

Power Line Modem

Power Line Modem is an integrated system, which allows power and bi-directional digital communications to submersible equipment over the same cable. The system is made up of two parts: the Interface Unit for use on-board surface vehicles and the Submersible Modem which is mounted in a robust pressure housing.



OVERVIEW

The Modem is based on proven telecommunications modem hardware, with all the advantages of the modern technological improvements in this field to enable optimum data transfer. The Interface Unit allows both RS232 and RS422 communications, and provides the primary power for both modems and remote instrumentation.

Chelsea Technologies Group originally developed the Power Line Modem to provide flexibility in the payload for its range of towed vehicles, but it has wider applications in oceanographic systems.

The use of the Modem enables the vehicles to be operated either on a single coax cable, or on multi-core cables allowing the full use to be made of the conductors available.

The Modem has the advantage of being able to work under varying load conditions, thus providing flexibility in the payload design. It is equally applicable to buoyed, moored and profiled systems.

The physical construction and electronic design techniques used ensure that the Modem can be used in a diverse range of survey applications, whether on land or sea.

SPECIFICATION

Interface Unit

Height	135mm
Width	216mm
Depth	300mm
Weight	5Kg
Power input	Mains Supply via IEC socket with integral EMC filter. 220/240 Vac 50/60Hz or 110 Vac 50/60Hz selected on filter.
Power output	72 Vdc via sea cable connector on rear of case. 1 amp max. rating when used with Modem. In-line fused at 1.6 amps.
Interface type	RS232 via standard 25 way D type socket. RS422 via Sea cable connector
Front Panel	Led indication for: DC Power On Modem Line Ready Transmit and Receive Data
Sea Cable	Connections via heavy duty sealed bayonet coupling to MIL-C-5015, AB 14S-6P, to mate with 14S - 6SSN fitted to the interface unit.
Data Rate	300 to 57600 Baud communications to Modem (9600 standard). Modem Carrier maximum 14400 baud. The number of characters per second depends on the line quality available to the Modem and the level of compression possible with the type of data presented.
Protocol	The modem supports MNP and LAPM protocols, and also provides V42bis error correction to ensure maximum data transfer possible.
Handshake	RTS/CTS Hardware flow control option. Xon/Xoff flow control option.

Submersible Modem

Length	310mm (excluding connectors)
Diameter	90mm
Weight	3 Kg in air 1.2 Kg in water
Material (Housing)	Titanium
Depth Rating	1Km limited by cable length / resistance Housing rated at 6000 metres. Tested to 60Bar.
Power input	DC supply via 2 way submersible connector, LPMBH-2-MP-1. Reverse polarity protected. For mating part, use Impulse LPMIL-2-FS.
Power output	DC supply to Instrumentation via 7 way submersible connector, LPMBH-7-FS-1. For mating part, use Impulse LPMIL-7-MP This allows direct connection to Chelsea Technologies Group's standard products such as AQUA ^{pack} (CTD-Fluorimeter) and towed vehicle servo units.
Interface type	RS422 via 7 way Impulse connector
Handshake	Xon/Xoff flow control option
Cable	Maximum Cable Length 1Km. Maximum Cable dissipation = 36 watt [i.e. <72 Ω return resistance @ 0.5 amp <36 Ω return resistance @ 1 amp (max)]

TECHNICAL DESCRIPTION

The Interface Unit houses the power supply. The mains is taken via an IEC EMC filter into a toroidal transformer which permits both 240 Vac and 110 Vac supplies to be accommodated.

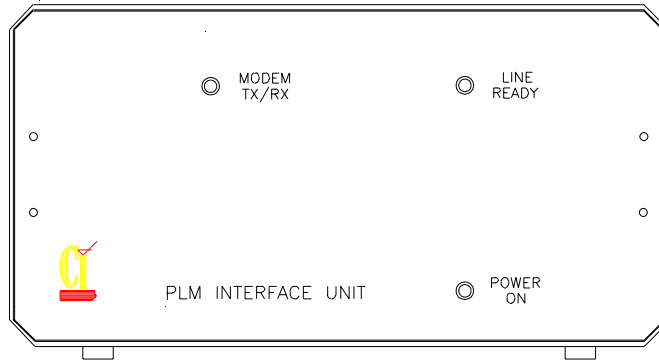
The rectified and smoothed output of the transformer is connected to a conservatively rated DC/DC converter to provide 72 volts DC, which powers the modems at both ends of the cable as well as the remote load.

The Modem operates in leased line mode, with the Interface Unit as the master station and the Submersible Unit operating as the slave. The Modem is AC coupled to the line after the DC power filter and automatically connects to the remote Modem at power on. This is confirmed by the illumination of the front panel 'LINE READY' light emitting diode.

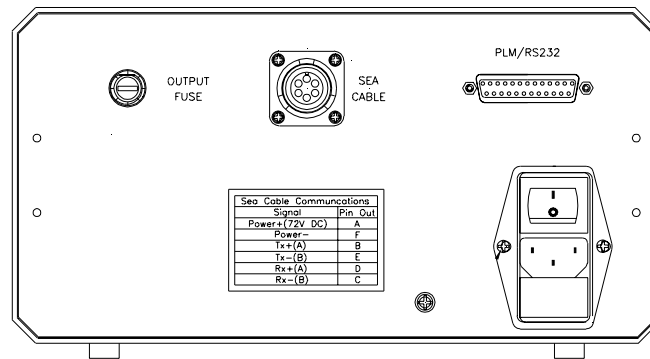
The Modem can be used with commercially available communications packages to provide data transfer in a similar fashion to a standard modem.

The protocols are fully configurable to provide system flexibility to the end user.

The handshake may be either or both software and hardware handshake at the Interface Unit. However the Submersible Unit only provides Xon/Xoff handshaking as standard due to the RS422 compatibility.



INTERFACE UNIT FRONT VIEW



INTERFACE UNIT REAR VIEW

The Submersible Modem receives power and communications on the two-pin connector. The unit has internal power supplies and a filter for the power to reject noise from the equipment connected as the load. It is AC coupled onto the line prior to the filtering.



SUBMERSIBLE MODEM HOUSING

The Load and the digital connection are via the 7 way connector.

LOAD POWER AND COMMS	
Signal	Pin Out
Power +(72V DC)	3
Power -	6
Tx+(A)	5
Tx - (B)	1
Rx+(A)	2
Rx -(B)	4

COMMUNICATIONS

The Modem is based on a standard Rockwell chipset and therefore can provide both data and the facility to fax using international telecoms standard protocols. Commercially available communications can directly control the flow of data using standard data protocols.

Once the Modems have connected, as indicated by the line ready light emitting diode, the Modem link is totally transparent to the user. The only noticeable difference may be in the pacing of the data out of the Modem under poor line conditions.

The Modem continuously monitors the line conditions and retrains to ensure connection can be maintained over varying line conditions.

The Modem has memory to buffer data and allow the Modem to support V42 error correction and V42bis data compression. This ensures data is not lost whilst the line conditions are poor. Additional standard protocols with in-built cyclic redundancy checking i.e. XMODEM, ZMODEM may be incorporated in the user's equipment to further safeguard the transfer of file data.

The software within the Modem has an auto baud facility. This allows the Modem to connect automatically to the DTE by issuing the AT command.



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April 2002