Septel Product Range

Septel PCI
User Manual

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Revision History

ISSUE	DATE	BY	CHANGES
A	20-Jul-00	SPM	Initial release of User Manual to accompany pre-production evaluation boards.
B	01-Mar-01	SPM	Added details of switch and link settings
1	26-Jul-01	SPM	Added appendices on safety and EMC

IMPORTANT INFORMATION

The information in this manual is supplied without warranty as to its accuracy. DataKinetics Ltd is not responsible or liable for any loss or damage of whatever kind arising from the use of the Septel PCI and its documentation.

Document reference U04HSP

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1. Introduction

1.1 Overview

Septel PCI is an intelligent multi-port signalling interface card for use in a telecommunications environment. Embedded software support for many signalling systems is available including the entire Signalling System Number 7 (SS7) protocol stack from DataKinetics.

The card supports up to four primary rate telecommunications interfaces, each can individually be configured at run-time under software control to operate as an E1, T1 or J1 interface.

The on-board H.100 Computer Telephony (CT) Bus interface and digital switch allows timeslots to be routed between the E1/T1/J1 interfaces, the H.100 CT Bus* and the on-board signalling processors. This allows bearer (voice) circuits to be routed to other resource cards and permits flexible routing of signalling timeslots through the system.

A signalling processor provides support for multiple HDLC based signalling channels including up to 4 SS7 signalling links. The signalling links may be presented either as a timeslot on an external PCM interface, as a timeslot on the CT Bus or as a synchronous V.11 (V.35 compatible) serial interface. Signalling links can all operate at 64kbit/s, 56kbit/s or 48kbit/s.

Software downloaded to the card at run-time implements the signalling protocol and provides a message based interface to the user's application software running on the host computer. Software for several signalling systems is available including the following SS7 protocols: MTP, ISUP, TUP, NUP, SCCP, TCAP, MAP, IS41 and INAP.

Software drivers for the Septel PCI card are available for many host operating systems including WindowsNT*, Windows2000*, Linux* and Solaris*.

This manual details the specification of the Septel PCI card and describes the physical properties, the installation procedure and how to interface to the card. For details of software operation the user should refer to the appropriate Programmer's Manual.

1.2 Hardware Overview

The Septel PCI card is a full length PCI card with a 33Mhz 32 bit PCI interface.

The Septel PCI card has an H.100 CT Bus interface, which is used to provide connectivity to other H.100 CT Bus compatible cards, such as voice processing and fax cards or further Septel PCI cards.

The H.100 CT Bus supports 4096 channels (or timeslots) and the associated clock and framing signals. The Septel PCI card is capable of generating the CT Bus clocks or can act as a slave. CT Bus channels may be used individually or grouped to provide a higher bandwidth data path. The signals are carried between cards in a chassis using an H.100 CT Bus ribbon cable.

1.3 System Requirements

To use the Septel PCI signalling card, the host computer must meet the following minimum specification:

a) This signalling card is for use only with UL* listed computers that have installation instructions detailing user installation of card cage accessories.

b) Rev. 2.1 PCI compliant computer system.

c) One free 33MHz 32 bit PCI expansion slot.

1.4 Related Documentation

For further information on the use of the card, refer to the DataKinetics SS7 Programmer's Manual for Septel cP/PCI

For further information on the H.100 bus, refer to the ECTF H.100 Hardware Compatibility Specification: CT Bus. This document may be obtained from the ECTF web site: http://www.ectf.org.

For further information on the PCI bus, refer to the PCI local bus specification Rev. 2.1. This document may be obtained from the PCIsig: http://www.pcisig.com.

For further information on DataKinetics products and services refer to the DataKinetics web site: http://www.datakinetics.co.uk.

