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Mega_Link 2
Product Familiarisation

Part 1 - Introduction

26th March 2026

Agenda

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- Part 1 - Introduction
  - Introductions
  - Telemetry Product Roadmap
    - (Nano_Link, Micro_Link, Mega_Link and Mega_Link 2)
  - Mega_Link 2 Architecture & Features
  - Digital/Analogue Inputs & Outputs
  - Expansion Modules
- Part 2 - Use Cases
- Part 3 - UHF Radio Comms
- Part 4 - 4G Comms
- Part 5 - Ethernet Comms
- Part 6 - Configuration & Diagnostics

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Introduction

- Founded in 1976 and based in Crowthorne, Berkshire
- Original products used leased telephone lines to send signals to and from a transducer
- In 1986 the Department of Trade and Industry recognised that UHF radio could be used for short range telemetry applications and selected radio channels were de-regulated
- Churchill Controls were quick to identify the opportunities and developed a range of products using radio
- Later on, this included use of mobile networks and more recently to cover Internet Protocol (IP) capability over 4G, Ethernet, Satellite and fibre based solutions

Telemetry Product Range

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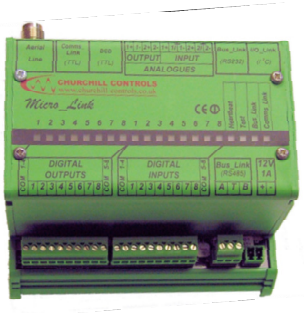
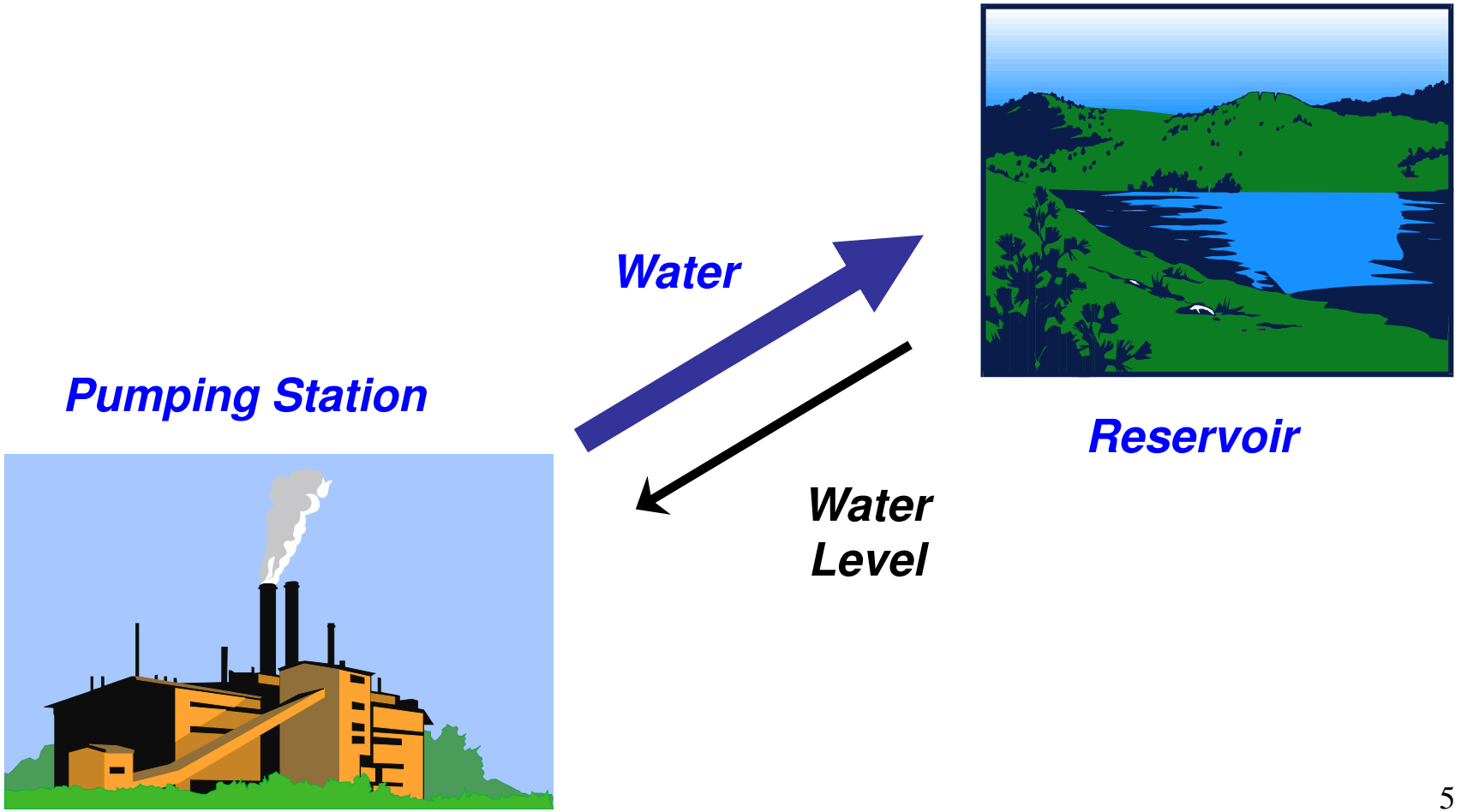


