

**FEATURES**

- Multi-port LAN - WAN router
- Optional data compression engine
- Optional SCAN bandwidth manager
- Optional data encryption engine
- Point to multipoint mesh networking
- Fully compatible with most modems

The LinkIP v3 is the ultimate tool for satellite bandwidth savings in IP based satellite networks. Economization is achieved on both network and data link layers. Its multipoint routed networking architecture allows highly efficient multi-destination networking. Bandwidth savings are also realized on the data link layer with LinkShrink™, LinkSat's powerful data compression engine that, depending on data type, can net as much as 60% in bandwidth savings. The LinkIP is compatible with most legacy satellite earth station equipment, and therefore can easily and cost effectively be overlaid into existing SCPC networks for overall bandwidth savings of as much as 80%.

NETWORK INTERFACE PORTS

The LinkIP supports multiple LAN and WAN ports. The LAN interfaces supported are 10/100/1000 Ethernet for IP networking applications, and T-1 / E1 for telephony and cellular backhaul applications, such as direct connection to BTS/ RBS equipment. The primary purpose of the WAN ports is to interface with satellite modems. The LinkIP can be equipped with multiple synchronous and asynchronous serial interfaces, including RS-422 / EIA-530 and ASI. This capability makes the LinkIP compatible with virtually any satellite modem via either serial or Ethernet data interfaces. The standard LinkIP supports two Ethernet ports and up to four serial ports. Up to 28 serial ports can be added with the use of an optional expansion chassis.

OPTIONAL INTEGRATED DATA COMPRESSION ENGINE

LinkShrink™ is LinkSat's proprietary data compression engine that compresses and decompresses packet headers, sub headers, and payload data. Bandwidth savings of up to 60% can be achieved in IP networks, depending on the type of data and level of compression used. Compression ratios are adjustable using the LinkShrink configuration tool so that optimal compression levels can be achieved while minimizing throughput latency. Data can be compressed per WAN port and can be independently configured on each port.

OPTIONAL SCAN BANDWIDTH MANAGER

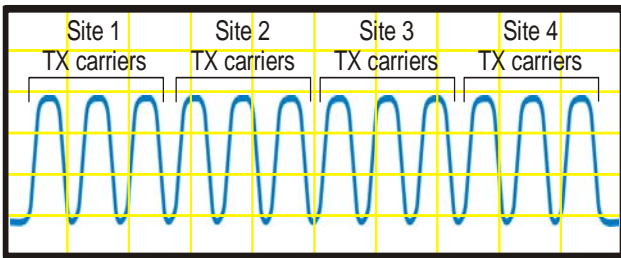
Further bandwidth savings can be realized using Scanned Channel Assigned Networking (**SCAN™**), which is LinkSat's patented bandwidth manager. SCAN employs Carrier Sense-Frequency Division Multiple Access-Collision Detection (CS-FDMA-CD) for hubless bandwidth-on-demand services. SCAN's hubless architecture enables each remote to independently make transmit and receive decisions based on bandwidth demand at each site.

Each SCAN remote site has an integrated spectrum analyzer that monitors spectral activity in real time. The LinkIP uses the SCAN spectral activity data to make decisions on when and where to transmit carriers, and which carriers to receive within a defined segment of satellite bandwidth. Satellite modulators and demodulators are controlled by the LinkIP for the transmission and acquisition / reception of carriers. This unique technology offers high bandwidth efficiency in multi-application environments, and supports virtually any type of network architecture, including multi-destination, star, partial mesh, and full mesh.

LinkIP Routed Multi-Destination Network Architecture

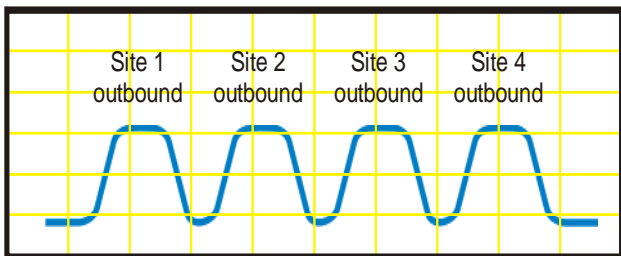
Due to its multiple WAN port support capabilities, the LinkIP can be configured as a point-to-multipoint router for partial-mesh and full-mesh multi-destination networks. IP packets destined for any other site in a network are multiplexed onto each site's outbound transmission. This outbound transmission can be received by any other LinkIP in the network that has a connected demodulator tuned to that outbound carrier. LinkSat's custom air protocols detect packets in the receive stream that the LinkIP must act upon. Using its built-in packet filtering capabilities and its native static and dynamic routing protocols, the receiving LinkIP routes only those packets destined for its local network out its LAN port. The resultant network architecture has lower bandwidth *and* capital costs than comparable SCPC networks. It is highly bandwidth efficient, typically saving 10 to 40% over duplex point-to-point SCPC networks. Each site needs only one modulator and can utilize cost effective high density demodulators, thereby reducing capital costs. Best of all, the LinkIP can be overlaid into existing SCPC networks, converting them into highly efficient routed networks with mesh capabilities using legacy modems and RF equipment.

