Cable on JT4 Serial Uplink



Appendix A Seabird 9 End Cap Pinouts

Top End Cap

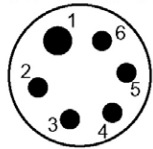
Optional connector
MCBH-6MP (WB)
3/8" length base, 1/2-20 thread



Water Sampler or SEARAM

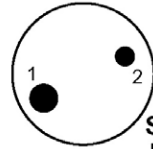
Pin	Signal
1	Return
2	RS-232 out to water sampler
3	RS-232 in from water sampler

Standard connector
AG-306-HP-SS



Pin	Signal
4	Data to SEARAM
5	N/C
6	+15V out/in

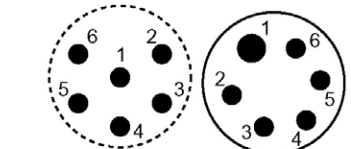
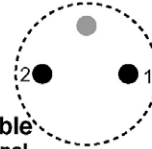
Standard connector
XSG-2-BCL-HP-SS



Sea Cable

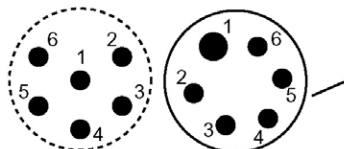
Pin	Signal
1	-
2	+

Optional connector
MCBH-2MP (WB)
3/8" length base, 1/2-20 thread



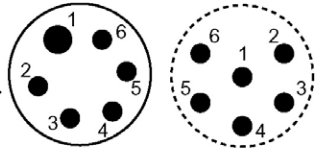
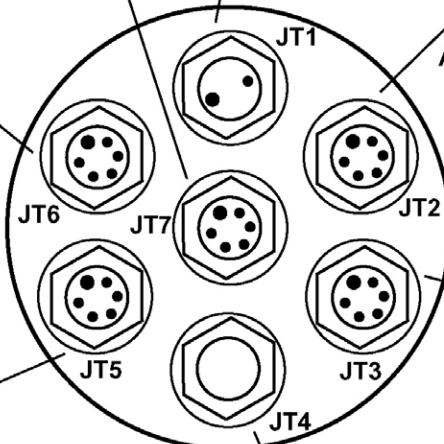
Auxiliary Sensor Connector 4

Pin	Signal	Pin	Signal
1	Return	4	V7 signal
2	V6 signal	5	V7 return
3	V6 return	6	+15V out



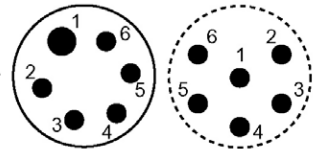
Auxiliary Sensor Connector 3

Pin	Signal	Pin	Signal
1	Return	4	V5 signal
2	V4 signal	5	V5 return
3	V4 return	6	+15V out



Auxiliary Sensor Connector 1

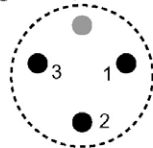
Pin	Signal	Pin	Signal
1	Return	4	V1 signal
2	V0 signal	5	V1 return
3	V0 return	6	+15V out



Auxiliary Sensor Connector 2

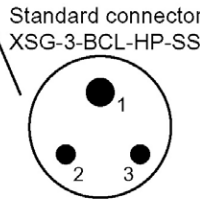
Pin	Signal	Pin	Signal
1	Return	4	V3 signal
2	V2 signal	5	V3 return
3	V2 return	6	+15V out

Optional connector
MCBH-3MP (WB)
3/8" length base, 1/2-20 thread



G.O. 1015 Rosette (standard)

