MARDEX
Tactical Digital Exchange

MARDEX -Advanced Digital
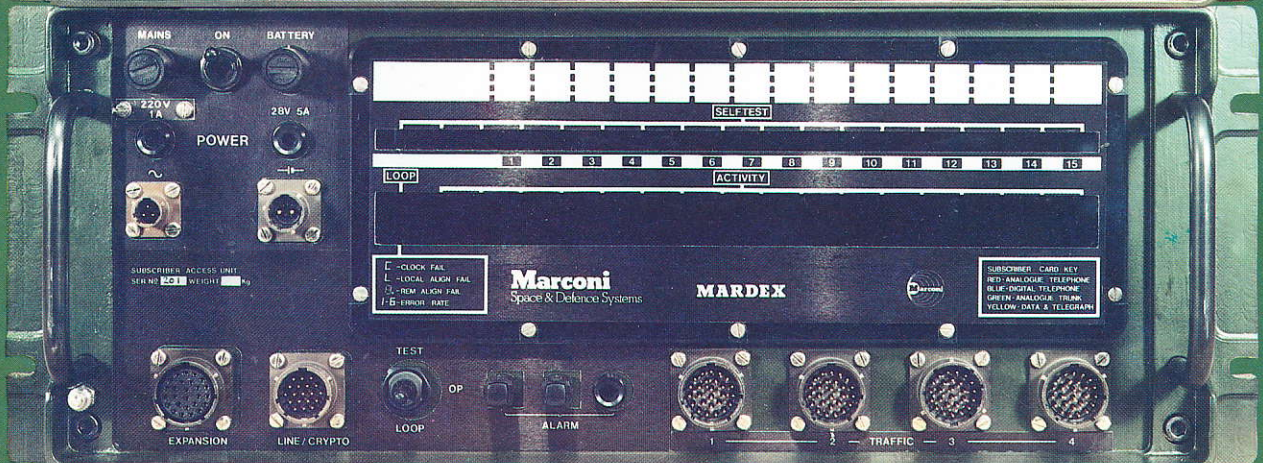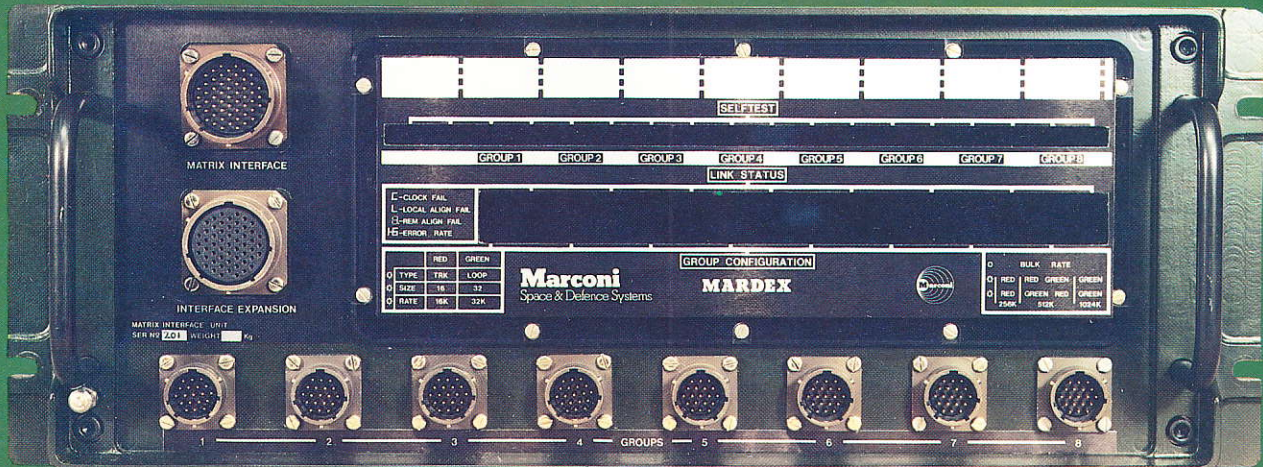
MARDEX - Microprocessor Controlled

The Marconi Digital Exchange is a family of microprocessor controlled equipments using proven design techniques and advanced technology to provide circuit switching for high performance military communications networks. The equipment is designed to the EUROCOM recommendations, to ensure reliable communications based on digital switching and transmission.

