Septel Product Range

Septel cP
User Manual

Revision History

ISSUE	DATE	BY	CHANGES
1	30-Jul-99	SPM	Initial release of User Manual to accompany pre-production evaluation boards.
2	29-Jan-02	SPM	New safety and EMC appendices. Updated specification includes reliability information and regulatory approvals. New note about handle locking button in installation instructions.

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 cP and its documentation.

Document reference U02HSP

CONTENTS

1. Introduction

1.1 Overview

Septel cP is an intelligent multi-port signalling interface card for use in a CompactPCI* chassis in a telecommunications environment. The card occupies a single slot and comprises two parts: the main board and the rear transition board. 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 eight 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.110 Computer Telephony (CT) Bus interface and digital switch allows timeslots to be routed between the E1/T1/J1 interfaces, the H.110 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 64kb/s, 56kb/s or 48kb/s.

The card supports Hot Swap allowing a faulty board to be replaced without the need to power down or restart the remaining cards in the system.

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 cP card are available for many host operating systems including WindowsNT*, Windows2000*, Linux* and Solaris*.

This manual details the specification of the Septel cP 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

CompactPCI is a midplane architecture containing cards that plug into the front of the chassis and cards that plug into the rear of the chassis. The system backplane fits between the front and rear cards and provides both bussed connectivity between all slot positions in the chassis and local connectivity between the front and rear cards. All cards connect to the backplane via connectors designated P1 to P5. The functions of these connectors are defined in the CompactPCI computer telephony specification. Connectors P1, P2 and P4 are bussed along the backplane whilst connectors P3 and P5 connect locally between the front and rear cards. The CompactPCI midplane architecture is shown below:
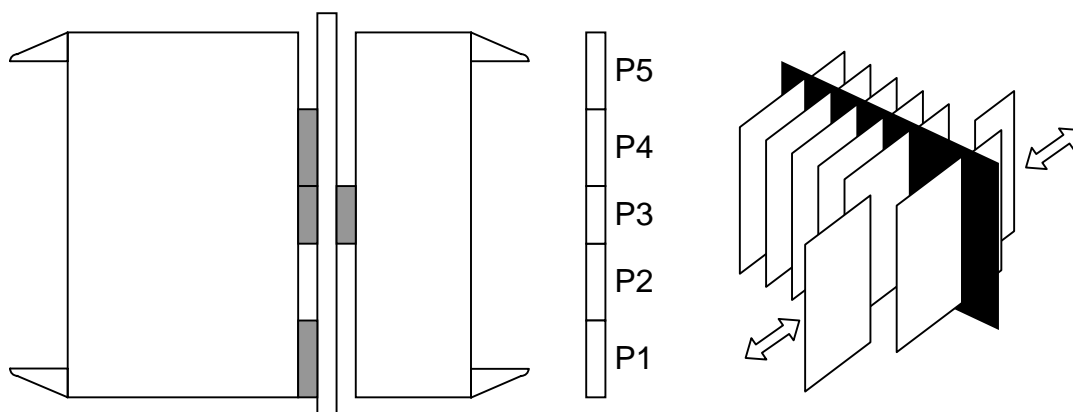
Fig. 1.1 CompactPCI midplane architecture

The Septel cP card requires a single 6U CompactPCI slot with rear transition card capability. It uses P1 to connect to the 32-bit PCI bus, P3 to connect to the rear transition card and P4 to connect to the H.110 CT Bus, P2 and P5 are not used.

The rear transition card is used for the physical connections to E1/T1/J1 trunks or V.11 ports. It also carries the isolation and protection components for the E1/T1 trunk interfaces and the drivers for the V.11 ports.

The Septel cP card has an H.110 CT Bus interface, which is used to provide connectivity to other H.110 CT Bus compatible cards, such as voice processing and fax cards or further Septel cP cards.

The H.110 CT Bus supports 4096 channels (or timeslots) and the associated clock and framing signals. The Septel cP 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 all carried between cards in a CompactPCI chassis using an H.110 CT Bus compatible backplane.

1.3 System Requirements

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

a) Rev. 2.1 CompactPCI compliant computer system.

b) One free 33MHz 32 bit CompactPCI 6U expansion slot with rear transition card capability using J3 connector.

1.4 Related Documentation

For further information on the H.110 bus, refer to the ECTF H.110 Hardware Compatibility Specification: CT Bus. This document may be obtained from the ECTF web site http://www.ectf.org.

