Dialogic

Dialogic®

SPCI2S and SPCI4 Boards User Manual

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Revision History

Issue	Date	Changes
A	20-Jul-00	Initial release of User Manual to accompany pre-production evaluation boards.
B	01-Mar-01	Added details of switch and link settings.
01	26-Jul-01	Added appendices on safety and EMC.
02	11-Sep-02	Additional regulatory information. Change branding.
03	19-Sep-02	Incorporate IDoC. Revised reliability data.
04	20-May-05	IDoC revised, and the editions of some EMC specifications. Additional EU language declarations. Corrected FCC Part 15 statement. Australia/New Zealand regulatory information included.
05	14-Jul-06	Introduction of Ordering Codes information. Revisions to Safety Specification editions and IDoC.
06	draft	Revision of EMC specifications
07	Dec 2007	Reformat and re-brand

Note: The latest release issue of this guide can be found at:
http://www.dialogic.com/support/helpweb/signaling

1 Warnings and Cautions

WARNING

TELECOMMUNICATIONS NETWORK CONNECTION: The telecommunication interfaces of these Products are not intended for direct connection to "outside plant" signal conductors (metallic). The Products shall be isolated, by channel banks or office repeaters, from any connections to network or terminal equipment, that lie outside of the same building. The telecommunication interface connections are considered to be, and meet the requirements of, SELV circuits (not TNV). The cables connecting to them shall be kept apart from any cables of TNV circuits. Refer also to any region specific regulatory requirements of network connection in Section 4 Regulatory Specifications and Declarations on page 15.

WARNUNG [Deutsch]

TELEKOMMUNIKATIONSNETZWERKVERBINDUNG: Die Telekommunikationsschnittstellen dieser Produkte sind nicht für den direkten Anschluss an externe Signalleiter (Metall) geeignet. Die Produkte sollten durch Netzwerkabschlusseinheiten (z. B. Multiplexer, Regeneratoren) von sämtlichen Netzwerk- oder Terminal-Geräten isoliert werden, die sich außerhalb des gleichen Gebäudes befinden. Die Verbindungen über die Telekommunikationsschnittstelle entsprechen den Anforderungen für SELV-Schaltkreise (nicht TNV). Die SELV-Verbindungskabel sollten von den TNV-Schaltkreisen getrennt sein. Regionale Vorschriften für Netzwerkverbindungen finden Sie in Abschnitt Section 4 Regulatory Specifications and Declarations on page 15.

CAUTION

Anti-Static Handling Procedures: The Dialogic® SPCI2S and SPCI4 boards ("boards" or "products") contain Electrostatic Sensitive Devices (ESDs), which may be permanently damaged if incorrectly handled. If boards are removed from the host computer they must be handled in accordance with appropriate anti-static handling procedures. Refer to: EN100015-1 Basic Specification: Protection of Electrostatic Sensitive Devices: Part 1 General Requirements for further details.

Hold boards only by their edges. After removing a board from its protective wrapper or from a host computer, place it on a grounded surface free of static electricity. Do not slide boards over any surface.

ACHTUNG [Deutsch]

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.

CAUTION

Temperature: The temperature in which these products operate, when installed in a host computer, must not go below 0 °C (32 °F) or rise above 55 °C (131 °F). Extreme fluctuations in temperature can cause a variety of problems in your products.

2 Introduction

2.1 Purpose

This document is a User Manual that addresses the Hardware aspects of the Dialogic® SPCI2S and Dialogic® SPCI4 products. These products are SS7 Signaling Boards in PCI form factor.

Collectively, the two board variants may be referred to as Equipment Type SPCI. The full Product IDs (ordering codes) for the two variants are SS7SPCI2SQ and SS7SPCI4Q, although in this User Manual, and many other documents, they are commonly known as SPCI2S and SPCI4.

This User Manual includes the specification of the products and a functional description. It details all the interface connections, including pin-out, and provides installation instructions.

It should be read in conjunction with the *Dialogic® SS7 Boards Programmer's Manual for SPCI2S and SPCI4*[*] which gives further information on the use of the boards, including a description of configuration parameters and commands.

2.2 Overview

The SPCI2S and SPCI4 boards are intelligent multi-port SS7 signaling interface boards capable of use in a telecommunications environment. Embedded software support for many signaling systems is available including the entire Signaling System Number 7 (SS7) protocol stack.

The SPCI4 board 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 SPCI2S board supports up to two primary rate telecommunications interfaces, but also supports up to two synchronous V.11 (V.35 compatible) serial interfaces.

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 signaling processors. This enables bearer (voice) circuits to be routed to other resource boards and permits flexible routing of signaling timeslots through the system.

A signaling processor provides support for multiple HDLC-based signaling channels including up to 4 SS7 signaling links. The signaling 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. Signaling links can all operate at 64kbit/s, 56kbit/s or 48kbit/s.

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

Software drivers for the board are available for many host operating systems, including: Microsoft Windows® 2000, Windows® XP, Linux and Solaris.

[*] Document number U03HSP.

