



# COMTECH™

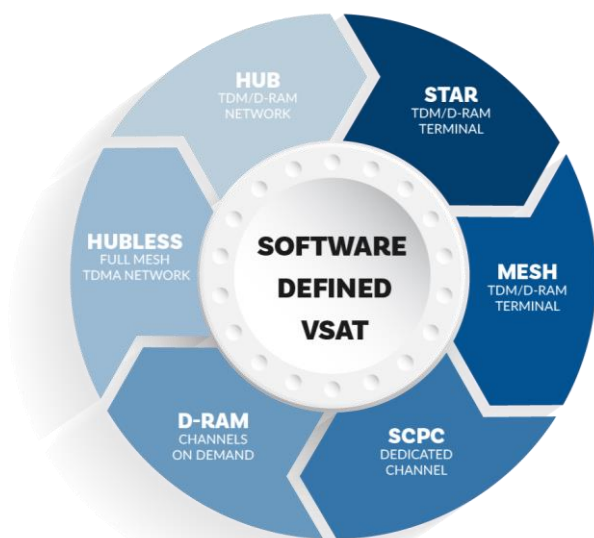


## Comtech ELEVATE CEL-200 Series

## Universal Satellite Router

Comtech ELEVATE is a scalable, reliable, software-defined solution that brings together the best of Comtech's popular Heights and MF-TDMA VSAT platforms in a first-of-its-kind leading-edge architecture featuring D-RAM (Dynamic Return Access Modes) that allows dynamic seamless shifting between MF-TDMA and H-DNA waveforms. Comtech's software-defined technology allows the creation of private VSAT Networks of any size and topology with unlimited potential for future development.

Comtech ELEVATE CEL-200 is a universal VSAT router with Software-Defined Architecture. The device packs industry-highest processing capability into a very compact size with power consumption under 12W. It can process up to 450 Mbps of aggregate traffic. CEL-200 comprises two DVB demodulators, four TDMA burst demodulators, a universal TDMA/H-DNA/SCPC modulator and a powerful IP router capable of processing over 190,000 IP packets per second (PPS). The high processing capability allows implementation of uniquely efficient protocols for network access, resource allocation and data encapsulation as well as support for advanced MODCODs.



Comtech ELEVATE CEL-200 is a truly universal router which can operate as a star or mesh remote or as a Tx/Rx SCPC IP modem, or as a node in a Hubless TDMA (full mesh) network, or as a building block (universal controller) in a large TDM/D-RAM HTS Hub. This unique device can even implement multiple access protocols and sophisticated QoS, so that it can work as a fully-fledged TDM/TDMA Hub with one Outroute TDM and Multi-Carrier Inroute Controller (IC) capable of receiving up to 8 TDMA carriers. Comtech ELEVATE CEL-200 router can switch on-the-fly between the modes, using any of the 8 configuration profiles stored in the device.

### Key Features:

- Dynamic Return Access Modes (D-RAM) automatically and seamlessly selects MF-TDMA or H-DNA return access schemes
- Two independent DVB demodulators with separate software-switchable IF inputs and rate up to 500 Msps
- Efficient DVB-S2/S2X ACM modulations with 5% or 20% roll-off and support for wideband HTS transponders
- Multichannel MF-TDMA demodulators and proven efficiency of >97% vs. SCPC
- Multiple demodulators allow simultaneous reception of two DVB (TDM or SCPC) carriers and a group of MF-TDMA carriers
- Adaptive coding and modulation (ACM) in forward and return channels, including SCPC and D-RAM modes
- Ultra-low latency VSAT system with round-trip delay about 570 ms for TDMA mode of operation
- Various modes of operation and topologies: SCPC, TDM/TDMA, TDM/H-DNA, Hubless TDMA
- HTS-ready VSAT with support of multiple beams, bands, satellites reception with traffic balancing
- Superior IP router productivity up to 190,000 PPS and rich set of supported protocols, multi-level QoS
- Dual-stack IPv6/IPv4 routing architecture and Layer 2 bridging mode
- GTP header compression and acceleration
- Doppler compensation, preloaded coverage maps, OpenAMIP and automatic network roaming
- 1:1 automatic redundancy without external controllers or M:N Smart Redundancy
- Highest reliability with over 200 000 hours MTBF
- H-DNA (High – efficiency Dynamic SCPC Network Access)

