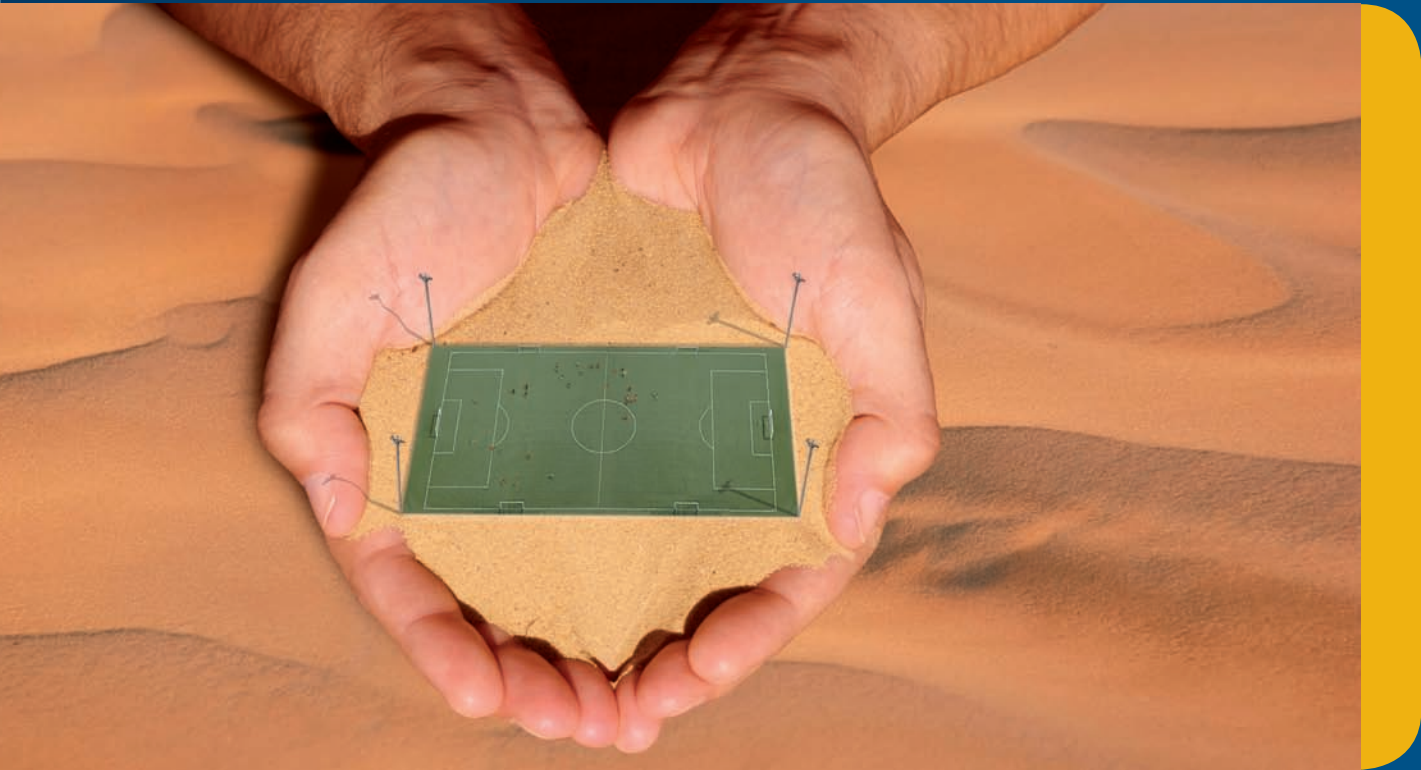


Broadband Systems

# MENOS

Multimedia Exchange Network over Satellite



# MENOS Key Features

MENOS is a revolutionary networking concept used to exchange multimedia content over satellite. It is intended primarily for professional broadcasters, allowing them to share video and audio material among several sites scattered across a large geographical area. It has been designed to provide these broadcasters not only with the fastest and most cost-effective technologies to perform the media exchange, but also with a complete range of tools to facilitate the related coordination tasks and improve people collaboration across the network.

In traditional satellite contribution systems, television and radio material is exchanged as real-time transmissions from one ground station to another. This requires the reservation of a satellite segment for a fixed time duration, a manual line-up procedure, and expensive uplink equipment. At the receive site, the transferred material needs to be used on the fly or recorded. The coordination between the two stations, or between the stations and the Network Operating Center, must typically be done via terrestrial or mobile telephony.

MENOS is fundamentally different because all exchanged material transmits through a central hub station, which also provides permanent two-way satellite IP connectivity among all remote stations. The multimedia content can be transmitted in real-time or be transferred as data files. It can also be retained in the central hub station for archiving and later access by other stations. The reservation of the bandwidth and the line-up procedure are automatic and the uplink stations are smaller and much less expensive than traditional systems. The two-way IP connectivity is ideal for VoIP coordination channels, e-mail exchange, Intranet and Internet access and other collaboration tools.

MENOS is also unique in the way it uses the satellite capacity. Advanced DVB-S2 modulation technology, combined with the statistical multiplexing of the data, voice, television and radio signals, ensures the optimum efficiency of the bandwidth usage and thus reduces operational costs.

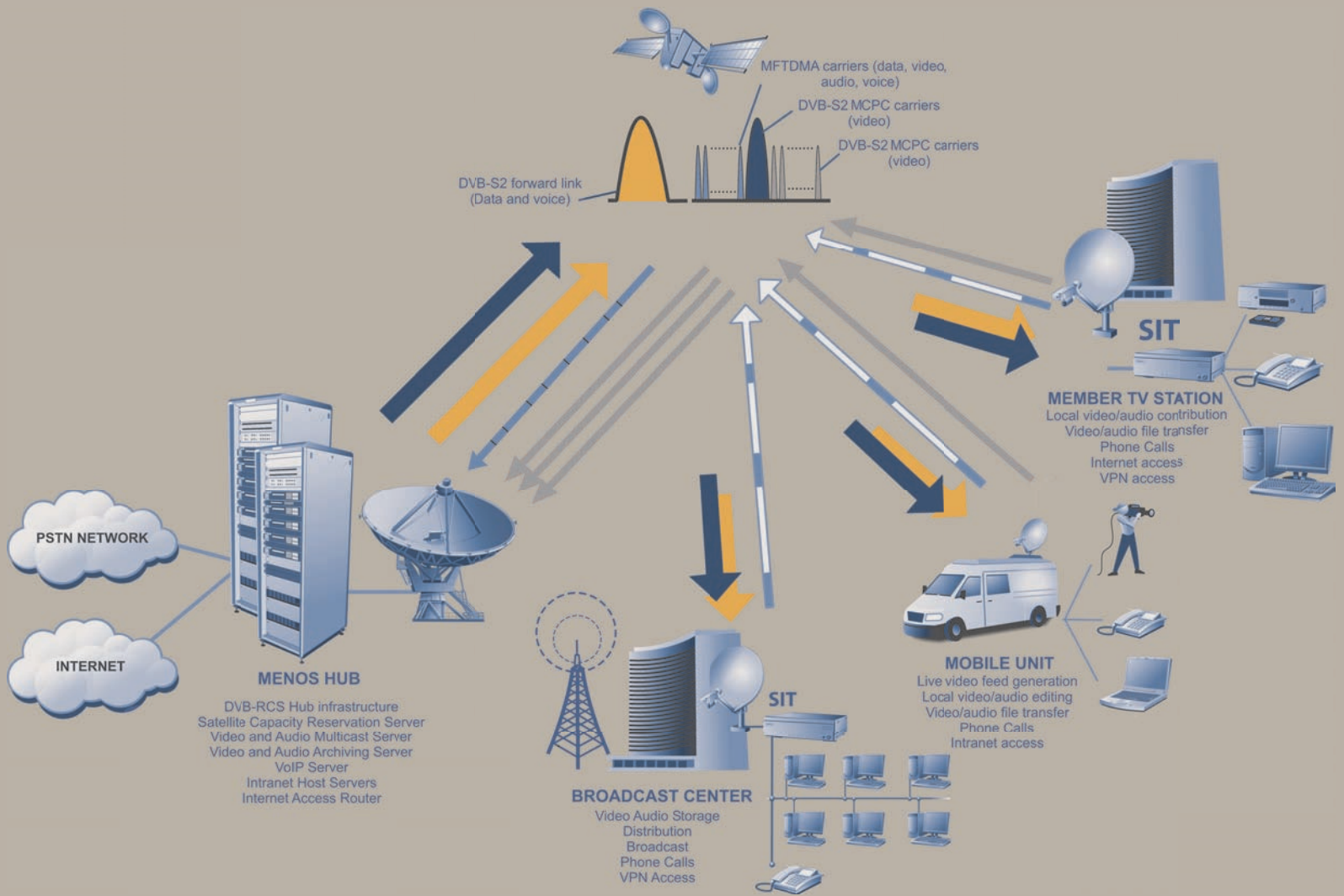
- **Small, cost effective and easy to use terminals**
- **Automated satellite capacity reservation**
- **Real time television and radio content exchange**
- **Store and Forward content exchange**
- **Central archiving**
- **VoIP coordination channels**
- **Intranet and Internet access**
- **E-mail**
- **Optimum use of the satellite capacity**