The use of microprocessor control, combined with modular software and hardware, provides a product which can be configured for optimum performance in varied applications whilst being easy to install, operate and maintain.

A range of standard interfaces ensure compatibility with existing analogue terminal equipment and exchanges in addition to modern advanced digital subscriber terminals and transmission systems, thereby enabling the phased introduction of MARDEX into existing systems.
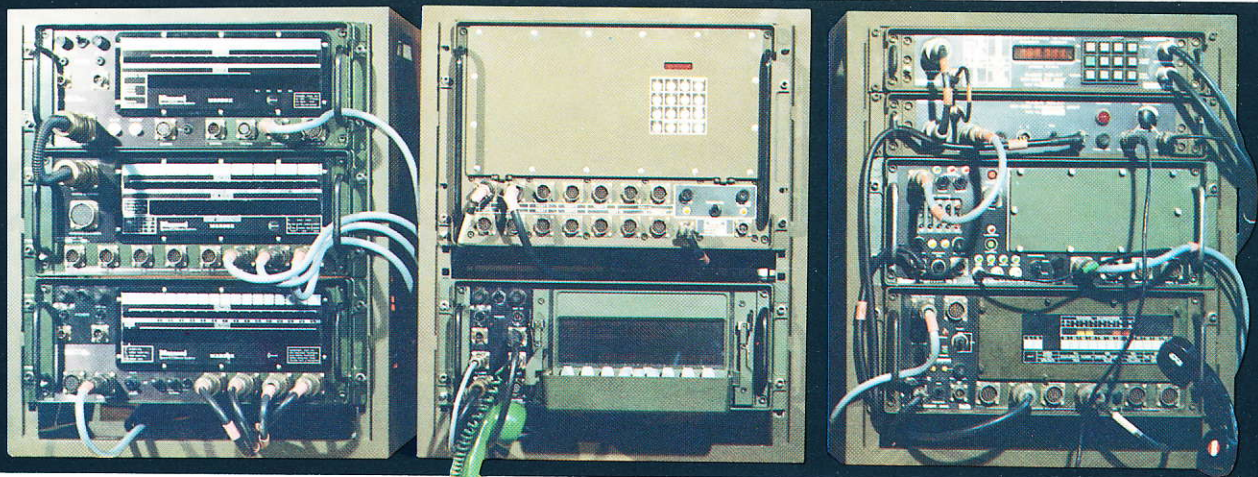
MARDEX - Features

- EUROCOM standards
- Interfaces with all types of existing digital and Analogue equipment
- Analogue/Digital and Digital/Analogue conversion to Eurocom standards
- Digital Time Division Multiplex Switching
- Non-Blocking
- Delta Modulation at 16 k/bits or 32 k/bits channel data rate
- Rugged, modular construction
- Simple to operate with comprehensive self-testing
- Modular software for tailoring to requirement
- Standard 19 inch rack mounting
- Stored programme control
- Advanced routing techniques
- Comprehensive status displays