# Specifications

## Network

Topology	P2P, Star, Mesh, Dual-Gateway
Modes of operation	SCPC, TDM/TDMA, TDM/DRAM, Hubless TDMA, Universal Hub Controller, Spectrum Analyzer
Frequency bands	C, X, Ku, Ka, including multi-beam HTS satellites GEO/MEO/LEO

## Demodulators

### DVB Demodulator

Standard	DVB-S2 / DVB-S2X ACM
Channels	2 with selectable IF inputs
MODCODs	QPSK to 256APSK
Symbol Rate	300 ksps - 500 Msps
Roll-Off	5%, 20%

### MF-TDMA Demodulator

Channels	Up to 8 MF-TDMA demodulators
MODCODs	BPSK to 16APSK
Symbol Rate	100 ksps – 22 Msps
Multi-frequency	Fast MF hopping
Roll-Off	5%, 20%

## Universal D-RAM Modulator

### TDMA Modulator

MODCODs	BPSK, QPSK, 8PSK, 16APSK / LDPC
Symbol Rate	100 ksps to 11 Msps. MF Hopping
Multi-frequency	Fast MF hopping
Roll-Off	5%, 20%
Spreading	Factors 2 and 4, max. 11.7 Mcps

### HDNA Modulator

MODCODs	BPSK to 32ARY
Symbol Rate	100 ksps to 15 Msps.
Roll-off	5%, 20%

## DVB (SCPC) Modulator

Standard	DVB-S2 / DVB-S2X ACM
MODCODs	QPSK to 256APSK
Symbol Rate	300 ksps to 64 Msps, step 1 ksps
Roll-Off	5%, 20%

## Routing & QoS

Protocols	IPv4/IPv6, IGMP, cRTP, SNMP, RIPV2, SNTP, TFTP, PPP, DHCP, DHCP Relay, OpenAMIP
Support	DSCP, multiple IP/VLANs, PAT, proxy ARP, L2 Bridging, TCP & GTP Acceleration, Jumbo frames (2KB MTU), AES-256, X.509
QoS	8-level prioritization, traffic policies, CIR, MIR, group QoS, hierarchic traffic shaper, FAP
Performance	Up to 190 000 packets per second
Management	HTTP interface, SNMP, Telnet, NMS



## Spectrum Analyzer (Optional)

Bandwidth	950-2150 MHz; accuracy: ±0.01%
Sweep time	1-2 sec
Span	Span 10 kHz - 1200 MHz; accuracy: ±1.8%
Measurement range	30 dB; Accuracy: ±6 dB; Relative: ±0.15 dB

## Interfaces

User LAN	2 x Giga Ethernet 10/100/1000 Base-T
Maintenance	MiniUSB, B female
IF Rx (both inputs)	950-2150 MHz; Ref. 10 MHz/+5 dBm [RX1]; 13.5/18 VDC 0.75A; F type; 22 kHz Tone
IF Tx	950-2400 MHz, -1...-46 dBm; Ref. 10 MHz/+5 dBm; 24V/3A; F type



Model	Housing	Dimensions, mm	Weight, kg	Operating voltage	Operating temperature	Humidity, non-condensing
CEL-200	Compact	147x30x144	0.5	24 VDC or 100-240 VAC, 10W	0...+50 °C	Up to 95%
CEL-210	Board	130x20x140	0.1	24 VDC, 10W	-40...+60 °C	Up to 95%
CEL-220	Outdoor	157x90x318	2.3	24 VDC, 10W	-40...+60 °C	IP67-class
CEL-230	Rackmount	440x44x170	1.7	24 VDC or 100-240 VAC, 10W	0...+50 °C	Up to 95%
CEL-240	Dual	440x44x170	2.0	24 VDC or 100-240 VAC, 20W	0...+50 °C	Up to 95%

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## About Us

Comtech Telecommunications Corp. is a leading global technology company providing terrestrial and wireless network solutions, next-generation 9-1-1 emergency services, satellite and space communications technologies, and cloud native solutions to commercial and government customers around the world. Our unique culture of innovation and employee empowerment unleashes a relentless passion for customer success. With multiple facilities located in technology corridors throughout the United States and the world, Comtech leverages its global presence, technology leadership and decades of experience to create the world's most innovative communications solutions.

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