

# Cello 4S



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### About this Guide:

The Cello 4s is the latest variant of the Technolog Cellular range, models are available for monitoring multiple site parameters over 2G (SMS/GPRS), 3G, or Cellular IoT networks, providing a comprehensive multi-application solution for the Utilities and Industry.

This Cello 4s Programming Guide allows a new user to follow step-by-step instructions for first time installations of both software and product, leading to successful commissioning of the Cello 4s.

A Cello 4s supplied and labelled as '**2G QB' supports 2G SMS, TCP-IP and UDP communications.** The internal antenna supports 800 / 850 / 1800 / 1900 MHz

A Cello 4s supplied and labelled as '**3G\_GL**' **supports 2G SMS, TCP-IP, UDP and 3G SMS, TCP-IP, UDP communications.** The internal antenna supports 800 / 850 / 1800 / 1900 MHz. If a **SIM Card / network is used for supporting 3G '2100MHz' then** an **external antenna** supporting **2100Mhz should be attached** to the external aerial port .



### **Contents**

### Section 1: Installation and Configuration of WinGPS software

- 1.1 Preparing Local PC Security
- 1.2 Installing WinGPS
- 1.3 Installation of Local communication Cable
- 1.4 Configuration of WinGPS Communications Port

### Section 2: Remote Communication Options

- 2.1 Sending data to a Local instance of PMAC Plus via SMS
- 2.2 Sending data to a Local instance of PMAC Plus via a TCP/IP/UDP Data Connection
- 2.3 Sending data to a Local instance of PMAC Plus via a Data Connection through a DMZ
- 2.4 Sending data to WaterCore Web Server

### Section 3: Cello 4s SIM card Selection and Testing

- 3.1 SIM Card Selection
- 3.2 Disable PIN code
- 3.3 Insert the SIM into the Cello 4s
- 3.4 Cellular Signal testing

#### Section 4: Cello 4s Programming

- 4.1 Connect to Cello 4s
- 4.2 Configuring the Cello 4s

#### Section 5: Starting Recording

5.1 Starting Cellular Communications

#### Section 6: Diagnostic

- 6.1 Logger Menu
- 6.2 Tools Menu



### Section 1

### Installation and Configuration of WinGPS software

Cello 4s data loggers can be programmed locally by using WinGPS software, running on Windows 10 and above. WinGPS also supports diagnostic tools to monitor network communications.

### 1.1 Preparing Local PC Security

Prior to installation of Technolog WinGPS software, ensure that all login privileges for the local computer are set to local administrator, with full administrative privileges.

For WinGPS to work correctly, the Windows **User Account Control Settings** needs to be changed to 'Never Notify'. This is accessible by typing **UAC** in the Windows search box. Move the slider to the bottom position, 'Never Notify' as per the image below:

•	User Account Control Settings – 🗖 🗙
Choose when to be User Account Control he Tell me more about User Always notify	e notified about changes to your computer Ips prevent potentially harmful programs from making changes to your computer. Account Control settings
	<ul> <li>Never notify me when:</li> <li>Applications try to install software or make changes to my computer</li> <li>I make changes to Windows settings</li> <li>I make changes to Windows settings</li> </ul>
	OK Cancel

NOTE: Your computer must be restarted for this change to be enabled.



#### 1.2 Installing WinGPS

The latest WinGPS software is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: <a href="mailto:technolog.com">technolog.com</a>

Once you have downloaded and opened the folder, you will see the following files

Installation and Configuration of	Adobe Acrobat Document	265 KB	
LOGRVERS.DEF	DEF File	1 KB	
🐏 Site commissioning for specific net	Microsoft Word Document	12 KB	
📧 WinGPS.exe	Application	740 KB	

If a WINGPS installer package in not present then a new WinGPS folder should be manually created We suggest creating C:\WinGPS and extracting all files into that folder. If this is an upgrade then the files should be copied into the same original location, overwriting the ones already in there.

Now right-click on the WinGPS.exe file inside the folder and select to 'send shortcut to desktop' or Drag and drop onto desktop. When the shortcut has been created, this must be set to 'Run as Administrator' for WinGPS to function correctly.