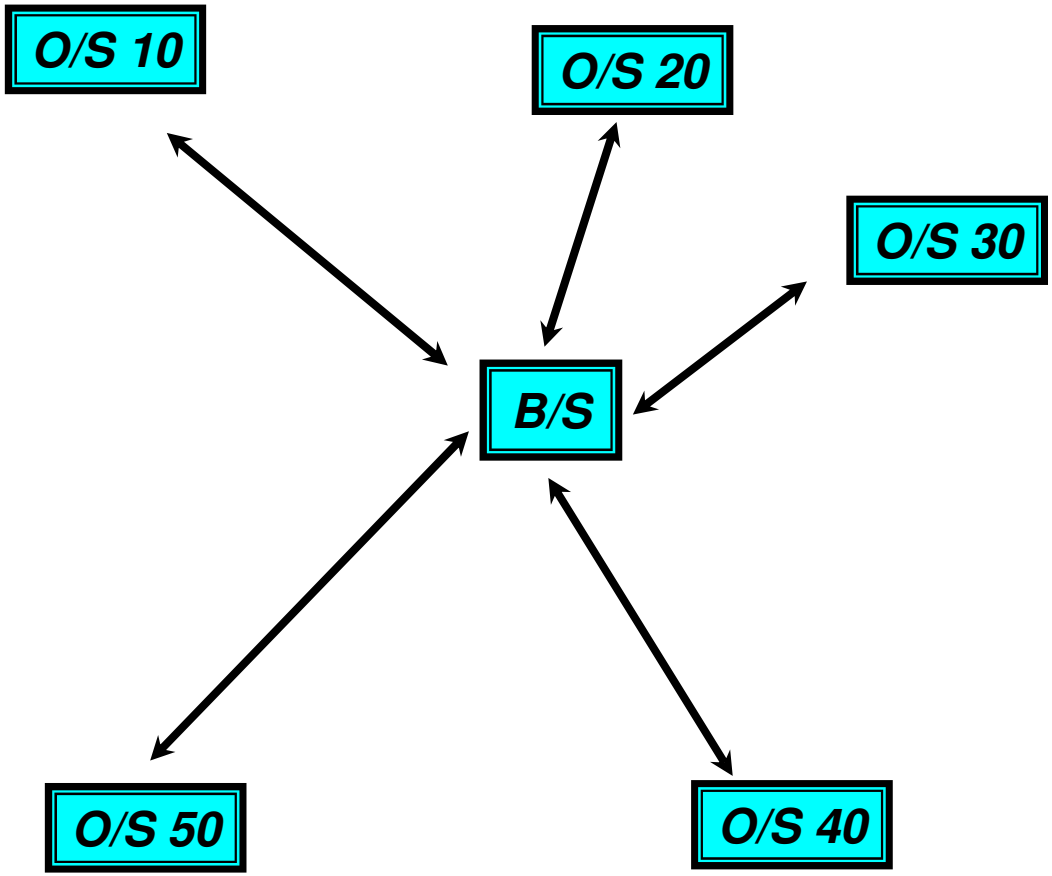
Nano & Micro_Link	***Mega_Link***	***Mega_Link 2***
Proprietary protocol	Proprietary protocol	**AES-256 ENCRYPTION**
8 Dig I/P, 8 Dig O/P, 2 Ana I/P, 2 Ana O/P + Expansion	8 Dig IP, 8 Dig OP, 2 Ana IP, 2 Ana OP + Expansion	8 Dig IP, 8 Dig OP, 2 Ana IP, 2 Ana OP + Expansion
458 MHz analogue radio	458 MHz, 869 MHz digital radio	458 MHz digital radio
2G GSM/GPRS	2G GSM/GPRS	4G LTE Cat-1
Serial External Modem	Serial External Modem	Serial External Modem
Leased Line	Leased Line	TCP IP Ethernet LAN/WAN
	Dual Comms	Dual Comms
PLC/SCADA Bus_Link: Modbus RTU	PLC/SCADA Fieldbus: Modbus RTU	PLC/SCADA Fieldbus: Modbus RTU
12V, 110/240Vac using external PSU unit	12V, 24V, 110/240Vac with battery back-up	12V, 24V, 110/240Vac with battery back-up