SINGLE CHANNEL PER CARRIER (SCPC)



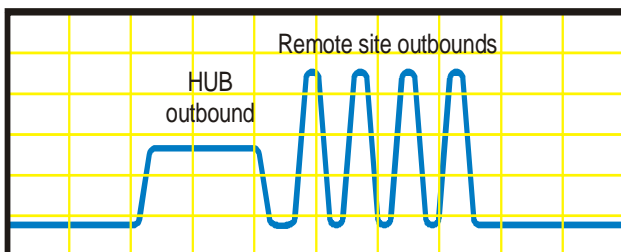
Full mesh connectivity using traditional SCPC requires a full duplex link between each site. That means each site needs to transmit a discrete carrier for every other site in the network, and needs to receive a dedicated carrier coming from every other site. Hence, a SCPC mesh network of four sites requires 12 discrete carriers. This "brute force" approach is effective but not very bandwidth efficient.

MULTI-DESTINATION FULL MESH (MDFM)

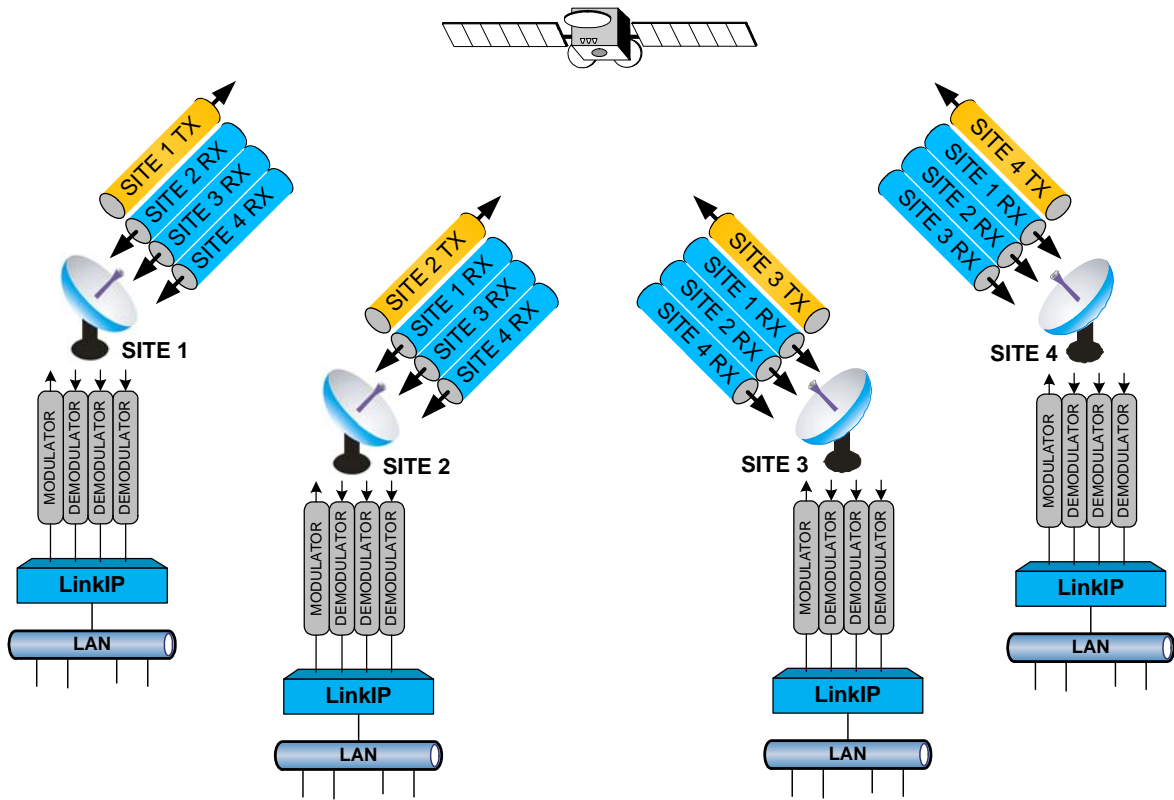


The LinkIP's unique architecture allows full-mesh single hop remote-to-remote communications. In a MDFM network, each site transmits a single carrier with all network traffic multiplexed onto a single IP stream that is broadcast to all other sites. Any other site in the network that wants to receive data from Site 1 simply tunes a demodulator to Site 1's transmit frequency. Only one modulator is used at each site, and high-density demodulators can be used for full or partial mesh configurations.

