



Elements IP Network Platform



Elements Network Products from Datum Systems is the most efficient and affordable FDMA satellite network product suite available. Elements products are designed with maximum flexibility and expandability because networks are always changing. The Elements M7 Series platform is optimized for point to multipoint (PtMP), but can also be used for ultra-efficient point to point (PtP) and Mesh IP Networks.

The Hub site equipment:

- Elements Modulator
- Elements ACM Multi-Demod

The Remote site equipment:

- Elements M7L/M7LT Remote Terminal

Key Features:

- IP Based FDMA access
- Point-to-Multipoint Network
- Low-cost Hub and Remote Hardware
- Highly Configured Standard Product
- IF or L-Band Compact Multi-Demod Hub
- DVB S2X Spectral Efficiency (54 Modcods)
- Outbound Data Rates up to 350 Mbps
- QPSK/8PSK/16QAM/32APSK/64APSK
- Return Data Options 16 kbps to 350 Mbps
- FlexLDPC Multi Block Sizes & Code Rates
- Industry Leading Low-Latency Solution
- Fast Carrier Acquisition

*Simple to Own and Operate,
No Annual Fee's!*



Options:

- Adaptive Coding Modulation (ACM)
- Automatic Uplink Power Control (AUPC)
- IP Network Optimization "Xiplink"
- Cellular Network Optimization "Sevis"
- Patented "SMART CARRIER" Cancelling
- Redundancy Options (Hub & Remote)



Applications Served

Enterprise– Global businesses rely on satellite IP connectivity to provide remote site and back office connectivity. Elements compact design provides high bandwidth connectivity within a small hardware footprint. Simplified integration and simplified network hub architectures make Elements a perfect fit for this market.



GSM Cellular Backhaul– Mobile Network Operators (MNO) worldwide are under pressure to provide instant connectivity everywhere, no matter how remote their location may be. Elements with Intelligent Backhaul Optimization from Xiplink IP (Acceleration/Compression) will deliver the highest possible ROI in the shortest amount of time.

Maritime– Passengers and crew members expect the same connectivity at sea as they do on-shore and satellite technology is the only solution for IP connectivity while at sea. Elements compact design provides high bandwidth connectivity for cruise ships and cargo vessels with the smallest hardware footprint available today. Elements advanced technology enables the use of smaller antennas and BUCs that further reduce the cost of hardware installations.



Emergency Response– When an emergency occurs, nothing is more important than having reliable and secure communication in the shortest amount of time. Connectivity requirements in an emergency management situation require flexibility, versatility, and availability of quick deployment of satellite networks. Elements compact design provides high bandwidth connectivity within small quick deployable satellite terminals. Simplified deployment and simplified network connectivity is what sets Elements apart from the rest.

Government / Defense– Elements offers Government, Military, and Multinational Organizations the ability to deploy secure, versatile, and reliable communications quickly. Elements is a cost efficient, future-proof and scalable satellite networking solution that can transform with ever changing requirements, meeting your tactical needs.



Oil & Gas– Service providers in the global Oil and Gas require the highest level of availability using the most cost effective technology. Data analysis, remote monitor and control, video surveillance, video training, telemedicine and general crew welfare are all a perfect match for the Elements Platform with embedded IP acceleration, QOS and optimization.

Full Featured – Economically Priced Network Solution

Network Requirements Met Elements M7 Series products make meeting current network requirements easier than ever before by providing a feature rich modem, including DVBS2X and LDPC technologies, at a low cost point. In addition, the M7 platform provides ease of use, flexibility and easy scalability in a truly future-proof platform.

No Service Contract or additional fees With all Datum Systems products, there are no support or service contracts required. Software upgrades are available as free downloads, and all software feature upgrades are very competitively priced and easily key code enabled.

DVBS2X – The Elements Outbound M7 Modulator offers both DVB-S2 and DVB-S2X with the latest standardized DVB-S2X extensions. DVB-S2X significantly improves satellite capacity by using much finer steps between modulation coding combinations (modcods) and allowing Filter Roll-Off options down to 5%. DVB-S2X can improve spectral efficiency up to 50% over DVB-S2. An Elements M7 outbound supports symbol rates up to 72 MHz to allow full utilization of wide transponders with data rates up to 350 Mbit/s.

