

MILITARY RADIO RELAY MH 500 SERIES

DESCRIPTION

The MH500 series is a new-generation of radio relay terminals designed to support tactical communication systems.

The increasing demand for traffic capacity, the need of providing reliable data transmission services in support of Command and Control applications and the continuous narrowing of the available RF spectrum, sets new requirements for high capacity radio communications in modern mobile networks.

This MH500 series is the SELEX Communications answer to such needs; it includes radio terminals working in the NATO Bands I, III+, IV and V, with an overall throughput in excess of 8 Mbps, available in Compact or Split versions to meet different deployment profiles.

Software modem technology, rugged and light-weight design, full control capabilities through comprehensive IP-based network management systems, complete the profile of a family of products generated to support mobile military networks in the 21st century battlefield scenario.

FREQUENCY BANDS

Three radio-relay equipment form the series:

- > MH502 , operating in the 225-400 MHz NATO Band I
- > MH513 , operating in the 1350-2700 MHz NATO Band III+
- > MH544 , operating in the 4400-5000 MHz NATO Band IV
- > MH515 , operating in the 14500-15350 MHz NATO Band V

Tx/Rx frequencies are independently selectable over the whole frequency band by operator/NMS. In Band I, III+ and IV, the internal control system provides for automatic continuous tuning of RF pass band cavity filters while in Band V the RF range is organised in frequency sub-bands.

TRAFFIC CAPACITY

MH513 / MH544 / MH515 can take up to four



MH 500 COMPACT VERSION

256-2048kb/s channels (or a single 8448kb/s channel) while MH502 can cope with a single 256-2048kb/s channel.

Interfaces are compliant to Eurocom D/1 and ITU-T G.703/V.11.

Sideband capacity includes digital EOW and auxiliary channel, both with 16/64kb/s configurable rate.

SPECTRAL EFFICIENCY

Best trade-off between spectral efficiency and link resilience to intentional jamming is assured through programmable modulation formats. Uncoded/coded QPSK, 8TCM, 16TCM modulations are selectable by operator/NMS to adapt to different propagation constraints and allow operation in a crowded electromagnetic scenario.

MH 500 SPLIT VERSION **EPM CAPABILITY**



Intrinsic robustness (due to software programmable modulation and high-selectivity filters) is greatly enhanced by several electronic protection measures:

- > Automatic frequency evasion for interference/jammer avoidance
- > Block/convolutional interleaved/ concatenated FEC codes for burst/random errors control and pulse jammer effects recovery
- > EOW-only mode (last ditch mode) for critical engineering link and operators communication resilience
- > Automatic interference and jamming detection

Anti-ESM capability is provided in terms of automatic power control. A robust real-time software procedure, based on received power level and signal quality evaluation, provides continuous and automatic control of transmit power to minimise the probability of link interception by enemy forces.

CONTROL

The control system provides a self-explanatory operation mode, real-time check of all equipment functions with fault identification (BITE) and link quality.

The operator can control the equipment, through a dedicated military or standard commercial terminal/PC, or remotely by any NMS via a SNMP interface.

POWER SUPPLY

This can be either mains, battery or both with automatic changeover for no-break operation.

MILITARY STANDARDS

MH500 series complies with military environmental and EMC/EMP specifications.

OPERATIONAL SCENARIO

New doctrine defines an extended and dynamic warfare scenario covering large operational areas with greater dispersion of forces where rapid and reliable communications are mandatory to fulfil the mission. A high degree of mobility for the entire array of communications facilities supporting the battlefield is mandatory: an Army on the move cannot stop to lay fibre optic cables, with their huge amount of error-free bandwidth, and has to live with the shortcomings of high-BER radio transmissions.

MH500 SERIES IMPROVES CONVENTIONAL RADIO TECHNOLOGY

- > Supports an Army's growing need for wideband radio communications providing the high-speed digital backbone for tactical networks
- > Assures high-reliability, low-residual bit error rate links compatible with data transmission requirements
- > Guarantees narrowband transmission with effective spectrum sharing and excellent co-site performance for dense network operation
- > Provides robustness against propagation difficulties and jamming allowing network survivability in a hostile battlefield environment