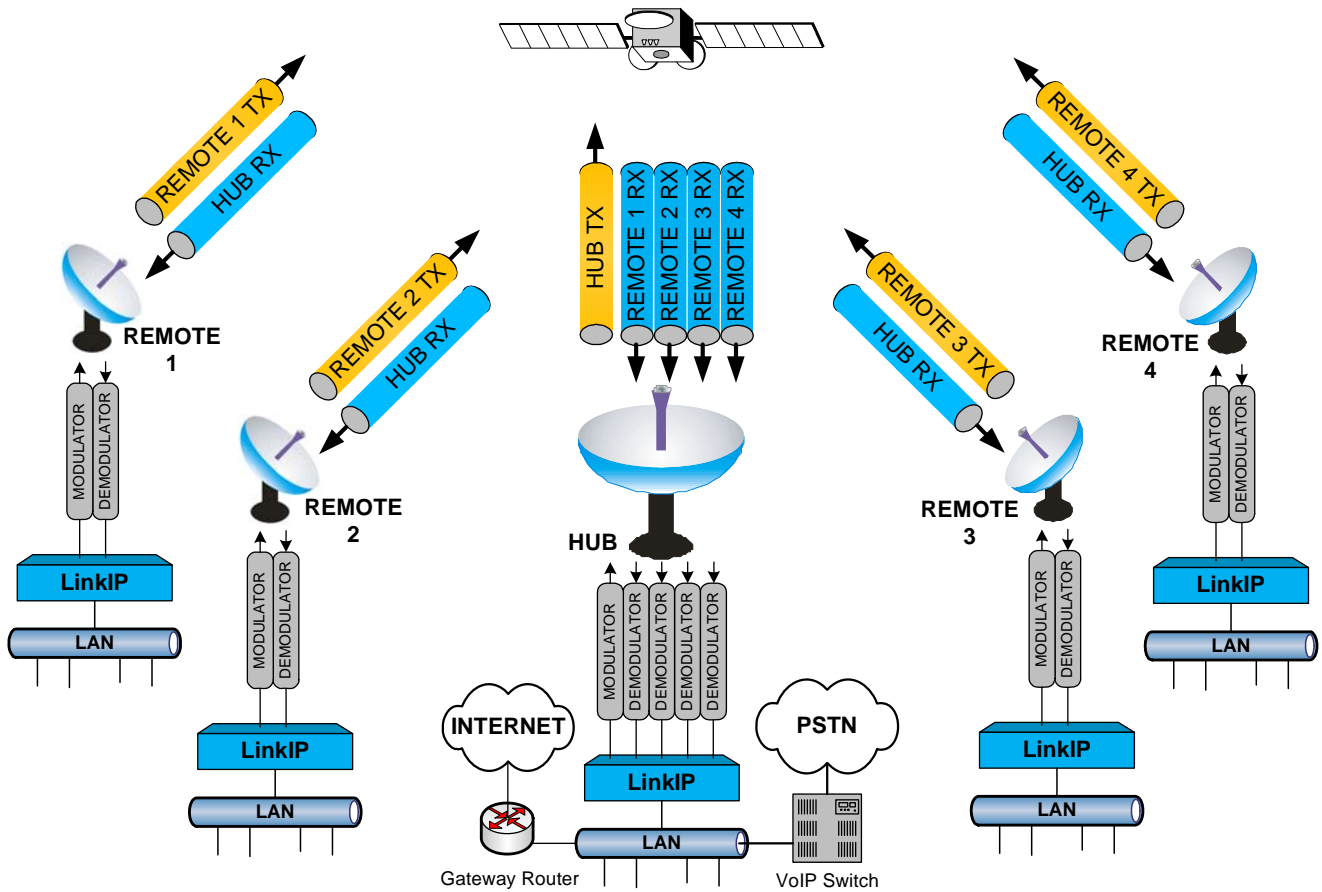
MULTI-DESTINATION STAR (MDS)



