

E1UC-4

Quad Stream E1 Switch/Groomer

INSTALLATION AND OPERATION

Applicable Products

*E1UC-4 Quad Stream E1
Switch/Groomer/recorder/replayer*

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E1UC-4 Quad Stream E1 Switch/Groomer



E1UC-4 *Quad Stream E1 Switch/Groomer*

REVISION HISTORY

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1	6 Oct 2011	Initial Issue

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1. INTRODUCTION

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What's in this User Guide

This User Guide covers SomerData's **E1UC** Quad Stream Portable combination Switch/Groomer/Recorder/Replayer for E1 bitstreams.

*Section 2 – **PRODUCT DESCRIPTION*** gives an overview of your unit's capabilities and features.

*Section 3 – **INPUT/OUTPUT CONNECTIONS*** provides details of connectors and cabling.

*Section 4 – **CONTROLS AND INDICATORS*** provides details of status indicators and switches.

*Section 5 – **OPERATION*** describes connection, switch and indicator functions, signal input / output paths and diagnostics.

*Section 7 – **SPECIFICATIONS*** describes the unit's technical parameters.

*Section 8 – **SUPPORT*** describes the procedure and contact details for obtaining customer support on this product.

*Section 9 – **WARRANTY*** your rights and obligations in support of this product.

*Section 10 – **NOTICES*** statutory documentation and certificates.

*Section 11 – **INDEX***

User Guide Availability

Printed copies of Hardware and Software User Guides are supplied with the original products on request.

E1UC-4 *Quad Stream E1 Switch/Groomer*

Additional printed copies, including the Programmer's Reference Guide can be supplied on request. Please contact your local supplier or SomerData for ordering details.

Electronic copies (Adobe Acrobat files) are included on the SomerData electronic delivery medium that is supplied with the original products.

The User Guide library, which also includes product data sheets, can be accessed by browsing the `\Documents\` folder for the required document.

Additional and updated copies are available through our website. or can be supplied on request. Please contact your local supplier or SomerData for ordering details.

E1UC-4 Quad Stream E1 Switch/Groomer

2. PRODUCT DESCRIPTION

In this Section

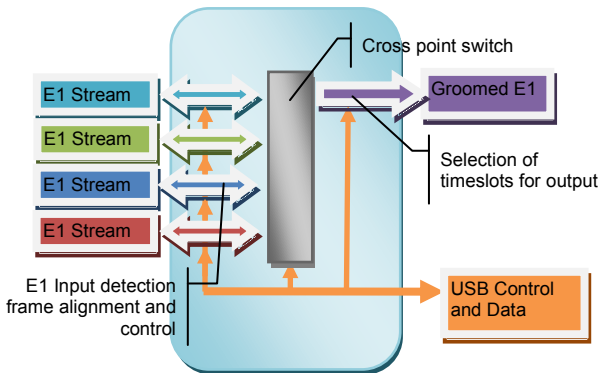
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Introduction

The E1UC-4 quadstream switch/groomer is a composite device capable of fully switching 4 pairs of E1/PRI signals, selecting timeslots to a dedicated groomed output, recording data in a time indexed file, replaying data as a test or reconstituted data source.

The unit is USB powered with an alternative DC powered source for use when a pc is not available. All settings are stored in non-volatile memory and are automatically applied on power resumption.

Block diagram



3. INPUT/OUTPUT CONNECTIONS

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Introduction

Data Input and Output connections are via RJ-48C type 8-way connectors on the unit's Data I/O panel.

Power, USB 2.0 control and E1 groomed data output connectors are on the unit's Control I/O panel.

Electro-magnetic Compatibility.

Note that fully screened cables should be used to maintain the unit's EMC and provide maximum resistance to data errors caused by external EM fields.

