

## OVERVIEW

The **Q-MultiFlex™** offers a new, cost-effective solution for point-to-multipoint IP satellite systems. The **Q-MultiFlex™** supports a highly-efficient **DVB-S2X** shared outbound along with up to 16 **FastLink™** low-latency LDPC returns.

The network system can optionally be controlled via our innovative **Q-Net™** Bandwidth Manager, supporting a wide range of centralised bandwidth management, network management, monitoring and reporting functions.

The **Q-MultiFlex™** interoperates with low-cost **Q-Lite™** and **Q-Flex™** remote network modems.

### Advanced Bandwidth-Efficient Features

The **Q-MultiFlex™** supports the most powerful bandwidth-saving technology available.

**Paired Carrier™** overlays transmit and receive carriers reducing satellite bandwidth by 50% (using ViaSat's patented PCMA technology).

**DVB-S2X**, the successor to the highly robust and bandwidth-efficient DVB-S2, are supported and includes support for spectral roll-off factors as low as 5%.

ACM allows any otherwise unused link margin to be converted into additional throughput.

## FEATURES

- ▶ Star, mesh & hybrid point-to-multipoint IP
- ▶ Modulator & up to 16 demodulators
- ▶ Dual IF/L-band operation
- ▶ Scalable to any network size
- ▶ DVB-S2X shared outbound
- ▶ **FastLink™** low-latency LDPC returns
- ▶ Data rates to 160Mbps outbound & inbound
- ▶ **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, down to 5%
- ▶ **Paired Carrier™** option
- ▶ Optional **Q-Net™** Bandwidth Manager
- ▶ Supports low-cost **Q-Lite™** & **Q-Flex™** remote modems
- ▶ **LinkGuard™** signal-under-carrier interference detection
- ▶ Built-in spectrum and constellation monitors
- ▶ DVB Carrier ID. Fully compliant with DVB-CID standard

## Applications

- ▶ IP trunking and backhaul
- ▶ Corporate networking
- ▶ Mobile backhaul
- ▶ Disaster recovery
- ▶ Maritime communications
- ▶ Cellular backhaul

Common Specifications	
Frequency	<b>IF:</b> 50 to 90MHz & 100 to 180MHz (resolution 100Hz) (BNC connector) <b>L-band:</b> 950 to 2050MHz (resolution 100Hz) (N-type connector) <b>L-band option:</b> Extends L-band operation to 2150MHz
Traffic Interface	<b>Standard:</b> Single Ethernet Gigabit RJ45 <b>Options:</b> <b>4-port Gigabit Ethernet switch</b> (1 RJ45 on base plus 3 further ports on expansion interface) <b>Optical Gigabit Ethernet</b> (Small Form-Factor pluggable module supporting all common optical standards)
Network Topologies	Supports star, mesh and hybrid networks
Impedance	<b>IF:</b> 50Ω/75Ω; <b>L-band:</b> 50Ω
Return Loss	<b>IF:</b> >18dB; <b>L-band:</b> >15dB
Redundancy	1:1 or up to 1:16 redundancy