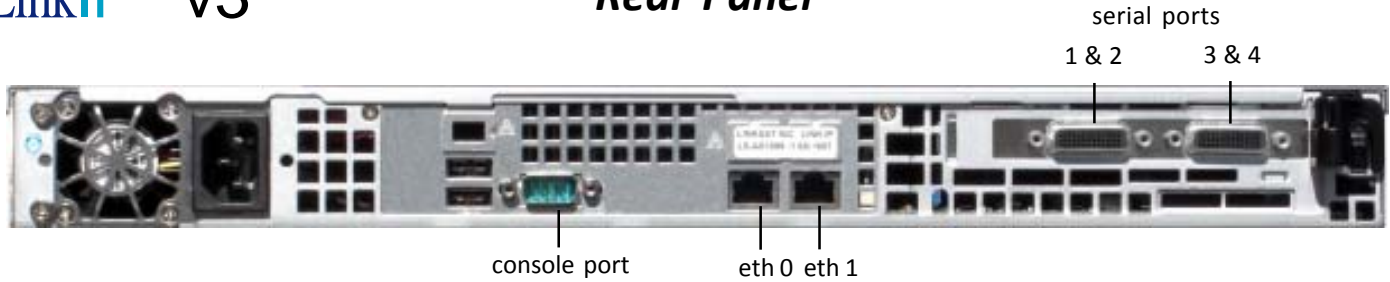
LinkIPs configured in a star architecture enable substantial savings in both capital equipment and space segment operating expenses. Savings come from aggregation of the hub transmit carriers into a single outbound, eliminating bandwidth wasted by carrier spacing requirements. Because only one carrier is transmitted, only one modulator is required at the hub, which eliminates $n-1$ modulators where $n = \#$ of sites. This architecture also enables use of high density demodulators for receiving inbound carriers. Partial mesh configurations are also possible by simply adding a demodulator to each site to be meshed to another site, and tuning that demodulator to the transmit frequency of the other site.



LinkIP Multi-Destination Full Mesh Network Example



LinkIP Multi-Destination STAR Network Example



Specifications

Routing Protocols

- Static Routing
- Dynamic Routing: RIP V1&2, OSPF, BGP, IS-IS
- Multicast: IGMP, PIM, DVB-MPE

Encapsulations

- PPP, PPPoE, PPPoA Client & Server
- HDLC
- Frame Relay
- SoftCell ATM & IMA
- Serial: RS-232, RS-422, EIA-449, EIA-530
- Tunnelling: GRE, IPIP, CIPE, & L2TP

Security

- Data Encryption: 256-bit AES, DES, 3DES
- IPSec & SSL VPNs
- Secure Shell (ssh v.2)
- NAT Firewall (1:1 & 1:many)

Traffic Monitor & Control

- QoS, ToS
- DiffServ
- Bandwidth Limiting
- Packet Filtering
- Port Forwarding
- Packet Processing by PVC
- Peer-to-peer Traffic Control
- Real Time Monitoring
- Local and Remote Monitoring

Physical Interface

- 2 On-board 10/100/1000 Ethernet Interfaces
- Up to 8 LAN / WAN Interfaces
- Management Ports: Serial Console, Telnet, SSH

Data Compression

- Proprietary software compression engine
- Compresses headers, sub-headers, and payload
- Configurable per WAN port connection

Plug-in Interface Options

- 4 Port RS-422/EIA-530/V.35 strap selectable
 - up to 10 mbps per port (HD-60)
 - up to 28 serial ports can be added with optional expansion chassis
- 1, 4, or 8 Port T-1/E-1 Interface (RJ45)
- ASI - up to 270 mbps (75 Ohm BNC)
- HSSI - up to 52 mbps (HD-50)
- DVB-S2 Integrated Receiver Decoder

Satellite Modem Interface

- Serial Data Interface Type: RS-422/EIA-530/V.35
- High Speed Data Interface Type: ASI
- Modem M&C Interface Type: RS-232, RS-485
- Modem M&C Interface Connector: DB-9 Male

Modems Supported

- Modem Compatibility: LinkIP will interface with any current, standard modulator / demodulator with serial or IP interface, examples include:
 - Advantech - AMT-30, AMT-34, AMT-70
 - Comtech EFData - SDM-300, SDM-300A, CDM-570, CDM-600, CDM-700
 - Datum - PSM-4900, PSM-500
 - Paradise - P-3000, P-3100

Network Architectures Supported

- STAR (Hub-and-spoke)
- Partial and full mesh
- Multi-destination Full Duplex

Dimensions

- 19" (17.8 cm) Wide
- 19.8" (48.3 cm) Deep
- 1.75" (4.45 cm) High (1 RU)

Power

- 90 to 264 VAC, Autosensing
- Max Power Consumption: 300 Watts
- Dual Redundant, Hot-Swap (optional)

note: specifications are subject to change without notice

Rev_C 10/09