

AXIOM-C Encryption

Compact Satellite Modem



A Compact and Compatible Member
of the Paradise Modem Family
with AES-256 Encryption

Overview

The AXIOM Compact is our smallest, 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 Compact ideal to support new HTS satellites, so future proofing your investment.

Features include:

- **Small:** 209mm (8.25") W x 209mm (8.25") D x 42.2mm (1.66") H; (217mm deep inc. RF connectors)
- **Lightweight:** 745g (1.6lb)
- **High capacity:** IP-centric, DVB-S2X, options up to 345Mb/s Tx, 230Mb/s Rx
- **Secure:** SCPC is more secure than TDMA, and provides guaranteed bandwidth for always-on applications.
- **Compatible with Q & AXIOM products**
- **Enhanced Doppler:** Superior performance for LEO and MEO communications with an allowable frequency shift of up to $\pm 700\text{kHz}$ and rate of change up to $\pm 100\text{kHz/s}$
- 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

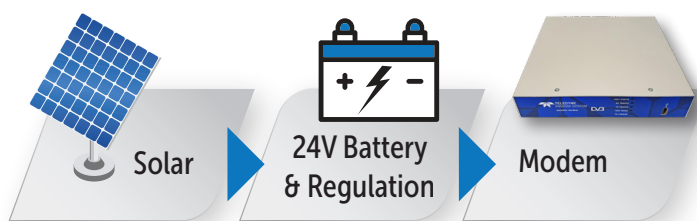


The AXIOM-C (right) is smaller than our Q-Lite Half-Width modem (left)

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

Optimized for Low Power

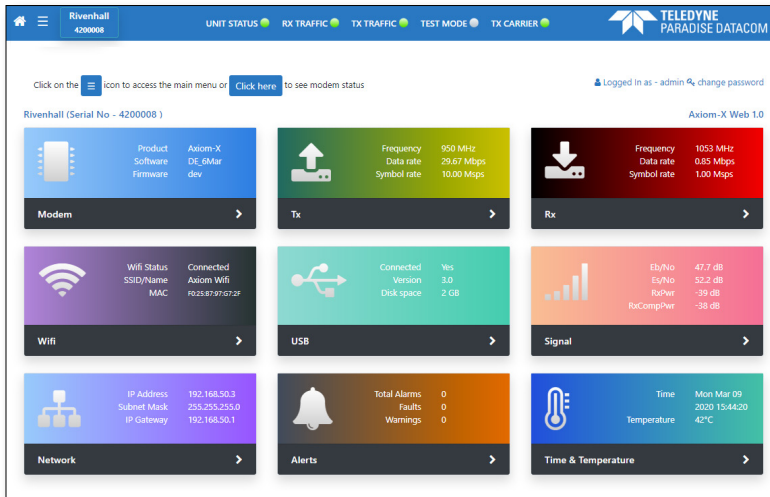


AXIOM-C is ideal for low power applications like solar-powered systems.

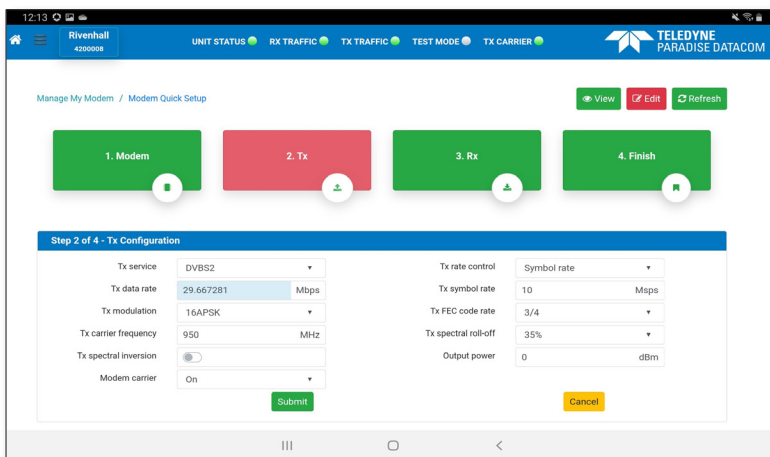


New Web User Interface

The AXIOM-C 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.

