ETERNITY MEX
The ULSB MK III Switch

Command and Control is the doctrine in militancy operations devoted to ensure the safety and security of a nation. At the time of combats it is the safety of the citizens which is at stake. The commanders and the contingents must be able to communicate anytime and from anywhere. The need of an efficient, highly-advanced and most importantly a dependable communication system sees no alternative. There can be no conciliation on the quality and dependability of such an equipment, as performance is highly imperative. The combat communication system must perform and perform the best nonetheless of the extreme weather conditions or the rough and bumpy terrains or the eternal hours of operation.

Presenting, ETERNITY MEX - The Military Exchange, built with zeal to deliver the most supreme communication to the combat forces. MEX is a highly-integrated unit level switch board (MK III) built to endure the vigorous field environment. The state of the art exchange functions as a local and transit switch providing termination of local telephone subscribers and trunk lines at unit or sub unit level. Modular configuration with distributed processing guarantees faster performance and a much simplified maintenance. Universal interfaces, completely non-blocking architecture, redundant configuration, a ruggedized and toughened structure and adherence to all stringent military standards ensure a dependable performance.

MATRIX
TELECOM SOLUTIONS

ARCHITECTURE

ETERNITY MEX main switch encompasses the system processing, power supply and various network and extension cards in a modular architecture. The exchange offers connectivity to various trunks and subscribers in form of plug-in cards. Due to the universal personality of the slots an interface card can be flexibly inserted in any of the vacant slot. Built-in redundancy of power supply and CPU facilitate uninterrupted operation-24x7.

The switch functions as an automated call management exchange, managing calls between various network ports and subscriber stations. MEX architecture is based on high-density digital switching. Employing a completely non-blocking architecture, the unit level switch offers unrestricted communication at any instant.

The integrated exchange offers interfaces for POTS, E&M, LD, ISDN BRI and E1/PRI. On the extensions side the switch supports analog extensions, magneto phones and digital subscribers.

# **MEX -** The Armored Exchange for Defence Communication!

The switch offers direct termination for voice and data delivered over copper or optic fibre networks. A data card facilitates data transfer and control applications with integrated 4 ethernet ports. A bifurcated E1 stream can be mapped to any ethernet port. Software configurable for CAS, R2MFC, PRI and QSIG, the switch offers transparent networking between the telephone exchanges.

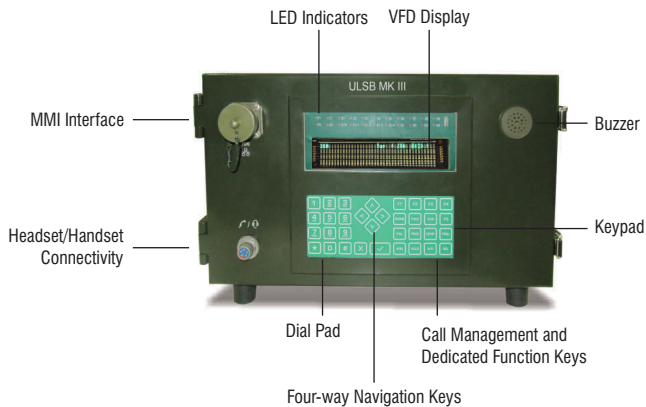The front fascia offers an integrated operator console from which an operator can manage the calls made from the system and monitor the switch for proper functioning. The rear side carries connectors for MDF termination. MEX is housed in a ruggedized cabinet and comes with separate LTB and FCBC units.

The cautious approach in designing, right from mounting modules on cards to the outermost casing, makes MEX extremely light-weight and compact.