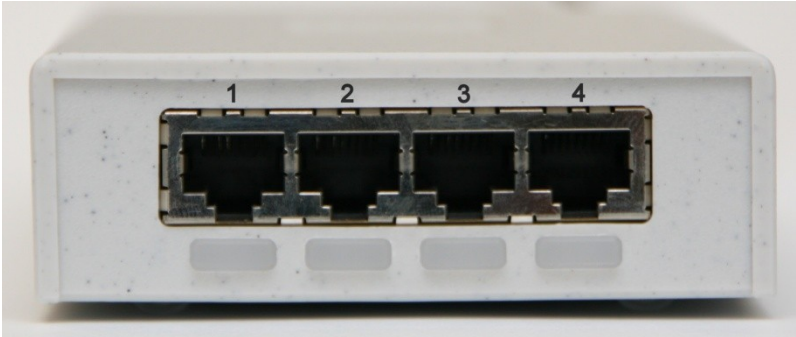
Cable screens should be connected to provide continuity to the unit's screened input/output terminals.

Cables should conform to E1 (G.703) specifications. Unscreened Twisted Pair (UTP) Ethernet cables eg Cat5 are NOT suitable.

E1UC-4 Quad Stream E1 Switch/Groomer

Data Connectors

Data Input/Output Panel



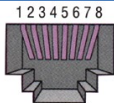
E1UC provides four RJ48 connectors for symmetrical 120 ohm E1 streams.

External E1 Baluns should be used if 75 ohm coaxial connections are required.

Data Connections Pin-out

Pin	Function	Comments
-----	----------	----------

RJ-45



1	RRING	E1UC Input
2	RTIP	E1UC Input
3	TX Ground	
4	TRING	E1UC Output
5	TTIP	E1UC Output
6	RX Ground	
7	Not used	
8	Not used	

E1UC-4 Quad Stream E1 Switch/Groomer

Signal specification

The signal Interface supports HDB3 encoded 2,048 Kbits/s signals in accordance with ITU-T Recommendation G.703.

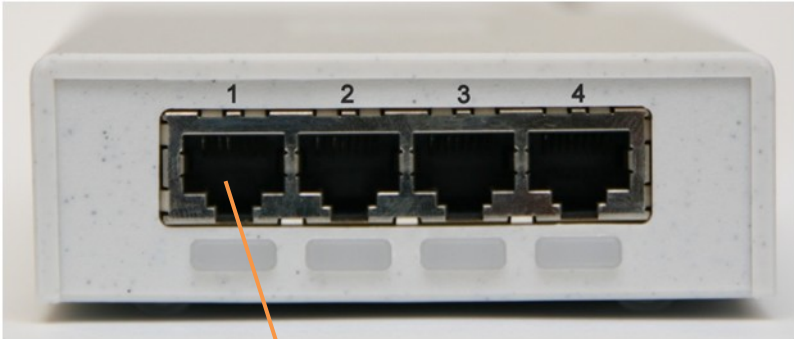
G.703 recommendation

Pulse shape (nominally rectangular)	All marks of a valid signal must conform to the mask irrespective of the sign. The value V corresponds to the nominal peak value.	
Pair in each direction	One coaxial pair	One symmetrical pair
Load impedance	75 Ohms	120 Ohms
Nominal peak voltage of a mark (pulse)	2.37V	3V
Peak voltage of a space (no pulse)	$0 \pm 0.237V$	$0 \pm 0.3V$
Nominal pulse width	244ns	
Ratio of the amplitudes of positive and negative at the centre of the pulse interval	0.95 to 1.05	
Ratio of the widths of positive and negative pulses at the normal pulse amplitude	0.95 to 1.05	

E1UC-4 Quad Stream E1 Switch/Groomer

Timing and Synchronization

E1UC presumes that data for all streams are synchronous to each other, that is to say, that they are all running on the same clock source.