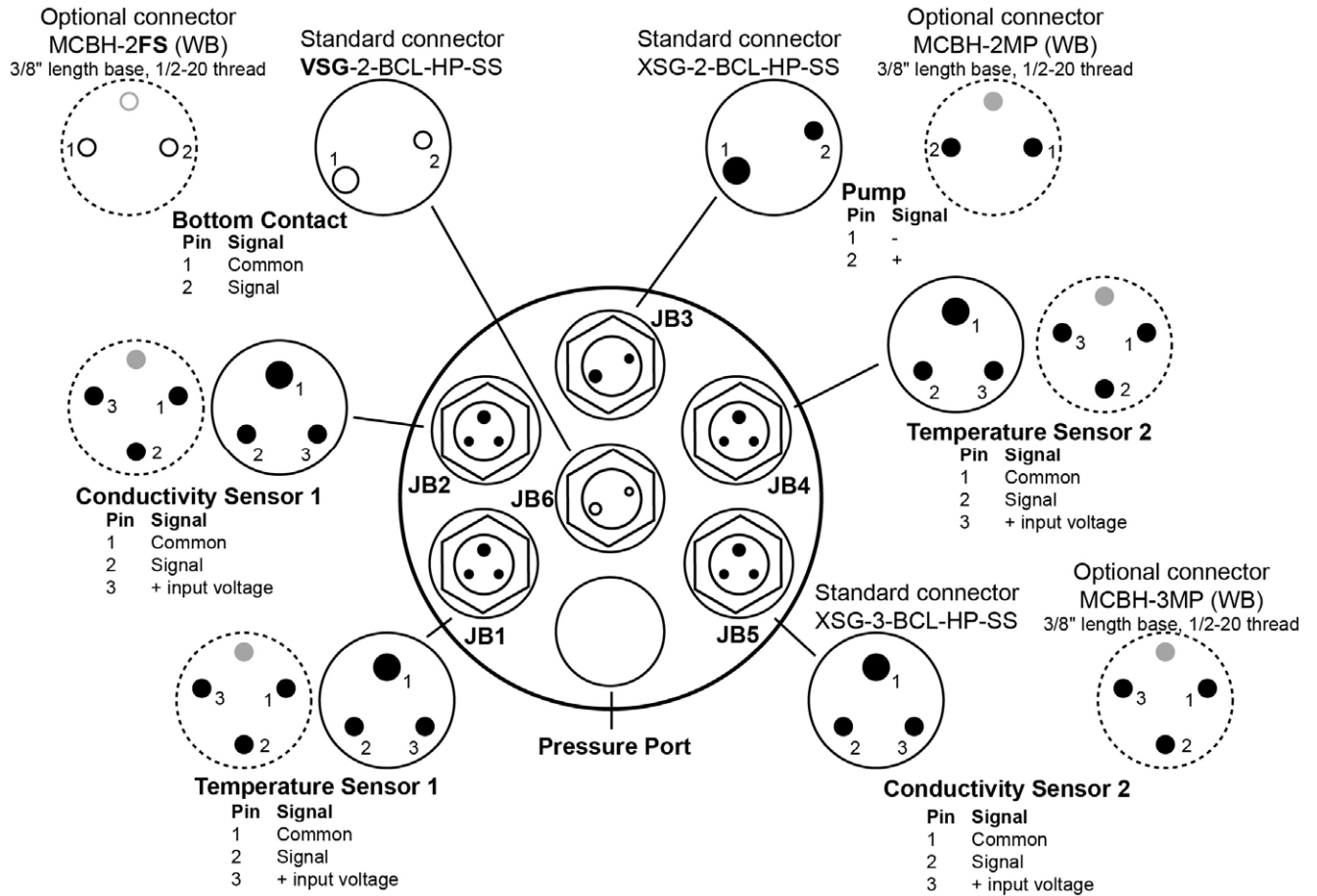
Pin	Signal
1	+
2	-
3	N/C



JT4 Options

Optional connector MCBH-3MP (WB) 3/8" length base, 1/2-20 thread	Standard connector XSG-3-BCL-HP-SS	OR	Standard connector XSG-4-BCL-HP-SS	Optional connector MCBH-4MP (WB) 3/8" length base, 1/2-20 thread																		
Optional Serial Output			Optional Serial Data Uplink																			
<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Common</td> </tr> <tr> <td>2</td> <td>RS-232 data output</td> </tr> <tr> <td>3</td> <td>Power in (12 - 16V)</td> </tr> </tbody> </table>		Pin	Signal	1	Common	2	RS-232 data output	3	Power in (12 - 16V)		<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Common</td> </tr> <tr> <td>2</td> <td>Rx from serial instrument</td> </tr> <tr> <td>3</td> <td>TX to serial instrument</td> </tr> <tr> <td>4</td> <td>15V out</td> </tr> </tbody> </table>		Pin	Signal	1	Common	2	Rx from serial instrument	3	TX to serial instrument	4	15V out
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Bottom End Cap



Note: An SBE 9plus with dual temperature and conductivity sensors is supplied with two pumps, one for each TC pair. JB3 connects to both pumps with a Y-cable.