Advanced FlexLDPC – With unparalleled configuration flexibility and superior coding gain, FlexLDPC takes FEC technology innovation to the next level. Granular code rates and block sizes get you the most out of your available satellite bandwidth and spectral power, while keeping processing latency at the lowest level in the industry. Low latency is essential in IP networks and Gateway offers the lowest system latency available in the industry.

Adaptive Coding & Modulation (ACM) ACM works for cases with where the data rate can be variable, as with IP networks. Satellite links were historically backed off significantly to account for Rain Fade and Inclined Orbit operation. ACM gives back that lost capacity during clear sky conditions, exchanging small information packets that tell the distant end what modcod will maximize the capacity.

Network Management System (NMS) Our optional NMS provides a single, integrated interface to dynamically manage every device, element, and service application within your network across all locations. Advanced functionalities, such as Auto Scheduling and Bandwidth-on-Demand combined with industry leading Monitoring and Control capabilities allow you to centralize control of your network.

IP Based Network – Elements is designed for IP networks, integrating the latest optimization technology to fit the network requirement. Available network optimizations include TCP/IP Acceleration, QOS, Header and Payload Compression, Static and Dynamic Routing and Cellular Backhaul Optimization.

Optimization on all layers – By utilizing the optimization techniques available in the Elements products the throughput, packets per second, bandwidth efficiency and FEC are all maximized. This greatly reduces cost of ownership and increases the service level to your customers.

IP Network Optimization – Our leading IP technology platform and embedded optimization solutions significantly enhance bandwidth efficiency and throughput, while reducing operating costs and improving service quality. Depending on your requirement, Elements supports both integrated and external appliance solutions from Xiplink.

Cellular Optimization Support Elements products provide the lowest end-to-end processing latency available which enhances the effectiveness of cellular backhaul optimizers for overall bandwidth savings in cellular backhaul applications. Elements works seamlessly with quality optimization products supports both integrated and external appliance solutions from Sevis.

Elements Network Series Products

Compact Modular Design –Elements is made up of products from the M7 Series Platform. The M7 Modulator and M7D ACM Multi-Demodulator hardware platforms fit within a half-rack 1 RU space, saving expensive rack space at the hub site. Dual Demodulators can be mounted and operated side-by-side and a 1:1 redundant configuration Modulator is supported in only a 1 RU space.

Elements M7 Hub Modulator



Side by Side = Redundant Hub Modulators in Single Rack Unit space

Specification Overview	
Symbol Rate Range	256 Msps to 72 Msps
Data Rate Range	256 kbps to 350 Mbps
IF Range	70-180 MHz and 950 MHz to 2250 MHz, 1 Hz Step
FEC	DVB-S2X DVB-S2X
Modulation Type	DVB-S2X QPSK, 8PSK, 8APSK, 16APSK, 32APSK, 64APSK
Carrier Alpha Roll-off Factor	2, 5, 10, 15, 20, 25, 30, 35%
Baseband Interface	5 Port Gigabit Ethernet with SFP, QoS and VLAN Support
Operating Temperature	0°C to 50°C, 99% humidity, non-condensing
Size & Weight	8.5" (W) x 11" (D) x 1.75" (H), with Redundancy 19" (W) <7 lbs. each

Elements M7D Hub ACM Multi-Demod



Side by Side = ACM Multi-Demod in Single Rack Unit Space

Specification Overview	
Number of ACM RX Channels	32 RX Channels each (in 1/2 RU Space), 64 RX Channels in full1 RU Space - DVBS2X Returns Optional DVB-S2X
Symbol Rate Range	16 ksps to 72 Msps per RX Channel, 72 Msps Aggregate per Demod
Data Rate Range	16 kbps to 75 Mbps per RX Channel, 72 Msps Aggregate per Demod
IF Range	50 MHz to 180 MHz, or 950 MHz to 2250 MHz (1 Hz Step)
FEC and Modcods	Advanced FlexLDPC: 2k, 4k, 8k and 16k BPSK: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11 QPSK: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11, 16/21, 4/5, 16/19, 8/9 8APSK: 8/13, 2/3, 16/23 16QAM: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11, 16/21, 4/5, 16/19, 8/9, 16/17
Baseband Interface	5 Port Gigabit Ethernet (N7), SFP Port
Operating Temperature	0°C to 50°C, 99% humidity, non-condensing
Size & Weight	8.5" (W) x 11" (D) x 1.75" (H) <7 lbs. each

