



Patapsco's LIBERATOR® 'E'

Technical Specification

High reliability ISDN Converter, ISDN Splitter, Switch, and Concentrator

Supports 8, 16, 24 or 32 PRI/E1/T1 interfaces. Dual load-sharing PSUs. Ability to inter-link Liberator 'E' units to support additional PRI ports in a virtual non-blocking single switch.

Features

- Modular, resilient PRI ISDN switch, ISDN splitter, sharer or concentrator
- Non-blocking
- Full cross-connection between any/all 'B' channels
- Connects to ISDN networks and/or local ISDN devices
- Load-share hot-swappable AC/DC PSUs
- Advanced routing capabilities
- Number manipulation
- Shares ISDN access between multiple local devices
- High call rate
- Switch between devices for load-sharing or resiliency
- Least Cost Routing
- Dynamic re-directing of calls if destinations unavailable
- Local connectivity between any ports
- Ports NT/TE user switchable
- Optional PRI E1 to T1 conversion
- Supports A-Law to μ -Law for voice conversion
- Tones generated from network and/or by Liberator "E"
- Clocking hierarchy
- Inter-link Liberator "E"s for a larger cross-connect switch
- Remotely manageable and software upgradeable
- Many applications and uses



1. Overview

The Liberator models detailed within this document support up to 32 E1/T1/PRI interfaces via two card types, either 8-port or 16-port cards.

The PRI ports on the 8-port card can be user-switched between NT and TE and have Telecoms Approvals for direct connection to the ISDN network.

The PRI ports on the 16-port cards are NT only.

When mixing an 8-port and a 16-port card the 8-port is always in the lower position. See the Ordering Information PDF for details.

As standard Liberator 'E' can be user configured with either all E1 or all T1 PRI interfaces. Purchasing the optional E1 T1 conversion pack means both E1 and T1 can be supported on the same unit and this can be selected on a per-port basis.

The unit will connect any port to any port and any 'B' channel to any 'B' channel without constraint, giving full cross-connectivity between all ports, both local and network channels.

The intuitive DbLite GUI (supplied) enables fast and simple configuration.

All options can be set to tailor the use, connectivity, least cost routing and other advanced features to match the requirements. The platform supports many applications, some of which are covered in

Application Notes available on our web site www.patapsco.com.

If your requirement is not specifically identified here, or in the Application Notes, please contact Technical Support or Sales at Patapsco.

The flexibility and modularity of the Liberator means it can be put to many varied uses.

2. Operation

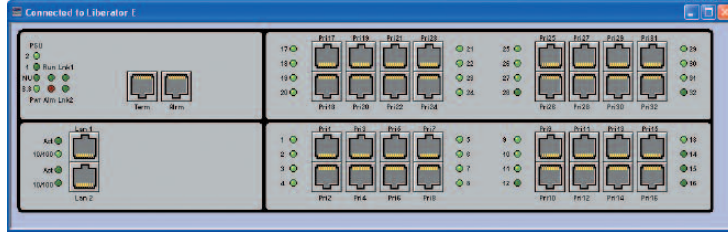
2.1 ISDN Services

Signalling is carried/converted between ports and ISDN types including when converting between ETSI and ANSI standards.

Supplementary Services from the network are passed transparently to local devices.

Enbloc and Overlap dialling are supported and Liberator can convert between the two.

Screen shot from DbManager showing the Liberator E to which the manager is connected. Optional Ethernet card fitted and shows LED status.



2.2 Routing

Liberator supports many routing options including the ability to configure Primary, Secondary and Tertiary destinations.

Call routing can be based on the incoming port and /or channel, DDI (DID) number, CLI, sub-address and/or Call Type (Bearer Capability).

CLIs can be locally generated.

Number Translation (see below) is standard on the Liberator "E" which means leading, trailing or digits in the middle of dialled number or CLIs can be modified, giving a great deal of flexibility.

It is extremely rare that Liberator cannot be configured to meet a customer requirement.

