AXIOM-S **Encryption**

Small Scale Satellite Modem

A Small Scale and Compatible Member of the Paradise Modem Family **with AES-256 Encryption**

TELEDYNE
PARADISE DATACOM
Everywhereyoulook™

Overview

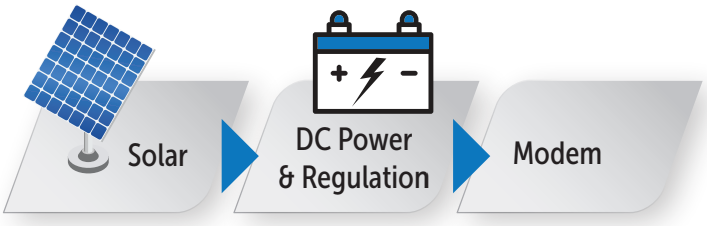
The AXIOM-S Encryption is our most powerful satellite modem to date, designed to provide exceptional performance and reliability, with the lowest power consumption aimed specifically at the VSAT and mobile systems networks. The availability of higher order modulations makes the AXIOM-S Encryption ideal to support new HTS satellites, so future proofing your investment.

Features include:

- **Small:** 209mm (8.25") W x 287mm (11.3") D x 42.2mm (1.66") H; (295mm deep inc. RF connectors)
- **Lightweight:** 1200g (2.6lb)
- **High capacity:** IP-centric, DVB-S2/X, options up to 345Mb/s Tx, 230Mb/s Rx
- **Low power consumption:** suitable for battery or solar power applications.
- **Wide range floating DC input Voltage:** Supports operation at either 24 - 48V and can be a floating input i.e. can be a positive earth.
- **Secure:** SCPC is more secure than TDMA, and provides guaranteed bandwidth for always-on applications.
- **Enhanced Doppler:** Superior performance for LEO and MEO communications with an allowable frequency shift of up to ±700kHz and rate of change up to ±100kHz/s
- Star remote node in a **Point-to-Multipoint** system, with an QMultiFlex-400 Hub or **Point-to-Point** with AXIOM or Q Series Modems.
- Built-in **AES-256 Encryption** for enhanced security

The AXIOM-S (right) is smaller than our Q-Lite Half-Width modem (left)

Optimized for Low Power



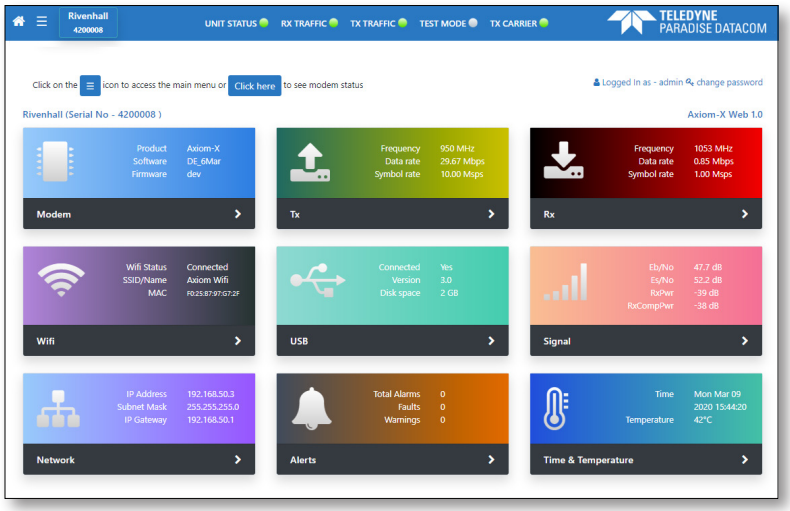
AXIOM-S is ideal for low power applications like solar-powered systems.