Professional equipment

Broadband systems

IP software

# MENOS



# MENOS System Architecture

A MENOS system consists of a central platform (hub) connected to a number of remote sites, each equipped with a satellite interactive terminal (SIT). The terminal is able to transmit or receive data to and from the hub. The data can be exchanged between the hub and the terminal or between two terminals via the hub. From the terminal to the hub, the data is transmitted either on a dedicated DVB-S2 carrier (Single Channel Per Carrier or SCPC), or on a return channel shared dynamically in time and frequency with other terminals (Multiple Frequency Time Division Multiple Access).

Low rate data, such as Internet and Intranet exchanges, VoIP, radio exchange and low bit rate file transfers, are typically sent using the MFTDMA channels, while real time television transmission and fast file transfers are operated in SCPC.

All transmissions are first received by the central hub. If necessary, the transferred material can be automatically archived in the central hub for later use by the remote stations. Data is transferred from the hub to the stations on one of two DVB-S2 multiplex carriers (Multiple Channel per Carrier or MCPC). The first one regroups all the video transfers and the second one regroups the Internet data, the file transfers and the VoIP calls.

Different types of MENOS remote stations are available, depending on the type of applications performed at the remote site.

- Data SITs only provide data and VoIP connectivity and can be used for Internet, Intranet, VPNs, and interactive collaboration tools
- Radio SITs provide all the service of a Data SIT in addition to radio exchange services
- Television SITs provide all the service of a Data SIT in addition to television exchange services

MENOS terminals can also be integrated into mobile units, in the form of DSNG trucks or flyaway kits.

# MENOS Key Advantages

## Easy-to-use terminals

Once installed, MENOS terminals are connected to the network in an always-on mode. All network services and terminal features are available on a single graphical user interface. Starting a video or audio transmission requires no line-up procedure as the bandwidth reservation is done automatically.

## Lower terminal cost

Because all communications are established via a central hub, MENOS terminals require much less power and smaller dishes than point-to-point media exchange systems. The transmission equipment in the terminal is IP-based, resulting in an overall terminal cost that is only a fraction of the cost of other types of satellite TV or radio uplinks.

## Higher flexibility

In a MENOS system, the bandwidth is negotiated dynamically or reserved automatically depending on the requested speed of delivery and the nature of the exchanged material. The multimedia material can be stored anywhere in the network, including in a central archiving system where it can be accessed by any other remote station via another satellite transmission.

## Lower operational costs

By using the most advanced satellite transmission technologies such as DVB-S2 and by sharing dynamically the available bandwidth among various applications, MENOS reduces the costs linked to the space segment. On the ground, operational costs are also kept to a minimum thanks to the ease of use of the terminals and the automation of the network management.

## Additional source of revenues

MENOS is much more than a system to exchange video and audio: it allows the development of many other IP-based services such as Voice over IP (VoIP), corporate VPNs and Internet broadband access services.

## High Quality of service

In a professional broadcast exchange network, the quality of service is paramount. As a fully automated system where all remote operators always have access to a voice or data communication channel, MENOS reduces the risk of human error. The equipment is very reliable and all transmissions can be backed up in the central archiving system.

# Deploying MENOS in partnership with ASBU and Arabsat

MENOS is a product developed and commercialized by Newtec, and is deployed over the Middle-East, North Africa and Europe in partnership with the Arab State Broadcasting Union (ASBU) and the Arab Satellite Telecommunication Organization Arabsat

ASBU, which is currently operating a large international radio and television satellite exchange network on the Arabsat satellite fleet, has awarded a contract to Newtec for the supply and installation of a complete MENOS satellite network for the exchange of multimedia services.

Arabsat and ASBU have entered into a Joint-Venture agreement for the MENOS space segment whereas Ku-band will be used from the new Arabsat BADR-4 satellite positioned at 26° East and C-band capacity will be used on Arabsat 2B

In a first phase of its deployment, this system will be used daily by the 25 full members and associated members of ASBU to exchange real-time broadcasting content via a central HUB and up to 450 remote terminals throughout the Middle-East and North Africa.

In a second phase, MENOS will be made available to any Arabsat customers for either Media content file exchanges or to large Corporations, Enterprises, and SMEs for high-speed data file exchange.



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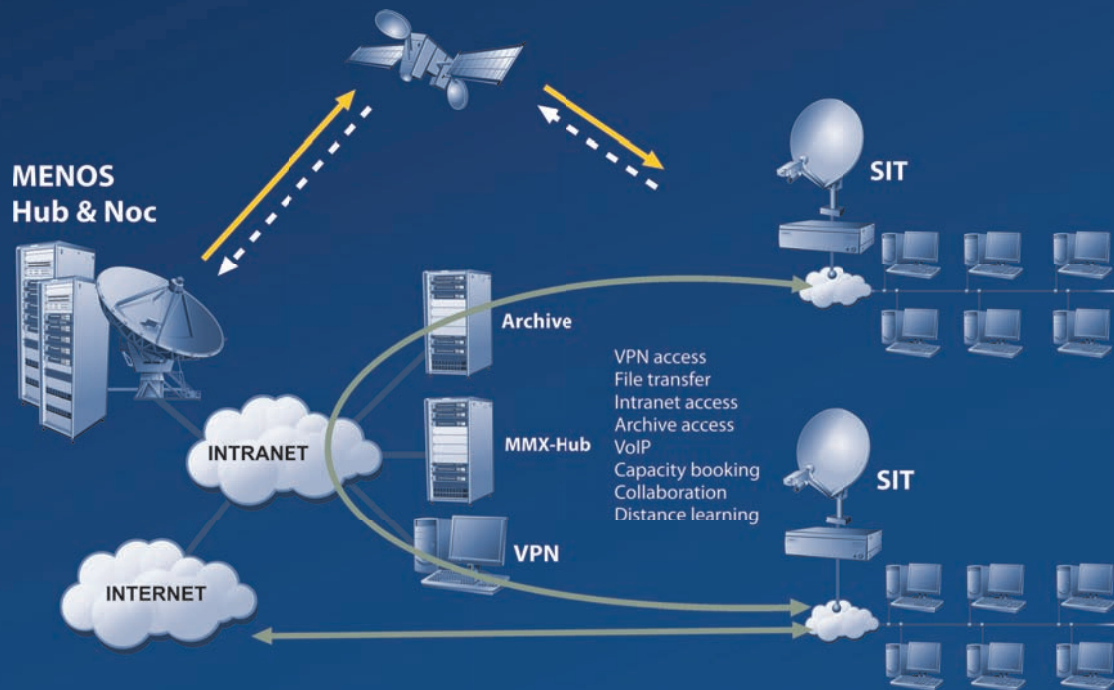


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# MENOS Applications

## Broadband Access



All MENOS terminals (SIT) are equipped with a common satellite broadband access part, so all users have access to a shared high speed Wide Area Network (WAN) and benefit from high performance application portals within their community.