2.3 Configuration/Management

Liberator is configured and managed by Patapsco's DbManager - see separate Tech Sheets.

DbManager is an intuitive GUI which supports multiple real-time workstations and is the common platform for all Patapsco products.

Versions are available which can be configured for a single Liberator "E" or simultaneously manage/monitor many.

Configuration/management sessions can be established remotely via an ISDN call or locally through the unit's serial port or optional Ethernet port.

SNMP Traps & Alarms are optionally supported as is a call/ISDN signalling protocol analysis tool.

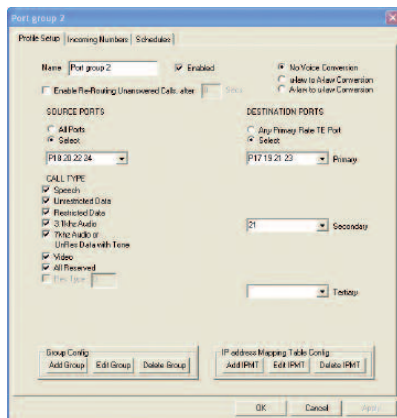
3. Ports and Inter-Connectivity

3.1 Ports, Channels and Groups

Liberator employs a simple system where PRIs or individual 'B' channels within one or more PRIs can be allocated to one or more customer named "Groups".

These Groups form the basis of all configurations, making it fast, simple and intuitive to your applications.

Example of a Routing Profile.



3.2 Cross-Connection

Any 'B' channel can be connected to any other within Liberator without constraints (unless some are programmed).

Any port can be barred from calling any other port or number. Any call can be routed to a Group of ports or 'hunt-group'.

Multiple devices can be configured to accept calls dialling to a range of numbers and the calls can be routed to a Group in a variety of ways (sequential, always the lowest available port etc).

Incoming calls can be automatically rerouted to alternate pre-programmed destinations if the main number is busy or unavailable, or after a set time of not being answered (1-20 seconds).

3.3 Call Rate

Liberator can maintain a constant call rate (in-coming or out-going) of 10 calls/sec with peaks of up to 20 calls/sec

3.4 Redirection on 'Busy' or 'Unavailable'

Incoming calls can be automatically rerouted to alternate pre-programmed numbers, Groups or ports if the main number or port is unavailable.

This gives the ability to automatically switch to backup or standby devices for resilience purposes.

Liberator supports alternative Secondary and Tertiary destination Routing Profiles.

If an out-going call to the ISDN network cannot be established (user or network busy, for example), Liberator can automatically redial via other network ports without the end user having to take any action. The same can be done for incoming calls switching between local devices.

3.5 E1 to T1 Conversion

Liberator can optionally convert between E1 and T1 PRIs.

Liberator supports the necessary A-Law to μ -Law encoding conversion necessary for voice traffic.

3.6 Number Translation or Conversion

Any incoming dialled number can be converted by Liberator and presented on any ISDN interface.

For example an incoming call to 12345 may be converted to 98765, perhaps because the original extension at 12345 has moved onto a VoIP gateway on a different ISDN PRI and now the user has a different DDI number.

Liberator can convert/add/delete leading digits, digits in the middle of numbers and/or trailing digits. It can also manipulate sub-addresses and CLIs.

All of this flexibility is not required by all, but if you should need it, it is easy to use and configure.

3.7 Tone Generation

Liberator normally passes the tones transparently between ISDN points but this is not always possible in all instances, such as some least-cost routing applications, if there is no network at all, or in certain other circumstances such as when Liberator cannot make a final routing decision until the number is dialled. In these instances, Liberator can be configured to generate dial, ring, busy, N/U tones itself.

3.8 CLI Generation

Liberator is able to generate a CLI field. The number of the CLI can be programmed for individual ports or calling numbers.

4 General

4.1 Clocking

Software-selectable clock source, extracting clock from any PRI port or a very high quality 0.15ppm Internal Clock.

Auto-switchover between clocks with no user impact. Auto recovery to higher priority clocks when they become available.