For further information on the CompactPCI bus, refer to the PICMG 2.0 R2.1 CompactPCI specification and PICMG 2.5 R1.0 CompactPCI computer telephony specification. These documents may be obtained from the PCI Industrial Computers Manufacturers Group http://www.picmg.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:	8
Data rate:	2048 kb/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.110 CT Bus
Clock rate:	8192 kHz
Connector:	CompactPCI P4 connector
Clocking:	Master or Slave

2.3 Serial Ports

Connector:	15 pin D-type male
Electrical:	V.11 (V.35 compatible)
Signals:	Tx Clock, Rx Clock, Tx Data, Rx Data
Data Rate:	48 kb/s, 56 kb/s, 64 kb/s or external

2.4 Signalling Interface

Source:	PCM interface, H.110 or serial interface
Data Rate:	48 kb/s, 56 kb/s, 64 kb/s
Timeslot:	Fully programmable

2.5 Visual Indicators

PCM Interface:	Green and red LED for each PCM interface
User LEDs:	3 general purpose red LEDs
Hot Swap:	Single blue LED

2.6 Processor System

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

2.7 Physical - Main board

Height:	6U
Depth:	160mm
Width:	Single slot CompactPCI card
Weight:	340g
Connectors:	J1, J3 & J4

2.8 Physical - Rear transition board

Height:	6U
Depth:	80mm
Width:	Single slot CompactPCI card
Weight:	230g
Connectors:	rJ3

2.9 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

2.10 Power requirements

+5V (±5%):	200mA Typical, 500mA Maximum
+3.3V (±5%):	2A Typical, 2.5A Maximum

2.11 Reliability

MTBF Main board:	27,600 hours MIL-HDBK 217F Notice 2 Ground Benign @ 25°C
MTBF Rear transition board	27,650 hours MIL-HDBK 217F Notice 2 Ground Benign @ 25°C

2.12 Regulatory Approvals

Safety:	EN 60950: 2000 UL 60950 Third Edition IEC 60950: 1999 ACA TS001: 1997 UL listed accessory, file number E219415
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
Telecoms	ETSI TBR4 A1

3. Hardware Installation

3.1 Warnings

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

The Septel cP 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: *EN100015-1 Basic Specification: Protection of Electrostatic Sensitive Devices: Part 1 General Requirements* for further details.

3.2 Unpacking

The Septel cP 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 then notify both the carrier and the supplier immediately.

3.3 Identification

The card type, hardware revision level and serial number are recorded on labels fitted at the top of the board. The main board and the rear transition board each have separate labels and serial numbers.

The type label is of the format <Type>/<BaseRevision>

For example: CPM8/01
                 CPR8RJ/01

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

3.4 Switch Settings

The two switches labelled ADDR (SW3) 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.

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 cP 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. The following designations are used:

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 cP card for the first time it is necessary to power down the computer.

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

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

The rear transition card should be fitted in the rear of the chassis to align with the front card.

Align the cards with the card guides and press home until the insert/extract handles engage with the chassis. Care should be taken to ensure correct alignment of the connectors before final insertion to prevent damage.

Use the insert/extract handles for final insertion of the card. Ensure that the red button on the handles (top and bottom) fully latch into position as unless this is done the card is not correctly inserted

Once the front and rear cards are fully inserted. Reconnect the power and switch on the computer.

Once the Septel cP card is physically installed in your computer, move on to the section on software installation in the Programmer's Manual that accompanies the Septel cP Development Package for the operating system you are using.

