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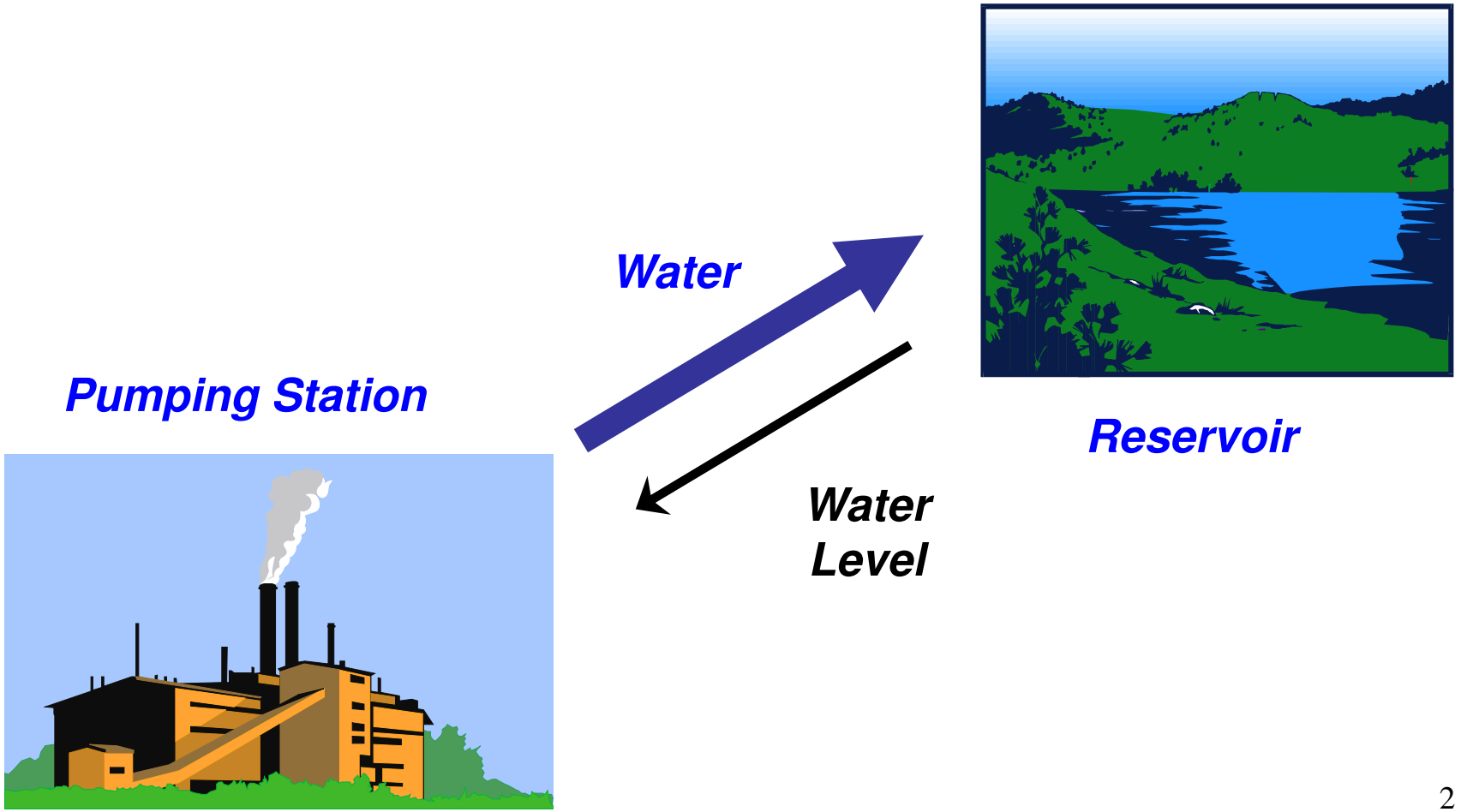
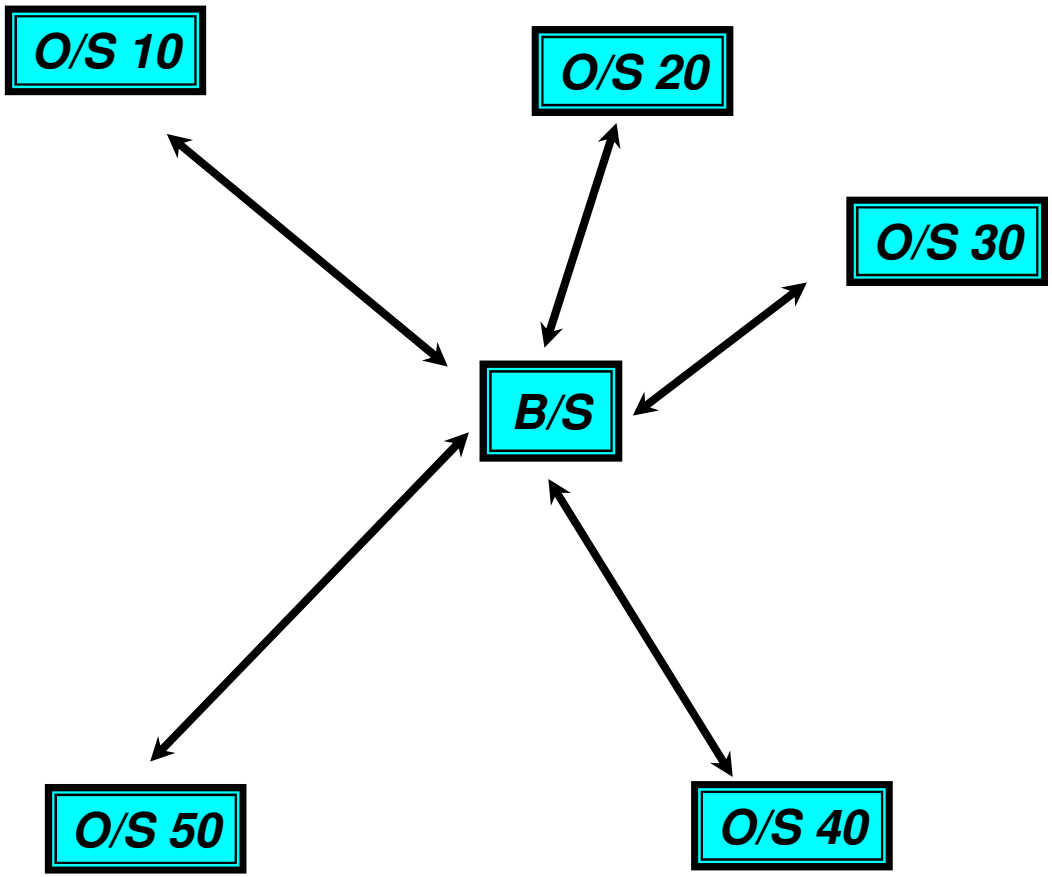
Mega_Link 2
Telemetry Training
(Part 1)