Section 10: Setting Up RS-232 Serial Data Uplink

The SBE 911*plus* system can be equipped to provide an interface for a serial data output instrument connected to the SBE 9*plus* CTD's JT4. The serial data is multiplexed into the 9*plus* telemetry stream, and is de-multiplexed by the 11*plus* V2 Deck Unit. The de-multiplexed data is output from the Deck Unit at the back panel's *Serial Data Uplink* connector.

The serial data uplink operates only in one direction, from the CTD to the Deck Unit. Communication from the Deck Unit to the serial data output instrument (through the CTD) is provided via the 300 baud FSK modem used for water sampler control. Note that the 911*plus* supports use of the serial data output instrument and water sampler in the same cast. Instrument commands sent via the 300 baud modem are transmitted from the CTD to the instrument at the transmission rate of the instrument.

Data from the serial output instrument is transmitted from the Deck Unit to the computer at 19200 baud.

The diagram below shows a schematic of the serial data instrument communications.

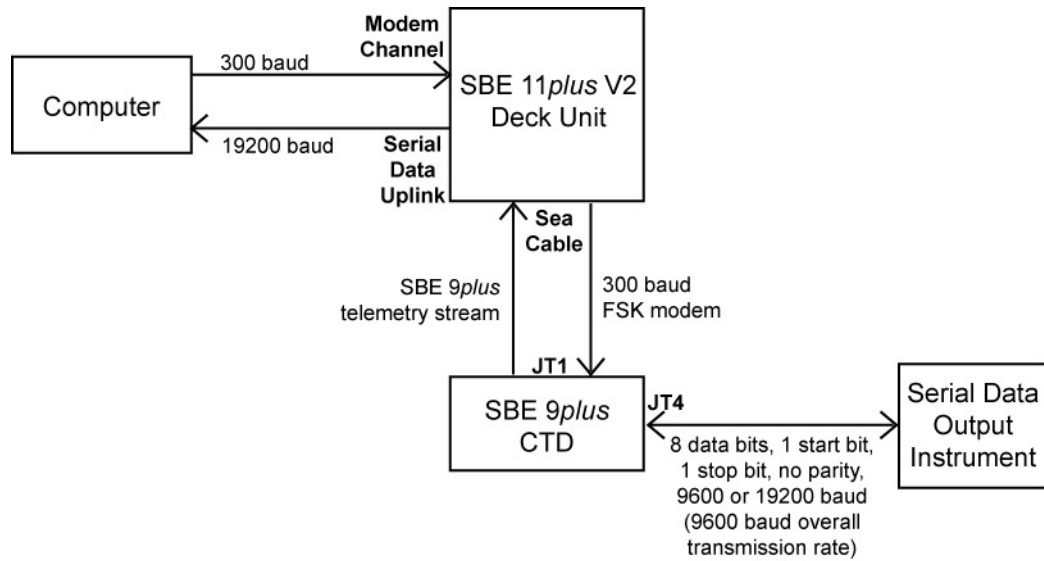
Serial Data Output Instrument Requirements

The serial data output instrument must be configured to transmit data with 1 start bit, 8 data bits, no parity, and 1 stop bit, with baud rate as follows:

- 9600 baud, or ☒
- 19200 baud – However, the continuous rate of transmission may not ☒ exceed 9600 baud (960 bytes/second). Therefore, the serial data output instrument must transmit at 19200 baud in *burst* mode. Burst mode data transmissions must be separated by intervals with no data transmission, resulting in an average data rate of 960 bytes/second or less. ☒ Note that when purchasing or retrofitting a 9*plus* to accommodate the serial data uplink, the user must select either 9600 or 19200 baud communication interface. ☒

Notes:

- The *Serial Data Uplink* connector (previously labeled *9600 Baud Uplink*) is included on all 11*plus* V2 with serial number 637 and higher. For older units, the connector was included only if the user ordered the 11*plus* V2 with the serial data uplink feature.
- Serial data uplink also requires that the 300 baud water sampler modem channel be installed in both the 11*plus* V2 and the 9*plus* CTD.



Note:

Baud is defined as bits/second. Each 8 bit byte that is to be transmitted has a start and stop bit added, providing 10 bits total. Thus, the 9600 baud data rate allows the transmission of 960 bytes/second.

