# Q-Lite™ Encryption Half-Width

## Encrypted Satellite Modem
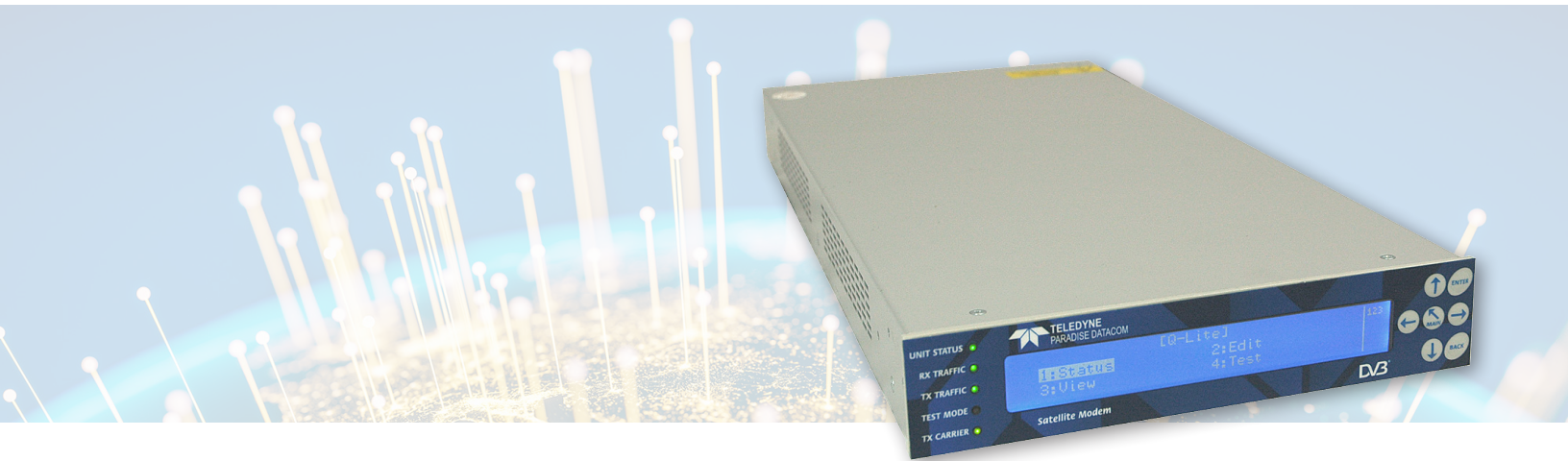
**Full-featured modem in one-half 1U rack space**

TELEDYNE
PARADISE DATACOM
Everywhere**you**look™

## Overview

The **Q-Lite™** is a compact, single-board satellite modem suitable for integration into custom enclosures for portable communications and comms-on-the-move.

The Q-LiteE half-width compact satellite modem is provided in 9.5-inch & 10.5-inch chassis. Two 9.5-inch chassis can be fitted side-by-side in a standard 19-inch rack, saving on air-conditioned hub space. Its small size and low power consumption also make it ideal for portable communications and comms-on-the-move.

The Q-Lite Half-Width modem supports Paradise Datacom's low latency Fastlink LDPC for latency sensitive applications and DVB-S2 / DVB-S2X, the most powerful and robust modulation and coding available for the space segment, supporting modulations from QPSK to 64APSK and data rates to 345Mbps. The Modem has an extended L-band frequency range, better RF performance, higher processing capability therefore allowing for future upgrades. Multiple serial interfaces are available or the unit may be used for L2 Bridging or L3 routing of IP traffic. In addition, the unit may be used in the highly efficient Trunking mode, where maximum performance is achieved in terms of bit rate and packets per second, with zero jitter.

It is ideal as a versatile point-to-point network modem or a remote modem in a point-to-multipoint network.

Remote monitoring and control of the modem is via Ethernet.

## Advanced Bandwidth-Efficient Features

Paired Carrier+™ is our enhanced carrier overlap technology that allows transmit and receive carriers to occupy the same space segment.

DVB-S2X, is between 20% and 60% more bandwidth efficient than its predecessor, DVB-S2.

Bandwidth-saving IP features include ACM, acceleration and header and payload compression.

## Markets and Applications

- Comms-on-the-move including vehicles, aircraft and UAVs
- Oil & gas
- Broadcast
- Disaster relief
- Maritime
- Satellite news gathering
- Compact, low-power satellite terminals

## Features

- Data rates to 345Mbps
- AES-256 Encryption
- Extended L-band operation to 2,450MHz
- Paired Carrier+™ enhanced carrier overlay
- **XStream IP™** advanced IP optimization suite including TCP Acceleration, header & payload compression, traffic shaping & ACM
- Optimized spectral roll-offs, including 5%
- DVB-S2/S2X, **FastLink™** LDPC & TPC
- 9.5-inch & 10.5-inch chassis options (convertible using just different L-brackets)
- Software Defined Network support: vendor-independent network device control using standard control (supports OpenFlow)
- 25 to 33 Watt power consumption
- AC & 48V DC input power supply options
- **LinkGuard™** signal-under-carrier interference detection
- Built-in spectrum & constellation monitors
- DVB Carrier ID. Fully compliant with DVB- CID standard
- TRANSEC (SAF option; limit <25Mbps) provides additional protection for communication channels
- **Q-NET™ Navigator** network control application included as standard
- Available in WGS-certified model

Q-LiteE - Half-Width Encryption Satellite Modem

## Why Q-Lite?

Our Flagship Software Defined Modem is Paradise Datacom's most innovative and flexible Satellite Modem to date

### STATE OF THE ART

- DVB-S2X up to 64APSK provides the highest bandwidth efficiency
- FastLink Low latency LDPC provides advanced optimisation modes for latency sensitive applications.

### SECURE

- SCPC is both secure, and with Paradise Modems, easy to provision
- For enhanced security, AES-256 encryption is standard
- Optional TRANSEC processing
- AAA Radius support and access control lists.

### COMPATIBLE

- Reuse your existing code
- Functional replacement for Q-Flex and older series Modems.
- No need for extensive retraining of Maintenance staff.
- Supports legacy interfaces and FEC schemes
- Supports IF and L-band in one unit.