2.3 Hardware Overview

The SPCI2S and SPCI4 boards are full length PCI boards with 33MHz 32 bit PCI interface. The boards are Universal expansion boards capable of detecting the host signaling environment in use and adapting themselves to either +5V or +3.3V signaling environments.

Note: The distinction is the signaling protocol used and not the power rail to which board connects.

Each board has an H.100 CT Bus interface, which is used to provide connectivity to further boards or to other H.100 CT Bus compatible boards, such as voice processing and fax cards.

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

2.4 System Requirements

To use the SPCI2S or SPCI4 signaling board, the host computer must meet the following minimum specifications:

- This signaling board is for use only with UL listed computers that have installation instructions detailing user installation of card cage accessories.
- Rev. 2.1 PCI compliant computer system.
- One free 33MHz 32 bit PCI full size expansion slot.

2.5 Related Documentation

- *U03HSP - SS7 Boards Programmer's Manual for SPCI2S and SPCI4*

  This document provides further information on the use of the board.
- *05-2300 - SS7G21 and SS7G22 Signaling Server Hardware Manual*

  This document provides full instructions on installing the board into Dialogic® SS7G21 Signaling Server products.
- *ECTF H.100 Hardware Compatibility Specification: CT Bus*

  This document provides further information on the H.100 CT Bus. This document may be obtained from the ECTF web site: http://www.ectf.org
- *PCI local bus specification Rev. 2.1*

  This document provides further information on the PCI bus. It may be obtained from the PCI-SIG web site: http://www.pcisig.com

For current software and documentation supporting SPCI products, visit:

http://www.dialogic.com/support/helpweb/signaling/

For the Dialogic® SPCI2S and SPCI4 boards product data sheet, visit:

http://www.dialogic.com/products/list.asp

For more information on Dialogic® SS7 products and solutions, visit:

http://www.dialogic.com/support/helpweb/signaling/

3 Product Specification

3.1 PCM Interface Ports

Ports:	2 (SPCI2S) 4 (SPCI4)
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

3.2 PCM Highway

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

3.3 SS7 Serial Interface Ports (SPCI2S)

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

3.4 Signaling Interface

Source:	PCM Interface, H.100 or SS7 Serial Interface
Data Rate:	48kbit/s, 56 kbit/s, 64 kbit/s
Timeslot:	Fully programmable

3.5 Processor System

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

3.6 Physical

Height: 106mm

Length: 341mm

Width: Single slot PCI board

Weight: 211 grams (SPCI2S)
180 grams (SPCI4)

3.7 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

3.8 Power requirements

+5V ±5%: 1.5A Typical, 2A Maximum

3.9 Reliability

MTBF: 204,000 hours Bellcore† Method @ 40°C

4 Regulatory Specifications and Declarations

4.1 Specifications Demonstrating Compliance

4.1.1 Safety Compliance

USA: **Canada:**	UL Listed to U.S. and Canadian safety standards. File number E310851 UL/CSA 60950-1 – 1st Edition – 2003
Europe:	EN 60950-1: 2001 + A11: 2004 including National deviations
Australia: **New Zealand:**	AS/NZS 60950.1: 2003 for national variations to IEC (below)
International:	CB Certificate to IEC 60950-1: 1st Edition (2001) + Corrigendum 1 (2002), with National and group differences according to CB Bulletin No 109A

4.1.2 Electromagnetic Compatibility (EMC)

USA:	FCC, 47 CFR, Part 15, Subpart B - Unintentional Radiators, verified Class A digital device
Canada:	ICES-003 Issue 4 – Feb 2004 - Class A, Digital Apparatus
Europe:	EN 300 386 V1.3.3 (2005-04) EMC + ERM, Telecommunication Network Equipment EN 55022: 1998, Class A Limits, ITE Radiated & Conducted Emissions EN 55024: 1998 +A1 +A2, ITE Immunity Characteristics EN 61000-4-2, ESD Immunity EN 61000-4-3, Radiated Immunity EN 61000-4-4, Electrical Fast Transients/Bursts EN 61000-4-6, Conducted RF Immunity EN 61000-4-8, Power Frequency Magnetic Fields EN 61000-4-11, Voltage Dips and Interrupts
Australia: **New Zealand:**	EN 300 386 V1.3.3 (2005-04) EMC + ERM, Telecommunication Network Equipment
International:	CISPR 22 Ed 4.0 (2003-04), Class A Limit

4.1.3 Telecommunications Compliance

USA:	TIA/EIA-IS-968 – July 2001 and TIA/EIA/TSB-168 FCC Part 68 rules as adopted by ACTA, interface classified as an “XD” terminal device (T1 DSX-1 type). ACTA Product-Labeling number: US: ICKCNNANSS7SPCI
Canada:	Industry Canada CS-03 Issue 8 – A7 July 2004, Part II Registered number: IC: 885F-SS7SPCI
Europe:	ETSI TBR 12 Business TeleCommunications (BTC); Open Network Provision (ONP) technical requirements; 2048 kbit/s digital unstructured leased lines (D2048U); Attachment requirements for terminal equipment interface ETSI TBR 13 Business TeleCommunications (BTC); 2048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface

4.2 Declarations of the Manufacturer or Importer

The International Declaration of Conformity for this product is copied below, or can be downloaded from: http://www.dialogic.com/declarations

Dialogic

Declaration of Conformity

No: D0002
Revision 02

The equipment described below is declared to be in conformity with the following applicable national and international standards. The conformity is valid ONLY when the equipment is used in a manner consistent with the manufacturer's recommendations and the reference documents.