MEX ULSB INTERFACE
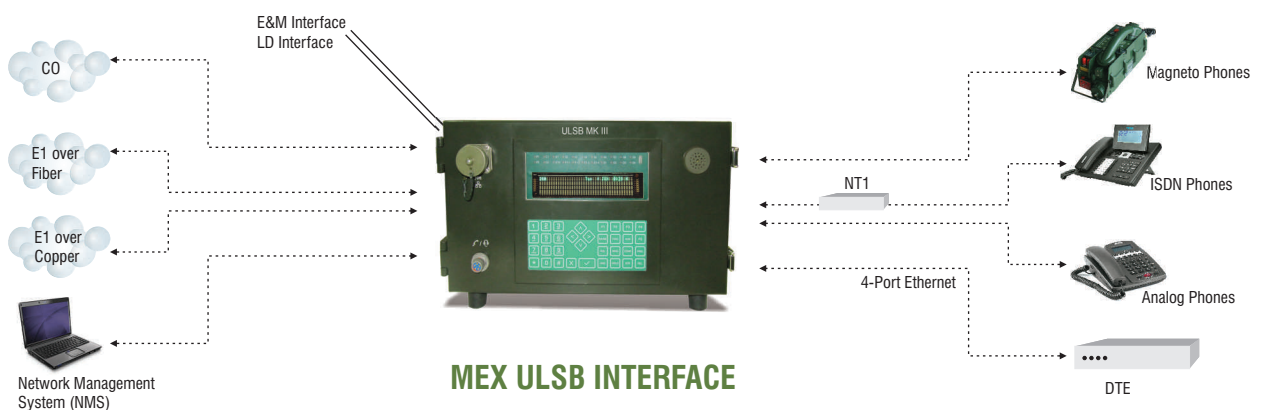
OPERATOR CONSOLE

The operator console embeds a 4x40 VFD display and various LED status indicators indicating proper functioning of the system cards. The Ringer Lamp provides visual indication of incoming calls and the buzzer produces audio. Programmable direct access function keys, dedicated call management and the 4-way navigation keys further pacify the operator's routine operations. A MIL standard, ruggedized headset and handset connector is also embedded on the front fascia.

LED Indicators · VFD Display
ULSB MK III
MMI Interface
Buzzer
Headset/Handset Connectivity
Keypad
Dial Pad
Call Management and Dedicated Function Keys
Four-way Navigation Keys

LTB

The LTB connects telephone lines coming from outside, i.e. the local exchange, on one side and the internal (PBX) lines on the other. The LTB offers terminations for BRI, E1/PRI, analog phones, magneto junctions, CO ports, LD and E&M ports. Integrated protection against lightning, electrical surges and standing voltages is offered for each port with a five stage protection module. An earthing point on the right end of the LTB connector side is provided along with cables and earthing kit. The LTB comes with a suitable case and harness for easy transit.

FCBC

A Float Cum Boost Charger (FCBC) is required to feed 48VDC power to the main switch. The FCBC works on input AC mains (150-300V). The FCBC comes with a built-in battery charging circuit.

When the batteries are drained, the FCBC goes into the boost mode and begins to charge the batteries at higher current. When the batteries reach a preset voltage level, the FCBC goes to float mode. In the float mode the FCBC keeps charging the battery but at lower current. The FCBC monitors the voltage level of the batteries. As soon as the battery voltage goes below preset voltage, FCBC goes from float mode to boost mode. The advantage of using an FCBC is that batteries get charged faster, since the batteries are charged with higher current initially.

LEDs on the front panel indicate various statuses such as failure of power supply, fault in battery, low battery and battery under and over voltage conditions, a reverse battery connection as well as the float or charging mode of battery.

Encased in a ruggedized housing, the FCBC comes with a harness and case for easy transit. Standard cables of appropriate length are also provided for connections to the main exchange and the battery with complementary connectors at both the ends. Suitable AC earthing cable is also provided.

- **150-300V AC Operation**
- **Built-in Battery Charging Circuit**
- **48V DC Battery Output**
- **Auto Change-over from AC to DC and Vice-Versa**
- **Over Voltage and Reverse Voltage Protection**
- **Low Battery Cut-off**
- **1+1 Redundancy of SMPS**

FEATURES AND FUNCTIONS

MEX functions as an automated call management exchange, flexibly managing calls right from initiation to termination. The intelligent exchange seamlessly routes calls between various network ports, from trunks to subscriber stations and amongst the various subscriber stations. Multi-location networking can be done over ISDN, E1 or E&M lines, extending system features and capacity till a distant comrade unit.