To run as Administrator Right Click on the Shortcut Icon



	Open	This wi
	Open file location	1113 W
	Run as administrator	
ě	Import to Grammarly	
	Troubleshoot compatibility	
	Pin to Start	
8	Hex Edit with Hex Workshop v6.8	
	Pin to taskbar	
U	Scan for threats	
_	Restore previous versions	
	Send to >	
	Cut	
	Сору	
	Create shortcut	
	Delete	
	Rename	
	Properties	Select

This will bring up this screen

Select Properties

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Details	Previous versions		
Shortcut	Compatibility		
working correctly on t	this version of Windows,		
/ troubleshooter			
ompatibility settings m	anually?		
em in compatibility mo	ode for:		
	$\sim$		
ur mode			
~			
180 screen resolution			
een optimisations			
am as an administrate	pr		Click on Change Settings for all users
h DPI settings			
ngs for all users			
ОК	Cancel Apply	1	
Properties		Х	<u>-</u>
isers			This will bring up this screen
oblems with this pro- lier version of Windo that matches that e	gram and it worked ows, select the earlier version.		
le			
am in compatibility r	mode for:		
ur mode			
ir mode			
480 screen resolutio	n		
reen optimisations			
am as an administra	ator		Select run this program as an administrator and
h DPI settings			click on Apply and UK and UK again on the next screen
	vorking correctly on a min compatibility settings m a min compatibility mu amin compatibility mu amin compatibility mu away and a management (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (	Vorking correctly on this version of windows, atbillity troubleshooter. "troubleshooter" ympatibility settings manually? am in compatibility mode for: with mode 180 screen resolution een optimisations am as an administrator h DPI settings OK Cancel Apple 190 Screen resolution resolution of Windows, select the that matches that earlier version. He ram in compatibility mode for: with this program and it worked lier version of Windows, select the that matches that earlier version. He ram in compatibility mode for: with mode with mode for: with mode	Vorking correctly on this version of Windows, attributeshooter ympatibility settings manually? am in compatibility mode for: ur mode 180 screen resolution een optimisations am as an administrator h DPI settings OK Cancel Apply Properties × sers Soblems with this program and it worked lier version of Windows, select the that matches that earlier version. de ram in compatibility mode for: ur mode ur mode ur mode ram as an administrator the DPI settings

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When running WinGPS for the first time, a red banner will be displayed until the correct Comms Port is selected as per the image below. Before setting this up, go to the next section,



### **1.3** Installation of Local Communications Cable

The next stage is to install the appropriate local communications cable. There are typically two types of local communications cables supplied by Technolog for use with Cello 4s, as identified below.

**USB to Logger Cable** – (item NAV1000081) – Driver installation required. Connect directly to any available USB socket on a Windows Laptop/PC.



A driver must be loaded prior to inserting the cable. The latest installation driver is available from the manufacturer's link below:

http://www.ftdichip.com/Drivers/D2XX.htm

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<b>FTDI</b> Chip	Future Technology Devices International Ltd. THE USB BRIDGING SOLUTIONS SPECIALISTS
Home	D2XX Direct Drivers
Products	This page contains the D2XX drivers currently available for FTDI devices.
Urivers VCP Drivers	For Virtual COM Port (VCP) drivers, please click here.
D2XX Drivers D3XX Drivers	Installation guides are available from the Installation Guides page of the Documents section of this site for selected operating systems.
<u>Firmware</u>	
<u>Support</u>	D2XX Drivers

Currently Supported D2XX Drivers:

				Proce	ssor Architecture	e	
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	ARM	MIPS	SH4	Comments
Windows*	2017-08-30	2.12.28	2.12.28	-	-	-	WHQL Certified. Includes VCP and D2XX Available as a setup executable Please read the Release Notes and Installation Guides.
Windows RT	2014-07-04	1.0.2	-	1.0.2	-	-	A guide to support the driver (AN_271) is available here

Once installed, open Windows **Device Manager** to identify the COM Port number assigned for the Local communications cable. In the example below, COM 1 is shown. Make a note of this port number:



Alternative Comms Cable to the USB to Logger cable

Where a serial 9 pin Serial port (DB9) connector is available on a PC, Laptop or Tablet, no software drivers are required. This port can be utilised for connection to either a modem or Technolog's Serial to logger cable (NAV1000912).