Equipment Type(s): SPCI – SS7 Signaling boards PCI
Dialogic SPCI2S
Dialogic SPCI4

Document No / Edition /Date	Title
IEC 60950-1 – 1st Edition (2001-10)	Safety of Information Technology Equipment [CB Certificate Issued]
UL/CSA 60950-1 – 1st Edition (2003)	Safety of Information Technology Equipment
EN 60950-1: 2001 + A11	Safety of Information Technology Equipment
AS/NZS 60950.1: 2003	Safety of Information Technology Equipment
FCC, 47 CFR Part 15, Class A digital device	Radio Frequency Devices - Subpart B - Unintentional Radiators
ICES-003 Issue 4 - Feb 2004, Class A	Interference-Causing Equipment Standards - Digital Apparatus
EN 300 386 V1.3.3 (2005-04)	ERM; Telecommunication Network Equipment; EMC
EN 55022: 1998, Class A Limit	Information Technology Equipment - Radio Disturbance Characteristics
EN 55024: 1998 + A1 + A2	Information Technology Equipment - Immunity Characteristics
CISPR 22 Ed 4.0 (2003-04), Class A Limit	Information Technology Equipment - Radio Disturbance Characteristics
TIA/EIA-IS-968 - July 2001, Subpart 4	Technical Requirements for Connection of Terminal Equipment to the Telephone Network
CS-03 Issue 8, A7 – July 2004, Part II	Specification for Terminal Equipment, Terminal Systems, Network Protection Devices, Connection Arrangements
ETSI TBR 12 + A1 ed.1 (1996-01)	2048kbit/s Digital Unstructured Leased Lines (D2048U): Attachment Requirements for Terminal Equipment I/F
ETSI TBR 13 ed.1 (1996-01)	2048kbit/s Digital Structured Leased Lines (D2048U): Attachment Requirements for Terminal Equipment I/F

Additional information:	
Australia test reports :	Nemko test report # 69403 dated 27-Jun-2006 covers AS/NZS 60950.1 Hursley EMC Services test report # 04R256C/R dated 20-Oct-2004 covers EN 300 386

Regions:

European Economic Area (EEA) :Dialogic (address below) declares the equipment in compliance with the essential requirements of EC Council Directives : 1999/5/EC - R&TTE : 2006/95/EC - Safety/LVD : 89/336/EEC – EMC
USA : Dialogic (address below) make this SDoC as Responsible Party for equipment registered with ACTA as number : US: ICKCNNANSS7SPCI Original Filing and Compliance date 18, September, 2002. SDoC revision not affecting compliance reflects an RPC Transfer dated 31, January, 2007
Canada : Dialogic (address below) is the Declaring Party for equipment registered with Industry Canada as number : IC: 685F-SS7SPCI
Australia / New Zealand : Supplier Code N-964 [Dialogic Pty Ltd - Level 12, 1 Pacific Highway North Sydney NSW 2060] : ACN: 064 824 899
Any other region where the Regulatory Requirements are satisfied by compliance to the standards declared above

This Declaration of Conformity is issued by **Dialogic Corporation**, which is solely responsible for the declared compliance.

Company Address:	Place of Issue:	Authorized signature, name and function:
Dialogic Corporation 9800 Cavendish 5th floor Montreal, Quebec Canada, H4M 2V9	Dialogic (UK) Limited, 21 Green Lane, Fordingbridge, Hampshire, SP6 1HU, UK	John Matthews – Engineering Manager Date: 05, April, 2007

Dialogic Distribution Limited, our location in Europe operates from:
Unit 4034 Kingswood Avenue Citywest Business Campus, Saggart, Co. Dublin, Ireland.

Copies of this Declaration of Conformity may be downloaded at http://www.dialogic.com/declarations

4.2.1 CE Declaration of Conformity – European Economic Area

The Products carry the CE mark CE

Hereby, Dialogic Corporation, declares that the Dialogic® SPCI2S and SPCI4 products are in compliance with the essential requirements and other relevant provisions of European Union Directives 1999/5/EC (R&TTE), 89/336/EEC (EMC Directive) and 2006/95/EC (Low Voltage Directive).

Manufacturer's office in European Union:

Dialogic Distribution Limited,
Unit 4034 Kingswood Avenue, Citywest Business Campus,
Saggart, Co Dublin, Ireland

To achieve CE compliance, be sure to select a host computer that already meets the EMC and Low Voltage Directives before the addition of any optional board. Remember that the use of option boards declared compliant with the Directives by their manufacturer only gives "presumption of compliance" for the whole system. It is the responsibility of the system supplier to verify that the requirements of the listed Directives are still met by the final system, as supplied to an end-user.