### CONVENIENT

- Optional BUC power Supply reduces need for external equipment
- Built in Spectrum Analyser and Constellation monitor

### PRACTICAL

- 1U, half-width rack mount chassis
- Simple front panel control with back-lit LCD
- Intuitive web browser and Q-NET compatible
- Built in test tools, no need for expensive test equipment

### EFFICIENT

- Paired Carrier+ saving up to 50% Bandwidth
- 5% spectral roll off saving 15% bandwidth over the standard 20%
- Advanced optimisation features, including TCP acceleration, Header and Payload compression.

## WELL EQUIPPED
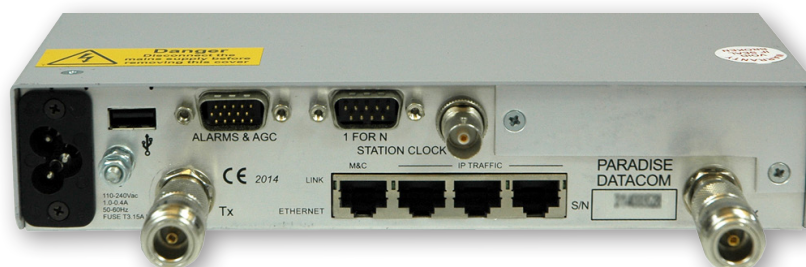
### Transmitter
Fast:
- Up to 345Mbps / 70Msps
- Output power: IF 0 to -25dBm; Standard L-Band +5 to -40dBm

### Interface Ports
Convenient:
- For IP traffic and legacy interfaces
- Allowing seamless migration from serial to IP
- 4 GB Ethernet ports, Layer 2 Bridge, Layer 3 router.
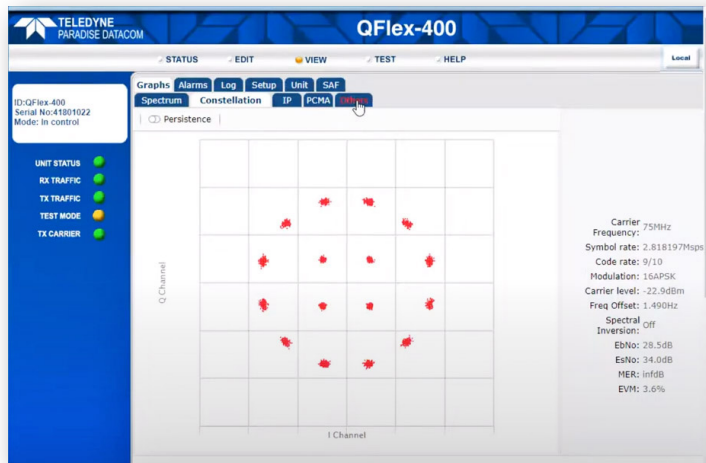
### RF Stages
Future Proof:
- Transmit and Receive speeds field upgradeable, only pay for the capacity you need now
- Extended L-Band coverage from 950 to 2,450 MHz
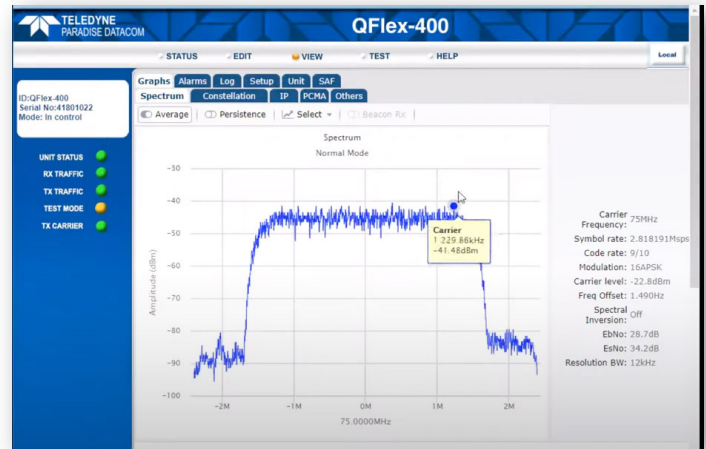- Wideband IF 50 - 180MHz

### Receiver
Fast:
- Up to 345Mbps/ 70Msps
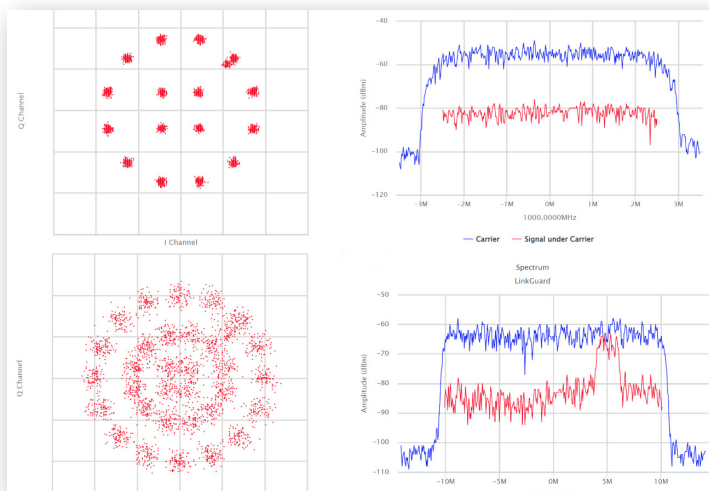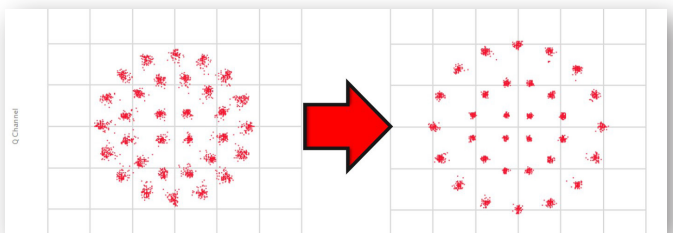
## Advanced Bandwidth-Efficient Features

The Q-Lite™ Encryption modem supports the most powerful bandwidth-saving technology available.

