

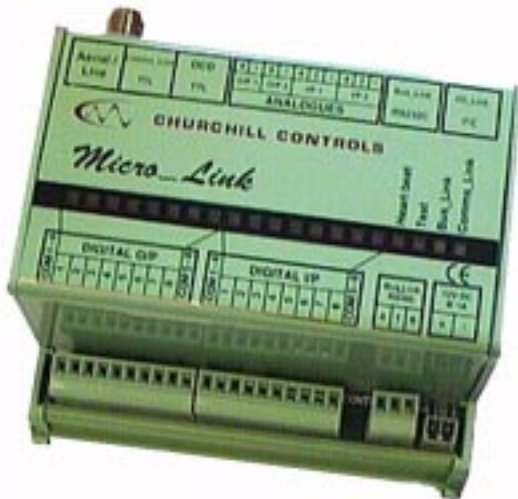


# Data\_Link 2000

RADIO/LAND LINE TELEMETRY & TELECONTROL  
SYSTEM WITH PLC/SCADA INTERFACE

## Overview

Churchill Controls *Data\_Link 2000* telemetry system offers a very flexible approach to the problem of transferring signals between industrial plant on distributed sites. By utilising radio or private wires as a communication medium it offers low installation charges and minimal ongoing running costs. Applications range from simple point to point systems to large schemes interfacing with PLC's and SCADA systems.

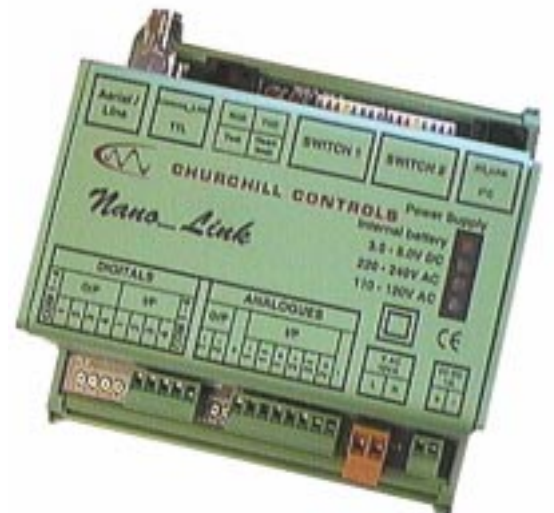


## System Design

*Data\_Link 2000* configures an industrial data communications network from *Nano\_Link* and *Micro\_Link* modules. *Nano\_Link* has been optimised for low power consumption, low cost applications with limited I/O. *Micro\_Link* is a more powerful device with additional communication ports and expansion capacity.

The simplest network comprises two *Nano\_Link* modules providing a point-to-point link transferring 4 digitals and 2 analogues in each direction.

More complex networks are built around a *Micro\_Link* base-station and any combination of *Micro\_Link* and *Nano\_Link* outstations. The base-station can poll up to 250 outstations, and every outstation can be used as a repeater if required, to access more distant outstations and/or repeaters.



# Data\_Link 2000



## Nano\_Link

*Nano\_Link* is a general-purpose outstation with 4 digital inputs and 2 analogue inputs, with the option of also including 4 digital outputs and 2 analogue outputs. It is housed in a compact plastic enclosure which can be clipped onto a standard DIN rail. It can be supplied in a waterproof polycarbonate enclosure if required, or in a roadside cabinet.

The internal power supply can be either three 'D' alkaline batteries or a mains power supply with battery back-up. The module has been optimised for low power consumption, to the extent that it will operate for at least 2 years on low-cost Duracell batteries. Battery operation has the advantage of significantly lower installation and running costs.