Demodulator Options	
<p>The demodulators are provided via an add-on card that supports 8 demodulators. One demodulator card is fitted as standard and a second can be optionally fitted, supporting up to 16 demodulators in total. Demodulators are enabled in software in blocks of 4.</p> <p>The second add-on card can optionally be fitted at the time of the original purchase but with none of the demodulators enabled, thereby keeping the initial purchase price low but allowing for convenient expansion in the future.</p>	
Demodulators	<b>Standard:</b> 4 <b>Options:</b> 8, 12 or 16 (total)
Operating Bandwidth	All inbound carriers must be within a bandwidth of 72MHz
Operating Mode	FastLink™ Low-latency LDPC decoder operated in Closed Network mode
Data Rate	<b>Aggregate for all inbounds:</b> 18kpbs to 160Mbps (with no single inbound larger than 100Mbps) 1bps resolution This gives a nominal rate of 20Mbps per inbound for 8 demodulators & 10Mbps per inbound for 16 demodulators
Symbol Rate	<b>Aggregate for all inbounds:</b> 18ksps to 40Msps (with no single inbound larger than 40Msps) 1sps resolution This gives a nominal rate of 5Msps per inbound for 8 demodulators & 2.5Msps per inbound for 16 demodulators
Scrambling	FastLink™ scrambler
Input Range	<b>IF minimum:</b> -115 + 10 log (symbol rate) <b>L-band minimum:</b> -130 + 10 log (symbol rate) <b>IF/L-band maximum:</b> -80 + 10 log (symbol rate)
Maximum Composite	+10dBm
Wanted-to-Composite	<b>IF:</b> -94 + 10 log (symbol rate) <b>L-band:</b> -102 + 10 log (symbol rate)
Frequency Sweep Width	<b>Up to 10Msps:</b> ±1kHz to ±32kHz (1kHz steps) <b>Above 10Msps:</b> ±10kHz to ±250kHz (10kHz steps)
Acquisition Time	Dependent on data rate and sweep width
Clock Tracking Range	±100ppm minimum
Receive Filter Roll-off	5%, 10%, 15%, 20%, 25%, 35%
LNB 10MHz Reference	Via IFL cable; 10MHz ± 0.01 ppm; 0dBm ± 3dB
LNB Voltage	Selectable 13V, 15V, 18V or 24V DC to LNB via IFL cable; maximum 0.5A

Modulator Option	
Operating Modes	<b>DVB-S2X</b> (EN 302 307-2)
	<b>DVB-S2</b> (EN 302 307-1)
	<b>FastLink™ Low-latency LDPC</b>
Data Rate (1bps resolution)	<b>DVB-S2X:</b> 100kpbs to 160Mbps
	<b>DVB-S2:</b> 100kpbs to 160Mbps
	<b>FastLink™:</b> 18kpbs to 100Mbps
Symbol Rate (1sps resolution)	<b>DVB-S2X:</b> 100ksps to 50Msps
	<b>DVB-S2:</b> 100ksps to 50Msps
	<b>FastLink™:</b> 18ksps to 40Msps
Output Power (0.1dB resolution)	<b>IF:</b> 0 to -25dBm <b>L-band:</b> 0 to -40dBm
Output Power Stability/Accuracy	<b>Stability:</b> ±0.5dB, 0°C to 50°C <b>Accuracy:</b> ±0.375dBm
Transmit Filter Roll-off	<b>DVB-S2/S2X:</b> 5%, 10%, 15%, 20%, 25%, 35% <b>FastLink™:</b> 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
Harmonics & Spurious	Better than -55dBc/ 4kHz in band (at 0dBm to -30dBm output)
Transmit On/Off Ratio	-65dBc minimum
BUC PSU Option	24V or 48V DC via IFL cable, 200W
BUC 10MHz Reference	Via IFL cable; 10MHz ± 0.01 ppm; 3dBm ± 3dB
FSK Control	Allows monitor & control of a compatible L-band BUC from the modem via the Tx IFL cable

Ethernet: Standard Features	
Bridging and Static Routing	<b>Trunking mode:</b> Hardware Layer 2 bridge supporting 160Mbps bi-directional traffic (at up to 500,000 packets per second); zero jitter <b>Layer 2 bridge &amp; Layer 3 router:</b> 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
Ethernet MTU Size	<b>Standard:</b> 10k bytes <b>Optical Ethernet:</b> 16k bytes

XStream IP™ Tier 1 (Tx only)	
<p>XStream IP™ is an integrated set of IP optimization and traffic management features designed for maximum reliability and bandwidth efficiency. The following features are provided as a standard part of the Modulator Option.</p>	
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 value
IP-over-DVB Encapsulation	Supports the transmission of IP packets with/without Ethernet frames over DVB-S2/DVB-S2X; encapsulates & decapsulates using our highly-efficient Paradise XStream Encapsulation (PXE)