END OF LIFE

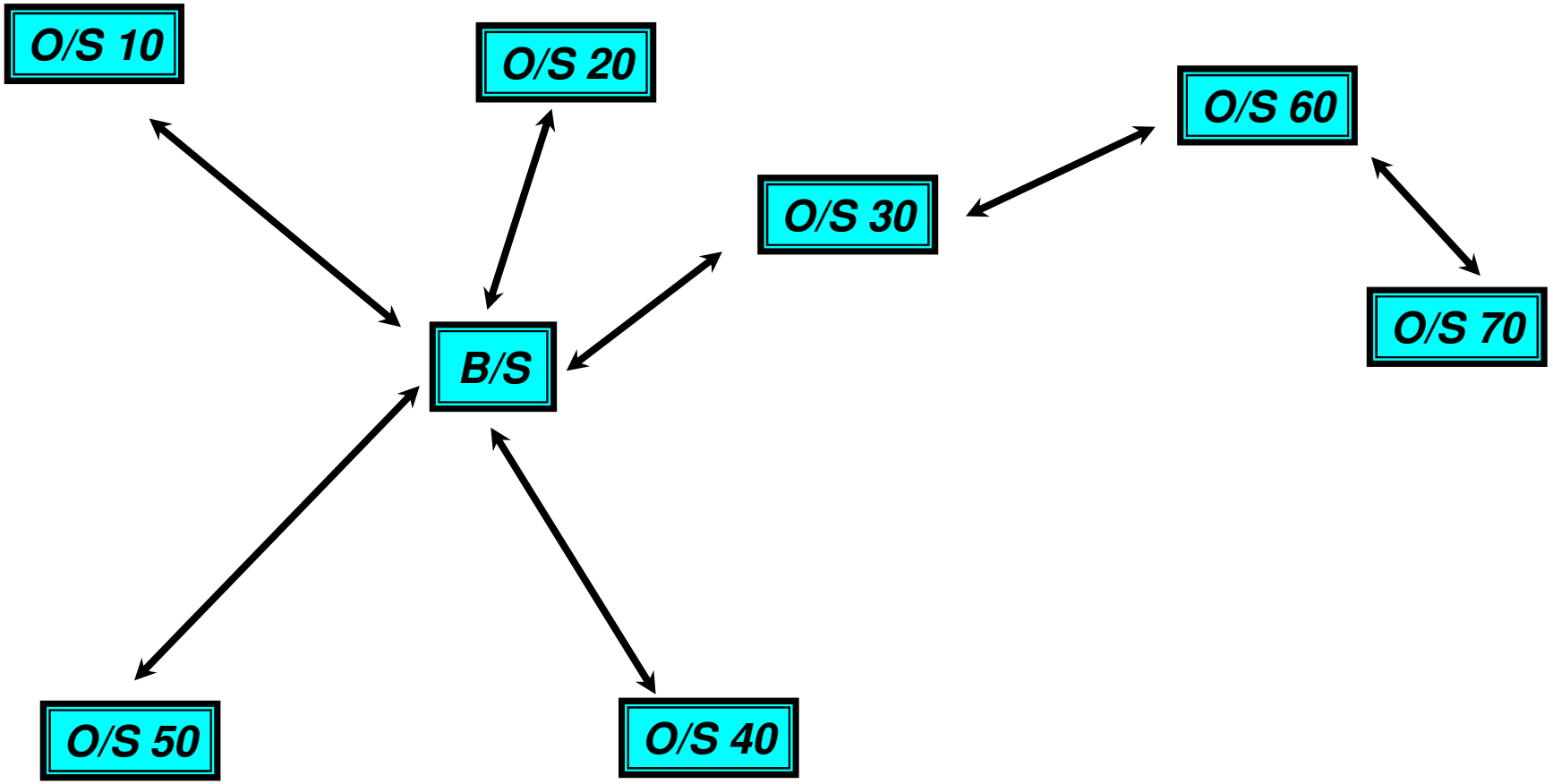
Simple Point-to-Point Application



Distributed Monitoring



Repeater Application



Expansion I/O

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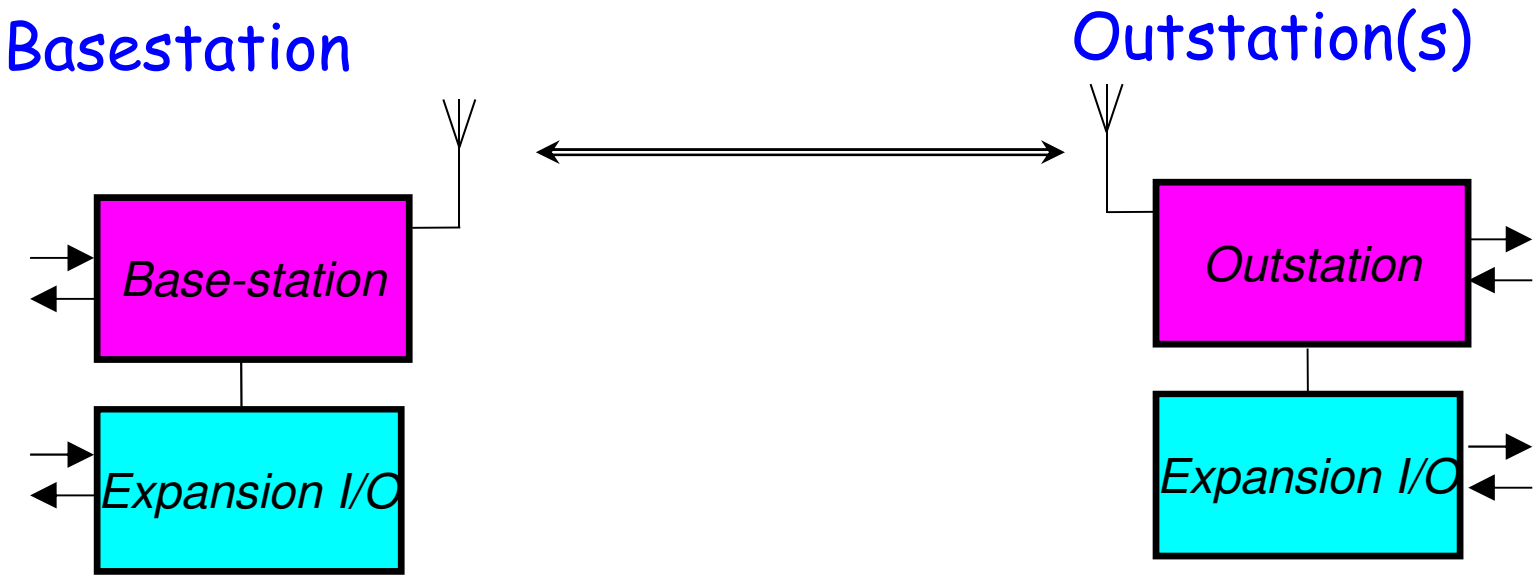
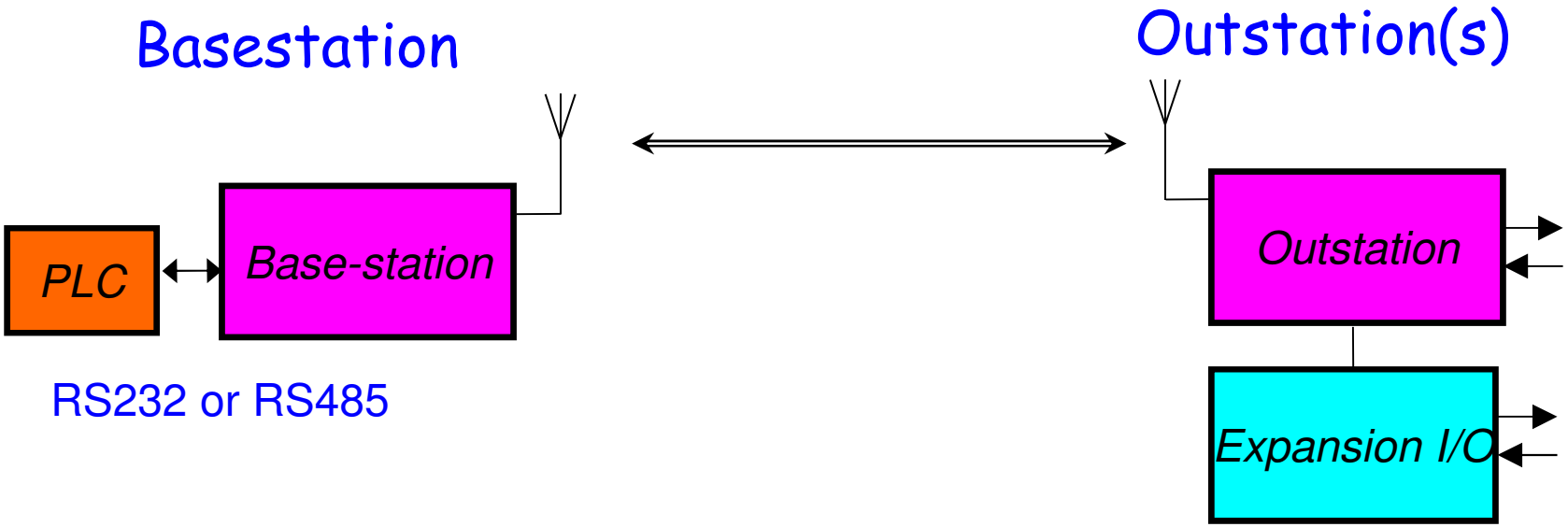
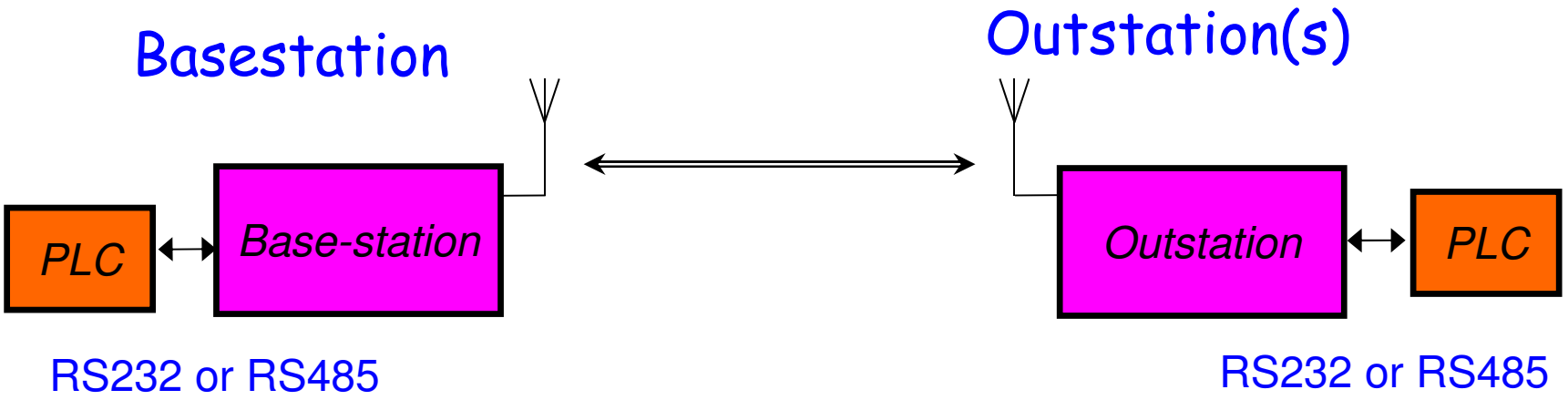


