

# INSTRUCTION MANUAL



## *SC-IRDA Infrared Communications Interface*

Revision: 6/04

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# **SC-IRDA Infra-red Communications Interface**

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## **1. Introduction**

The SC-IRDA interface is designed to provide a wireless connection between a hand-held computer and a datalogger. It is designed to be permanently installed through the wall of environmentally sealed enclosures thereby removing the need to open the enclosure or expose any connectors whilst allowing full communication with the datalogger inside.

The quiescent power consumption of the SC-IRDA is very low so it has no significant effect on the overall power consumption of the logging system.

The SC-IRDA also supports a new mode of communicating with some dataloggers (the CR510, CR10X and CR23X with new standard operating systems) that allows it to be connected at the same time as other modem devices, for example a telephone modem, thus avoiding the need for any extra port switching device.

## **2. Specifications**

### **2.1 Electrical**

Standby Current: 0.17mA typical  
Active communicating: 6.2mA typical  
(current drawn from the 5V supply provided by the datalogger)

### **2.2 Communications**

Standards: Conforms to the IRDA low power SIR specification (as supported by most Palm PCs and laptops)  
Range: 200mm with typical lighting  
Acceptance angle: 30 degrees

### **2.3 Physical**

Size: 12mm diameter x 44mm long  
Cable length: 800mm.  
Weight: 90g.  
Temperature range (standard): -25 to +50C  
Temperature range (extended): -40 to +80C  
SC-IRDA module sealed to IP68 (see installation notes below)

## 2.4 Datalogger Communication Modes

Baud rate (default): 9600

Manually selectable baud rates: 1200, 9600, 19200.

Baud rate is automatically set to 19200 baud for datalogger operating system upgrades.

SC-IRDA is compatible with 21X, CR7X, CR500, CR510, CR10, CR10X, CR23X and CR5000 dataloggers.

The SC-IRDA supports the SDC protocol *if the datalogger also supports this mode*, thus allowing the CS I/O port to be shared with modem devices; otherwise it operates as an ME (modem-enabled) device. The SDC protocol is supported by the CR510, CR10X and CR23X standard operating systems, post-dated October 2002 (version 1.18 for the CR10X).

## 2.5 Supported Software Packages

### Campbell Scientific Software Packages

LoggerNet Version 2.1a

PCconnect for Palm PCs (version 2.1 or later)

PC200W version 1.2 (but *not* version 2.0)

PC208W Version 3.0 or later

PC9000 (at 9600 baud only)

Storage Module software (Version 4.6 and later).

### PC Operating Systems Support

Windows 98 and ME directly

Windows 2000 and XP require a third party virtual serial port driver (supplied).

Please check with Campbell Scientific for availability of compatible versions of other programs and other variants of PCconnect.

## 3. Installation

### 3.1 Hardware

The SC-IRDA package is designed for installation through the wall of an enclosure with the optical sensors at the end of the metal tube protruding towards the outside. The 12 mm diameter metal tube body will fit through common rubber grommets or liquid tight cable glands (cord grips). A Skintop® PG-13.5 fitting, manufactured by Lapp Cable, is an example of a suitable type. Campbell Scientific can supply and fit suitable components if required.