The common broadband access part in every terminal allows applications such as:

- Intranet and Internet access
- IP multicast for content delivery
- File transfer of content to different locations and to the central archive
- E-mail exchange
- Teleconference and distance education

When MENOS is used for multimedia exchange, such as television or radio contribution and distribution, the broadband part of the network allows remote users to choose the optimal method for delivering their content to other users in the network, make the necessary capacity reservations and control the access to the media content. Access to the central media archiving server is also possible over the air. Thanks to the broadband access subsystem of MENOS, these various control and monitoring functions are all available on web-based interfaces throughout the MENOS network. Moreover, the broadband network allows the users to communicate from one remote location to another, enabling voice and data coordination channels or live interactivity between the creator of the content and its end user.

### Key features

- High speed internet / intranet access
- Unicast and Multicast traffic
- Acceleration of traffic
- Data/audio/video file transfer
- Integrated encryption on all sessions and data
- Support for real-time traffic for VoIP telephone calls and live audio contribution

### Key Benefits

- Always on, true broadband experience
- Cost effective exchange of data, voice, audio and video
- Efficient reservation of live or archived radio & video feeds

### Key Services

- IP connectivity
- VPN connectivity
- VoIP telephony
- Distance learning & Collaboration



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# Technical description

## IP connectivity

IP connectivity allows the end-user to benefit from always-on high-speed satellite internet access, supporting a broad range of IP services, such as web browsing, e-mail, chat, FTP, Telnet ...

Whether the user is a broadcaster, the operator of a mobile unit, a journalist in the field, a technician in a TV station or anybody else, several applications can be envisaged:

- Basic web browsing
- Transfer files between locations without reservation of capacity
  - Store video or audio files
  - Retrieve video or audio files for local editing
  - Transfer files between locations
- Reserve capacity using the web based capacity reservation system for live or archived audio and video feed generation
- Chat with members of the team on different locations to synchronise on events.
- Exchange e-mail from any location, at anytime.

## VPN service

Professional users have the ability to create Virtual Private Network (VPN) connections between locations to allow secured access to and exchange of private data. The VPN's are implemented by the tunnel mode IPSec Internet standard, encrypting and authenticating the entire IP packet contents for maximal security.

By using a VPN service the user can securely access important resources provided by his organisation:

- Secure e-mail
- Secure web-services, like intranet.
- Secure access to TV/Radio archives
- Secure file transfer between locations without reservation of capacity
  - Store video or audio files
  - Retrieve video or audio files for local editing

## Collaboration Service

Collaboration Services allow the creation of sessions with audio, video and data sharing for applications such as distance learning, sales and customer training, engineering discussion etc.

The following collaboration applications examples are possible with the MENOS collaboration service:

- 1) A scheduled session with a few or up to hundreds of people listening to a teacher/trainer with limited voice only interactivity.  
Teacher/Trainer lectures in "classroom" and has presentations on his/her PC and a large number of students follow the lecture passively on computers with projectors/speakers with limited voice interaction.
- 2) Interactive training/teaching session with limited number of participants allowed fully interactivity (voice, video, data) and the rest of the individuals passively watching with limited voice participation.  
Trainer/teacher presenting/annotating on a whiteboard and a limited number of trainees/students allowed to also manipulate content at the teacher's site and interact with teacher via video and audio and the rest of the students following passively with limited voice interactivity.

## Voice over IP service

The availability of high quality VoIP coordination channels in each MENOS terminal facilitates the daily operations and reduces significantly the communication cost while consuming very little satellite bandwidth.

## Live Radio service

With the MENOS Radio SIT, radio stations can exchange live or recorded digital radio programs. The broadband access services allows for easy web-based reservations for live audio feeds. Similarly, live radio content can be distributed with high quality through the cost-efficient and always available multicast streaming capability of the broadband access service of the MENOS terminal.

## Live TV service

The broadband access services available in each MENOS terminal allows for easy web-based reservations for live video feeds. Another use of the broadband access service of the MENOS terminals, is that video content can be distributed through cost-efficient multicast streaming, which can be captured and stored on the MENOS terminal in local storage for screening at a later time. A separate document is available describing this service in detail.

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# MENOS Applications

## Real-time Television Exchange

MENOS is a very flexible and efficient platform for the satellite contribution and distribution of live television signals in professional broadcast networks.

Television content often originates at regional sites. This content is typically captured in high quality in order to allow editing and various processing steps. The captured content is then sent or contributed to a central location, from where the content can be distributed to a number of national or regional broadcast centers. Content contribution is typically a point-to-point unicast transmission while content distribution is generally a point-to-multipoint multicast or broadcast diffusion.

Live television contribution or distribution is possible for all network users who own a MENOS TV terminal (SIT-TV). These terminals are equipped with DVB-S2 modems that allow the transmission or the reception of high speed signals to and from the hub of the MENOS network.

Live TV sessions start with a user making a reservation. This can be performed on a web based interface from any MENOS terminal in the network. During the reservation process, the user defines the TV session and the bandwidth required for the uplink. If the live feed is only intended to specific stations of the networks, the user can also indicate which set of stations is allowed to receive the signal.

At transmission time, the system will automatically configure the MENOS hub and the equipment at the uplink station. The transmission starts when the video source is turned on. The television signal is first transmitted from the uplink station to the MENOS hub. In the hub the content is multiplexed with other MENOS services in a single broadband signal that is distributed from the hub to all stations in the network. Authorized stations can receive the signal by manually joining the session on their own web-based user interface. This action will configure the receive equipment automatically.

All MENOS stations are equipped with broadband data connectivity and Voice over IP channels, so two-way communication is possible at any time during the TV transmission. This communication is typically used for technical coordination as well as interactivity with the content generation (interviews).

When television content needs to be contributed and distributed in real-time, sufficient network bandwidth has to be guaranteed throughout the transmission time and throughout the entire communication chain. Typically, the contribution or distribution of real-time standard definition television requires 4 to 8 Megabits/sec. The MENOS system automatically ensures that the capacity is reserved on the contribution and distribution links in order to guarantee the quality of the delivered content.

### Key features

- Intra-network TV sessions.
- Content protection and conditional access
- Main Profile @ Main Level and 4:2:2 Profile @ Main Level
- Each SIT-TV can support one TV channel (1 video + up to 2 audio)
- Two-way voice and data coordination channels during the transmission