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Manual revision 017 Section 10: Setting Up RS-232 Serial Data Uplink SBE 11plus V2 **SBE 9plus CTD Requirements**

The RS-232 serial data uplink can be included when the 9plus is ordered, or the 9plus can be retrofitted (at the factory). The retrofit requires:

- Logic PCB that generates the 9plus control at the normal rate, but moves data onto the sea cable at twice the normal rate. ☒
- Modem PCB (for 300 baud FSK modem channel for water sampler control) that also is able to accommodate the serial data input. ☒
- Change to the backplane wiring. ☒
- 4-pin JT4 connector on the top end cap for connection to the serial data ☒ output instrument. ☒ These changes make the 9plus incompatible with an 11plus V2 Deck Unit set up without the jumper positions described below. ☒
- **SBE 11plus V2 Deck Unit Requirements** ☒

Note:

Serial data uplink also requires that the 300 baud water sampler modem channel be installed in both the *11plus V2* and the *9plus CTD*.

Notes:

- The *Serial Data Uplink* connector (previously labeled *9600 Baud Uplink*) is included on all *11plus V2* with serial number 637 and higher. For older units, the connector was included only if the user ordered the *11plus V2* with the serial data uplink feature.
- Serial data uplink also requires that the 300 baud water sampler modem channel be installed in both the *11plus V2* and the *9plus CTD*.

Jumper	Position
J1	H
J2	H
J3	H
J4	H
J5	Short
J6	H

System Limitations

If already equipped with the *Serial Data Uplink* connector, the *11plus V2* requires only a change in jumper positions to process the multiplexed data stream. Remove the *11plus V2* bottom cover, and set the following jumpers on the Receiver/Modem PCB (PCB with transformers on it; see drawing 41704 for the jumper locations):

Connect the null modem cable from the *Serial Data Uplink* connector to the computer.

A *911plus* system set up for serial data uplink has the following limitations:

- Sea cable length - The maximum sea cable length that will reliably maintain data transmission is 8000

meters. ☒

- Autonomous water sampler operation - The *9plus* cannot be used with an SBE *17plus V2* Searam, preventing water sampler operation on non-conducting cable. ☒
- Water sampler - The *911plus* cannot be used with a G.O. 1015 water sampler. ☒
- Compatibility – A *9plus* that includes the RS-232 serial data uplink is incompatible with an *11plus V2* set up for standard transmission. ☒
- Tape recorder interface – An *11plus V2* with jumpers set for serial data uplink cannot output data through *Tape Recorder* on the *11plus V2* Back Panel. ☒

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Section 10: Setting Up RS-232 Serial Data Uplink SBE *11plus V2*

Theory of Operation

The *9plus* and *11plus V2* must be equipped with the data telemetry channel as well as the 300 baud FSK modem channel. Additionally, the *9plus* must be equipped with the serial data uplink feature. The 300 baud modem channel features two-way communications and is used for water sampling commands and responses. This channel is also used to communicate with the serial data output instrument.

Water sampling communications are carried out with 1 start bit, 8 data bits, no parity bit, and 1 stop bit. ASCII characters only require 7 data bits to express the standard character set. The system uses the 8th data bit to flag communications on the modem channel as water sampler or serial data

output communication:

- If a byte is received by the *9plus* with the 8th bit set, it is interpreted by the *9plus* as a command to the water sampler, and is routed to the water sampler. Similarly, if a byte is received by the *11plus V2* with the 8 bit set, it is interpreted as a water sampler control response to a bottle closure command. ☒
- If a byte is received by the *9plus* without the 8th bit set, it is interpreted by the *9plus* as a command to the serial data output instrument, and is routed to the serial data output instrument at the appropriate baud rate (9600 or 19200 baud). The serial data output instrument response is transmitted to the *9plus* and then multiplexed into the *9plus* telemetry stream and de-multiplexed

by the 11*plus* V2 Deck Unit. ☒The 9600 baud serial uplink communications channel is time dimension multiplexed into the 9*plus* data telemetry channel. Each 9*plus* data scan is transmitted via the sea cable at twice the normal speed, leaving a gap in the data stream long enough to accommodate continuous transmission at ☒9600 baud. Presuming the serial data is coming into the 9*plus* continuously; the 9*plus* buffers serial data until its data scan is complete and then moves the accumulated serial data packet onto the telemetry channel. The first byte of the serial data packet defines the number of bytes that follow. This allows binary or ASCII data to be transmitted over the serial uplink. ☒The 11*plus* V2 splits the data stream, processing the 9*plus* scan normally and sending the serial data at 19200 baud to a port on the back plane for processing by the user's computer. ☒