2. Specifications

2.1 PCM Interface

Ports:	2 or 4
Data rate:	2048 kbit/s (E1) or 1544 kbit/s (T1/J1) software selectable for each individual port
Connector:	RJ45
Pulse shape:	ITU-T G.703, AT&T TR62411
Frame format:	E1, E1-CRC4, D4, ESF
Line code:	HDB3, AMI (ZCS), AMI, B8ZS

2.2 PCM Highway

Bus type:	H.100 CT Bus
Clock rate:	8192 kHz
Connector:	Edge connector
Clocking:	Master or Slave

2.3 Serial Ports

Connector:	26 pin High density D-type female shared between both ports
Electrical:	V.11 (V.35 compatible)
Signals:	Tx Clock, Rx Clock, Tx Data, Rx Data
Data Rate:	48kbit/s, 56 kbit/s, 64 kbit/s or external

2.4 Signalling Interface

Source:	PCM interface, H.100 or serial interface
Data Rate:	48kbit/s, 56 kbit/s, 64 kbit/s
Timeslot:	Fully programmable

2.5 Processor System

Processor:	MPC860
Clock rate:	50MHz
RAM:	32 Mbyte Synchronous DRAM
Bus interface:	33 MHz 32 bit PCI Rev. 2.1

2.6 Physical

Height:	106mm
Length:	341mm
Width:	Single slot PCI card
Weight:	190g

2.7 Environmental

Operating temperature:	0°C to +55°C
Storage temperature:	-40°C to +70°C
Humidity:	0 to 95% non-condensing
Altitude:	0 to 3,500m

2.8 Power requirements

+5V:	1.5A Typical, 2A Maximum

2.9 Reliability

MTBF:	39,000 hours MIL-HDBK 217F Notice 2 Ground Benign @ 25°C

2.10 Regulatory Approvals

Safety:	EN 60950: 2000 UL 60950 Third Edition IEC 60950: 1999
EMC:	ETSI EN 300 386: 2000 EN 55022: 1998 EN 55024: 1998 EN 61000-3-2: 1995 EN 61000-3-3: 1995 FCC Part 15, subpart B, class A AS/NZS 3548: 1995

3. Hardware Installation

3.1 Warnings

Refer to Appendix A: Safety and Appendix B: Electromagnetic Compatibility before commencing installation.

The Septel PCI card contains Electrostatic Sensitive Devices (ESDs), which may be permanently damaged if incorrectly handled. If modules are removed from the chassis they must be handled in accordance with appropriate anti-static handling procedures. Refer to: *EN100-015 Part 1 Basic Specifications: Protection of Electrostatic Sensitive Devices: Part 1 General Requirements* for further details.

3.2 Unpacking

The Septel PCI card is supplied in anti-static packaging and should always be stored in its anti-static bag when not installed in a computer. Inspect the packaging for any signs of damage that may have occurred during transit. In the event of damaged or missing items notify both the carrier and the supplier immediately.

3.3 Identification

The card type, hardware revision level and serial number are recorded on a label fitted at the top of the board.

The label is of the format <Type>/<BaseRevision> S/N:<Serial Number>.

For example. SPCI4/01 S/N:01234

Any modifications applied to the board beyond the Base Revision number are indicated by a strike on the Modification Record panel.

3.4 Switch and Link Settings

The two switches labelled ADDR (SW1) and BOOT (SW2) should be set to 0 for normal operation, alternative modes are detailed in the SS7 Programmer's Manual for Septel cP/PCI.

Boards at either end of the H.100 CT Bus must terminate the clock lines, this is achieved by fitting links at all positions on the link field labelled CLK TERM (J3).

All other jumper positions are for manufacturing purposes only and should not be fitted.

3.5 Software Licence Button

All software running on the Septel PCI card is protected by a removable software licence button. This is a small metal can that resembles a battery and is fitted to a holder near the top of the card.

Prior to installing the board the correct licence button must be fitted. The licence button may be supplied in a separate package, if so it should be carefully inserted into the holder by sliding it under the clip. Ensure that both contacts on the clip make good contact with the licence button.

The software licenced by the licence button is indicated by a symbol engraved in the top of the casing.

Symbol	Mnemonic	Description
M2	MTP2	MTP2 only
M3	MTP	MTP (MTP2 & MTP3)
V2	ISUP	ISUP & MTP
V4	ISUP-L	ISUP (large) & MTP
T2	TUP	TUP & MTP
T4	TUP-L	TUP (large) & MTP
U2	NUP	NUP & MTP
U4	NUP-L	NUP (large) & MTP
A2	SCCP-CL	SCCP-CL & MTP
B2	SCCP-CO	SCCP-CO & MTP
S2	TCAP	TCAP, SCCP-CL & MTP
J2	ISTC	TCAP, SCCP-CL, ISUP & MTP
R2	MAP	MAP, TCAP, SCCP-CL & MTP
H2	IS41	IS41, TCAP, SCCP-CL & MTP

Table 3.1 Licence button symbols

3.6 Installation

Prior to installing a Septel PCI card it is necessary to power down the computer.