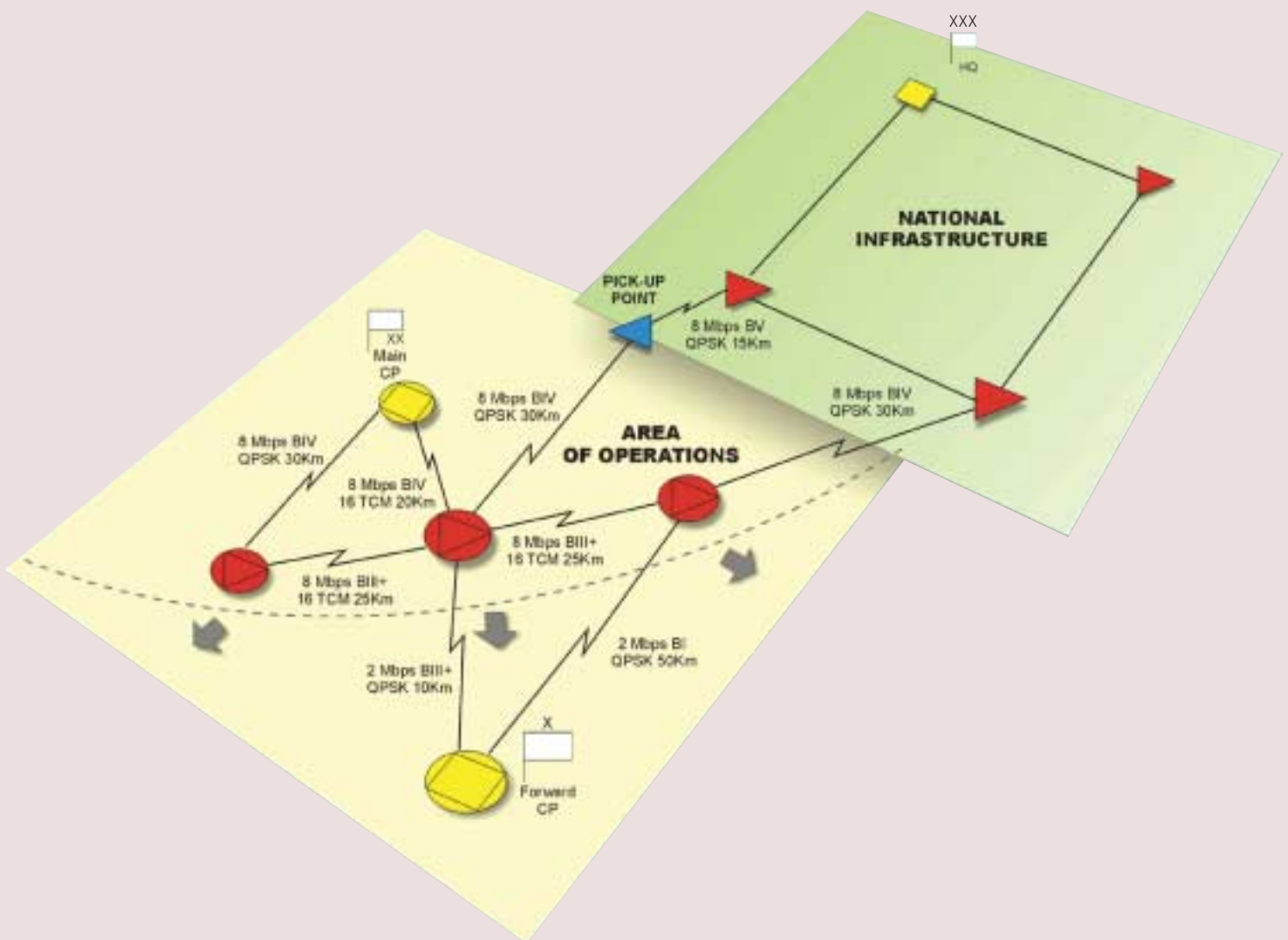
FLEXIBLE ARCHITECTURE

MH500 series is available in two mechanical configurations, Compact and Split, to allow the maximum flexibility for all operational scenarios.

Compact Version (available for MH513 / MH544) consists of a single-box, rugged, waterproof, 4U, 19" rack mountable equipment.

Compact Version presents reduced dimensions and weight resulting in the smallest tactical radio-relay equipment available in the market.

This feature is very useful for field applications, particularly for vehicle installations where equipment size is always a critical point.



Split Version consists of a dual-box (IDU/ODU), rugged, waterproof equipment. IDU uses the same Compact Version 4U case while ODU uses a smaller case suitable to be located at the base or at the top of the mast.

IDU and ODU are connected by coaxial cable up to 300m or optical cable up to 4km (option).

ODU is directly supplied by IDU when coaxial cable is used, otherwise a local power supply is required.

Split Version provides maximum path loss capability allowing close ODU-antenna location.

This feature is very useful in Band IV and V where feeder losses are relevant, particularly when high masts are required to gain line-of-sight conditions.

In Band IV and V a flat antenna integrated in the ODU is also available on request.

MH500 series has a fully-modular architecture and the same electrical units can be fitted in both mechanical arrangements.

The RF operating band is easily configured by means of frequency-dependant module substitution.

Particularly, in the Split Version, the same IDU can be used with Band I, Band III+, Band IV and Band V ODU.