2nd February 2026

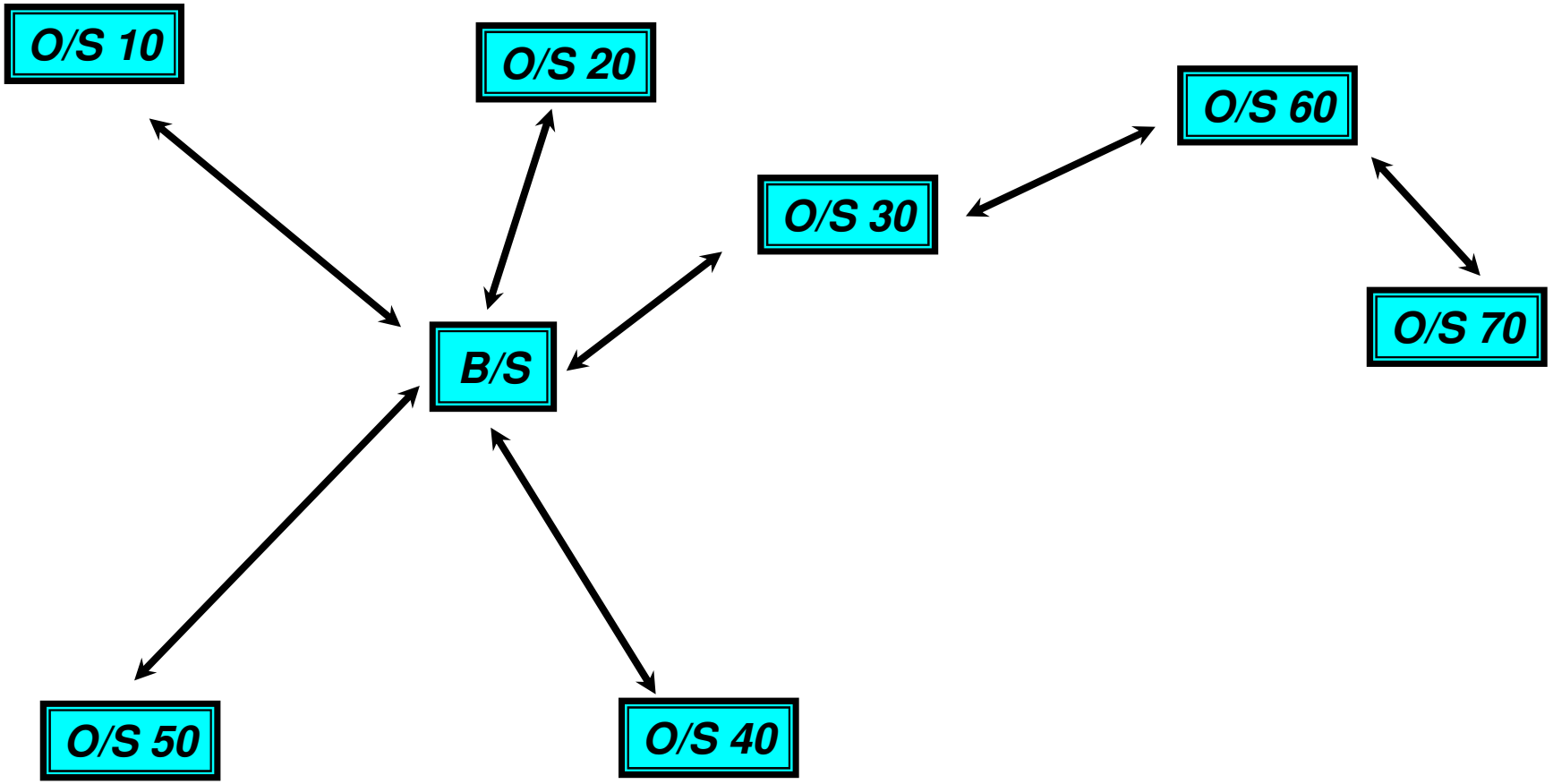
Simple Point-to-Point Application



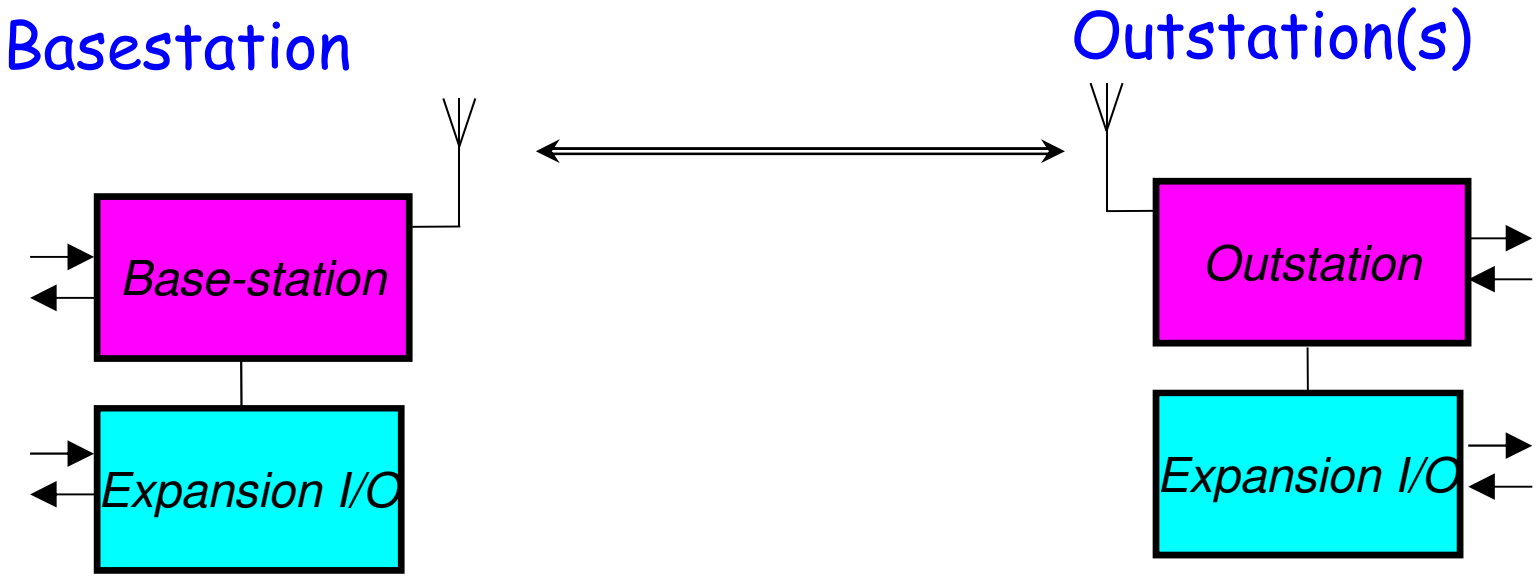
Distributed Monitoring



Repeater Application



Expansion I/O



Fieldbus Interface (Modbus)

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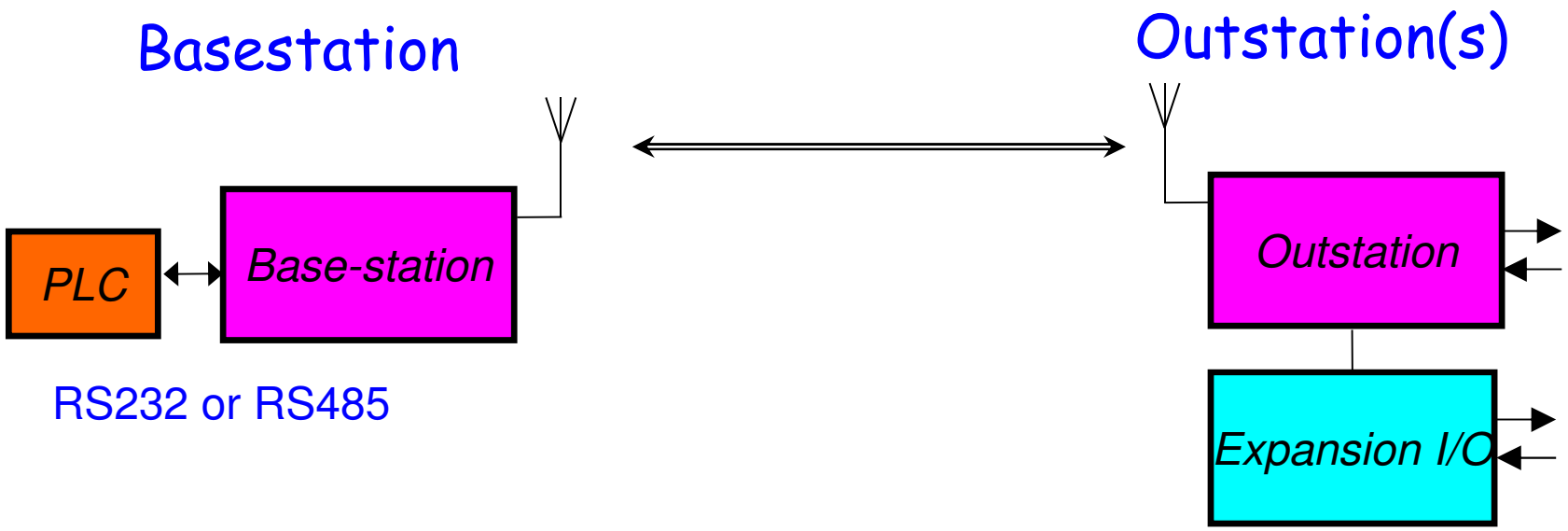

Typical Project Life-Cycle

1. Customer requirements and RFQ
2. Radio path desktop survey
3. Budgetary quotation
4. Radio path site survey
5. Update formal quotation
6. Requisition purchase order
7. Build, test & ship
8. Install
9. Commissioning

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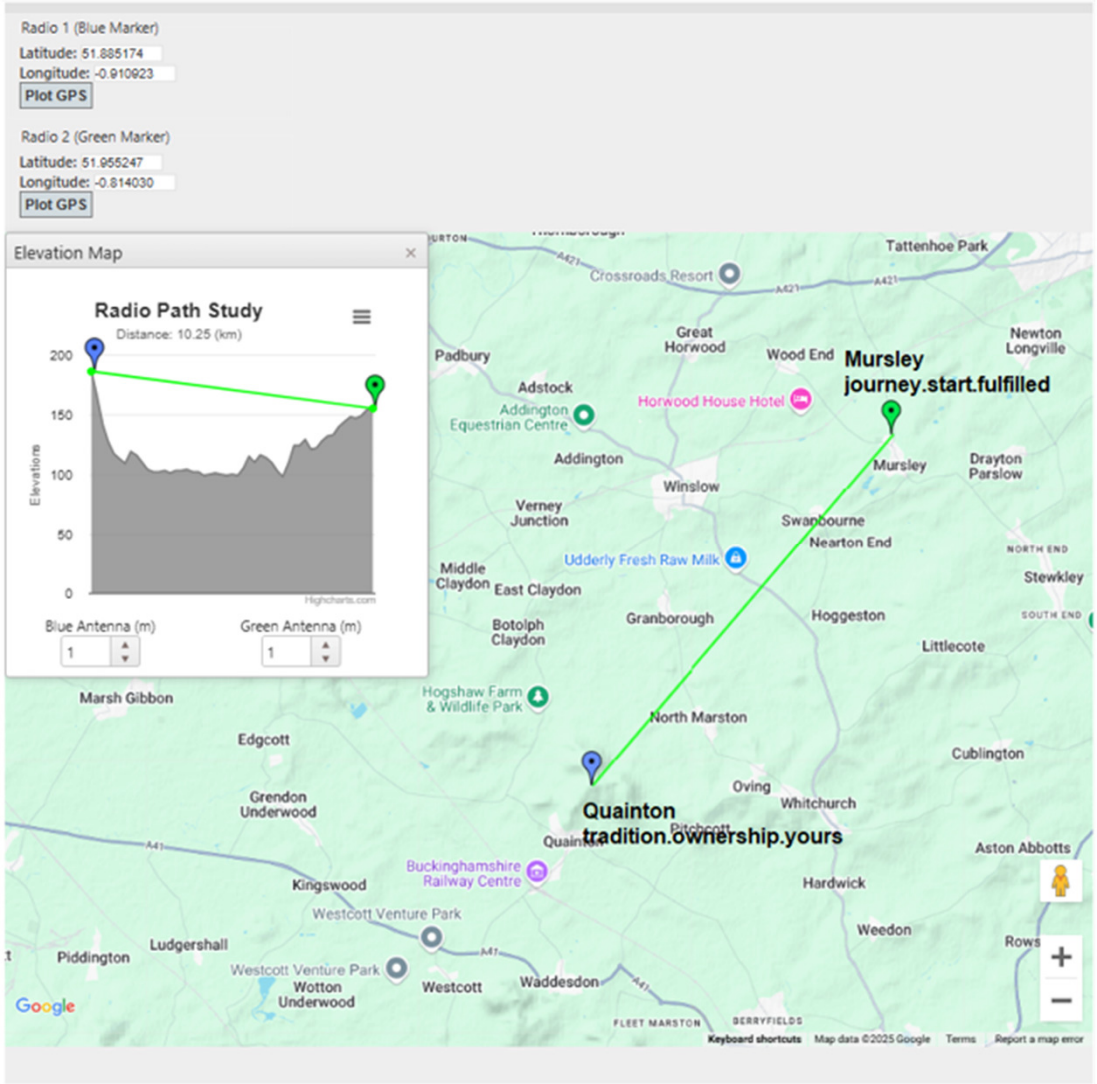
Radio Path Desktop Survey