[Česky]

Dialogic Corporation tímto prohlašuje, že tento SPCI2S, SPCI4 je ve shode se základními požadavky a dalšími príslušnými ustanoveními smernice 1999/5/ES, 89/336/EHS, 2006/95/ES.

[Dansk]

Undertegnede Dialogic Corporation erklærer herved, at følgende udstyr SPCI2S, SPCI4 overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF, 89/336/EØF, 2006/95/EF.

[Deutsch]

Hiermit erklärt Dialogic Corporation, dass sich das Gerät SPCI2S, SPCI4 in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der der Richtlinie 1999/5/EG, 89/336/EWG, 2006/95/EG befindet".

[Eesti]

Käesolevaga kinnitab Dialogic Corporation seadme SPCI2S, SPCI4 vastavust direktiivi 1999/5/EÜ, 89/336/EMÜ, 2006/95/EÜ, põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

[Español]

Por medio de la presente Dialogic Corporation declara que el SPCI2S, SPCI4 cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE, 89/336/CEE, 2006/95/CE

[Ελληνική]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Dialogic Corporation ΔΗΛΩΝΕΙ ΟΤΙ SPCI2S, SPCI4 ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ, 89/336/ΕΟΚ, 2006/95/ΕΚ.

[Français]

Par la présente Dialogic Corporation déclare que l'appareil SPCI2S, SPCI4 est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE, 89/336/CEE, 2006/95/CE.

[Italiano]

Con la presente Dialogic Corporation dichiara che questo SPCI2S, SPCI4 è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE, 89/336/CEE, 2006/95/CE.

[Latviski]

Ar šo Dialogic Corporation deklare, ka SPCI2S, SPCI4 atbilst Direktivas 1999/5/EK, 89/336/EEK, 2006/95/EK, butiskajam prasibam un citiem ar to saistitajiem noteikumiem.

[Lietuvių]

Šiuo Dialogic Corporation deklaruoja, kad šis SPCI2S, SPCI4 atitinka esminius reikalavimus ir kitas 1999/5/EB, 89/336/EEB, 2006/95/EB, Direktyvos nuostatas.

[Magyar]

Alulírott, Dialogic Corporation nyilatkozom, hogy a SPCI2S, SPCI4 megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EK, 89/336/EGK, 2006/95/EK, irányelv egyéb elõírásainak.

[Malti]

Hawnhekk, Dialogic Corporation, jiddikjara li dan SPCI2S, SPCI4 jikkonforma mal-htigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/KE, 89/336/KEE, 2006/95/KE.

[Nederlands]

Hierbij verklaart Dialogic Corporation dat het toestel SPCI2S, SPCI4 in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG, 89/336/EEG, 2006/95/EG.

[Polski]

Niniejszym Dialogic Corporation oświadcza, że SPCI2S, SPCI4 jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/WE, 89/336/EWG, 2006/95/WE.

[Português]

Dialogic Corporation declara que este SPCI2S, SPCI4 está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE, 89/336/CEE, 2006/95/CE.

[Slovensko]

Dialogic Corporation izjavlja, da je ta SPCI2S, SPCI4 v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES, 89/336/EGS, 2006/95/ES.

[Slovensky]

Dialogic Corporation týmto vyhlasuje, že SPCI2S, SPCI4 spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES, 89/336/EHS, 2006/95/ES.

[Suomi]

Dialogic Corporation vakuuttaa täten että SPCI2S, SPCI4 tyyppinen laite on direktiivin 1999/5/EY, 89/336/ETY, 2006/95/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

[Svenska]

Härmed intygar Dialogic Corporation att denna SPCI2S, SPCI4 står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG, 89/336/EEG, 2006/95/EG.

[Íslenska]

Hér með lýsir Dialogic Corporation yfir því að SPCI2S, SPCI4 er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC, 89/336/EEC, 2006/95/EC.

[Norsk]

Dialogic Corporation erklærer herved at utstyret SPCI2S, SPCI4 er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF, 89/336/EØF, 2006/95/EF.

4.2.2 FCC Part 15 Electromagnetic Compliance Statement -USA

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 operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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 is required to correct the interference at their own expense.

4.2.3 FCC Part 68 Statement - USA

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the pcb of this equipment is a label that contains, among other information, an ACTA product-labelling number in the format US: AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

For this equipment the Facilities Interface Code (FIC) may be 04DU9.BN , 04DU9.DN , 04DU9.1KN or 04DU9.1SN according to configuration of equipment, and the Service Order Code (SOC) is 6.0N.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

The T1 interface provided on this equipment is classified by the FCC as an "XD" terminal device (T1 DSX-1 type) and must be connected behind a registered CSU or PBX.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of the service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

To return a board for warranty repair or any other returns, please contact your Dialogic vendor from whom you purchased the board or Dialogic Technical Services and Support[1]. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

The mounting of the approved unit in the final assembly must be made so that the approved unit is isolated from exposure to any hazardous voltages within the assembly. Adequate separation and restraint of cables and cords must be provided. The final assembler shall provide in the consumer instructions all applicable customer information.

Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources. The use of a surge arrestor on the AC line is recommended.

In order for FCC registration of this product to be retained, all other products used in conjunction with this product to provide your telephony function must also be FCC Part 68 registered for use with CTBUS hosts. All Dialogic® CTBUS resource and network devices, which are FCC registered, are compatible and approved for use with each other.

[1] See http://www.dialogic.com/support/contact/ for contact information.

Some non-Dialogic devices may be compatible and approved for use with CTBUS devices. In determining if your particular component device is appropriately approved, look for the FCC Registered number on all components and ensure that the classification code "CE" or "CN" is part of that number. Refer to the FCC registered number on this product as an example.

Note: The non-Dialogic host or resource equipment used in conjunction with this product may bear an FCC Registered number with other than the "CE" or "CN" classification).

Classification code "CN" is for devices that provide a network interface, and code "CE" is for devices that do not have a network interface.

Therefore it is recommended that only other Dialogic® FCC Part 68 registered devices or other FCC Part 68 registered devices bearing the "CE" or "CN" Classification be used in providing your telephony function. If any of these components are not registered, then you are required to seek FCC Part 68 registration of the assembled equipment prior to connection to the telephone network. Part 68 registration specifies that you are required to maintain this approval and as such become responsible for the following:

- any component device added to your equipment, whether it bears component registration or not, will require that a Part 68 compliance evaluation is done and possibly that you have testing performed and make a modification filing to the FCC before that new component can be used;
- any modification/update made by a manufacturer to any component device within your equipment, will require that a Part 68 compliance evaluation is done and possibly that you have testing performed and make a modification filing to the FCC before the new component can be used;
- if you continue to assemble additional quantities of this compound equipment, you are required to comply with the FCC's Continuing Compliance requirements.

4.2.4 Telecommunications Attachment Notice - Canada

This product meets the applicable Industry Canada technical specifications.

4.2.5 ICES-003 Electromagnetic Compatibility Notice - Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à La norme NMB-003 du Canada.

4.2.6 Telecommunications Notice – Australia / New Zealand

The primary role of this product is as Telecommunications Network Equipment.

The product is not considered to be Customer Equipment (CE).

It is the responsibility of the system integrator or network operator to ensure that installations meet Telecommunication specifications in support of interconnect agreements.

4.3 Essential Compliance Information

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

4.3.1 Safety

Users of this product, and service personnel, must refer to the Safety information included in Section 1 Warnings and Cautions on page 7 and in the documentation of any host computer into which the board is to be installed.

The SCPI2S and SPCI4 boards are approved for installation in a host computer, and with host attachments, which are covered by a relevant type approval of their own.

It is a condition of approval that the power required by the host and the total of all adapter boards installed within the host environment, together with any auxiliary apparatus, does not exceed the power specification as stated in the Technical reference Manual of the host computer. The power required by this board is 1.5A typical, 2.0A maximum, @ +5V.

It is not intended for this product to be installed in a home or residential environment. It is not intended for this product to be installed or operated in a stressful or inordinary environment such as industrial sites, medical applications, or in flammable/explosive environments.

4.3.2 USA and Canada Specific Safety aspects

This SCPI2S and SPCI4 boards are for use only with UL listed computers that have installation instructions detailing user installation of card cage accessories.

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 board must **NOT** be directly connected to the external public line).

4.3.3 EMC

Installation of Cables

In order to ensure that the EMC performance of the products meet regulatory requirements: -

Cables used for the PCM Interface Ports, marked L1 to L4, shall be twisted-pair screened cables, grounded at both ends.

Cables used for the SS7 Serial Interface Ports (SPCI2S), marked AUX, shall have the ferrite clamps, provided with the product, installed close to the connector backshell.

Further Information

Refer also to any region specific information on EMC (Sections 4.2.2 on page 19 and 4.2.5 on page 21).

For further information on good EMC practice, the installer should consult the IEC61000-5-x series of Technical Reports on the subject of Electromagnetic Compatibility (EMC) - Installation and Mitigation Guidelines. In particular the following sections are recommended; IEC61000-5-1 - General Considerations, IEC61000-5-2 - Earthing and Cabling, IEC61000-5-6 - Mitigation of External EM Influences.

4.3.4 Telecommunications

The telecommunication interfaces of this product are described in Sections 3.1 on page 13 and 6.3 on page 31. They are primary rate telecommunications (PCM) interfaces, configurable as E1/T1/J1 interfaces, with selectable line code and frame format. For information on setting the product configuration consult the *SS7 Boards Programmer's Manual for SPCI2S and SPCI4*[*]. The developer/installer must ensure that they are configured to give an implementation that complies with the services offered by the local Public Switch Telephone Network (PSTN) operator. Application developers implementing supplementary services at application level must ensure that their implementation complies with the services offered by the local Public Switch Telephone Network (PSTN) operator. In case of doubt, network specifications must be consulted. In the European Union, the R&TTE Directive imposes that each PSTN operator makes such specifications available.

