AI-SRVR ARCNET Server to Ethernet Client

DATA SHEET

Benefits

- Provides connectivity between ARCNET baseband networks and Ethernet
- Send/receive ARCNET packets to/from Ethernet clients
- Supports coaxial and twisted-pair ARCNET networks including AC- and DC-coupled EIA-485
- Provision for 10/100 Mbps Ethernet TCP/IP connection
- 256 separate ARCNET receive buffer mailboxes
- Allows for the monitoring of all ARCNET traffic including broadcasts
- A DLL for Windows 2K/XP clients is provided to facilitate communication
- Resident web server provides status information
- Configurable through an EIA-232 console port
- Low-voltage AC or DC powered
- Provisions for redundant power connections
- DIN-rail or panel mounted
- CE Mark

Applications

- Remote Monitoring and Control
- Communications Gateway
- Human Machine Interface (HMI)
- Test and Measurement
- Data Acquisition

The AI-SRVR provides connectivity between an ARCNET network and an Ethernet network allowing a client on the Ethernet side access to nodes on the ARCNET side. The AI-SRVR functions as an ARCNET server by executing communication requests from an Ethernet client. Any number of Ethernet TCP/IP clients can initiate requests to any node on an ARCNET network. The AI-SRVR will receive ARCNET packets and send the data to Ethernet clients or reverse the process for transmitted packets.

Both ARCNET and Ethernet are data link technologies with different medium access methods, frame sizes and link layer protocols. With Ethernet, the most popular transport layer protocol is TCP/IP, but ARCNET is usually found in embedded applications that do not use TCP/IP. ARCNET also does not utilize a universal application layer so it is best to query ARCNET by examining raw packets. It is up to the Ethernet client to interpret the meaning of the raw packets. This approach allows for any ARCNET network to be queried by an Ethernet client regardless of the application layer protocol being used with ARCNET.

Configuration of the AI-SRVR is accomplished through an EIA-232 serial port. The Ethernet IP address and ARCNET node address are set in this fashion. Once configured, a resident web server can be accessed to determine the operational status of the AI-SRVR.

The AI-SRVR can also operate in the "AI-PROXY" mode. When used in AI-PROXY mode, the AI-SRVR allows ARCNET devices on separate networks to communicate directly over an Ethernet network. One AI-SRVR-1 is needed for each ARCNET device as each AI-SRVR-1 acts as a "proxy" for one ARCNET device (see Figure 1 on page 3). The local AI-SRVR, basically, sends received ARCNET packets over the Ethernet network to an appropriate AI-SRVR for re-transmission on its ARCNET network. This allows ARCNET nodes on separate ARCNET networks to communicate over a wired or wireless Ethernet network.

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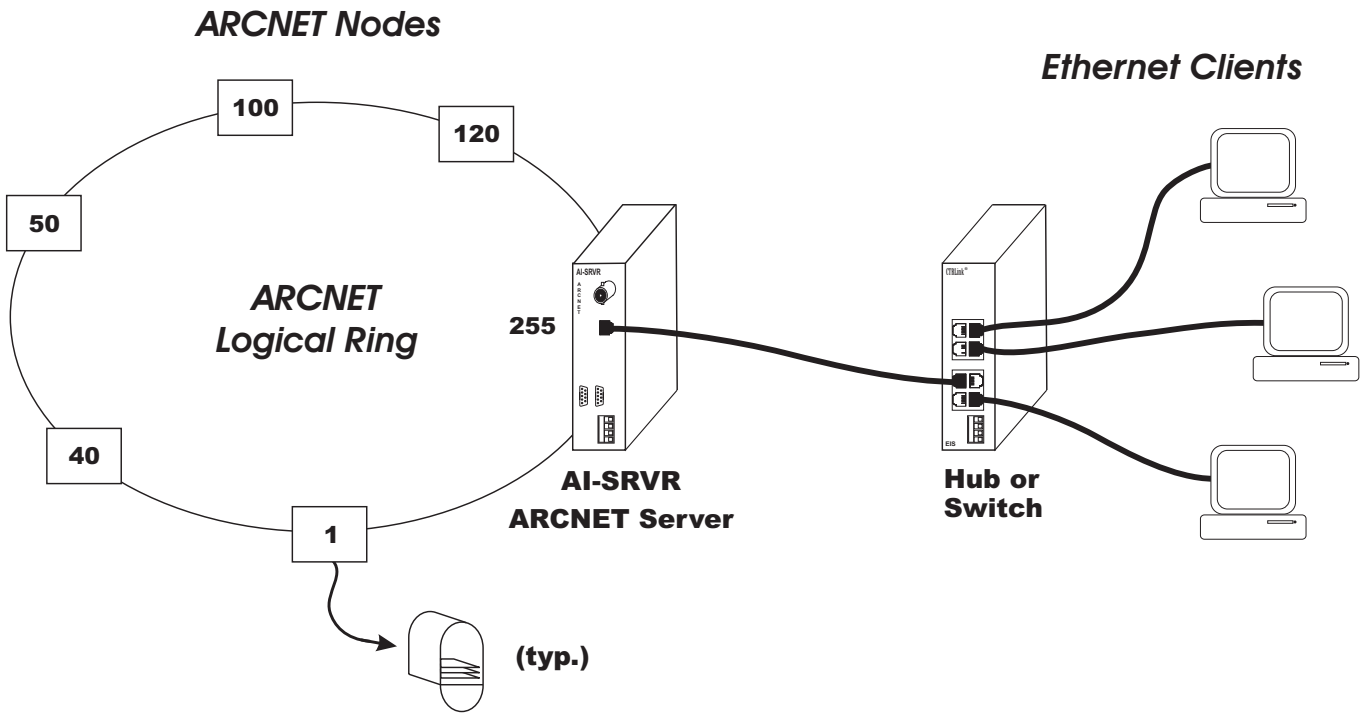
Serving Up ARCNET Packets to Ethernet Clients



