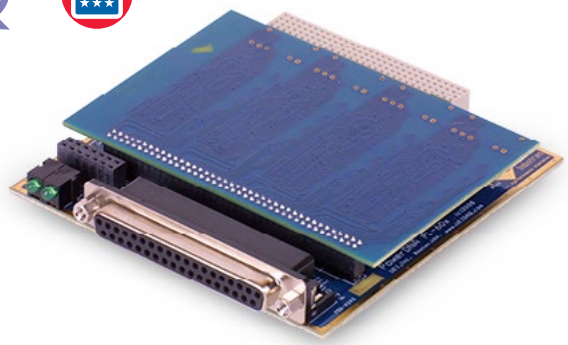
DNA/DNR/DNF-SL-501-804

RS-232/485 Serial Communications Interface

- DNA-/DNR-/DNF-SL-501-804 for use with Cube/ RACKtangle™ / FLATRACK™ I/O chassis
- 4 independent ports with custom baud rates per port
- Arbitrary baud rate selection (0.01% accuracy)
- Max speed of 256 Kb/s for RS-232 and 4 Mb/s for RS-485
- J1587/J1708 support included
- Each port is software-configurable as RS-232 or RS-485
- Completely independent bit rate settings for every port
- 350 V isolation between ports, ports and circuitry; 15 kV ESD
- Includes UEI-RSS Remote Serial Server application



General Description

The DNx-SL-501-804 are 4-port serial communications layers compatible with UEI's powerful Cube, RACKtangle and FLATRACK I/O chassis. The boards offer fully isolated serial interfaces, software-configurable as RS-232 or RS-485. DNx-SL-501-804 supports up to 4 Mb/s transfer speed in RS-485 mode or up to 256 Kb/s in RS-232 mode. The DNx-SL-501-804 is a special, high speed version of the popular DNx-SL-501 board. The boards use a 16550C UART emulation on each port (FIFO mode only) and support half- and full-duplex mode over RS-485.

The DNx-SL-501-804 is compatible with RS-422 networks when used in RS-485 mode. The layer provides 200Ω software-selectable TX and/or RX termination for RS-485 communications. The DNx-SL-501-804 is an ideal solution for connecting serial based data acquisition devices to the Ethernet as well as interfacing to a wide variety of serial based devices and legacy DAQ systems. In addition to standard serial I/O features, the DNx-SL-501-804 offers a series of additional functions. These functions include:

- Fully customizable baud rates generated by programmable PLL on per-channel basis from 300 baud to 4 Mbaud
- Programmable inter-character delay (required to drive/ simulate some avionics instruments)
- Programmable inter-frame delay (used to schedule frames at different rate)
- Automatic repeat of the last frame if new data is not sent from the host on time (required to keep "inop" flag happy on many avionic devices)
- None/Even/Odd/Space/Mark parity in 8-bit mode and per-symbol programmable in 9-bit mode
- Automatic in-hardware or software flow control
- Asynchronous event mode with loop closure in 100µs (for avionics expecting immediate reply)
- Echo suppression in half-duplex mode (for 422 mode)
- Timeout programmable in 10µs, 100µs or 1ms intervals

Software is included, providing a comprehensive, yet easy-to-use API that supports all popular operating systems, including Windows, Linux, and most real-time operating systems—such as QNX, Intime, VXworks, and more. Additionally, the UEIDAQ Framework—an even higher level Windows driver—supplies complete support for those creating applications in many popular Windows programming languages, as well as data acquisition software packages such as LabVIEW and MATLAB/Simulink.

Technical Specifications

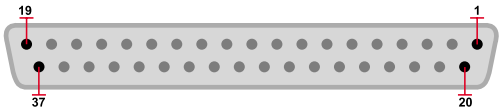
General serial specifications	
Number ports	4
Serial interfaces	RS-232, RS-485(RS-422), per-port software-configurable
Max. speed: RS-232 RS-485	 256 Kb/s 4 Mb/s
Baud rate selection	Any rate from 300 baud to 4 Mbaud, with 0.01% accuracy
Supported modes: RS-232 RS-485	 half- and -full-duplex
RS-232/485 transceiver	MAX3160E (w/ fail-safe RS-485 RX termination)
UART controller	16550C emulation (w/ extended parity control)
Protection	350 V channel-to-channel; 15 kV ESD protection
Power consumption	2-5 W (RS-485 mode with max current drive)
Operating temperature	Tested -40 to +85 °C
Operating humidity	0 - 95%, non-condensing
UART controller	
Base clock	66 MHz, 24 MHz, custom
FIFO size	2048 (input and output)
Error detection	interrupts-based, 4 per port
Dedicated port interrupts	UART interrupt, Timeout interrupt, TX/RX FIFO interrupt
General and environmental	
Isolation	350 Vrms port-to-port and port-to-chassis
Power Consumption	2.0 W (not including output loads)
Operating temp. (tested)	-40 °C to +85 °C
Operating humidity	95%, non-condensing
Vibration *IEC 60068-2-6* *IEC 60068-2-64*	5 g, 10-500 Hz, sinusoidal 5 g (rms), 10-500 Hz, broad-band random
Shock *IEC 60068-2-27* *IEC 60068-2-64*	100 g, 3 ms half sine, 18 shocks @ 6 orientations 30 g, 11 ms half sine, 18 shocks @ 6 orientations
MTBF	350,000 hours
Altitude	120,000 FT

