



The Skylinx® Quad VSAT Communications System is a powerful, cost effective product designed to provide efficient voice and high-speed data services to underserved areas. Designed with flexibility, scalability and superior performance, the Skylinx Quad differentiation comes from seamlessly integrating the commercial grade back-office support components with a state-of-the-art satellite transmission system.

The Skylinx Quad platform comprises a number of subsystems, each addressing specific functionality and applications. Built for large network support, the system dynamically supports thousands of simultaneous mesh calls, providing connectivity between remote areas, while also providing SS7 PSTN call termination capabilities. In its basic configuration, the Skylinx Quad system is deployed in an IP66 enclosure, supporting 4 voice/fax/data lines and is scalable to provide up to 960 (32xE1) lines per site in an indoor enclosure. The system supports multiple traffic gateways and flexible transponder connections including global, spot, and cross-strapped beams.

Operational and Back Office Support Systems (OSS/BSS), enterprise class call managers and G.723.1 standards based voice codecs are included in the management system, allowing this satellite based network to provide low cost, high quality, reliable voice and data services.

By featuring an integrated DVB-S2 receiver, the Skylinx Quad broadband terminal provides high-speed data services while simultaneously maintaining mesh connectivity for the voice circuits.

For cellular backhaul, ViaSat has developed a GSM/3G, multi-TRX, radio access network unit which is integrated with the Skylinx Quad for GSM or Skylinx Quad Broadband for 3G support. This topology provides extremely efficient on demand satellite bandwidth usage for cellular voice, SMS, and data services over the Skylinx SCPC channels.

Low power consumption is achieved by using advanced technology power saving modes which reduce the solar power requirements.

Robustness, security, reliability and system capacity are all integral within the Skylinx Quad system. Virtual Network Operator (VNO) support allows this platform to manage a number of operators, each of which will have the ability to manage and control their network under the guidance of the primary network operator. Full featured billing, calling card support and call differentiated rating plans for each VNO, makes this an ideal platform for emerging regional communications requirements.

SKYLINX QUAD SYSTEM AT-A-GLANCE

Features and Benefits

- » Fully integrated communications system with business support
- » Full mesh technology using SCPC DAMA access method
- » High bandwidth efficiency
- » Extremely low power consumption
- » Software and configuration updates via satellite download
- » High speed data downloads
- » Full system monitor and control functionality
- » Back office support providing single point of entry into the management system
- » Multi-transponder operation
- » Support for fax, in-band data and voice



