



## AVIAT NETWORKS

# CTR 8540 MICROWAVE ROUTER

The CTR 8540 from Aviat Networks is the industry's first purpose built microwave router. CTR merges the functionality of a microwave indoor unit and cell site router into a single integrated solution which bridges both microwave and Ethernet/IP/MPLS networking domains.



### 3-LEVEL INTEGRATION SIMPLIFIES OPERATOR NETWORKS

CTR 8540 is the industry's first microwave router. Unlike traditional microwave indoor units that require separate routers and management systems, CTR is a fully integrated microwave networking solution. A fully featured router, purpose built for microwave, CTR reduces the number of devices and saves money.

CTR's "3-Level Integration" enables efficient, high performance operation across critical microwave, routing, and management functions thus drastically simplifying mobile backhaul networks. Best of all, CTR is also a powerful Layer 2 microwave solution that can be deployed today and is IP/MPLS-ready via simple software upgrade for optimum flexibility and investment protection.

### ENABLING INTEGRATED SERVICE DELIVERY

Built on Layer 3 intelligence, the CTR 8540 delivers essential functionality to enable the transformation of Mobile cell sites from simple base stations for voice and low speed mobile data access to multi-functional hubs for delivery of new services, multimedia rich content, and broadband data access. Alternative microwave backhaul solutions make this transition more difficult, as more capacity and smarter devices complicate cell site configurations, increase cost, and add management overhead.

### COMPACT DESIGN, PACKED WITH FEATURES

The CTR 8540 delivers an amazing array of capabilities in a single rack unit. Nodal support for up to 8 IF-connected ODUs, 12 Gigabit Ethernet interfaces, 16 E1 ports, optional PoE to power all-outdoor Ethernet-connected microwave or millimeter-wave radios, and redundant power supply options. CTR is also fully compatible with Aviat ODU300 and ODU600 microwave (6-42GHz) outdoor units. Apart from advanced Carrier Ethernet and IP/MPLS built-in, CTR also supports the latest microwave transport features such as up to 1024QAM ACM, co-channel operation with XPIC and diversity options to deliver high capacity, ultra-reliable microwave paths.

### MODULAR DESIGN FOR A SAFE INVESTMENT

One of the biggest operator challenges is to understand what will be needed in the future. CTR 8540 offers software modularity to complement its flexible hardware design to safeguard your investment. CTR combines the latest in Carrier Ethernet switching with the ability to upgrade to full IP routing and MPLS in the future, providing scalability for future expansion of services as needed, without having to add extra devices. Features can be added through simple software upgrades only when and as needed.

### KEY FEATURES

- Aviat "3-Level Integration" combines Inherent Microwave, Interactive Routing and Intuitive Management in a single package
- Compact 1RU carrier class design with optional redundant power
- High density base with 8x10/100/1000 Ethernet, 4x GigE SFP ports and 16x E1 interfaces
- Four plug-in modular slots supporting: Radio Access Cards (RAC), Power-over-Ethernet (PoE) and Redundant power supply options
- Advanced microwave functions: 1024QAM (ACM), 1+1 MHSB and 2+0 (XPIC), and space diversity
- Carrier Ethernet: 802.1q & 802.1ad (QinQ), VLAN, STP/MSTP, L2LA (802.1AX), LACP, ERP (G.8032)
- IP/MPLS: IPv4, IPv6, Static and Dynamic IP Routing; MPLS LDP and RSVP-TE; L2 VPN (VPWS, VPWS) & L3 VPN services
- MEF-8 and MPLS Pseudowires for TDM over packet transport
- Advanced Traffic Management: L2/ L3 QoS, Ingress Policing, Shaping, Buffering, Multiple Class scheduling
- Advanced Ethernet OAM, including IEEE 802.1ag, 802.3ah and ITU-T Y.1731
- Multiple Synchronization options including T1/E1, IEEE 1588v2 and Synchronous Ethernet (SyncE)
- End-to-end Network Management and Craft Interfaces including Aviat ProVision support and Manage Advance support

## HARDWARE PLATFORM AND INTERFACES

### BASE HARDWARE CHASSIS:

- 1 RU height chassis includes:
  - -48 V DC power supply
  - V.24 Maintenance Port (RJ-45)
  - Ethernet User Interfaces (details below)
  - Protection and Diversity Ports
  - Four Universal Plug-In Module Slots (details below)
  - Removable Fan Module