4. Interfaces - Main Board

This section details the interfaces present on the Septel cP main board. The diagram below shows the main board and a view of the front panel.
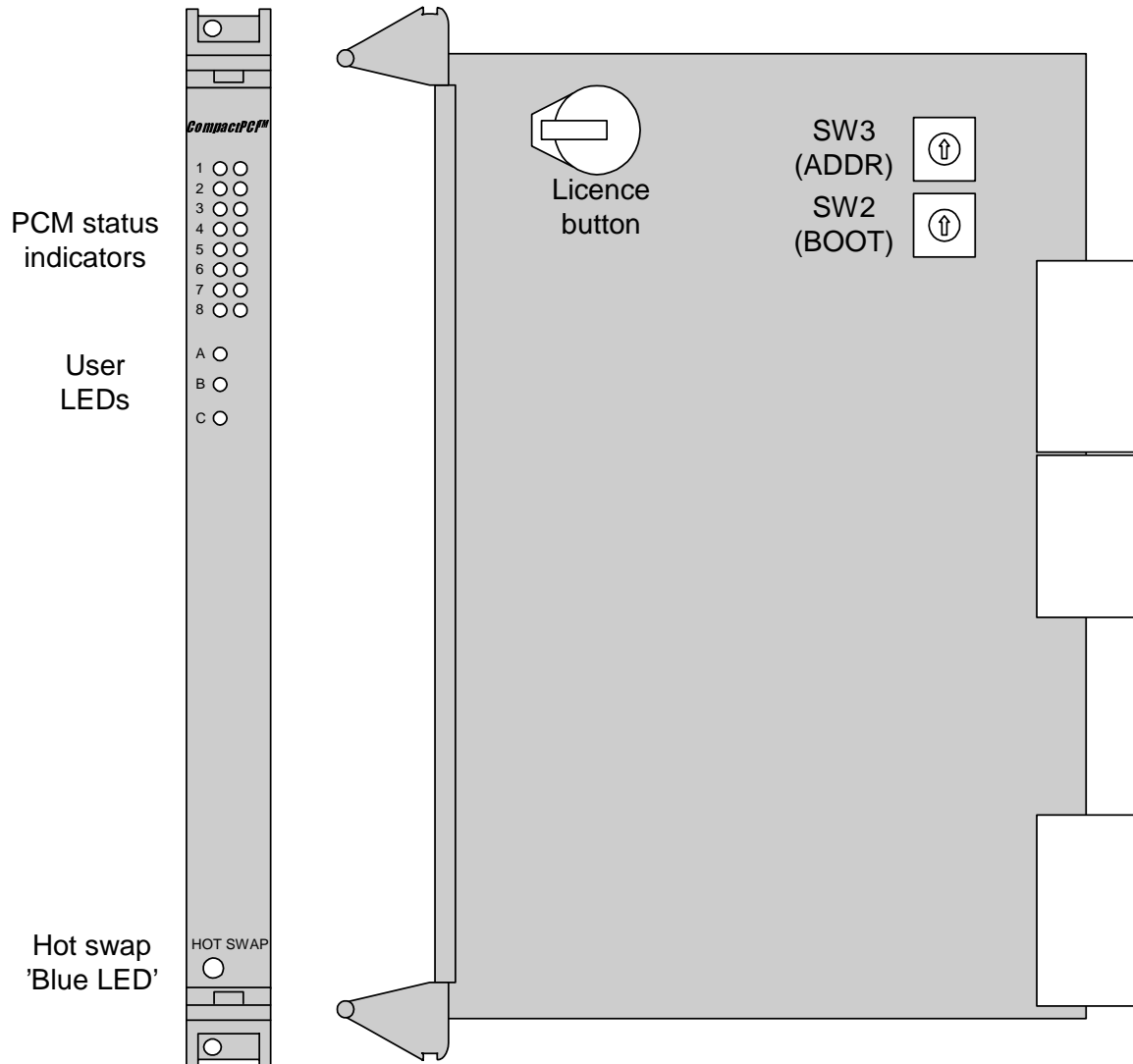

Fig. 4.1 Front panel connector and indicator positions

4.1 Front Panel Visual Indicators

Status indicators are provided on the front panel of the Septel cP card. After a card reset all PCM status indicators remain on until the onboard software is run.

4.2 PCM Interface Status Indicators

The front panel contains 8 pairs of PCM Interface Status indicators labelled 1 to 8. Each pair comprises a green and a red LED which indicate the current status of the individual PCM interfaces in accordance with the following table:

PCM Status	Green LED	Red LED
Disabled	OFF	OFF
Sync Loss	OFF	ON
In Sync	ON	OFF
Remote (Yellow) Alarm	ON	ON

Table 4.1 PCM Interface Status Indicaton

4.3 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.

4.4 Hot Swap 'Blue LED'

The hot swap 'blue LED' is used to indicate that the board is ready to be extracted from the system. This indicator is also on during card insertion and system reset.