Typical MARDEX Tactical Switch Node

KEY
Z = MARCRYPMUX
R = GR 083 RADIO
LTU = LINE TERMINATING UNIT
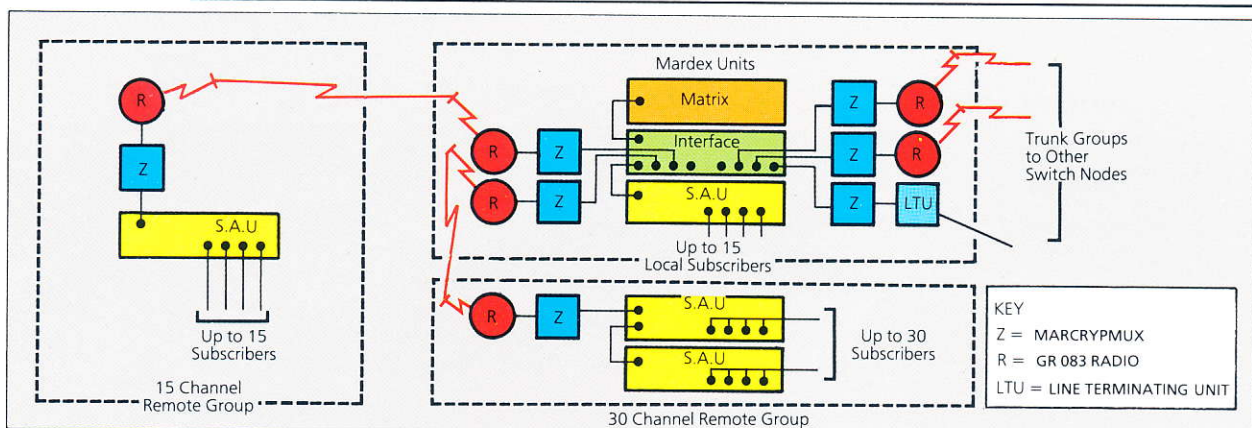
MARDEX - The System in detail

The MARDEX tactical switching system is based on a range of equipment which may be operated independently or as an integrated system; it is fully compatible with the CLAYMORE radio relay system. The equipments consist of small, rugged, transportable units which offer extreme flexibility for field deployment. Based on Delta modulation with digital switching throughout, employing stored program control using distributed microprocessors, the system offers high survivability, advanced features, comprehensive self test facilities and simplicity of operation.

The units which together form a complete exchange include:

SWITCH MATRIX UNIT

A switch unit which carries out local and network switching under stored program control. The switching element is a non-blocking 256 channel time division multiplex switch matrix. Facilities are also provided for system control, alarm monitoring, recording of statistics, operator console interface and connection to the Matrix Interface Unit(s).

MATRIX INTERFACE UNIT

A Matrix Interface Unit which provides the interface for up to 8 ports. Each port may be configured as a 16 or 32 channel loop or trunk group in any mix. Conference facilities may be provided, each conference of up to 8 conferees replacing the group facility. Power and control of the unit is derived from its associated Switch Matrix Unit. Two Matrix Interface Units may be interconnected to provide a 16 port switch.

SUBSCRIBER ACCESS UNIT

A Subscribed Access Unit provides connections for up to 15 subscribers to the Matrix Interface Unit as a Eurocom loop group. Conventional dial, push button multitone or ring-down analogue telephones can be accommodated in addition to Eurocom digital subsets and PTT interfaces. Each subscriber is associated with a separate circuit card selected from a range which caters for different instruments and signalling systems. 3 telegraph circuits may be submultiplexed over one subscriber channel.

The Subscriber Access Unit provides a Eurocom loop group interface programmed to operate a channel data rate of 16 or 32 kbits/second on a per call basis. It may be connected to its associated Matrix Interface Unit directly or via a suitable transmission system such as the MSRS GR083 radio relay system.

An expansion interface allows two Subscriber Access Units to be interconnected to form a 30 channel loop group.

OPERATOR CONSOLE UNIT

The Operator Console Unit provides a simple to operate, user friendly man-machine interface providing all necessary engineering and database management facilities. The display consists of 6 lines of 40 characters, the bottom line of which is used to 'label' a row of soft keys thereby continually prompting the console operator throughout the interactive processes.