Having ensured that all power is off, Select a vacant expansion slot (If in doubt, refer to your computer manual for advice).

If blanking plates are fitted, remove them by undoing the retaining screw at the top. Retain the blanking plates for possible future use.

Align the card with the card guide and the slot in the chassis and press home until fully inserted.

Care should be taken to ensure correct alignment of the connector and card guide before final insertion to prevent damage.

Once the card is fully inserted. Secure the card with the retaining screw at the top.

Reconnect the power and switch on the computer.

Once the Septel PCI card is physically installed in your computer, move on to the section on software installation in the SS7 Programmer's Manual for Septel cP/PCI.

4. Interfaces

This section details the interfaces present on the Septel PCI signalling card.

4.1 User LEDs

Three general purpose red LEDs labelled A, B and C are provided for use by the user application. The usage of these LEDs is detailed in the SS7 Programmer's Manual for Septel cP/PCI.

4.2 H.100 CT Bus

An H.100 CT Bus interface is provided to allow connection to other H.100 compatible cards. The H.100 CT Bus supports 4096 channels (or timeslots) and the associated clock and framing signals. The Septel PCI card is capable of generating the CT Bus clocks or can act as a slave. CT Bus channels may be used individually or grouped to provide a higher bandwidth data path. The signals are carried between cards in a chassis using an H.100 CT Bus ribbon cable.

4.3 PCM Interface Ports

Connections to the balanced E1/T1/J1 trunks are made via female RJ45 connectors. The connectors are labelled from 1 to 4 starting at the top of the board.

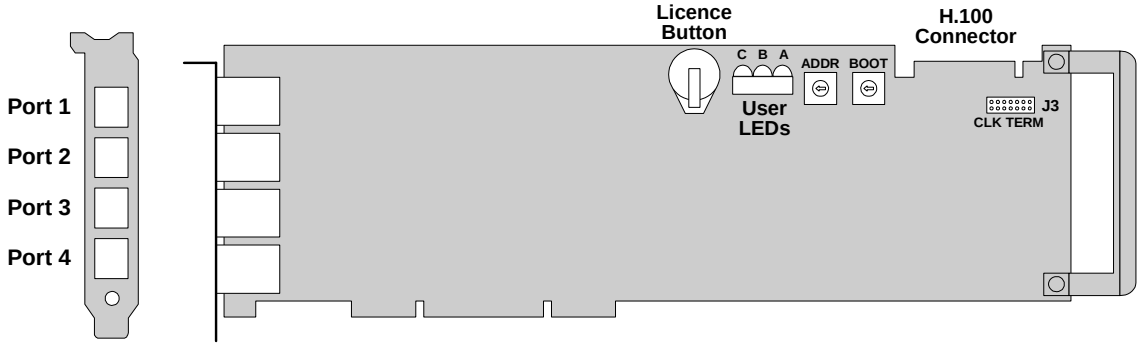

Fig 4.1 Septel PCI with 4 PCM ports

The connector pin-out and signal descriptions are shown in the following table. Note that pin 1 is towards the top of the board for each RJ45 connector.

Pin No	Direction	Function
1	Input	Receive
2	Input	Receive
3		No connection
4	Output	Transmit
5	Output	Transmit
6		No connection
7		No connection
8		No connection

Table 4.1 Balanced line interface connector pin-out

4.4 Serial Interface Ports

The optional serial interface board provides two synchronous serial ports. Both ports are presented in the same female 26 way high density D-type connector and use V.11 (V.35 compatible) electrical interface characteristics.

