data SHEET
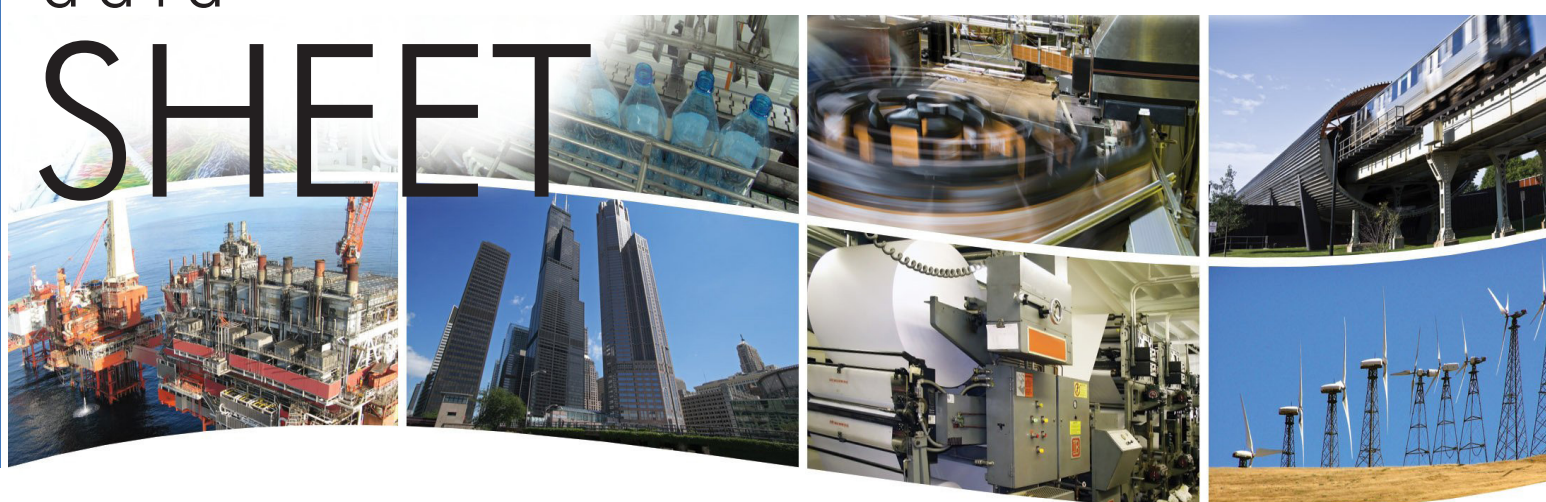
AI Series — Fixed-Port Active Hubs and Links

The ARCNET® Interconnect (AI) Series of fixed-port hubs expand ARCNET Local Area Networks (LANs) with repeaters, links and hubs. **Repeaters** extend a network using the same cabling technology. A **link** mixes two cabling technologies — functioning as a **media converter**. A **hub** adds a segment to support a distributed star topology. The method implemented depends on the number of ports. The AI2 has two ports for repeater and link applications — while the AI3 implements the hub function.

The AI operates from either wide-range, low-voltage AC (8–24 VAC) or DC (10–36 VDC) power. If needed, a redundant power source can be attached. Each port LED indicates received data or token passing. Each unit has one LED for unit status and one for reporting network reconfigurations. EIA-485 data rates of 78 kbps to 10 Mbps are supported.

A watchdog timer stops hub lockup, eliminating the need to cycle power on signal transmission error.

Active hubs boost network robustness and extend segment distance up to 2,000 feet (610 m) on coaxial segments and 6,000 feet (1,825 m) on multimode fibre optic segments. Unused hub ports need not be terminated. A distributed star topology minimizes required cabling — while inks and repeaters extend bus systems or bridge to other media.

Compatible with the baseband 2.5 Mbps ARCNET® network

- Provides either 2 or 3 ports
- Panel-mount or DIN-rail mount
- Configure for either link, repeater or hub operation
- LED identifies reconfiguration of the network
- Minimizes bit jitter with precision delay line timing
- Watch-dog timer prevents hub lockup
- Hub unlatch delay digitally controlled
- Wide-range, low-voltage AC- or DC-powered
- Provision for redundant power sources
- Variable data rates from 78 kbps to 10 Mbps
- Accommodates AC- or DC-coupledEIA-485 networks
- CE Mark

CONTEMPORARY CONTROLS®

Transceivers Match the Cable and Topology

Model number suffixes indicate the various transceiver types.