Radio Path Survey - Results Sheet

Confidential? ~~YES~~ / NO		Surveyed by: Paul Blundell	
Customer : United Utilities		Tel: 07826 959 242	Mobile:
Address: Hurleston WTW, Chester Road, Hurleston, Nantwich, Cheshire. CW5 6BU		Project Name/Description: Delamere WTW etc	
Witness: Chris Gaskell	Witness Signature:	Date: 26/07; 19/09; 22/11/2018	Ref: Q9719 : WO 1888 Q9856 : WO 2037

Link 1: Delamere WTW – Sandiford WTW – Tested 26/07/2018

LOCATION: Cheshire	**Base-station: Sandiford WTW Coordinates: SJ 56713 66805**			**Outstation: Delamere WTW Coordinates: SJ 56108 67734**		
Test Channel: 18	Bearing to outstation: 327°			Distance from base-station: 1.11Km		
458.7250 MHz	**PROPOSED**	**SURVEY**		**PROPOSED**	**SURVEY**	
Power Supply	230/110VAC	-		230/110VAC	-	
Equipment Type	Mega_Link	Mega_Link		Mega_Link	Mega_Link	
Aerial Type	UHF 4	ENF		FUC 3	ENF	
Feeder length	20	10	m	15	10	m
Aerial height above ground	7	5	m	11	8	m
Aerial pole length	4	5	m	4+2 (c/w Joint Bkt)	4.5	m
Aerial brackets	6" Channel Bkts	N/A		12" Standoff	N/A	
U bolts required	N/A	N/A		N/A	N/A	
TX Power	500	500	mW	500	500	mW
TX Power *(see table overleaf)*	134	134	dBµV	134	134	dBµV
+ Aerial Gain *(see table overleaf)*	7.5	0	dB	3	0	dB
- Feeder loss *(see table overleaf)*	4	2	dB	3	2	dB
ERP (134dBµV max)	134.0	132.0	dBµV	134.0	132.0	dBµV
Read from Test Set:	Local RSSI	12.0	dBµV	Remote RSSI	12.0	dBµV
Copied from corres-ponding box above:	- Survey out-station ERP	132.0	dBµV	- Survey base station ERP	132.0	dBµV
	+ Proposed out-station ERP	134.0	dBµV	+ Proposed base station ERP	134.0	dBµV
	- Survey b/s aerial gain	0	dB	- Survey o/s aerial gain	0	dB
	+ Proposed b/s aerial gain	7.5	dB	+ Proposed o/s aerial gain	3.0	dB
	+ Survey b/s feeder loss	2.0	dB	+ Survey o/s feeder loss	2.0	dB
	- Proposed b/s feeder loss	4.0	dB	- Proposed o/s feeder loss	3.0	dB
Adjust for radio receiver sensitivity:	+ Proposed RX Sensitivity	10	dBµV	+ Proposed RX Sensitivity	10	dBµV
Proposed Receive Margin	**Base-station:**	**29.5**	**dB**	**Outstation:**	**26.0**	**dB**

Channel Frequencies

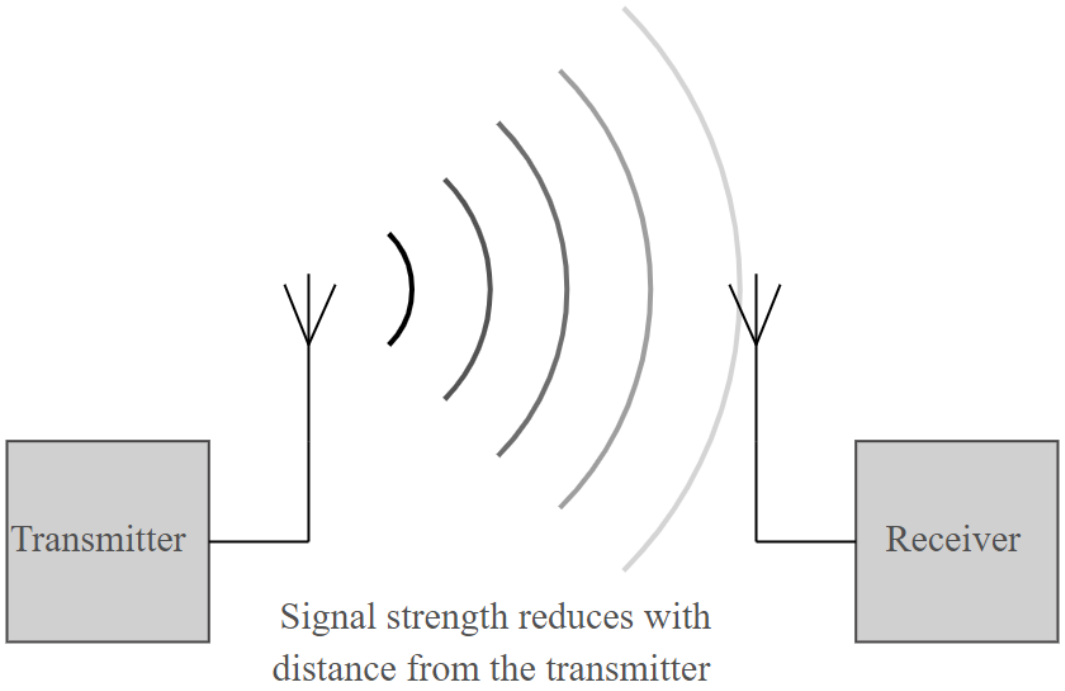
Mega_Link Channels - 458.xxxxMHz (avoid those in red)

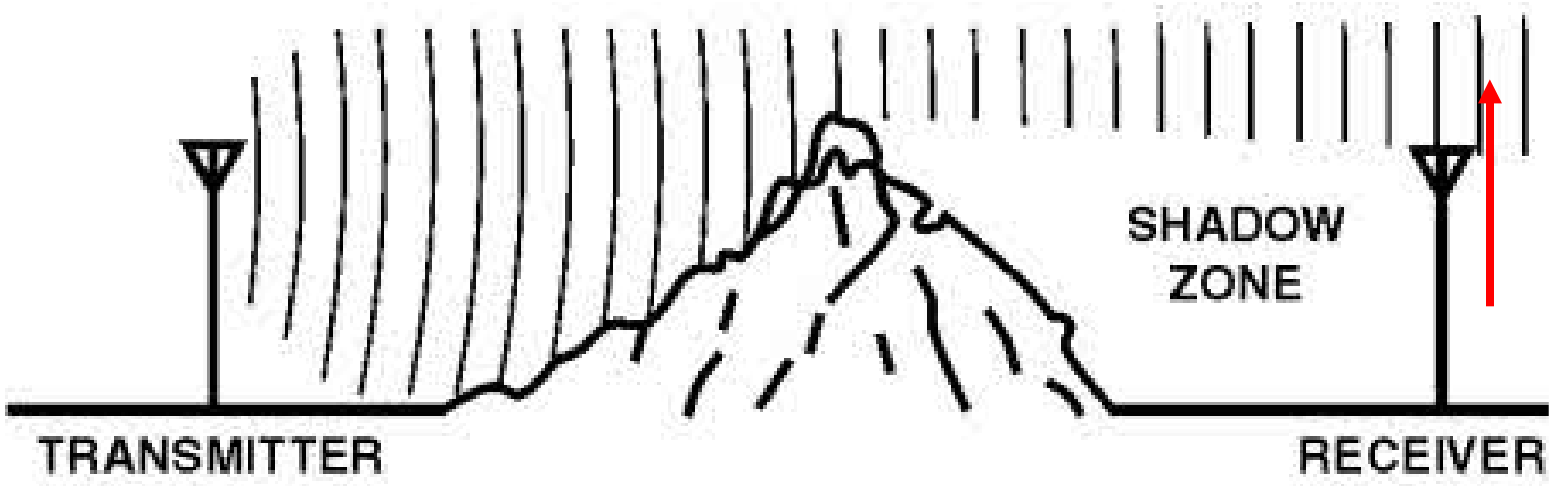
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
16	17	18	19	21	22	23	24	25	26	27	28	29	30	31	32
7000	7125	7250	7375	7625	7750	7875	8000	8125	8500	8625	8750	8875	9000	9125	9250

See Application note:
AN026 Channel Frequencies.pdf

Radio Path Considerations

- Topology:
  - At UHF frequencies, radio signals travel in straight lines, so transmitter-receiver should ideally have a line of sight
  - Hills, buildings, dense vegetation can block signal
- Transmitter Output Power:
  - Fixed 500mW by regulations
- Propagation Loss:
  - In theory signal falls off inversely proportional to square of distance, in practice the fall off is always worse than this Urban clutter etc.
- Receiver Sensitivity:
  - Mega_Link 2 uses modern high sensitivity receiver technology
- Aerial Efficiency (& Aerial Gain)
- Aerial Location
- Feeder Loss because of cable length


Transmitter
Receiver
Signal strength reduces with
distance from the transmitter



Works best with line of sight.
Aerial height is your friend!

Aerials

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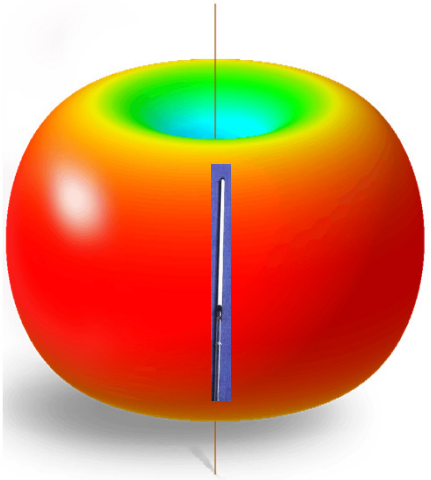
End fed dipole (0dB)
ENF450

Co-linear (6dB)
FUC6

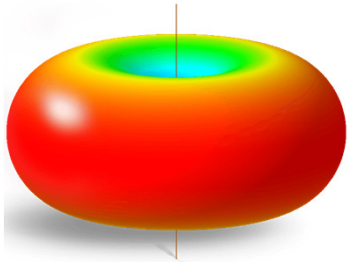
8 element Yagi (10dB)
UHF8

ENF450 End Fed Dipole 0dB gain 0.5m

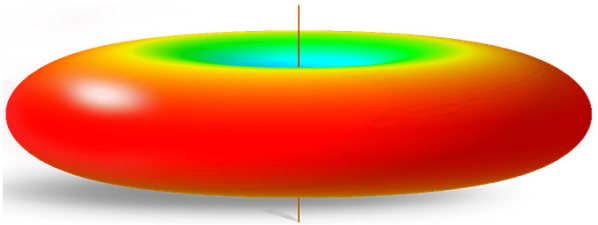
Our go to aerial – good all rounder!