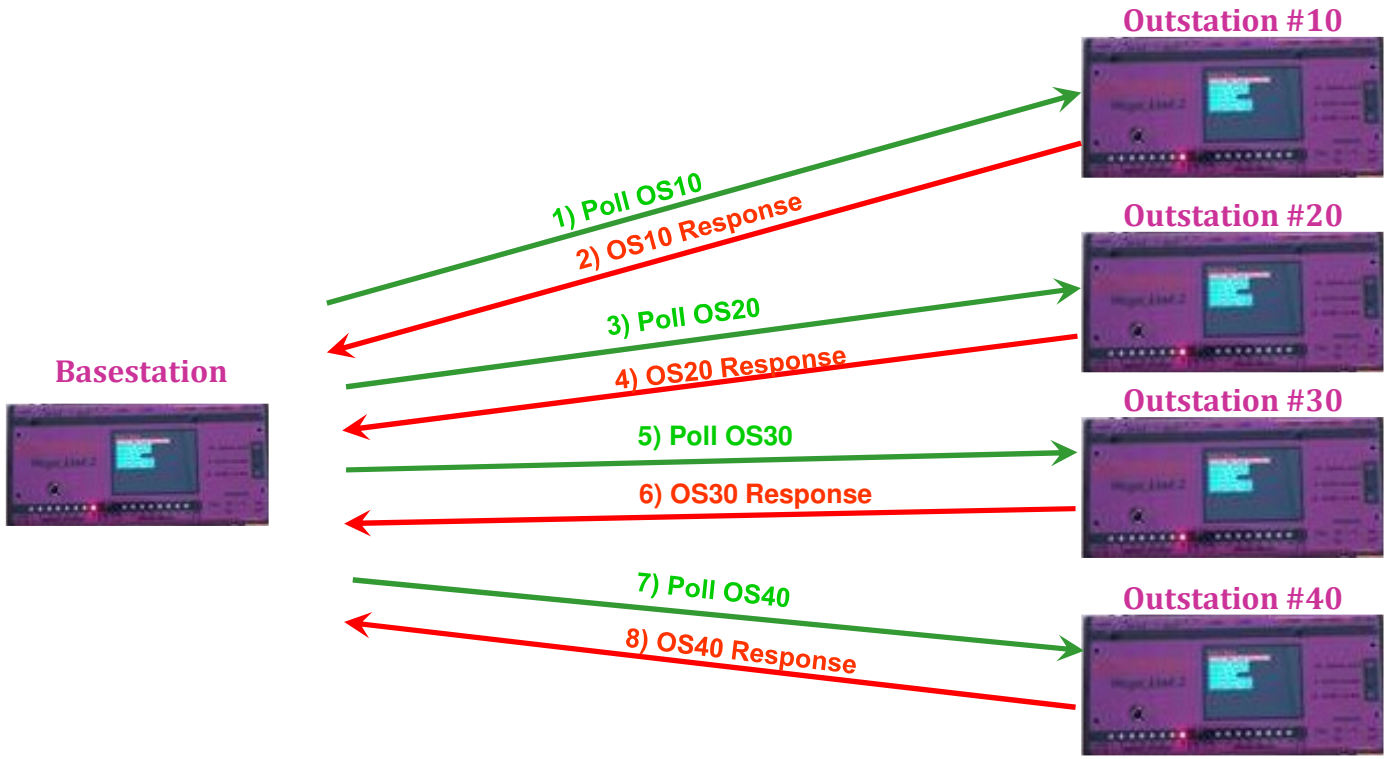
Fieldbus Interface (Modbus)



Fieldbus Interface (Modbus)



Polling (Scanning)



At 10 second poll rate, it takes 4 x 10 = 40 seconds to go around each one.
Can be more if expansion modules are included.

Mega_Link 2

AES-256

- All messages are end-to-end encrypted using **AES-256**
- We did this in response to the UK implementing the NIS Directive through the Network and Information Systems Regulations (2018)
  - The NIS Regulations apply to operators of essential services
- 256-bit (32-byte) encryption key
  - Python script can be used to download and change to a new key

Key Features

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- Main unit:
  - 8 DI, 8 DO, 2 AI, 2 AO
- Expansion modules:
  - Up to 256 DI, 256 DO, 128 AI, 128 AO
- Power supply:
  - 12V, 24V, 110/240V Mains (with battery backup)
- LCD Display
- RS232/485 Serial
  - Comms or Modbus RTU (Master or Slave)

Comms Options

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- COM1 (and COM2) interface modules:
  - 458MHz licence-free radio
  - 4G LTE Cat-1 (TCP/IP)

- COM3A/3B
  - External modem serial RS232 or RS485
    - 4G, VDSL Router, Satellite etc.
  - Modbus RTU interface for PLC/SCADA

- COM4
  - Ethernet TCP/IP
    - LAN/WAN
    - External Modem, VDSL Router etc.

Single Comms

Mode	Primary	Bus_Link
458 MHz UHF Low Power Radio	COM1 (Radiocrafts 458 MHz)	COM3A or COM3B
4G LTE Cat-1	COM1 (Sierra Wireless RC7620-1)	COM3A or COM3B
RS232/RS485 External Modem	COM3A/3B (RS232)/(RS485)	-
Ethernet TCP I/P	COM4 (Ethernet)	COM3A or COM3B

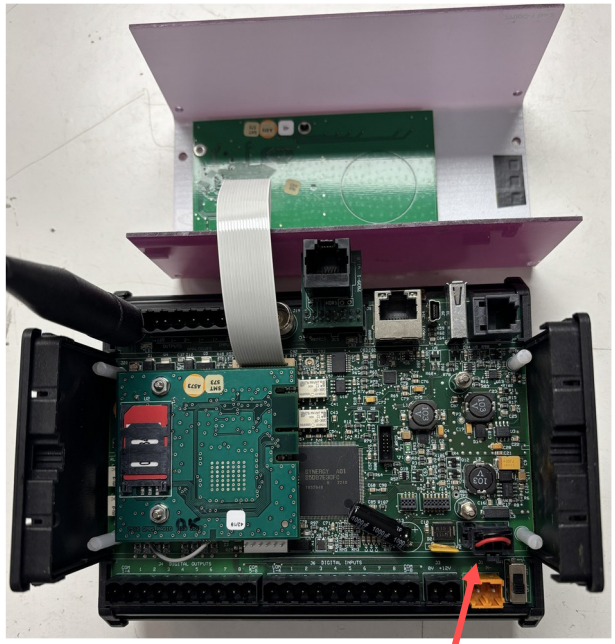
Dual Comms

Mode	Primary	Secondary	Bus_Link
Radio + Radio	COM1 (458 MHz)	COM2 (458 MHz)	COM3A or COM3B
4G + Radio	COM1 (Sierra Wireless)	COM2 (458 MHz)	COM3A or COM3B
Radio + RS232/RS485 External Modem	COM1 (458 MHz)	COM3A/3B (RS232)/(RS485)	-
Radio + Ethernet TCP I/P	COM1 (458 MHz)	COM4 (Ethernet)	COM3A or COM3B

Power Supply Options (1)

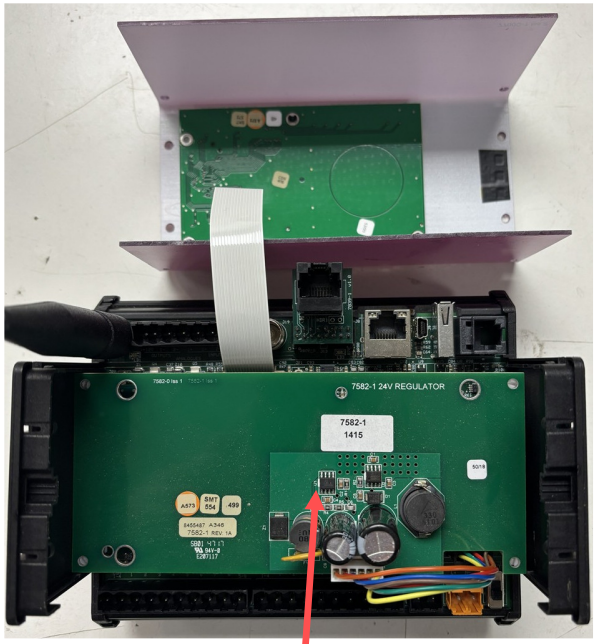
Power Supply Options (2)