DVB-S2X, is between 20% and 60% more bandwidth efficient than its predecessor, DVB-S2.

Paired Carrier+™ is our enhanced carrier overlap technology that allows transmit and receive carriers to occupy the same space segment.

XStream IP™ bandwidth-saving IP features include ACM, TCP acceleration and header and payload compression.
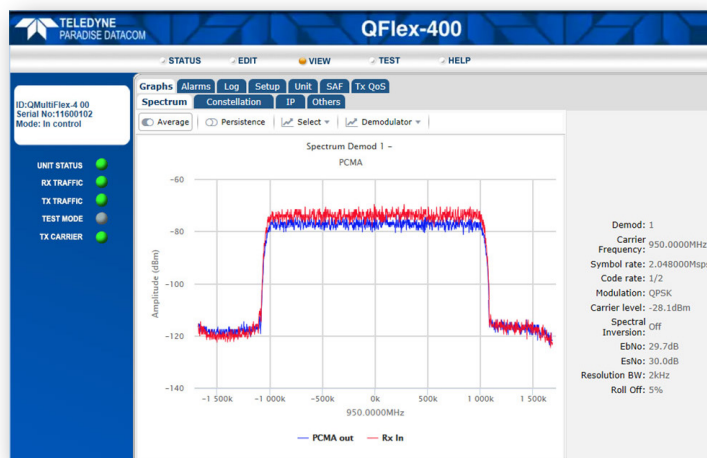
## Included Network Management

Q-NET Navigator supports monitor and control of all Paradise modems from a single application. Includes easy-to-use navigation, support for multiple operator roles / access levels, continuous status / alarm polling and full access to all modem features. The web based Q-NET Navigator is included as standard, free of charge.

**Paired Carrier+:** used to reduce the occupied satellite bandwidth by up to 50% by overlaying the transmit and receive carriers in the same space segment. Adaptive self-interference cancellation is used to remove the unit's transmitted signal from the composite received signal, leaving just the desired signal.

## Beacon Receiver Function

Q-Lite™ detects satellite beacon transmissions down to very low signal levels. This helps with automatic antenna pointing and removes the need for a separate beacon receiver.
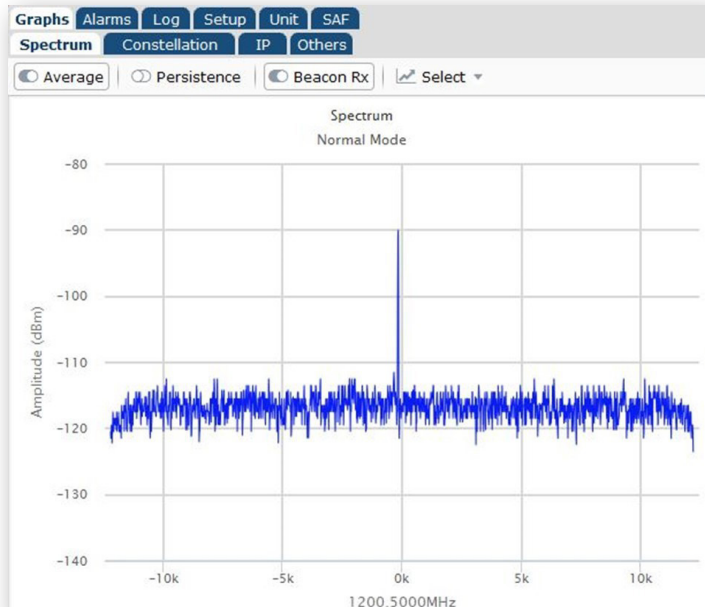
## The Q-Net Family
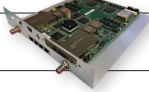
**Q-Net** is a fabric that allows each of the Q-Series modems to seamlessly interoperate giving you the ability to upgrade your network and re-use assets at will.

The different models have been thoughtfully designed to cover a wide variety of network situations flexibly and securely.

From models with WGS certification and encryption, to built-in features like 1:1 redundancy and test tools, we give you the lowest risk, highest return secure network available.

**QFlex-400 Encryption**
- Remote Site
- 1:1 Redundancy
- AES-256 Encryption
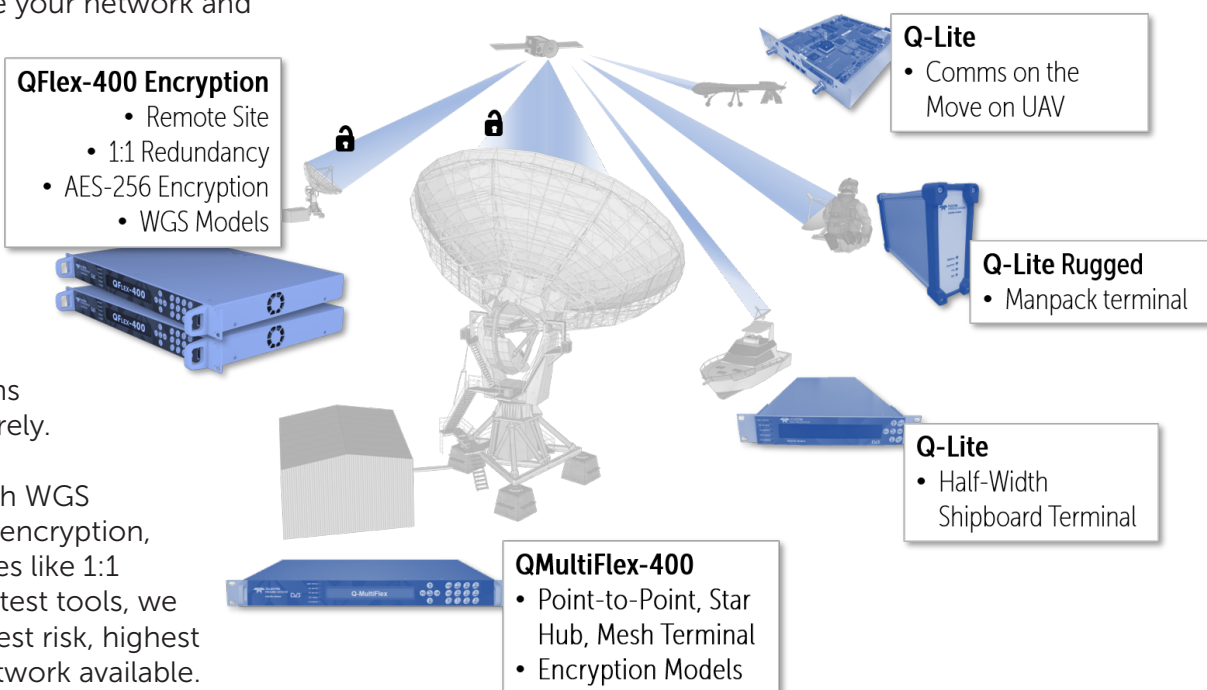- WGS Models