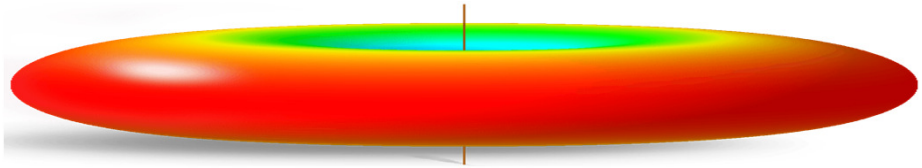
FUC3 Colinear 3dB gain, 1.16m

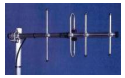


FUC6 Colinear 6dB gain, 3.05m

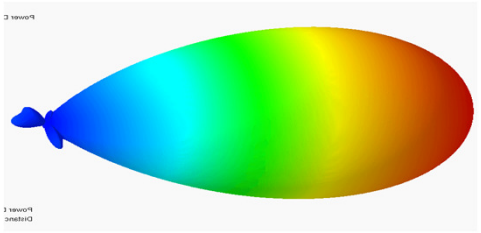


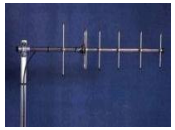
FUC10 Colinear 10dB gain, 5.2m



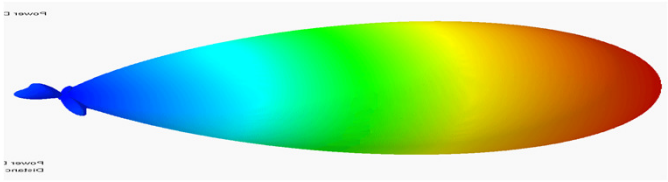


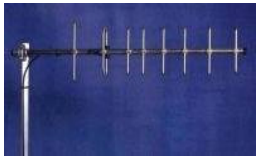
UHF4 4 Element Yagi
7.5dB gain



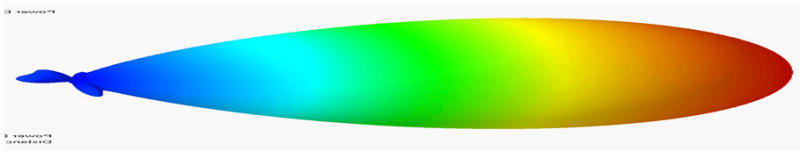


UHF6 6 Element Yagi
8.5dB gain

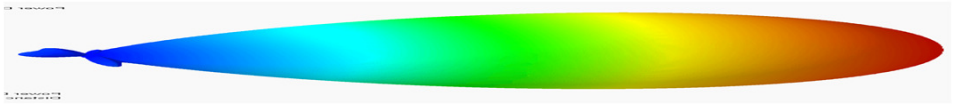


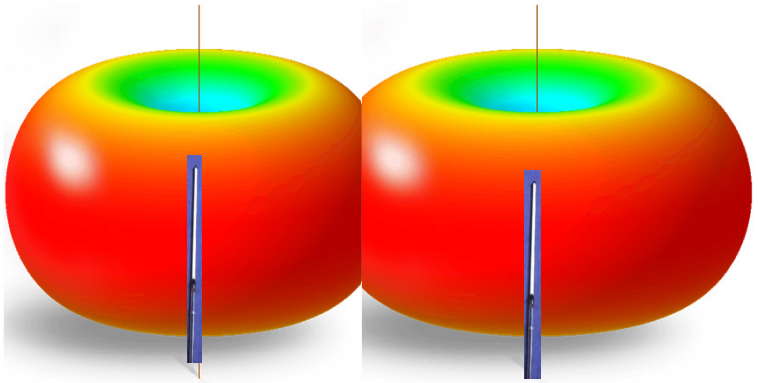


UHF8 8 Element Yagi
10dB gain



UHF12 12 Element Yagi
12dB gain





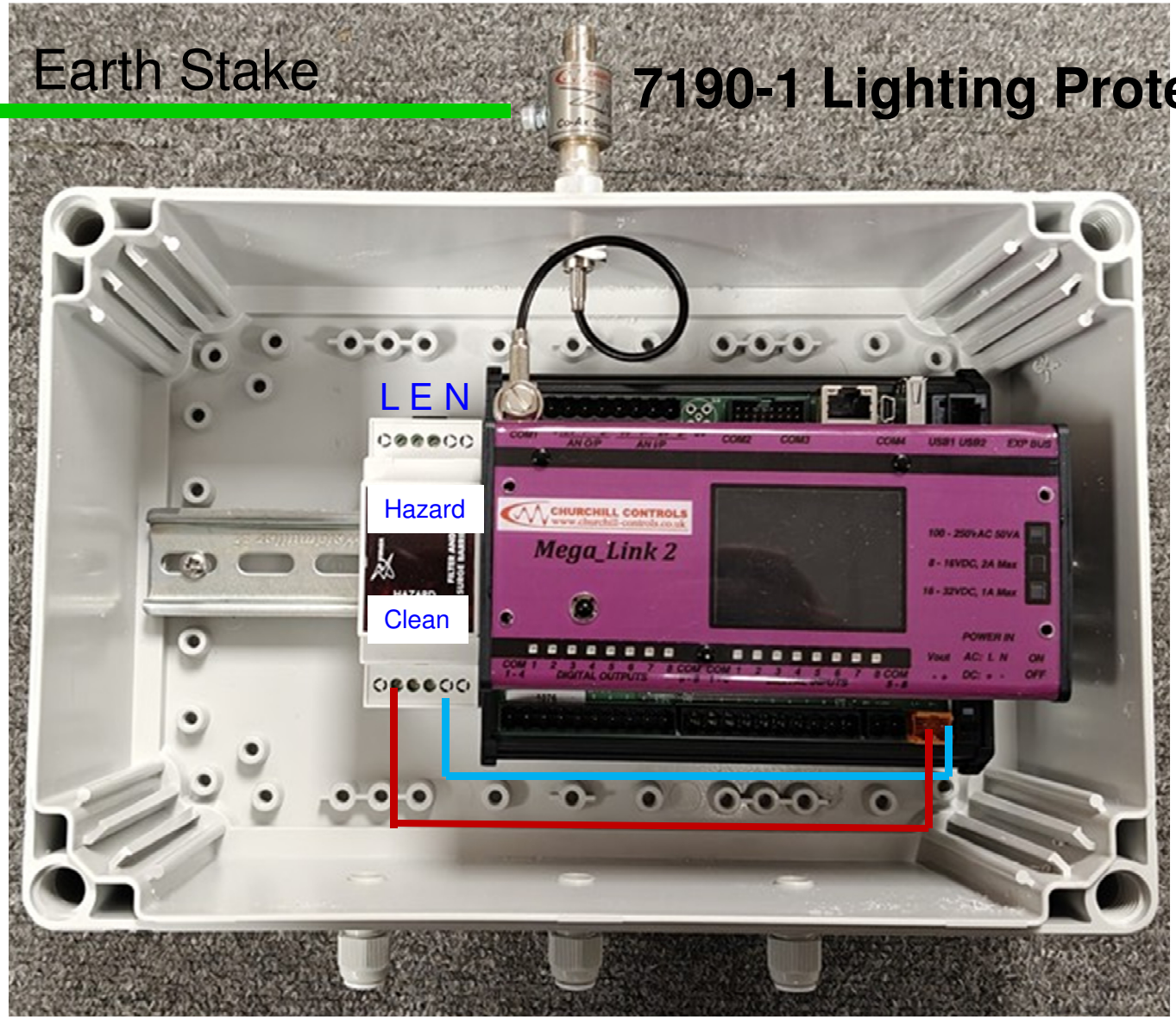
Yagis with gain give longer range but are directional and will require alignment for best signal strength

Lightning Protection Unit

Earth Bonding Terminal

7190-1 ZapGap

7190-1 Lighting Protector



End-Fed Dipole

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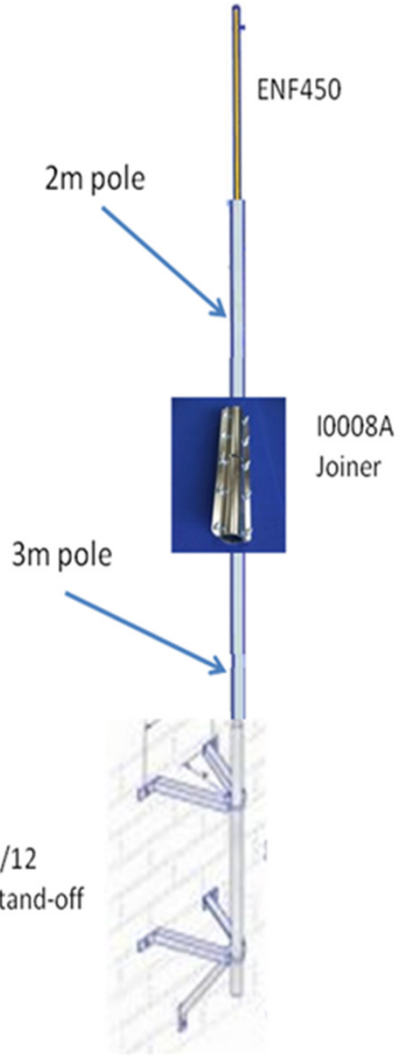
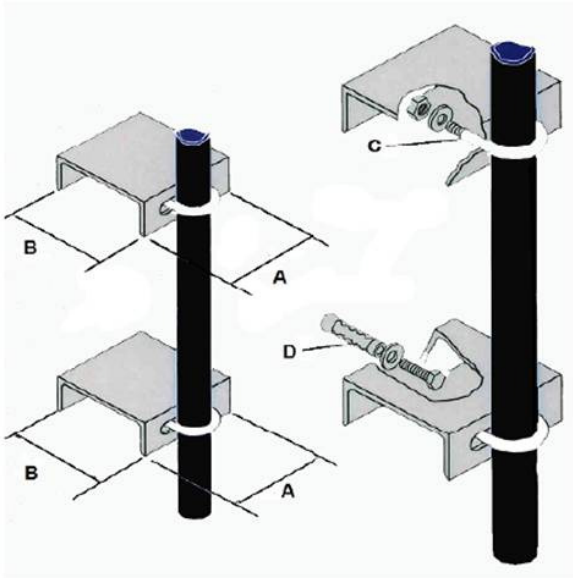
ENF450
(most popular)