### Key Benefits

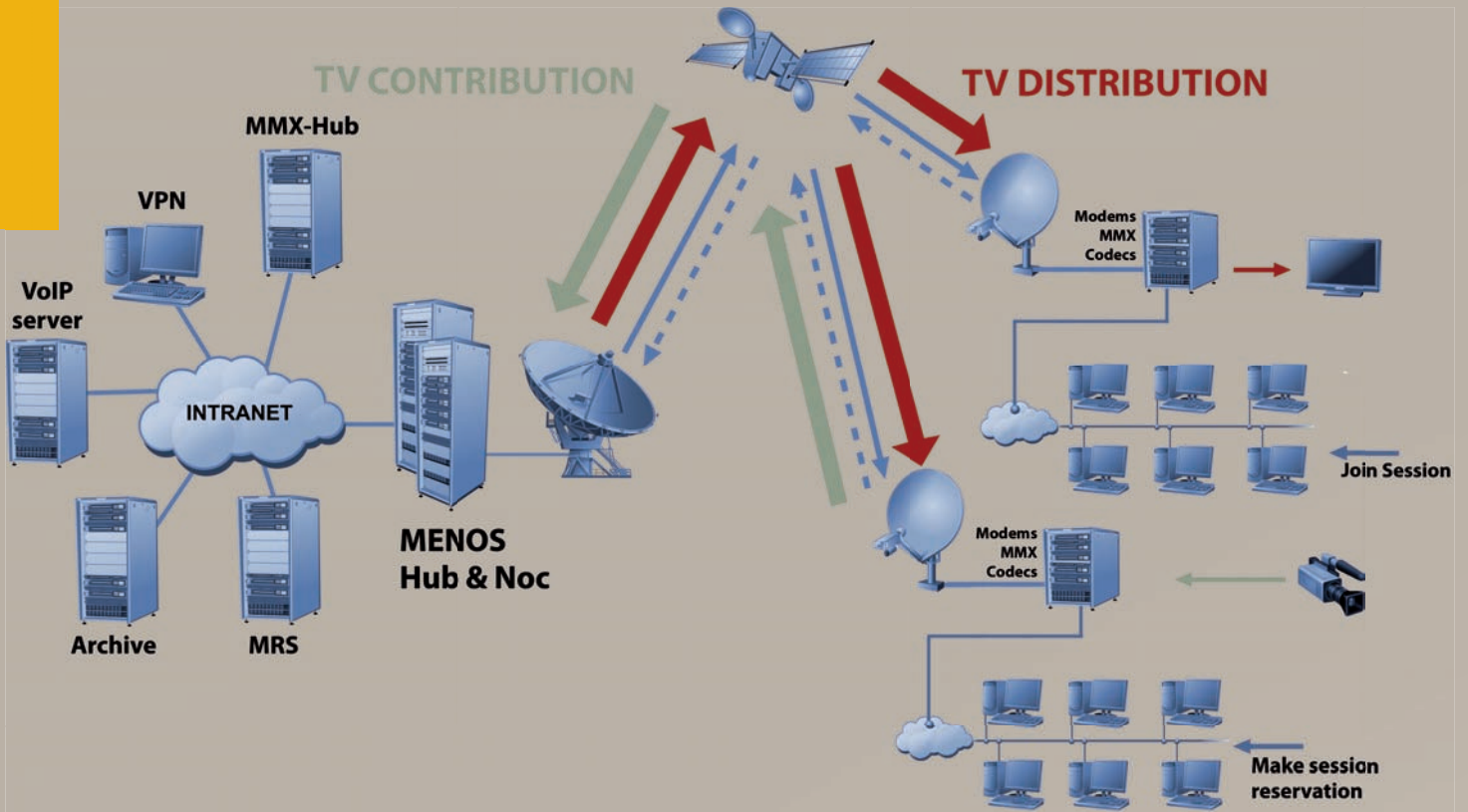
- Efficient usage of the space segment with DVB-S2 and VCM technologies
- Efficient usage of the available bandwidth by the multiplexing of services
- Easy-to-use terminals thanks to the automatic configuration of the equipment
- Easy reservation process for new contribution sessions
- Single-click process to join distribution sessions



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## Technical description

Real-time television exchanges from 2 to 10 Megabits/sec are implemented on the DVB-S2 subsystem of the MENOS network. This subsystem is based on dedicated SCPC (Single Channel Per Carrier) DVB-S2 return carriers from the terminals to the hub and an MCPC (Multiple Channel Per Carrier) DVB-S2 forward carrier from the hub to the terminals.

The Live TV infrastructure consists of a multicast streaming server in the Hub (MMX-Hub) and a multicast streaming client in the terminal (MMX-SIT). The MMX-SIT is associated with video encoders/decoders at the customer site.

### Video Encoder

The video encoders are stand-alone equipment in the terminal that interfaces to the MMX. The video encoding is based on the MPEG-2 standard. Both Main Profile @ Main Level as well as 4:2:2 Profile @ Main Level are supported. The latter is useful for contribution applications. One video channel and two stereo audio channels are supported. The encoder has an SDI interface.

### MMX Streaming Server/Client Module

The MMX is the device that streams the video signal in IP format over the MENOS network. Contribution signals are streamed in unicast while distribution signals are streamed in multicast. The multicast session information is then periodically announced to the receivers. The receivers can then decide to join or not the session.

### Interface to Reservation System

The Reservation System (MRS) is used by the MENOS users in order to book the sessions. This reservation server guarantees that once a session for Live TV has been booked, the bandwidth required for the time of the session is committed. The reservation server therefore avoids any capacity overbooking. Once the session has been booked, the information is sent to the MMX.

### Interface to Archive Subsystem

During the reservation process it is also possible to indicate whether the content should be archived. If the user determines that archiving is required, the content is then directed by the MMX in the Hub to the archive as well. Metadata associated with the session/content also is sent to the archive by the MMX.

### Interface to Multimedia VPN (conditional access) subsystem

During the reservation process it is possible to indicate which set of receivers are allowed to receive content. The signaling subsystem then indicates to the MMX in the Hub to encrypt the content before multicasting the content to the authorized SITs.

### Video Decoder

The video decoders are stand-alone equipments that interface to the MMX. The video decoding is based on the MPEG-2 standard. Both Main Profile @ Main Level as well as 4:2:2 Profile @ Main Level are supported. One video channel and two stereo audio channels are supported. The decoder decodes the A/V stream and plays out the stream on the SDI interface.

# MENOS Applications

## Real-time Radio Exchange

MENOS is a very flexible and efficient platform for the satellite contribution and distribution of live radio signals in professional broadcast networks.

Radio content often originates at regional sites. This content is typically digitized and compressed at 48 Kilobits/sec per stereo channel. The captured content is then sent or contributed to a central location, from where the content can be distributed to a number of national or regional broadcast centers. Content contribution is typically a point-to-point unicast transmission while content distribution is generally a point-to-multipoint multicast or broadcast diffusion.

Live Radio contribution or distribution is possible for all network users who own a MENOS Radio terminal (SIT-Radio). These terminals are equipped with a satellite broadband access modem that allows the transmission and the reception of the compressed radio signal to and from the hub of the MENOS network.

Live Radio sessions start with a user making a reservation. This can be performed on a web based interface from any MENOS terminal in the network. During the reservation process, the user defines the Radio session and the bandwidth required for the uplink. If the live feed is only intended to specific stations of the networks, the user can also indicate which set of stations is allowed to receive the signal.

At transmission time, the system will automatically configure the MENOS hub and the equipment at the uplink station. The transmission starts when the audio source is turned on. The radio signal is first transmitted from the uplink station to the MENOS hub. In the hub the content is multiplexed with other MENOS services in a single broadband signal that is distributed to all stations in the network. Authorized stations can receive the signal by manually joining the session on their own web-based user interface. This action will configure the receive equipment automatically.

All MENOS stations are equipped with broadband data connectivity and Voice over IP channels, so two-way communication is possible at any time during the Radio transmission. This communication is typically used for technical coordination as well as interactivity with the content generation (interviews).

When radio content needs to be contributed and distributed in real-time, sufficient network bandwidth has to be guaranteed throughout the transmission time and throughout the entire communication chain. Typically, the contribution or distribution of real-time professional quality radio signals encapsulated in IP format requires 80 Kilobits/sec. The MENOS system automatically ensures that the capacity is reserved on the contribution and distribution links in order to guarantee the quality of the delivered content.

### Key features

- Intra-network Radio sessions.
- Content protection and conditional access
- MPEG4-AAC High Efficiency and MPEG4-AAC Low Complexity profiles
- Each SIT-Radio can support 2 stereo channels or 4 mono channels
- Two-way voice and data coordination channels during the transmission