**Q-Lite**
- Comms on the Move on UAV

**Q-Lite Rugged**
- Manpack terminal

**Q-Lite**
- Half-Width Shipboard Terminal

**QMultiFlex-400**
- Point-to-Point, Star Hub, Mesh Terminal
- Encryption Models

## 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 | ✔ | | | ✔ | 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.

The QFlex-400, Q-Lite, Q-Lite Half Width and Q-Lite Rugged models are also available as **WGS-certified** models.

Q-LiteE - Half-Width Encryption Satellite Modem

## Main Specifications

| | |
|---|---|
| Topology | Point to Point or Star Modem within a Point to Multipoint Network |
| Frequency | **L-band:** 950 to 2,450MHz (resolution 1Hz)<br>**IF:** 50 to 180MHz (resolution 100Hz)<br>TNC connectors for Tx & Rx |
| Data Rates | **Standard:** 2,048kbps<br>**Options:** 5, 10, 25, 60, 100, 200 & 345Mbps |
| Data Rate Limits | **DVB-S2/S2X:** 55kbps to 345Mbps<br>**FastLink™ LDPC:** 18kbps to 100Mbps (1bps resolution)<br>**TPC:** 2.4kbps to 60Mbps<br>**DVB-S/DSNG:** 100kbps to 50Mbps (1bps resolution) |
| Symbol Rate Limits | **DVB-S2/S2X:** 150ksps to 70Msps<br>**FastLink™ LDPC:** 18ksps to 40Msps<br>**TPC:** 2.4ksps to 40Msps<br>**DVB-S/DSNG:** 100ksps to 40Msps |
| Operating Modes | **DVB-S2/S2X** (EN 302 307-1 & EN 302 307-2)<br>**Closed Network** (+ ESC) (IESS-315)<br>**DVB-S/DSNG** (EN 300 421 & EN 301 210) |
| Impedance | 50Ω |
| Return Loss | **L-Band:** 950MHz to 2GHz >16dB<br>2GHz to 2.45GHz >12dB<br>**IF:** > 18dB |
| Redundancy | 1:1 through 1:16 redundancy (requires Utilities Card) |

## Mechanical/Environmental

| | |
|---|---|
| Size | 440mm x 215mm (480mm x 250mm when fitted with TNC to N type converters and L-mounting brackets) |
| Weight | 1.5kg |
| Power Supply | 90 to 264VAC, 1A @ 100V, 0.5 A @ 240V, 47 to 63 Hz Fused IEC connector (live and neutral fused); 48V DC option |
| Compliance | FCC, CE and RoHS compliant |
| Safety Standards | EN 62368-1:2014 |
| Emissions & Immunity | Emissions: EN 55032:2015 Class A<br>Immunity: EN 55032:2017 |
| Operating Temperature | 0°C to +50°C |
| Storage Temperature | -20°C to +70°C (limits must not be exceeded) |
| Humidity | 95% relative humidity, non-condensing |
| Shock & Vibration | Certification to relevant part of MIL-810G currently in progress |
| Design & Production Facility Certification | Both the design and production facilities are ISO9001 certified; the production facility is additionally AS9100 certified (giving parts traceability) |

## Test Facilities & Alarm Outputs

| | |
|---|---|
| Built-in Test Tools | As part of built-in web server: Rx constellation monitor; Rx spectrum analyser; **LinkGuard™** Signal-Under-Carrier interference detection; beacon receiver function that provides automatic detection of satellite beacon transmissions; time graphs for key performance indicators (IP throughput, Eb/No, etc.) |
| BER Tester | Bit error rate tester operates over main traffic or ESC channel, allowing BER monitoring while on traffic. Not available in DVB-S2/S2X modes. Supports various test patterns compatible with common BER testers |
| Other Test Modes | Transmit CW<br>Transmit alternate 1-0 pattern<br>Simulated satellite delay for TCP/IP packets |
| Alarm Relays | 4 independent Form C relays for unit, Tx, Rx and deferred alarms |

## Features

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|---|---|
| ClearLinQ™ Adaptive Tx Predistorter ⊙ | Corrects for linear & non-linear distortion in the RF chain (i.e. amplifier and transponder). Applicable to all FECs and modulations. Maximises amplifier linear output power; minimises required back-off. Up to 2dB performance gain |
| DVB-S2/S2X Rx Adaptive Equaliser | Corrects for slope on the carrier and group delay (typically found at transponder edges, causing inter-symbol interference). The 9-tap Rx equaliser is provided as standard; automatically switched on above 10Msps |
| DVB Carrier ID Option (ETSI TS 103 129) ⊙ | Supports the identification of interfering carriers. Allows identification of individual modem carriers by superimposing a low-power CID waveform onto the carrier with negligible degradation. **Supported for all carriers.** The CID waveform contains a unique Carrier ID and other identity information. A carrier monitoring system is required to decode CID waveforms |
| Traffic Interfaces ⊙ | **Standard: 4-port Gigabit Ethernet switch** (RJ45 connectors; used for IP traffic and M&C)<br>**Options** (maximum of one additional interface may be selected)**:**<br>• **EIA-530** (RS422, X.21, V.35 and RS232 on 25-pin D-type female)<br>• **Quad ASI** (75Ω BNC female)<br>*Please contact us regarding support for other interfaces* |