Incoming calls can be automatically directed to specific users; else routed amongst a group of users as per pre-defined priorities. Outgoing calls are routed via the most-cost-effective network calculating various algorithms. The dial plans can be unlike for different groups and flexibly revived as per the time of calling.

ETERNITY MEX delivers intelligent features to its service extensions, such as remembering access codes for easy and speed dialling, forwarding calls to desired extension, grouping extensions, establishing conferencing circuits for multi-party conversations, re-attempting calls at unsuccessful trials and many others. ETERNITY MEX logs all its activity, maintains a detailed call activity reports with the provision to back-up and print the same.

RELIABILITY

An indispensible requirement of a military exchange is to perform and perform at every instant. The envisaged military environment is highly strenuous for any equipment. Ruggedized to tolerate all the duress, MEX is engineered to offer a reliable performance under all arduous situations. The distributed processing architecture with local processing units for each card localize fault points and lead to fault isolation and easier fault identification. Integrated DSP based SLIC and DAA are used for analog subscriber and trunk Interfaces along with automatic thermal management on subscriber and tie lines.

On-board secondary protection, over voltage and current protection eliminate overheating or breakdowns. The LTB also comes with 5-Stage protection. The MTBF is better than 5000 working hours with a repair time less than 30 minutes.

1+1 Hot-Standby for critical cards offers true redundancy. In the event of failure of the active card, the changeover to the standby card is automatic and transparent, without any disruption of services. All the interface cards are hot-swappable, eliminating unhealthy system down-time.

NETWORK MANAGEMENT (MMI)

MEX configuration is possible from subscriber stations, operator console as well as via a local/remote terminal. Ruggedized network management terminal/MMI with user friendly web based GUI allows the switch to be configured, monitored and managed remotely. The system access can be secured with passwords differentiated for access at various levels. The switch also provides a MIL standard MMI interface on the front fascia with an EMI protected cable with a sealed connector on one end and industrial standard connector for laptop.

SYSTEM TRAFFIC AND STATISTICS

Comprehensive monitoring and management reports can be generated with per port/trunk occupation details. Built-in SMDR for 12000 records is provided. System Event and Fault Logs can also be generated for easier troubleshooting and maintenance. These logs can also be viewed on the VFD display of operator console.

TESTING AND EVALUATION
(POST and BITE)

Besides the network management terminal, card level system diagnosis is available through the LED status indicators on the operator console and the corresponding textual messages displayed on the VFD. Power-on self-test (POST), on-line and off-line diagnostics offer self-diagnosis of various cards. Built-in Test Equipment (BITE) testing of various ports like SLT, Magneto, CO (TWT), E&M and LD can also be done.

RUGGEDIZATION
(MIL STD-461D and JSS-55555)

MEX is well armored at each and every step of its designing. Housed in a ruggedized cabinet, the connectors and MDF are duly toughened. There are no moving parts and cards are well secured to the slots. MEX is ruggedized to match all the specifications as per table L2B of JSS-55555. Abiding the EMI/EMC specifications as per MIL STD-461D ensure impervious performance under varying climatic conditions. Draped in a color scheme in camouflage to the field environment, MEX is built to endure extreme variations of temperature, pressure and humidity. The ruggedization offers absolute endurance against vibration, shock, bounce, collision, drop, duress, dust and immersion.
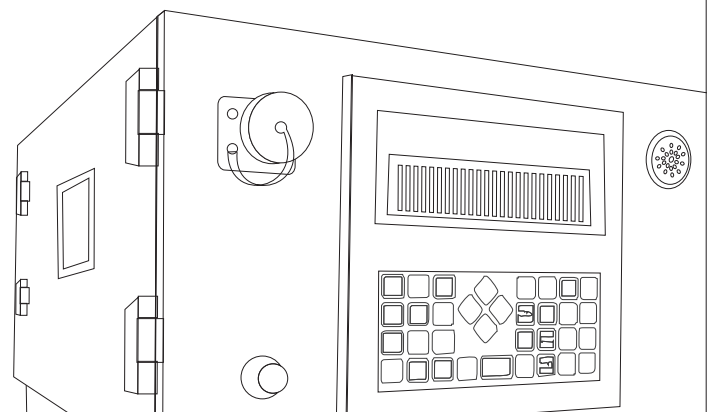
TRANSPORTABILITY

