TELEDYNE PARADISE DATACOM
A Teledyne Technologies Company

DVB S2X

Q-Lite™
'Comms-On-The-Move' Half-width Satellite Modem

OVERVIEW

The **Q-Lite™** half-width compact satellite modem is provided in 9.5-inch & 10.5-inch chasses. Two 9.5-inch chasses can be fitted side-by-side in a standard 19-inch rack. Its small size and low power consumption makes it ideal for portable communications and comms-on-the-move.

Advanced Bandwidth-Efficient Features

The **Q-Lite™** is small in size but big on features!

Paired Carrier™ overlays transmit and receive carriers reducing satellite bandwidth by 50%.

Both DVB-S2, renowned for its robustness and bandwidth efficiency, and its successor, **DVB-S2X** are supported. DVB-S2X supports reduced spectral roll-off factors (down to 5%). Our proprietary **low-latency extension** to DVB-S2x reduces link latency by nearly 80%!

FEATURES

- 9.5-inch & 10.5-inch chasses options (convertible using just different L-brackets)
- Minimise required air-conditioned rack space by fitting two 9.5-inch chasses side-by-side in 19-inch rack
- L-band operation (950MHz to 2050MHz)
- 4-port Ethernet switch (155Mbps traffic rate)
- **XStream IP™** is an integrated suite of advanced IP optimization & traffic management features including TCP acceleration, header & payload compression, dynamic routing, traffic shaping, encryption & ACM
- Optimized spectral roll-offs, including 5%
- **DVB-S2X**, **FastLink™** LDPC & TPC
- AC, 24V DC & 48V DC input PSU options
- BUC 24V DC & 48V DC PSU options

- 25 to 33 Watt power consumption
- **LinkGuard™** signal-under-carrier interference detection
- Built-in spectrum & constellation monitors
- DVB Carrier ID. Fully compliant with DVB-CID standard

Applications

- Comms-on-the-move
- Portable communication systems
- Man-packs
- Disaster relief
- High-speed train internet connectivity
- Satellite news gathering
- Compact, low-power satellite terminals

Request A Quote

Q-Lite™

Half-width Satellite Modem

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Main Specifications

Frequency	950 to 2050MHz (resolution 100Hz) (TNC connector)
Data Rate	**Operation to 2,048kbps provided as standard** **Extension options:** 5Mbps, 10Mbps, 25Mbps, 60Mbps, 100Mbps and 155.52Mbps
Data Rate Limits	**DVB-S2X:** 100kbps to 155.52Mbps **DVB-S2:** 350kbps to 132Mbps **FastLink™ LDPC:** 18kbps to 100Mbps **TPC:** 4.8kbps to 60Mbps 1bps resolution
Symbol Rate Limits	**DVB-S2X:** 100ksps to 50Msps **DVB-S2:** 350ksps to 37.5Msps **FastLink™ LDPC:** 18ksps to 40Msps **TPC:** 9ksps to 40Msps
Operating Modes	**DVB-S2X** (EN 302 307-2) option **DVB-S2** (EN 302 307-1) option **Closed Network (+ ESC)** (IESS-315)
Scrambling	**DVB-S2/DVB-S2X:** As per EN 302 307 **Closed Network + ESC:** Synchronised to ESC overhead
Impedance	50Ω
Return Loss	14dB typical
Redundancy	1:1 or up to 1:16 redundancy (requires Utilities Card option)

Traffic Interfaces

Standard:
4-port Gigabit Ethernet switch (RJ45 connectors; for IP traffic and M&C)
Options:
EIA-530 (RS422, X.21, V.35 and RS232 on 25-pin D-type female)