Skylinx Quad System and Features

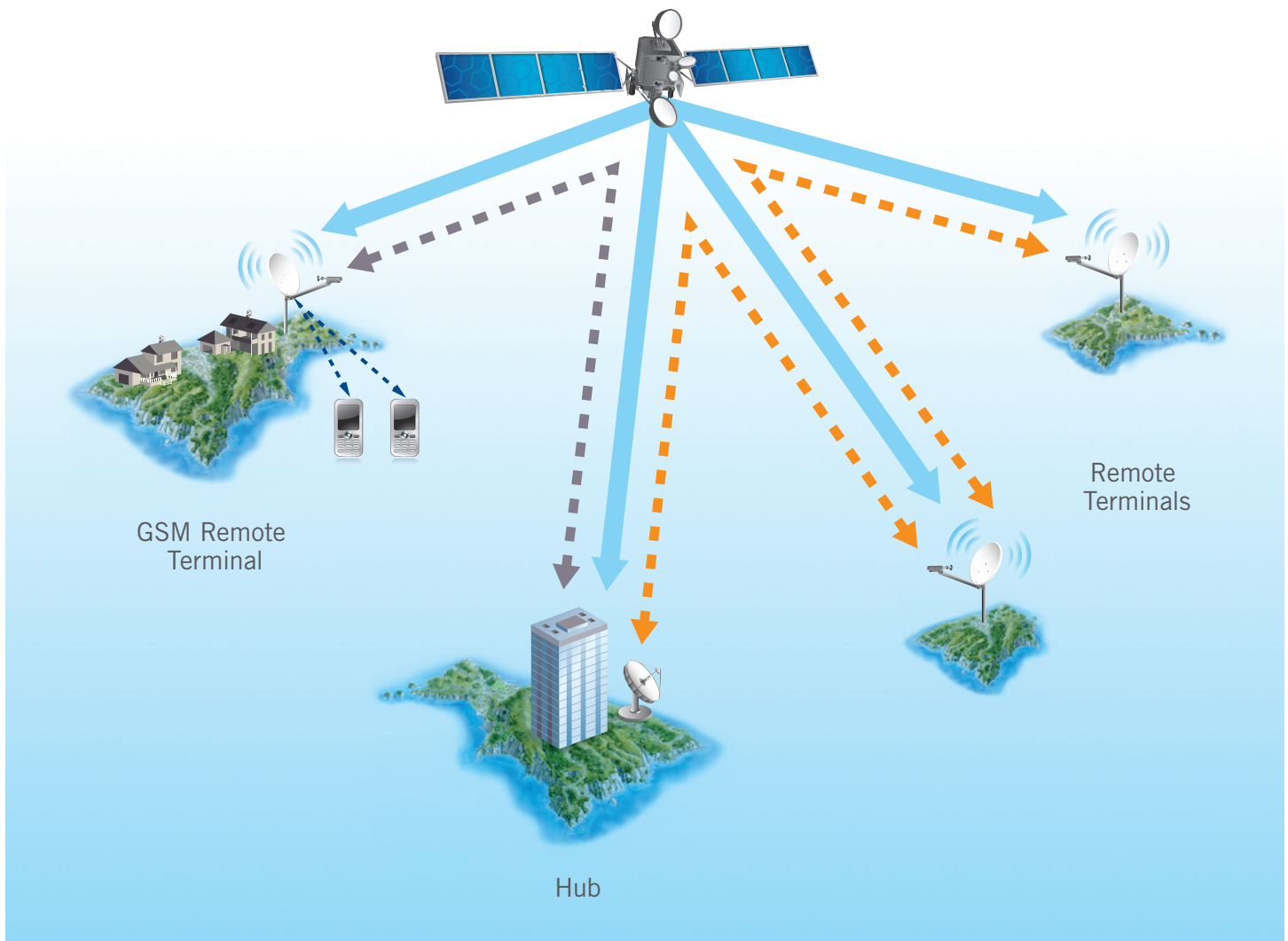
NETWORK DIAGRAM

Benefits

- » Extend the reach of mobile, broadband, and landline networks
- » Proven carrier class gateways and remote terminals
- » Own your gateway or be a VNO
- » Low total cost of ownership
- » Improved ARPU with Value Added Services

Features

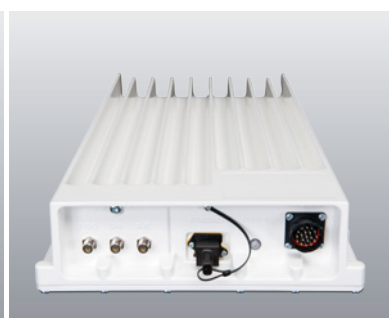
- » Remote terminals
 - Quick install
 - Solar or AC powered
 - Prepaid/postpaid/public call office (PCO) support
- » Mobile: GSM Voice, SMS, 2.5G Data
- » PC/Laptop: Always On DSL-like broadband connection
- » Phone: One hop, toll quality voice connections to/from any destination
- » Seamless and flexible service integration with PLMN, ISP, and PSTN providers



SYSTEM COMPONENTS



QUAD VOICE CHANNEL CARD



REMOTE TERMINAL



BROADBAND



NETWORK MANAGEMENT SYSTEM RACK

FEATURES

Back-Office Support

Provides operators a “single entry point” into the management system to provision terminals, set rate plans, monitor usage, invoice and support pre/post billing and calling cards.

Virtual Network Operator Support (VNO)

Ability to allow “sub-operators” or VNOs to manage their own network system.

Low Bandwidth Usage

For a full duplex 5.3kbps G.723.1 voice call, the system requires 10.2kHz of satellite bandwidth under heavily loaded conditions. Voice Activity Detection (VAD) with comfort noise generation is supported for those networks which have limited satellite EIRP.

Low Power Consumption

Unique multiple power saving modes reduce the solar power loading. Power consumption of the mesh based Skylinx Quad terminal is typically 50% less than star based systems.

Standards Based Voice Codecs

Voice solution is based on the G.723.1 ITU standard codec operating at 5.3 or 6.4kbps coding. G.168 echo cancellation is supported at both the remote terminal and gateway.

Multi-Transponder Operation

Operates on loop-back and cross-strapped beams simultaneously to provide more flexible service provisioning for voice and data.