Aerial Mounting Hardware



CS6D2W
For mounting ENF450
without poles

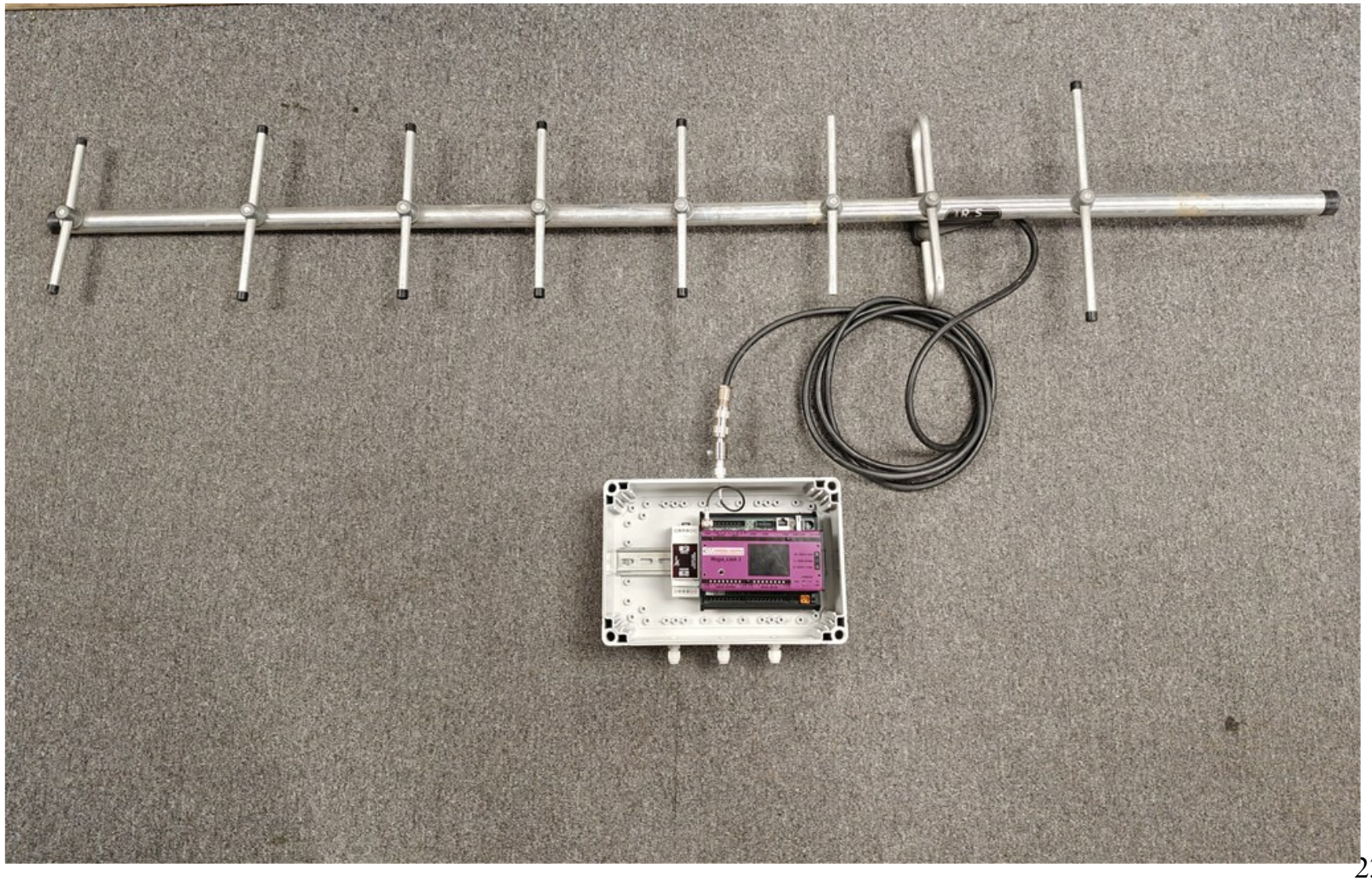
Wall mounting channel brackets



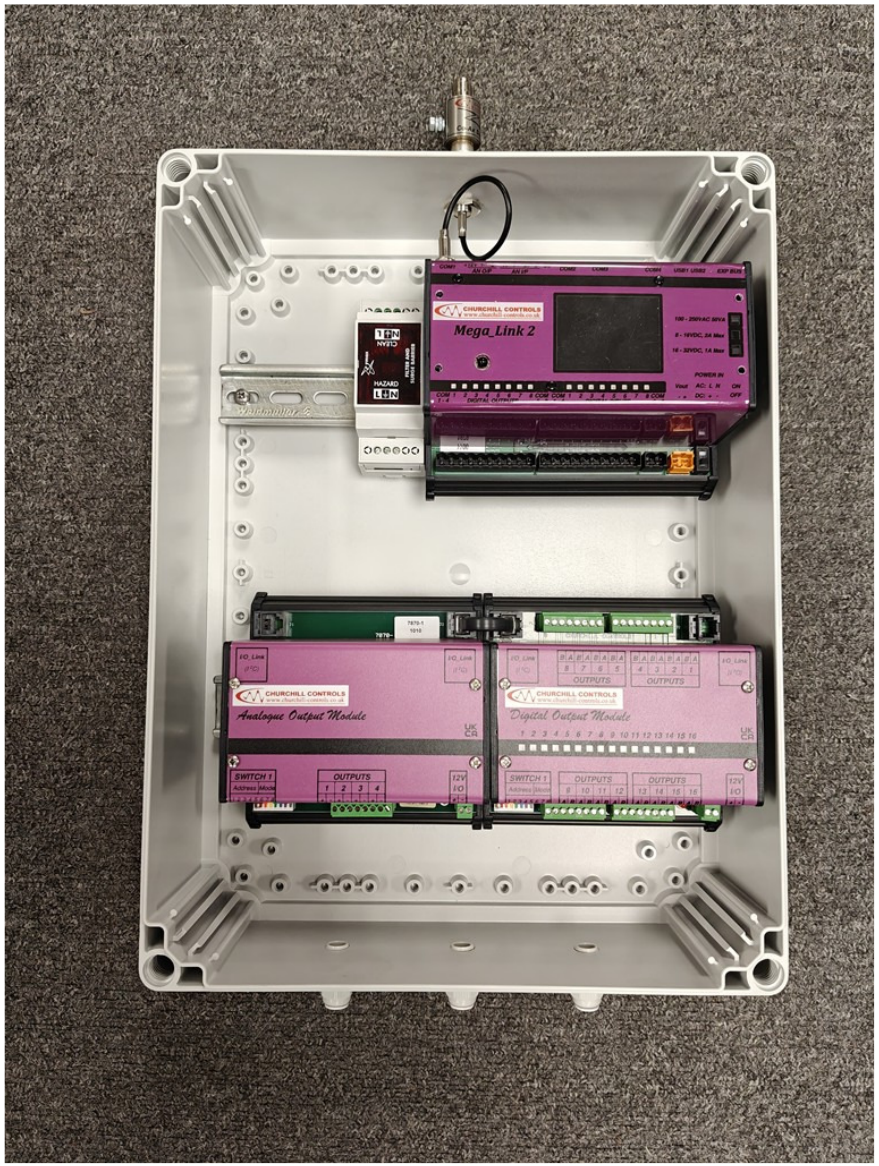
CS6
6" stand-off

Stock code	A	B	C	D
CS4	130mm	92mm	GUB002	RAWLBOLT/10
CS5	130mm	127mm	GUB002	RAWLBOLT/10
CS6	130mm	152mm	GUB002	RAWLBOLT/10

8-Element Yagi



Larger for Expansion



4G Aerial

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OSCAR40/5M	5m cable
OSCAR40/10M	10m cable
CON43	SMA to TNC adapter