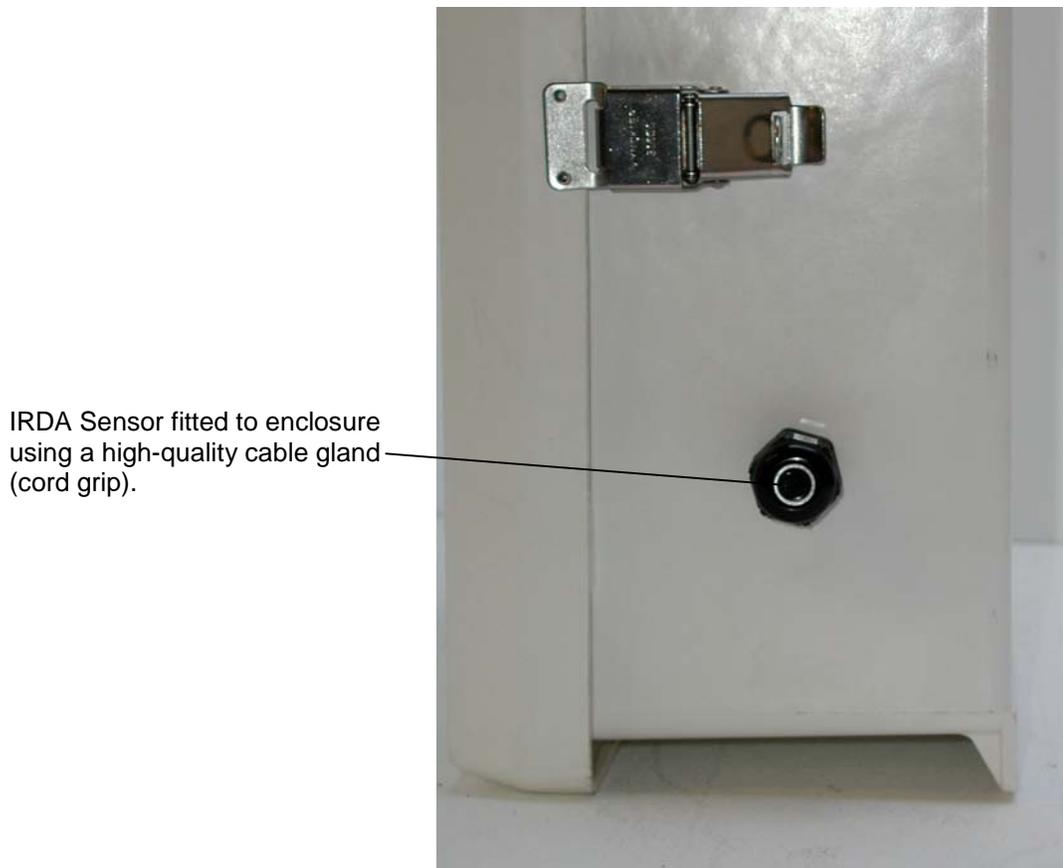


FIGURE 1. SC-IRDA Sensor Installed in a Standard Enclosure

If mounting the SC-IRDA in this way, you need to consider several factors to ensure ideal placement of the interface. The final installation position needs to allow you to hold your computer in an acceptable position such that you can use it comfortably whilst pointing it at the sensor at the end of the SC-IRDA interface. Ideally the two IRDA sensors should point at each other "head-on".

Exposure of the sensor to the weather is not normally a big problem as the SC-IRDA is sealed against moisture. However, the sensor lens may degrade if exposed to wind blown sand or ice. Deposits of dust or rain on the sensor can normally be gently wiped off with a soft cloth before communication is started.

Exposure of the sensor to bright sunlight may reduce the maximum spacing between computer and the interface. Exposure to strong artificial lights which have a high frequency electronic ballast may also reduce the working range. In addition they may cause the SC-IRDA to stay "awake" and thus draw 5mA continuously.

The bottom of an enclosure provides a little extra protection from both the weather and direct light, but is not practical if the enclosure is mounted at a low level.

For installations where the enclosure is mounted in an inaccessible position, high up a tower for example, the serial cable can be extended by up to 10 meters. The rear of the interface is sealed to the same standard as the sensing

end, but care must be taken to ensure that the 9 way D connector is sealed if exposed to the elements. Contact Campbell Scientific if you require a special assembly.

The interface is rated for exposure to temperatures ranging between -25 to +50°C as standard. It will survive many years of use with normal rates of temperature change. Note, however, that damage can be caused to the sealing of the sensor if it is exposed to unnatural rates of temperature cycling, for example taking a warm interface and plunging it into ice cold water. If you have an application that involves this type of cycling, please contact Campbell Scientific as other packaging arrangements are possible.

