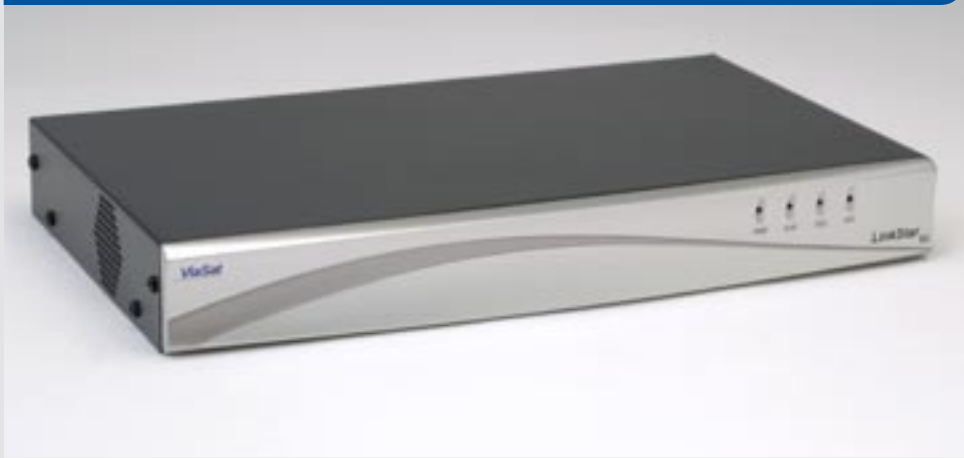


LinkStar$_{S2}$™ DVB-S2 Broadband VSAT System

The ViaSat® *LinkStar*$_{S2}$ system is a two-way, bandwidth-on-demand broadband VSAT system designed around the DVB-RCS standard for service providers, ISPs, and corporate networks. *LinkStar*$_{S2}$ brings more efficiency and higher data rates to the market than other TDMA systems. The *LinkStar*$_{S2}$ Broadband VSAT System combines broadband access and a high-speed return channel to satisfy bandwidth-intensive applications using IP data over any fixed satellite.

Since their introduction, LinkStar® VSATs have been built on a foundation of open-standard DVB technology, including a DVB-S or DVB-S2 forward link and DVB-RCS return link. A *LinkStar*$_{S2}$ terminal can operate in either of two over-the-air downloadable software personalities. The DVB-RCS software enables interoperability with other manufacturers. The standard LinkStar e-ATM software includes additional advanced features not included in the DVB-RCS standard.

The *LinkStar*$_{S2}$ DVB-S2 system-compliant technology includes advanced LDPC (Low Density Parity Check) coding for ultra-low Eb/No performance near Shannon's theoretical limit along with 8PSK coding for bandwidth reductions up to 30% below traditional values. The system offers satellite link speeds up to 81 Mbps on the outbound channel and up to 4.2 Mbps on the inbound channels to the hub. With this high inbound channel capacity, remote sites can be server locations, content providers, multimedia sources, video teleconferencing participants, and corporate headquarters.

LinkStar$_{S2}$™ At-A-Glance

Multimedia, broadband connections
- Up to 58 Mbps download via DVB-S on outbound channel; up to 81Mbps with DVB-S2
- Up to 4.2 Mbps on inbound channel

Standards-based platform
- Outbound: DVB-S, DVB-S2
- DVB-RCS compliant (optional)
- Over-the-air software upgrades

Flexible, scalable architecture
- Up to 80,000 remotes per network
- Operates in C, Ku, or Ka band
- Local or geographic redundancy for hub
- Multiple DVB uplink/multiple transponder/ multiple satellite operation
- Compact C-Series Hubs for smaller, scalable, cost-efficient networks
- Network locking to control migration of terminals across networks
- IPSec-transparent with control plane security

Hybrid star/mesh networks
- Interoperability with *LinkWay*$_{S2}$™

Multiple inbound access schemes to support a wide range of applications
- Bandwidth on Demand (BoD)
- Committed Information Rate (CIR)
- Application-triggered BoD/CIR
- CIR reallocation
- Slotted ALOHA
- Frequency hopping across carriers

Advanced IP routing capability
- Unicast and multicast
- RIP, IGMP, UDP, TCP protocols
- VLAN tagging and DHCP relay
- Quality of Service based on DiffServ