XStream IP™ Tier 2 (Tx only) Option	
<p>The Tier 2 option extends the transmit capabilities provided by the XStream IP™ Tier 1 option.</p>	
DVB-S2/S2X ACM	Dynamically varies modcod with varying link conditions in order to maximise throughput for each remote site at all times by converting unused link margin into additional throughput; 100% link availability
DVB-S2/S2X VCM	Supports the transmission up to 16 IP streams. Each stream has its own associated modcod for optimal per-site throughput

XStream IP™ Tier 3 (Tx and Rx) Option	
<p>The following features apply to both transmit and receive and can be used independently of XStream IP™ Tier 1 and XStream IP™ Tier 2 options. The Tier 3 option supports all demodulators for a single price.</p>	
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%
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-MultiFlexE™ model only. See separate Q-MultiFlexE™ datasheet

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 160Mbps 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

Network Management	
Standard Web Browser UI	A built-in web server provides full web browser monitoring and control
Q-NET™ Option	Q-NET™ is an innovative, scalable bandwidth management system. It supports centralized monitoring and control of all hub and remote units in the system through a single server. See separate Q-NET™ datasheet for more details
Modem Compatibility	Q-NET™ and Q-MultiFlex™ are compatible with the use of Q-Flex™ and Q-Lite™ satellite modems

Tx Forward Error Correction	
DVB-S2X  <i>(Note: the DVB-S2X option includes support for DVB-S2 modulations and FEC rates as shown below)</i>	<b>Normal Frame:</b> <b>QPSK</b> 13/45, 9/20, 11/20 <b>8PSK</b> 23/36, 25/36, 13/18 <b>8APSK-L</b> 5/9, 26/45 <b>16APSK</b> 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90 <b>16APSK-L</b> 5/9, 8/15, 1/2, 3/5, 2/3 <b>32APSK</b> 32/45, 11/15, 7/9 <b>32APSK-L</b> 2/3 <b>64APSK</b> 11/15, 7/9, 4/5, 5/6 <b>64APSK-L</b> 32/45 <b>Short Frame:</b> <b>QPSK</b> 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 <b>8PSK</b> 7/15, 8/15, 26/45, 32/45 <b>16APSK</b> 7/15, 8/15, 26/45, 3/5, 32/45 <b>32APSK</b> 2/3, 32/45
DVB-S2X Low-latency Mode  <i>Paradise proprietary extension to DVB-S2X</i>	<b>Very Short Frame:</b> (Frame size of 5,400 bits, reducing latency to 33% of standard DVB-S2 Short frame) <b>QPSK/8PSK/16APSK/32APSK</b> 2/5, 7/15, 8/15, 3/5, 2/3, 11/15, 4/5, 13/15, 14/15 <b>Ultra Short Frame:</b> (Frame size of 3,240 bits, reducing latency to 20% of standard DVB-S2 Short frame) <b>QPSK/8PSK/16APSK/32APSK</b> 1/3, 4/9, 5/9, 2/3, 7/9, 8/9
DVB-S2	<b>QPSK</b> 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 <b>8PSK</b> 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 <b>16APSK</b> 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 <b>32APSK</b> 3/4, 4/5, 5/6, 8/9, 9/10
FastLink™ Low-Latency LDPC	<b>BPSK</b> 0.499 <b>QPSK/OQPSK</b> 0.532, 0.639, 0.710, 0.798 <b>8PSK/8QAM</b> 0.639, 0.710, 0.778 <b>16APSK/16QAM</b> 0.726, 0.778, 0.828, 0.851 <b>32APSK</b> 0.778, 0.828, 0.886, 0.938 <b>64QAM</b> 0.828, 0.886, 0.938, 0.960

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)	2.1 (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					3.9 (6.4)	4.2 (7.2)	5.0 (8.5)		5.9 (9.8)	6.8 (11.0)	7.0 (11.3)
16APSK						5.5 (9.7)	6.1 (10.8)	6.6 (11.6)	7.0 (12.2)	7.9 (13.4)	8.2 (13.7)
32APSK							8.2 (13.9)	8.8 (14.8)	9.2 (15.3)	10.1 (16.5)	10.4 (16.9)

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).