This product has been successfully tested against TBR12 and TBR13 when configured for E1 operation. Refer also to other region specific information on network connection (Sections 4.2.3 on page 20 and 4.2.4 on page 21).

The telecommunication network interfaces of this product are not intended for direct connection to "outside plant" signal conductors (metallic). The product shall be isolated, by channel banks or office repeaters, from any connections to network or terminal equipment, that lie outside of the same building. The telecommunication interface connections are considered to be, and meet the requirements of, SELV circuits (not TNV).

In order to maintain the host-independent approval for the network interface, it is essential that, when other option boards are introduced which use or generate a hazardous voltage (as defined in IEC/EN60950-1), the minimum creepage and clearance distances specified in Table 1 on page 24 are maintained.

The board or assembly holding the network interface must be installed such that, with the exception of the connections to the host, clearance and creepage distances shown in the table below are maintained between the board or assembly holding the network interface, and any part of the host, including other option boards or assemblies. Failure to maintain these minimum distances will invalidate the approval.

[*] Document number U03HSP.

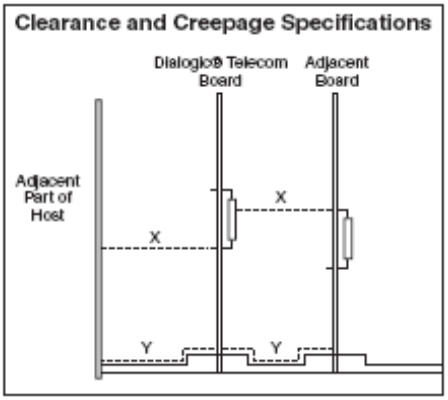
Table 1. Voltage Used or Generated by Other Clearance Parts of the Host, Including Other Boards or Assemblies

X mm	Y mm	
2.0	2.4	< 50 Vrms or Vdc
2.6	3.0	<125 Vrms or Vdc
4.0	5.0	<250 Vrms or Vdc
4.0	6.4	<300 Vrms or Vdc

The above creepage distances apply in a normal office environment. In the presence of conductive pollution, or voltages greater than 300 V (rms or dc), or if you have any doubt, seek advice from a competent telecommunication safety engineer before the installation.

Creepage and clearance distances can be checked by measuring between the adjacent parts as shown below. Clearance distance X is the shortest distance in air between two parts. Y is the length of the creepage path between the same two parts.

Figure 1. Creepage and Clearance Distances



4.4 Product Environmental Information

During August 2005, the European Union Directive on Waste Electrical and Electronic Equipment (2002/96/EC) and its amendment (2003/108/EC), collectively known as the WEEE Directive, came into force throughout most of the European Union. These Dialogic® products come within the scope of the WEEE Directive. We are confident that this product will provide you with many years of reliable service. Moreover, we are pleased to advise you that Dialogic warrants this product, as detailed in the user guide and provides a fee based repair service when the product is out of warranty. However, a time will come when the product will no longer meet your needs or will become un-economic to repair. It is at that stage that we ask for your co-operation in recycling this product in the spirit of the WEEE directive.

Dialogic has taken great care to minimise the environmental burden of this product by careful design and manufacturing it under an Environmental Management System, registered to ISO14001. The requirements of ISO14001 are similar to and as rigorous as the requirements of ISO9001, Quality Management Systems with which you may be more familiar. We ask you to help us to ensure that the environmental burden of this product is minimised when it is of no further use to you by recycling it.

Please do not dispose of this product through municipal or general waste systems because it contains materials which can be economically recycled. Like all electrical and electronic equipment, including televisions and computers, it may contain small amounts of materials which could lead to environmental damage. To minimise any environmental damage we ask you to have this product recycled by:

- Bringing it to the recycling collection point in your company.
- Handing it into the store where you are purchasing the replacement.
- Delivering it to a local bring-centre in your area.

No charge can be imposed on you for this recycling service, in the European Union, as Dialogic has paid for recycling this product when it was placed on the market. These are requirements of the WEEE directive.

We thank you in advance for you co-operation and working with Dialogic in protecting our environment.

Please do not dispose of this product through municipal or general waste. Recycle it.

5 Hardware Installation

5.1 Warnings and Cautions

Refer to Section 1 Warnings and Cautions and Section 4.3 Essential Compliance Information before commencing installation.

Refer to any Warnings and Cautions and Compliance Information in the documentation supplied with the Host Computer before commencing installation.

⚠ **CAUTION**

The Dialogic® SPCI2S and SPCI4 boards contain Electrostatic Sensitive Devices (ESDs), which may be permanently damaged if incorrectly handled. If a board is removed from the host computer it 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.

5.2 Unpacking

The SPCI2S and SPCI4 boards are 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.

5.3 Identification

Two labels are applied to the non-component side of the main board assembly.

The smaller of these labels shows the serial number in barcode and alphanumeric formats.