12 Vdc



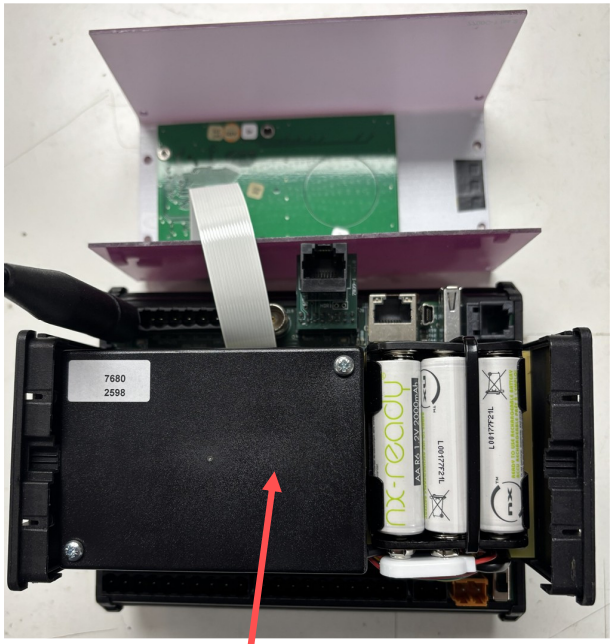
7581-4
12 V Link Plug

24 Vdc



7582-1
24 V Power Board

110/240 Vac



7860
Mains Power Supply

Part Numbers

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Part Number	Power	COMMS
7800-140D	12 Vdc	458 MHz Radio
7800-240D	24 Vdc	458 MHz Radio
7800-A40D	120/240 Vac	458 MHz Radio
7800-1G0D	12 Vdc	4G LTE Cat-1
7800-2G0D	24 Vdc	4G LTE Cat-1
7800-AG0D	120/240 Vac	4G LTE Cat-1
7800-100D	12 Vdc	Serial & Ethernet
7800-200D	24 Vdc	Serial & Ethernet
7800-A00D	120/240 Vac	Serial & Ethernet

Interfaces

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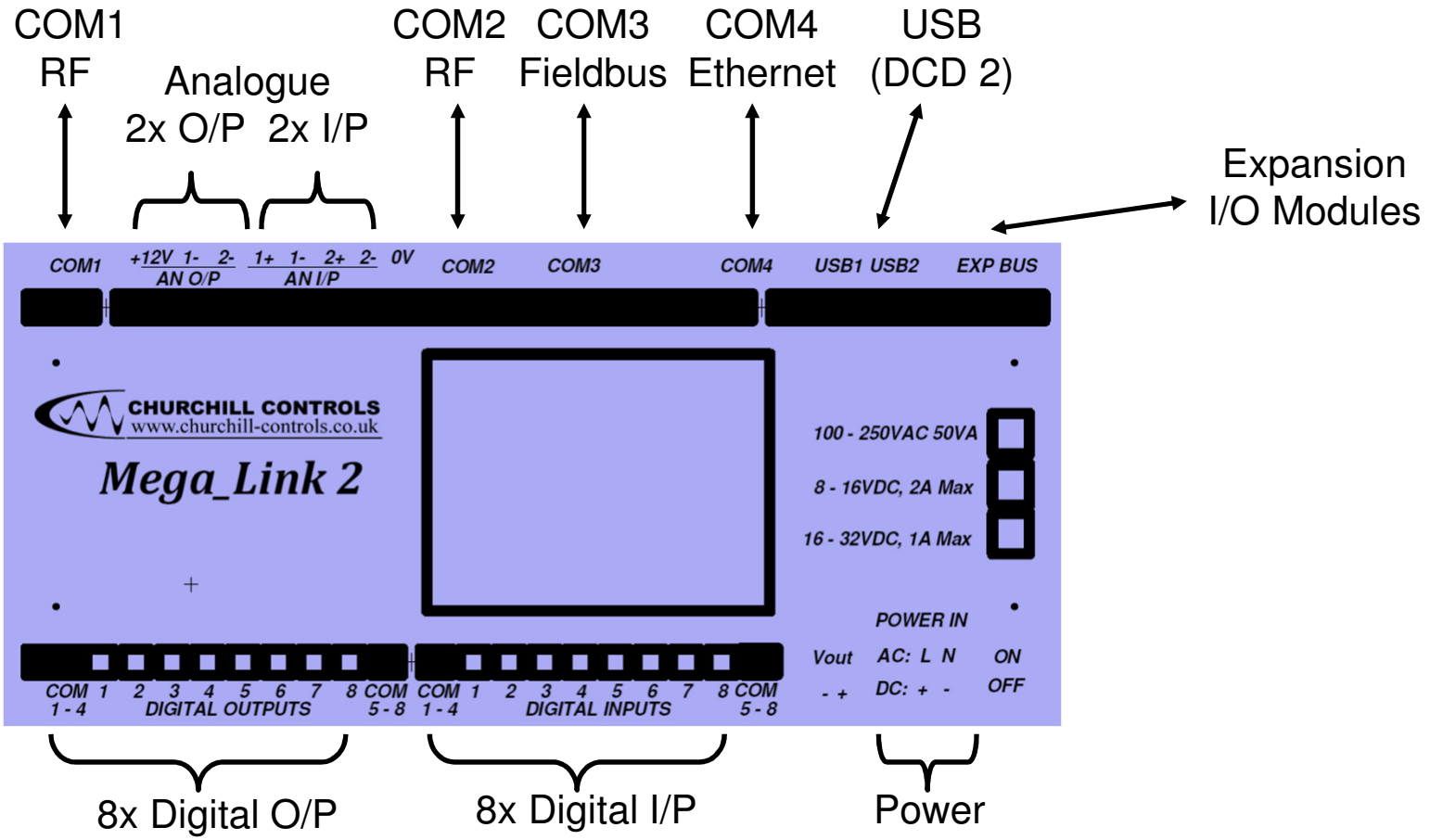
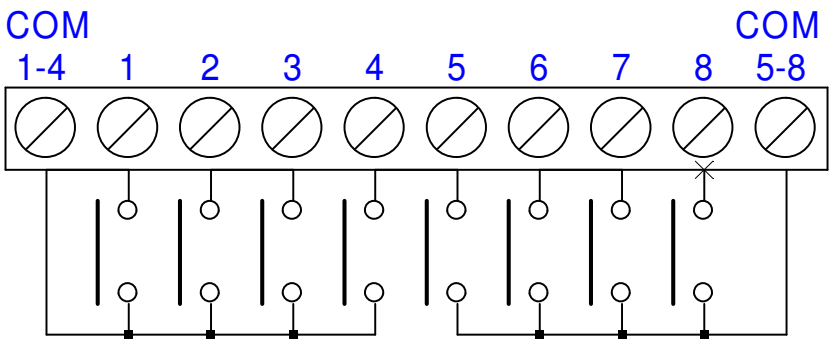
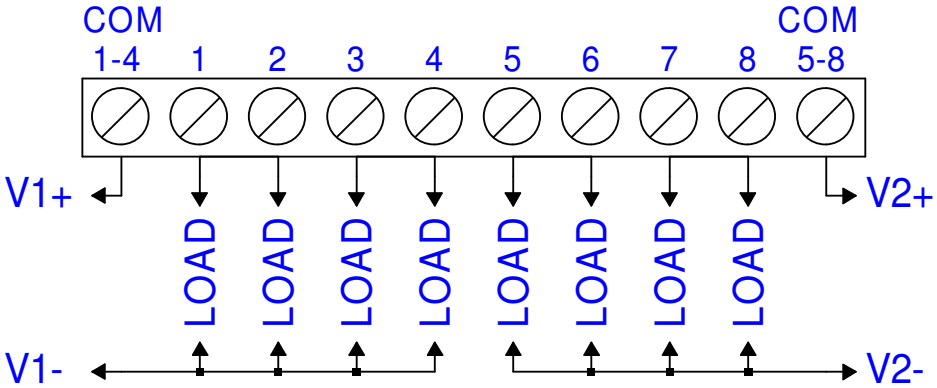