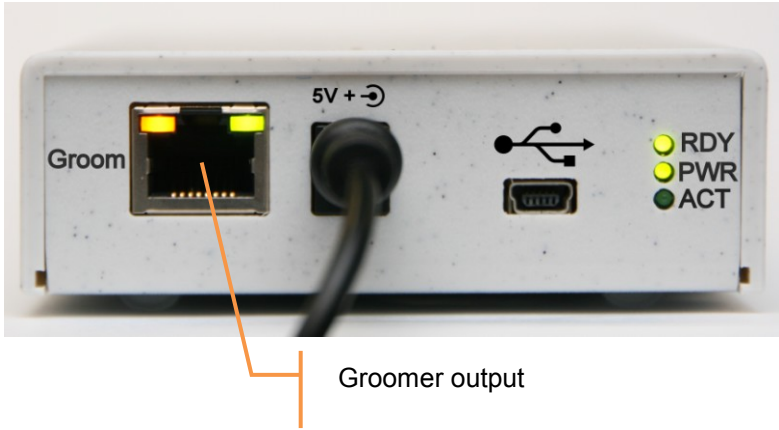
Master input

Input 1 is considered to be the Master input. If a stream that is from a different clock domain is plugged into another stream, the data integrity of that stream will be compromised. Padding frames may be inserted in the case that the rate of this stream is lower than that of the master input. If this stream's rate is higher than the master stream, whole frames may be discarded.

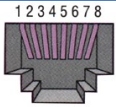
If only one stream is to be used, this should be connected to Input 1.

E1UC-4 Quad Stream E1 Switch/Groomer

Groomer output RJ45 connector



Pin-out

Pin	Function	Comments
RJ-45		
1	RRING	Groom Input (for testing only)
2	RTIP	Groom Input (for testing only)
3	TX Ground	
4	TRING	Groom Output
5	TTIP	Groom Output
6	RX Ground	
7	Not used	
8	Not used	

E1UC-4 Quad Stream E1 Switch/Groomer

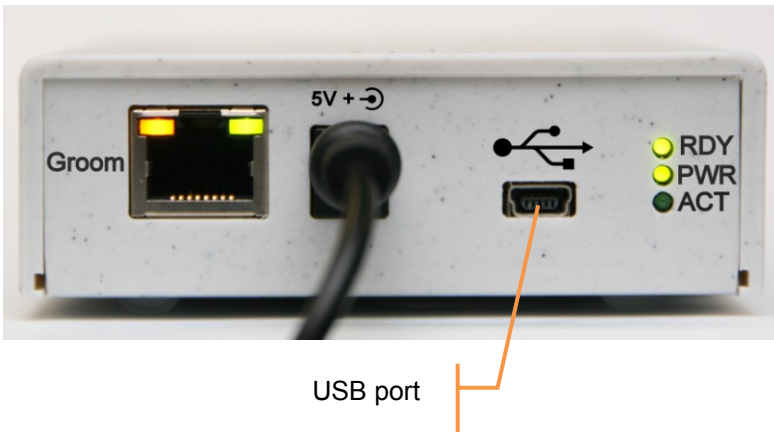
Input Impedance

Input impedance is selectable under software control. Select 120 Ohm for direct connection to a line, High Impedance for connection through a tap or to a Protected Impedance Point.

Note that with no power applied, the unit defaults to High Impedance.

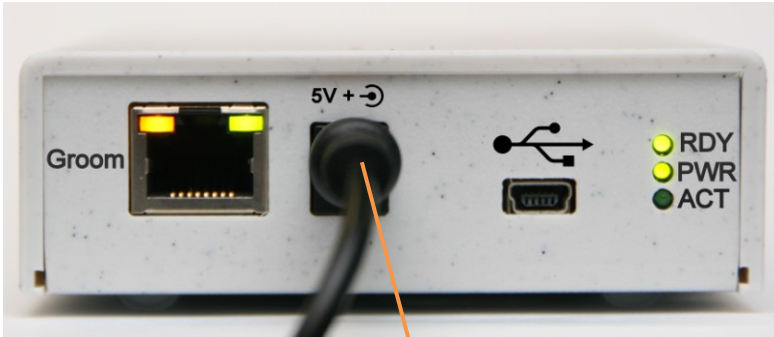
USB connector

A USB 2.0 High-speed (480Mbps) port with mini USB connector is used for Control, status and data transfer.