The AI-SRVR facilitates communication between any number of ARCNET nodes and Ethernet clients. ARCNET nodes are represented by node addresses each with their own mailbox.

As the AI-SRVR-1 can act as a proxy for only one ARCNET node, the AI-SRVR-8 was created to provide one device which would represent multiple ARCNET nodes. The AI-SRVR-8 can act as a proxy for up to eight ARCNET nodes (see Figure 2 on page 3). The AI-SRVR-1 and the AI-SRVR-8 can also be used together, for example, to add one remote ARCNET node to an eight node ARCNET system (see Figure 3 on page 3). Multiple AI-SRVR-8 devices can be used when more than eight ARCNET nodes are to be represented.

ARCNET is classified as a token-bus network where nodes become momentary masters when they receive the token. A node with the token can either initiate a transmission or pass the token to the node with the next highest address which is called its logical neighbor. Although ARCNET is usually wired in either a star, distributed star, or bus network, its token-passing operation is best viewed as a logical ring. The AI-SRVR is wired into the ARCNET network and participates in the logical ring.

An ARCNET network can consist of 255 possible nodes with node address "0" reserved for broadcast messages. The AI-SRVR will consume one address and will participate in the token-passing protocol on the ARCNET network. The AI-SRVR can operate in promiscuous mode and, therefore, can monitor all ARCNET traffic. It reserves 256 mailboxes for the maximum number of nodes plus one for broadcast messages. Each mailbox has a first-in, first-out (FIFO) memory whose depth can be set. A mailbox captures the packet data originating from a source node. Depending upon its configuration, the AI-SRVR will capture all packets originating from those nodes of interest. The packets will be stored in mailboxes that correspond to source node addresses. Two methods of receiving packets are possible. The first method is the polling mode where the Ethernet client must continually check mailboxes for data. If not polled in time, data will be lost. The second method is the automatic forwarding mode. Packets in mailboxes are automatically forwarded to the requesting Ethernet clients.

The Ethernet side of the AI-SRVR appears as any other 10/100 Mbps Ethernet TCP/IP station requiring an IP address assignment. The unit is shipped with a pre-assigned private IP address which can be changed using the console port. As an option, a DHCP server can automatically assign the IP address if the unit is so configured. An Ethernet client can wire data to the ARCNET network by simply specifying the ARCNET destination address and appending the data to be sent. A number of Ethernet clients can do the same. The AI-SRVR will receive the requests and execute the writes using its own ARCNET node address as the source address. It will continue to process requests from Ethernet clients in the order they are received. To facilitate this process, Contemporary Controls provides a DLL for use with Windows 2K/XP clients.

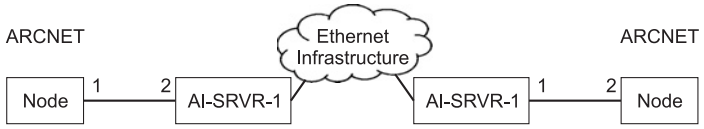


Figure 1. Two AI-SRVR-1 devices interconnecting two ARCNET nodes.