4G SIM Card

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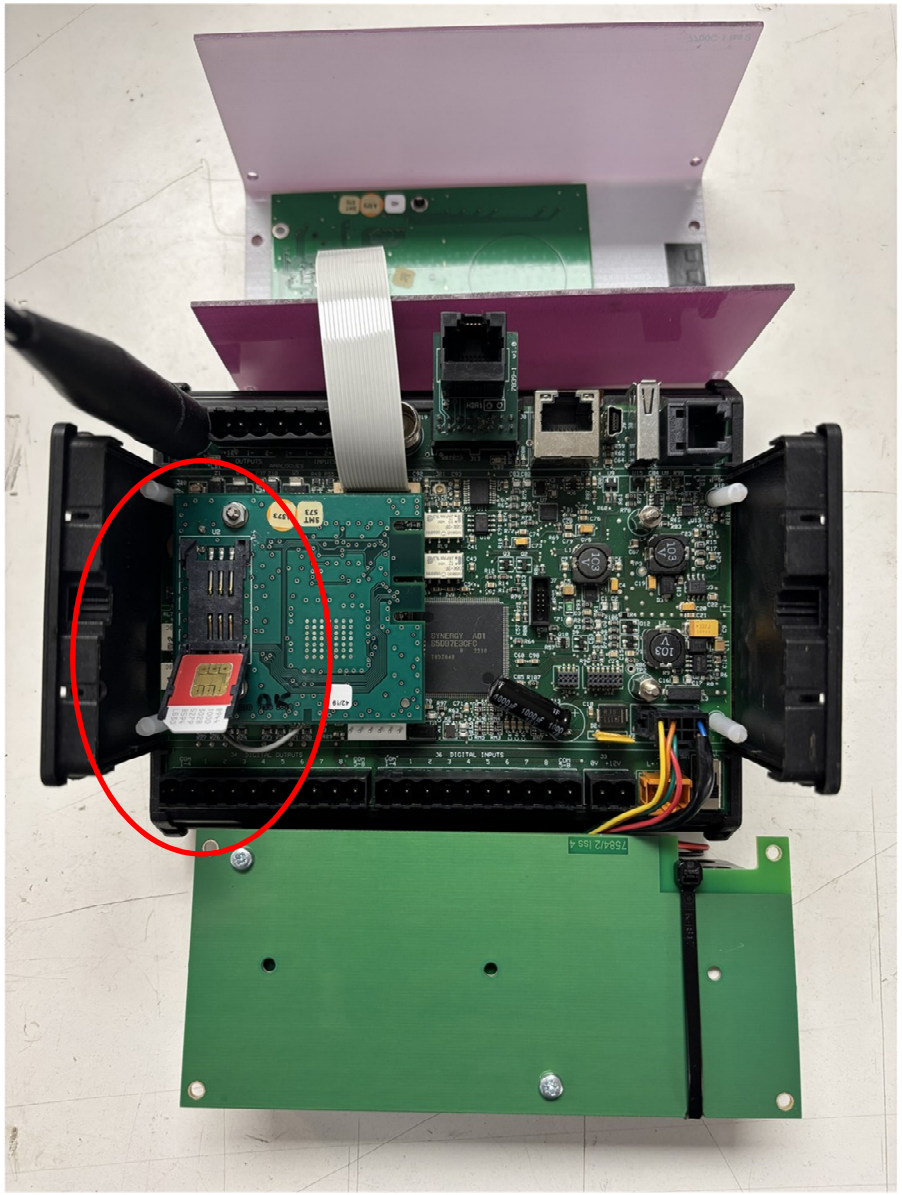

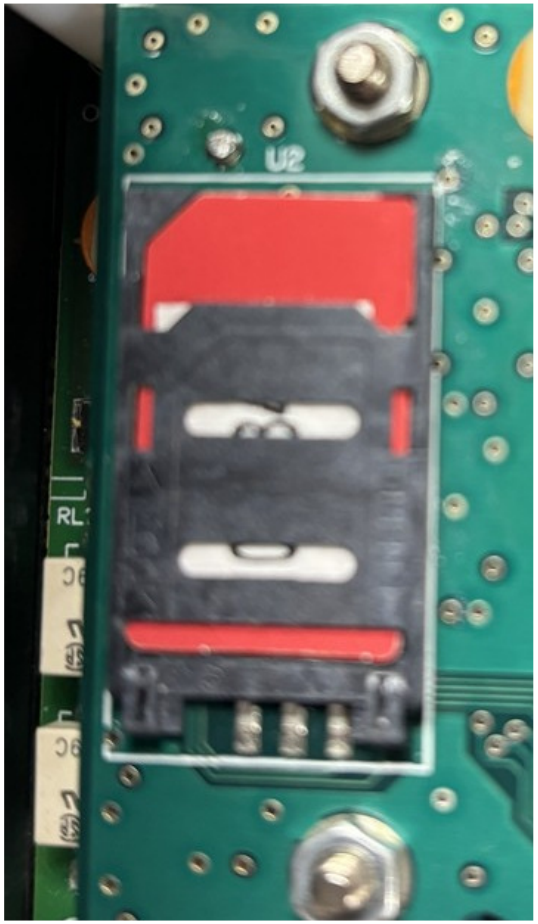

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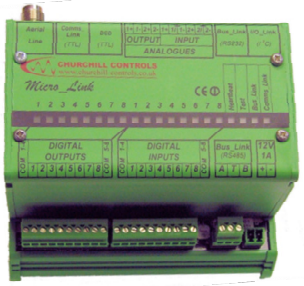
Low Power Radio Telemetry Product Range



Nano & Micro_Link ***Mega_Link*** ***Mega_Link 2***

Nano & Micro_Link	***Mega_Link***	***Mega_Link2***
Proprietary protocols	Proprietary protocols	**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	4G LTE
		TCP IP Ethernet LAN/WAN
	Dual Comms	Dual Comms
PLC/SCADA Fieldbus: Modbus RTU	PLC/SCADA Fieldbus: Modbus RTU, Allen Bradley, Mitsubishi	PLC/SCADA Fieldbus: Modbus RTU
12V	12V, 24V, 120/240Vac with battery back-up	12V, 24V, 120/240Vac with battery back-up

END OF LIFE

Mega_Link 2


Mega_Link 2
Main Menu
System Configuration
System Status
Comms Traffic
Calibrate
Calibrate COM1
Calibrate COM2
03/02/22 08:39:51
COM1
AN O/P
AN I/P
0V
COM2
COM3
COM4
USB1 USB2
EXP BUS
100 - 250VAC 50VA
8 - 16VDC, 2A Max
16 - 32VDC, 1A Max
POWER IN
Vout
AC: L N
DC: + -
ON
OFF
DIGITAL OUTPUTS
DIGITAL INPUTS

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 Modbus
- Ethernet comms as standard

Comms Options

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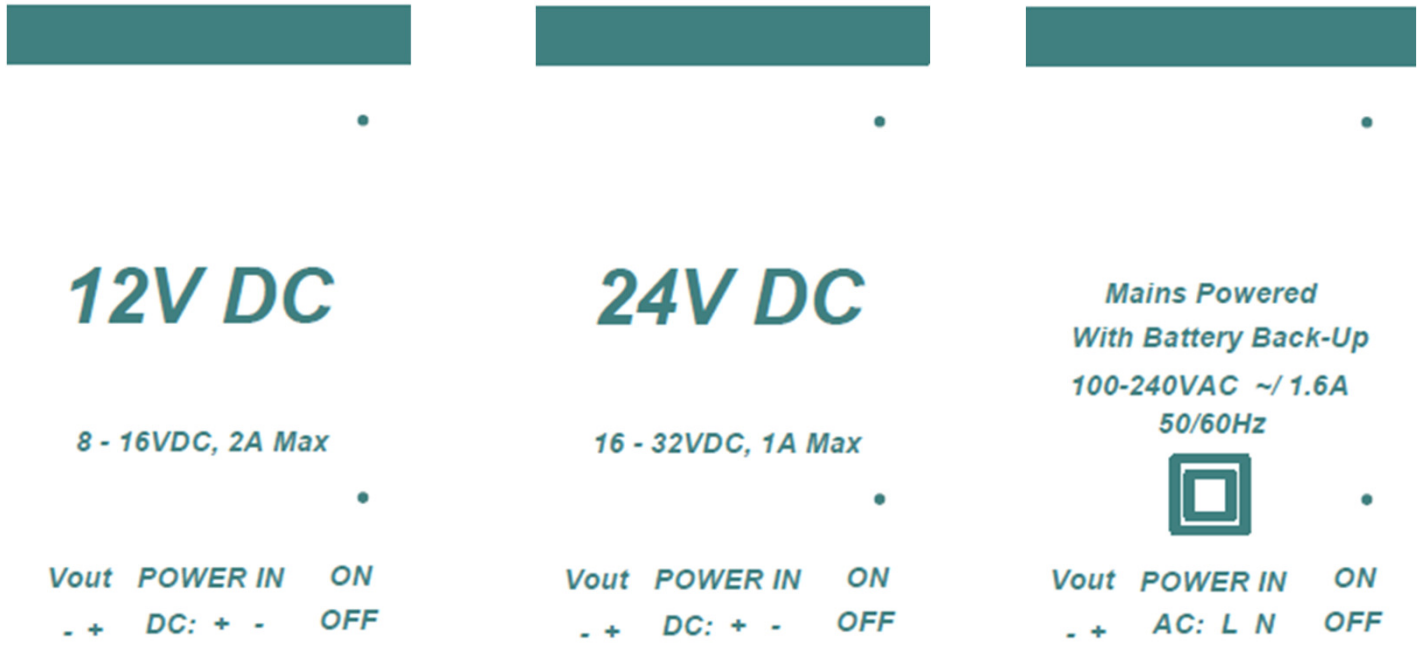
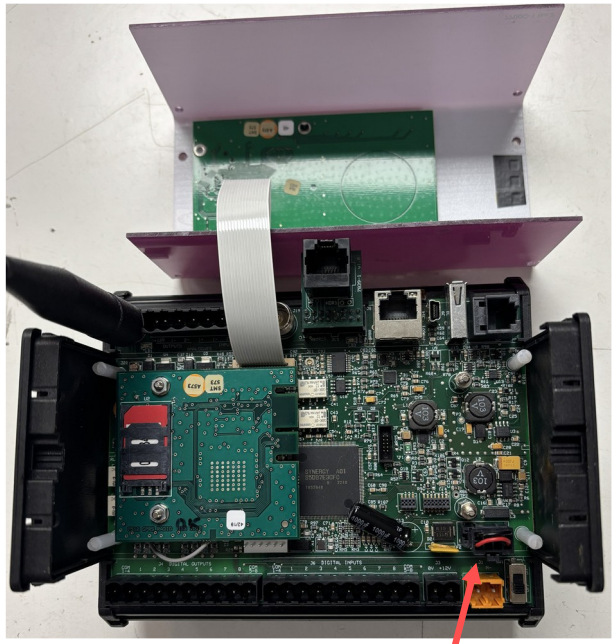
- COM1 (and COM2) interface modules:
  - 458MHz licence-free radio
  - 4G LTE Cat-1
    - Sierra Wireless
    - Telit
- COM3
  - External modem serial RS232 or RS485
    - 4G, DSL Router, Satellite etc.
  - Modbus RTU for PLC/SCADA
- COM4
  - Ethernet TCP/IP
    - LAN/WAN, DSL Router etc.

