Overview

The CDM-570A and CDM-570AL are the first Comtech EF Data modems in the entry-level category to support DoubleTalk® Carrier-in-Carrier® bandwidth compression, VersaFEC® low-latency LDPC advanced Forward Error Correction, and optimized transmit filter rolloff for maximum bandwidth and power efficiency, allowing satellite communications users to:

- Minimize operating expenses (OPEX)
- Maximize throughput without using additional transponder resources
- Maximize availability (margin) without using additional transponder resources
- Minimize capital expenses (CAPEX) by allowing a smaller BUC/amplifier and/or antenna
- Or, a combination to meet specific business needs

The high-performance Packet Processor enables efficient IP networking and transport over satellite with header compression, payload compression and advanced Quality of Service (QoS). The advanced QoS combined with header and payload compression ensures the highest quality of service with minimal jitter and latency for real-time traffic, priority treatment of mission critical applications and maximum bandwidth efficiency.

Increased Horsepower

The new packet processor is capable of processing 4-5 times more packets per second compared to the older CDM-570 IP Module, supporting up to 40,000 pps in router mode, which allows the platform to support the most demanding shared outbound in point-to-multipoint topology or duplex links in a satellite network.

Network Topology

CDM-570A/L-IP can be used in point-to-point topology, as well as hub-spoke (point-to-multipoint) topology along with our CDD-564/L and CDD-562L multi-demodulators.

Seamless Layer 2 or Layer 3 Operation

The packet processor supports Routed mode as well as Managed Switch mode of operation.

Managed switch mode is available in point-to-point topology and enables layer 2 operation with MAC learning, VLAN trunking and VLAN access mode while benefitting from:

- Quality of Service
- Header compression including Layer 2, Layer 3 and Layer 4 headers
- Lossless payload compression
- Bi-directional Adaptive Coding & Modulation (ACM)

Ethernet frames containing higher layer protocols including VLAN, MPLS, IPv4/IPv6, UDP, TCP, RTP, OSPF and BGP, seamlessly flow through the link greatly simplifying the network design, deployment and operation and enabling seamless integration with existing IT infrastructure.

Routed mode can be used in point-to-point, as well as hub-spoke topology. It supports static routing along with header compression, payload compression and advanced QoS.

Quality of Service (QoS)

Today's networks have to support a wide range of applications with diverse requirements. The packet processor incorporates an advanced QoS mechanism to ensure the highest service quality with minimal jitter and latency for real-time traffic and priority treatment of mission critical applications while maximizing bandwidth utilization. Four QoS modes are available:

- DiffServ – Industry-standard method of providing QoS enabling seamless co-existence in networks that implement DiffServ.
- Max/Priority – Provides eight levels of traffic prioritization with the ability to limit maximum traffic per priority class
- Min/Max – Provides a Committed Information Rate (CIR) to each user defined class of traffic with the ability to allow a higher burstable rate depending on availability
- VLAN Priority/Max – Available in Managed switch mode when using VLANs. Uses 3-bit 802.1p VLAN priority with ability to set a maximum data rate per priority

The packet processor includes a powerful classifier capable of classifying packets based on Application/Protocol, Source IP Address/Subnet, Destination IP Address/Subnet, Source Port / Range and Destination Port / Range.

Figure 1. Min / Max QoS Configuration

Header Compression

The packet processor incorporates industry-leading header compression for IP/Ethernet traffic. In Routed mode, header compression can be enabled on a per route basis and can reduce the typical 40 byte IP/UDP/RTP header to an average of 2 bytes. For TCP/IP, the 40 byte header is reduced to an average of 4 bytes. In Managed Switch mode, header compression also compresses the Ethernet header. So, a 58 byte Ethernet header with VLAN and IP/UDP/RTP header can be compressed to as little as 2 bytes.

