

# Configuring the DX99 Comms Boost Model to work with a Siemens Model 2100 Digital Level Sensor

This technical note describes how to configure the DX99N9-2100-ASSY and DX99N2-2100-ASSY kits to work with a Siemens Model 2100 Digital Level Sensor.

## DX99Nx-2100-ASSY PARTS LIST

- DX99N9X1S1S0V2X0D4 or DX99N2X1S1S0V2X0D4 SureCross DX99 Node with the following items preassembled to the metal housing: one ½-inch NPT stainless steel pipe union, two ½-inch NPT stainless steel hex fittings, one 900 MHz or 2.4 GHz dome antenna, and one 5-pin M12 Female QD
- Cordset, male quick disconnect, 0.5 m length, with flying leads
- Cable gland, plastic, ½-inch



## INSTALLATION INSTRUCTIONS

The DX99 Node ships as a complete unit, including the radio core, metal housing, and integrated battery. The M12 quick disconnect receptacle is pre-wired into the terminal strip on the radio with the proper connections for 13V Switch Power (SP2), Ground (GND), and 2-wire RS-485 (XC- and XC+).

The user must mount the radio head to the DLS 2100 fuse box using the included ½-inch NPT fittings and wire/install the included male quick disconnect cordset into the DLS 2100's terminals.

## MOUNTING AND SEALING THE NODE TO THE DLS

1. Install and tighten the included ½-inch NPT hex nipple into the conduit entrance of the DLS 2100 fuse box that faces up.
2. Install the female half of the ½-inch NPT pipe union to the nipple.
3. Align the male/female ends of the union to mount the DX99. While tightening, position the face of the DX99 to be parallel to the screw cover of the DLS 2100 fuse box.



## To WIRE THE NODE TO THE DLS

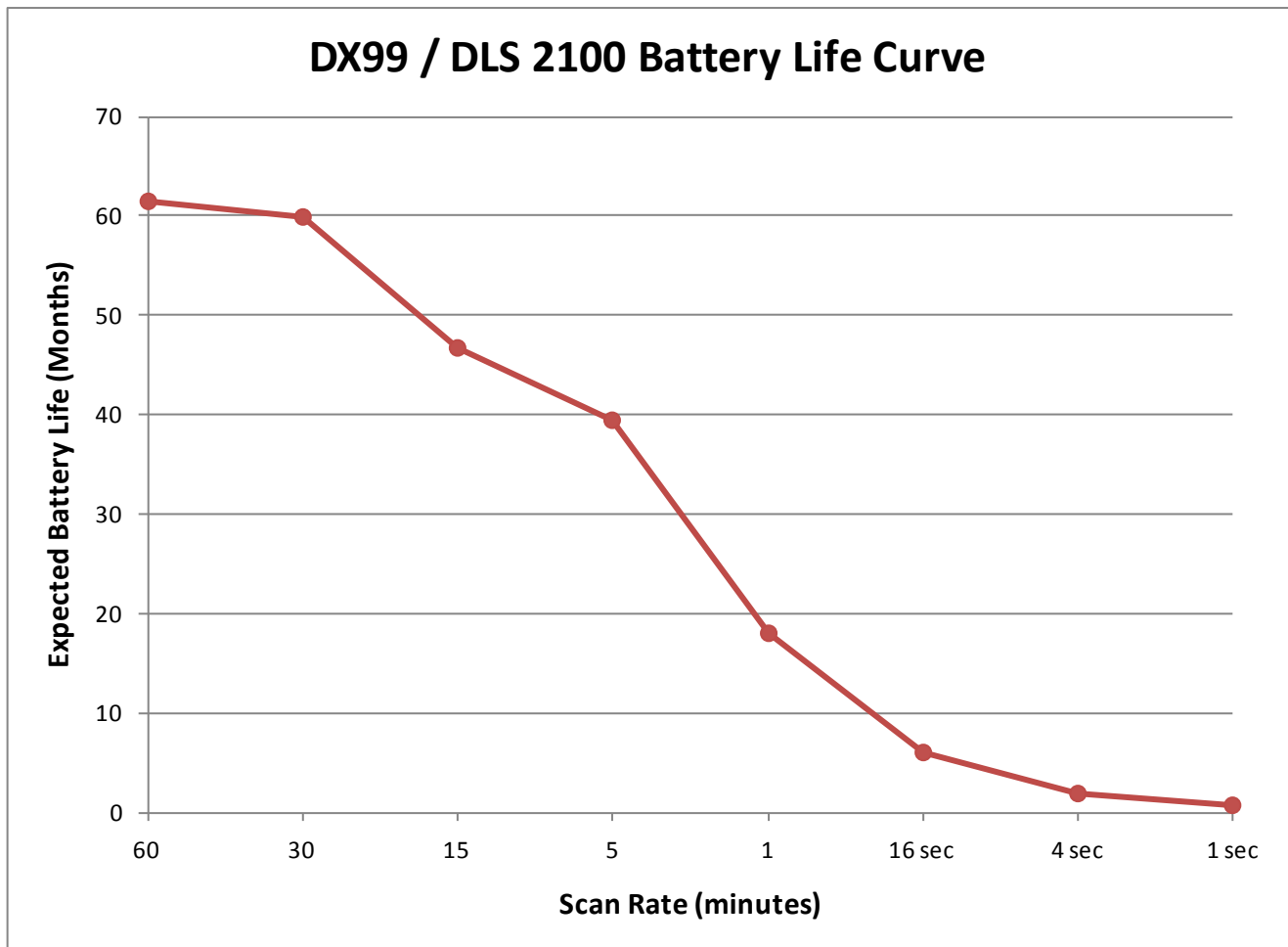
1. Open the screw cover for the DLS 2100 fuse box
2. Install the ½-inch NPT plastic cable gland into the side port of the DLS 2100
3. Pass the M12 cordset (flying leads end first) through the gland and land the wires to the terminals as follows:

Wire Color	DLS terminal label
Black	TX/RX –
White	TX/RX +
Blue	dc common (GND)
Brown	V dc

4. Close the fuse box cover and tighten the cable gland over the M12 quick disconnect cord.
5. Screw the male M12 quick disconnect fitting to the female receptacle on the side of the DX99 metal housing.
6. Open the DX99 housing by unscrewing the cover with the glass window.
7. Press and hold button 1 (left of LCD display) for three seconds to wake up the radio. LED 2 (right of LCD) begins blinking red once every second until the Node synchronizes to an available SureCross Gateway.



Below is a graph showing the relationship between scan time (Sample/Report Interval parameters) and battery life expectancy:



# RS-485 PARAMETER SETUP

The DX99 Node comes pre-configured from the factory to wake up the DLS 2100 tank sensor periodically and request certain data registers over the 2-wire serial line. The sensor responds with the data (16-bit Modbus registers values), then shuts down. This exchange takes 250 milliseconds. The DX99 Node immediately transmits the register values back to a SureCross Gateway. The Gateway retains the same register values (I/O points) in memory until the next read/update cycle so that the Modbus master (RTU) can poll the Gateway's holding registers over a wired RS-485 connection as fast as is needed without draining the remote DX99's internal battery.

The user needs to configure the DLS 2100 device as Unit Number "1" with baud rate of 9600 bps and no parity (none).

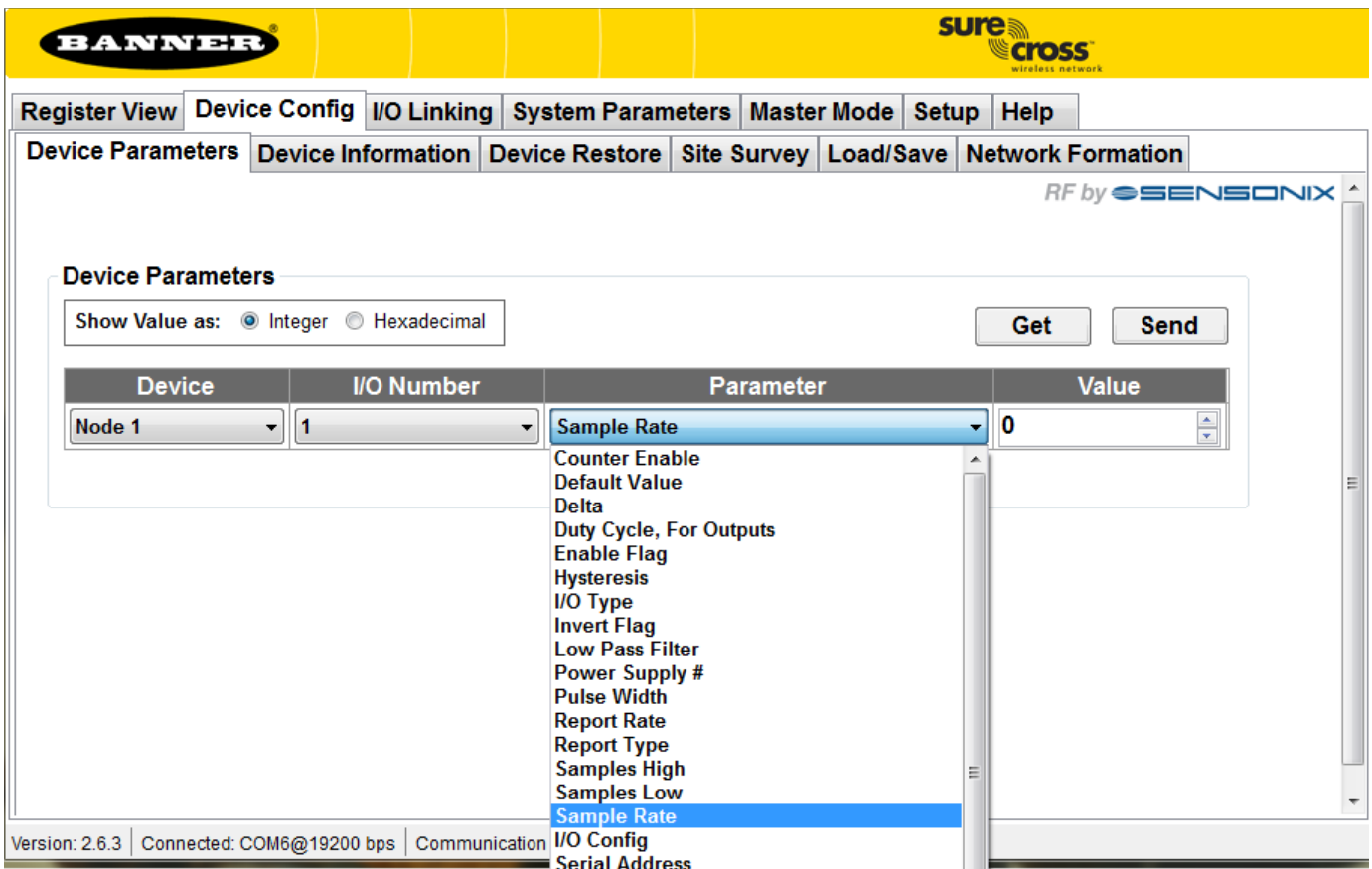
The DX99 can request up to six 16-bit integer holding registers from the DLS sensor. By default, it is pre-configured to read five holding registers:

- Float 1 (top float)
- Float 2 (bottom float)
- Temperature1
- Error Register
- Warning Register

The frequency for the reads is defined differently for data registers (float1, float2, temp) than it is for error/warning registers. It is assumed error registers are not as time critical as data. Here are the default settings for read frequency:

- Float 1, Float 2, and Temp Sample Rate: 2 minutes
- Float 1, Float 2, and Temp Warmup Time: 250 ms
- Error and Warning Sample Rate: 15 minutes
- Error and Warning Warmup Time: 250 ms

The user can change the update frequency of the individual register requests by changing the Sample Rate and Report Rate parameters of I/O 1 for data (float, temp, etc.) and I/O 4 for error/warning using the User Configuration Tool (UCT) software (downloadable from [www.bannerengineering.com](http://www.bannerengineering.com)).



# ADVANCED PARAMETER CONFIGURATION

The DX99 Node can be configured to read any Modbus data registers from the DLS 2100 device. Consult the technical documentation for the DLS 2100 for a list of available data registers. The DX99 Node's I/O 1 retrieves a block of contiguous holding registers starting from "Modbus Start Address" of length determined by the Miscellaneous parameter (up to 16 total registers). Within the retrieved block of registers, the user may set which registers to keep and which to discard using the "Disable Register Bit Mask" parameter stored in I/O 1's I/O Config and M-GAGE Baseline Filter (unrestricted) parameters. The maximum number of "kept" registers is six due to the restrictions of the SureCross register architecture.

Parameter Name	Parameter in UCT	Allowable Values	Default Value
DLS Modbus Address or Unit Number	Serial Address	1 to 31	1
Modbus Start Address	Default Value	any	3990
# of Registers to Read (Consecutive)	Miscellaneous	1 to 16	7
Baud Rate / Parity Bit Mask *	Low Pass Filter	0 to 256	1 (9600/none)
Disable Register Bit Mask (Low Byte) †	I/O Config	0 to 256	60
Disable Register Bit Mask (High Byte) †	M-GAGE Baseline Filter (unrestricted)	0 to 256	0

† Bit mask indicates (starting from bit position 0, working through bit position 7, low byte to high) which modbus registers to retain of the available 16 consecutive that have been read. A "0" indicates 'enabled' while a "1" indicates disabled. Kept registers will be populated sequentially in the DX99's input register bank (I/O 1 through I/O 6).

\* Bit positions 0 to 3 indicate baud rate, bit positions 4 to 5 indicate parity as follows:

Baud Rate (0-3)		Parity (4-5)	
000	19.2K	00	None
001	9600	01	Odd
010	38.4K	10	Even
011	76.8K		

**BANNER** sure cross wireless network

Register View | Device Config | I/O Linking | System Parameters | Master Mode | Setup | Help

Device Parameters | Device Information | Device Restore | Site Survey | Load/Save | Network Formation

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**Device Parameters**

Show Value as:  Integer  Hexadecimal Get Send

Device	I/O Number	Parameter	Value
Node 1	1	Serial Address	1

**Serial Address.** The serial address parameter defines the remote serial device address to read. This parameter also defines configuration information for the Extended Logic I/O type. (Parameter number 0x19).

Supported in Gateway RF Firmware Version 2.7 and above.  
Supported in Node RF Firmware Version 3.3 and above.