⊙   Optional Functionality

## Modulator

| | |
|---|---|
| Output Power (0.1dB steps) | **IF:** 0 to −25dBm (0.1 dB steps) <br> **L-Band** (0.1 dB steps)**:** <br> • +5 to -40dBm (950 to 1,950MHz) <br> • 0 to −40dBm (1,950 to 2,150MHz) <br> • 0 to −30dBm (2,150 to 2,450MHz) |
| Output Power Stability/ Accuracy | Stability: ±1.0dB, 0°C to 50°C <br> Accuracy: ±0.375dBm |
| Transmit Filter Roll-off | 5%, 10%, 15%, 20%, 25%, 35% |
| Phase Accuracy | ±2° maximum |
| Amplitude Accuracy | ±0.2dB maximum |
| Carrier Suppression | -30dBc minimum |
| Output Phase Noise | As EN 302 307, EN 300 421, IESS-308 & EN 301 210; minimum 16dB better than IESS-308/309 |
| Harmonics & Spurious | Better than −55dBc/ 4kHz in-band (at 0dBm to −30dBm output) |
| Transmit On/ Off Ratio | -65dB minimum |
| BUC PSU Option | 24V or 48V DC via IFL cable, 200W |
| BUC 10MHz Reference | Via IFL cable; 10MHz ± 0.01 ppm; 2dBm ± 2dB |
| FSK Control | Allows monitor & control of a compatible L-band BUC via the Tx IFL cable |

## Demodulator

| | |
|---|---|
| Input Range (dBm) | **IF minimum:** -130 + 10 log (symbol rate) <br> **L-band minimum:** -140 + 10 log (symbol rate) <br> **IF/L-band maximum:** -68 + 10 log (symbol rate) |
| Maximum Input Power | **L-Band:** +10dBm <br> **IF:** 0dBm |
| Wanted-to-Composite | -102 + 10 log (symbol rate) |
| Frequency Sweep Width | ±1kHz to ±255kHz (1kHz steps) |
| Acquisition Time | Dependent on FEC, data rate and sweep width |
| RX Spectral Roll-off | 5%, 10%, 15%, 20%, 25%, 35% |
| LNB 10MHz Reference | Via IFL cable; 10MHz ± 0.01ppm; 2dBm ± 2dB |
| Antenna Pointing Output | Scalable 0 to 10V DC output signal of the wanted Rx power level, composite Rx signal level, demodulator AGC level or Eb/No level for antenna peaking/pointing (requires Utilities Card or Antenna Pointing Card) |
| LNB Voltage | Programmable 13V, 15V, 18V, 20V or 24V DC to LNB via IFL cable; maximum 0.5A |

## Ethernet: Standard Features

| | |
|---|---|
| Bridging and Static Routing | **Trunking mode:** Hardware Layer 2 switch supporting 345Mbps bi-directional traffic at up to 200,000 packets per second; zero jitter <br> **Layer 2 bridge & Layer 3 router:** Software processing capability of up to 150,000 packets per second |
| IPv4/IPv6 | Dual IPv4/IPv6 TCP/IP supporting IPv4/ IPv6 bridging and routing |
| VLAN Support | IEEE 802.1q VLAN support |
| | IEEE 802.1p packet prioritisation using strict priority or fair weighting queuing |
| Software Defined Network Support | OpenFlow and other SD-WAN protocols provide support for network virtualisation; see Q-NET Satellite Network Solution white paper for more details |
| DHCP | DHCP client for automatic allocation of M&C IP address; DHCP server allocates IP addresses to network devices |
| NAT | NAT firewall; allows all network devices to share a single IP address when viewed from other end of satellite link |
| SNMP | SNMP v1, v2c & v3 |
| Access Control Lists | Separate IP and MAC address black/ white user access control lists |
| Network Time Protocol (NTP) | NTP client synchronises modem time & date to NTP server; provides millisecond accuracy |
| Web Server | Modem web server M&C interface (including built-in tools listed under Test Facilities) |
| AAA RADIUS Secure User Login | Authentication, Authorisation & Accounting. Greater access control & accountability. Replaces standard modem login with user's personal network login credentials |
| IP Metrics | Tx, Rx throughput (bps, pps) graphs; dropped, errored packet counts |
| sFlow Performance Metrics | sFlow is the industry standard for network monitoring, giving full modem performance visibility to sFlow compatible network management devices |
| Active Queue Management (AQM) | Implements CoDel (controlled delay) which overcomes buffer bloat by maintaining a constant delay through the modem for all IP packets |
| MPEG over IP | Supports the efficient transfer of SMPTE 2002-2 MPEG2 transport streams over satellite |
| OpenAMIP Protocol Support | Controls modem interaction with compliant antenna control units to support antenna deployment/pointing/ tracking |
| Virtual Routing & Forwarding | VRF supports multiple modem routing tables, allowing inter-VLAN routing |
| Packet Generator/ Analyser | Generates & analyses TCP & UDP packet streams, allowing modem-to-modem IP testing without any PCs |
| Ethernet MTU Size | 10k bytes |

Q-LiteE - Half-Width Encryption Satellite Modem

## Encryption

| AES-256 Encryption | Supported on Q-LiteE™ model only. The Q-LiteE™ is identical to the Q-Lite™ in every other respect |
|---|---|

## Ethernet: XStream IP™ DVB-S2X

Provided as standard as part of DVB-S2/S2X

| ACM | Dynamically varies Modcod with varying link conditions, maximises throughput at all times by converting unused link margin into additional throughput; 100% link availability |
|---|---|
| DVB-S2/X VCM mode | Supports MultiStream mode where the outbound carrier consists of multiple Modcods. Up to 6 Modcod's are supported, which allows stations to be configured to receive any one of these Modcod's, depending on signal strength at the remote site. |
| VCM | Supports transmission/reception of two ASI streams or, one ASI stream with one IP stream, each with its own Modcod for optimal throughput |
| IP-over-DVB Encapsulation | Supports the transmission of IP packets with/without Ethernet frames over DVB-S2/S2X; encapsulates & decapsulates using GSE (see below), MPE (EN 301 192), ULE (RFC 4326) or Paradise XStream Encapsulation |
| GSE Encapsulation | Highly efficient encapsulation of IP packets or Ethernet frames; compatible with EN 302 307-2 standard, for use with DVB-S2 and DVB-S2X |