E1UC-4 Quad Stream E1 Switch/Groomer

Power supply



5V DC, 500mA
minimum

An external 5VDC power supply can be used to power E1UC if not connected to a USB port or if the USB port cannot supply power to E1UC.

The connection is a 2.1mm centre positive jack.

The recommended power supply rating is 1A, minimum rating 500mA.

Absolute min voltage: 4.5 volts

Absolute maximum voltage: 6 volts

4. CONTROLS AND INDICATORS

In this Section

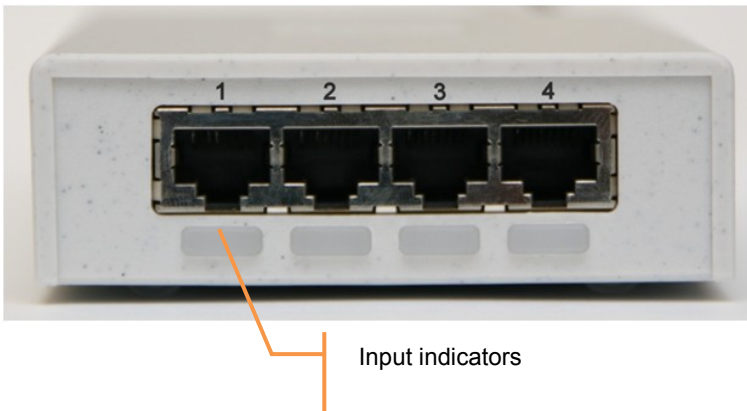
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Introduction

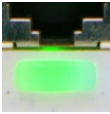
Front panel LED indicators provide status display of power. Each input is checked for loss of signal, data all ones, and G.704 Frame alignment word detection. Each stream can be frame aligned to the G.704 framing sequence. Each frame is then sent to the internal switch matrix for routing and/or transmission over USB.

Each output can be individually disabled (tri-stated), output data directly from the input (bypass mode), output data from the switch matrix or output data from the USB data interface.

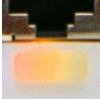
Indicators - Data I/O Panel



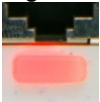
E1UC-4 Quad Stream E1 Switch/Groomer



Green means signal detected and frame aligned to G.704 Frame alignment signal



Orange means a signal is present but no frame alignment sequence has been detected



Red means Loss of signal

Indicators Groomer output

On means
loss of input
signal



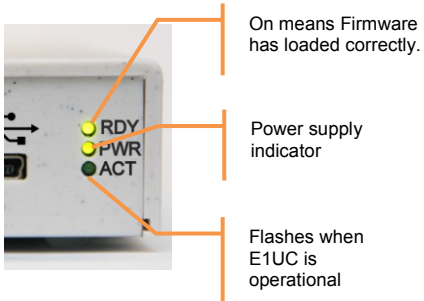
On means
groomed
output is
active

Green indicator: Groomed output enabled

Amber indicator: Loss of signal on Groom connector input

E1UC-4 Quad Stream E1 Switch/Groomer

System Status indicators



Rdy: on means firmware loaded and valid.

Pwr: on means power has been applied to the system.

Act: flashing means E1UC is active.

5. OPERATION

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Applications for E1UC

This section shows applications for E1UC. These are not comprehensive, but indicate the range of operations available. For detailed use, refer to the Application help screens and the individual Application documentation.