The military exchange is destined to be installed in harsh locations, to be carried on rough and bumpy terrains. It may be carried physically, in cars and trucks and also in aircrafts. All the handheld devices along with the unit level switch are easily portable and light weight. The accessories include transit-case and harnesses for the switch (main unit), LTB, FCBC, batteries and laptop. The light-weight switch, with all the accessories is ideal for carriage as man-pack equipment and for vehicular transport. An appropriate vehicle mounting arrangement is provided to mount the switch and FCBC which can be then mounted on the platform of wheeled vehicle.

MEX (ULSB MK III)

ETERNITY MEX carts handles which make movement easier. ETERNITY MEX is housed in a ruggedized transit case. The specially designed man-pack harness eases the mobility of the equipment in the field. All the housings are in camouflage to maintain the aspect of disguise for the equipment in the field. A vehicle mounting kit, well tested for vibration induced during transits is provided for the main switch.

MEX system assemblage is also capable of withstanding the vibrations and other dynamic duresses normally induced during transportation. The intelligent packaging of equipment plays a vital role in easing the commutation and prevents the system against vibrations, shock and duresses occurring during the commutation.

HANDSET AND HEADSET

Rugged handset and headset are provided with ETERNITY MEX to meet all the requirements of the armed forces. The retractable coiled cord and standard termination of the handset makes it the best end-point for communication in the field. Rugged and superior voice quality headset is provided with ETERNITY MEX for on-field communication to be clearer.

FCBC

The FCBC unit is the powering unit of the whole system, so protecting and moving the unit along with ETERNITY MEX is of the utmost importance. Handles, ruggedized transit case and man-pack harness are provided. A vehicle mounting kit, well tested for vibration induced during transits is provided for FCBC.

LTB

The LTB unit is critical for providing on-field connectivity with the other members. The protection of the unit is also thereby critical. A rugged transit case and harness protect the unit from external environment and make for easy transit. Dial holes are provided for vertical mounting on the side panel of the military vehicle.

Vehicle Mounting Kit (VMK/VIK)

The frequent movement of equipment's is a regular activity for armed forces due to changes in operation locations and regimes as per the changing tactics. The main switch unit and FCBC come with a vehicle mounting.
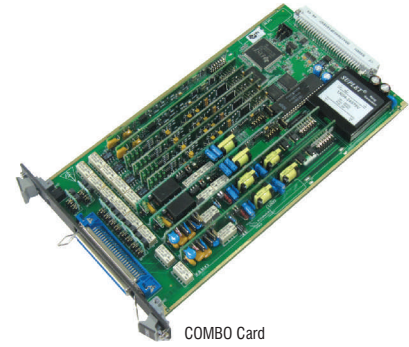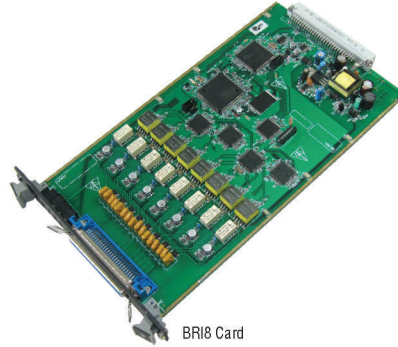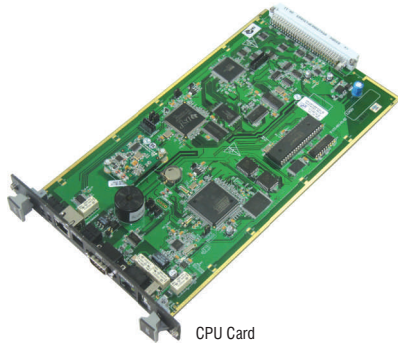
MEX PACKAGING