## 3.2 Using PC Software Drivers

### Palm OS Handhelds

No special installation is needed, except to install a compatible version (2.1 or later) of PConnect in the normal way.

### Windows 98/98SE and ME

No special procedures are required, other than to allow Windows to install its standard IRDA drivers and to let it assign a virtual serial port during the IRDA installation. This will normally be done during the original installation of Windows providing the IRDA interface was present and not disabled for any reason in the PC's BIOS. Please refer to your system documentation and Microsoft's installation help system for further information.

To allow you to use the virtual serial port you need to know which COM port number has been assigned to the IRDA port. This information is normally found using the Windows Control Panel, either via General System Information, an IRDA setup link or via a taskbar icon (if this was enabled during installation).

### Windows 2000 and XP

These operating systems also install drivers for the IRDA hardware if found during installation. However, Microsoft officially withdrew support for IRDA virtual serial ports in Windows 2000. This has caused problems for many hardware vendors to such an extent that several third parties have written drivers that 'add back' the virtual COM port support removed by Microsoft.

One of the commonest of these drivers can be downloaded from [ftp://ftp.campbellsci.co.uk/pub/csl/outgoing/IrCOMM2k\\_121\\_eng.zip](ftp://ftp.campbellsci.co.uk/pub/csl/outgoing/IrCOMM2k_121_eng.zip) . Further details or updates to these drivers can be found at <http://www.ircomm2k.de/>

Before installing these drivers please ensure you have up to date service packs installed for your operating system and that the IRDA hardware support is also installed. Then install the virtual COM port drivers by running the Setup program included in the Zip file. You will need to be logged onto the PC as a user with installation/administrative rights.

## 4. Operating Instructions

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**NOTE** Whichever computer system or software package is used (see below) **in all cases** the IRDA port on the computer needs to be aligned with the sensor on the SC-IRDA for at least 5 to 10 seconds before attempting to communicate with the datalogger.

This is to allow time for the two IRDA devices to recognize each other and to negotiate a working IR link. If a link is not established before you attempt communication, that specific attempt may fail or may take a prolonged period of time.

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### 4.1 Palm OS Handheld Software

To utilize the IRDA connection you need to select the IRDA option in the screens where the station parameters are selected. The program will then operate as normal from that point.

The only points to note that are specific to the IRDA interface are that you must ensure the IRDA sensors on the Palm PC and SC-IRDA are properly aligned. Check your Palm PC carefully, as the sensors are not easily identified on some models.

Once you have established a connection to the datalogger you will need to keep the Palm PC in the correct orientation to maintain the connection. The PConnect software will tolerate a short disturbance to the connection and the various protocols will ensure no loss of data. However, if the connection is broken for more than a few seconds the SC-IRDA may shut down. This may then require PConnect to be terminated, restarted, and the connection re-initialized before further data can be collected or displayed.

**NOTE** Some of the older, slower, Palm PCs are not able to keep up with the speed of transfer of data when using the option to read a datalogger program from the datalogger back to the Palm. For long programs you may find sections of the program missing, and so you should not rely on this mode. This should not generally be an issue, as the master copy of the program is normally generated and retained on the PC.

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### 4.2 PC Software

The SC-IRDA will work reliably with many PC communications packages. However, all IRDA interfaces have one characteristic that can upset automatic programs that expect to communicate via a serial port; this is the time that the interface takes to initialize. This can take several seconds as opposed to a few milliseconds with a standard serial port.

Many of Campbell Scientific's own programs will generate a warning message in a log file, or, in the worst case, not operate at all because of this unexpected delay. The degree of the problem varies to a degree with the speed of the PC being used, as faster PCs will have a shorter initialization time. Some guidance on the use of Campbell Scientific programs with the SC-IRDA interface is given below.