Digital I/O – main unit





Analogue Inputs

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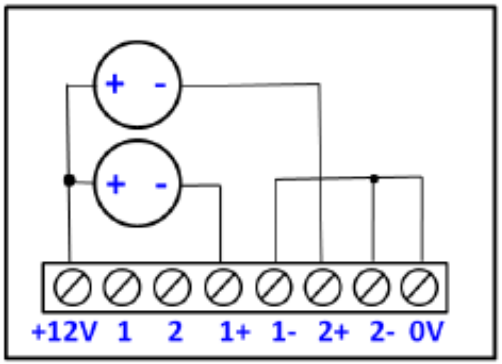
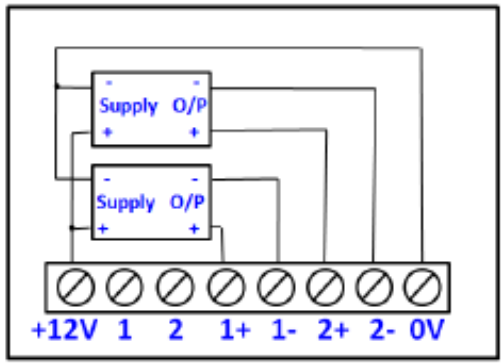
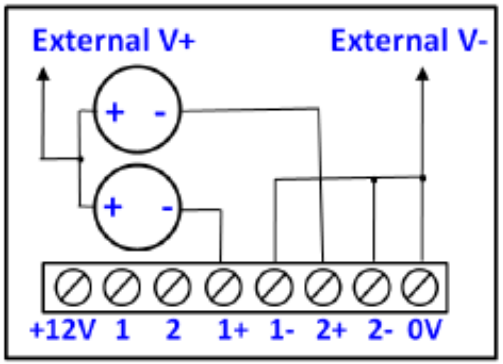


Analogue inputs.
Powered from ***Mega_Link 2***



4-wire transducer inputs.
Powered from ***Mega_Link 2***



Analogue inputs.
Powered externally.

Analogue Outputs

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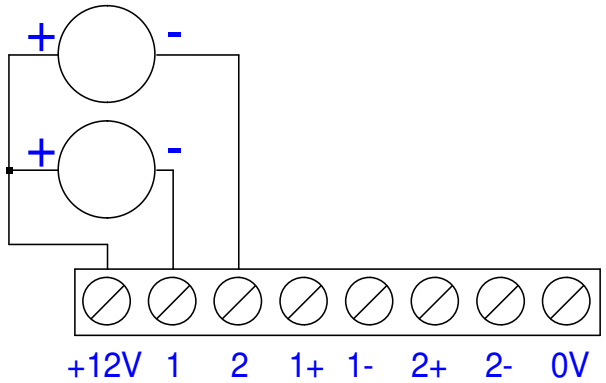

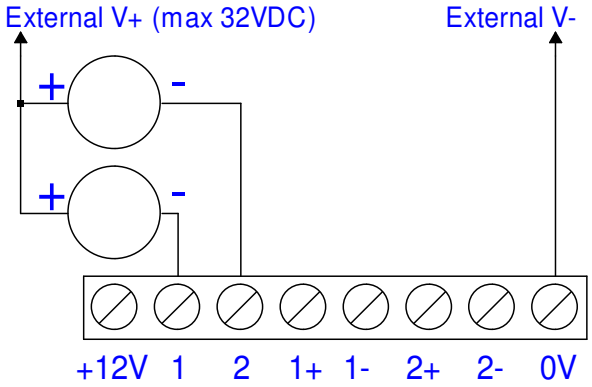

Analogue outputs powered from ***Mega_Link 2***

Analogue outputs, externally-powered

Expansion Modules

Each expansion must have unique number, irrespective of type

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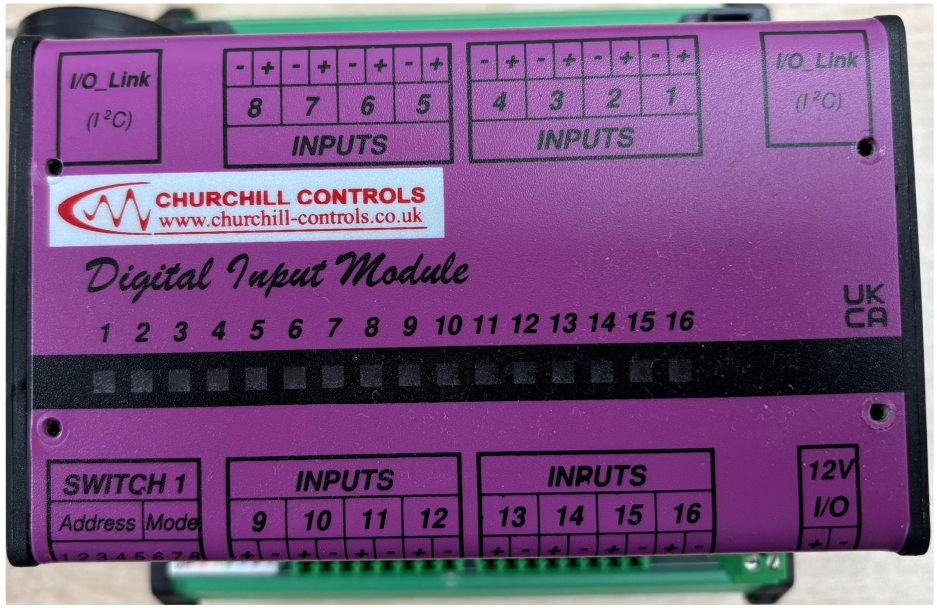
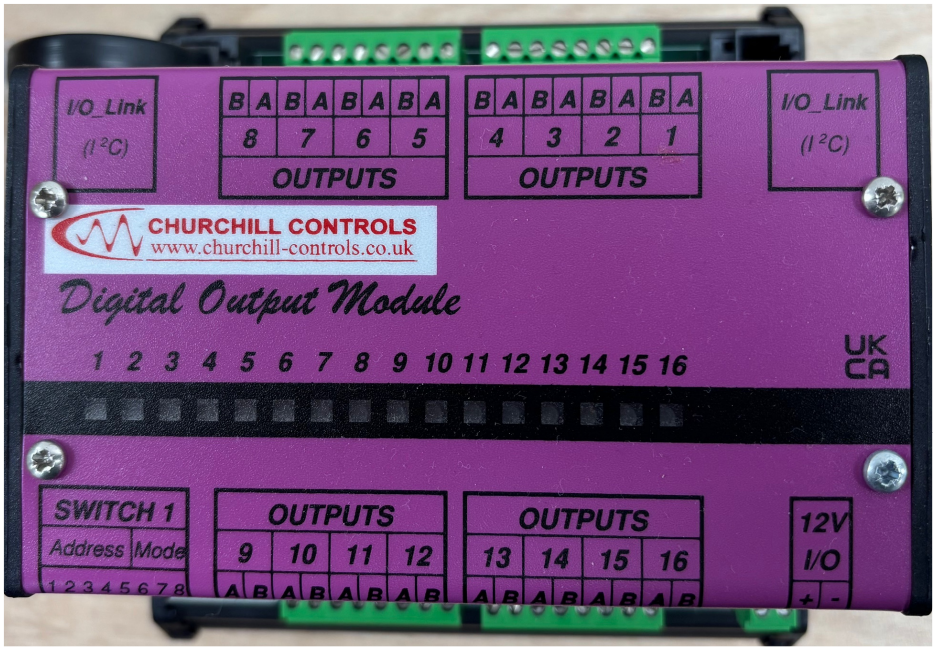
Digital I/O – expansion modules