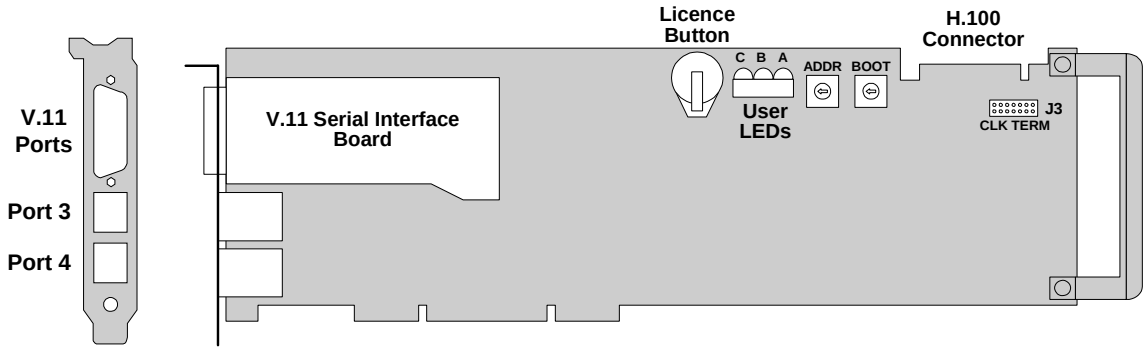

Fig 3.2 Septel PCI with 2 PCM ports and V.11 serial interface board.

The serial port interface may be clocked either by an internally generated clock or by an externally applied clock. In both cases the same clock is used for both the transmit data and the receive data.

For internal clock operation use the transmit clock pins and make no connection to the receive clock pins on the D-type connector. For external clock operation connect the clock source to the receive clock pins on the D-type connector and make no connection to the transmit clock pins.

The connector pin-out and signal assignment is shown in the following table:

Pin No	Direction	Function
1		Chassis ground
2	Output	V11 Transmit inverted clock Port B
3	Output	V11 Transmit clock Port B
4	Output	V11 Transmit inverted data Port B
5	Output	V11 Transmit true data Port B
6	Input	V11 Receive inverted clock Port B
7	Input	V11 Receive clock Port B
8	Input	V11 Receive inverted data Port B
9	Input	V11 Receive true data Port B
10		Signal ground
11 .. 18		Do not connect
19	Output	V11 Transmit inverted clock Port A
20	Output	V11 Transmit clock Port A
21	Output	V11 Transmit inverted data Port A
22	Output	V11 Transmit true data Port A
23	Input	V11 Receive inverted clock Port A
24	Input	V11 Receive clock Port A
25	Input	V11 Receive inverted data Port A
26	Input	V11 Receive true data Port A

Table 4.2 V.11 Serial interface connector pin-out

Appendix A: Safety

This section documents miscellaneous safety points that should be observed to ensure the proper and safe use of this product worldwide.

The terminology in this section relates to a variety of international safety standards.

A.1 Installation of Signalling Cards

This signalling card is for use only with UL listed computers that have installation instructions detailing user installation of card cage accessories.

A.2 Connector Classification

Type	Description	Status
25 Way D-Type	AUX (Only present with V.11 serial interface)	SELV
RJ45 Ports	PCM	SELV

A.3 Australia and New Zealand Specific

To comply with the relevant safety requirements in these countries, connection of this equipment MUST be via a line isolation unit with a telecommunications compliance label.

A.4 USA and Canada Specific

To comply with the relevant safety requirements in these countries, connection of this equipment to the public network MUST be via a UL listed channel service unit (i.e. the unit must NOT be directly connected to the external public line).

A.5 German Specific

Achtung: Durch elektrostatische Entladung können Zusatzkarten/-module beschädigt werden. Wenn Module aus dem Gehäuse entfernt werden, muß das im Einklang mit EN 100-015 Teil 1 Allgemeine Bestimmungen geschehen.

Appendix B: Electromagnetic Compatibility

This section documents miscellaneous points that should be observed to ensure the proper and safe use of this product worldwide.

The terminology in this section relates to a variety of international EMC standards.

B.1 Installation of Signalling Cards

The ferrite chokes supplied should be fitted to the PCM cables close to the card.

In order to meet the requirements of the EMC regulations in some installations where cable lengths exceed three metres it may be necessary to use screened cables.

B.2 USA and Canada Specific

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.