## Ethernet: XStream IP™ Option

XStream IP™ is an integrated set of IP optimization and traffic management features designed for maximum reliability and bandwidth efficiency. The maximum throughput depends on features enabled & traffic format

| Traffic Shaping | 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 |
|---|---|
| Header Compression | Robust Header Compression (RFC 3095). Reduces Ethernet/IP/UDP/TCP/RTP header sizes typically by 90%. 1-way packet processing limit: 60,000 pps; 2-way limit: 45,000 pps. Includes Ethernet header compression (compresses 14-byte Ethernet frame to typically one byte) |
| Payload Compression | Uses Deflate algorithm (RFC 1951) to compress TCP & UDP packets; typical payload compression of 50% |
| Dynamic Routing | RIP V1, V2; OSPF V2, V3; BGP V4 |
| TCP Acceleration | Typical throughput level of 90% of link capacity. Supports 4,400 concurrent accelerated TCP connections (plus at least 40,000 unaccelerated TCP connections) up to 100Mbps |

## Paired Carrier+™ Option

| Paired Carrier+™ | Transmit and receive carriers are overlaid in the same space segment. Echo cancellation techniques are used to cancel the unwanted transmit carrier, leaving the wanted receive carrier. Supports an occupied bandwidth between 25kHz and 70MHz depending on license |
|---|---|
| Data Rate Options | 256kbps, 512kbps, 1024kbps, 2.5Mbps, 5Mbps, 10Mbps, 15Mbps, 20Mbps, 25Mbps, 30Mbps, 40Mbps, 50Mbps, 60Mbps, 80Mbps, 100Mbps, 200Mbps and 345Mbps traffic rate |
| Carrier Asymmetry | **Symbol rate:** Up to 10:1 |
| Max Sym Rate | 70MBaud (carrier roll-off 10% max) |
| Min Sym Rate | 25kBaud |
| Delay Range | 0 to 350ms |
| Cancellation Range | -10 to +10dB local to remote carrier |
| Cancellation ratio | 28dB typical |
| Es/No degradation (symmetric carriers) | <0.1dB for Es/No $\leq$ 7dB. <0.2dB for 7dB < Es/No $\leq$ 11dB. <0.4dB for 11dB < Es/No $\leq$ 14dB. <0.5dB for 14dB < Es/No $\leq$ 16dB. <1.0dB for 16dB < Es/No $\leq$ 18dB. <1.5dB for 18dB < Es/No $\leq$ 20dB. <2.0dB for 20dB < Es/No $\leq$ 22dB. |
| Monitoring | Delay, frequency offset, power offset, lock status, channel amplitude slope and group delay (consult sales) |
| Mobile Operation | Uses GPS data to continually recalculate position relative to satellite, allowing uninterrupted operation in mobile environments anywhere in satellite footprint |

## Forward Error Correction

| | |
|---|---|
| **DVB-S2X**<br>EN 302 307-2<br>⬤<br>Includes support for DVB-S2 | **Normal Frame:**<br>**QPSK** 13/45, 9/20, 11/20<br>**8PSK** 23/36, 25/36, 13/18<br>**8APSK-L** 5/9, 26/45<br>**16APSK** 26/45, 3/5, 28/45,23/36, 25/36, 13/18, 7/9, 77/90<br>**16APSK-L** 5/9, 8/15, 1/2, 3/5, 2/3<br>**32APSK** 32/45, 11/15, 7/9   **32APSK-L** 2/3<br>**64APSK** 11/15, 7/9, 4/5, 5/6   **64APSK-L** 32/45<br><br>**Short Frame:**<br>**QPSK** 11/45, 4/15, 14/45, 7/15, 8/15, 32/45<br>**8PSK** 7/15, 8/15, 26/45, 32/45<br>**16APSK** 7/15, 8/15, 26/45, 3/5, 32/45<br>**32APSK** 2/3, 32/45 |
| **DVB-S2**<br>EN 302 307-1 | **QPSK** 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10<br>**8PSK** 3/5, 2/3, 3/4, 5/6, 8/9, 9/10<br>**16APSK** 2/3, 3/4, 4/5, 5/6, 8/9, 9/10<br>**32APSK** 3/4, 4/5, 5/6, 8/9, 9/10 |
| **FastLink™ Low-Latency LDPC**<br>⬤ | **BPSK** 0.499<br>**(O)QPSK** 0.532, 0.639, 0.710, 0.798<br>**8PSK/8QAM** 0.639, 0.710, 0.778<br>**16APSK/16QAM** 0.726, 0.778, 0.828, 0.851<br>**32APSK** 0.778, 0.828, 0.886, 0.938<br>**64QAM** 0.828, 0.886, 0.938, 0.960 |
| **TPC** | **BPSK** 5/16, 21/44, 3/4, 7/8 **(O)QPSK** 5/16, 21/44, 3/4, 7/8, 0.93<br>**8PSK** 3/4, 7/8, 0.93<br>**8QAM** 3/4, 7/8, 0.93<br>**16QAM** 3/4, 7/8, 0.93 |
| **DVB-S/DSNG** | DVB-S: QPSK 1/2, 2/3, 3/4, 5/6, 7/8<br>DVB-DSNG: 8PSK 2/3, 5/6, 8/9; **16QAM** 3/4, 7/8<br>(ETSI EN 300421/ 301210 compliant) |

## Utilities Card

| | |
|---|---|
| **Standard** | Includes the following features:<br>• 9-way D type for 1:1 and 1:N redundancy (compatible with Q-NET PDQS Redundancy Sw)<br>• 15-way D type for alarms (4 independent Form C relays for unit, Tx, Rx and deferred alarms), Tx Inhibit signal and scalable DC voltage output for antenna pointing USB connector for software upgrades, etc.<br>• Second fan for environments where extra cooling is required<br>• FSK signalling |

## Included Network Management

Web browser user interface support provided standard. SNMP & command line interfaces support development of third-party user interfaces. The following network control application options is available

| | |
|---|---|
| **Q-NET™ Navigator** | A simple interface to allow all Q-series modems in a network to be monitored and controlled from a single desktop application. Provided as standard, free of charge. |



**Ideal for comms-on-the-move:**
Two 9.5-inch chassis can be fitted
side-by-side in a standard 19-inch rack,
saving on air-conditioned hub space.