Powerful network management system
- Web-based GUI with remote access
- Manage network parameters and monitor traffic statistics
- Dynamic Uplink Power Control
- Online training with context-sensitive help
- SNMP-compliant
- Optional VNO (Virtual Network Operator) and VSP (Virtual Service Provider)

Acceleration and compression to improve link efficiency and user experience
- TCP Acceleration
- HTTP Acceleration (optional appliance)
- Header compression for VoIP traffic

Choice of input power options
- Universal AC power supply; DC optional
- Intelligent power conservation mode

Maritime/Mobile operation

Pointing tool for fast and easy commissioning

Dynamic Bandwidth Allocation, combined with guaranteed Quality of Service (QoS) and TCP acceleration features, makes the *LinkStar*$_{S2}$ system more efficient and faster than other TDMA systems. The combination automatically increases the speed of the return channel to give you the throughput you need. ViaSat is always working to bring you the highest return channel data rates in the industry, so even large multimedia files are quickly transmitted.

Bandwidth on Demand (BoD) allows users to seamlessly increase bandwidth as it is needed, for as long as it is needed. BoD is ideal for multi-user Intranet and Internet applications as well as large file transfers.

Committed Information Rate (CIR) mode provides users with near-instantaneous availability of all the bandwidth in their SLA, ideal for guaranteed Quality of Service (QoS) applications. Combined with the *LinkStar*$_{S2}$ system's advanced application-triggered CIR feature, this is the right choice for VoIP and videoconferencing services.

Application-Triggered BoD/CIR allows dynamic assignment of BoD/CIR resources, matching customer-specific application requirements.

CIR Reallocation offers CIR when the user needs it. Once the needs are satisfied, the bandwidth becomes available to the entire network. This allows operators to fully utilize their bandwidth resources.

Slotted ALOHA grants immediate network access to low-bandwidth applications. This powerful feature minimizes latency and is particularly suited for transactional applications such as lotteries, point-of-sale (POS), and automated teller machines (ATMs).

Turbo Coding and Optimized Spectral Shaping on the return channels enable you to use your satellite bandwidth more efficiently and further increase return channel throughput.

DVB-Based Architecture enables service providers and satellite operators worldwide to build open-standard networks for IP data, Internet access, video streaming, telemedicine, voice-over-IP, or distance learning. For operators that require standardization on the return channel, the *LinkStar*$_{S2}$ network offers a DVB-RCS compliant version with a simple over-the-air software download.

Web-Based Network Management gives you configuration, control, and management of your VSAT network using a standard browser. The NCC provides additional management through traffic statistics, call detail records, and an SNMP interface.

Reduced Operating Costs are achieved through over-the-air software upgrades of remote terminals without site visits.

Scalability, with each Regional NCC (RNCC) managing up to 8,000 sites, and a single NCC controlling up to 10 RNCCs for a total of up to 80,000 network nodes.

User Groups enable you to logically group remote terminals to apply common operating parameters to members of the group. This powerful capability is ideally suited to the network operator managing multiple customers or classes of access.

IP Header Compression reduces the bandwidth required for a voice call by eliminating extraneous and redundant protocol information.

Maritime/Mobile Operation for installation on moving platforms. Though originally designed for the maritime market, this feature adapts to any moving platform.

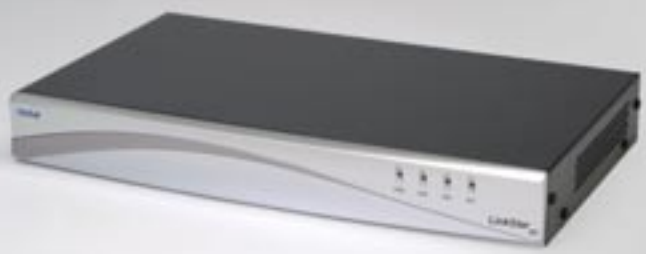
Control Channel Encryption using the LinkStar Control Channel Security Architecture (LCCSA) provides secure communications of the *LinkStar*$_{S2}$ system control channel.

Six-Level Quality of Service (QoS) offers six queues at the scheduler level on each remote terminal. You get a finer prioritization of user traffic based on profiles defined using the IP QoS feature.