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

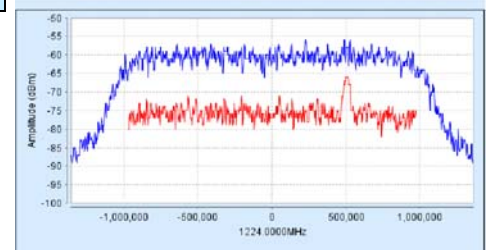
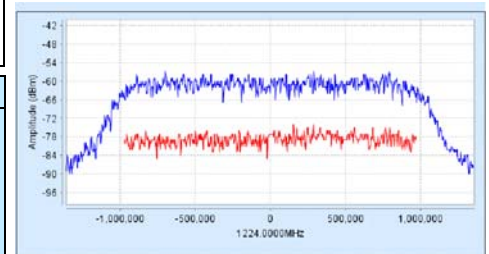
DVB Carrier ID Option (ETSI TS 103 129)	
Supports the identification of interfering carriers. Allows identification of individual modem carriers by superimposing a low-power CID waveform onto the carrier with negligible degradation. The CID waveform contains a unique Carrier ID and other identity information. A carrier monitoring system is required to decode CID waveforms	

Rx Forward Error Correction	
FastLink™ Low-Latency LDPC	<b>BPSK</b> 0.499 <b>QPSK/OQPSK</b> 0.532, 0.639, 0.710, 0.798 <b>8PSK/8QAM</b> 0.639, 0.710, 0.778 <b>16APSK/16QAM</b> 0.726, 0.778, 0.828, 0.851 <b>32APSK</b> 0.778, 0.828, 0.886, 0.938 <b>64QAM</b> 0.828, 0.886, 0.938, 0.960

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

Test Facilities and Alarm Outputs	
BER Tester	Demodulator-based bit error rate tester, allowing the link from each remote to be tested for data transparency. Supports various test patterns compatible with common BER testers
Other test modes	Transmit CW Transmit alternate 1-0 pattern Simulated satellite delay for transmitted TCP/IP packets
Alarm Relays	4 independent Form C relays for unit, deferred, Tx and aggregated Rx alarms

Mechanical/Environmental	
Size	1U chassis, 410mm deep excluding front panel handles and rear panel connectors and fans
Weight	3.5kg
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	<b>Emissions:</b> EN55022:2010 Class B <b>Immunity:</b> EN55024:2010 (incorporating EN61000-4-2:2009; EN61000-4-3:2006, A1, A2; EN61000-4-4:2012; EN61000-4-6:2009)
Operating Temperature	<b>Standard:</b> 0 to 50°C (storage: -40°C to 70°C) <b>Extended:</b> 0 to 55°C when fitted with Ruggedisation option
Humidity	95% relative humidity, non-condensing