16 Digital Input



16 Digital Output

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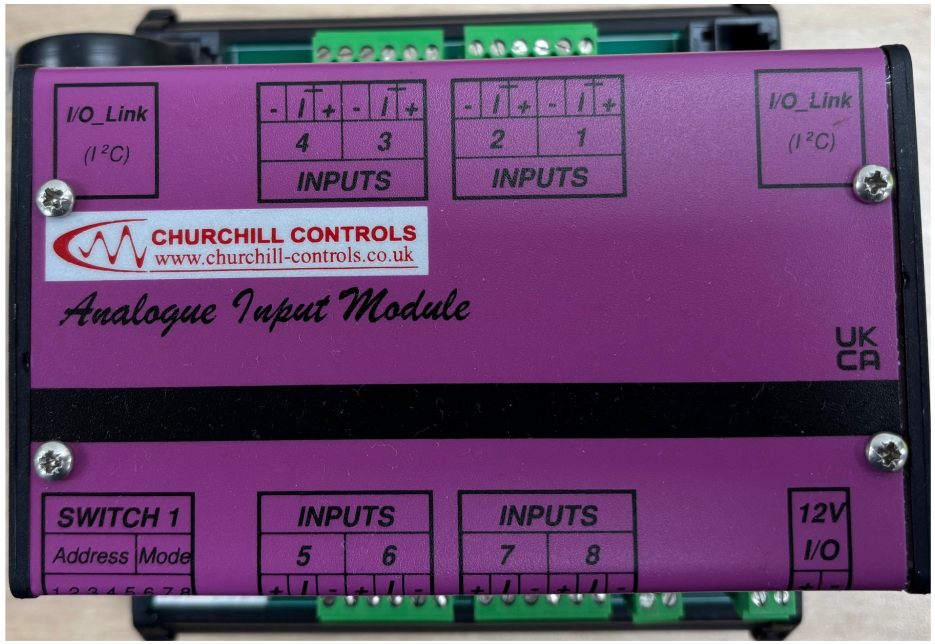
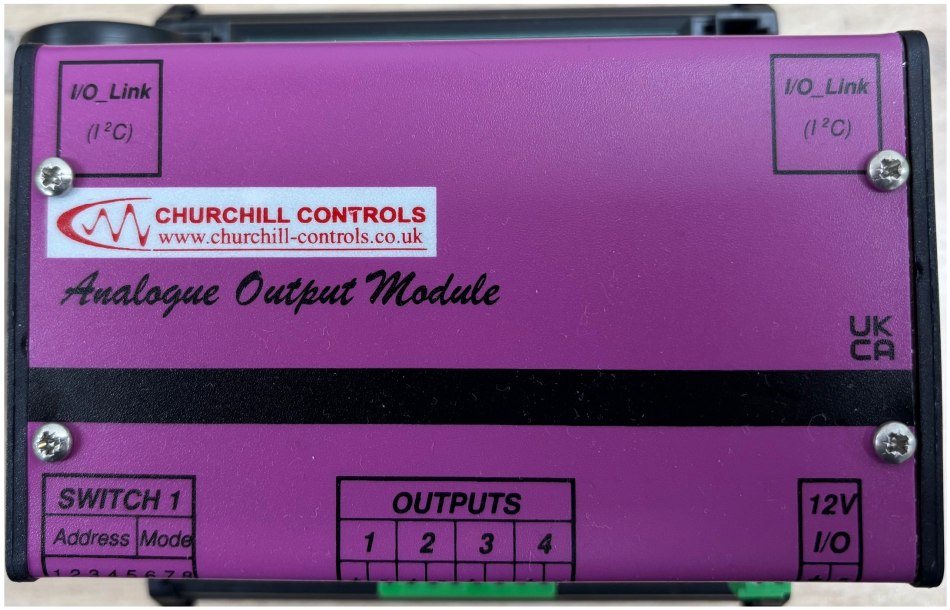
Analogue I/O – expansion modules



8 Analogue Input



4 Analogue Output

Point Numbering

	Main Unit	1st Exp	2nd Exp	3rd Exp
Digital Inputs	1 - 8	9 - 24	25 - 40	40 - 56
Digital Outputs	1 - 8	9 - 24	25 - 40	40 - 56
Analogue Inputs	1 - 2	3 - 10	11 - 19	20 - 27
Analogue Outputs	1 - 2	3 - 6	7 - 10	11 - 14

