

Fugro OCEANOR GENI

Data Acquisition and Control Unit

Description

The Fugro OCEANOR GENI (General Interface) is a robust data acquisition unit targeted at operation in remote locations, powered only from batteries. It features a high-end 32-bit processor and large internal storage capacity. Extreme mechanical robustness is achieved by use of a gas-tight aluminium housing, quality connectors and no moving parts. A proven operating system and modular C++ application software ensure software reliability.

Proven Record

The current version of the GENI is the fourth generation made by Fugro OCEANOR AS. The predecessors have been in use since the 1980's. They have mainly been installed in oceanographic buoys and are currently in use world-wide. Other areas of use are meteorological systems, river and groundwater monitoring and structural surveillance systems.

Reliability

Given the remote location of most GENI based systems, high reliability has been a goal in the design. Important measures to ensure the high reliability are:

- Hardware watchdog circuit
- Robust, conservative electronic design
- Compact design with low number of boards
- Industry temperature range specification on components
- Proven Linux operating system
- Modular high level C++ software where each module is tested separately (prior to the system test)
- Fault tolerant software, restarting processes which doesn't behave as specified
- CPU featuring hardware memory protection between processes



Flexibility

The software is built up from completely separate programs, with a well defined interface. This enables different sensors and communication options to be easily added or removed from the system. The system is configured by a user friendly MS-Windows program. It enables the user to select sensors, parameters, communication options and all configurable parameters. The configuration program produces XML files as output. These may be downloaded to the GENI using any of the two way communication links. Typically, the full configuration is done at the factory. The end user receives an easy-to-use Wizard version of the configuration program, highlighting only user configurable parameters.

Low Power Consumption

Low power consumption was together with reliable operation, the target during the design of the GENI. It is achieved through careful design and choice of extremely low power electronic circuits. In comparison to an ordinary portable PC which shares much of the architecture of the GENI, the GENI consumes only 1/100 to 1/10 of the power. The power consumption is a compromise between processing abilities and low power operation. The micro controller used in the system is the PXA255 XScale RISC processor, which has a flexible power management scheme. Controller sub-systems may be powered on or off depending on the need of the software, and the processor clock may be stopped for minimum power consumption. This means that the power consumption of the GENI is adapted to the given task.

Technical Specifications

Sensor Inputs/Outputs

16 Differential analog inputs.
16 bit resolution, +/-5V range.
Optional inputs are 0-20 mA, PT-100 and other resistance based sensors are also supported
18 RS-232, 1 RS-485 and 2 RS-422
1 Frequency in
26 digital in/out
11 lines for sensor power supply.

All ports are ESD protected and the serial ports are capable of up to 250 kbit/s transfer rates.

Virtually all sensors on the market today fit directly or with small adaptations into one of the above categories.

Storage Capacity

CPU Board:
512 Mb Flash memory (CompactFlash) for data storage (can be extended on request)
32 Mb of Flash memory for program storage
64 Mb of SDRAM for system software

Processor

PXA255 XScale RISC processor running at 400 MHz.

Miscellaneous

Battery backed Real Time Clock. Initial accuracy 1 min./month. Automatic correction when GPS is available

Software

Linux 2.6 operating system
Fugro Oceanor modular software for data acquisition, data analysis, data storage and transmission.

Communication Options

Argos
Inmarsat-C
IRIDIUM
GSM telephone
GPRS
UHF/VHF
Serial line (proprietary or PPP protocol) over any of the serial ports
10/100base-TX Ethernet
WLAN

Configuration

The system is configured through an easy to use program running on a PC under MS-Windows 95/98/NT/2000/XP/Vista. New configurations may be uploaded to the system via any of the communication options above (except Argos). Program upgrades may also be performed remotely.

General Specifications

Supply current: 160 mA (active, inc. network)
110 mA (active, no network)
75 mA (idle)

Supply Voltage: 7 to 15 VDC
Operating temp: -5 to +70 °C

Size: 177 x 133 x 111 mm

Weight: 2.4 kg

Shock resistance: 1000 m/s²



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