-CXS Coaxial Star

Most ARCNET networks use RG-62/u coaxial cable (with BNC connectors) in a star topology where each NIM connects directly to a port on an AI hub. But the coaxial star configuration provides the longest coaxial distance and simplifies troubleshooting. A -CXS port terminates a coaxial segment without requiring a passive terminator.

-CXB Coaxial Bus

BNC tee connectors can be used in a bus built of RG-62/u cable — with passive terminators at each end of the cable. Although hubs are unneeded, cabling options are restricted, troubleshooting is more difficult and a minimum distance is required between adjacent nodes. Coaxial bus segments can be extended using AI repeaters or hubs.

-TPB, -TB5 Twisted-Pair Bus

Twisted-pair can be used in a bus and dual RJ-11 or RJ-45 jacks are provided so a "daisy-chain" can be wired — even though electronically the AI units are connected as a bus. Distances and node count are limited. Passive terminators are inserted in unused jacks at the far end of the segment. Shielded as well as unshielded cable is supported.
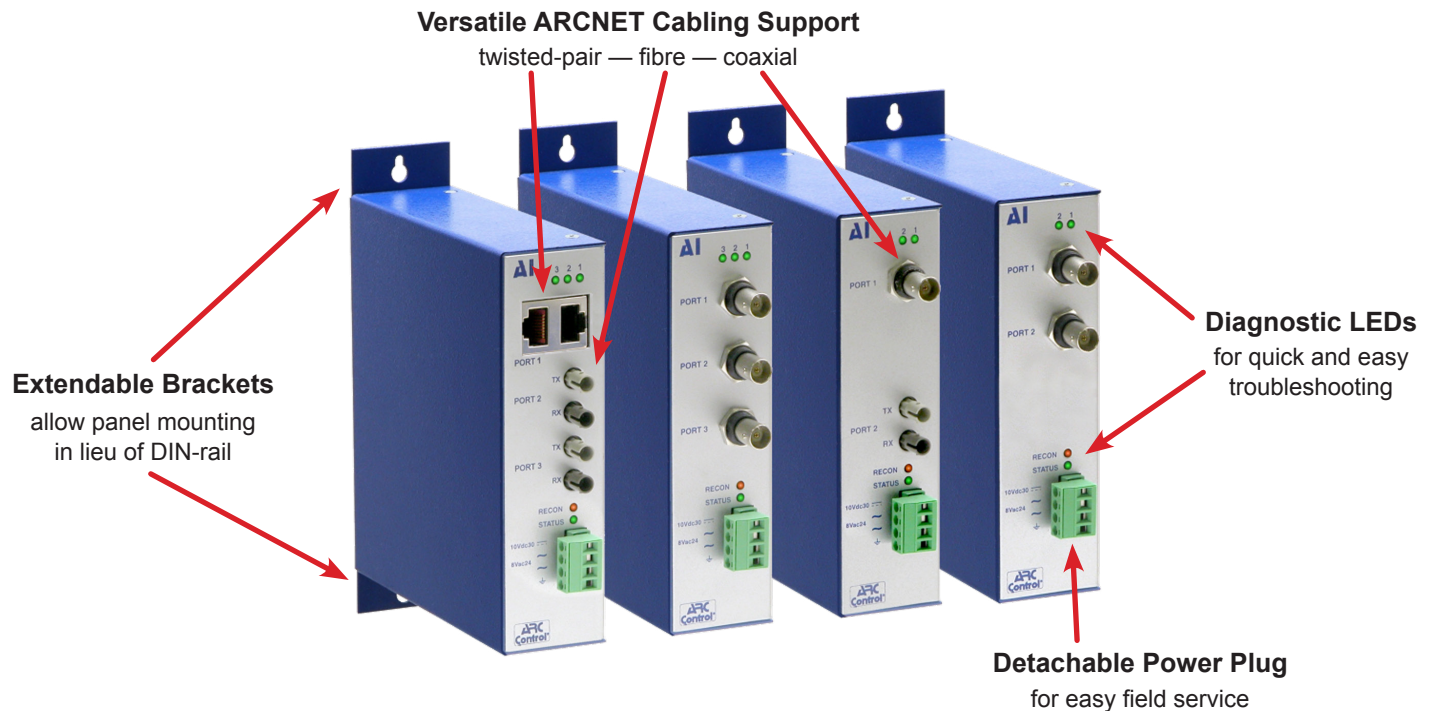
-FOG Glass Fibre Optics