DHCP Relay and VLAN Tagging enable service providers to offer VPN services to multiple customers. The *LinkStar*$_{S2}$ system enables end-to-end VLAN separation of customer traffic, reuse of private addresses, and automatic IP address assignment to devices at remote sites.

HTTP Acceleration boosts the speed of your customers' web surfing experience. Using a pre-fetch proxy, the *LinkStar*$_{S2}$ significantly reduces the time that a user waits for HTML objects to appear on screen.

Hybrid Star/Mesh Network Architectures provide flexibility for a multitude of applications in one integrated network. Sharing a common DVB-S2 outlink, the *LinkStar*$_{S2}$ system is interoperable with ViaSat's *LinkWay*$_{S2}$™ mesh VSAT system.



LinkStar$_{S2}$

THE NEXT-GENERATION LINKSTAR IS HERE

LinkStar$_{S2}$™ Satellite Terminal

Burst Rates (ksym/s)	156	312	625	1250	2500
Bit Rates (rate 2/3 FEC, kbits/s)	208	416	833	1667	3333
Bit Rates (rate 6/7 FEC, kbits/s)	267	535	1071	2142	4285
Channel Spacing (kHz)	200	400	800	1600	3200

RETURN/INBOUND CHANNEL (remote to hub)
Format: MF-TDMA
Transmit IF Frequency: 950 to 1525 MHz
Turbo Coding: DVB-RCS compliant
Modulation: QPSK

OUTBOUND CHANNEL (hub to remote)
Format:
DVB-S, DVB-S2, DVB-MPE for IP data
Symbol Rates:
DVB-S: 2.5 to 36 Msps; 1 to 36, 42 Msps optional
DVB-S2: 2.5 to 30 Msps
Data Rates:
DVB-S: 1 to 58 Mbps
DVB-S2: 2.5 to 70 Mbps standard; 81 Mbps with optional hub upgrade
FEC and Modulation:
DVB-S: R/S (204, 188) and Convolutional
QPSK @ 1/2, 2/3, 3/4, 5/6, 7/8
DVB-S2: LDPC
QPSK @ 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
8PSK @ 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
BER: Quasi-error-free per DVB standards EN 300421 (DVB-S) and EN 302307 (DVB-S2)
Receive IF Frequency: 950 to 1750 MHz

PHYSICAL INTERFACES
L-band Transmit and Receive: (2) Type-F, 75 ohm
Network: (1) 10/100BaseT Ethernet (RJ-45)

RF Antenna Diameters: 0.96, 1.2, 1.8, 2.4 M
ODU Power:
1, 2, 3 and 4 watt Ku-band, 2 and 5 watt C-band
ODU Operating Temperature: -40°C to 55°C
LNB: DRO (standard), High stability PLL (optional), Universal LNB compatible

RETURN CHANNEL SATELLITE TERMINAL (RCST)

MECHANICAL/ENVIRONMENTAL
Dimensions: 1U high, 13" W, 8" D
Power: 100 to 240 VAC, auto-sensing, auto-ranging
Positive or Negative 20 to 60 VDC (optional)
Temperature:
-5° to 50°C operating; -20° to 70°C storage
Humidity:
95% relative humidity non-condensing at 0° to 50°C operating; 90% relative humidity non-condensing at 65°C storage

NETWORK MANAGEMENT AND CONTROL
Network Management System (NMS):
Java Web-based, standard PC
Network Control Center (NCC):
SUN Solaris Workstation; SNMP agent

SYSTEM PERFORMANCE
TCP Acceleration: 10 Mbps throughput to the LAN
Scalability:
500 nodes with C Series Hub;
8,000 nodes with single Hub/NCC;
80,000 nodes with multiple Hubs/NCC
Protocols:
TCP/IP, UDP/IP, IGMP, RIP 1&2, IP QoS support

COMPLIANCE
Safety: UL/cUL 60950-1; CE-R&TTE (EN60950-1)
EMI/EMC:
FCC part 15 Class B; ICES-003 Class B; VCCI Class B; AS/NZS3548 Class B; BSMI; CE-R&TTE (EN 301489-12)
RF Spectrum:
CE-R&TTE (EN 301 428); ANATEL

*Specifications subject to change without notice.

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