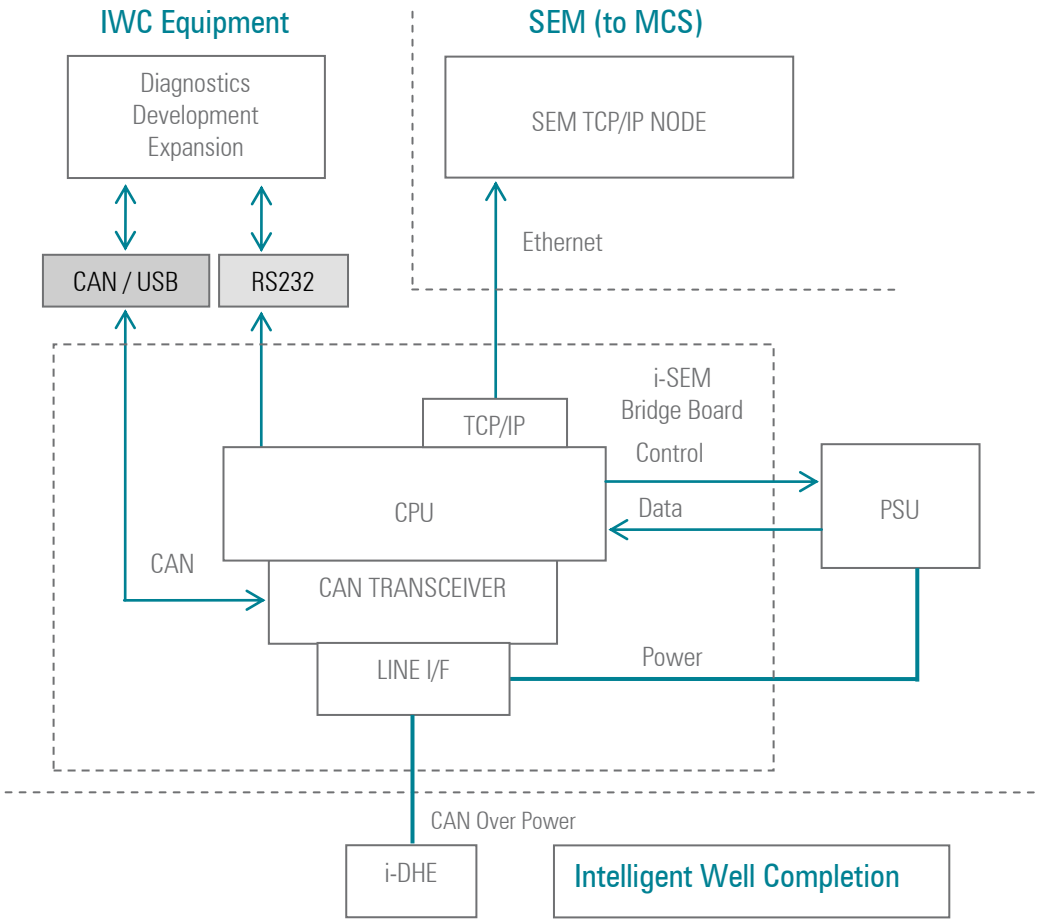


# INTELLIGENT WELL ELECTRONICS SYSTEMS CAPABILITY

Neopartners have designed, built and tested a number of Intelligent Well systems fully rated to 150°C and qualified for a minimum 5 years continuous life at this temperature.

Our Intelligent well systems include downhole and subsurface electronics of a completion system that provides the control for monobore or multi-lateral wells. It is a modular system with real time monitoring and control of a number of well zones. Fault tolerant CAN based communications are provided down a dedicated mono-core or twisted pair cable.

Figure 1. The basic architecture shown below is a master/slave configuration where the surface unit (UMD) is the system master. An alternative is a peer-to-peer arrangement of all units including UMD.



# INTELLIGENT WELL ELECTRONICS

## DOWNHOLE OUTLINE SPECIFICATION

- Full operation & 5 year life at 150°C
- Survivability & recovery to 200°C
- 25g broadband vibration rating
- PSU input range 100 - 300Vdc dependent upon load
- Pressure, temperature & vibration monitoring
- System management data
- System resolution - 16bits
- System accuracy & linearity - 14bits
- Brushless DC & stepper motor drives
- Solenoid type drivers
- CAN based full duplex communications systems for multiple units
- Operation on up to 20kft of monoline

## UPHOLE OUTLINE SPECIFICATION

- AC or DC power inputs to the subsurface unit
- PSU outputs to 200Vdc
- PSU inputs 110/220Vac and 300Vdc
- Pressure and temperature inputs
- System accuracy & linearity - 14bits
- CAN based full duplex master system
- Data interface for external networks including Field-bus, CAN and TCP/IP
- GUI front-ends can be added for control and data display/storage.

## BUILD

A significant number of systems (32) have been built and tested at up to 180°C. These systems include:

- Data acquisition
- Timing control & communications
- Signal conditioning
- Switched power mode supplies
- Linear power supplies
- Solenoid valve actuation
- Stepper motor and BLDC motor drive systems

The systems utilise the CANbus communications protocol meeting the current IWIS standards but other systems are available, such as FSK modem, FM and a range of field bus standards. All of our designs use high temperature qualified components either from the original vendor or through the company HT database process.

# INTELLIGENT WELL ELECTRONICS

## SYSTEM TESTING

Shake and bake testing to defence and aerospace specifications has contributed significantly to the robustness and reliability of the system. Downhole unit testing includes:

- Swept resonance to identify and improve PCB and component mounting
- Shock and shear effects to improve component attach, connectors and wiring
- Thermal imaging of system components to achieve as near isothermal conditions as possible.
- Modelling of system heat flow to the external environment



## TYPICAL APPLICATIONS

- Production system for multi-level choke control
- Inclusion in wired drilling systems
- Safety critical systems giving continuous positional data as well as motor drive current and voltage indications.
- Pressure gauges

The subsurface systems have been engineered to meet the IWIS and ISO 13628-6 standards including Eurocard compatible formats and a variety of input voltages to the subsurface units.

The details above are an example of a basic system specification, actual systems can be designed to customer's own requirements.