Elements M7LT Remote L-band VSAT Modem/Router

The Elements M7LT Remote L-Band VSAT Modem/Router provides industry leading innovation to IP networks requiring high performance and lower latency FDMA solutions. The M7LT combines performance and reliability, which is unmatched by any other modem for its BER performance, fast acquisition, low latency and total power/bandwidth optimization.



Specification Overview

Symbol Rate Range	Tx Outbound: 32 ksps to 14.76 Msps (Optional DVBS2X Return to 72 Msps) Rx Inbound: 256 ksps to 72 Msps
Data Rate Range	Tx Outbound: 16 kbps to 40 Mbps (Optional DVBS2X Return to 350 Mbps) Rx Inbound: 256 kbps to 350 Mbps
IF Range	950 MHz to 2150 MHz, 1 Hz Step
FEC & Modcodes	Tx Outbound: Advanced FlexLDPC (Optional DVBS2X) Block Size: 2k, 4k, 8k, 16k BPSK: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11 QPSK: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11, 16/21, 4/5, 16/19, 8/9 8APSK: 8/13, 2/3, 16/23 16QAM: 1/2, 8/15, 4/7, 8/13, 2/3, 16/23, 8/11 16/21, 4/5, 16/19, 8/9, 16/17 Rx Inbound: QPSK, 8APSK, 16APSK, 32APSK, 64APSK (DVB-S2X)
BUC Power Option	24 VDC @ 100 watts, 5A max w/PFC, optional 120 Watt BUC Supply 48 VDC @ 100 watts, 2.1A max w/PFC, Optional 150, 240 Watts BUC Supply
LNB Power	Selectable: Off, 13VDC, or 18VDC
Main Power Supply	90 to 264 VAC, Optional 20 to 60 VDC
Operating Temperature	0°C to 50°C, 99% humidity, non-condensing
Size & Weight	19" (W) x 11" (D) x 1.75" (H) – Dual Unit <10 lbs.

Network Interface (N7)

N7 Network interface :

The Network Ethernet Interface, referred to as the N7, is a 5 Port switched based Layer 2 Bridge-only Ethernet Interface. The N7 Supports an additional SFP Port and simple predefined QoS and VLAN functionality as standard options, allowing for easy system set-up and use. The N7 provides predefined settings to support PtP and PtMP modes for effective Ethernet routing of the traffic over the network.