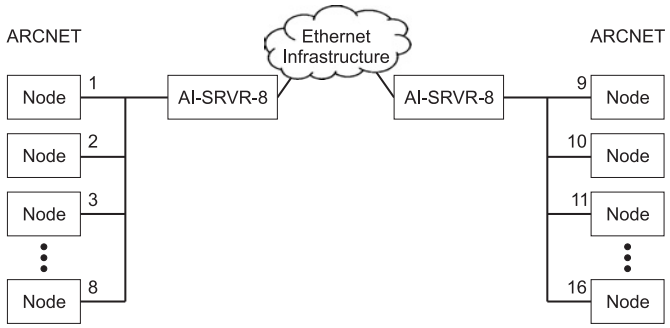


Figure 2. Two AI-SRVR-8 devices interconnecting 16 ARCNET nodes.

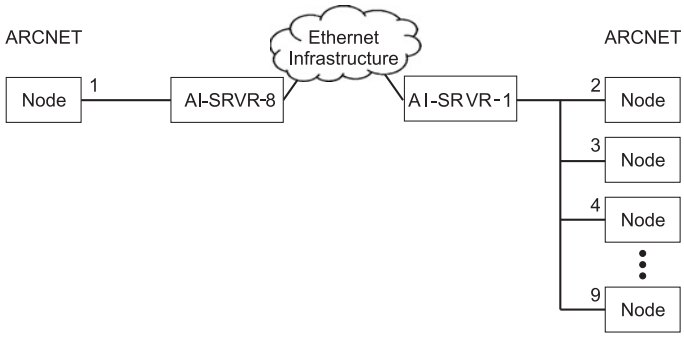
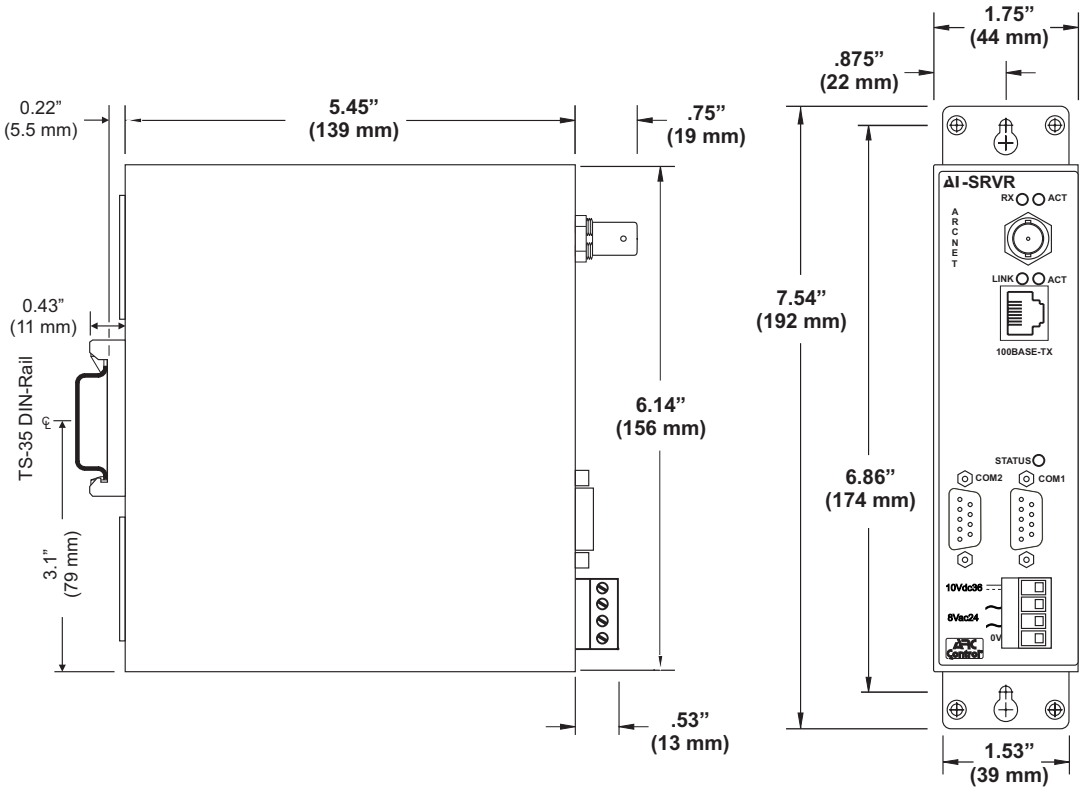


Figure 3. One AI-SRVR-8 and one AI-SRVR-1 interconnecting nine ARCNET nodes.