Q-LiteE - Half-Width Encryption Satellite Modem

## Ordering: Q-Lite™ Encryption Half-Width Satellite Modem

| Standard Features | | Description |
|---|---|---|
| Base Modem | ✓ | **Q-Lite mounted in 9.5-inch chassis** (supplied with additional L-brackets to allow easy conversion to 10.5-inch chassis)<br>**AES-256 Encryption**<br>**4.8kbps to 2.048Mbps Closed Network (+ ESC) modem with 4-port Gigabit Ethernet switch for M&C and traffic**<br>**IF operation 50 to 180MHz; L-band operation 950 to 2450MHz**; high-stability 10MHz reference<br>**TPC:** BPSK, QPSK, OQPSK, 8PSK, 8QAM and 16QAM; to 60Mbps subject to prevailing modem data rate<br>**AUPC:** Automatic Uplink Power Control<br>**All features described under Ethernet Standard Features**<br>**All features described under Test Facilities**<br>**Utilities card as described**<br>**AC mains input** |

### Optional Features

| | | |
|---|---|---|
| Tx Only | ◯ | Transmit functions only |
| Rx Only | ◯ | Receive functions only |
| Extend Tx Data Rate | ◯ | **5Mbps data rate:** Extends base operation to 5Mbps |
| | ◯ | **10Mbps data rate:** Extends 5Mbps operation to 10Mbps |
| | ◯ | **25Mbps data rate:** Extends 10Mbps operation to 25Mbps |
| | ◯ | **60Mbps data rate:** Extends 25Mbps operation to 60Mbps |
| | ◯ | **100Mbps data rate:** Extends 60Mbps operation to 100Mbps (FastLink, DVB-S2 & DVB-S2X only) |
| | ◯ | **200Mbps data rate:** Extends 100Mbps operation to 200Mbps (DVB-S2 & DVB-S2X only) |
| | ◯ | **345Mbps data rate:** Extends 200Mbps operation to 345Mbps (DVB-S2 & DVB-S2X only) |
| XStream IP™ | ◯ | **XStream IP Bundle,** includes all of the features listed below (or select any combination of individual features): |
| | ◯ | **Traffic Shaping:** Supports CIR/BIR/priority settings for IP streams classified by VLAN ID, IP address, Diffserv class, IEEE 802.1p priority, MPLS EXP field & MPEG2 transport stream PID |
| | ◯ | **Header Compression:** IP/UDP/TCP/RTP packet header compression (RFC 3095) plus Ethernet header compression |
| | ◯ | **Payload Compression:** TCP/UDP packet payload compression using the Deflate algorithm (RFC 1951) |
| | ◯ | **Dynamic Routing:** RIP, OSPF and BGP |
| | ◯ | **TCP Acceleration:** Up to 4,400 concurrent accelerated TCP connections to 100Mbps subject to prevailing data rate |
| DVB-S2X<br>To 345Mbps subject to prevailing modem data rate limits | ◯ | **DVB-S2/S2X CCM Tx:** DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Tx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 8APSK, 16APSK, 32APSK & 64APSK Tx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2X, which comprises ACM, VCM and IP-over-DVB encapsulation |
| | ◯ | **DVB-S2/S2X CCM Rx**: Add-on card supporting DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Rx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 8APSK, 16APSK, 32APSK & 64APSK Rx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2X, which comprises ACM, VCM and IP-over-DVB decapsulation |
| ClearLinQ™ | ◯ | **Adaptive Tx Predistorter:** Corrects for linear & non-linear distortion in the RF chain (amplifier & transponder). Applicable to all FECs and modulations |
| FastLink™<br>Low-latency LDPC | ◯ | Add-on card; includes BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16APSK, 16QAM, 32APSK & 64QAM; to 100Mbps subject to prevailing modem data rate limits; includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs as standard |

## Ordering: Q-Lite™ Encryption Half-Width Satellite Modem Continued

| Paired Carrier+™ | ○ | **Paired Carrier+™ add-on card** (requires one or more options below) |
|---|---|---|
| Subject to prevailing modem data rate limits. Occupied bandwidth: minimum 25kHz; maximum 72MHz | ○ | Paired Carrier+™ up to **256kbps** (requires Paired Carrier+™ add-on card) |
| | ○ | Extends Paired Carrier+™ up to **512kbps** |
| | ○ | Extends Paired Carrier+™ up to **1.024Mbps** |
| | ○ | Extends Paired Carrier+™ up to **2.5Mbps** |
| Paired Carrier+™ is also available as a low-cost 90 -day license for light users (the license counts down only when Paired Carrier+™ is being actively used) - please contact us for details | ○ | Extends Paired Carrier+™ up to **5Mbps** |
| | ○ | Extends Paired Carrier+™ up to **10Mbps** |
| | ○ | Extends Paired Carrier+™ up to **15Mbps** |
| | ○ | Extends Paired Carrier+™ up to **20Mbps** |
| | ○ | Extends Paired Carrier+™ up to **25Mbps** |
| | ○ | Extends Paired Carrier+™ up to **30Mbps** |
| | ○ | Extends Paired Carrier+™ up to **40Mbps** |
| | ○ | Extends Paired Carrier+™ up to **50Mbps** |
| | ○ | Extends Paired Carrier+™ up to **60Mbps** |
| | ○ | Extends Paired Carrier+™ up to **80Mbps** |
| | ○ | Extends Paired Carrier+™ up to **100Mbps** |
| | ○ | Extends Paired Carrier+™ up to **200Mbps** |
| | ○ | Extends Paired Carrier+™ up to **345Mbps** |
| **Terrestrial Interfaces** (Please choose up to one hardware options) | ○ | **EIA-530:** D25 DCE supporting RS422/X.21/V.35/RS232 |
| | ○ | **Quad ASI:** 4xBNC 75Ω sockets; includes DVB-S/DSNG FEC (for use with ASI, or MPEG over IP, or general IP) |
| Optimised Spectral Roll-Off | ○ | Extends the standard 35%, 25% and 20% roll-off factors to include 5%, 10% and 15% roll-offs for TPC and legacy FEC's |
| DVB-CID | ○ | **DVB Carrier ID:** Tx carrier identification per ETSI 103 129 |
| IBS | ○ | Satellite framing to IESS 309 with low-rate Intelsat ESC (to IESS 403) and high-rate IBS ESC |
| Legacy FEC | ○ | **Sequential FEC** (limited to maximum of 2.048Mbps); TCM 8PSK 2/3 to IESS 310; Viterbi BPSK/QPSK/OQPSK FEC rates 1/2, 3/4 & 7/8; Intelsat Reed-Solomon outer codec |
| TRANSEC (Transmission Security) | ○ | **TRANSEC** provides an additional layer of protection for communication channels. It builds on, but is separate from, encryption of the payload and is a licenced software activated feature (SAF) limited to <25Mbps. |
| DC Input | ○ | 48V DC: **K3027** 48V DC primary power input (in place of 100 to 240V AC input) |
| BUC PSU (Select up to one BUC PSU option) | ○ | **AC In & 24V Out:** P3563 AC input, 24V 200W DC to Tx BUC |
| | ○ | **AC In & 48V Out:** P3564 AC input, 48V 200W DC to Tx BUC |
| | ○ | **48V In & 24V Out:** P3565 Floating 48V DC input; +24V 200W DC to Tx BUC |
| | ○ | **48V In & 48V Out:** P3566 Floating 48V DC input; +48V 200W DC to Tx BUC |