4.2 Real-Time Clock

Internal battery-backed realtime clock for Event Log time-stamps and debugging purposes.

4.3 Events

Up to 5000 Events are held within the Liberator in NV RAM on a FIFO basis. Events include all call information such as port dialling, number dialled, sub-address, time of call and time of call clear-down, time of incoming call and to which port and if there is a CLI attached, time of clear-down and which 'end' cleared.

Events can be reported automatically to the DbManager or other tools via an ISDN call, the local serial port or via the optional Ethernet.

This can be on a timed schedule or when the Event Log reaches 90%. Once Events are successfully reported to the DbManager the log is cleared. DbManager can also access the logs and download them when required.

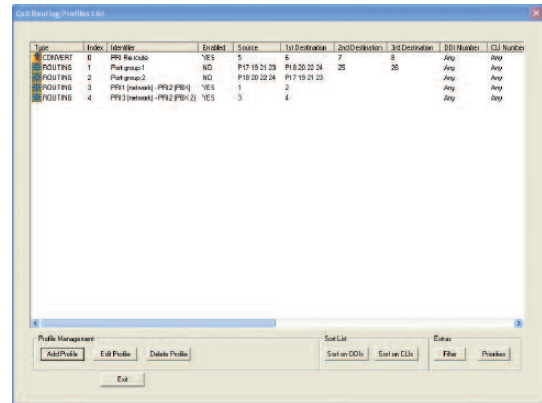
DbManager writes all Events and Alarms to a flat .csv file in real-time and this file can be manipulated by external tools to format and extract information, for example for billing.

4.4 Routing and Prioritisation Summary Windows

A choice of easy to understand summary windows display the routing configurations. These include a complete display of all routing profiles, their order of priority, names, numbers, ports etc. These windows are particularly useful in more complicated configurations with multiple network ISDNs, multiple local ports/devices and perhaps re-direction facilities.

4.5 Off-Line Routing Profile Configurator

For large configurations with many Routing Profiles, Patapsco supply an off-line Configurator that enables multiple routes to be loaded directly to the machine instead of adding Profiles individually.



DbManager showing a summary of all Call Routing Profiles.

4.6 Diagnostics

Liberator provides excellent diagnostic and debug tools with visibility of all routing decisions taken across the unit and all messages from attached devices.

Patapsco have a conversion program available that can convert raw ISDN Layer 2 and 3 messages into more comprehensible English.

4.7 Approvals

The Liberator "E" benefits from a wide range of Safety and Emissions approvals and the 8-port card also has Telecoms Approvals for direct connection to the ISDN PSTN. Section 5.7.

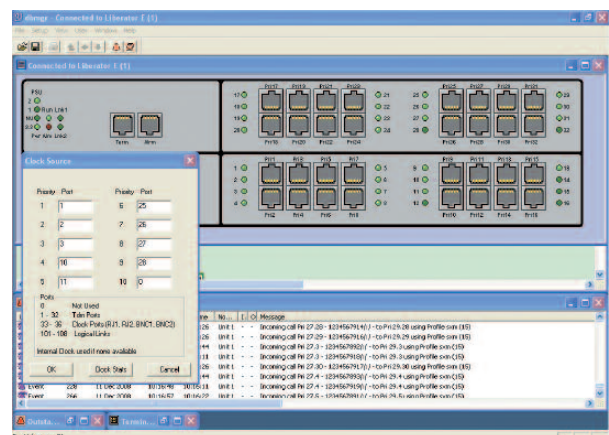
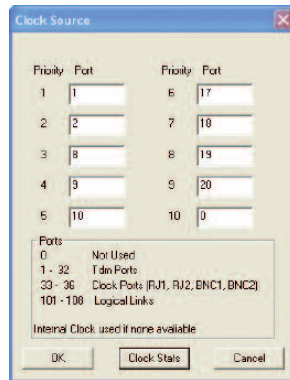
All Patapsco equipment is RoHS compliant without having to resort to the use of temporary "Exemptions".