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### 1.4 Configuration of WinGPS Communications Port

The WinGPS port settings can be opened by two methods:

1. By clicking on the Red Banner at the base of the WinGPS window to open the Options screen.



The correct Comm Port may be selected though the drop-down menu option in the topleft corner of the screen below:

Comms	Files	Misc			
	Comn	Port:	COM4	✓ Advanced	
Initi	al comm	s rate:	1200	~	
Ma	x comm	s rate:	9600	$\sim$	
Log	ger dete	ction:	Manual	~	
Ina	ctivity tin	neout:	5 🜲	mins	
I	nitial cha	ain ID:	0 \$	CTRL+n in main window	

Once a Comm Port has been selected, ensure the Initial comms rate remains at 1200 baud. The rest of the options can remain as they are.

Select OK to save these settings.

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### Section 2

### **Remote Communication Options**

The Cello 4s can be programmed to transmit data via SMS to a Host PC Modem or via a TCP IP / UDP connection.

### <u>Option 1:</u> Sending of Data directly to a Local Instance of PMAC Plus via SMS (Refer to Section 2.1)



<u>Option 2:</u> Sending Data directly to a Local Instance of PMAC Plus via a TCP/IP/UDP Data Connection (Refer to Section 2.2)



<u>Option 3:</u> Sending Data directly to a Local Instance of PMAC Plus via a Data Connection through a secure 'Demilitarised Zone' (DMZ). (Refer to Section 2.3)



Option 4: Sending Data directly to WaterCore (Refer to Section 2.4)

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### 2.1 Sending Data directly to a Local Instance of PMAC Plus via SMS



#### 2.1.1 Configure PMAC Plus server security settings.

Prior to the installation of Technolog PMAC Plus software, ensure that all login privileges for the local PC are set to local administrator, with full administrative privileges.

For Technolog software to work correctly, the Windows **User Account Control Settings** needs to be changed to 'Never Notify'. This is accessible by typing **UAC** in the Windows search box. Move the slider to the bottom position, 'Never Notify' as per the image below:

	User Account Control Settings – 🗖 🗙
Choose when to b User Account Control h Tell me more about Use Always notify	e notified about changes to your computer elps prevent potentially harmful programs from making changes to your computer. Account Control settings
-   -	Never notify me when:
	Applications try to install software or make changes to my computer     Imake changes to Windows settings
	Not recommended.
Never notify	
	SOK Cancel

NOTE: Your computer must be restarted for this change to be enabled.



### 2.1.2 Install PMAC Plus on Local Server

The latest PMAC Plus software is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: techsupport@technolog.com

PMAC Plus will only function correctly on Microsoft Windows 10 and higher, or Windows Server 2012 R2 and higher. Save this zip file to your computer:

To install PMAC Plus, unzip the files from the downloaded PMACPlus.zip file.

Right click on the 'Setup.exe' and right-click to 'Run as Administrator'

🛃 Setup.exe		05/09/2001.0	5
Setup.ini		Open	ß
setup.inx	۲	Run as administrator	В
·		Troubleshoot compatibility	

For a new installation, the following screens will appear:



Select Next>

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#### Select All Protocols.

InstallShield Wizard Select Protocol(\$)		V	×
Choose the Protocols to Install. At least one protocol must be installed.			
E5565 Protocol (Newlog 4, Metrolog 4)			
GPS Protocol (Newlog 3,Metrolog 3,Cello)			
Cello6 Protocol			
✓ Regulo Support (Requires .Net2)			
nstallShield			
	< Back	Next >	Cancel

#### Next>

The installation process will continue until the process has finished.

#### Note:

If Re-installing/Upgrading your system, the screen below will be displayed:

InstallShield Wizard
Setup Type Choose the setup type that best suits your needs.
Please Select an Install Operation
Re-Install / Upgrade
C Remove All
InstallShield
< Back Next > Cancel

Please restart the computer once the installation is complete:

<b>.</b>	
Setup ha use the p	is finished copying files to your computer. Before you can program, you must restart your computer.
Choose (	one of the following options and click OK to finish setup.
¢	Yes, I want to restart my computer now.
c	No, I will restart my computer later.