Groomer

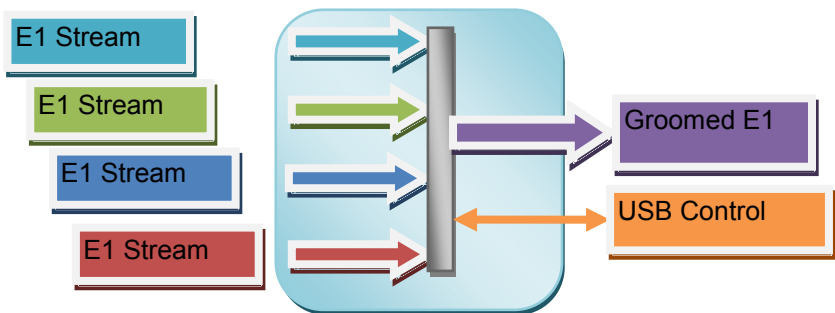


Figure 1 groomer functional diagram

The role of E1UC as a groomer is to populate the timeslots of the groomed E1 output with timeslots from the input E1 streams. The frame alignment timeslot (TS0) can only be sourced from frame alignment timeslots. Data timeslots (TS1 to TS31) can only be sourced from input data timeslots.

E1UC-4 Quad Stream E1 Switch/Groomer

The groomed output takes its clock from the master input.

The groomer is set-up using software command. These commands are stored in non-volatile memory so the configuration will be restored on power up.

Use the groomer software to set up E1UC as a groomer.

Switching or routing

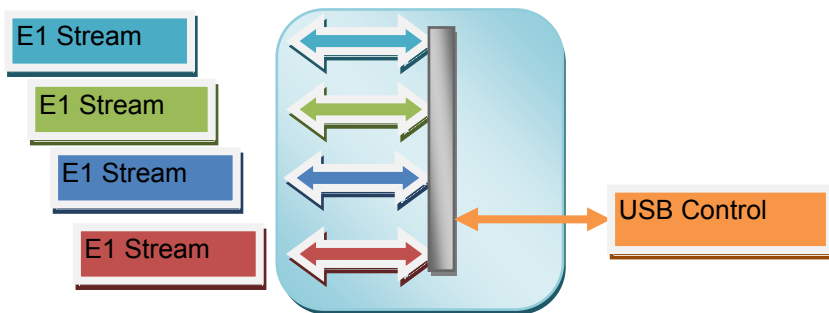


Figure 2: routing

inputs E1 streams to any of the output E1 streams.

Each output stream can only take one input source, but an input can be sent to any or all outputs.

Routing and replaying data are incompatible modes of operation, so settings applied by the routing software will override replay commands.

The router is set up using software commands. These commands are stored in non-volatile memory so the configuration will be restored on power up.

Use the router software to set up E1UC as a router/switch.

Recording data

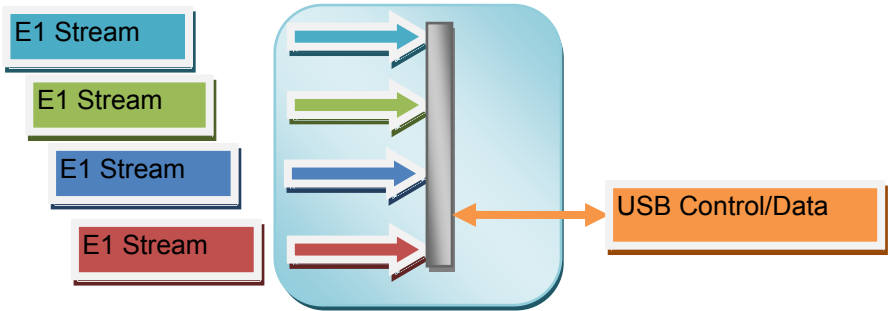


Figure 3: recording data

USB interface.

Software is used to set up the streams to be received over USB, set up the data transfer, manage the transfer of data while it is being received and close the connection at the end of the transfer.

The recorder software is used for this task.