### USER INTERFACES:

- Eight 10/100/1000BASE-T (RJ-45)
- Four 10/100/1000Base-X (SFP) unpopulated ports:
  - Single-mode -LX (1310nm), -ZX (1550nm) optical
  - Multimode -SX (850nm) optical
  - 1000Base-T (RJ-45)
  - STM-1 & STM-4 (1310nm) Optical TSOP
  - 2.5 GBPS Ethernet Interconnect
- 16x T1/E1 ports (2 HDR connectors)

### PLUG-IN MODULES (OPTIONAL):

- RACx1: Single IF radio interface
- RACx2: Dual IF radio interface
- PoEx2: Dual power over Ethernet interface
- PWR: Power supply for redundancy

## HARDWARE PLATFORM AND INTERFACES

### RADIO NETWORKING

- Up to 8-way nodal IF links per CTR using RACx1 or RACx2:
  - Split-mount ODUs (Aviat ODU600, ODU 300HP)
  - All-indoor radios (Aviat IRU 600)
- All-outdoor radios via PoEx2 or any fixed Ethernet interface:
  - Aviat WTM 3000 or 3rd party
- Fixed and Adaptive Coding and Modulation (QPSK, 16, 32, 64, 128, 256, 512, 1024 QAM)
- L1 link aggregation for IF connected radios
- 1+0, 1+1 Monitored-Hot-Standby or Space Diversity
- Co-channel operation with XPIC
- Payload Encryption

### SYNCHRONIZATION

- Internal Stratum-3 clock
- Ethernet and PDH clock source and delivery options
- Synchronous Ethernet (ITU-T G.8262)
- ESMC/SSM (ITU-T G.8264)
- Precision Time Protocol (IEEE 1588v2)

### CIRCUIT EMULATION/PSEUDOWIRE SERVICES

- Supported on all T1/E1 interfaces
- Structure-agnostic CES over Ethernet (MEF 8)
- Pseudowire Emulation Edge to Edge (PWE3)
- Structure-agnostic TDM over Packet (SAToP)
- Structure aware TDM CES over Packet Switched Network (CESoPSN)

### CARRIER ETHERNET/L2 SERVICES

- QoS: 8 COS, Scheduling, Policing, Storm Control, Shaping
- QoS mapping: PCP (802.1p), DSCP, and MPLS EXP
- VLANs (IEEE 802.1Q) and Q-in-Q (IEEE 802.1ad)
- Rapid and multiple spanning tree protocols (RSTP, MSTP)
- L2 Link Aggregation (802.1AX)
- Ethernet Linear Protection Switching (G.8031)
- Ethernet Ring Protection (G.8032v2)
- Ethernet OAM (IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731)

### IP/MPLS SERVICES

- IPv4 and IPv6
- Unicast and multicast routing
- IS-IS, OSPF, BGP
- Label Distribution Protocol (LDP)
- RSVP-TE
- L2 VPN (VPLS, VPWS) & L3 VPN
- LSP Protection with BFD
- VRF & LSP Ping and Traceroute
- MPLS Packet Loss and Delay Measurements

### ELEMENT AND NETWORK MANAGEMENT

- Local Configuration via CLI or Web GUI
- Aviat ProVision EMS
- RMON1, RMON2, and port mirroring
- SNMP v1/v2/v3
- SSH & TACACS+

## OPERATING ENVIRONMENT AND POWER

- Operating Temperature: -5° to +55°C / -14° to +122°F
- Humidity: 5 to 93%, non-condensing
- Altitude: 4,500 m/15,000 ft.
- Base chassis input voltage: -48 VDC nominal
- Base chassis voltage range: -40 VDC to -57 VDC
- Power consumption: 30-200 W (loading dependent)
- PoE++ interface output power: Up to 70 W per PoE port

## MECHANICAL

- CTR 8540 chassis: 44 mm (1RU) x 445 mm x 240 mm / 1RU x 19 in x 9.4 in
- Universal Plug-In Module: 18.27 mm x 104.3 mm x 230 mm / 0.72in x 4.1 in x 9.0 in
- Chassis weight: 4.5 kg / 9.9 lb

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