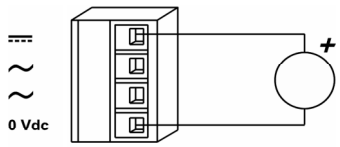
Mechanical



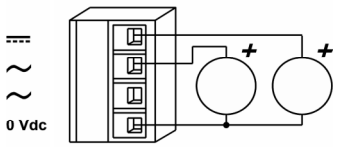
Side View showing DIN-rail Clip (Mounting Brackets Retracted)

Front View with Mounting Brackets Extended

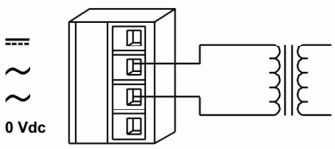
Power Options



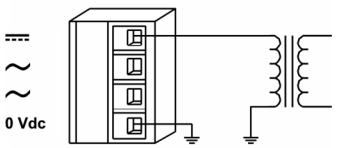
DC Powered



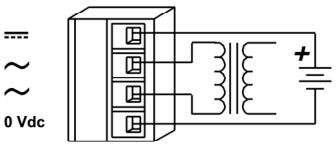
Redundant DC Powered



AC Powered



AC Powered With Grounded Secondary



AC Powered With Battery Backup

Specifications		
Electrical	**DC**	**AC**
Input voltage	10–36 Volts	8–24 Volts
Input power	8 W	8 VA
Input frequency	N/A	47–63 Hz
Environmental		
Operating temperature	0ºC to 60ºC	
Storage temperature	–40ºC to +85ºC	
Compliance	ANSI/ATA 878.1,	ANSI/IEEE 802.3
Extended timeouts	Supports all three extended ARCNET timeouts	
Data Rates	AI-SRVR-1/485: 156 kbps to 10 Mbps	
	AI/SRVR-1/485X: 1.25 Mbps to 5 Mbps	
	AI-SRVR-1/CXB: 2.5 Mbps	
	AI-SRVR-1/TB5: 2.5 Mbps	
	AI-SRVR-8/485: 156 kbps to 10 Mbps	
	AI-SRVR-8/485X: 1.25 Mbps to 5 Mbps	
	AI-SRVR-8/CXB: 2.5 Mbps	
	AI-SRVR-8/TB5: 2.5 Mbps	
Regulatory Compliance	CE Mark	
	CFR 47, Part 15 Class A	

Ethernet MDI 10BASE-T/100BASE-TX	
RJ-45	Usage
1	TD+
2	TD–
3	RD+
4	Not Used
5	Not Used
6	RD–
7	Not Used
8	Not Used

Console Port (EIA-232C)[1]	
Male D-Sub	Usage
1	Not Used
2	RX
3	TX
4	Not Used
5	Gnd
6	Not Used
7	Not Used
8	Not Used
9	Not Used

[1] The console port is wired as a DTE and therefore requires a null-modem cable to a terminal or terminal emulation workstation.

Electromagnetic Compatibility

Standard	Test Method	Description	Test Levels
EN 55024	EN 61000-4-2	Electrostatic Discharge	8 kV Contact
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 to L & 2 kV L to Earth
EN 55024	EN 61000-4-6	Conducted Immunity	10 Volts (rms)
EN 55024	EN 61000-4-11	Voltage Dips & Interruptions	1 Line Cycle @ 100% Dip 1 to 5 Seconds @ 100% Dip
EN 55022	CISPR 22	Radiated Emissions	Class A
EN 55022	CISPR 22	Conducted Emissions	Class A
CFR 47: 15	ANSI C63.4	Radiated Emissions	Class A

Ordering Information

Model	Description
AI-SRVR-1/485	Single Node ARCNET Server for DC-coupled EIA-485
AI-SRVR-1/485X	Single Node ARCNET Server for AC-coupled EIA-485
AI-SRVR-1/CXB	Single Node ARCNET Server for coaxial bus
AI-SRVR-1/TB5	Single Node ARCNET Server for twisted-pair bus
AI-SRVR-8/485	Eight Node ARCNET Server for DC-coupled EIA-485
AI-SRVR-8/485X	Eight Node ARCNET Server for AC-coupled EIA-485
AI-SRVR-8/CXB	Eight Node ARCNET Server for coaxial bus
AI-SRVR-8/TB5	Eight Node ARCNET Server for twisted-pair bus

Accessories

Model	Description
AI-XFMR	Wall-mount plug-in transformer 120 VAC (nom) input/24 V (nom) output
AI-XFMR-E	Wall-mount plug-in transformer 230 VAC (nom) input/24 V (nom) output
AI-DIN	TS-35 DIN-rail mounting kit
BNC-T	BNC “T” connector
BNC-TER	93-ohm BNC terminator
TB5-TER	100-ohm RJ-45 terminator