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After restarting the PC, you will be requested to update the PMAC Database. Select both options:

Select the databa	ase file to use within PMAC:		
c:\pmac\pmacsit	e.mdb	Browse	
, I▼ Transfer new into database I▼ Update site n	site information from DAT and L ames from the LGR file content	_GR files	
	OK Cancel		Select OK.
stallShield Wizard			7
	InstallShield Wizard Complete The InstallShield Wizard has successfully in Finish to exit the wizard.	installed %P. Click	
	K Back Finish	Cancel	Select Finish.

PMAC has now successfully installed.

Ensure PMAC Plus always runs in Administrator mode. Right-click on the Desktop icon, select Properties, Compatibility and 'Run this program as an administrator'

MAC Properties			×	
Security	Details	Previous Versions		
General	Shortcut	Compatibility		
this program isn't v nning the compatil	vorking correctly on this bility troubleshooter.	version of Windows, try		
Run compatibili	ty troubleshooter			
<u>ow do I choose co</u>	mpatibility settings man	ually?		
Compatibility mod	8			
Run this progra	am in compatibility mode	for:		
Windows 8		~		
Settings				
Reduced colo	rmode			
8-bit (256) color	~			
Run in 640 x 48	0 screen resolution			
Disable fullscr	een optimizations			
Run this progra	am as an administrator			
Channe hi				
Change ni	gii DFi sewilgs			
Change sett	ings for all users			
				Select Apply and then OK to fir

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When PMAC starts, a pop-up window appears, prompting for a Licence request key. This should be supplied by the company where you have acquired the PMAC software, or you could contact Technolog UK. In the case of the latter, please send an email to <u>techsupport@technolog.com</u> ensuring it contains a clear screen shot of the Licence Request Key, like this screen shot image to right.

MAC ONLICENSE	.0	
This software is r software by co You will n	unning under a trial license. You can fully li ontacting your local distributor or Technolog corelicensing@technolog.com eed to quote the license request key belov	cense this J UK at: v.
Licence request key	(send this to get your unlocking key):	
020 173215 10021	13 135189	
020 173215 10021 Enter a new softwa	re licence key then click 'Update':	
020 173215 10021 Enter a new softwa	re licence key then dick 'Update':	Update
020 173215 10021 Enter a new softwa	re licence key then dick 'Update':	Update

On receipt of the Activation code, enter your software licence key exactly as it reads, containing the spaces. Now select Update.

Alternatively select 'continue trial' to temporarily remove the screen. During the trial period, the full features of PMAC are available, with the licence key screen appearing intermittently.

### 2.1.3 Configure PMAC permissions

#### PMAC Plus requires various permissions in the registry to run in Windows.

Windows has two core variants, 32 bit and 64 bit. These variants have different registry structures:

#### 32 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Technolog Ltd\

#### 64 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\Technolog Ltd\

#### Note: PMAC requires full access to all these keys and the branches from each key.

#### **Disk Access**

PMAC is usually installed to C:\PMAC and the application requires full access to this folder and all sub folders. If PMAC is installed to another folder, the same rules apply. Please contact your IT administrator or email **techsupport@technolog.com** if you require any assistance with this procedure.

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#### 2.1.4 Enable 2 way SMS communication with PMAC Plus

When an SMS Modem is installed on the PMAC Server, an operator can request information remotely to check the operation of PMAC Plus and receive alarms.

To use this Service, send an email to local distributor or **techsupport@technolog.com**, requesting the 'Allow User SMS Interface facility' and advise if your PMAC server has a 32 Bit or 64 Bit Windows Operating System.

On receipt of the return email, place the file onto your desktop and run

### 2.1.5 Test the SIM Card intended for SMS HOST PC modem and remove the PIN Code Lock

Prior to inserting the SIM Card into any SMS PC Modem, it is important to check that the SIM card has the PIN Code disabled and has sufficient credit to perform 2-way SMS communications.