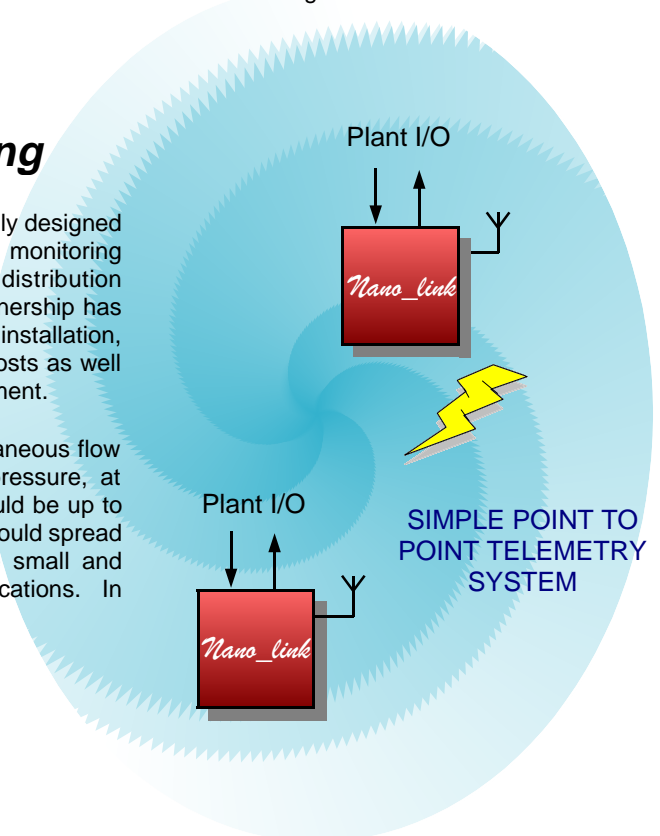
### Hardware I/O

Small systems copy inputs at one end of the link to outputs at the other, maintaining the same electrical format. They can therefore be visualised as multi-core cables.

### District Monitoring

*Nano\_Link* has been specifically designed to address the need for district monitoring to detect leaks in water distribution networks. The total cost of ownership has been considered by addressing installation, operational and maintenance costs as well as the capital cost of the equipment.

District monitoring requires remote reading of totalised and/or instantaneous flow from one or two transducers, with the option of also monitoring pressure, at numerous points around the network. In urban areas the density could be up to one outstation per square kilometre, whilst in rural areas the network could spread over many tens of square kilometres. Outstation aerials must be small and protected against vandalism, since they are likely to be in public locations. In some instances they must be under manhole covers.



### Nano\_Link I/O

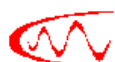
*Nano\_Link* has 4 digital inputs which can each be used to monitor alarm or status conditions, and also to count pulses from totalised flow transducers. An extra pseudo input gives a battery low voltage digital alarm.

*Nano\_Link* also has 2 analogue inputs which can be used with low-cost millivolt transducers or more conventional current loop transmitters. There is also a pseudo analogue input which monitors the battery voltage and another which monitors the radio received signal strength.

*Nano\_Link* can be configured as a base-station to provide a point-to-point link to another *Nano\_Link*, transferring two analogues and four digitals in both directions. To access pseudo inputs, use repeaters, or use more than one outstation, a *Micro\_Link* base-station should be used.

### Repeaters

Every outstation in a network is capable of repeating messages to/from more distant outstations. Up to 8 levels of repeating can be used to greatly extend radio range. The network is fully configurable from the base-station.



# Data\_Link 2000

## Micro\_Link

*Micro\_Link* is mechanically similar to *Nano\_Link*, but has been designed to provide expansion capacity, more processing power and more communication ports at the expense of higher power consumption.

The *Bus\_Link* communication port allows *Micro\_Link* to be connected to a wide variety of PLC's and SCADA systems using proprietary serial protocols such as Modbus.

The *Data\_Link* Configuration and Diagnostic (DCD) port can be connected to a DCD terminal for configuring the system and/or running diagnostics to analyse problems.



## Bus\_Link

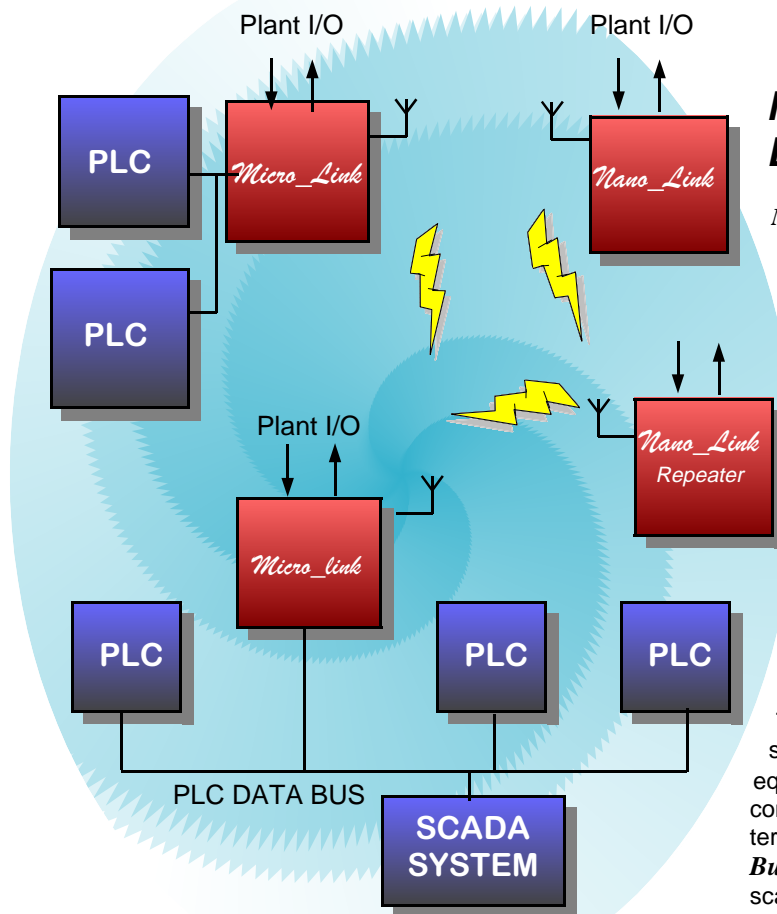
*Bus\_Link* is Churchill Controls' terminology for a general-purpose serial interface which can be configured to use a standard PLC bus protocol. Although the industry-standard is Modbus, other protocols such as Allen-Bradley can also be used.