	Option	Description <span style="color: #0070C0;">Fully configurable - pay only for what you need!</span>
Base Unit	✓	<p><b>Four demodulators with FastLink™ Low-latency LDPC Closed Network operation:</b> BPSK, (O)QPSK, 8PSK, 8QAM, 16APSK, 16QAM, 32APSK, 64QAM; maximum aggregate receive data rate of 160Mbps/40Msps; 5%, 10%, 15%, 20%, 25%, 35% spectral roll-off factors</p> <p><b>Two Ethernet 10/100/1000 BaseT RJ45s for M&amp;C and traffic respectively;</b> Ethernet bridge, static routing; IPv4/IPv6; IEEE 802.1p QoS; IEEE 802.1q VLAN; 10k bytes MTU</p> <p><b>IF demodulator operation 50 to 90MHz and 100 to 180MHz</b></p> <p><b>L-band demodulator operation 950 to 2050MHz;</b> high-stability 10MHz reference (for BUC/LNB); FSK</p> <p><b>LinkGuard™:</b> Signal-under-carrier interference detection web spectrum graph showing received spectrum and any interference underneath the received carriers while on traffic; automated alarm when interference rises above user-set threshold</p> <p><b>Web browser monitoring tools:</b> Spectrum display, constellation monitor, TCP/IP throughput</p> <p><b>Internal Bit Error Rate Tester (BERT):</b> Demodulator-only Internal Bit Error Rate Tester (BERT)</p>
Modulator Options		<p><b>DVB-S2/S2X CCM Tx:</b> Modulator transmit function to 160Mbps/50Msps; DVB-S2 QPSK, 8PSK, 16APSK &amp; 32APSK Tx operation per EN 302 307-1. DVB-S2X QPSK, 8PSK, 16APSK, 32APSK &amp; 64APSK Tx operation per EN 302 307-2. Includes 5%, 10%, 15%, 20%, 25% &amp; 35% spectral roll-offs</p> <p>Includes XStream IP™ Tier 1 (Tx only), which comprises traffic shaping and IP-over-DVB encapsulation</p>
		<p><b>DVB-S2X Low-latency Mode</b> (<i>proprietary extension to DVB-S2X</i>):</p> <p><b>Very Short Frame:</b> 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</p> <p><b>Ultra Short Frame:</b> 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</p>
		<p><b>Low-cost DVB-S2 CCM Tx:</b> (<i>Reduces cost by providing only DVB-S2 operation.</i>) Modulator transmit function to 160Mbps/50Msps; DVB-S2 QPSK, 8PSK, 16APSK &amp; 32APSK Tx operation per EN 302 307-1. Includes 15%, 20%, 25% &amp; 35% spectral roll-offs</p> <p>Includes XStream IP™ Tier 1 (Tx only), which comprises traffic shaping and IP-over-DVB encapsulation</p>
		<p><b>FastLink™ Low-latency LDPC:</b> Modulator transmit function to 100Mbps/40Msps; includes BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16APSK, 16QAM, 32APSK &amp; 64QAM; includes 5%, 10%, 15%, 20%, 25% &amp; 35% spectral roll-offs</p>
Demodulator Options		<b>8 demodulators:</b> extends base operation from 4 demodulators to 8 demodulators
		<b>12 demodulators:</b> extends operation from 8 demodulators to 12 demodulators
		<b>16 demodulators:</b> extends operation from 12 demodulators to 16 demodulators
		<b>'16 Demodulator Ready' option:</b> one demodulator add-on card is fitted as standard supporting up to 8 demodulators; this option adds a second demodulator card to the unit but with none of the extra demodulators enabled by default in order to keep the initial cost as low as possible. When required, the number of enabled demodulators can be expanded conveniently (to either 12 or 16 demodulators) by entry of a software code without the need for a field hardware upgrade
XStream IP™ Options		<p><b>XStream IP™ Tier 1 (Tx only):</b> provided as standard with the <b>Modulator Option</b>; includes:</p> <ul style="list-style-type: none"> <li>• <b>Traffic Shaping:</b> CIR/BIR/priority settings for IP streams classified by IP address, IEEE 802.1p priority, Diffserv DSCP, PID, VLAN ID or MPLS EXP value</li> <li>• <b>IP-over-DVB Encapsulation:</b> transmission of IP packets and Ethernet frames over DVB-S2/S2X using Paradise XStream Encapsulation (PXE)</li> </ul>
		<p><b>XStream IP™ Tier 2 (Tx only):</b> requires <b>Modulator Option</b>; includes:</p> <ul style="list-style-type: none"> <li>• DVB-S2/S2X point-to-multipoint ACM</li> <li>• DVB-S2/S2X point-to-multipoint VCM</li> </ul>
		<p><b>XStream IP™ Tier 3 (Tx &amp; Rx):</b> applies to Tx and Rx; does not require XStream IP™ Tier 1 or Tier 2 options; supports all enabled demodulators; includes:</p> <ul style="list-style-type: none"> <li>• <b>Header Compression:</b> IP/UDP/TCP/RTP packet header compression (RFC 3095) plus Ethernet header compression</li> <li>• <b>Payload Compression:</b> TCP/UDP packet payload compression using the Deflate algorithm (RFC 1951)</li> <li>• <b>TCP Acceleration:</b> Supports up to 10,000 concurrent accelerated TCP connections at up to 100Mbps</li> <li>• <b>AAA RADIUS Secure User Login:</b> Authentication, Authorisation &amp; Accounting. Greater access control &amp; accountability. Replaces standard modem login with user's personal company network login credentials</li> <li>• <b>AES-256 Encryption:</b> <i>Please note that AES-256 Encryption (TCP/IP packet payload encryption using AES with 256-bit keys) is supported on the Q-MultiFlexE™ model only. The Q-MultiFlexE™ is identical to the standard Q-MultiFlex™ in every other respect</i></li> </ul>