4.8 Configuration

Held in non-volatile RAM (retained during power off) and downloadable to/from the DbManager. Configuration files can be saved to a file on a PC.

4.9 Software

New versions of software can be remotely uploaded to Liberator via the DbManager. This is loaded to an off-line sector of FLASH and a confirmation check-sum given. The operator can switch software banks at any time and revert to the original software at any time. If the Liberator is unable to run from the new software, it will revert to the original.



5. Specification

5.1 Interfaces

• 5.1.1 PRI/E1/T1

16-port NT-only card and 8-port selectable NT/TE.
 16-port cards marked as Ports 1 to 16 and Ports 17 to 32.
 8-port cards marked as ports 1 to 8 and 17 to 24.
 When mixing 8 and 16 port cards ports 9-16 will not exist.
 By default all ports are NT – a crossed cable is required to connect TE ports on the 8-port card

E1

RJ45 120Ohm balanced (E1)
 Auto-detect CRC4 or non-CRC4 framing (Multiframe or Doubleframe)
 Support of non-switched E1 and Fractional E1 services
 ISDN PRI ETSI Q.931/921, ETSI-DSS1, ETSI 300-011, ETSI300-125, ETSI 300-102, approved to TBR4
 A-law and μ -law tones

T1

RJ45 100Ohm balanced T1
 ESF or D4 Framing selectable
 B8ZS or AMI line code selectable
 NI-2, DMS-100, AT&T 5ESS Switch selectable
 AT&T TR-62411 and ANSI T1.403 Compliant
 Hong Kong variant available
 A-law and μ -law tones

• 5.1.2 Control Ports

RJ11 Marked 'Cmd'
 Asynchronous 8 data, 1 stop bit no parity 19.2kbps to 115kbps
 Password protected
 Dry contact alarm relay
 Optional Ethernet RJ45 Marked 10baseT/100baseT/1GE
 Password protected

5.2 LEDs

Each PRI has 1 associated LEDs
 Fl slowly=synchronising to Layer 1; fl quickly = synchronising Layer 2; solid= synchronised
 PWR x 1
 Unlit=no power; Green=power on unit
 Run x 1
 Slow flash=microprocessor OK and configured; fast flash=internal error or lost base configuration
 LAN ACT x 1
 Activity on the LAN
 LAN 100 x 1
 Off=LAN running at 10baseT; on=LAN running at 100baseT

5.3 Power

Support for 1 or 2 supplies
 Hot swappable to ATCA.
 One supply can power a fully populated chassis.

AC

Auto-sensing 96VAC – 240VAC
 Max consumption 0.5A RMS @230VAC

DC

4mm terminal Block
 36VDC tp 57VDC
 1.2A max

5.4 Environment

Operating 0 – 55 °C
 Humidity 10-90% non-condensing
 Natural convection cooling

5.5 Physical

Metal chassis and front/rear panels
 W – 225; D – 320 (300 from mounting); H-88mm
 Weight – 10.5Kg max
 Operating temperature -20°C to +55°C radiated cooling
 Humidity 10-90% non-condensing
 Optional cooling fans for higher temperature environments

5.6 Maintenance

There are no serviceable parts or maintenance required.
 The battery used for the real-time clock and some NV RAM elements has a 7 year (typical) life-time.

5.7 Approvals

All approvals completed in UK
 Accredited laboratory - reports available

Telecomms

TBR12/TBR13
 TBR4:1995, 1997 Amendment
 TIA/E1A-IS/968
 TNA117
 AS-ACIF-S006/S016
 CS-03 Canada
 TIA-968-A USA

EMC

EN55022:1998
 EN55024:1998
 A12001
 EN61000-3-2/3:1995
 AS/NZS CISPR22:2000

Safety

IEC60950-1:2007
 ACS/NZS60950:2000
 AS/NZS3260:1993
 ACA TS001:1997



All details subject to change without notification E&OE

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