5. Interfaces - Rear Transition Board

This section details the interfaces present on the Septel cP rear transition board. The diagram below shows the rear transition board and a view of the rear panel.
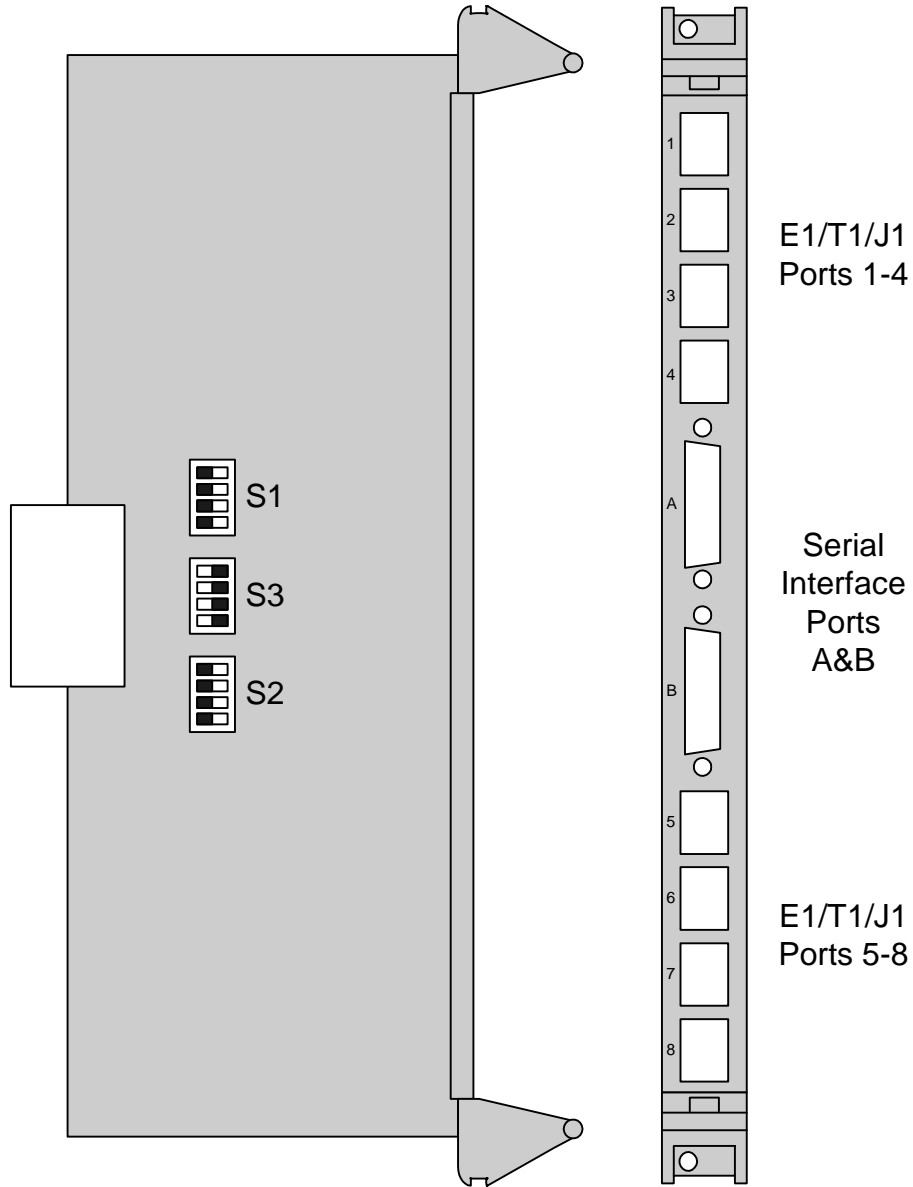
E1/T1/J1
Ports 1-4

Serial
Interface
Ports
A&B

E1/T1/J1
Ports 5-8

Fig. 5.1 Rear panel connector positions

5.1 Rear Panel Connectors

The Septel cP rear transition board provides connections to the E1/T1/J1 PCM interface trunks and V.11 serial interface ports.

5.2 PCM Interface Ports

Connections to the balanced E1/T1/J1 trunks are made via female RJ45 connectors fitted to the Septel cP rear transition board. The connectors are in two blocks of 4 and are individually labelled from 1 to 8 starting at the top of the board.

The connector pin-out and signal descriptions are shown in the following table. Note that pin 1 is towards the bottom 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
Screen		Chassis Ground

Table 5.1 Balanced line interface connector pin-out

5.3 Serial Interface Ports

The rear transition board provides two synchronous serial interface ports. Each port is presented as a male 15 way D-type connector with V.11 (V.35 compatible) electrical interface characteristics.

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 15-way D-type connector. For external clock operation connect the clock source to the receive clock pins on the 15-way 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		Shield (Chassis Ground)
2	Output	Transmit True Data
3		No Connection
4	Input	Receive True Data
5		No Connection
6	Input	Receive True Clock
7	Output	Transmit True Clock
8		Signal Ground
9	Output	Transmit Inverted Data
10		No Connection
11	Input	Receive Inverted Data
12		No Connection
13	Input	Receive Inverted Clock
14	Output	Transmit Clock
15		No Connection
Screen		Chassis Ground

Table 5.2 Serial Interface Port 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

The signalling card is intended for installation in UL listed CompactPCI hosts only.

A.2 Connector Classification

Type	Description	Status
15 Way D-Types	Serial Interface Port	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 100015 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 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.