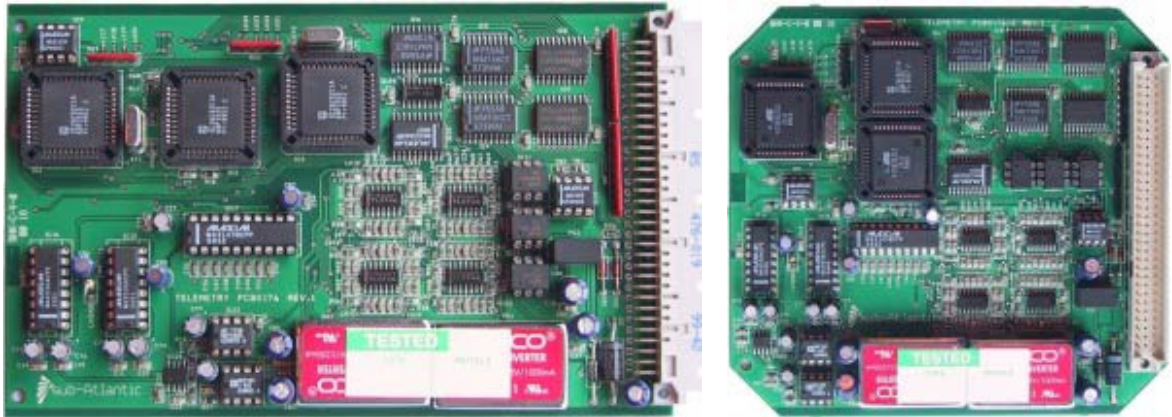




Sub-Atlantic Telemetry System SUB-0176



Telemetry Specification

Supply voltage:	18-36VDC
Supply Current	146mA @ 18V (nominal)
Analogue channels:	8 inputs and 8 outputs All 12 bit resolution Input 0-5V Unipolar +/-5V bipolar Output 0-5V Unipolar +/-5V bipolar
Digital channels:	16 inputs and 16 outputs, TTL levels Maximum Input Voltage: 5.1V Minimum Input Voltage: -0.1V Output current per pin ± 10 mA (nominal)
Communications link:	RS 485 Maximum baud rate 115,000 Optically isolated
RS232 Links:-	Two bi-directional RS232 (1200 – 9600) Baud data links are available with optional Firmware. See Appendix 1
Connector Assignment:	Refer to Appendix 2 for functional description.

The telemetry system is a two-way serial multiplexing system that provides 8 analogue inputs and outputs and 16 digital inputs and outputs. The analogue channels are 12 bit resolution. The data is transmitted via a single screened twisted pair cable up to 1 kilometre in length in RS 485 format.

Two card sizes are available, an octagonal card (131mm x 121mm) or a Eurocard format (160mm x 100mm). The circuitry on both boards is identical

The cards communicate in half duplex mode over a serial data link that uses RS 485 drivers at a maximum rate of 115200 baud. For firmware that does not use the RS232 capability the data transmission rate is user selectable to one of 8-baud rates as shown in Table 1. Otherwise, Tables 5 to 9 are applicable in Appendix 1.

Table 1 – Serial link baud rate selection

Link 17	Link 18	Link 19	Baud Rate
IN	IN	IN	115200
OUT	IN	IN	57600
IN	OUT	IN	38400
OUT	OUT	IN	19200
IN	IN	OUT	9600
OUT	IN	OUT	4800
IN	OUT	OUT	2400
OUT	OUT	OUT	1200

Both cards operate in a master/slave relationship, which is determined by a link setting as shown in Table 2.

Table 2 – Master / slave selection

Link 20	Status
Link	Slave
Open	Master

The top-end card polls regularly for information from the bottom-end (slave) card. The master includes the latest settings for the slave outputs in the poll request. When the slave receives the poll request it decodes the output values passed to it from the master, and then replies with its

own sampled input data. The result is rapid exchanges of data between the two cards, ensuring that both top and bottom-end outputs are refreshed as rapidly as possible. The refresh rate depends on the data rate selected for the data link.

The sub-sea and surface cards operate in the same manner, and have identical circuits. See drawing 0176-ELS Sheet 1-2 for circuit and pin out details.

Each card has a high-speed processor that controls the operation of the card and formats data for transmission on the data link. The processor is provided with a watchdog timer to prevent system lock-up.

The processor is interfaced to an 8 channel, 12 bit data acquisition system, and to an 8-12 bit DACS. These will provide 8 analogue inputs/outputs channels at 12-bit resolution.

The processor also communicates with a Programmable Logic Device (PLD) which will provide 16 bits of digital output data, and also provide the logic for selection of the ADC, DAC and multiplexer. The PLD will also have the ability to control the link direction and type.

The analogue inputs and outputs can be either 0-5V unipolar (links open) or +/-5v bipolar (links soldered) as shown in Table 3 and Table 4 respectively.