Markets & Applications

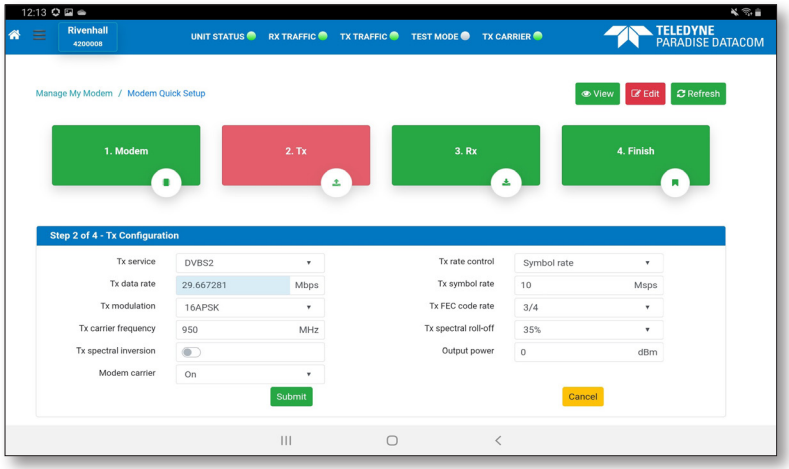
- Broadband Internet access / rural Internet access
- VoIP networks
- Wi-Fi hotspots
- Small Office / Home Office
- SME
- Ship crew / passenger entertainment
- Internet of things
- Enterprise / corporate networks

New Web User Interface

The AXIOM-S M&C is via an intuitive Ethernet based web browser ideally suited to use on a tablet, Mobile or laptop PC and allows the user to install, configure and monitor the Modem with ease. In addition, WiFi capability provided by a Paradise supplied pluggable USB Dongle further enhances the ease of use and provides greater flexibility for remote control and installation using portable devices.



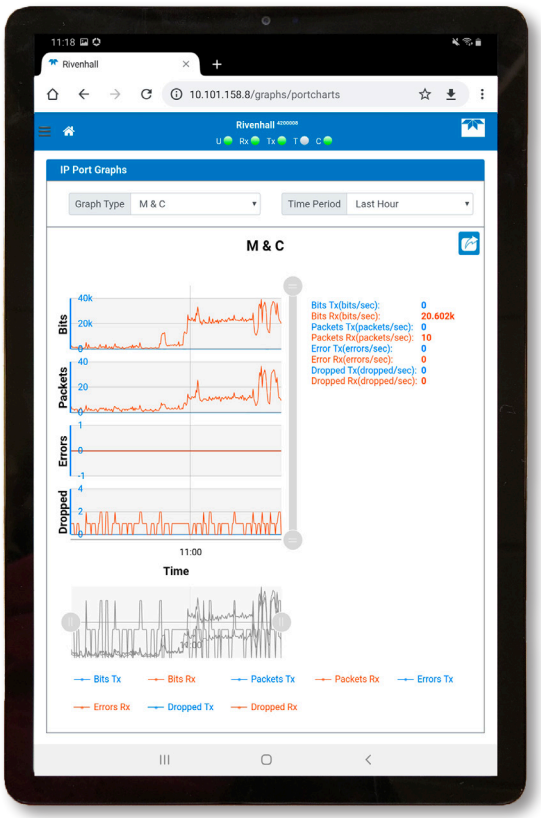
Clear, Intuitive Home views allows easy, one click navigation direct to the required fields



Easy flow configuration allowing quick set-up of key parameters (upper)

Network tree overview (lower)

Tablet view allowing easy on the move Browsing



Built for the Most Stringent Portable Applications

SECURE

- SCPC is both secure, and with Paradise Modems, easy to provision
- For enhanced security, AES-256 encryption is built in