To ensure that the SIM card sends and receives SMS messages, simply insert into a Cellular phone and send a text message to and from the SIM card.

Refer to section 3.3 of this document for more instructions.

#### 2.1.6 Identify and install the appropriate PC Modem for SMS communications



#### Option A – Installing Fastrack FXT009 (For 2G Networks / SIM Cards only)

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Kit comprises of: DB15M to DB9F Serial Cable Aerial (SMA) RS232 DB9 Male to DB15 Female cable

If no RS232 DB9 Serial socket is available on the Server, it may be necessary to install a Prolific USB to RS232 adaptor cable (NAV1001944) where the drivers must be loaded prior to inserting the cable.



Download the latest installation driver from the link below; http://www.ftdichip.com/Drivers/VCP.htm

Ensuring the SIM Card is clean and free from fingerprints, install the SIM Card into the modem, ensuring the SIM Card lock mechanism is closed by sliding over the locking mechanism as shown in the images below:



Connect to an available RS232 DB9 Serial socket (or USB to RS232 Adaptor). Connect Aerial to Modem, connect Power Supply Unit (PSU) to the Fastrack Modem and wait until the LED starts to flash. A flashing led indicates that the SIM card has registered onto the network.

Open PMAC Plus as SYSTEM MANAGER:

User Name: Password:

system system



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PMAC Communication Settings (SYSTEM) ×

🃅 Psion NWL | 🏈 Global | 💋 PMAC-SMS | 🝙 Pagers 🌆 Devices | 🎧 Local | 層 Workabout

E- PMAC Plus

Select Edit, Communications Port



Cello Modems, Add.. Cello Modem Next>

Select the Communications Port to which the Cello Modem is connected to. Communications Port (COM?)

Next >

Select: Sierra Wireless / Wavecom FXT009

Next >



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2099UM9000 rev. 'B'.

<Back Next > Cancel



Setup Cello Baud Rate

Select Dial-Out Group

Enter Device Name

A unique name should be supplied to identify this device within PMAC Plus.

Baud Rate

GSM Modem
 X.25 Radio PAD

Cello Modern

Select the baud rate and type of modem / PAD to be used. GSM Modems default to 9600 Baud and X.25 Radio PAD's defaul

\*

< Back Next > Cancel

easi-out group to assign this device to. Id normally be left at the default value, but the device may ed to a different group by selecting one from the list or aut

•

<Back Next > Cancel

1.0

10.1

Set Baud Rate (serial connection to modem) Baud Rate: 115200 Select: Modem type

Next >

Dial-out Group: Select 'Cello Modems' **Next >** 

Name: Cello Modem #1 (editable)

Next >

Cancel

	Your communicat	on device will now i	be added to PMA	C
Ĩ				

Setup complete

**Restart PMAC Plus** 

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#### Option - B: Installation of Gemalto Modem (For 2G/3G SIM Cards)

Kit comprises of: EHSx Driver Installation USB-A to USB-B cable (see image) Aerial (SMA) Gemalto Modem



Locate the file EHSx Driver v1113.zip and unzip the contents. If you do not have this file, email **<u>techsupport@technolog.com</u>**.

Extract the supplied EHSx Driver v1113 file to desktop.

Open Windows Device Manager and connect the modem. You will see multiple entries in 'Other devices'



Right-click on each item, individually, to Update Driver.

Browse to desktop and to the EHSx Driver folder and select the USB sub-directory.



Sheet 20 of 92



You should see several entries for the Cinterion EHx USB in the Ports section but it is in the Modems parent option you need to check which details the port.



Find the correct COM port number by right-clicking on the device, Properties and select Modem.

In this instance the modem is shown to be connected to COM3

Details		Events	Power Manag	ement
General	Modem	Diagnostics	Advanced	Driver

Ensuring the SIM Card is clean and free from fingerprints, insert the SIM Card fully until you hear/feel the click of the locking mechanism.

If you need to remove the SIM, depressing the SIM card will eject it from the modem. Connect USB-B plug to the Gemalto Modem and the USB-A plug to the PC. Connect the Power Supply Unit (PSU) to the Gemalto Modem and attach the antenna. Wait until the GREEN LED illuminates and the RED LED starts to flash.