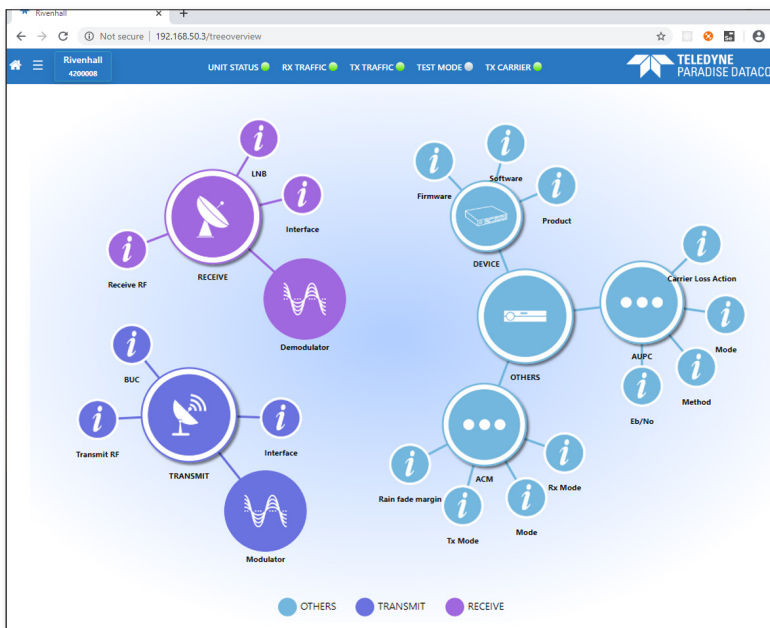


Clear, Intuitive Home views allows easy, one click navigation direct to the required fields

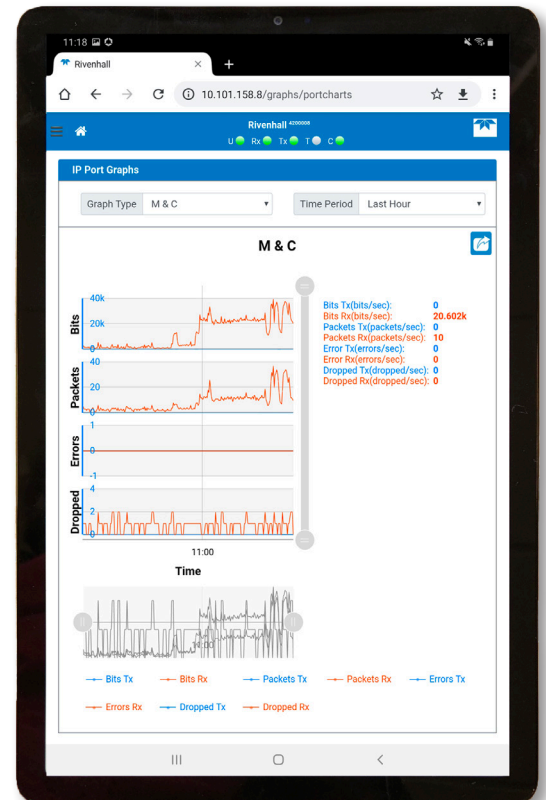


Easy flow configuration allowing quick set-up of key parameters (upper)

Network tree overview (lower)



Tablet view allowing easy on the move Browsing



Built for the Most Stringent Portable Applications

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

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

PRACTICAL

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

CONVENIENT

BUC power supply can be provided by the standard 24V DC input, reducing the need for external equipment

COMPACT & EFFICIENT

Small size and weight

WELL EQUIPPED

Transmitter

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

4 Gigabit Ethernet Ports

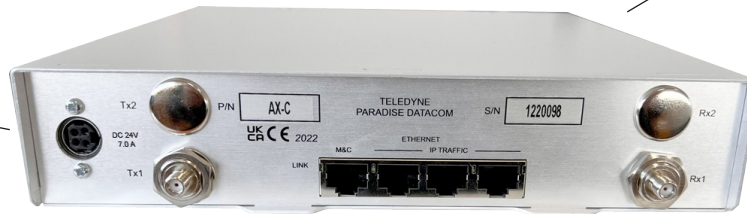
Convenient – no need for an external switch, saving space, power, wiring;
Layer 2 Bridging, Layer 3 Routing

Receiver

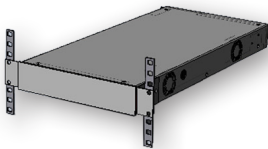
Fast: Up to 230Mbps, 98Msps

RF Stages

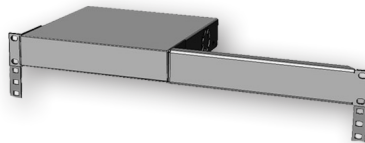
- Future Proof: Transmit and receive speeds upgradable in the field – only pay for the capacity you need now
- L-band coverage from 950 to 2,150 MHz



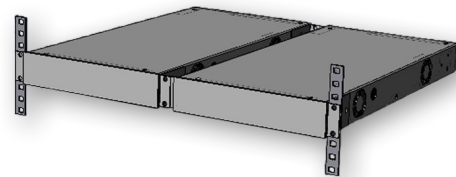
Rack-Mountable



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



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



K4100: Mounting kit for two AXIOM-Cs 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) (Supports all DVB-S2 & DVB-S2X MODCODs including Linear MODCODs) 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)

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
DVB Features	ACM/VCM, DVB Encapsulation, GSE Encapsulation

Interface, Mechanical and Environmental Specifications:

Traffic	4-port Gigabit Ethernet switch (RJ45 connectors; Interface used for IP traffic and M&C)
Power Supply	24V input, power consumption 30W max (modem only), 150W max (including BUC PSU). Unit is supplied with a 24V DC plug for customer power supply connection or two optional adapters are available. 65 Watt PSU option: universal 100 to 240Vac, 50/60Hz inpit, 24V DC, 2.7A output external power block capable of supplying the standard unit. 150 Watt PSU option: universal 100 to 240Vac, 50/60Hz inpit, 24V DC, 6.25A output external power block capable of supplying the standard unit and a BUC if also ordering the BUC PSU option

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 24V 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, PID & MPLS EXP

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; rate 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

Comparing AXIOM-C to Q-Lite Half-width

Specification	AXIOM-C Encryption	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 209 x 42.2mm, 745g	440 x 250 x 42.2mm, 1.5kg
PSU	24V DC + / - 0.5V for AXIOM-C, comes with universal 100-240Vac external power block	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-C	✓			✓	Compact IP-centric modem 
		Rugged	Q-Lite Rugged	✓			✓
		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-C Encryption

Standard Features	Description
	<input checked="" type="checkbox"/> 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; high-G 10MHz reference (with G sensitivity rating of 1×10^{-9} /g) 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, VLAN ID and MPEG2 transport stream PID Dynamic Routing: RIP, OSPF and BGP
	<input checked="" type="checkbox"/> AES-256 Encryption: TCP/IP packet payload encryption using symmetric AES with 256-bit keys
Optional Features	
Extend Tx Data Rate	<input type="checkbox"/> 5Mbps: Extends base operation to 5Mbps <input type="checkbox"/> 10Mbps: Extends 5Mbps operation to 10Mbps <input type="checkbox"/> 25Mbps: Extends 10Mbps operation to 25Mbps <input type="checkbox"/> 100Mbps: Extends 25Mbps operation to 100Mbps <input type="checkbox"/> 345Mbps: Extends 100Mbps operation to 345Mbps
Add Advanced IP Features	<input type="checkbox"/> 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) <input type="checkbox"/> Acceleration: Up to 10,000 concurrent accelerated TCP connections to 100Mbps subject to prevailing data rate limits
DVB-S2X	<input type="checkbox"/> 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. <input type="checkbox"/> Advanced Modulations: 128APSK, 256APSK, 256APSK-L
BUC	<input type="checkbox"/> Enable BUC PSU software feature to provide DC via the RF connector to power a BUC. 6A Max at 24V supplied via the Modem PSU. Requires 150W Power Supply or other suitable external source.
Power Supply	<input type="checkbox"/> 65 Watt: Universal power block (2.7A) <input type="checkbox"/> 150 Watt: Universal power block (6.25A) for use with Enable BUC PSU option
AC Power Cord <i>Select one if a Power Supply option is selected</i>	<input type="checkbox"/> UK <input type="checkbox"/> US <input type="checkbox"/> EU <input type="checkbox"/> Australia
Rack Mounting Kits	<input type="checkbox"/> 19" Double: Rack mount kit for two AXIOM-C modems <input type="checkbox"/> 19" Single: Rack mount kit for a single AXIOM-C modem <input type="checkbox"/> 10.5" Single: Rack mount kit for single AXIOM-C modem <input type="checkbox"/> 9.5" Single: Rack mount kit for single AXIOM-C modem

Global Sales Offices

U.S., Canada, Latin America

Teledyne Paradise Datacom
11361 Sunrise Park Drive
Rancho Cordova, CA 95742
Tel: +1 (814) 954-6163
sales@paradisedata.com

Eastern Regional Sales Office (Eastern U.S. & Latin America)

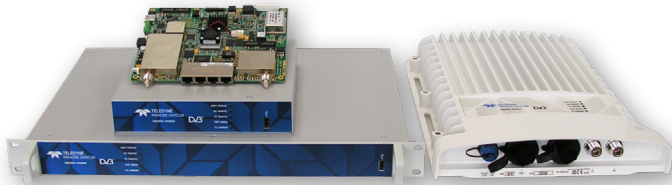
RF Inquiries: John O'Grady, (848) 220-6464
Modem Inquiries: Mike Towner, (470) 509-9941
sales@paradisedata.com

Western Regional Sales Office (Western U.S. & Canada)

Bruce Grieser
Cell: +1 (480) 444-9676
sales@paradisedata.com

U.K. Office

Europe, Middle East, Africa
Teledyne Paradise Datacom
106 Waterhouse Lane,
Chelmsford, Essex, England, CM1 2QU
Tel: +44(0)1245 847520
Tel: +44(0)1376 515636
sales@paradisedata.com



The AXIOM-C is part of the AXIOM family of IP-centric satellite modems

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Refer to the website or contact Sales or Customer Support for the latest product information. The information contained herein is classified EAR99 under the U.S. Export Administration Regulations. The information contained herein is classified EAR99 under the U.S. Export Administration Regulations. The modem itself is classified ECCN 5A002.a.1 and is subject to U.S. Department of Commerce export control. Export re-export or diversion contrary to U.S. law is prohibited.