COMPATIBLE

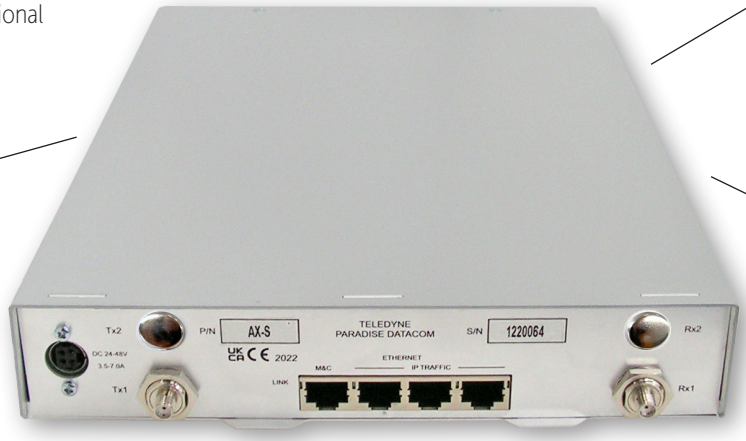
- Reuse your existing code
- No need for extensive retraining of maintenance staff
- Inclusion of SMA connectors with the same spacing as Q-Lite aids compatibility

STATE OF THE ART

- DVB-S2X up to 256APSK provides the highest bandwidth efficiency
- Advanced compression and acceleration features optional
- Ideal for use with constellations

PRACTICAL

Two AXIOM-S's can be mounted side by side in a standard 19 inch rack.



CONVENIENT

Optional BUC power supply reduces the need for external equipment

COMPACT & EFFICIENT

Small size, low power, suitable for battery/ solar power

WELL EQUIPPED

Transmitter
Fast: Up to 345 Mbps, 100Msps
Output power 0 to -40dBm

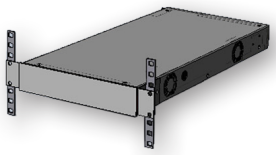
4 Gigabit Ethernet Ports
Convenient – no need for an external switch, saving space, power, wiring; Layer 2 Bridging, Layer 3 Routing

Receiver
Fast: Up to 230Mbps, 98Msps

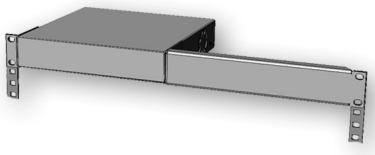
DC Supply
- Wide range floating DC input Voltage, for 24V or 48V Operation

RF Stages
- Future Proof: Transmit and receive speeds upgradable in the field – only pay for the capacity you need now
- L-band coverage from 950 to 2,150 MHz

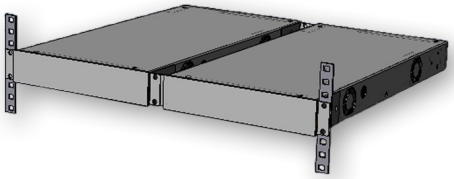
Rack-Mountable



K4101: Mounting kit for 9.5" racks
K4102: Mounting kit for 10.5" racks



K4103: Mounting kit for one AXIOM-S in a 19" rack



K4100: Mounting kit for two AXIOM-S's in a 19" rack

Main Specifications

Topology	Point to Point or Star Modem within a Point to Multipoint Network
Standard	**DVB-S2:** (EN 302 307-1) **DVB-S2X:** (EN 302 307-2)
Frequency	**L-band:** 950 to 2150MHz (resolution 1Hz)
Data Rates	**Standard:** 2,048kbps (Tx); up to 230Mbps (Rx) **Tx Options:** 5Mbps, 10Mbps, 25Mbps, 100Mbps, & 345Mbps
Data Rate Limits	**DVB-S2/S2X:** Up to 345Mbps Tx & 230Mbps Rx
Tx Symbol Rate Limits	**DVB-S2/S2X:** 90ksps to 100Msps
RX Symbol Rate Limits	**DVB-S2/S2X:** 90ksps to 98Msps 98Msps@QPSK, 85Msps@8PSK/8APSK, 64MSps@16APSK, 51Msps@32APSK,43Msps@64APSK, 36Msps@128APSK, 32Msps@256APSK.
DVB Features	ACM/VCM, DVB Encapsulation, GSE Encapsulation