Q7-Packet Processor Plug-on Card

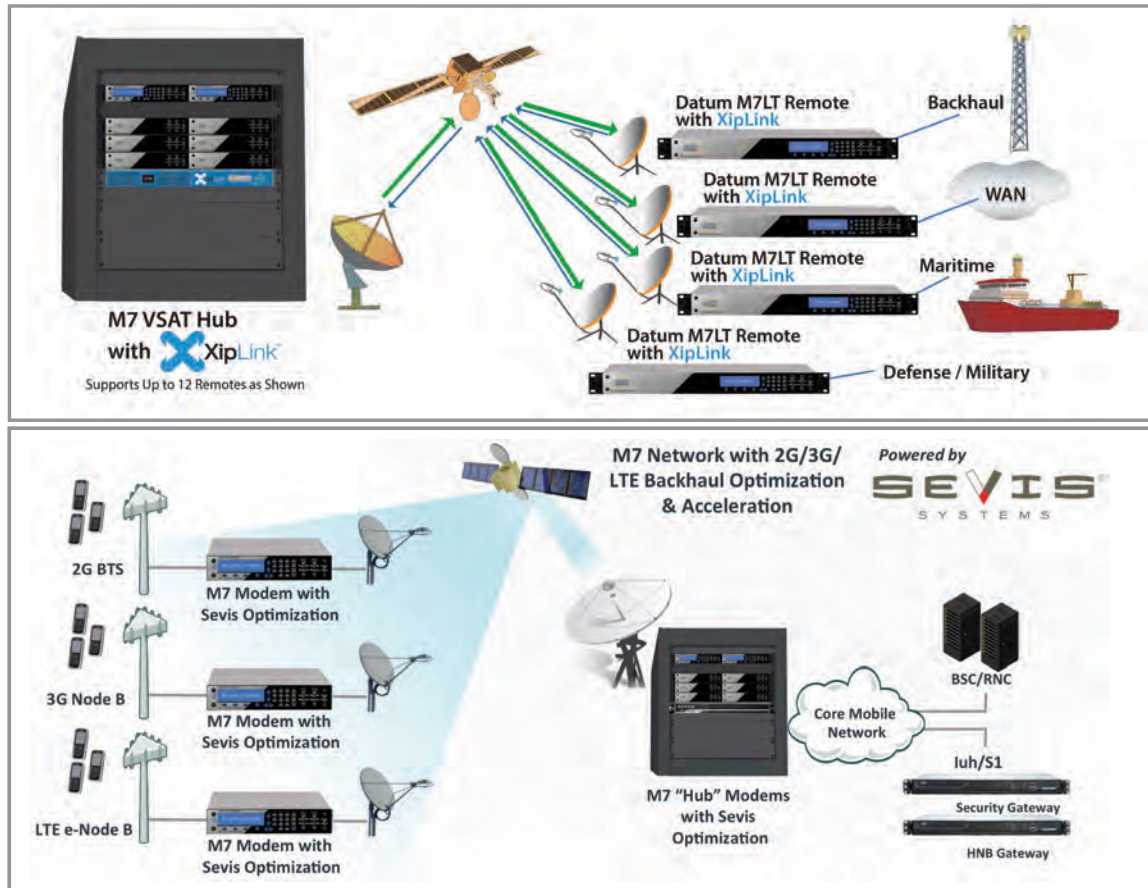
The N7 can be optioned with a powerful processor based interface Plug-on Card that supports both Bridge and Router Modes using a base Xiplink operating system. The Xiplink OS also supports customized QoS and VLAN Settings, and supports industry leading IP or Backhaul Optimization capabilities, such as TCP/IP Accelleration, Header and Payload Compresssion, Backhaul Optimization and Packet Coalescing.

Elements Interface Uses Case:

Elements is supported by a powerful N7 Network Interface that supports both Xiplink IP & Cellular Optimization. This means you can optimize both IP and Cellular Backhaul Networks with the same Elements Platform Hardware.

For a simple and easy to install point-to-multipoint system, the network can be entirely optioned for end-to-end bridge-only, using just the N7 interface at both hub and remote locations. When embedded routing or optimization is desired at the remotes, the Q7 Processor Card can simply be installed on the N7 to provide remote optimization.

A typical Elements Network configuration will have base N7 interfaces installed in Hub side Equipment, optionally using an external Xiplink Server or Router. Remote sites will have an embedded Xiplink OS to provide IP or Backhaul Optimization in a 1 box solution.



Summary

Elements is a point-to-multipoint network platform that can deliver IP throughput up to 350 Mbps on the outbound carrier and up to 30 Mbps (350 Mbps optional) on an unlimited number of return channels. The Elements M7 Series Platform supports advanced features such as higher order modulation, ACM, Sharp Carrier, Smart Carrier cancelling, and advanced optimization techniques. With an unmatched combination of affordability and system flexibility, Elements is able to seamlessly support PtMP and PtP network requirements without changing the modem hardware.

About Datum Systems:

Datum Systems is a privately-held company, located in the heart of Silicon Valley, which has focused solely on the design and manufacture of advanced satellite communications modems for over 20 years. Datum specializes in designing and delivering the most spectral and bandwidth efficient FDMA modems in the industry and is the global leader in low cost and compact modem products. Through a global network of distribution partners, Datum provides IP and alternative solutions for Mobile Backhaul, Trunking, Enterprise, Oil & Gas, Government and Maritime. Solution architectures include Point-to-Point, Point-to-Multipoint, Mesh, On-the-Move, and SCADA. Visit us at www.datumsystems.com.