### Key Benefits

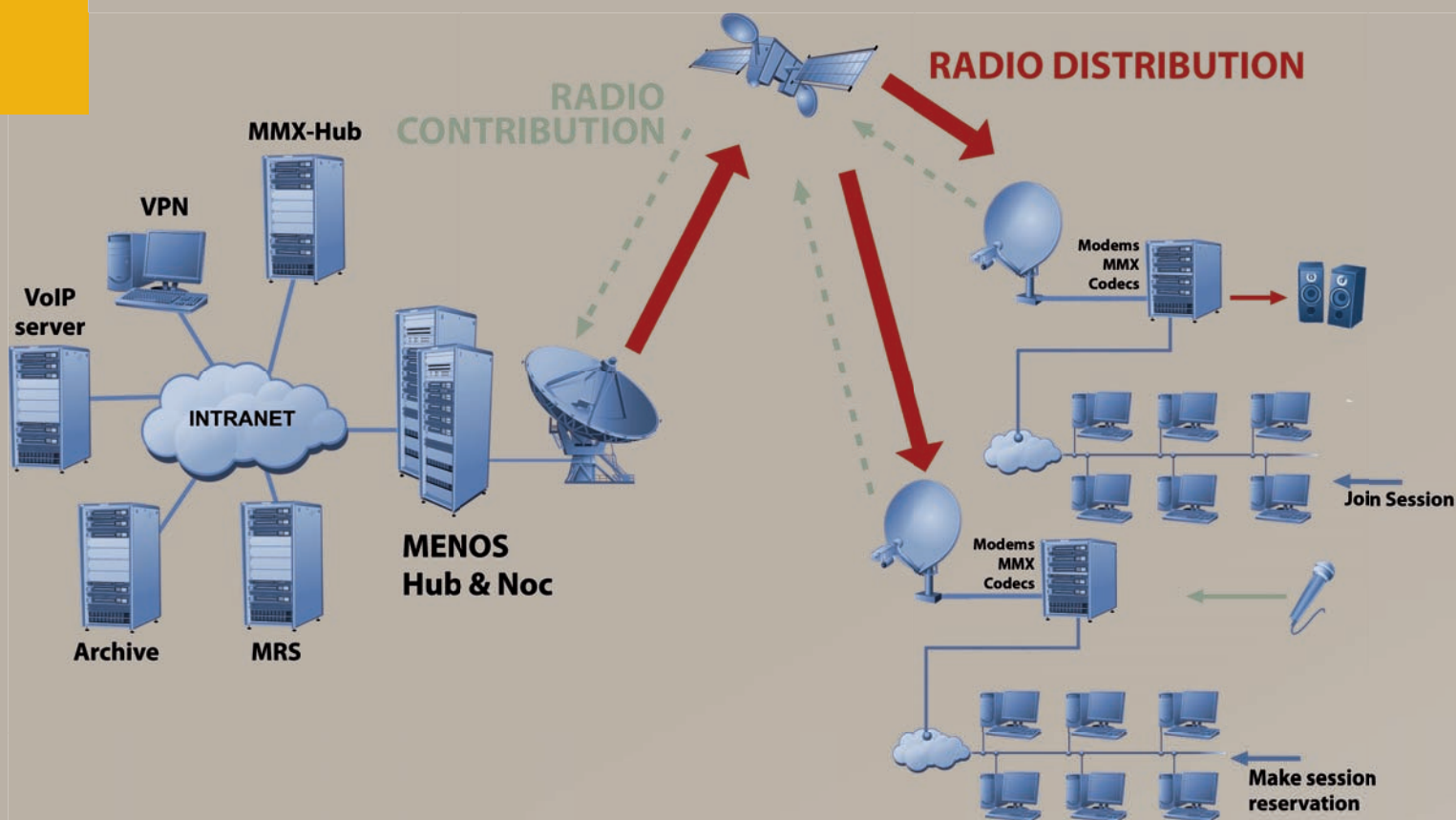
- Efficient usage of the space segment with DVB-S2 and VCM technologies
- Efficient usage of the available bandwidth by the multiplexing of services
- Easy-to-use terminals thanks to the automatic configuration of the equipment
- Easy reservation process for new contribution sessions
- Single-click process to join distribution sessions



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## Technical description

Real-time radio exchanges are implemented on the broadband access subsystem of the MENOS network. This subsystem is based on MF-TDMA (Multiple Frequency Time Division Multiple Access) return carriers from the terminals to the hub and an MCPC (Multiple Channel Per Carrier) DVB-S2 forward carrier from the hub to the terminals.

The Live Radio infrastructure consists of a multicast streaming server in the Hub (MMX-Hub) and a multicast streaming client in the terminal (MMX-SIT). The MMX-SIT is associated with audio codecs at the customer site.

### Audio Codec

The audio codec is a standalone piece of equipment in the terminal that interfaces to the MMX. The audio encoding is based on MPEG4-AAC HE and LC. The codec is capable of transmitting and receiving 4 mono channels or stereo channels. The encoded radio signal is encapsulated in IP format.

### MMX Streaming Server/Client Module

The audio codec is a standalone piece of equipment in the terminal that interfaces to the MMX. The audio encoding is based on MPEG4-AAC HE and LC. The codec is capable of transmitting and receiving 4 mono channels or stereo channels. The encoded radio signal is encapsulated in IP format.

### Interface to Reservation System

The Reservation System (MRS) is used by the MENOS users in order to book the sessions. This reservation server guarantees that once a session for live Radio has been booked, the bandwidth required for the time of the session is committed. The reservation server therefore avoids any capacity overbooking. Once the session has been booked, the information is sent to the MMX.

### Interface to Archive Subsystem

During the reservation process it is also possible to indicate whether the content should be archived. If the user determines that archiving is required, the content is then directed by the MMX in the Hub to the archive as well. Metadata associated with the session/content also is sent to the archive by the MMX.

### Interface to Multimedia VPN (conditional access) subsystem

During the reservation process it is possible to indicate which set of receivers is allowed to receive content. The signaling subsystem then indicates to the MMX in the Hub to encrypt the content before multicasting the content to the authorized SITs.

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# MN410 (C-band) MN420 (Ku-band)

## MENOS TV Satellite Interactive Terminal (SIT) V1.1

# MENOS

### Description

The MENOS TV SIT is one of the terminal types that can be used within the MENOS satellite network environment. It is intended for network members who need to exchange or distribute professional television content with remote sites in a fast, reliable and efficient way. The TV Terminal also provides high-speed Internet, VPN and VoIP services independently of the availability of terrestrial links.

The core of the TV SIT is the Multimedia Exchange Unit (MMX), which processes both live video signals and video files. The MMX of the SIT exchanges video content with the MMX of the MENOS hub for:

- Live TV contribution/distribution (reserved channel)
- File transfer (reserved channel or best effort)
- Store and forward: short time storage in the SIT or long term archiving in the HUB

These exchange sessions are synchronized and activated automatically by the hub's Multimedia Reservation Server (MRS).

The TV SIT is connected to the MENOS hub via two satellite subsystems: a MF-TDMA (Multiple Frequency and Time Division Multiple Access) broadband subsystem for data and voice communication, and a RAMA (Reservation Access Multiple Access) subsystem for video and fast file transfers.

The MENOS concept starts with the end-users in mind. The terminals require little maintenance, are easy to install and operate and are configured for specific applications while being made of common building blocks using standardized technologies.

### Applications

#### Television Contribution and Distribution:

The MENOS TV SIT can be used to contribute digital master video content from a remote station to the MENOS hub where it is stored in a central repository for distribution or archiving. The TV SIT can also be used to receive and store local content distributed from the hub's repository to the remote stations. The store and forward capability allows the contributor/distributor to use low bandwidth channels or to schedule the exchange of the TV content at a time when the load of the network is lower, thereby saving on the cost of transmission. The content can be digitally secured to limit access to specified MENOS stations.

#### IP access services:

As an integrated satellite IP access platform, the MENOS TV SIT provides an 'always-on' high-bandwidth Intranet and Internet connection, both for unicast and multicast traffic.

#### VPN:

Professional users have the ability to create Virtual Network connections among SITs to allow secured access for exchanging private data. The Virtual Networks are implemented by the tunnel mode IPSec Internet standard, encrypting and authenticating the entire IP packet contents for maximal security.

#### VoIP collaboration channels:

The VoIP collaboration channels enable cost-effective SIT to SIT voice communication and multi-party conferences for daily operations, while consuming very little satellite bandwidth. The embedded Quality of Service (QoS) features ensure high quality VoIP.