Modulator Specifications

Modulator	**DVB-S2:** QPSK, 8PSK & 16APSK **DVB-S2X:** QPSK, 8PSK, 8APSK-L 16APSK, 16APSK-L, 32APSK, 32APSK-L, 64APSK & 64APSK-L **Options for Advanced Modulation:** 128APSK, 256APSK and 256APSK-L
Output Power	0 to –40dBm (950 to 2,150MHz)
Transmit Filter Roll-off	**DVB-S2:** 20%, 25%, 35% **DVB-S2X:** 5%, 10%, 15%, 20%, 25%, 35%
Harmonics & Spurious	Better than –55dBc/ 4kHz in-band (at 0dBm to –30dBm output)
BUC PSU Option	Allows the DC input power to be used to power a BUC via the Interfacility Link (IFL) (6A Max)
BUC 10MHz Reference	Via IFL cable; 10MHz ± 0.01 ppm; 2dBm ± 2dBm
QoS	Provides guaranteed throughput for priority traffic; supports Committed and Burst Information Rates. Stream classification by VLAN ID, IP address, IEEE 802.1p priority, Diffserv DSCP, & MPLS EXP

Router Specifications

Network Support	Layer 2 Bridging, Layer 3 Routing, Jumbo Frames to 10k bytes, 160k pps **Trunking Mode:** Supporting 230 Mbps bi-directional traffic at up to 350k pps, each way.
Management	HTTP/S Web Server, SNMP v1, v2c & v3, AAA RADIUS Secure User Login & Access Control Lists, SSH
Protocols	IPv4/IPv6, IEEE 802.1q /p VLAN support, Software Defined Network Support, NAT, DHCP, Network Time Protocol (NTP), sFlow Performance Metrics, Active Queue Management (AQM), MPEG over IP, OpenAMIP Protocol Support, Inter VLAN Routing Support with Virtual Routing & Forwarding
Advanced IP Features	Robust Header Compression (RFC 3095), Payload Compression, Dynamic Routing (RIP V1, V2; OSPF V2, V3; BGP V4), TCP Acceleration, **AES-256 Encryption**

Demodulator Specifications

Demodulator	**DVB-S2:** QPSK, 8PSK & 16APSK **DVB-S2X:** QPSK, 8PSK, 8APSK-L 16APSK, 16APSK-L, 32APSK, 32APSK-L, 64APSK & 64APSK-L **Options for Advanced Modulation:** 128APSK, 256APSK and 256APSK-L
Enhanced Doppler	**Frequency shift:** up to ±700kHz; r**ate of change** up to ±100kHz/s (symbol rate dependent)
Receive Filter Roll-off	**DVB-S2:** 20%, 25%, 35% **DVB-S2X:** 5%, 10%, 15%, 20%, 25%, 35%
Input Range	**Minimum:** -140 + 10 log (symbol rate) **Maximum:** -78 + 10 log (symbol rate)
LNB Voltage	Selectable 13V, 15V, 18V or 20V DC to LNB via IFL cable; maximum 0.5A

Interface, Mechanical and Environmental Specifications:

Traffic	4-port Gigabit Ethernet switch (RJ45 connectors; Interface used for IP traffic and M&C)
IF Tx and Rx	L-band: 950 to 2,150MHz (resolution 1Hz) SMA connectors
Power Supply	Wide range floating DC input Voltage: 24V to 48V, 9A @ 24V, 4.5A @ 48V, power consumption 30W max (modem only), 200W max (including BUC PSU). Unit is supplied with a DC plug for customer power supply connection

Mechanical	Size: 209 x 287 x 42.2mm; depth 295mm with RF connectors; Weight: 1200g
Environmental	0°C to 55°C Operating Temperature; 95% relative humidity, non-condensing; FCC, CE and RoHS compliant; Safety: EN62368-1:2014 Edition 2; Emissions: EN55032:2015 Class B; Immunity: EN55035:2017

