V487

WIRELESS MODEM UNIT

User's Guide

An Arcadian Networks Inc. Technical Document

Copyright and Trademark Information:

FCC COMPLIANCE STATEMENT

NOTE: This equipment is authorized under FCC ID:**V72AE11** to operate in the A Block (re-banding) of the Upper 700 MHz Band pursuant to Part 27 of the FCC's rules.

In addition, this equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning!
Changes or modifications to this equipment not expressly approved by Arcadian Networks, Inc. could void the user's authority to operate the equipment.

Warning!
This product was tested and shipped with shielded coaxial cable and Category 5 Ethernet cable equipped with a shielded RJ-45 connector. These cables must be used with the unit to ensure compliance.

Installation and Safety Information

The following information is provided to ensure safe operation of this equipment. Arcadian Networks assumes no liability in the event that the customer fails to comply with the following safety precautions and warnings.

DC System Power-on

1- When connecting the DC power lines, make sure to connect the Ground line first.

2- When disconnecting the DC power lines, make sure to disconnect Ground last.

3- FUSE Replacement: Make sure to use a fuse of the same type and value!

4- EUT shall be powered from limited power source up to 100VA according UL 60950-1 requirements.

L'équipement sous tension doit être branché a une source limitée au maximum de100 VA conformément a UL 60950-1.

5- Voltage rating is from 9.5VDC to Maximum 29VDC

La tension d'opération est de 9.5 VDC à 29 VDC maximum.

Earthing

The minimum cross sectional area of the protective earthing should be 1mm^2.

La section du fil de terre doit être d'un minimum 1mm$^{2.}$

Cables

The power, Ethernet and RS232 cables shall be limited up to 140 Feet (42.6 meter).

Les branchements électriques, Ethernet & RS232 doivent être limités a un maximum de 140 pieds (42.6 mètres)

Repair Safety

Repairs of modem should take place only in Arcadian Networks service laboratories or in service laboratories of other Arcadian Networks formally approved distributors.

In case of field handling, disconnect the unit from power supply for safest repair.

Safety Summary

Warnings:

Carefully connect units to the supply circuit so that wiring is not overloaded. Connect the Ground first (and remove Ground last when disconnecting).

Read the installation instructions before connecting the system to its power source.

Secure all power cabling when installing this unit.

Do not touch the power supply when the power cord is connected. Line voltages are present within the power supply, even when the power switch is off and the power cord is connected.

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects heat up when connected to the power and ground. This can cause serious burns or weld the metal object to the terminals.

CONTENTS

1 OVERVIEW AND PURPOSE

Welcome to the User's Guide for the **Arcadian Networks Inc. V487 Modem**.

Figure 1-1: The Arcadian Networks V487 Wireless Modem Unit

1.1 Purpose of This User's Guide

This guide is designed to be used as a tool in the initial installation and periodic maintenance of the V487. It contains information on how to perform the following tasks:

- Installing the V487
- Configuring the V487
- Maintaining the V487
- Troubleshooting the V487

1.2 Target Audience

This guide is intended for service personnel required to install, configure or maintain the V487 modem.

1.3 Document Conventions

This guide is intended for service personnel required to install, configure or maintain the V487 modem.

The following icons appear throughout this guide:

Note: This is a note. It provides additional information on the current topic.

Warning: This is a warning. It contains cautionary information on the current topic.

Tip: This is a tip. It provides time saving information to the reader.

1.4 Arcadian Networks

Arcadian Networks Inc. provides fixed wireless broadband end-to-end telephony and high-speed data connections to business and residential subscribers. Arcadian Networks Inc. technology uses point-to-multipoint architecture to deliver circuit-switched telephony and data over IP to commercial and private customers throughout the world.

2 MODEM FEATURES AND COMPONENTS

The V487 modem offers the following features:

- Point-to-multipoint broadband wireless Internet access
- Superior operations over a wide range of modulation formats and IF bandwidths, including noisy channels
- Easy installation
- Robust RF performance
- Internal radio for UHF bands

2.1 Right Panel Connectors

There are two connectors located on the right panel of the V487 modem.

Figure 2-1: V487

LAN

RS232

Connector	Function
LAN	Connect an RJ-45 Ethernet cable to this port. The other end of the cable can be connected to the PC or RTU
RS232	Connect a RS232 cable to this port. The other end of the cable can be connected to the subscriber's SCADA devices

2.2   Left Panel Connectors

There are two connectors located on the left panel of the V487 modem.

RF Link

Power

Figure 2-2: V487 WMU Left side Panel Connectors

Connector	Function
POWER	Connect 9.5V to 29 V external power source here.
Antenna	Connect this N-type connector to the UHF antenna.