Designed for Large Networks

Network capacity allows system to support more than 100,000 remote terminals or 400,000 telephony lines at 400 call attempts per second.

Cellular Backhaul

Developed GSM/3G, multi-TRX, Radio Access Network unit which is integrated with the Skylinx Quad for 3G support. Provides extremely efficient on demand satellite bandwidth usage for cellular voice, SMS, and data services over the Skylinx SCPC channels.

Ease of Remote Terminal Installation

No special installation tools are required to install the remote terminals. A telephone attached to the terminal being commissioned provides voice prompting in local language and key entry for installation parameters.

PSTN Feature Support

Standards based PSTN access using G.703 with either SS7, R2MFC or ISDN (PRI) interface support. Additional PSTN features are closest to destination number, least cost routing, and ITU-T E.164 numbering plan support .

Payphone Support Supports 12/16 KHz metering and tip and ring reversal. DTMF dialing is fully supported with out-of-band DTMF relay for calling card and other interactive voice response (IVR) applications.

Local Language Support

Local languages are supported for voice prompting during installation and used in calling card services. Two languages are supported per site.

Quick Call Set-up

Call set-up is typically less than 4 seconds.

Software Updates via Satellite

Channel card updates for software and firmware updates are processed over the satellite from the hub to the gateway and remotes. Cards can be grouped or individually addressed.



SPECIFICATIONS

SYSTEM

OSS/BSS	Fully functional Invoicing, Billing and Management solution
PSTN Support	G.703 with SS7 and/or R2 signaling and VoIP interface
Phone Support	FXS, VoIP, Calling Cards, Payphone
Numbering Plan	ITU-T E.164
Max. Gateways	120
Max Gateway Capacity	32 E1
Network Size	~150,000 4-Channel Terminals
Call Attempts Per Second	400
Monitor and Control	Network wide of Hub, Gateways, Terminals

TRANSMISSION SYSTEM

Topology	Full Mesh
Access	Demand Assigned Multiple Access
Carrier	SCPC

Signaling Channels

- » Outlink: TDM at 128/64 kbps
- » Return Link: Slotted Aloha at 8kbps

REMOTE TERMINAL TYPES

- » Voice Remote Terminal in IP66 enclosure (4 lines)
- » Multi-Channel Remote Terminal (16 lines)
- » Broadband Remote Terminal (4 lines)
- » GSM/3G Remote Terminal (scalable)

VOICE REMOTE TERMINAL

BUC Size	0.5W to 3W
BUC Frequency	Standard Ku or C-Band
LNB Type	PLL, Ext. 10 MHz Reference
Input Voltage	12 to 24 VDC
Power Consumption	33/15/5.5 Watts for Active/Standby/Hibernate modes, Ku RT, solar power
Operating Temperature	-15 to +55° C
Enclosure	IP66 weatherproof
Weight, BBU	15.5 lb; 7.03 kg
Size, BBU	17.2 x 10.7 x 3.4 in
Typical IFL Length	< 30-meter
Telephony Cable length	< 100-meters, typical
Lightning Protection	IFL and telephony lines
RF Monitoring Port	TVRO Out, 950 to 1650 MHz

MODEM SPECIFICATIONS

Modulation	QPSK
Error Correction	Turbo, R 2/3
Carrier Spacing	1.2
No. of SCPC Traffic Modems	4
IF Tuning Range	950 to 1450 MHz
Signaling Channel Data Rate	» Outlink: 128/64 Kbps, Return Link 8 Kbps
Traffic Channel Rate	» Voice: 5.3/6.4 Kbps, Fax/In-Band Data at 32/64 Kbps
Occupied Bandwidth	5.1 kHz (5.3 kbps), 6.2 kHz (6.4 kbps)

DATA SERVICES

Data Interface	TCP/IP
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VOICE SERVICES

Codec	ITU-T G.723.1, includes VAD and CNG
Line Interfaces	FXS, loop start
Line Signaling	DTMF, ITU-T Q.23 / Q.24
Payphone Metering	12/16 kHz
Fax/Data Rates	Up to 28.8 kbps
Echo Cancellation	G.168, 12 ms tail Applications



CONTACT

1725 Breckinridge Plaza Duluth, GA 30096

SALES

TEL +1 678.924.2449 EMAIL skylinxGSM@viasat.com WEB www.viasat.com