Comparing AXIOM-S to Q-Lite Half-width

Specification	AXIOM-S Family	Q-Lite Half-width
Data Rate	Tx: 345 Mbps Rx: 230 Mbps	345 Mbps
Symbol Rate	Tx: 100 Msps Rx: 98 Msps [1]	70 Msps
Modulation	DVB-S2X up to 256APSK	DVB-S2X up to 256APSK
RF Frequency Range	L: 950 to 2,150 MHz	IF: 50 to 180 MHz L: 950 to 2,450 MHz
RF Tx Power Range	L: 0 to -40 dBm	IF: 0 to -25 dBm L: +5 to -40 dBm (950 to 1,950 MHz) 0 to -40 dBm (1,950 to 2,150 MHz) 0 to -30 dBm (2,150 to 2,450 MHz)
RF Connector	SMA Connectors	TNC IF & L
PCMA Bandwidth	-	72 MHz
Display & Keypad Entry	-	Yes
Terrestrial Interface Slots	-	Choice of Two
Available WGS-Certified Models?	-	Yes
Available Encrypted Models?	Yes	Yes
Ethernet M&C/ Traffic Ports	1 M&C, 3 Traffic	IP: 1 M&C, 3 Traffic
Size, Weight	209 x 287 x 42.2mm, 1200g	440 x 250 x 42.2mm, 1.5kg
PSU	24V – 48V ± 10% (floating)	90 to 264VAC, 1A @100V, 0.5A @ 240V or 24V DC option

[1] 98Msps@QPSK, 85Msps@8PSK/8APSK, 64MSps@16APSK, 51Msps@32APSK,43Msps@64APSK, 36Msps@128APSK, 32Msps@256APSK

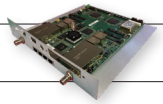
The Paradise Family of Secure SCPC Modems

Paradise SCPC Modems			Point-to-Point	Mesh	Point-to-MultiPoint, Star, Hybrid		Features of Note
					Hub	Remote Site	
Standard	1U 19" Rack	QFlex-400	✓			✓	PCMA+ enhanced carrier overlay available
		QMultiFlex-400	✓	✓	✓	✓	Optional Embedded Hub Canceller
		QFlex-400 P2MP	✓			✓	Configured remote
		QubeFlex	✓				Small Sat/LEO - support for CCSDS
		AXIOM-N	✓			✓	IP-centric modem
Small Form Factor	Rack Mount Half Width	Q-Lite Half Width	✓			✓	Mountable side-by-side in 1U rack space
		AXIOM-S	✓			✓	Compact IP-centric modem
	Rugged	Q-Lite Rugged	✓			✓	IP65 weatherproof outdoor modem
		AXIOM-R	✓			✓	IP67 IP-centric modem
	OEM Card	Q-Lite Card	✓			✓	For OEM integration
		AXIOM-X	✓			✓	Our smallest modem