RADIO REMOTE CONTROL

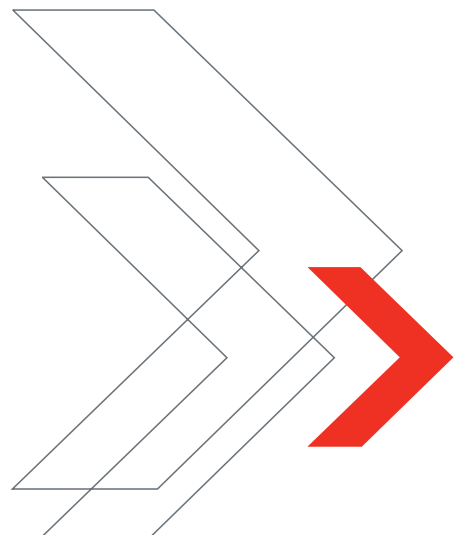
MH500 series enables full remote control of all radio-relay equipment in the network from a single management position.

An operator/NMS is able to monitor & control far-end radio terminals through an IP addressing scheme.

Data communication is performed at 64kb/s "over-the-air" and routed to any radio-relay equipment in the network.

MAIN FEATURES

- > Light-weight Compact/Split architecture
- > 225-400MHz / 1350-2700MHz / 4400-5000MHz / 14500-15350MHz frequency bands
- > QPSK, coded-QPSK (1/2,3/4,7/8), 8TCM, 16TCM digital modem
- > Up to 8Mb/s with embedded multiplexer
- > EOW and auxiliary channel
- > EPM capability
- > Low-probability of intercept mode
- > High-sensitivity EOW-only mode
- > SNMP v.3 NMS interface
- > Radio remote control
- > Mains / battery power supply
- > MIL proof design



TECHNICAL SPECIFICATIONS

RF data

Frequency Band	225-400MHz (MH502)
	1350-2700MHz (MH513)
	4400-5000MHz (MH544)
	14500-15350MHz (MH515)
Rx/Tx Minimum Duplex Separation	20MHz (MH502)
	40MHz (MH513)
	60MHz (MH544)
	322/728MHz (MH515)
Channel Spacing	125kHz (MH502/MH513/MH544)
	1.75MHz (MH515)
Modulation Format	QPSK, coded-QPSK (1/2,3/4,7/8), 8TCM, 16TCM

Baseband data

Traffic	MH502 : one single 256/512/1024/ 2048kb/s channel
	MH513 / MH544 / MH515 : up to four 256/512/ 1024/2048kb/s channels or one single 8448kb/s channel
	Eurocom D/1 or ITU-T G.703/V.11 interface
Auxiliary	Configurable 16kb/s Eurocom D/1 or 64kb/s ITU-T V.11/X.21bis channel
Engineering Order Wire	Configurable 16kb/s Eurocom D/1 or 64kb/s ITU-T G.703

System gain (BER=10⁻⁶)

MH502	ranging between 138 and 122 dB depending on bit rate and modulation (QPSK : 128dB@2Mb/s)
MH513 / MH544	ranging between 130 and 109 dB depending on bit rate and modulation (QPSK : 120dB@2Mb/s / 114dB@8Mb/s)
MH515	ranging between 121 and 100 dB depending on bit rate and modulation (QPSK : 111dB@2Mb/s / 105dB@8Mb/s)

EPM	Automatic frequency evasion
	Block/convolutional FEC codes
	High-sensitivity EOW-only mode
	LPI mode by automatic power control
	Automatic interference/jamming detection

Management

Auto-diagnostics	Power-on self-test
	On-line BITE
	General Alarm

Local Control	V.10/V.24 asynchronous serial line, ASCII protocol, or IEEE802.3 10Base-T, WEB oriented interface
	Through handheld terminal or PC

Remote Control	IEEE802.3 10Base-T, SNMP v.3 protocol
----------------	---------------------------------------

Power supply	AC/DC with no-break automatic changeover
--------------	--

Voltage	110/220Vac nom., 50/60Hz or 24/48Vdc nom
---------	--

Consumption	150W (MH502)
	140W (MH513)

130W (MH544)

120W (MH515)

Physical

Compact Version (available for MH513/MH544):

Size 177x448x400mm (HxWxD)

Weight 30kg

Split Version

MH502

Size IDU: 177x448x400mm (HxWxD)

ODU: 177x448x400mm (HxWxD)

Weight IDU: 18kg

ODU: 24kg

MH513 / MH544 / MH515

Size IDU: 177x448x400mm (HxWxD)

ODU: 177x320x400mm (HxWxD)

Weight: IDU: 18kg

ODU: 18kg

Environmental According to MIL-STD-810

Temperature -40°C +55°C operating

Humidity 95% non condensing

EMI/EMC According to MIL-STD-461/2

Installation 19" racks

Fixed, shelter, platform systems, field use