Using ST connectors, these duplex 850 nm transceivers support three sizes of glass multimode fibre optic cable: 50/125μ, 62.5/125μ and 100/140μ. Larger sizes allow greater distances, but the popular 62.5/125μ cable provides good distance, reasonable cost, immunity to electrical noise, lightning protection, and data security.

-485 DC-Coupled EIA-485

A shielded or unshielded EIA-485 twisted-pair can support several nodes over a limited distance. Screw terminals or twin RJ-11 jacks permit a "daisy-chain" segment. EIA-485 offers a hubless solution but with limited distance and low common mode breakdown voltage. Segments can be extended with AI repeaters and hubs and each port accommodates failsafe bias and cable termination.
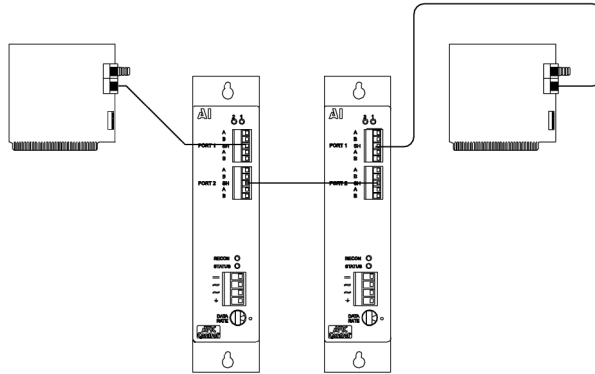
-485X AC-Coupled EIA-485

The EIA-485 transformer-coupled option provides the convenience of EIA-485 connectivity — but with a much higher common mode breakdown voltage. The -485X option eliminates the phase reversal issue of the -485 option, but distance and node count are lower.
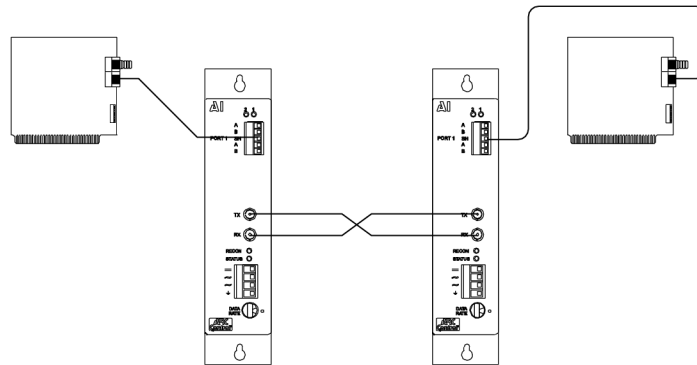

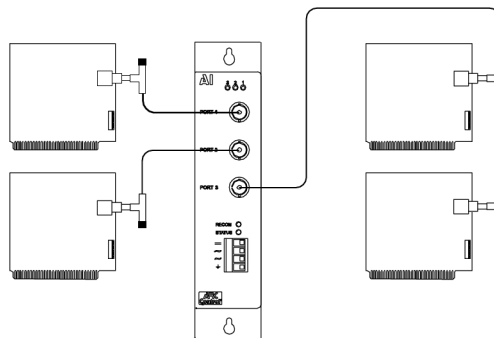**Versatile ARCNET Cabling Support**
twisted-pair — fibre — coaxial