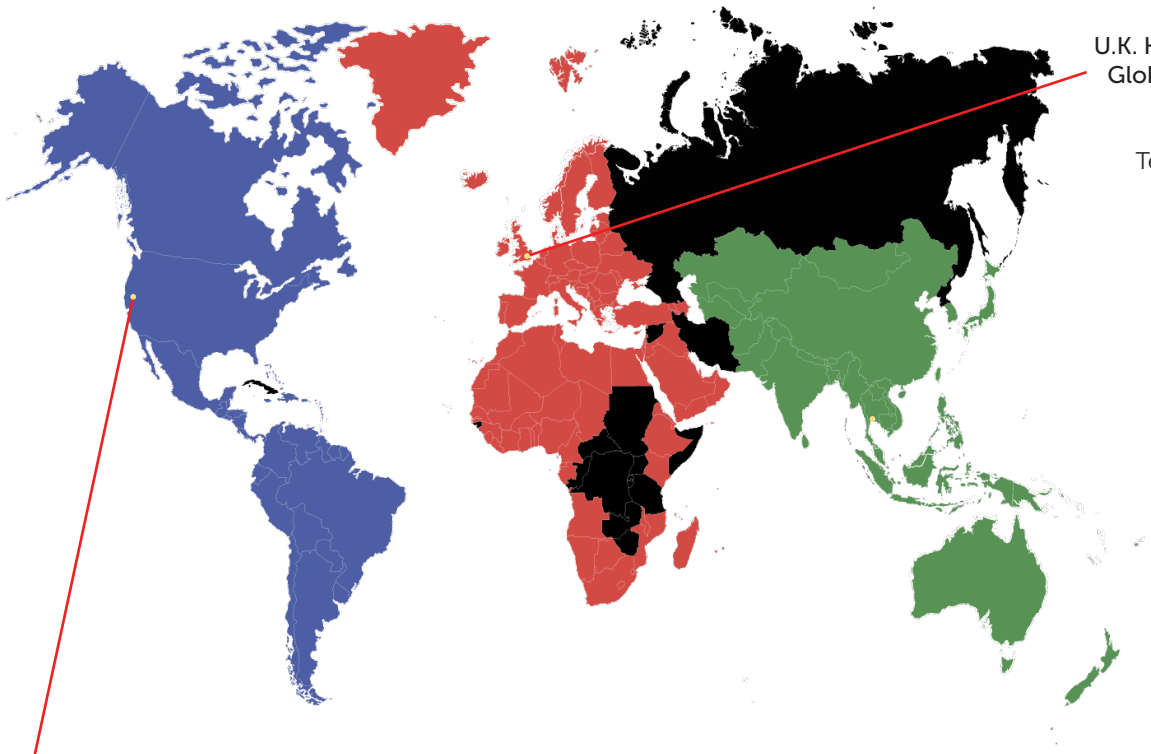

All modem models except QubeFlex are also available as **encrypted models**, capable of TCP/IP packet payload encryption using symmetric AES with 256-bit keys. Note that these models are export controlled.

Ordering: AXIOM-S Encryption

Standard Features		Description
	☑	**100kbps to 2.048Mbps DVB-S2 CCM/ACM** (EN 302 307-1) **Modem**, Supporting QPSK, 8PSK & 16APSK, 20%, 25% & 35% Roll off, with **4-port Gigabit Ethernet switch for M&C and traffic**; **L-band** operation 950 to 2,150MHz **AUPC:** Automatic Uplink Power Control **Traffic Shaping:** Supports CIR/BIR/priority settings for IP streams classified by IP address, Diffserv class, IEEE 802.1p priority tag, MPLS EXP field, and VLAN ID **Dynamic Routing:** RIP, OSPF and BGP
	☑	**AES-256 Encryption:** TCP/IP packet payload encryption using symmetric AES with 256-bit keys

Optional Features		
Extend Tx Data Rate	○	**5Mbps:** Extends base operation to 5Mbps
	○	**10Mbps:** Extends 5Mbps operation to 10Mbps
	○	**25Mbps:** Extends 10Mbps operation to 25Mbps
	○	**100Mbps:** Extends 25Mbps operation to 100Mbps
	○	**345Mbps:** Extends 100Mbps operation to 345Mbps
Add Advanced IP Features	○	**Compression:** IP/UDP/TCP/RTP packet header compression (RFC 3095) plus Ethernet header compression; TCP/UDP packet payload compression using the Deflate algorithm (RFC 1951)
	○	**Acceleration:** Up to 4,400 concurrent accelerated TCP connections to 100Mbps subject to prevailing data rate limits
DVB-S2X	○	**DVB-S2X** CCM, ACM, VCM: QPSK, 8PSK, 8APSK, 16APSK, 32APSK & 64APSK Tx/Rx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes DVB features; ACM, VCM and DVB encapsulation. To 345/230Mbps subject to prevailing modem data rate limits.
	○	**Advanced Modulation:** 128APSK, 256APSK, 256APSK-L
BUC	○	Enable **BUC** PSU software feature to provide DC via the RF connector to power a BUC. 6A Max at 24V supplied via the DC input to the Modem.
Rack Mounting Kits	○	**19" Double:** Rack mount kit for two AXIOM-S modems
	○	**19" Single:** Rack mount kit for a single AXIOM-S modem
	○	**10.5" Single:** Rack mount kit for single AXIOM-S modem
	○	**9.5" Single:** Rack mount kit for single AXIOM-S modem

Global Sales Offices



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