Table 2-1: V487 Left side Panel Connectors

3   USING THE MODEM

Follow the steps below to use the modem properly.

To use the modem:

1 Check that the computer with which you are using the V487 modem contains a working Ethernet network card, and has the following software installed and operational:

   - Microsoft Windows 95 operating system or later
   - A standard Internet browser application
   - The Telnet communications utility

2 Attach your computer to the modem's LAN port with the included RJ-45 Ethernet cable.

3 Connect the antenna cable to the **CABLE** connector on the Left side of the modem.

4 Plug the 9.5-29Volt modem power supply jack into the **POWER** socket on the Left side of the modem.

*Note: As with any household electrical device, avoid the risk of accidental electrical shock. **Make sure that your hands are completely dry** and that there is no moisture on the floor or other surfaces in the immediate area of the electrical wall outlet.*

Hazard: The antenna used for this transmitter must be installed to provide a separation distance of at least 200 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter.

4   TECHNICAL SPECIFICATIONS

General	
Dimensions	12.6 x 7.9 x 4.4 in. (32 x 20 x 11 cm)
Operating Temperature	-33 to 60° C
Power	9.5V-29V (Max 3A)

Interface	
Data Interface	RS232 (SCADA service)RJ45 – 10/100 baseT Ethernet full/half duplex
RF Interface	50 ohm N Type Female Connector

RF Characteristics	Downstream			
RX Frequency	757 – 758 MHz Downstream Receive			
Channel Bandwidth	245, 330 KHz			
Modulation Format	QPSK, 16QAM, & 64QAM			
Data Rates	0.55 – 1.65 Mbps			
Rx Sensitivity (dBm)	BW (KHz)	64 QAM	16 QAM	QPSK
	330	-81	-87	-91
RF Characteristics	Upstream			
Frequency Range	787 – 788 MHz			
Channel Bandwidth	250, 325 kHz			
Modulation Format	QPSK & 16QAM			
Data Rates (Raw)	0.52 – 1.04 Mbps @ 330 KHz 0.4 – 0.8 Mbps @ 250 KHz			
RF Amplifier P1dB	37 dBm			
Linear Output Power	Up to 27 dBm			

Service		
Network Management	Protocol:	SNMP
	MIB:	RFC1213, RFC1493, RFC2233, RFC2669, RFC2670, DOCSIS Privacy MIB
	Provisioning:	As per DOCSIS
Security	Link Layer Encryption:	DES CBC, 40 and 56 Bits per user (Sara)
	Key Distribution:	Two-layer key distribution protocol, which includes DES-ECB and RSA public key encryption and HMAC-SHA1 authorization
IP Protocols	Network Protocols:	IP, ICMP, ARP, PPPoE, 802.1Q/p, IP Multicast
	Transport Protocols:	TCP, UDP, RTP
	Application Protocols:	SNMP, TFTP, DHCP
# IP Data Services	64 CPE MAC Addresses	

5 PROBLEM TROUBLESHOOTING

If you encounter problems with your modem, try the following steps.

1 Check for damage to the external modem casing during shipping or installation. If you see visible damage, the modem may need replacement.

2 Verify that the 9.5Volt to 29V modem power supply jack is connected to the modem **POWER** connector on the Left side of the modem, and that the modem power supply is connected to a known-good AC power outlet.

3 Verify that the RF coaxial cable is connected properly to the modem **N-type** connector.

4 Verify that the PC **LAN** LED is illuminated and that the LAN cable is connected to a working Ethernet network port on the PC.

Following are further steps you can take to identify and correct modem problems.

#	Problem Description	Possible Cause	Potential Resolutions
1	The RS232 does not connected to the PC	• The DC plug may not be installed correctly. • The power supply may be faulty. • The serial port of the PC is not enabled	1. Check the connection of the power supply. 2. Test the power supply using another modem. 3. Replace the power supply if necessary. 4. check the serial port configuration on the PC

#	Problem Description	Possible Cause	Potential Resolutions
2	The **LAN** LED does not light up.	• The connection between the modem and the PC may be faulty.	1. Check the 10/100BaseT cable connection. 2. Check the network configuration: IP address, Gateway, DHCP, and DNS. 3. Reset the modem by disconnecting and reconnecting the power. 4. Replace the NIC Ethernet card. 5. Test the connection using another modem or network device.

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6 WARRANTY INFORMATION

The Arcadian Networks Inc. Limited Warranty and related information can be found in the terms and conditions and/or other contracts under which this product was purchased.

CONTACTING ARCADIAN NETWORKS

For further information about the V487 WMU or other Arcadian Networks products, visit the Arcadian Networks Website at:

www.arcadiannetworks.com .