Man-Pack Harness

Transit-Case

INTERFACE CARD

CPU Card

BRI8 Card

COMBO Card

CPU	Digital PCM-TDM Technology
	High-Performance 32-bit RISC Processor
	100% Non-Blocking
	High-Density Digital 1024X1024 Switching
	Solid State Flash Memory (32 MB) with High Reliability and Longer Data Retention Time
	Redundancy
	Hot-Swappable
POWER SUPPLY	44V-48V DC (+20%) Operation
	Over Voltage and Current Protection
	Redundancy
	Hot-Swappable
COMBO	Common Card for SLT, Magneto, E&M, LD and CO (TWT) Interfaces
	6 Analog Subscriber Stations, 2 Magneto Phone Junctions, 2 Two-Wire Trunk (CO) Lines, 2 LD Ports and 2 E&M Ports
	Automatic Thermal Management
	Selectable Caller ID Presentation - DTMF, FSK
	Programmable AC Impedance - 600Ω, 900Ω and Various Complex Impedances
	Programmable Orientation Type for E&M - Trunk, Station, Tie-line
	Selectable E&M Interface Types - IV and V
	Selectable Speech Interface (Audio Interface) for E&M - Two-Wire and Four-Wire
	On-Board Secondary Protection
	Hot-Swappable
BRU8	8 BRI Ports/Card
	BRI U-Interface
	Connectivity for ISDN Devices via NT1
	Hot-Swappable
E1F0	E1/PRI Termination Card with 2 PRI Ports/Card
	Software Configurable for CAS, R2MFC, PRI and QSIG
	Full QSIG Feature Transparency as per ECMA, ETSI & ISO Standards
	E1/PRI over Copper or Optic Interface
	Direct Optical Interface for Monomode Fiber
	Fiber Interface up to 20 Km on Monomode OFC
	Hot-Swappable
DATA	4 Ethernet (10/100 Mbps) Ports
	Bifurcated E1 Stream can be Mapped to Any Ethernet Port
	Data Transfer and Control Applications
	Hot-Swappable

TECHNICAL SPECIFICATIONS

System Specifications

Type of Switching	PCM/TDM Digital Switching (100% Non-blocking)
Processor	32-bit RISC
Architecture	Distributed Processing

System Capacity and Resources

Total Port Capacity	184
Total Slots	12
Universal Slots	8
RS232C (COM) Port	1
USB Port	1

## Power Supply

Input	48VDC (+/- 20%) Operation
FCBC	Input: 150V to 300V AC Operation
	Battery Output: 48V DC, Battery Backup with Built-in Charging Circuit
	Auto Change - over from AC to DC

Mechanical

MEX Unit	Weight:19.460 Kg, Dimension (WxHxD):39.3 x 23 x 51.5 cm
FCBC	Weight:5.18 Kg, Dimension (WxHxD):39.7 x 6.8 x 31.4 cm
LTB	Weight:11.260 Kg, Dimension (WxHxD):47.2 x 10 x 37.6 cm

Compliances

EMI/EMC	As Per MIL-STD-461D
Environmental Standards	As Per JSS 55555 (L2B Table)
Literature	As Per JSS 0251-01
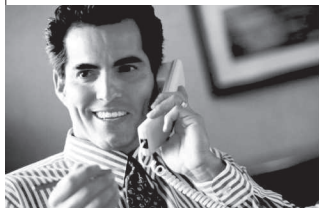
◼ ABOUT MATRIX

An ISO 9001 Company, Matrix is a leader in Telecom and Security solutions for modern businesses and enterprises. An innovative, technology driven and customer focused organization; the company is committed to keep pace with the revolutions in the telecom and security industries. With around 30% of its human resources dedicated to the development of new products, Matrix has launched cutting-edge telecom products like IP-PBX, Universal Gateways, VoIP Gateways and Terminals, GSM Gateways, Access Control and Time-Attendance Systems and Fire Alarm Systems. These solutions are feature-rich, reliable and conform to the international standards.Having global foot-prints in Asia, Europe, North America, South America and Africa through an extensive network of more than 500 channel partners, Matrix ensures that the products serve the needs of its customers faster and longer. Matrix has gained trust and admiration of more than 150,000 customers representing the entire spectrum of industries. Matrix has won many awards for its innovative products.

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TELECOM SOLUTIONS

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Due to continuous technology upgradations, product specifications are subject to change without notice.