Extendable Brackets
allow panel mounting
in lieu of DIN-rail

Diagnostic LEDs
for quick and easy
troubleshooting

Detachable Power Plug
for easy field service

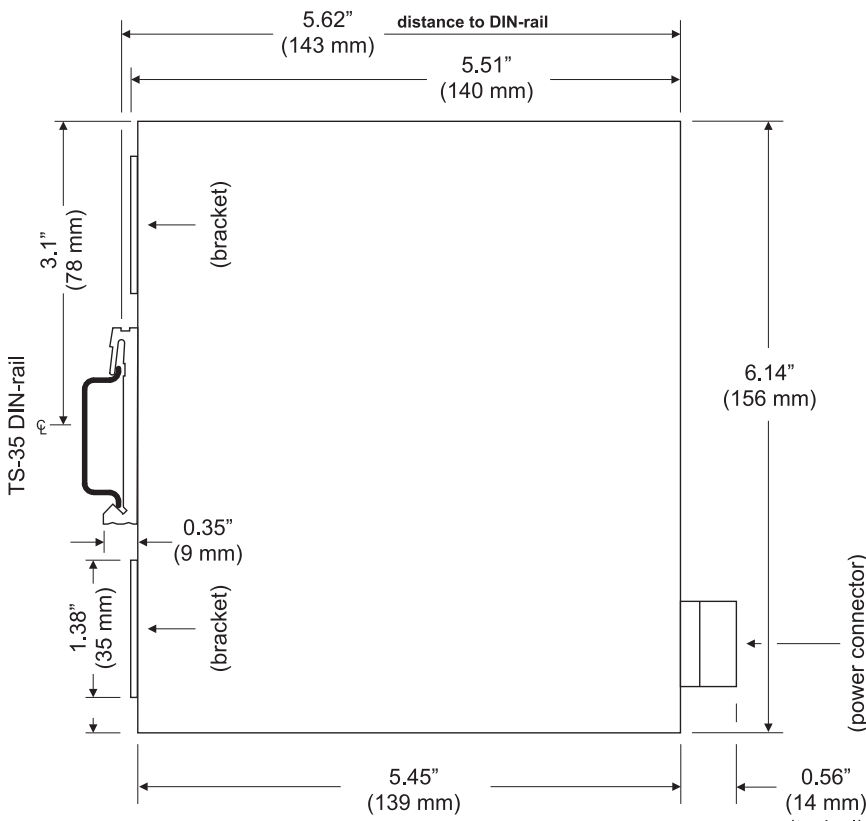CONTEMPORARY CONTROLS®

Topologies

Repeater

Link

Hub

Permissible Cable Lengths and Nodes Per Segment (2.5 Mbps)

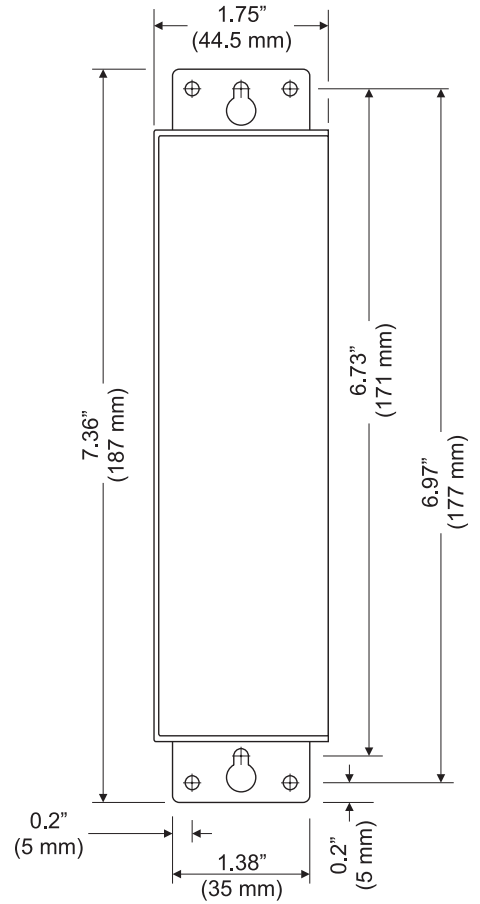| Transceiver	Description	Cable	Connectors	Cable Length Min	Max	Max Nodes Bus Segment	Notes
-485	DC-coupled EIA-485	IBM type 3	screw	0	900ft/274m	17	DC-coupled
-485X	AC-coupled EIA-485	IBM type 3	screw	0	700ft/213m	13	Transformer isolated
-CXB	Coaxial bus	RG-62/u	BNC	6ft/2m[1]	1000ft/305m	8	5.5 dB/1000 ft max
-CXS	Coaxial star	RG-62/u	BNC	0	2000ft/610m	N/A	5.5 dB/1000 ft max
-FOG	Duplex fibre optic	50/125	ST	0	3000ft/915m[2]	N/A	4.3 dB/km max
-FOG	Duplex fibre optic	62.5/125	ST	0	6000ft/1825m[2]	N/A	4.3 dB/km max
-FOG	Duplex fibre optic	100/140	ST	0[2]	9000ft/2740m	N/A	4.0 dB/km max
-TB5	Twisted-pair bus	IBM type 3	RJ-45	6ft/2m[1]	400ft/122m	8	
-TPB	Twisted-pair bus	IBM type 3	screw	6ft/2m[1]	400ft/122m	8	