Replaying data

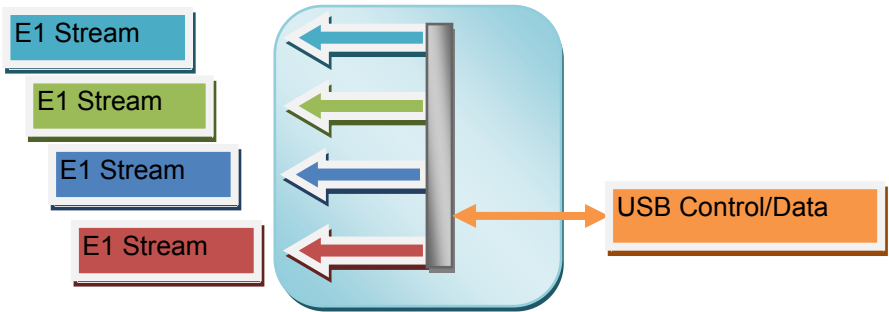


Figure 4: replaying data

Replaying data over the USB Interface.

Routing and replaying data are incompatible modes of operation, so settings applied by the replay software will overwrite routing commands.

Software is used to set up the output streams, set up the data transfer, manage the transfer of data while it is being sent to E1UC and close the connection at the end of the transfer.

The replayer software is used for this task.

6. APPLICATION PROGRAMMING INTERFACE

All of E1UC's functions are available in a simple API for easy OEM integration. See the API's programmer's reference guide for more information.

7. SPECIFICATIONS

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Introduction

E1UC-4 is a portable low powered device housed in a lightweight high impact plastic enclosure.

The following paragraphs describe the E1UC specifications provided here for reference. Please note that specifications shown here may differ from data sheet specifications.

E1UC-4 Quad Stream E1 Switch/Groomer

Physical

Case

High impact 'Granito' plastic case

Dimensions

Length 170 mm x Width 90 mm x Height 30 mm

Weight

240g

Environmental

Temperature (Operating)

0°C to 50°C

Temperature (Storage)

-20°C to +85°C

Note: In common with all electronic equipment, allow suitable stabilisation time when moving from extreme storage to operating conditions before powering on the unit, especially where condensation might be expected to form. DO NOT operate the unit if condensation is present.

Relative Humidity (Operating)

5% to 95% non-condensing

Power

Supply

External/USB

5V DC at 380mA

Connector

2.1mm circular, Centre positive

Consumption

1.9W

4 port Signal Interface

G.703, 2,048 kbits/s * 4

Signal Characteristics

Pulse shape: :As ITU-T G.703 pulse mask
Line code: HDB3
Data type: G.704 framed or unframed
Input sensitivity:-13.6dB
Nominal amplitude: :±3.00 V, 120 Ω interface
Loss of Input Signal Threshold::300 mV
Data Decision Threshold:43% to 57% peak
Input Pulse Width: 230 ns to 260 ns
Output Pulse Width: 244 ±20 ns (at mid level)

Input / Output Impedance

120 Ω/75 Ω balanced
selectable high-impedance input (40 kΩ)

Input / Output Jitter Attenuation

45 dB at 40 kHz (typical)
20 dB / decade attenuation above the 10 kHz corner
frequency

Jitter attenuation is applied to the input signal for input data transfers and to the output signal when the input signal is used as an external clock reference for output data transfers.

Input jitter tolerance

1200 UI at 10 kHz
14 UI at 750 Hz
0.4 UI at 10 kHz – 100 kHz

E1UC-4 Quad Stream E1 Switch/Groomer

Output Pulse-to-Pulse Jitter

- <100ns using internal clock
- <32ns using clock recovered from an external E1/HDB3 signal

Signal Input / Output Connectors

- Data Input/Output
- Four RJ-48 C connectors (Input/Output)
- Grooming:
- One RJ-48C connector (Output only)

USB Interface Compatibility

- USB 2.0.(Full speed)
- USB connector type: Mini B

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8. SUPPORT

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What to do if you have a problem

Firstly, please ensure that you have followed the installation, connection and operation instructions in the appropriate User Guide.