Pinout Diagram

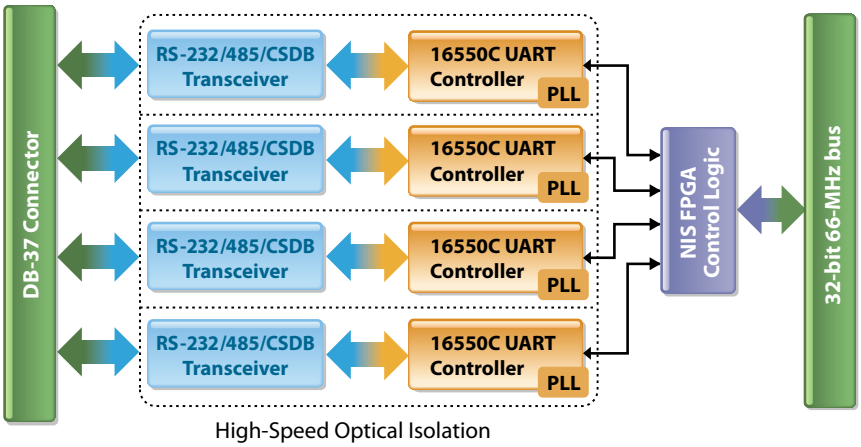
DB-37 (female)
37-pin connector:

	J1		DB-9*	RS-232	RS-485
Serial Port 1	19	>	3	TXD1	TX1-
	37	>	2	RXD1	RX1+
	18	>	7	RTS1	TX1+
	36	>	8	CTS1	RX1-
	17	-	6	-	-
	35	>	5	GND1	GND1
	16	-	4	-	-
	34	-	1	-	-
	15	-	9	-	-
Serial Port 2	33	>	3	TXD2	TX2-
	14	>	2	RXD2	RX2+
	32	>	7	RTS2	TX2+
	13	>	8	CTS2	RX2-
	31	-	6	-	-
	12	>	5	GND2	GND2
	30	-	4	-	-
	11	-	1	-	-
	29	-	9	-	-
Serial Port 4	10	>	3	TXD4	TX4-
	28	>	2	RXD4	RX4+
	9	>	7	RTS4	TX4+
	27	>	8	CTS4	RX4-
	8	-	6	-	-
	26	>	5	GND4	GND4
	7	-	4	-	-
	25	-	1	-	-
	6	-	9	-	-
Serial Port 3	24	>	3	TXD3	TX3-
	5	>	2	RXD3	RX3+
	23	>	7	RTS3	TX3+
	4	>	8	CTS3	RX3-
	22	-	6	-	-
	3	>	5	GND3	GND3
	21	-	4	-	-
	2	-	1	-	-
	20	-	9	-	-
	1	-		-	-

GNDx	Isolated ground for the corresponding serial port
TXDx/**RXD**x	RS-232: Transmit/Receive
RTSx/**CTS**x	RS-232: request to Send/Clear to Send
TXx+/**TX**x-	RS-485: Transmit pair
RXx+/**RX**x-	RS-485: Receive pair
-	no internal connection



Block Diagram



High-Speed Optical Isolation

Ordering Guide:

Part #	Description
DNx-SL-501-804	RS-232/485 Serial Communications Interface
DNA-CBL-COM	1ft. DB37 cable split into four DB9 connectors
DNA-CBL-37S	3ft, 37-way round shielded cable
DNA-STP-37	37-channel screw terminal panel
DNA-STP-3762	Universal Screw Terminal Panel for DNx-Series I/O
DNA-STP-37-DR	37-pos Terminal Panel for PowerDNA Layers
UEI-RSS	Standard Serial Server for DNx-SL-501 and DNx-SL-508; included with DNx-SL-501/508 purchase
Extended Warranty	Option to purchase UEI's extended warranty (up to 10 years) is available