[1]   This represents the minimum distance between any two nodes or between a node and a hub.

[2]   A jumper change on the AI module may be required to achieve this distance.

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Mechanical Diagram

5.62"
(143 mm)   distance to DIN-rail

5.51"
(140 mm)

3.1"
(78 mm)   (bracket)

TS-35 DIN-rail

6.14"
(156 mm)

0.35"
(9 mm)

1.38"
(35 mm)   (bracket)

(power connector)

5.45"
(139 mm)

0.56"
(14 mm)
(typical)

**Side View showing DIN-rail Clip
(Mounting Brackets Retracted)**

1.75"
(44.5 mm)

7.36"
(187 mm)

6.73"
(171 mm)

6.97"
(177 mm)

0.2"
(5 mm)
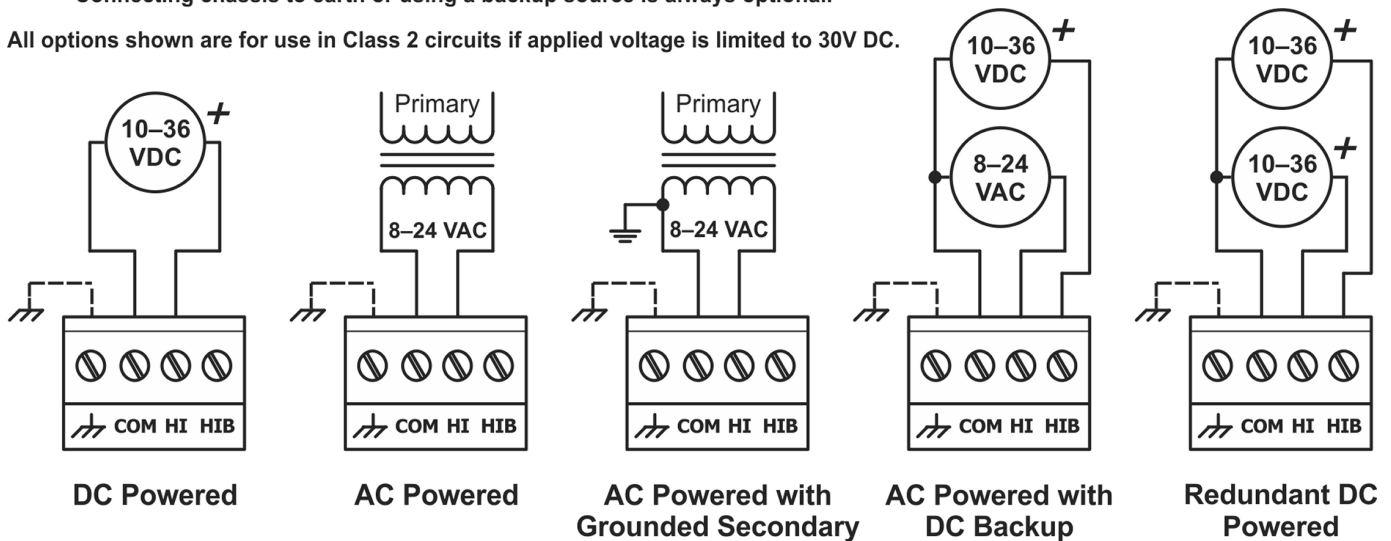
1.38"
(35 mm)

0.2"
(5 mm)

**Front View with
Mounting Brackets Extended**

Power Diagrams

Input power: 10–36 VDC   or   8–24 VAC, 47–60 Hz.
Connecting chassis to earth or using a backup source is always optional.