Power Supply Options (1)



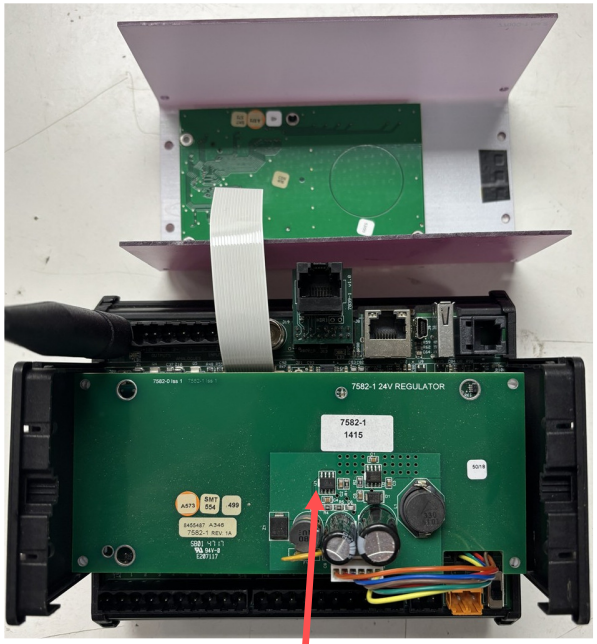
Power Supply Options (2)

12 Vdc



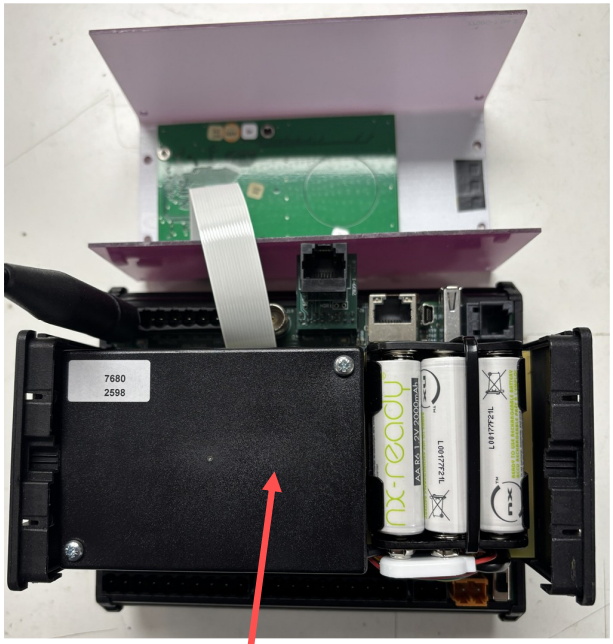
7581-4
12 V Link Plug

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
7800-1E0D	12 Vdc	Ethernet
7800-2E0D	24 Vdc	Ethernet
7800-AE0D	120/240 Vac	Ethernet

Interfaces

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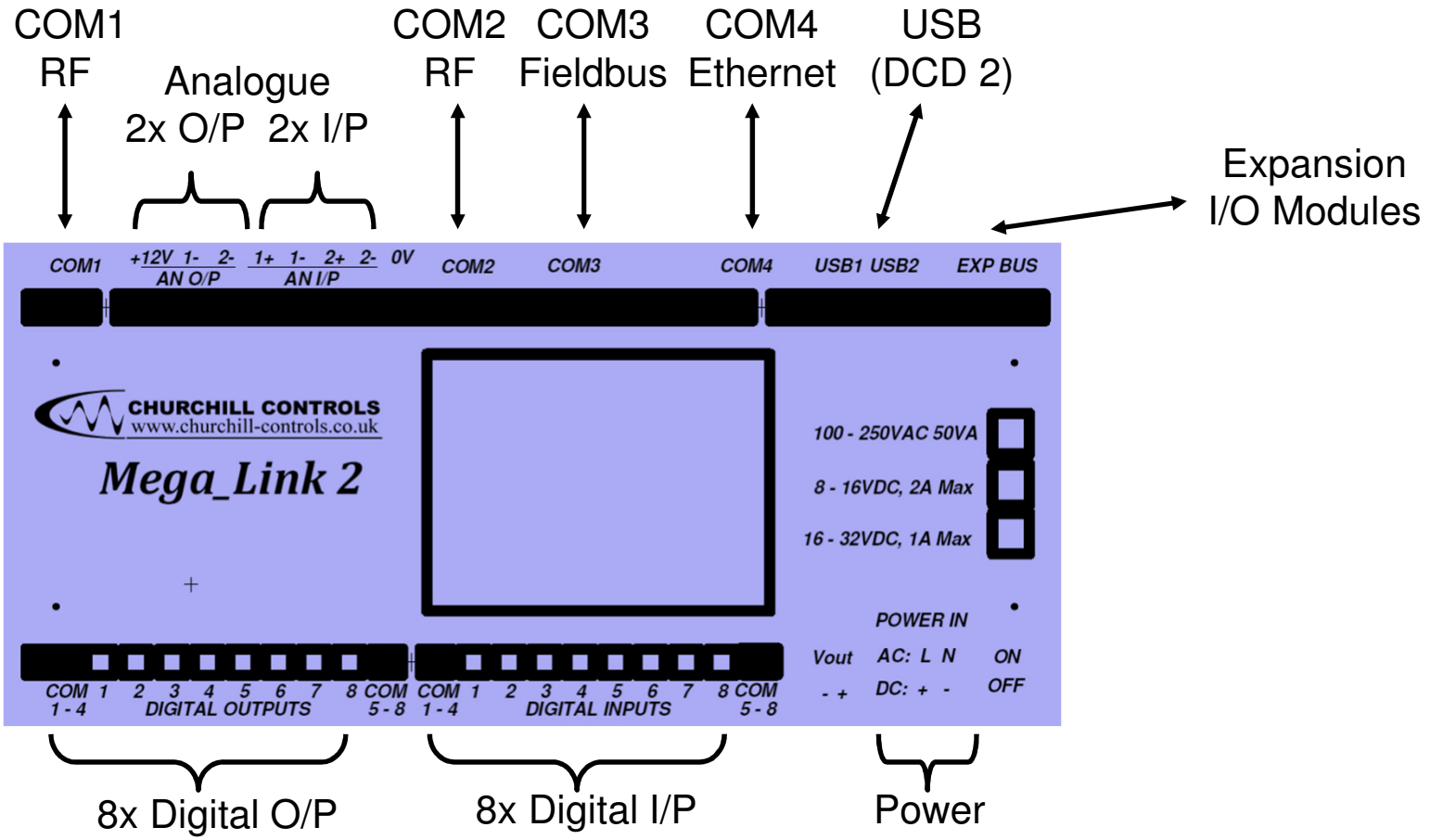

Digital I/O – main unit

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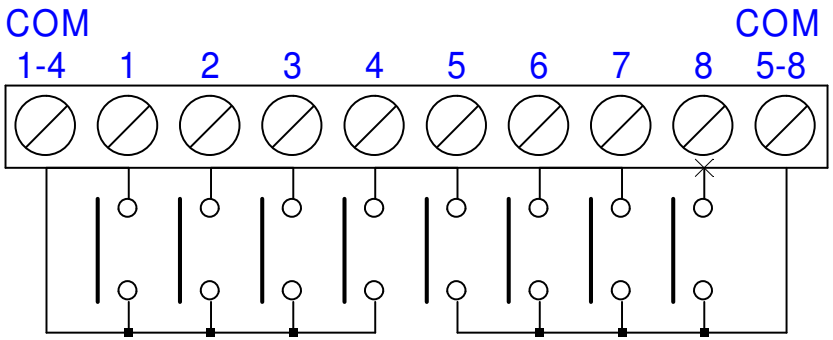

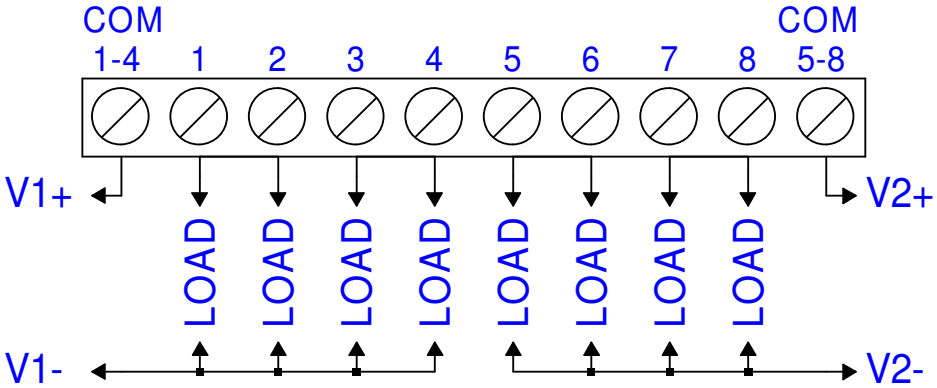

Analogue Inputs

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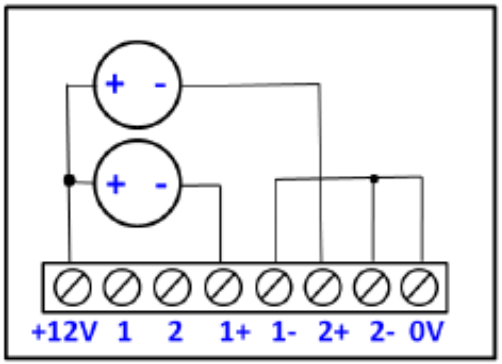
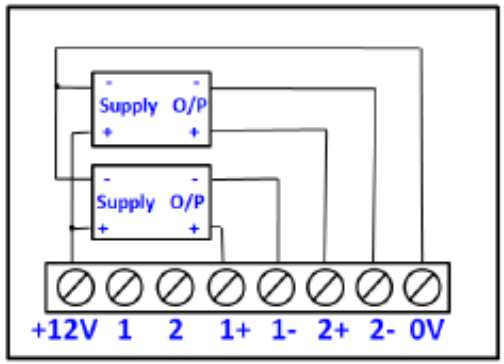
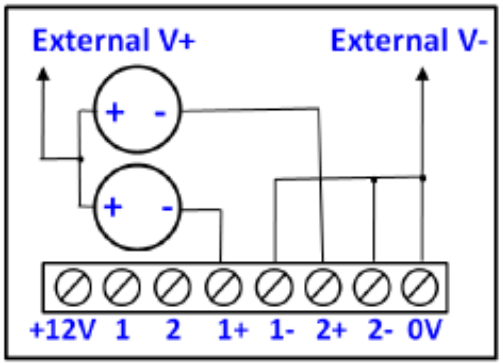


Analogue inputs.
Powered from ***Mega_Link 2***



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



Analogue inputs.
Powered externally.