Modulator

Output Power	0 to –30dBm (0.1dB steps)
Output Power Stability/Accuracy	**Stability:** ±0.5dB, 0ºC to 50ºC **Accuracy:** ±0.375dBm
Transmit Filter Roll-off	5%, 10%, 15%, 20%, 25%, 35%
Phase Accuracy	±2º maximum
Amplitude Accuracy	±0.2dB maximum
Carrier Suppression	-30dBc minimum
Output Phase Noise	As EN 302 307 and IESS-316, nominally 3dB better
Harmonics & Spurious	Better than –55dBc/ 4kHz in band
Transmit On/Off Ratio	55dB minimum
BUC PSU Option	24V or 48V DC via IFL cable, 200W
BUC 10MHz Reference	Via IFL cable; 10MHz ± 0.001 ppm; 3dBm ± 3dB

Demodulator

Input Range	**Minimum:** -130 + 10 log (symbol rate) **Maximum:** -80 + 10 log (symbol rate)
Maximum Composite	+10dBm
Wanted-to-composite	-102 + 10 log (symbol rate)
Frequency Sweep Width	**Up to 10Msps:** ±1kHz to ±32kHz (1kHz steps) **Above 10Msps:** ±10kHz to ±250kHz (10kHz steps)
Acquisition Time	Dependent on FEC, data rate and sweep width (at 9.6kbps, less than 1s at 6dB Es/No QPSK; at 10Mbps, less than 100ms at 6dB Es/No QPSK)
Clock Tracking Range	±100ppm minimum
Receive Filter Roll-off	5%, 10%, 15%, 20%, 25%, 35%
AGC Output	Buffered direct AGC output for antenna peaking (requires Utilities Card)
LNB 10MHz Reference	Via IFL cable; 10MHz ± 0.001 ppm; 0dBm ± 3dB
LNB Voltage	Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A

Forward Error Correction

DVB-S2X *Includes support for DVB-S2* *Rates supported by DVB-S2X that are not part of DVB-S2 are shown in italics*	**QPSK** 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, *13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45* **8PSK** 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, *23/26, 25/36, 13/18, 7/15, 8/15, 26/45, 32/45* **16APSK** 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, *26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45* **32APSK** 3/4, 4/5, 5/6, 8/9, 9/10, *32/45, 11/15, 7/9, 2/3* **64APSK** *11/15, 7/9, 4/5, 5/6*
DVB-S2X Low-latency Mode *Paradise proprietary extension to DVB-S2X*	**Very Short Frame:** (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) **QPSK/8PSK/16APSK/32APSK** 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 **Ultra Short Frame:** (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) **QPSK/8PSK/16APSK/32APSK** 1/3, 4/9, 5/9, 2/3, 7/9, 8/9
DVB-S2	**QPSK** 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 **8PSK** 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 **16APSK** 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
FastLink™ Low-Latency LDPC	**BPSK** 0.499 **QPSK/OQPSK** 0.532, 0.639, 0.710, 0.798 **8PSK/8QAM** 0.639, 0.710, 0.778 **16APSK/16QAM** 0.726, 0.778, 0.828, 0.851 **32APSK** 0.778, 0.828, 0.886, 0.938 **64QAM** 0.828, 0.886, 0.938, 0.960
TPC	**BPSK** 5/16, 21/44, 3/4, 7/8 **QPSK/OQPSK** 5/16, 21/44, 3/4, 7/8, 0.93 **8PSK** 3/4, 7/8, 0.93 **16QAM** 3/4, 7/8, 0.93

Ethernet: Standard Features

Bridging and Static Routing	**Trunking mode:** Hardware Layer 2 bridge supporting 155Mbps bi-directional traffic (at up to 500,000 packets per second); zero jitter **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 Quality of Service (packet prioritisation) using strict priority or fair weighting queuing
DHCP, SNMP	DHCP for automatic allocation of M&C IP address. SNMP v1, v2c & v3
Web Server	Modem web server M&C interface
IP Diagnostic Graphs	Shows Tx, Rx throughput (bps, pps); dropped, errored packet counts
TCP/IP Packet Generator/ Analyser	Generates & analyses TCP & UDP packet streams, allowing modem-to-modem IP testing without any other test equipment
Ethernet MTU Size	**Standard:** 10k bytes **Optical Ethernet:** 16k bytes