## Micro\_Link Database

*Micro\_Link* includes a database of 2008 input registers, 2000 output registers, 8032 digital inputs and 8000 digital outputs. This is sub-divided into 251 input data blocks and 251 output data blocks, each containing 8 registers and 32 digitals.

A *Micro\_Link* base-station automatically copies analogue inputs and totalised counts from outstations to registers in the output data block corresponding to the outstation address. Outstation digital inputs are similarly copied to database digital outputs, and the data in the input data blocks is copied to outstation analogue and digital outputs.

The contents of the registers and digitals in the base-station data blocks can be written and read by host equipment over the *Bus\_Link* interface. They can also be configured to be copied to/from hardware I/O via the DCD terminal. This flexibility provides a seamless link between *Bus\_Link* communications, hardware I/O and radio scanning which is transparent to the user.



## DCD Terminal

The DCD terminal is a laptop computer running Windows™ software free-issued by Churchill Controls.

In configuration mode the software allows all systems, network and *Bus\_Link* configurable parameters to be edited, saved to disc, downloaded to *Micro\_Link* and uploaded from *Micro\_Link*.

In diagnostic mode it allows the internal database to be examined and modified, and serial communications with *Bus\_Link* and with the radio to be eavesdropped.

## Radio Communication

Both *Micro\_Link* and *Nano\_Link* use synthesised UHF transceivers which operate on the de-regulated MPT1329 band. Any of 32 channels can be selected to avoid conflict with other users.

The radio range depends on the aerials used and the topology of the area, but will typically be up to 8Km in urban environments and up to 25Km with elevated aerials.

# Data\_Link 2000

## SPECIFICATIONS

### NANO\_LINK & MICROLINK COMMON FEATURES

#### RADIO:

Operating frequency: MPT1329 458MHz telemetry band 32 channels available  
Power output: Up to 500mW  
Receiver sensitivity: -118dBm

#### LINE MODEM:

Mode: V23 1200 baud

#### DIMENSIONS:

125 X 125 X110mm

### NANO\_LINK

#### HARDWARE I/O

##### Digitals:

Inputs: 4 digital / count inputs compatible with external volt free contacts  
Outputs: Optionally 4 digital volt free contact outputs rated 125VAC/0.5A/62.5VA or 24VDC/1A/30W max.

##### Analogues:

Inputs: 2 analogue inputs ( non isolated ).  
Range and accuracy: 0 -20mA or millivolt strain gauge +/- 1%  
Outputs: Optionally 2 analogue outputs ( non isolated ).  
Range and accuracy: 0-20mA +/- 1%  
Derived Analogues Inputs: 2 derived analogue inputs to transmit battery volts and received radio signal strength.

#### POWER SUPPLIES:

- 230/240V AC with 8 hours battery backup
  - 3 x alkaline D cells giving minimum 2 years operation, typically 3 years\*
  - External 5V DC supply
- \* Battery life based on interrogating every 15 minutes

### MICRO\_LINK

#### HARDWARE I/O

##### Digitals:

Inputs: 8 digital / count inputs compatible with external volt free contacts, expandable by the use of external DIN rail mounted modules  
Outputs: 8 digital volt free contact outputs rated 125VAC/0.5A/62.5VA or 24VDC/1A/30W max.

expandable by the use of external DIN rail mounted modules.

##### Analogues:

Inputs: 2 analogue inputs ( fully isolated ) expandable by the use of external DIN rail mounted modules. ( fully isolated )  
Range: and accuracy: 0-20mA or 0 - 5V +/- 1% ( expansion modules +/- 0.1% )  
Outputs: 2 analogue outputs ( non isolated ) expandable by the use of external DIN rail mounted modules. ( fully isolated )  
Range: and accuracy: 0-20mA +/- 1% ( expansion modules +/- 0.1% )

Derived Analogues:Inputs: 2 derived analogue inputs to transmit battery volts and received radio signal strength.

#### SERIAL PORTS:

**Bus\_Link:** up to 9600 baud, RS232 or RS485  
**Data\_Link** Configuration and Diagnostic Terminal ( DCD ) 9600 baud RS232

#### POWER SUPPLIES:

12V DC @ 1A max



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Optional IP68 Enclosure