All options shown are for use in Class 2 circuits if applied voltage is limited to 30V DC.

10–36
VDC +

COM HI HIB

DC Powered

Primary

8–24 VAC

COM HI HIB

AC Powered

Primary

8–24 VAC

COM HI HIB

**AC Powered with
Grounded Secondary**

10–36
VDC +

8–24
VAC

COM HI HIB

**AC Powered with
DC Backup**

10–36
VDC +

10–36
VDC +

COM HI HIB

**Redundant DC
Powered**

CONTEMPORARY CONTROLS®

Specifications

Electrical Input	DC	AC
Voltage	10–36 VDC	8–24 VAC
Power	4 W	4 VA
Frequency	N/A	47–63 Hz

Environmental/Mechanical

Operating temperature	0°C to 60°C
Storage temperature	–40°C to +85°C
Relative humidity	10–95%, non-condensing
Protection	IP30

Functionality

	Transceiver	Data Rates
Data rates	485	78 kbps to 10 Mbps
	485X	1.25 Mbps to 10 Mbps
	CXB, CXS, TB5, TPB	2.5 Mbps
	FOG	78 kbps to 10 Mbps

Extended timeouts	Supports all three extended ARCNET timeouts
Hub, repeaters and link delay	320 ns max at 2.5 Mbps
Unlatch delay time	5.9 µs max at 2.5 Mbps
Compliance	ATA 878.1-1999

LED indicators

RECON	yellow
ACTIVITY	green
STATUS	green

Regulatory Compliance

CE Mark
CFR 47, Part 15 Class A

Electromagnetic Compatibility

Standard	Test Method	Description	Test Levels
EN 55024	EN 61000-4-2	Electrostatic Discharge	4 kV contact, 8 kV air
EN 55024	EN 61000-4-3	Radiated Immunity	10 V/m, 80 MHz to 1 GHz
EN 55024	EN 61000-4-4	Fast Transient Burst	1 kV clamp, 2 kV direct
EN 55024	EN 61000-4-5	Voltage Surge	1 kV L-L, 2 kV L-Earth
EN 55024	EN 61000-4-6	Conducted Immunity	10 Volts (rms)
EN 55024	EN 61000-4-11	Voltage Dips & Interruptions	1 Line Cycle, 1 to 5 s @ 100% dip
EN 55022	CISPR 22	Radiated Emissions	Class A
EN 55022	CISPR 22	Conducted Emissions	Class A
CFR 47, Part 15	ANSI C63-4	Radiated Emissions	Class A

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Ordering Information

Repeaters	*Description*
AI2-485	DC-coupled EIA-485 repeater
AI2-485X	AC-coupled EIA-485 repeater
AI2-CXB	Coaxial bus repeater
AI2-TPB	Twisted-pair bus repeater

Links	*Description*
AI2-485/FOG-ST	DC-coupled EIA-485 to fibre optic link
AI2-485X/FOG-ST	AC-coupled EIA-485 to fibre optic link
AI2-CXB/FOG-ST	Coaxial bus to fibre optic link
AI2-TPB/FOG-ST	Twisted-pair bus to fibre link

Hubs	*Description*
AI3-485	DC-coupled EIA-485 hub
AI3-485X	AC-coupled EIA-485 hub
AI3-CXS	Coaxial star hub
AI3-485/FOG-ST	DC-coupled EIA-485 fibre hub
AI3-485X/FOG-ST	AC-coupled EIA-485
AI3-FOG-ST/485	Fibre backbone to DC-coupled EIA-485
AI3-FOG-ST/485X	Fibre backbone to AC-coupled EIA-485
AI3-FOG-ST/CXB	Fibre backbone to coaxial bus hub
AI3-FOG-ST/TB5	Fibre backbone to twisted-pair bus hub
AI3-TB5	Twisted-pair bus hub

Accessories

Model	*Description*
AI-XFMR	Wall-mount plug-in transformer, 120 VAC input/24 VAC output (nominal values)
AI-XFMR-E	Wall-mount plug-in transformer, 230 VAC input/24 VAC output (nominal values)
BNC-T	BNC "T" connector
BNC-TER	93-ohm BNC terminator
TB5-TER	100-ohm RJ-45 terminator
TPB-TER	100-ohm RJ-11 terminator

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