The larger label contains the following information:

- Manufacturers name and country of origin
- The Equipment Type [ET: SPCI]
- The variant specific Product ID [SS7SPCI2SQ or SS7SPCI4Q]
- ACTA Product-Labeling number
- Industry Canada Registered number
- Other approvals symbols and/or text

5.4 Host Specific Installation Aspects

The instructions that follow provide all of the installation information specific to the board. Any information relating to the host computer will, of necessity, be general in nature. Always consult the documentation provided with the host for more details of these aspects.

If the board is being installed in a Dialogic® SS7G21 product, either as an upgrade or a repair, then the relevant Hardware Manual provides full instructions*, and should be used in preference to the remainder of Section 5 on page 27.

5.5 Switch and Link Settings

The two switches, labeled ADDR (SW1) and BOOT (SW2), are set to 0 for normal operation. Alternative modes are detailed in the SS7 Boards Programmer's Manual for SPCI2S and SPCI4*.

Boards at each end of the H.100 CT Bus must terminate the clock lines; this is achieved by fitting links (jumpers) at all 7 positions on the link field labeled CLK TERM (J3). For boards in a 'middle' (non-end) position, the links (jumpers) should be installed in an offset (open) state.

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

5.6 Software License Button

All software running on the board is enabled by a removable software license button. This is a small metal can that resembles a battery and is fitted to a holder near the top of the board.

Prior to installing the board the correct license button must be fitted. The license button is supplied in a separate package. Carefully insert it into the holder by sliding it under the clip. Ensure that both contacts of the holder make good contact with the license button.

The software enabled by the license button is indicated by a symbol engraved in the top of the button casing, as listed in Table 2 below. For Product ID (ordering codes) for license buttons refer to Section 7.

Table 2. License Button Symbols

Symbol	Description
M2	MTP2 only
M3	MTP (MTP2 and MTP3)
T1	ISUP, TUP, MTP (Small)
T2	ISUP, TUP, MTP (Regular)
T4	ISUP, TUP, MTP (Large)
XX	For use in SS7G21, SIU520, SG430 systems only
MM	Multi-link MONITOR only

* *U03HSP – Dialogic ® SS7 Boards Programmer's Manual for SPCI2S and SPCI4*

5.7 Physical Installation

Prior to installing SPCI2S or SPCI4 boards, it is necessary to power down the host computer and disconnect any network interfaces.

Having ensured that all power is off/disconnected, select a vacant expansion slot (If in doubt, refer to your host 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 board with the card guide and the slot in the computer 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 board is fully inserted, secure the board with the retaining screw at the top.

Reconnect the power and network interfaces, then switch on the host computer.

Once the board is physically installed in your host, refer to the section on software installation in the *Dialogic® SS7 Boards Programmer's Manual for SPCI2S and SPCI4*[*].

[*] Document number U03HSP.

6 Interfaces

This section details the interfaces present on the Dialogic® SPCI2S and SPCI4 products.

6.1 User LEDs

Three general purpose red LEDs, labeled A, B and C, are available to the user application.

Use of these LEDs is detailed in the *Dialogic® SS7 Boards Programmer's Manual for SPCI2S and SPCI4*[*].

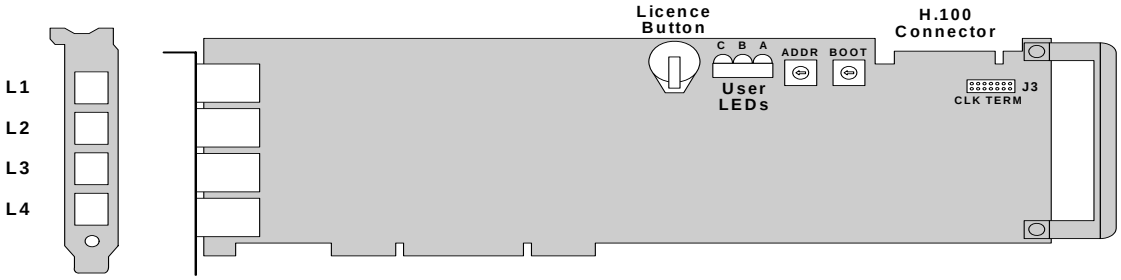
6.2 H.100 CT Bus

An H.100 CT Bus interface is provided to allow connection to other H.100 compatible boards. The H.100 CT Bus supports 4096 channels (or timeslots) and the associated clock and framing signals. This board 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 boards in a host computer using an H.100 CT Bus ribbon cable. The position of the H.100 connector can be seen in Figure 2 below and Figure 3 on page 32.

6.3 PCM Interface Ports

Figure 2. SPCI4 Connector Positions



Each board provides two (SPCI2S) or four (SPCI4) primary rate telecommunications (PCM) interfaces, each port being individually configured at run-time under software control to operate as balanced E1, T1 or J1 ports, with selectable line code and frame format. For information on setting port configurations consult the SS7 Boards Programmer's Manual for SPCI2S and SPCI4[*].

The E1/T1/J1 ports on the boards are Safety Extra Low Voltage, SELV – the apparatus connects to the outside network via network termination units (NT1).

Use twisted-pair, screened cables, grounded at both ends, to ensure the EMC and error-free performance of the product.

[*] Document number U03HSP.