The links are made by fitting jumper links across the pins provided and are shown marked-up on the component side of the boards.

Table 3 – ADC Input Selection

Channel	Link	Unipolar	Bipolar
Ch 1	1	Open	Link
Ch 2	2	Open	Link
Ch 3	3	Open	Link
Ch 4	4	Open	Link
Ch 5	5	Open	Link
Ch 6	6	Open	Link
Ch 7	7	Open	Link
Ch 8	8	Open	Link

Table 4 – DAC Output selection

Channel	Link	Unipolar	Bipolar
Ch 1	9	Open	Link
Ch 2	10	Open	Link
Ch 3	11	Open	Link
Ch 4	12	Open	Link
Ch 5	13	Open	Link
Ch 6	14	Open	Link
Ch 7	15	Open	Link
Ch 8	16	Open	Link

Appendix 1

The Telemetry system with optional firmware provides two additional bi-directional RS232 data inputs and outputs, which form part of the RS485 telegram format. The following tables provide Baud Rate, Data bit format and Parity jumper link information.

Table 5 – RS485 Baud selection

LK 18	LK 17	Baud
IN	IN	115200
IN	OUT	19200
OUT	IN	38400
OUT	OUT	57600

Table 6 – RS232 channel A Parity selection

LK 20	LK 19	Parity
IN	IN	NONE
IN	OUT	EVEN
OUT	IN	ODD
OUT	OUT	NONE

Table 7 – RS232 channel A Serial Link Baud rate selection and data bits

Link 23	Link 22	Link 21	Baud Rate	Data Bits
IN	IN	IN	1200	7
IN	IN	OUT	2400	7
IN	OUT	IN	4800	7
IN	OUT	OUT	9600	7
OUT	IN	IN	1200	8
OUT	IN	OUT	2400	8
OUT	OUT	IN	4800	8
OUT	OUT	OUT	9600	8

Table 8 – RS232 channel B Serial Link Baud rate selection and data bits

Link 26	Link 25	Link 24	Baud Rate	Data Bits
IN	IN	IN	1200	7
IN	IN	OUT	2400	7
IN	OUT	IN	4800	7
IN	OUT	OUT	9600	7
OUT	IN	IN	1200	8
OUT	IN	OUT	2400	8
OUT	OUT	IN	4800	8
OUT	OUT	OUT	9600	8

Table 9 – RS232 channel B Parity selection

LK 28	LK 27	Parity
IN	IN	NONE
IN	OUT	EVEN
OUT	IN	ODD
OUT	OUT	NONE

Note: The RS232 data channels each provide input buffering of up-to 200 data bytes, therefore sufficient time must be allowed between data packets to allow transmission via the RS485 link. Eight data bytes per RS232 channel are transmitted via the RS485 link, i.e. 8 data bytes approximately every 40ms.

Appendix 2

Connector Pin Designation

Pin	Function	Pin	Function
1a	Digital Out 1	1c	Digital In 1
2a	Digital Out 2	2c	Digital In 2
3a	Digital Out 3	3c	Digital In 3
4a	Digital Out 4	4c	Digital In 4
5a	Digital Out 5	5c	Digital In 5
6a	Digital Out 6	6c	Digital In 6
7a	Digital Out 7	7c	Digital In 7
8a	Digital Out 8	8c	Digital In 8
9a	Digital Out 9	9c	Digital In 9
10a	Digital Out 10	10c	Digital In 10
11a	Digital Out 11	11c	Digital In 11
12a	Digital Out 12	12c	Digital In 12
13a	Digital Out 13	13c	Digital In 13
14a	Digital Out 14	14c	Digital In 14
15a	Digital Out 15	15c	Digital In 15
16a	Digital Out 16	16c	Digital In 16
17a	RS232 CHA TX	17c	RS232 CHA RX
18a	RS232 CHA 0V Return	18c	RS232 CHB 0V Return
19a	RS232 CHB TX	19c	RS232 CHB RX
20a	RS485 +	20c	RS485-
21a	RS485 Common	21c	No Connection LK29AB Open/ +5V Reference LK29B Closed/ Comm Status LK29A Closed
22a	Digital 0V Return	22c	Digital 0V Return
23a	Analogue In 1	23c	Analogue Out 1
24a	Analogue In 2	24c	Analogue Out 2
25a	Analogue In 3	25c	Analogue Out 3
26a	Analogue In 4	26c	Analogue Out 4
27a	Analogue In 5	27c	Analogue Out 5
28a	Analogue In 6	28c	Analogue Out 6
29a	Analogue In 7	29c	Analogue Out 7
30a	Analogue In 8	30c	Analogue Out 8
31a	Analogue 0V Return	31c	+24V DC Supply
32a	Analogue 0V Return	32c	Supply 0V Return