Also, check the Troubleshooting section (where appropriate) to eliminate common problems.

Servicing, Maintenance and Repairs

Please contact your supplier or SomerData for all questions relating to maintenance and repairs.

Any unauthorised attempt to open, modify or otherwise repair the product will invalidate the SomerData warranty and may result in the product being left in an irreparable condition.

If you need Support

For warranty, technical and application support issues, you should initially contact your supplier to check whether your SomerData product is covered by warranty, extended warranty or maintenance contract.

At SomerData, we will make our best efforts to provide prompt and friendly support by phone, fax and e-mail.

Diagnosing a problem will require your co-operation and we expect you to provide a detailed description of the problem in the form of a detailed Fault Report.

Support Requests

When contacting SomerData for support, please provide as much information as possible about the problem or issue for which you require assistance.

We will be able to deal with your request more efficiently if you provide the following details (where available) in your Fault Report:

- Part Number or Model Number
(for example E1UC-4)
- Serial Number (for example 2010/01/001)
- Software Version (for example 2.0)
- Details of any symptoms or error messages
- Diagnostics information (if available)
- Sequence of events/actions or other circumstances that triggered the problem
- How you are able to identify that there is a problem
- How you have been able to measure, log or otherwise display the problem
- Details of the host PC (if appropriate) including: operating system; hardware configuration; other hardware devices (e.g. additional PCI cards); other software applications (e.g. analysis or processing programs) that are running at the same time
- Sample data files (if appropriate)

When we acknowledge your support request, you will be given a *Support Tracking Number* (STN), which should be quoted in all further correspondence relating to that specific support request.

Returns

Please do not return any products to SomerData without first contacting SomerData and obtaining a Return Merchandise Authorisation (RMA) Number. Goods returned without a RMA will be subject to a handling charge and returned unopened.

This will ensure that the processing of any repair or upgrade is handled efficiently and in accordance with any agreed action.

If the SomerData product is under warranty, repairs are free-of charge. If not, there will be a repair charge, which will comprise an initial evaluation fee and quotation, followed by repair and parts (if authority is given to carry-out the repair).

Pack the item in its original packaging. If the original packaging is not available, it must be packed in such a way to avoid transit damage. Damage sustained in transit is not covered under warranty.

Returned goods should be accompanied by documentation that indicates the RMA Number along with a detailed fault report and contact details (name, organisation, phone, fax and e-mail).

Mark the RMA Number on the outside of the package.

Ship the item by insured, prepaid carrier to the above address.

Items being returned from outside the European Community must be accompanied by a Commercial Invoice. This should include a description of the goods, value for Customs Purposes and state that the goods are being temporarily returned to the UK for repair. SomerData will not accept liability for UK importation costs resulting from inadequate documentation.

SomerData Contact Information

Address: Somerdata Limited
1 Riverside Business Park
Bristol
BS4 4ED
England

Phone: UK 01179-634050
International +44 1179-634050

Fax: UK 01173-302929
International +44 1173-302929

E-Mail: support@somerdata.com

Website: www.somerdata.com

End-of-Life Disposal

Your SomerData product may be returned to SomerData at the end of its life provided that the product is free from radiation or biological contaminants and that no other legislation forbids the return. The end user is responsible for all shipping costs and the Returns procedure should be followed.

Waste Electrical & Electronic Equipment (WEEE)

In the UK, Somerdata products may be recycled free of charge at any local authority recycling centre as long as the SomerData logo appears on the product and the following WEEE producer registration number is quoted: WEE/HA0074UR/PRO.



9. WARRANTY

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Introduction

This section describes SomerData's Warranty Terms and Conditions.

Where the SomerData product has been supplied via an authorised Reseller, the Warranty and Support is between SomerData and its Reseller. Local Warranty and Support arrangements should be agreed between the Reseller and the Customer.