IO Expansion

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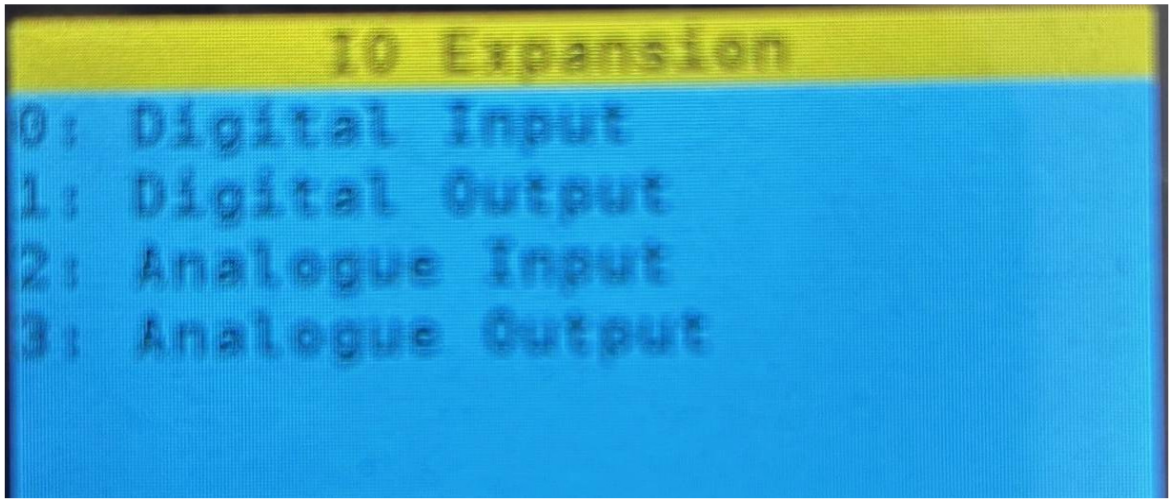
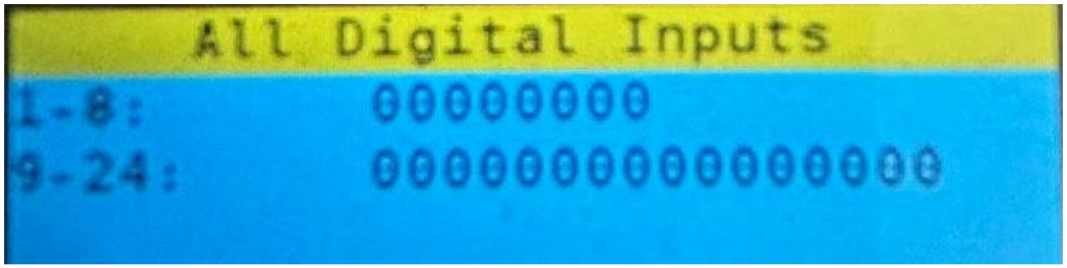
System Configuration -> IO Expansion

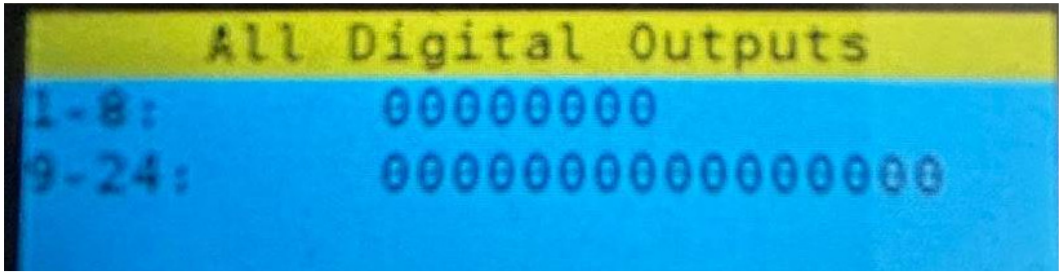


Digital IO Expansion

System Status -> All Digital Inputs

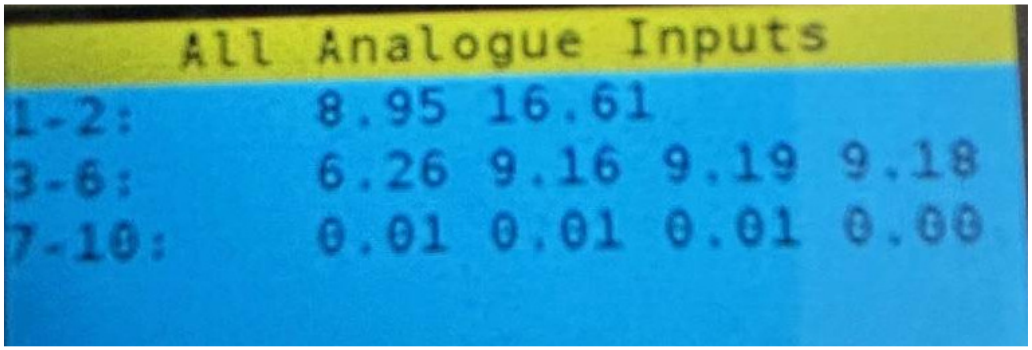


System Status -> All Digital Outputs

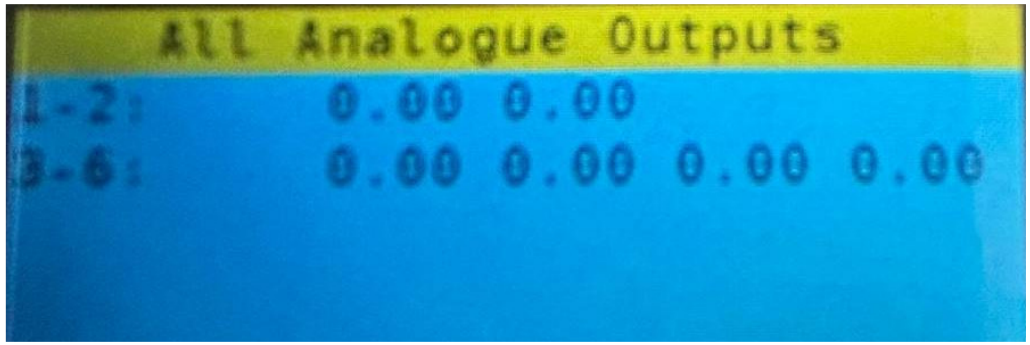


Analogue IO Expansion

System Status -> All Analogue Inputs



System Status -> All Analogue Outputs



COM3A/3B Adaptor

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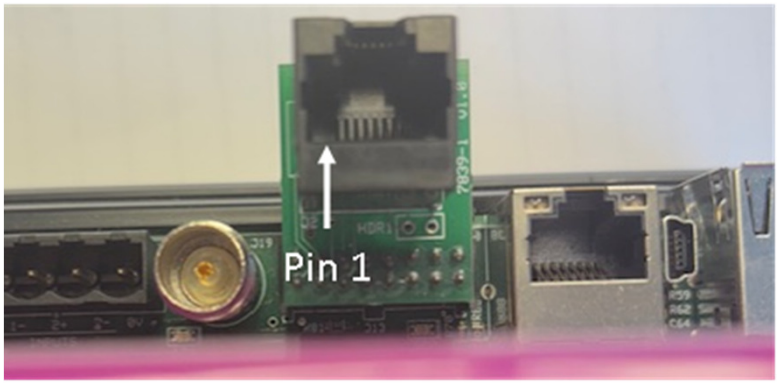
- RS232 and RS485 interface for external modem comms or Modbus RTU
- Mega_Link 2 COM 3 Adaptor Board, part number 7839-1
- This provides an RJ45 socket which is compatible with the interface of Mega_Link 1and Micro-link units

COM 3A/3B Adaptor



Pin	Function	CAT5 Colour	Notes
1	0V	White/Orange	Ground
2	RS485 B (D+)	Orange	Differential In/Out
3	RS485 T	White/Green	Termination Resistor (connect to RS485 B if used)
4	RS485 A (D-)	Blue	Differential In/Out
5	RS232 TXD	White/Blue	Output from Mega_Link 2
6	RS232 RXD	Green	Input to Mega_Link 2
7			
8			