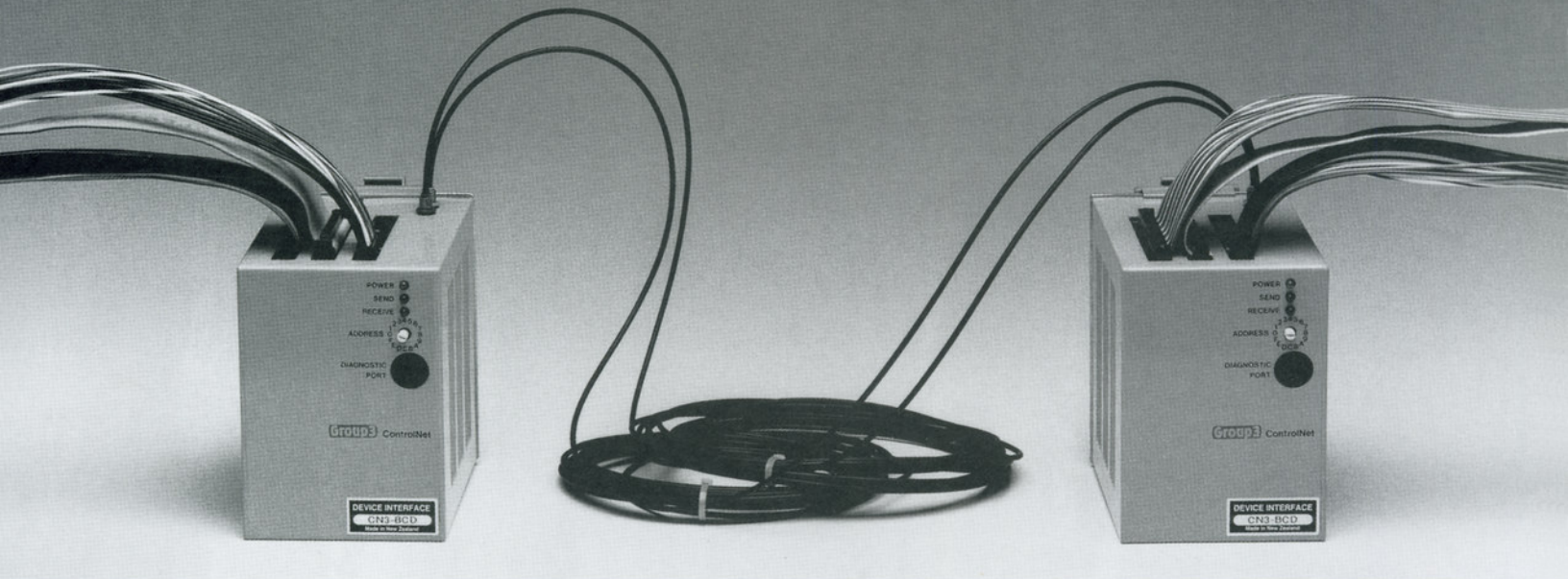


## Isolated Control and Monitoring



Group3 **ControlNet** Device Interfaces connected with just two fiber optic cables provide noise free transmission of many analog and digital signals in difficult environments. High voltage isolation and long distance transfer of signals are simple to implement using this low cost system.

The system uses the same well proven hardware of the computer based *ControlNet* system, but in a new configuration in which two Device Interface (DI) modules communicate with each other, not with a computer.

If, for example, a signal voltage is presented to an analog input channel in one DI, the exact same voltage will be generated by a corresponding output channel in the other DI module. Digital on/off channels are similarly replicated by the system - if a switch is closed that grounds a digital input channel in one DI, the corresponding output in the other DI will be clamped to its ground level.

A Device Interface module can house up to 3 I/O boards. There are a number of different I/O boards to choose from, and these can be used in any combination in one DI, and matched with the corresponding board in the other DI.

The transmission of data is over two fiber optic cables, providing noise immunity and voltage isolation for electrical signals present at each end of the cables.