### Features

- Fully integrated, easy to install turn-key system
- DVB-RCS-based IP Broadband Access
- DVB-S2 SCPC for high bandwidth contributions/distributions
- High speed IP connection with embedded acceleration
- Multiple frequency bands supported (Ku / C-band)
- Integrated Video encoder/decoder
- Video Multimedia Exchange Services (MMX) with automated interface to the MRS (Multimedia reservation server)
- Supports IP broadband unicast and multicast applications
- Integrated encryption on all sessions and data
- Secure Virtual Network Operation
- Fully integrated VoIP services
- Quality of Service (QoS) (dynamic & constant bit rate)
- Remote Monitoring and Diagnostics
- Remote software upgradeable

### Related Products And Documents

#### Other MENOS products

- MN610 and MN620 IP SITs
- MN510 and MN520 Radio exchange SITs

#### Application notes

- MENOS applications – broadband access
- MENOS applications – Real-time Radio exchange
- MENOS applications – Real time TV exchange



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# Specifications

## SATELLITE INTERFACE

### MF-TDMA Broadband access system

- Forward Channel:
  - Modulation: DVB-S2 QPSK/8PSK CCM
  - Rates: 3 to 30 Mbaud
- Return Channel:
  - Modulation: GMSK
  - Rates: 0.256 Mbaud
- Outdoor unit (MN420) :
  - TX Frequency: 13.75 to 14.25 GHz
  - TX Output power: 4 W
  - RX Frequency: 11.7 to 12.75 GHz, single band
  - Polarisation: orthogonal
  - Antenna: 1.2m offset – Tx/Rx 43.3/41.8 dBi
- Outdoor unit (MN410):
  - TX Frequency: 5.85 to 6.425 GHz
  - TX Output power: 5 W
  - RX Frequency: 3.7 to 4.2 GHz
  - Polarisation: orthogonal
  - Antenna: 1.8m offset – Tx/Rx 39.5/35.4 dBi

### RAMA system

- DVB-S2 Forward and Return Channel
  - Rates: QPSK: 0.256 Mbaud to 40 Mbaud
  - 8PSK, 16APSK, 32APSK: 0.256 Mbaud to 30 Mbaud
- Outdoor unit (MN420):
  - TX Frequency: 13.75 to 14.25 GHz
  - TX Output power: 4 W
  - RX Frequency: 11.7 to 12.75 GHz, single band
  - Polarisation: orthogonal
  - Antenna: 1.8m dual offset – Tx/Rx 47/45.5 dBi
- Outdoor unit (MN410):
  - TX Frequency: 5.85 to 6.425 GHz
  - TX Output power: 10 W
  - RX Frequency: 3.7 to 4.2 GHz
  - Polarisation: circular
  - Antenna: 2.4m dual optics – Tx/Rx 41.7/38 dBi

## VIDEO SUBSYSTEM

### Video Encoder:

- Thomson Vibe AS Encoder:
  - MPEG-2 4:2:0MP@ML and 4:2:2P@ML video encoding
  - CBR single pass encoding, max rate 55Mbps
  - SDI 4:2:2 (BNC)
  - MPEG-1 Layer II audio compression
  - Up to two stereo analog, AES/EBU or embedded audio inputs
  - 100 Base T IP output

- Video Decoder:
  - MPEG-2 4:2:0MP@ML and 4:2:2P@ML video decoding
  - 100 Base T IP input unicast and multicast
  - SDI (with embedded audio) and CVBS outputs

- Multimedia Exchange Server (MMX):
  - Dual 100 BaseT Ethernet (RJ-45) for high bandwidth traffic
  - Single 100 BaseT Ethernet (RJ-45) for low bandwidth traffic
  - Single 100 BaseT Ethernet (RJ-45) for management
  - 2 x 250 GB RAID HDD
  - MPEG-TS over UDP (IETF RFC 2250)

## TELEPHONY

### Analog Telephone Adapter:

- GrandStream HT-386:
  - 10Base T Ethernet port
  - 2 FXS ports
  - PSTN pass through
  - G.723,1 (5.3K/6.3K), G.729A, G.711  $\mu$ A, G.726 and iLBC codecs

## IP PERFORMANCE

- IP data Throughput broadband access system:
  - Forward: Max. 2 Mbps Unicast, 16 Mbps Multicast
  - Return: 146 kbps (GMSK)
- IP data Throughput RAMA:
  - Forward: 20 Mbps
  - Return: 15 Mbps
- Collaboration channels:
  - Max. 2 VoIP connections simultaneously

## STANDARDS AND PROTOCOLS

### STANDARDS

EN 301790 (DVB-RCS (partially)), EN 302307 (DVB-S2), EN 301421 (DVB-S), IEEE 802.3 (10T Ethernet), IEEE 802.3u (100TX Ethernet), ISO/IEC 13818-1 (MPEG-2) ISO/IEC 14496-14 (MPEG-4)

### ROUTING PROTOCOLS

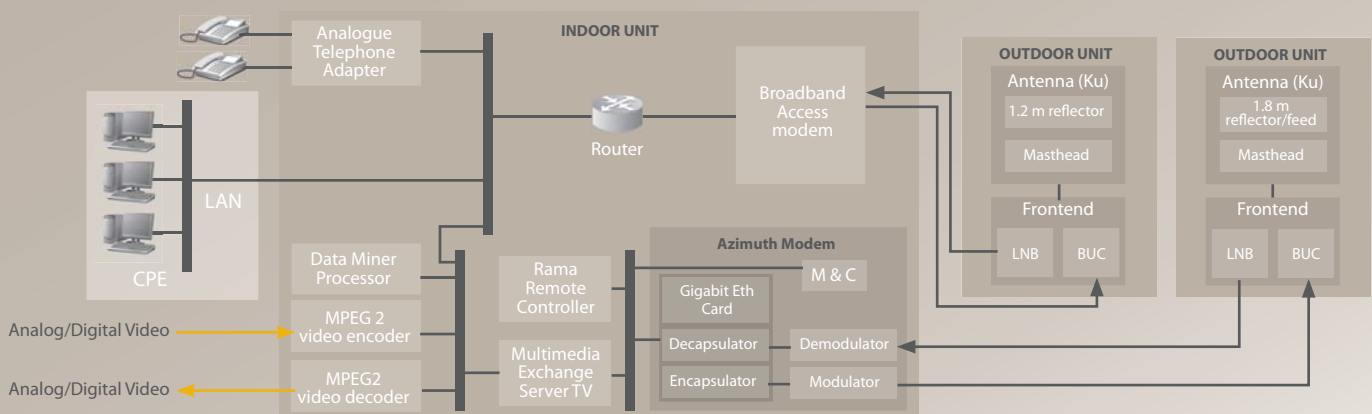
RFC 768 (UDP), RFC 791 (IP), RFC 792 (ICMP), RFC 793 (TCP), RFC 826 (ARP), RFC 959 (FTP), RFC 2131 (DHCP)

### STREAMING PROTOCOLS

RFC 2250 (MPEG-TS over UDP), RFC 3550 (RTP)

## ENVIRONMENT

- Mechanical - 19" rack
  - Housing: 60cm W x 80cm H x 80cm D
  - Weight: 115 kg
- Temperature (indoor unit)
  - operational: 0 to 40 degC – non condensing
  - storage: -40 to 70 deg C up to 95% condensing
- Temperature (outdoor unit): -30 to 55 deg C
- Power Supply: 230V / 6A
- Power consumption: 740 W



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Fax: +32 3 780 65 49	Fax: +1 (203) 323-8406	Fax: +55 (11) 6193 3756	Fax: +65 6777 08 87	Fax: +86 10-823 18 731	Fax: +971 4 368 67 68	mbr@newtec.eu

# MN510 (C-band) MN520 (Ku-band)

## MENOS Radio Satellite Interactive Terminal (SIT)

# MENOS

### Description

The MENOS Radio SIT is one of the terminal types that can be used within the MENOS satellite network environment. It is intended for network members who need to exchange or distribute professional Radio content with remote sites in a fast, reliable and efficient way. The Radio Terminal also provides high-speed Internet, VPN and VoIP services independently of the availability of terrestrial links.

The core of the Radio SIT is the Multimedia Exchange Unit (MMX), which processes both live audio signals and audio files.

The MMX of the SIT exchanges radio content with the MMX of the MENOS hub in any of the following modes

- Live Radio contribution/distribution (reserved channel)
- File transfer (reserved channel or best effort)
- Store and forward: short time storage in the SIT or long term archiving in the HUB

These exchange sessions are synchronized and activated automatically by the hub's Multimedia Reservation Server (MRS).