Initial status Static Green LED



2099UM9000 rev. 'B'.

After initialisation Static Green LED Flashing Red LED

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Open PMAC Plus in SYSTEM MANAGER:

Select Edit,

**Communications Port** 



Cello Modems, Add..

Cello Modem

Next>



Select the Communications Port which the Host Modem is connected.

Communications Port (COM?)

Next >

Select: Gemalto 3G Modem

Next >

Set Baud Rate (serial connection to modem)

Baud Rate: 115200 Select; Modem type

Next >







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Dial-out Group:

Select Cello Modems Next >

Name: Cello Modem #1 (editable)

Next >







Finish >

Setup complete

**Restart PMAC Plus** 

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DMR No.: N/A



### 2.1.7 Check the Host Modem (i.e. Option A or Option B) is visible in PMAC comms driver window

Open the Communications Device(s) and 'click' on this icon 🚺 on the Windows toolbar.

The PMAC Communications window should open detailing all communication devices installed in PMAC. This screen also shows the PMAC version. You may need to provide this version number if requested by Tech Support.

If the Cello Modem has been installed correctly the modem will display "Searching for Cello Data" as per below:

MAC Communicati	ons (5.11	6)	
Name	Site ID	Activity	
Local Cello Modem #1 SMS Processor (2) Cello 3 Manager (3) Cello 6 Manager (4)	0 0 0 0	Idle Searching fa Idle Idle Idle	or Cello Data
Selected Comms De Curre Telepho	tails COM Po ent Protoc one Numb	ort: :ol: E5565 er:	
Global Information Total Packets Trans Total Packets Recei	mitted: 0 ved: 0		Setup Comms Close

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### 2.1.8 Confirm Operation of Host Modem

Send a text message in international format (i.e. +44..) containing only the letter **S** to the SIM Card in the Host Modem.

On receipt of this message, the Host Modem will reply with the status of PMAC.

The message on the phone should display 'PMAC is running'.

However, if you do not receive a reply, please confirm the following:

- PMAC Plus is running.
- The PC modem communications cable is plugged into the correct communication port
- The modem is switched on (LED is illuminated and indicating modem registration)
- The SIM card is correctly installed with the locking mechanism closed.
- The SIM PIN Code is disabled.
- The SIM 'SMS' number sent from the phone is correct.
- Registry entries have been added (See Section 2.1.3 of this document).

However, if all the above have been checked, it may be necessary to validate the SIM again by placing the SIM inside a mobile phone and sending a SMS text message to another mobile / cellular phone.



### 2.2 <u>Sending Data directly to Local Instance of PMAC Plus via a TCP IP/UDP</u> Data Connection



### 2.2.1 Configure PMAC Plus server security settings.

Prior to the installation of Technolog PMAC Plus software, ensure that all login privileges for the local PC are set to local administrator, with full administrative privileges.

For Technolog software to work correctly, the Windows **User Account Control Settings** needs to be changed to 'Never Notify'. This is accessible by typing **UAC** in the Windows search box. Move the slider to the bottom position, 'Never Notify' as per the image below:

	User Account Control Settings – 🗖 🗙
Choose when to b User Account Control In <u>Tell me more about Use</u> Always notify	e notified about changes to your computer elps prevent potentially harmful programs from making changes to your computer. Account Control settings
-   -	Never notify me when:
	<ul> <li>Applications try to install software or make changes to my computer</li> <li>I make changes to Windows settings</li> </ul>
	1 Not recommended.
Never notify	
	GOK Cancel

NOTE: Your computer must be restarted for this change to be enabled.

Sheet 26 of 92



### 2.2.2 Install PMAC Plus on Local Server

The latest PMAC Plus software is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: techsupport@technolog.com

PMAC Plus will only function correctly on Microsoft Windows 7 and higher, or Windows Server 2012 R2 and higher. Save this zip file to your computer:

To install PMAC Plus, unzip the files from the downloaded PMACPlus.zip file.

Right click on the 'Setup.exe' and right-click to 'Run as Administrator'

🛃 Setup.exe		05/09/2001 0	5
Setup.ini		Open	B
setup.inx	۲	Run as administrator	В
·		Troubleshoot compatibility	

For a new installation, the following screens will appear:



Select Next>

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#### Select All Protocols.

