HUGHES HX150
Broadband Terminal

High-performance L-band satellite router

The HX150 is a high-performance satellite router designed to support high-bandwidth links with Quality of Service (QoS) features such as Min/Max CIR together with dynamic allocation of bandwidth. With integrated IP features including NAT/PAT, DHCP, RIPV1, RIPV2, and DNS server/relay functionality, together with TCP acceleration and a high-performance satellite modem, the HX150 is the ideal platform to enable high-performance IP connectivity for a variety of applications including cellular backhaul, MPLS extension services, virtual leased line services, and other high-bandwidth solutions.

Target Markets

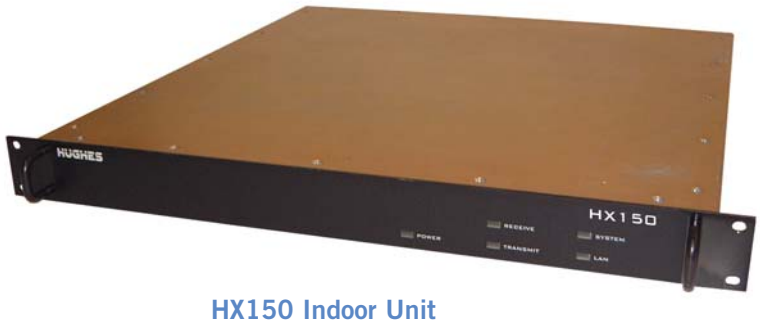
- SCPC/MCPC replacement links
- GSM backhaul
- MPLS extension services
- Embassy and government networks
- Private leased line services

HX System Architecture

The HX System provides star TDM/TDMA connectivity consisting of a central gateway connecting to multiple HX remote terminals. With a DVB-S/DVB-S2 outbound carrier supporting rates up to 121 Mbps and multiple inbound carriers supporting rates up to 3.2 Mbps, the HX System provides the high throughput needed for high QoS networking.

Efficiency and flexibility in utilizing satellite bandwidth are the core of its design. Each link can be configured to provide a QoS tailored for the individual remote terminal. Each remote link can be independently configured with Minimum CIRs and Maximum Rates, thereby allowing a service provider to develop a service tailored to its customers' specific requirements. In addition, the HX System bandwidth allocation scheme uses an Aloha channel for initial traffic requests, which means that remotes can be configured to deallocate bandwidth based on inactivity. This frees up unused bandwidth and allows an operator to make more efficient use of space segment resources.

Because the HX System is DVB-S conformant, the HX System can easily be multiplexed to an existing DVB outbound carrier such as the Hughes HN system, DTH system, or other DVB-based broadband systems.



HX150 Indoor Unit

HUGHES, the world leader in satellite networking, has introduced the HX System, designed and optimized for small networks where the provision of high-quality and high-bandwidth links are the most important criteria. Building upon the heritage and capabilities of the more than 700,000 broadband satellite terminals shipped by Hughes, the HX System incorporates many of the advanced features pioneered by Hughes including integrated TCP acceleration and advanced IP networking features.

Features

- Quality of Service features include:
  - On-demand constant bit rate (CBR) services
  - Minimum CIR with fixed steps to maximum rate (Rate limiting)
  - Minimum CIR with best effort to maximum rate (Rate limiting)
  - Best effort services - weighted fair queueing
  - Class-based weighted prioritization
  - Multicast data delivery
  - Four levels of IP traffic prioritization
- Bandwidth allocation
  - Supports both preassigned (static) traffic assignment and dynamic traffic assignment
  - Idle remotes can be configured to release all network resources
- Acts as a local router providing:
  - Static and dynamic addressing
  - DHCP server or relay
  - DNS Caching
  - Full RIPV2 routing support
  - Multicasts to the LAN by using IGMP
  - NAT/PAT
  - VLAN tagging
  - Firewall support through integrated access control lists
- Supports unicast and multicast IP traffic
- Software and configuration updates via download from the HX Gateway
- Implements dynamic, self-tuning Performance Enhancement Proxy (PEP) software to accelerate the throughput performance by optimizing the TCP transmission over the satellite, delivering superior user experience and link efficiency
- Bidirectional data compression
- Configuration, status monitoring, and commissioning via the gateway
- Embedded Web interface for local status and troubleshooting
- Remote terminal management via the Hughes Unified Element Manager and SNMP agent
- User-friendly LED display indicating terminal operational status

High Availability Features

- Closed loop control between hub and remote
- Dynamic outbound coding and modulation changes based on received signal
- Dynamic inbound coding changes based on received signal
- Dynamic remote uplink power control

Technical Specifications

Physical Interfaces

Two 10/100BaseT Ethernet LAN RJ45 ports

One Serial port (RS-422 or RS-232)

Satellite & Antenna Specifications

Outbound transmission format: DVB-S or DVB-S2

DVB-S2 supports adaptive coding and modulation

Information Rate (Receive or HX System Outbound Channel): up to 121 Mbps

Information Rate (Transmit or HX Inbound Channel): up to 3.2 Mbps

Symbol Rate (Receive): 1–45 Msps (in 1 Msps steps)

Symbol Rate (Transmit): 128, 256, 512, 1024, 2048 ksps

Encoding DVB-S (Receive): Convolutional with concatenated Reed Solomon; Viterbi 7/8, 5/6, 3/4, 2/3, or 1/2

Encoding DVB-S2 (Receive):
BCH with LDPC 3/5, 2/3, 3/4, 5/6, 8/9, or 9/10 (8PSK)
1/2, 3/5, 2/3, 4/5, 5/6, 8/9, 9/10 (QPSK)

Transmit encoding: Rate 1/2, 2/3, 4/5 TurboCode, Rate 1/2 Convolutional

Frequency Range: C-. extended C-, Ku-, and Ka-band

Modulation (Receive): QPSK or 8PSK

Modulation (Transmit): OQPSK

Bit Error Rate (Receive): 10^{-10} or better

Bit Error Rate (Transmit): 10^{-7} or better

Inbound Spreading: (requires optional Hub equipment)

Radio Interface

TX IF: Type-TNC Female, 950–1700 MHz, composite power -5 dBm/-35 dBm

RX IF: Type-F, 950–2150 MHz, -68 dBm (per carrier at 1 Mbps), -8 dBm (composite)

Available BUC Power (IFC):	+24 V at 3.2 amps (nominal, typically up to 5 W BUC)
Available LNB Power (IFC):	+19.5 v (nominal)

10 MHz reference available

Mechanical & Environmental

1U enclosure for 19" rack

Weight (IDU):	5.5 lbs (2.5 kg)
Dimensions (IDU):	19" W x 1.75" H x 18" D (48.26 cm W x 4.45 cm H x 45.72 cm D)

Operating temperature:

IDU:	+32° F (0° C) to +122° F (+50° C)
Input power:	90–264 VAC; 50–60 Hz

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