# Global Sales Offices

**U.K Headquarters**
Business Development Director, EMEA
Paul McConnell
Teledyne Paradise Datacom
106 Waterhouse Lane, Chelmsford,
Essex, England, CM1 2QU

Tel: +44(0)1245 847540
Mob: +44(0)7720 707499
Paul.mcconell@teledyne.com
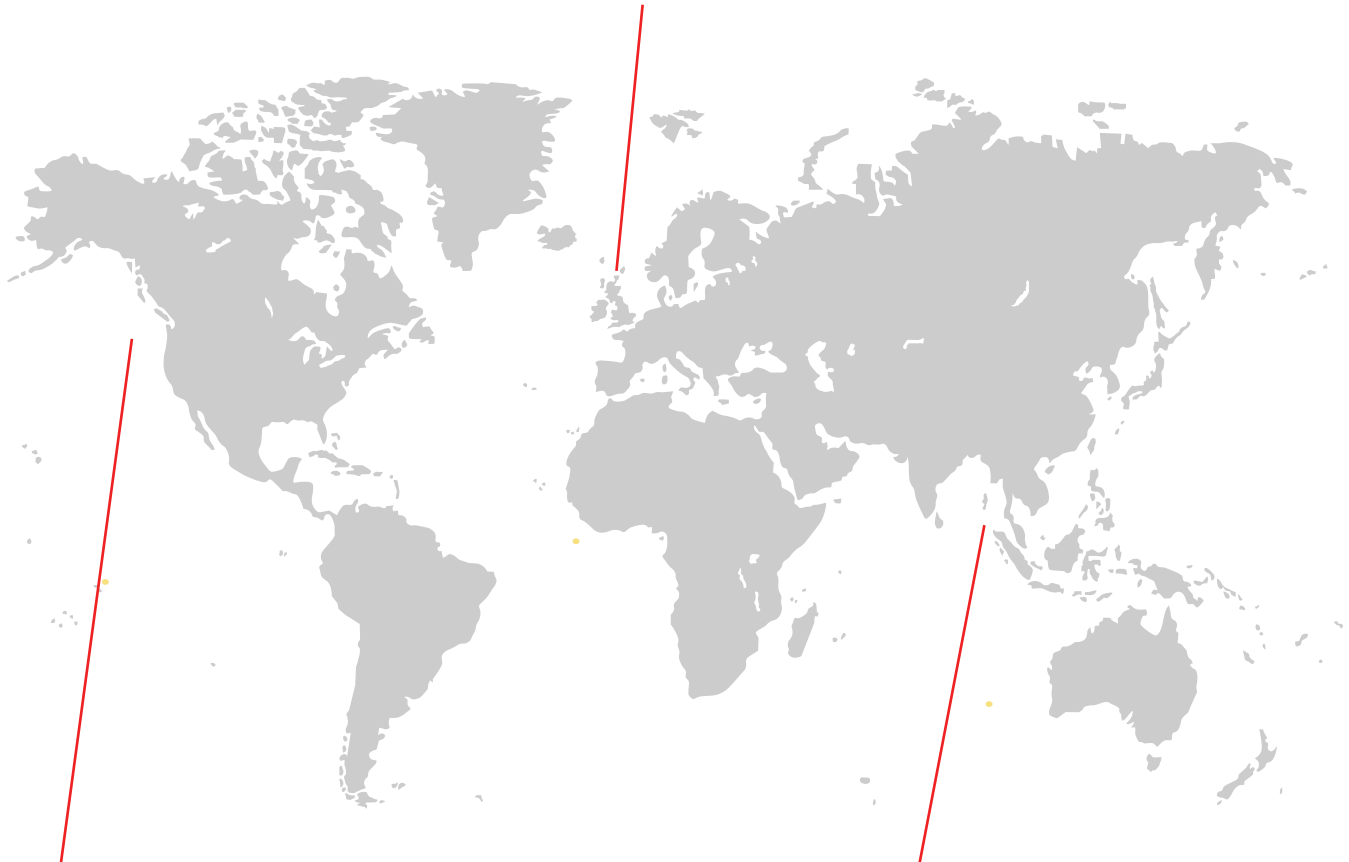
**U.S, Canada & South America**
**Sales Director**
Bruce Grieser
+1 (480) 444-9676
bruce.grieser@teledyne.com

**Asia Pacific**
**Sales Director**
Tavechai M.
333, 20 Fl., C1,
Lao Peng Nguan Tower 1,
Vibhavadi-Rangsit Rd.,
Chatuchak, Bangkok 10900
Thailand

Tel: +66 2 2722996
Mobile: +66 83 5545145
tavechai.mektavepong@teledyne.com