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 & traffic format

Traffic Shaping	Provides guaranteed throughput for priority traffic, using Committed and Burst Information Rates. Stream differentiation is by IP address, IEEE 802.1p priority, Diffserv DSCP, PID, VLAN ID or 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 10,000 concurrent accelerated TCP connections (plus at least 40,000 unaccelerated TCP connections) up to 100Mbps
AAA RADIUS Secure User Login	Authentication, Authorisation & Accounting. Greater access control & accountability. Replaces standard modem login with user's personal company network login credentials
AES-256 Encryption	*Supported on **Q-LiteE™** model only. See separate Q-LiteE™ datasheet*

Ethernet: XStream IP™ DVB-S2

Provided as standard as part of DVB-S2 & DVB-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
IP-over-DVB Encapsulation	Supports the transmission of IP packets with/without Ethernet frames over DVB-S2; encapsulates & de-capsulates using MPE (EN 301 192), ULE (RFC 4326) or Paradise PXE

Q-Lite™

Half-width Satellite Modem

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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
Paired Carrier™ data rate options *(30kHz to 54MHz occupied bandwidth)*	256kbps, 512kbps, 1024kbps, 2.5Mbps, 5Mbps, 10Mbps, 15Mbps, 20Mbps, 25Mbps, 30Mbps, 40Mbps, 50Mbps, 60Mbps, 80Mbps, 100Mbps and 155Mbps traffic rate
Power asymmetry	-10dB to +10dB
Symbol rate asymmetry	Up to 12:1
Eb/No degradation	Typically < 0.5dB (0.7dB for 16QAM/16APSK with 10dB power asymmetry; 1dB or more for 32APSK and higher)
Mobile Operation	Uses GPS data to continually recalculate position relative to satellite, allowing uninterrupted operation in mobile environments anywhere in satellite footprint

ClearLinQ™ Adaptive Tx Predistorter Option

Corrects for linear & non-linear distortion in the RF chain (i.e. amplifier and transponder). Applicable to all FECs and modulations (including DVB-S2X, DVB-S2, TPC & FastLink™). Maximises amplifier output power and minimises required back-off. Up to 2dB performance gain

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. The CID waveform contains a unique Carrier ID and other identity information. A carrier monitoring system is required to decode CID waveforms.
The DVB Carrier ID option is available as a software upgrade for all Q-Series modems

TPC Performance
Eb/No (dB) at BER 5E-8

	Rate 1/2	Rate 3/4	Rate 7/8	Rate 0.93	
BPSK, (O)QPSK	3.0	4.2	4.2	6.5	
8PSK		6.3	6.8	9.6	
16QAM		7.6	7.9	10.4	

FastLink™ Performance
Eb/No (dB) at BER 5E-8

		Low BER	Balanced	Low Latency
BPSK	0.499	2.1	2.9	3.4
(O)QPSK	0.532	2.2	2.6	2.9
(O)QPSK	0.639	2.4	2.8	3.2
(O)QPSK	0.710	2.7	3.3	3.7
(O)QPSK	0.798	3.3	3.9	4.4
8PSK	0.639	5.9 (QEF*)	6.2 (QEF*)	6.7 (QEF*)
8PSK	0.710	5.9 (QEF*)	5.5	5.9
8PSK	0.778	5.7	6.1	6.6
8QAM	0.639	4.5	4.8	5.1
8QAM	0.710	5	5.4	5.7
8QAM	0.778	5.6	5.9	6.3
16APSK	0.726	7.2 (QEF*)	7.7 (QEF*)	8.1 (QEF*)
16APSK	0.778	7.4 (QEF*)	7.9 (QEF*)	8.3 (QEF*)
16APSK	0.828	7.7	8.2	8.5
16APSK	0.851	8	8.5	8.9
16QAM	0.726	7.6 (QEF*)	7.5	7.7
16QAM	0.778	7	7.6	7.9
16QAM	0.828	7.5	8.0	8.2
16QAM	0.851	7.8	8.2	8.6
32APSK	0.778	9.4	9.9	10.3
32APSK	0.828	10.1	10.7	11.2
32APSK	0.886	11.1	11.6	12.2
32APSK	0.938	12.9	13.5	14.3