	Option	Description
<b>Fully configurable - pay only for what you need!</b>		
<b>Paired Carrier™</b>  <i>Subject to prevailing data rate limits.</i>  <i>Occupied bandwidth: minimum 30kHz; maximum 54MHz</i>  Paired Carrier™ is also available as a low-cost 90-day per annum license for redundancy system standby equipment - please contact Sales for details		<b>Paired Carrier™ add-on card P3607</b> (requires one or more options below)
		Paired Carrier™ up to <b>256kbps</b> (requires Paired Carrier™ add-on card)
		Extends Paired Carrier™ up to <b>512kbps</b>
		Extends Paired Carrier™ up to <b>1.024Mbps</b>
		Extends Paired Carrier™ up to <b>2.5Mbps</b>
		Extends Paired Carrier™ up to <b>5Mbps</b>
		Extends Paired Carrier™ up to <b>10Mbps</b>
		Extends Paired Carrier™ up to <b>15Mbps</b>
		Extends Paired Carrier™ up to <b>20Mbps</b>
		Extends Paired Carrier™ up to <b>25Mbps</b>
		Extends Paired Carrier™ up to <b>30Mbps</b>
		Extends Paired Carrier™ up to <b>40Mbps</b>
		Extends Paired Carrier™ up to <b>50Mbps</b>
		Extends Paired Carrier™ up to <b>60Mbps</b>
		Extends Paired Carrier™ up to <b>80Mbps</b>
		Extends Paired Carrier™ up to <b>100Mbps</b>
	Extends Paired Carrier™ up to <b>160Mbps</b>	
<b>Terrestrial Interfaces</b>		<b>4-port Gigabit Ethernet Switch:</b> Extends base unit Ethernet traffic port with 3 Ethernet ports, creating 4-port switch
		<b>Optical Gigabit Ethernet:</b> Small Form-factor Pluggable module; supports single-mode & multi-mode fibre & all wavelengths; supports all standard fibre connector types such as SC & LC (subject to provision of suitable mating socket for SFP cage)
<b>Ruggedisation</b>		Ruggedises the equipment for harsh environments (fans with higher airflow, heatsinks on key components, etc.)
<b>Wideband</b>		Extends L-band operation upper frequency limit from 2050MHz to 2150MHz
<b>DVB-CID</b>		<b>DVB Carrier ID:</b> Tx carrier identification per ETSI 103 129
<b>Packet Synchronisation</b>		Supports IEEE 1588 Precision Time Protocol Version 2, plus Simple Network Time Protocol
<b>24V DC Input</b>		<b>K3023</b> 24V DC primary power input (in place of 100 to 240V AC input); DC input attaches via a screw-terminal connector plate
<b>48V DC Input</b>		<b>K3018</b> 48V DC primary power input (in place of 100 to 240V AC input); DC input attaches via a screw-terminal connector plate
<b>24V 200W BUC PSU</b>		<b>P3543</b> AC input, 24V 200W DC to Tx BUC
<b>48V 200W BUC PSU</b>		<b>P3544</b> AC input, 48V 200W DC to Tx BUC
<b>48V In &amp; 24V BUC PSU</b>		<b>P3545</b> Floating 48V DC input; +24V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate
<b>48V In &amp; 48V BUC PSU</b>		<b>P3546</b> Floating 48V DC input; +48V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate
<b>+48V In &amp; 48V BUC PSU</b>		<b>P3547</b> +48V DC input; +48V 200W DC to Tx BUC; DC input attaches via a screw-terminal connector plate

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