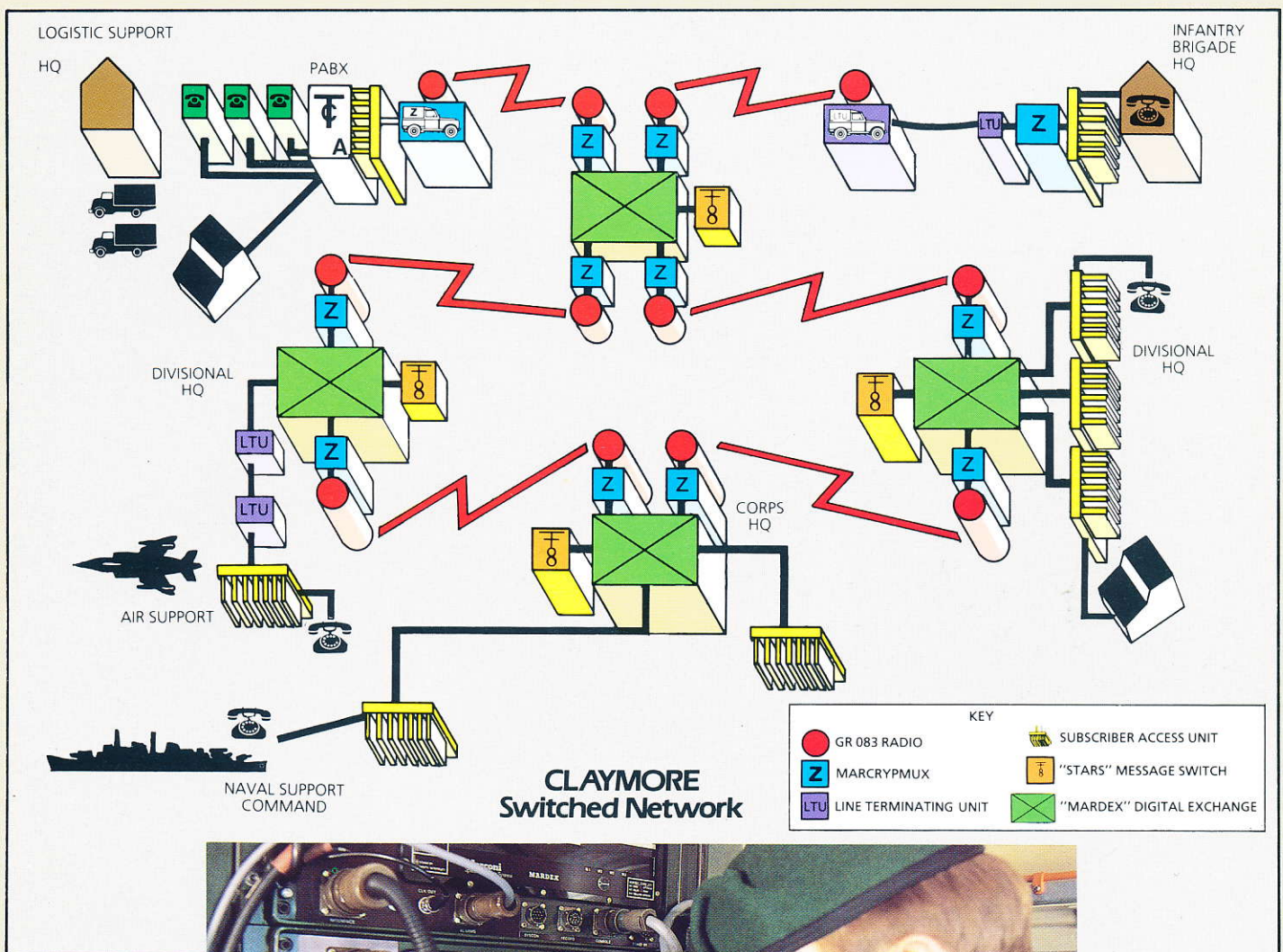The Operator Console Unit also enables the operator to give subscriber assistance and provides indications of waiting, hold and assistance calls. Comprehensive displays of call status are also available.

Call monitoring and call tracing facilities are included. The simple keyboard hinges up and is locked in this protective position during transit.

Selected data such as subscriber profiles and status information may be fed to an attached printer.

System Introduction

In order to maintain its effectiveness against an enemy possessing a high degree of mobility, the Army of Today, whatever its size, requires comprehensive telephone and telegraph communications stretching from General Headquarters down to at least Brigade and in some cases to Battalion level.

In a modern digital radio relay system, these communications will involve telephone switching by means of Exchanges at various HQs and it is possible that a single call may have to pass through a number of Exchanges before reaching its destination. It is vital, therefore that the switching should also be carried out in digital form without having to convert back to analogue at each Exchange. In a network with both digital transmission and digital switching, there is no limit to the number of Exchanges through which a call may pass while still retaining the original speech quality. Additionally processor controlled digital switching confers flexibility of routing and reliability upon the System.