The MENOS concept starts with the end-users in mind. The terminals require little maintenance, are easy to install and operate and are configured for specific applications while being made of common building blocks using standardized technologies.

### Applications

#### Radio Contribution and Distribution:

The MENOS Radio SIT can be used to contribute content from a remote station to the MENOS hub where it is stored in a central repository for distribution or archiving. The Radio SIT can also be used to receive and store local content distributed from the hub's repository to the remote stations. The store and forward capability allows the contributor/distributor to schedule the exchange of the radio content at a time when the load of the network is lower, thereby saving on the cost of transmission. Up to four analog audio input channels are supported, (four mono channels or two stereo pairs), all of which can be streamed simultaneously.

#### IP access services:

As an integrated satellite IP access platform, the MENOS Radio SIT provides an 'always-on' high-bandwidth Intranet and Internet connection, both for unicast and multicast traffic.

#### VPN:

Professional users have the ability to create Virtual Network connections among several SITs to allow secured access for exchanging private data. The Virtual Networks are implemented by the tunnel mode IPSec Internet standard, encrypting and authenticating the entire IP packet contents for maximal security.

#### VoIP collaboration channels:

The VoIP collaboration channels enable cost-effective SIT to SIT voice communication and multi-party conferences for daily operations, while consuming very little satellite bandwidth. The embedded Quality of Service (QoS) features ensure high quality VoIP.

### Features

- Fully integrated, easy to install turn-key system
- DVB-RCS-based IP Broadband Access
  - DVB-S2 Constant Coding Modulation Forward Channel
  - MF-TDMA Return Channel
- Multiple frequency bands supported (Ku/C-band)
- Radio Multimedia Exchange Services (MMX):
  - MPEG-4 AAC-LC/HE coding.
  - Real Time or Store & Forward
  - Automated interface with MRS (Multimedia reservation server)
- Supports IP broadband unicast and multicast applications
- Integrated encryption on all sessions and data
- High speed IP connection with embedded acceleration
- Fully integrated VOIP services
- Quality of Service (QoS) implementation
  - Support of four dynamic QoS traffic classes
  - Support of Constant bit rate allocation reservations for VoIP and Radio traffic
- Remote Monitoring and Diagnostics
- Remote software upgradeable

### Related Products And Documents

#### Other MENOS products

- MN610 and MN620 IP SITs
- MN410 and MN420 TV exchange SITs

#### Application notes

- MENOS applications – broadband access
- MENOS applications – Real-time Radio exchange
- MENOS applications – Real time TV exchange



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# Specifications

## SATELLITE INTERFACE

### Broadband access system

- Forward Channel:  
Modulation : DVB-S2 QPSK/8PSK CCM  
Rates : 3 to 30 Mbaud
- Return Channel:  
Modulation : GMSK  
Rates : 0.256 Mbaud
- Outdoor unit Ku Band (MN520):  
TX Frequency : 13.75 to 14.25 GHz  
TX Output power : 4 W  
RX Frequency : 11.7 to 12.75 GHz, single band  
Polarisation : orthogonal  
Antenna : 1.2m offset – Tx/Rx 43.3/41.8 dBi
- Outdoor unit C Band (MN510):  
TX Frequency : 5.85 to 6.425 GHz  
TX Output power : 4 W  
RX Frequency : 3.7 to 4.2 GHz  
Polarisation : circular  
Antenna : 1.8m offset – Tx/Rx 39.5/35.4 dBi

### AUDIO SUBSYSTEM

- Multimedia Exchange Server:  
Dual 100 BaseT Ethernet (RJ-45) for traffic  
Single 100 BaseT Ethernet (RJ-45) for management  
2 x 250 GB RAID Hard Disk Drive
- Audio Encoder / Decoder:  
Single 10/100/1000 BaseT Ethernet (RJ-45) for traffic  
Single 10/100 Ethernet (RJ-45) for management  
Analog audio I/O:  
- 2 stereo or 4 mono I/O channels  
- 25-pin female sub-D, twisted pair cables with XLR  
Sample rates of 32, 44.1, 48 and 96 kHz  
MPEG-4 AAC-HE with 32 kbps / 48 kbps bandwidth  
MPEG-TS over RTP (IETF RFC 3550)  
SMA 2.0 compliant streaming
- Analog Telephone Adapter:  
GrandStream HT-386:  
10Base T Ethernet port  
2 FXS ports  
PSTN pass through  
G.723,1 (5.3K/6.3K), G.729A, G.711  $\mu$ A, G.726 and iLBC codecs

## IP PERFORMANCE

- IP data Throughput:  
Forward : Max. 2 Mbps Unicast, 16 Mbps Multicast  
Return : 146 kbps (GMSK)
- Collaboration channels:  
Max. 2 VoIP connections simultaneously

## STANDARDS AND PROTOCOLS

### STANDARDS

EN 301790 (DVB-RCS (partially)), EN 302307 (DVB-S2), EN 301421 (DVB-S), IEEE 802.3 (10T Ethernet), IEEE 802.3u (100TX Ethernet), ISO/IEC 13818-1 (MPEG-2) ISO/IEC 14496-14 (MPEG-4)

### ROUTING PROTOCOLS

RFC 768 (UDP), RFC 791 (IP), RFC 792 (ICMP), RFC 793 (TCP), RFC 826 (ARP), RFC 959 (FTP), RFC 2131 (DHCP)

### STREAMING PROTOCOLS

RFC 2250 (MPEG-TS over UDP), RFC 3550 (RTP)

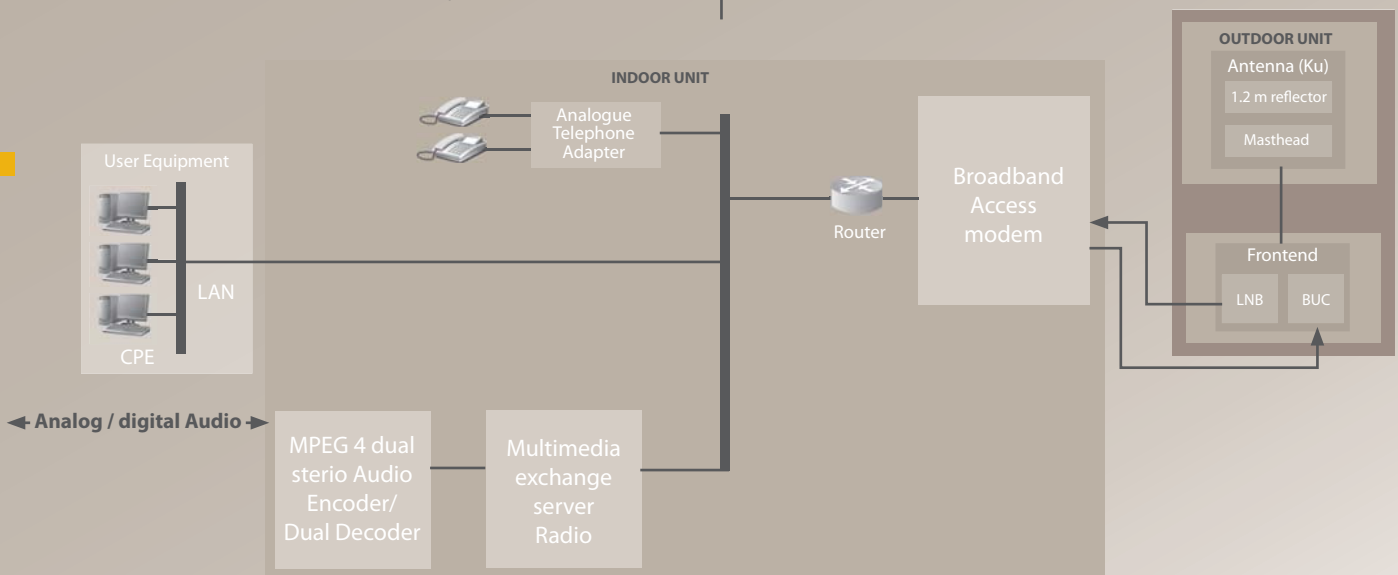
## ENVIRONMENT

- Mechanical - 19" rack  
Housing : 60cm W x 80cm H x 80cm D  
Weight : 95 kg
- Temperature (indoor unit)  
operational : 0 to 40 degC – non condensing  
storage : -40 to 70 deg C up to 95% condensing
- Temperature (outdoor unit) : -30 to 55 deg C
- Power Supply : 230V / 6A
- Power consumption : 600 W

### ORDERING INFORMATION

MN510: Radio terminal with C Band RF Front End + Antenna  
MN520: Radio terminal with Ku Band RF Front End + Antenna

Options: none



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Fax: +32 3 780 65 49

### North-America

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### South-America

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# MN610 (C-band) MN620 (Ku-band)

## IP Satellite Interactive Terminal (SIT) V1.1

# MENOS

### DESCRIPTION

The MENOS IP SIT is one of the terminal types that can be used within the MENOS satellite network environment. It is intended to network members and organizations requiring high-speed Internet access or telephony services independently of the availability of terrestrial links.