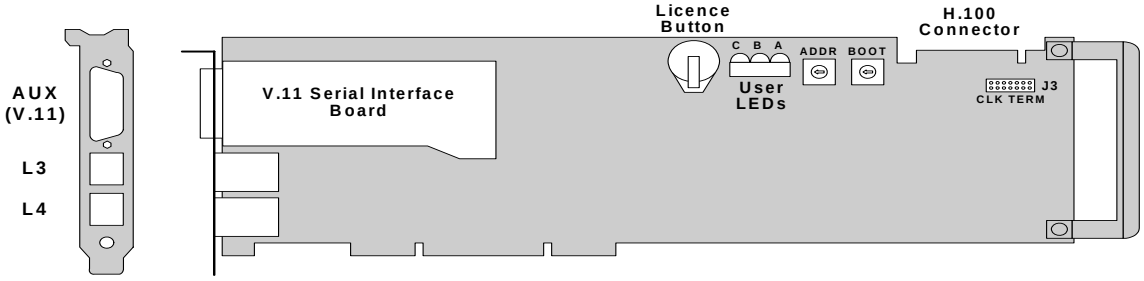
The connectors are 8-way RJ45, and are labeled L1 to L4 in Figure 2 on page 31 and on the product (L3 and L4 only for SPCI2S in Figure 3 below). The connector pin out and signal descriptions are shown in Table 3 below. Note that pin 1 is towards the top of the board for each RJ45 connector.

Table 3. PCM Interface Ports Connector Pin-Out

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

6.4 SS7 Serial Interface Ports (SPCI2S)

Figure 3. SPCI2S Connector Positions



Each SPCI2S board provides two synchronous SS7 Serial Interface Ports. Both ports are presented in a single 26 way female high density D-type connector, and use V.11 (V.35 compatible) electrical interface characteristics.

The connector is labeled AUX in Figure 3 above and on the product. The connector pin-out and signal assignment is shown in Table 4 on page 33, which identifies the ports as A and B.

The SS7 Serial Interface Ports on the SPCI2S board are designated as SELV.

Install the ferrite clamp, provided with this product, on the SS7 Serial Interface Port cable, close to the connector backshell, to ensure the EMC performance of the product.

The SS7 Serial Interface Port 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.

Table 4. SS7 Serial Interface Ports (Dual V.11) Connector Pin-Out (SPCI2S)

Pin No	Direction	Function
1		Chassis ground
2	Output	V.11 Transmit inverted clock Port B
3	Output	V.11 Transmit clock Port B
4	Output	V.11 Transmit inverted data Port B
5	Output	V.11 Transmit true data Port B
6	Input	V.11 Receive inverted clock Port B
7	Input	V.11 Receive clock Port B
8	Input	V.11 Receive inverted data Port B
9	Input	V.11 Receive true data Port B
10		Signal ground
11 to 18		N/C
19	Output	V.11 Transmit inverted clock Port A
20	Output	V.11 Transmit clock Port A
21	Output	V.11 Transmit inverted data Port A
22	Output	V.11 Transmit true data Port A
23	Input	V.11 Receive inverted clock Port A
24	Input	V.11 Receive clock Port A
25	Input	V.11 Receive inverted data Port A
26	Input	V.11 Receive true data Port A

7 Part Number Reference

The Product IDs shown in the Tables below may be used to place orders for these products.

Table 5. Board Products of Equipment Type SPCI

Product ID	Description
Dialogic® SS7SPCI2SQ	SS7 signaling PCI board supporting up to 4 SS7 links,
	2 software-selectable T-1/E-1 interfaces and 2 V.11 interfaces
Dialogic® SS7SPCI4Q	SS7 signaling PCI board supporting up to 4 SS7 links,
	4 software-selectable T-1/E-1 interfaces

Table 6. Software License Buttons for SPCI Board-based Protocols

Product ID	Description
Dialogic® SS7SBPCIISTUPSQ	SS7 ISUP, TUP, MTP (Small)
Dialogic® SS7SBPCIISTUPQ	SS7 ISUP, TUP, MTP (Regular)
Dialogic® SS7SBPCIISTUPLQ	SS7 ISUP, TUP, MTP (Large)
Dialogic® SS7SBPCISYSQ	For use in systems product Dialogic® SS7G21.

Table 7. Software Licenses for Host-based Protocols for use with SPCI Boards

Product ID	Description
Dialogic® SS7SBHSTINAP	SS7 INAP software
Dialogic® SS7SBHSTIS41	SS7 IS41 (TIA-41, ANSI-41) software
Dialogic® SS7SBHSTISUP	SS7 ISUP software
Dialogic® SS7SBHSTMAP	SS7 MAP software
Dialogic® SS7SBHSTMTP3	SS7 MTP3 software
Dialogic® SS7SBHSTSCCPCO	SS7 SCCP connection-oriented software
Dialogic® SS7SBHSTSCCPCL	SS7 SCCP-CL software
Dialogic® SS7SBHSTTCAP	SS7 TCAP software
Dialogic® SS7SBHSTTUP	SS7 TUP software

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