Test Facilities and Alarm Outputs

BER Tester	Bit error rate tester operates over main traffic, ESC or Aux channels, allowing BER monitoring while on traffic. Not available in DVB-S2 mode
	Supports various test patterns compatible with common BER testers
Other test modes	Transmit CW (pure carrier) Transmit alternate 1-0 pattern Simulated satellite delay for TCP/IP packets
Alarm Outputs	Single open-collector output summary alarm plus 4 independent Form C relays for unit, Tx, Rx and backward alarms

Mechanical/Environmental

Size	255mm x 184mm
Weight	3.0kg
Power Supply	90 to 264VAC, 1A @100V, 0.5A @ 240V, 47 to 63Hz Fused IEC connector (live and neutral fused); 24V and 48V DC options
Compliances	FCC, CE and RoHS compliant
Safety Standards	EN60950-1:2006
Emissions and Immunity	**Emissions:** EN55022:2006 Class B **Immunity:** EN55024:1998 (+ A1:2001 + A2:2003
Operating Temperature	**Standard:** 0 to 50ºC (storage: -40ºC to 70ºC) **Extended:** -40 to 70ºC
Humidity	95% relative humidity, non-condensing

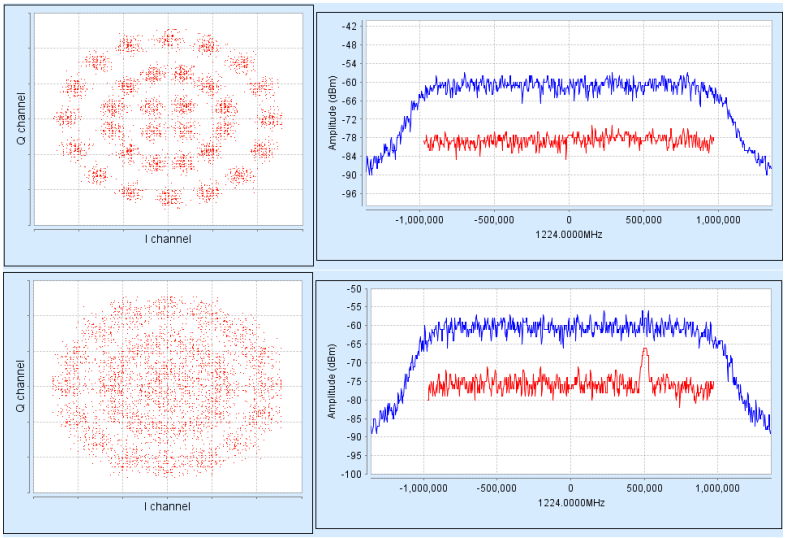
DVB-S2 Performance (for DVB-S2X performance, see separate datasheet)
Eb/No (dB) for Normal (64k) frames at QEF* (Es/No in brackets)

	Rate 1/4	Rate 1/3	Rate 2/5	Rate 1/2	Rate 3/5	Rate 2/3	Rate 3/4	Rate 4/5	Rate 5/6	Rate 8/9	Rate 9/10
QPSK	1.5 (-1.6)	1.1 (-0.7)	1.3 (0.3)	1.5 (1.5)	2.0 (2.8)	2.2 (3.4)	2.6 (4.3)	3.0 (5.0)	3.3 (5.5)	4.0 (6.5)	4.2 (6.7)
8PSK					3.8 (6.3)	4.1 (7.1)	4.9 (8.4)		5.8 (9.7)	6.8 (11.0)	7.0 (11.3)
16APSK						5.4 (9.6)	6.0 (10.7)	6.5 (11.5)	6.8 (12.0)	7.7 (13.2)	7.9 (13.4)

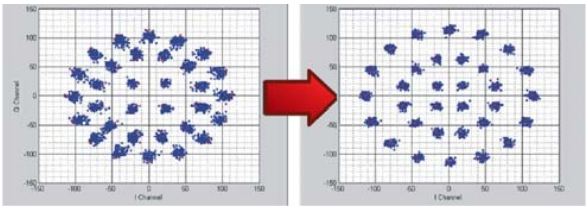
Note for operation with DVB-S2 Short (16k) frames, an Eb/No increase of 0.3dB is required (worst case) with respect to the corresponding modcod for Normal frame performance.