MARDEX, Marconi's Digital Exchange, is part of a comprehensive Military Radio Relay System, CLAYMORE, designed to meet the requirements of modern, tactical communications. MARDEX is multi microprocessor controlled with distributed data base, is fully to Eurocom standards and will interface with all existing systems. Its modular design makes it flexible for tailoring to customers requirements and for ease of future expansion. MARDEX has been designed specifically to meet the modern military requirement for digital switching in the field and is the result of years of Marconi experience and expertise in digital signal technology.

CLAYMORE
Switched Network

KEY

Symbol	Description	Symbol	Description
●	GR 083 RADIO	⊥	SUBSCRIBER ACCESS UNIT
Z	MARCRYPMUX	⊤8	"STARS" MESSAGE SWITCH
LTU	LINE TERMINATING UNIT	⊠	"MARDEX" DIGITAL EXCHANGE

LOGISTIC SUPPORT HQ

INFANTRY BRIGADE HQ

PABX

DIVISIONAL HQ

DIVISIONAL HQ

CORPS HQ

AIR SUPPORT

NAVAL SUPPORT COMMAND

MARDEX
Data Summary

SWITCH MATRIX UNIT:

Matrix	: 256 channels non-blocking TDM
Control	: Stored Program Microcomputer
Call Connection Rate	: 10 calls per second
Switch Configurations	: Access, Transit or combination of both
Power Supply	: 110/220V AC, 50/60 Hz with no break automatic changeover to 24V DC
Power Consumption	: 40 W (nominal)
Dimensions	: 177mm × 483mm × 300mm
Weight	: 15kg (nominal)

MATRIX INTERFACE UNIT:

Number of Ports	: 8
Port Configuration	: Eurocom loop group, trunk group or conference
No of Channels	: 16 or 32
Group Data Rate	: 256,512 or 1024 kbits/second
Channel Data Rate	: Programmable for 16 or 32 kbits/second
Trunk Group Signalling	: Common channel, Eurocom Error Encoded with 4 or 6 block ARQ recovery
Loop Group Signalling	: In-band, Eurocom cyclically permutable Codeword (CPC)
Power Consumption	: 30W (nominal). (Power derived from parent SMU)
Dimensions	: 177mm × 483mm × 300mm
Weight	: 15Kg (nominal)

SUBSCRIBER ACCESS UNIT:

Number of Subscribers	: 15 (expandable to 30 with two units interconnected).
Loop Group Interface Group Size	: 16 channel (expandable to 32 with two units interconnected).
Channel Data Rate	: Programmable for 16 or 32 kbits/second
Bulk Data Rate	: 256 or 512 kbits/second (512 or 1024 kbits/second when expanded
Subscriber Interface Digital Telephone	: Eurocom Single Channel Interface
Analogue CB Telephone	: Dial pulse or DTMF signalling 48V central battery power feed and 25Hz ringing
Analogue LB Telephone	: Ringdown (magneto) signalling 25Hz ringing
Analogue Trunk	: 2 or 4 wire with E & M supervision dial pulse or DTMF signalling
Data	: Synchronous 16 or 32 kbits/second. Asynchronous data to 4.8 kbits/second.
Telegraph	: Up to 3 sub-multiplexed telegraph circuits (up to 110 baud) in one traffic channel.
Power Supply	: 110/220V Ac, 50/60Hz with no break automatic changeover to 24V DC.
Power Consumption	: 30W (nominal)

OPERATOR CONSOLE UNIT:

Keyboard	: Numeric keypad plus eight 'soft keys'
Display	: 6 lines of 40 alpha – numeric characters
Power Supply	: 110/220V AC, 50/60 Hz with no break automatic changeover to 24V DC
Power Consumption	: 40W (nominal)
Dimensions	: 177mm × 438mm × 300mm (keyboard projects by 180mm in operating position).
Weight	: 20Kg (nominal)

ENVIRONMENTAL SPECIFICATIONS

All units in the MARDEX family of equipment meet the relevant sections of DEFSTAN 07-55.

Marconi
Secure Radio Systems

Designed and produced by Blitz Design and Graphics. Printed in England.