InstallShield Wizard Select Protocol(s)		V	×
Choose the Protocols to Install. At least one protocol must be installed.			
E5565 Protocol (Newlog 4, Metrolog 4)			
GPS Protocol (Newlog 3,Metrolog 3,Cello)			
Cello6 Protocol			
Regulo Support (Requires .Net2)			
nstallShield			
	< Back	Next >	Cancel

#### Next>

The installation process will continue until the process has finished.

#### Note:

If Re-installing/Upgrading your system, the screen below will be displayed:

InstallShie	Id Wizard ×
Setup Type Choose the setup type that best suits your need	s.
Please Select an Install Operation	
Re-Install / Upgrade	
C Remove All	
InstallShield	
	< Back Next > Cancel

Please restart the computer once the installation is complete:

<b>.</b>	
Setup ha use the p	is finished copying files to your computer. Before you can program, you must restart your computer.
Choose (	one of the following options and click OK to finish setup.
¢	Yes, I want to restart my computer now.
c	No, I will restart my computer later.

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DMR No.: N/A



After restarting the PC, you will be requested to update the PMAC Database. Select both options:



#### PMAC has now successfully installed.

Ensure PMAC Plus always runs in Administrator mode. Right-click on the Desktop icon, select Properties, Compatibility and 'Run this program as an administrator'

PMAC Properties			×	
Security	Details	Previous Versions		
General	Shortcut	Compatibility		
If this program isn't w running the compatib Run compatibilit	orking correctly on this ility troubleshooter. v troubleshooter	version of Windows, try		
How do I choose con	npatibility settings man	ually?	-2	
Run this progra	m in compatibility mode	e for:		
Windows 8		~		
			-8-	
Settings				
Reduced color	mode			
8-bit (256) color	~			
Run in 640 x 48	screen resolution			
Disable fullscre	en optimizations			
Run this progra	m as an administrator			
Change hig	h DPI settings			
			-12	
🛟 Change setti	ngs for all users			
				Select Apply and then OK to fin

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When PMAC starts, a pop-up window appears, prompting for a Licence request key. This should be supplied by the company where you have acquired the PMAC software, or you could contact Technolog UK.

In the case of the latter, please send an email to <u>techsupport@technolog.com</u> ensuring it contains a clear screen shot of the Licence Request Key, like this screen shot image to right.

MAC UNLICENSED		×
This software is running software by contact cor You will need to	g under a trial license. You can full ng your local distributor or Techno elicensing@technolog.com o quote the license request key be	l <mark>y lice</mark> nse this blog UK at: elow.
cence request key (send	this to get your unlocking key):	
nter a new software lice	nce key then click 'Update':	
		Update
	Incorrect licence key	
	Continue Trial 10	
	Conunde mai 19	

On receipt of the Activation code, enter your

software licence key exactly as it reads, containing the spaces. Now select Update.

Alternatively select 'continue trial' to temporarily remove the screen. During the trial period the full features of PMAC are available, with the licence key screen appearing intermittently.

### 2.2.3 Configure PMAC permissions

#### PMAC Plus requires various permissions in the registry to run in Windows.

Windows has two core variants, 32 bit and 64 bit. These variants have different registry structures:

#### 32 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Technolog Ltd\

#### 64 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\Technolog Ltd\

#### Note: PMAC requires full access to all these keys and the branches from each key.

#### **Disk Access**

PMAC is usually installed to C:\PMAC and the application requires full access to this folder and all sub folders. If PMAC is installed to another folder, the same rules apply. Please contact your IT administrator or email **techsupport@technolog.com** if you require any assistance with this procedure.

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### 2.2.4 TGSN Installation Overview

To provide both security and communications with the Cello 4s, PMAC Plus uses a TGSN (Technolog GPRS Service Node) module.

This can be installed in between the 'dirty' internet and 'clean' corporate network as required.