For applications such as VoIP, header compression can provide bandwidth savings exceeding 60%. E.g. 8 kbps G.729 voice transported in an IP/UDP/RTP datagram typically requires 24 kbps in a routed network or approximately 32.4 kbps in a switched network including VLAN header and FCS. With header compression, the same voice call needs approx 9 kbps (before HDLC encapsulation) – a savings of over 60% in a routed network or over 70% in a switched network. Bandwidth requirement for typical Web/HTTP traffic is also reduced with TCP/IP header compression.
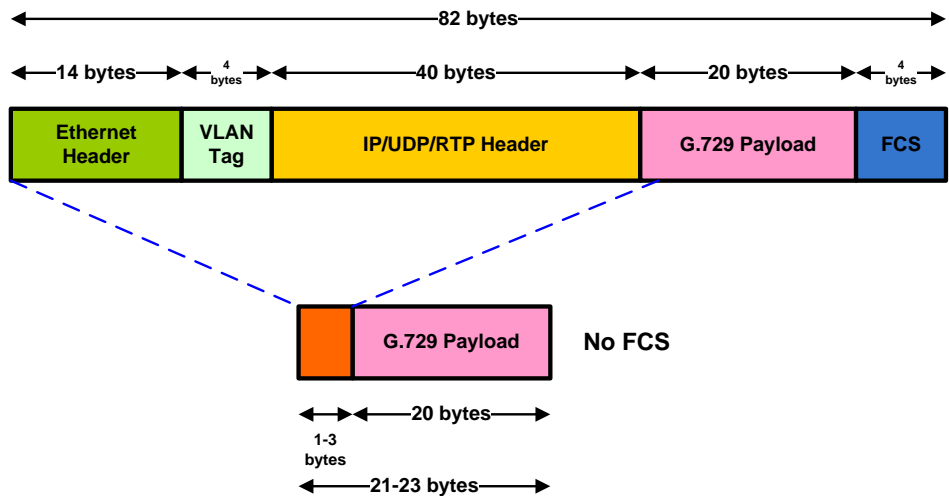

Figure 2. Header Compression in Managed Switch Mode

Payload Compression
Implemented in the hardware for maximum throughput and efficiency, payload compression can typically reduce the required satellite bandwidth by 20-30%.

Vipersat Management System
CDM-570A/L-IP will be fully integrated with our Vipersat Management System (VMS) for dynamic bandwidth management on demand. A VMS managed network enables:

- Dynamic SCPC carrier allocation & true bandwidth-on-demand
- User-defined policies for upstream carrier switching
- Star and dynamic mesh capabilities using single hop on-demand
- Guaranteed bandwidth capability

VMS Network & Bandwidth Management
A Vipersat-powered network integrates these advanced modems with a powerful network management tool, the Vipersat Management System. In addition to the traditional monitoring and control of the CDM-570A/L-IP modems and the demodulators, the VMS allows these devices to share bandwidth, and when needed, switch automatically to a dedicated SCPC channel. In a Vipersat-powered network, the CDM-570A/L-IP modem takes advantage of its fast acquisition demodulation to allow it to operate in a shared mode. Inbound transmissions (from remote to hub) can be switched from a shared Selective Time Division Multiple Access (STDMA) mode to a dedicated Single Carrier Per Channel (SCPC) connection via a variety of user defined policies or triggers. This enables the network to more effectively handle real-time connection-oriented applications and reduces both latency and network congestion. Through VMS, dynamic point-to-point mesh connections can also be established between remotes.

Upstream Switching
Through protocol classification in the remote terminals, the modem initiates automatic switching. VMS establishes *dSCPC* bandwidth based on policies that can be individually enabled on a per-remote basis, or globally enabled. Policies can be configured for a variety of applications such as VoIP, video (VTC), or based on a load, or via a schedule, Type of Service (ToS), or QoS rules such as IP port or IP address and protocol type. Operators are able to set minimum and maximum data rates for each remote as well as excess data rates for an initial upstream switch.

Global Roaming
CDM-570A/L-IP supports global roaming in conjunction with the Vipersat Management System and Roaming Oceanic Satellite Server (ROSS). This allows a remote satellite terminal on-board an oceanic vessel to seamlessly transition between satellite beams or hub coverage with minimal service interruption.