#### The MENOS IP SIT provides IP, VoIP and VPN connectivity.

The MENOS concept starts with the end-users in mind. The terminals require little maintenance, are easy to install and operate and are configured for specific applications while being made of common building blocks using standardized technologies.

### APPLICATIONS

#### IP access services:

As an integrated satellite IP access platform, the MENOS IP SIT provides an 'always-on' high-bandwidth Intranet and Internet connection, both for unicast and multicast traffic. The TCP acceleration services, HTTP prefetching and caching allow for a seamless broadband internet experience.

#### VPN:

Professional users have the ability to create Virtual Private Network (VPN) connections among SITs to allow secured access for exchanging private data. The VPNs are implemented by the tunnel mode IPSec Internet standard, encrypting and authenticating the entire IP packet contents for maximal security.

#### VoIP collaboration channels:

The Voice over IP (VoIP) collaboration channels enable cost-effective SIT to SIT voice communication and multi-party conferences for daily operations, while consuming very little satellite bandwidth. The embedded Quality of Service (QoS) features of the SIT ensure that VoIP traffic is prioritized over IP access traffic. As such, optimal voice quality can be assured during phone conversations or conference calls.

The terminal is equipped with an Analogue Telephone Adapter (ATA) that is fully integrated into the VOIP sub-system.

### FEATURES

- Easy to install turn-key system
- DVB-RCS-based IP Broadband Access
  - DVB-S2 Constant Coding Modulation
  - MF-TDMA Return Channel
- Two satellite frequency bands supported
  - MN620 operating in Ku Band
  - MN610 operating in C Band
- Supports IP broadband applications, both unicast and multicast
- High speed IP connection with embedded acceleration:
  - DNS cache/relay for bandwidth efficiency
  - HTTP pre-fetching for faster web browsing
  - Web caching

- Integrated encryption on all sessions and data
- Fully integrated VoIP services
- Quality of Service (QoS) implementation
  - Support of four dynamic QoS traffic classes
  - Support of Constant bit rate allocation reservations
- Remote Monitoring and Diagnostics
- Remote software upgradeable

### RELATED PRODUCTS AND DOCUMENTS

#### Other MENOS products

- MN510 and MN520 Radio exchange SITs
- MN410 and MN420 TV exchange SITs

#### Application notes

- MENOS applications – Broadband access
- MENOS applications – Real-time Radio exchange
- MENOS applications – Real time TV exchange



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# Specifications

## SATELLITE INTERFACE

### Broadband access modem

- Forward Channel:  
Modulation: DVB-S2 QPSK/8PSK CCM  
Rates : 3 to 30 Mbaud
- Return Channel:  
Modulation : GMSK  
Rates : 0.256 Mbaud

### Outdoor unit Ku Band (MN620):

TX Frequency : 13.75 to 14.25 GHz  
TX Output power: 4 W  
RX Frequency : 11.7 to 12.75 GHz, single band  
Polarisation : orthogonal  
Antenna : 1.2m offset – Tx/Rx 43.3/41.8 dBi

### Outdoor unit C Band (MN610):

TX Frequency : 5.85 to 6.425 GHz  
TX Output power: 4 W  
RX Frequency : 3.7 to 4.2 GHz  
Polarisation : circular  
Antenna : 1.8m offset – Tx/Rx 39.5/35.4 dBi

## TELEPHONY

### Analog Telephone Adapter:

- GrandStream HT-386:  
10Base T Ethernet port  
2 FXS ports  
PSTN pass through  
G.723,1 (5.3K/6.3K), G.729A, G.711  $\mu$ A, G.726 and iLBC codecs

## IP PERFORMANCE

### IP data Throughput:

Forward : Max. 2 Mbps Unicast, 16 Mbps Multicast  
Return : 146 kbps (GMSK)

### Collaboration channels:

Max. 2 VoIP connections simultaneously

## STANDARDS AND PROTOCOLS

### STANDARDS

EN 301790	: DVB-RCS (partially)
EN 302307	: DVB-S2
EN 301421	: DVB-S
IEEE 802.3	: 10T Ethernet
IEEE 802.3u	: 100TX Ethernet
ISO/IEC 13818-1	: MPEG-2
ISO/IEC 14496-14	: MPEG-4

### ROUTING PROTOCOLS

RFC 768	: UDP
RFC 791	: IP
RFC 792	: ICMP
RFC 793	: TCP
RFC 826	: ARP
RFC 959	: FTP
RFC 2131	: DHCP

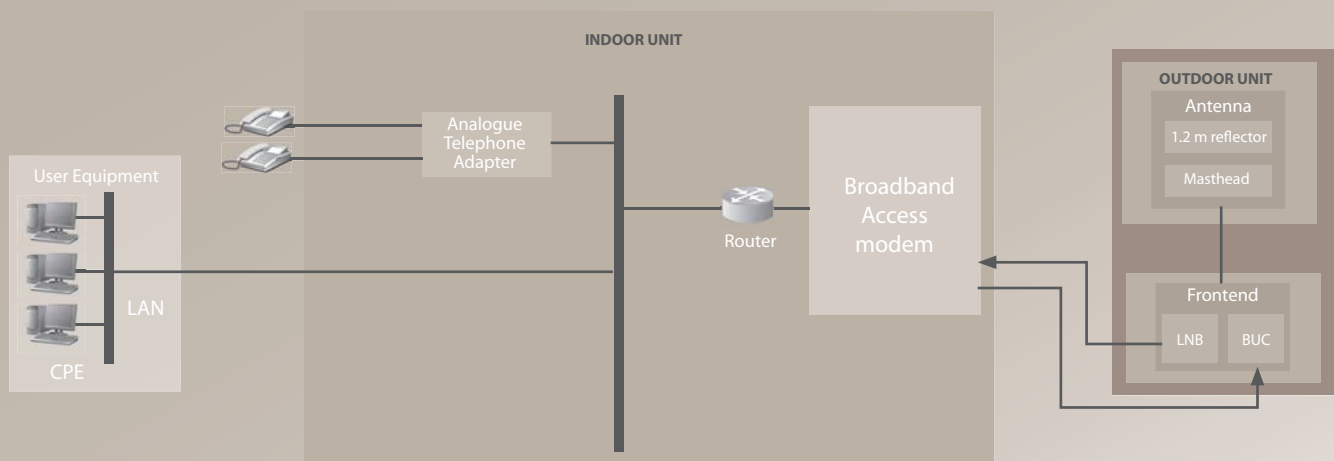
## ENVIRONMENT

- Weight : 10 kg
- Temperature (indoor unit)  
operational: 0 to 40 degC – non condensing  
storage: -40 to 70 deg C up to 95% condensing
- Temperature (outdoor unit) : -30 to 55 deg C
- Power Supply : 230V/6A
- Power consumption : 80 Watt

## ORDERING INFORMATION

MN610: IP terminal with C Band RF Front End + Antenna  
MN620: IP terminal with Ku Band RF Front End + Antenna

Options: none



### Europe

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Fax: +86 10-823 18 731

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Fax: +971 4 368 67 68

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