Analogue Outputs

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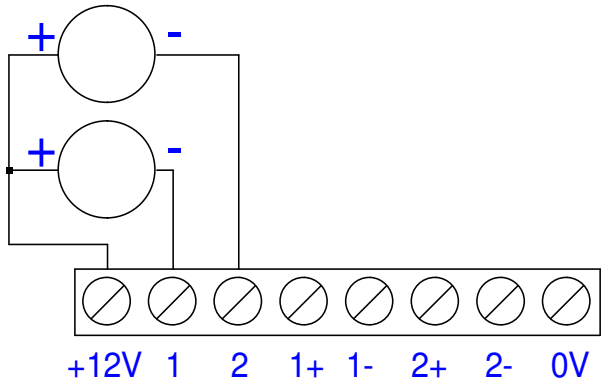
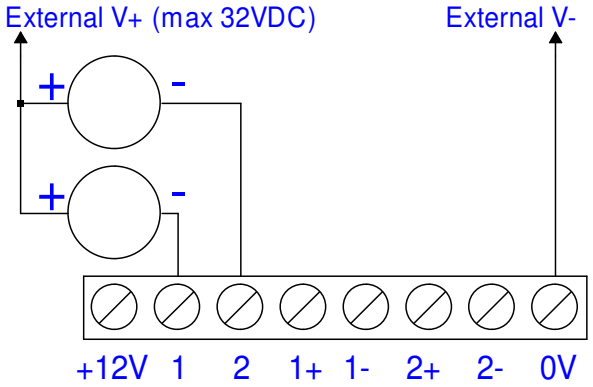


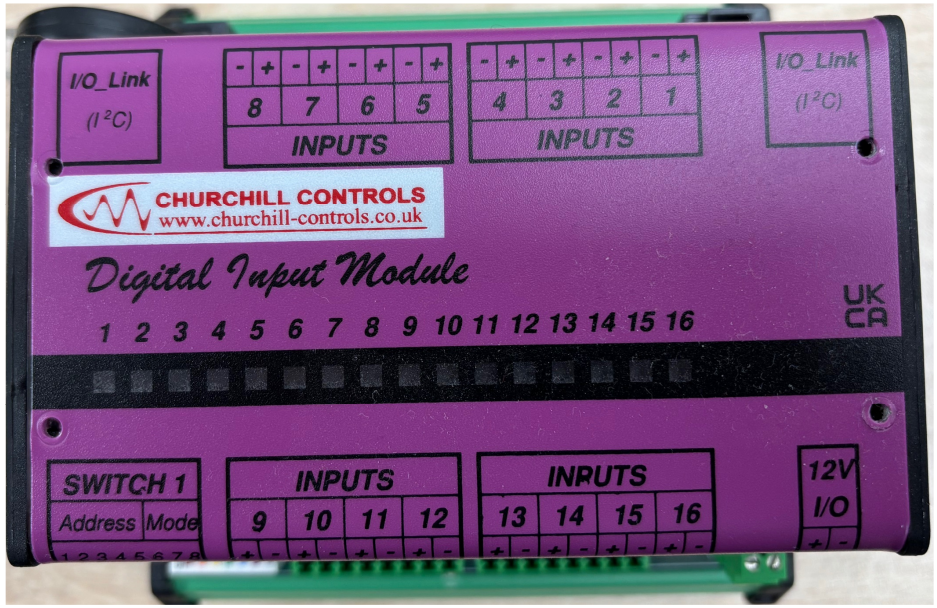
Analogue outputs powered from ***Mega_Link 2***



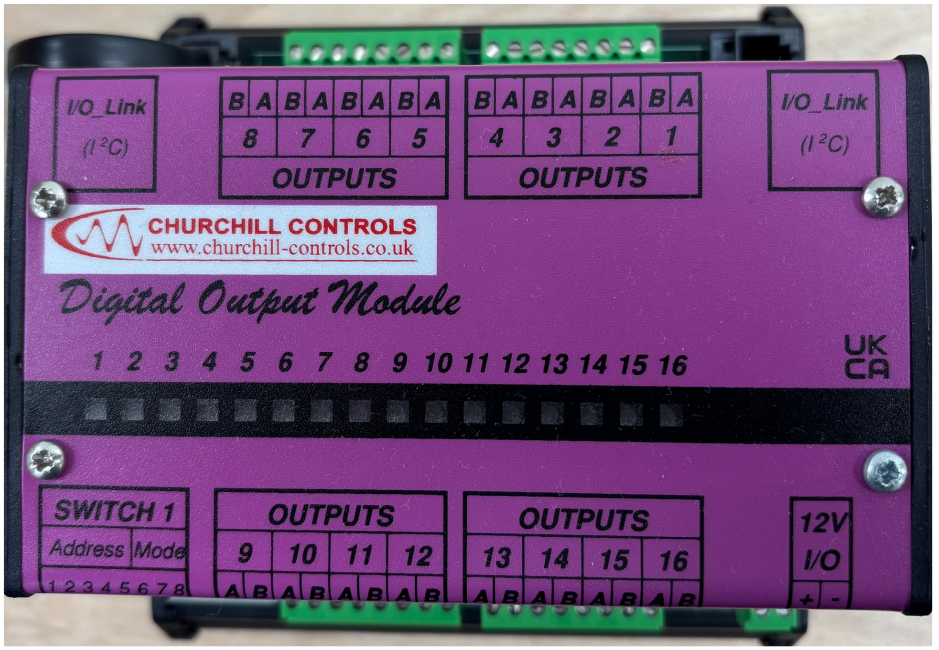
Analogue outputs, externally-powered

Expansion Modules

Digital I/O – expansion modules



16 Digital Input



16 Digital Output

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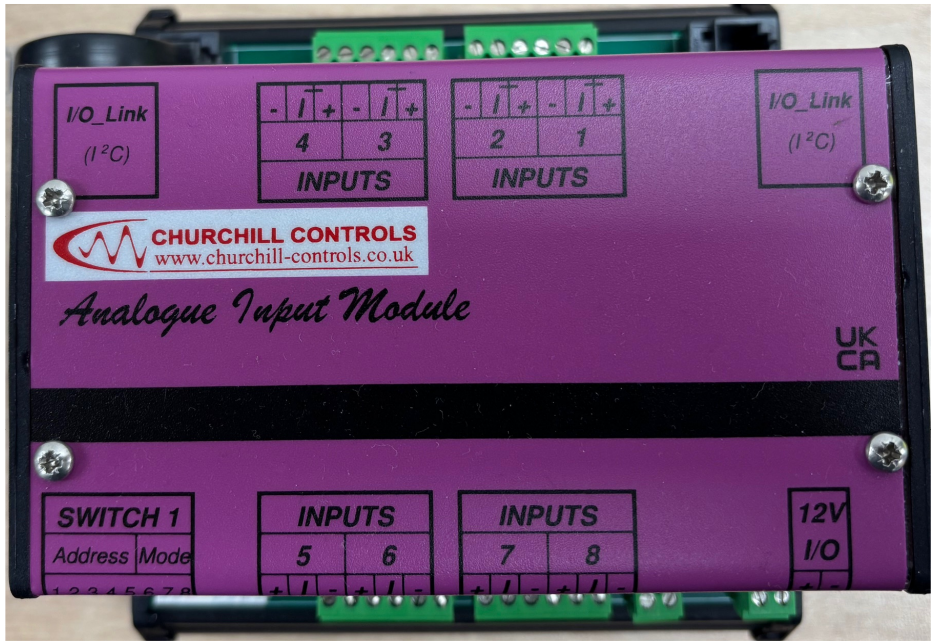
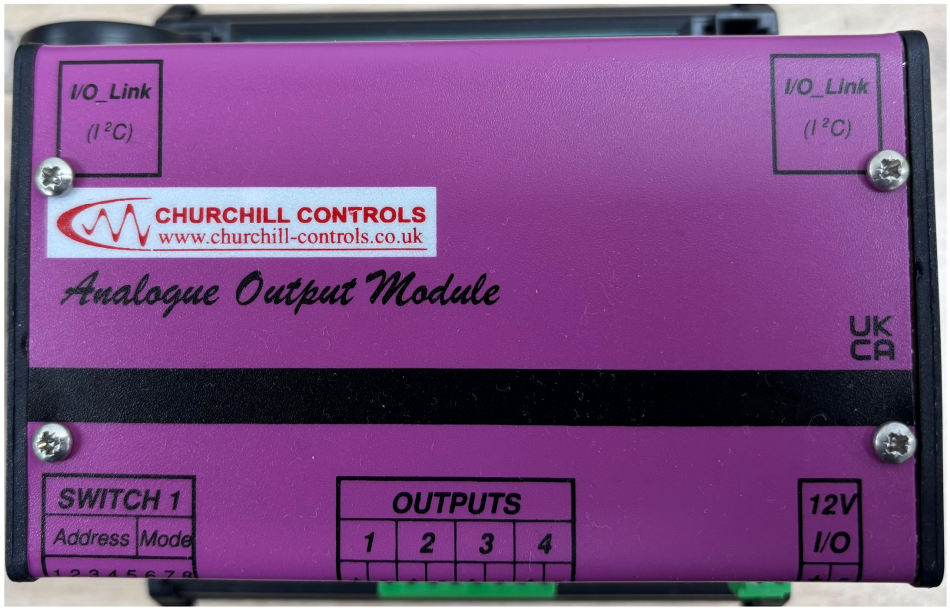
Analogue I/O – expansion modules



8 Analogue Input



4 Analogue Output