** Note: QEF is defined as a BER of 5E-12 (this is equivalent to a PER of approximately 5E-9).*

*The **FastLink™** QEF point is used for modcods where there is no discernible gradation in BER performance (i.e. once the demodulator has locked then the modem will operate at the QEF point only).*



*Built-in Spectrum Analyser showing **LinkGuard™** Signal-Under-Carrier interference detection without/with interferer present.*



*'Before and after' constellations showing **ClearLinQ™** Adaptive Tx Pre-distorter compensating for severe non-linear signal distortion to a 32APSK carrier*

Side-by-side chasses, suitable for 19-inch rack mounting

Q-Lite™

Half-width Satellite Modem

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	Option	Description — Fully configurable - pay only for what you need!
Base Modem	✓	**Q-lite™ mounted in 9.5-inch chassis** (supplied with additional L-brackets that allow easy conversion to 10.5-inch chassis) **Front-panel keypad and LCD display** **4.8kbps to 2.048Mbps Closed Network (+ ESC) modem with 4-port Ethernet 10/100/1000 BaseT switch for M&C and traffic**; Ethernet bridge; static routing; IPv4/IPv6 support; IEEE 802.1p QoS; IEEE 802.1q VLAN; 10k bytes MTU **L-band operation 950 to 2050MHz**; high-stability 10MHz reference **TPC:** BPSK, QPSK, OQPSK, 8PSK and 16QAM; to 60Mbps subject to prevailing modem data rate **LinkGuard™:** Signal-under-carrier interference detection web spectrum graph showing received spectrum and any interference underneath the received carrier while on traffic; automated alarm when interference rises above user-set threshold; supported for FastLink™, TPC and DVB-S2X for all modulations **AUPC:** Automatic Uplink Power Control **Web browser monitoring tools:** Spectrum display, constellation monitor, TCP/IP throughput **Internal Bit Error Rate Tester (BERT):** For non-DVB-S2/DVB-S2X operation only **TCP/IP Packet Generator/Analyser:** Generates and analyses TCP and UDP packet streams, allowing modem-to-modem IP testing without the need for any other test equipment **Utilities Card:** 9-way D type for 1:1 and 1:N redundancy, compatible with PDQS Standalone Redundancy Switch 15-way D type for alarms and AGC USB connector for software upgrades, etc. BNC connector for Station Clock Also connectors for alarm relays, transmit inhibit function, additional fan, Async ESC channel, AGC output for antenna pointing, FSK signalling
Tx-only		Transmit functions only
Rx-only		Receive functions only
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)
		155.52Mbps data rate: Extends 100Mbps operation to 155.52Mbps (DVB-S2 & DVB-S2X only)
XStream IP™		**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
		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 10,000 concurrent accelerated TCP connections to 100Mbps subject to prevailing data rate
		AAA RADIUS Secure User Login: Authentication, Authorisation & Accounting. Greater access control & accountability. Replaces standard modem login with user's personal company network login credentials
		AES-256 Encryption: *Please note that AES-256 Encryption (TCP/IP packet payload encryption using AES with 256-bit keys) is supported on the* ***Q-LiteE™*** *model only. The Q-LiteE™ is identical to the standard Q-Lite™ in every other respect*
XStream IP™ DVB-S2 *Provided as standard as part of DVB-S2 & DVB-S2X options*		**IP-over-DVB Encapsulation:** Encapsulation of IP packets and Ethernet frames over DVB-S2 using Paradise XStream™ Protocol (PXE), MPE or ULE
		ACM: DVB-S2/DVB-S2X ACM
DVB-S2X *To 155Mbps subject to prevailing modem data rate limits*		**DVB-S2X CCM Tx:** DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Tx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 16APSK, 32APSK & 64APSK Tx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2, which comprises ACM and IP-over-DVB encapsulation
		DVB-S2X CCM Rx: Add-on card (P3609) supporting DVB-S2 QPSK, 8PSK, 16APSK & 32APSK Rx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 16APSK, 32APSK & 64APSK Rx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2, which comprises ACM and IP-over-DVB decapsulation
DVB-S2 ***Low-cost*** *DVB-S2 option; to 155Mbps subject to modem data rate limits*		**DVB-S2 CCM Tx:** DVB-S2 QPSK, 8PSK & 16APSK Tx operation per EN 302 307-1. Includes 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2, which comprises ACM and IP-over-DVB encapsulation
		DVB-S2 CCM Rx: Add-on card (P3604) supporting DVB-S2 QPSK, 8PSK & 16APSK Rx operation per EN 302 307-1. Includes 15%, 20%, 25% & 35% spectral roll-offs. Includes XStream IP™ DVB-S2, which comprises ACM and IP-over-DVB decapsulation. *Please note that this add-on card is physically different to the DVB-S2X add-on card!*
DVB-S2X Low-latency Mode *Proprietary extension to DVB-S2X*		**Very Short Frame:** Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame; supports QPSK/8PSK/16APSK/32APSK 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 **Ultra Short Frame:** Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame; supports QPSK/8PSK/16APSK/32APSK 1/3, 4/9, 5/9, 2/3, 7/9, 8/9