Two fiber optic cables are easier to install and considerably less expensive than a bundle of shielded cables over long distances. If glass fiber optic cables are used the DIs can be up to 3000 metres apart. Plastic fiber optic cables can be used for distances up to 40 metres.

The DI modules and I/O cards are standard components of the *ControlNet* range, so at a later date they could be used as part of a full computer based control system if required.

Boards available to use for this system are:-

- Type A Combined analog and digital board.  
analog input, analog output, 8 digital channels
- Type B 24 digital channels, each channel can be independently set as an input or as an output.
- Type C Eight analog inputs. (ADCs) 16 bit resolution
- Type D Eight analog outputs. (DACs) 14 bit resolution

Some examples:

If a type B board in one DI is matched to another B board in the other DI, it gives 24 channels of digital on/off signals. Each channel can be set to operate in either direction.

A type A matched to another type A gives two analog channels, one in each direction, and eight digital channels.

Two DIs, each with 3 boards - a B, C, and a D, gives 24 digital signal lines, and 8 analog monitoring channels, and 8 analog control channels.

Two DIs each with 3 type B boards give 72 digital lines.

Two DIs each with 3 analog boards give 24 analog signals.

If the range settings of the analog channels are set appropriately then it is possible to have the system insert a gain factor during transmission. For example a 0-50mv input signal could be transformed to a 0-10 volt output just by setting the input and output ranges to those values.



## System Specifications

### Isolation

Fiber optically isolated, so essentially no limit to the voltage isolation, and no noise pick up during transmission.

### Distance

Using plastic fiber optic cable - up to 40 metres in one length. Repeaters are available to extend this distance if required.

Using glass fiber optic cable - up to 3000 metres

### Resolution

Analog inputs have 16 bit resolution, analog outputs have 14 bit resolution, so the overall system transmission resolution is 14 bits

### Speed

The speed of signal transmission varies according to the number and type of I/O boards used, The delay in transmitting digital on/off signals is 2ms for 24 channels, the delay for two DIs loaded with B, C, and D boards is 25ms.

## Component Specifications

### Device Interface (DI) module.

Houses processor card that handles all communications. Can house up to three multi-channel I/O boards. 3 LED indicators for power and communications. Diagnostic port for access by a standard terminal to allow set up of individual channel parameters.

Size: 112h x 76w x 140d (mm)  
Power: DC: 12 to 30 Volts, 7W max.  
AC: 12 to 24 Volts, 10 VA max.

DIN rail mounting.

Transmission at 1.152 Mbaud over the fiber optic cables.

### I/O Boards.

Type A Combined analog and digital board.  
analog input, analog output, eight digital

Digital Channels:  
40 Volts max allowed on any signal pin.  
internal 1 K $\Omega$  pull up to +5V  
as outputs: Open collector, sink to ground, 100 mA max  
as inputs: TTL voltage level compatibility.

Type B 24 digital channels.

Analog Inputs:  
differential inputs of 16 bit resolution.  
selectable input ranges: 50mV, 5V, 10V, uni- or bipolar.  
Input resistance: 180K $\Omega$

Type C Eight analog inputs. (ADCs)

Analog Outputs:  
single ended outputs of 14 bit resolution.  
selectable output ranges: 5V or 10V, uni- or bipolar.  
minimum allowable load impedance: 2K $\Omega$

Type D Eight analog outputs. (DACs)

### Signal Conditioners

A series of DIN rail mounting signal conditioning modules are available as part of the standard *ControlNet* range of products. These units act to suppress transients on the signal wiring, preventing electrical noise entering the DI module. The analog channel signal conditioners also have provision for voltage division resistors to bring inputs or outputs into a desired range.

The signal conditioners also provide a change from the electronic ribbon cable type connectors of the DI boards to rows of screw terminals - making it easier to install individual signal wiring.

### Fiber Optic Cables

DI modules are shipped with transmitters and receivers fitted for plastic fiber optic cable. These use the Hewlett Packard Versatile Link plastic connectors.

By request at order time transmitters and receivers for glass fiber optic cables with ST or SMA connectors can be fitted.

Specifications may change without notice - check with your distributor. Jan 1995

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