### 4.2.1 PC200W Version 1.2 and PC208W Version 3 (or later)

Both of these programs will work with the SC-IRDA on all but the slowest PCs. PC200W only supports COM 1 to COM 4, and so you must ensure the virtual IRDA serial port maps to one of these numbered ports. PC208W does not have this limitation.

Both of these programs will generate a warning message in the low level log files when the serial port is first opened. This can be ignored.

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**NOTE**

PC200W version 2.0 does not work with the SC-IRDA. Please contact Campbell Scientific to check if a later version is available which includes support.

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### 4.2.2 LoggerNet

Version 2.1 of LoggerNet works with the SC-IRDA but requires the addition of a Generic Modem to be inserted between the virtual COM port and the datalogger in the network map. The only non-default setting required in the Generic modem setup is the dial string which should be entered as "D5000". This setting forces LoggerNet to wait for 5 seconds after opening the serial port before it tries to communicate. Later versions of LoggerNet should not need this setting.

Users of Windows 98 or ME may encounter a problem with LoggerNet not allowing use of the virtual COM port assigned to the IRDA interface. This is due to inconsistencies in the way valid COM ports are reported to applications. Please contact Campbell Scientific for further advice on how to overcome this problem.

The version of SMS supplied with LoggerNet 2.1 will not allow communication to a storage module connected in parallel to a datalogger. Version 4.6 of SMS, which will be shipped with LoggerNet 2.2, is needed to allow for the extra start up delay associated with the IRDA interface. Please contact Campbell Scientific if you need a copy prior to the formal release of this version.

### 4.2.3 PC9000

All versions of PC9000 should work with the SC-IRDA interface by setting the program to operate via the virtual COM port assigned to the SC-IRDA. As with all PC programs, the serial port speed set on the PC does not actually control the real baud rate used to communicate with the datalogger. With PC9000 this is fixed at 9600 baud and cannot be changed. This baud rate may be a severe limitation if you need to transfer large volumes of data.

## 4.3 Optimizing the Datalogger Baud Rate

The speed of connection between the datalogger and SC-IRDA interface is set at 9600 baud by default, independently of any baud rate settings you enter in the PC software. This speed ensures "out of the box" operation with all Campbell Scientific dataloggers.

The interface itself has the capability to run at different baud rates, e.g. 1200, 9600 or 19200 baud. Using the higher speed setting will increase throughput of

data collection for dataloggers that support speeds higher than 9600 baud such as the CR23X and CR5000 dataloggers.

To use these speeds a simple ASCII string needs to be sent to the SC-IRDA before any communication is attempted with the datalogger. These strings and their function are shown in the table below.

String	Action
SETUP=0	1200baud SDC with ME fall back
SETUP=1	9600baud SDC with ME fall back
SETUP=2	19200baud SDC with ME fall back
SETUP=3	1200baud ME connect only
SETUP=4	9600baud ME connect only
SETUP=5	19200baud ME connect only

The first three options are the most commonly used where the SC-IRDA will attempt to connect as an SDC device and then fall-back to attempt connection as a ME (modem enabled device). Options 3 to 5 are only likely to be used if another SDC device is used at the same time.

To send the string, PC208W and LoggerNet require you to add a generic modem between the COM port and the datalogger in the network map. A command is then entered in the dial string for the generic modem as shown below:

D5000T"SETUP=2"

D5000 instructs the program to wait 5000 milliseconds after opening the serial port before transmitting the string that is entered in quotes (T).

#### 4.4 CSOS Datalogger Operating System Download Utility

With care, the SC-IRDA interface can be used as a communications method for upgrading the operating system in a datalogger. This will only work with the CR23X datalogger if the current operating system in the datalogger post-dates January 2003.

To ensure success, only attempt this process if you have no hard wire alternative and can ensure a stable and reliable IR link throughout the download process. For example, ensure that your PC batteries have sufficient power and the PC is not moved for the duration of the upload.





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