Configuration options continue on next page.

	Option	Description — Fully configurable - pay only for what you need!
ClearLinQ™ Adaptive Tx Predistorter		Corrects for linear & non-linear distortion in the RF chain. Applicable to all FECs and modulations including DVB-S2X, DVB-S2, FastLink™ & TPC
FastLink™ Low-latency LDPC		Add-on card (P3605); includes BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16APSK, 16QAM, 32APSK & 64QAM; to 100Mbps subject to prevailing modem data rate limits
Paired Carrier™ *Subject to prevailing modem data rate limits.* *Occupied bandwidth: minimum 30kHz; maximum 54MHz* *Note that* Paired Carrier™ *is also available as a low-cost 90-day per annum license for redundancy system standby modems - please contact Sales for details*		**Paired Carrier™ add-on card** P3607 (requires one or more options below)
		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**
		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 **155.52Mbps**
EIA-530 Terrestrial Interface Card		EIA-530 (D25 DCE providing RS422/X.21/V.35/RS232)
Optimised Spectral Roll-off		Extends the standard FastLink™ & TPC 35%, 25% and 20% roll-off factors to include 5%, 10% and 15% roll-offs
DVB-CID		**DVB Carrier ID:** Tx carrier identification per ETSI 103 129
Packet Synchronisation		Supports IEEE 1588 Precision Time Protocol Version 2
Extended Temperature Range		Extends the standard operating temperature range (0 to 50ºC) to –40ºC to 70ºC with respect to the ambient temperature outside of the chassis
24V DC Input		24V DC primary power input (in place of 100 to 240V AC input)
48V DC Input		48V DC primary power input (in place of 100 to 240V AC input)
24V 200W BUC PSU		**P3563** AC input, 24V 200W DC to Tx BUC
48V 200W BUC PSU		**P3564** AC input, 48V 200W DC to Tx BUC
48V In & 24V BUC PSU		**P3565** Floating 48V DC input; +24V 200W DC to Tx BUC
48V In & 48V BUC PSU		**P3566** Floating 48V DC input; +48V 200W DC to Tx BUC
+48V In & 48V BUC PSU		**P3567** +48V DC input; +48V 200W DC to Tx BUC