The following information is subject to change without notice.

Warranty: Terms and Conditions

SomerData warrants all goods supplied by it to be free from defects in material and workmanship, under normal use, care, storage and service, for a maximum period of twelve months from the date of delivery (per Incoterms 2000) by SomerData.

This warranty is limited to the repair or replacement, as SomerData may elect and at an establishment authorised by it, of such items as shall appear to SomerData, upon inspection to have been defective in material or workmanship.

All decisions relating to the validity and processing of Warranty claims shall be at the sole discretion of SomerData.

This warranty does not apply to normal maintenance service or to normal replacement of service goods.

Any claim under this warranty shall expire unless made in writing immediately after the appearance of a claimed defect.

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This warranty excludes damage from incorrect installation, unauthorised modification, negligence, misuse or abuse or any item of equipment which has been serviced or worked on by anyone other than SomerData or its authorised representative.

SomerData will repair or replace, at its option, any product purchased from SomerData which, under normal conditions of use and service, proves to be defective in material or workmanship.

No charge will be made for labour or parts with respect to defects covered by this warranty, provided that the work is done by SomerData.

This warranty does not cover expenses incurred in the removal or reinstallation of any SomerData products, whether or not proven defective

Replacement or repairs furnished under this warranty are subject to the same terms and conditions of the original warranty.

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General Information

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Somerdata and the Environment

SomerData is committed to design and introduce products that conform to applicable environmental legislation and standards.

E1UC-4 Quad Stream E1 Switch/Groomer

One of our missions is to integrate environmental stewardship into the business of providing quality products, services, and customer support at the best value.

In order to achieve this, SomerData has established a strategic team to focus on the importance of meeting our environmental obligations in the design, manufacture and support of our products.

We have developed a broad appreciation of the impact of these directives on our entire business model, from technical processes for materials, to finished goods manufacturing.

Current Compliance Activities

The Company's current environmental compliance commitment has been structured to meet the following European Union directives:

- Restriction of use of Hazardous Substances or RoHS Compliance (EU Directive 2002/95/EC)
- Waste Electrical & Electronic Equipment or WEEE Compliance (EU Directive 2002/96/EC)

Our goal is to meet or exceed compliance obligations of these EU directives.

Restriction of use of Hazardous Substances (RoHS)

Somerdata has also established a RoHS qualification process to help ensure that products meet stringent reliability and quality requirements, as well as regulatory compliance requirements.

The maximum allowable hazardous substance at a homogeneous material level under the EU RoHS Directive is shown in the following table.

From 1st July 2006 all SomerData manufactured products used lead-free soldering

E1UC-4 Quad Stream E1 Switch/Groomer

Substances	Maximum Concentration Values (ppm)
Lead and its compounds	1000
Mercury and its compounds	1000
Hexavalent Chromium (Cr+6)	1000
Cadmium and its compounds	100
PolyBrominated Biphenyls (PBBs)	1000
PolyBrominated Diphenyl Ethers (PBDEs)	1000

AOS-OC3-124 *Quad Active Optical Splitter*

Declaration of Conformity

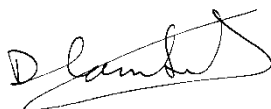
Name of Manufacturer: Somerdata Ltd.
Address of Manufacturer: Somerdata Ltd
1 Riverside Business Park
Bristol
BS4 4ED
United Kingdom
Equipment description: Quad stream Communications
Switch
Model: E1UC-4

Conforms to the following Product Specifications:

Safety: IEC 950

EMC: 89/336/EEC EN55022 Harmonised Standard

The product complies with the requirements of the Electromagnetic Compatibility Directive 89/336/EEC as amended and the Low Voltage Directive 73/23/EEC and carries the CE marking accordingly.



Signed:
Position: Technical Director
Date: 19th October 2011

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