ROSS functions as the onboard mobility controller – it interfaces with the Antenna Control Unit (ACU), maintains satellite footprint maps, shoreline contour vector maps and exclusion zones, and initiates beam switching and handoff as vessels move through the satellite footprints. The ROAM protocol offers a common management interface for the ROSS and the ACU by providing a set of commands, information, interfaces and status queries.

Adaptive Coding & Modulation (IP ACM)
The packet processor enables bi-directional IP ACM for point-to-point circuits.

Satellite users have traditionally relied on worst-case link margin to overcome rain fade and other impairments, which leads to significant inefficiencies. ACM converts the available link margin into increased throughput – a gain of 100% or more is possible. It also increases availability by maintaining the link at a lower data rate under deep fade.

With the ability to maximize throughput under all conditions – rain fade, inclined orbit satellite operation, interference and other impairments – ACM allows a circuit to achieve maximum throughput thereby maximizing network efficiency and availability.

ACM operation is integrated with advanced QoS and other optimization technologies.

Detailed Stats

The packet processor collects extensive traffic and optimization statistics to give users a complete picture of the link operation allowing them to maximize available resources.

CDM-570A: Comtech EF Data Modem :: Ethernet Statistics

Home | Admin | Configuration | Status | ODU | Redundancy

Modem Status | System Logs | Modem Info | Traffic Statistics | Performance | Graph

Ethernet | Router | WAN | Compression | QoS | Clear Counter

Clear Ethernet Statistics

Clear   Refresh

Ethernet Statistics

Receive Statistics		Traffic port	Management port	WAN port
Total Packets Received		3771	157500	2910
	Unicast Packets	2372	145106	2909
	Broadcasts Packets	920	7471	1
	Multicasts Packets	479	4923	0
	Ethernet Pause Frames	0	0	0
Bytes Received		568530	11925731	1277593
Total Receive Errors		0	0	0
Receive Performance				
Current Data Rate (kbps)		0	0	0
Avg Data Rate (kbps – 5 minutes)		0	0	0
Max Data Rate (since last clear)		54	177	245
Current Packets/s		0	0	0
Avg Packets/s (5 minutes)		0	0	0
Max Packets/s (since last clear)		53	38	63
Transmit Statistics				
Total Packets Transmitted		2909	145121	3771
	Unicast Packets	2909	145118	2372
	Broadcasts Packets	0	3	920
	Multicasts Packets	0	0	479
	Ethernet Pause Frames	0	0	0
Bytes Transmitted		1277529	9451134	568530
Transmit Performance				
Current Data Rate (kbps)		0	0	0
Avg Data Rate (kbps – 5 minutes)		0	0	0
Max Data Rate (since last clear)		245	59	54
Current Packets/s		0	0	0
Avg Packets/s (5 minutes)		0	0	0
Max Packets/s (since last clear)		63	38	53

Error Details

Receive Errors	Traffic port	Management port	WAN port
LAN FCS Error	0	0	0
Alignment Error	0	0	0
Undersize	0	0	0
Fragments	0	0	0
Jabber	0	0	0
Oversize	0	0	0
InDiscards	0	0	0
Transmit Errors			
Single Collision	0	0	0
Multiple Collisions	0	0	0
Excessive Collisions	0	0	0

Figure 3. Detailed Packet Stats

Conclusion

Our product suite offers multi-dimensional optimization tailored towards particular user applications. This multi-dimensional optimization utilizes a building block approach, with one of the data flow processing blocks focused on making sure that the IP data flow is handled in the most efficient manner possible. For entry-level point-to-point and high-end point-to-multipoint satellite networking, the CDM-570A/L-IP with its high-speed Packet Processor, through intelligent lossless compression and data handling, provides the most "net efficiency" in the industry while ensuring the highest quality of service with minimal jitter and latency for real-time traffic. Built upon the CDM-570 platform, the new solution provides the horsepower required to support the most demanding duplex links of any satellite network.