The TGSN module may be either installed onto the same server as PMAC Plus (as described below) **or** onto a separate server (i.e. within what we call a DMZ). For security, we normally recommend the latter option, with the TGSN module situated away from the corporate network, residing between two firewalls creating a Demilitarised Zone (DMZ).



The TGSN module performs two key roles:

- Receives and stores any inbound data / alarms sent by the Cello 4s for subsequent collection by PMAC Plus.
- Allows outgoing messages from PMAC to be collected by the Cello 4s upon next inbound connection.

Any outgoing messages to the Cello data logger from PMAC Plus (i.e to fill data gaps) can be thought of as being stored in the TGSN 'outcache' for collection by the Cello. Oubound messages are picked-up when the Cello next communicates with the server installed with the TGSN module.

If the TGSN module is to be installed onto a separate server, away from PMAC, one firewall is normally configured to allow inbound traffic from the outside world, whilst the firewall separating the TGSN module from PMAC should be configured to allow outbound traffic, i.e. from PMAC to the TGSN module on a specific port. This method prevents any potential unauthorised 'inbound' connections through to the corporate network.

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As a minimum requirement you would need a static IP address / domain name for the Cello to send data to. Traffic arriving on this address may need to be port -forwarded to the PMAC server inside the corporate network.

For data communications;

- Cello's should be configured for GPRS/3G/NB-IoT data requiring a specific configuration file.
- The Cello SIM telephone number should be saved into the 4s
- Network APN, user name and password would need to programmed into the Cello 4s



### 2.2.5 Installing TGSN Communication Module onto PMAC Local Server

The latest TGSN software module is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: techsupport@technolog.com

- 1. Ensure that the computer is logged in under Administrator mode.
- 2. Create a folder called TGSN, ideally on your local computer's C: drive (C:\TGSN), then extract the TGSN.exe & the TGSN\_PMAC-Setup (32 or 64).reg files into that folder.
- 3. Ensure all Users have full permissions for this TGSN folder. Right-click on the folder and select Properties. Click Edit and grant full permissions for each group or user name listed in the window, Clicking on Apply → OK to take you back to the TGSN Properties menu.

Permissions for Users		Allow	Deny
Full control		$\mathbf{\nabla}$	□ <u>^</u>
Modify		$\checkmark$	
Read & execute		$\checkmark$	
List folder contents		$\checkmark$	
Read		$\checkmark$	
E	ОК	Cancel	Apply

4. Select 'Advanced...

Replace all child object permission entries with inheritable permission entries from this object			
	ОК	Cancel	Apply

Place a tick next to 'Replace all child object permission entries.."

5. Identify if the computer is running Windows 32 or 64-bit and within the TGSN folder, rename the correct file (either TGSN-PMAC-Setup (32).re1 or TGSN-PMAC-Setup (64).re1) from .re1 to .**reg** 

For example a 64-bit Windows computer you would need to rename the file to: **TGSN-PMAC-Setup (64).reg** 

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Now double-click on this to run the file. This will copy the TGSN information to Windows registry:

Registry	y Editor	
	Adding information can unintentionally change or delete values and cause components to stop working correctly. If you do not trust the source of this information in C:\TGSN\TGSN-PMAC-Setup (64).reg, do not add it to the registry. Are you sure you want to continue?	
	Yes No	
Select	t Yes	
🚺 Re	gistry Editor	×
1	The keys and values contained in C:\TGSN\TGSN-PMAC-Setup (64).reg have been s added to the registry.	uccessfully
	Γ	ОК

Still within the TGSN folder, rename the TGSN.ex\_ file to TGSN.exe (confirm the change).Right-click on this file and choose Properties, Compatibility, 'Change settings for all users' and select the 'Run this program as administrator; option. Now select OK, and OK again to come out of Properties.

TGSN.exe Properties	$\times$		
General Compatibility Security Details Previous Versions			
TGSN.exe Properties	×		
Compatibility for all users			
If you're having problems with this program and it worked correctly on an earlier version of Windows, select the compatibility mode that matches that earlier version.			
Compatibility mode			
Run this program in compatibility mode for:			
Windows 8 $$			
Settings Reduced colour mode 8-bit (256) colour Run in 640 x 480 screen resolution			
run tnis program as an administrator			
Change high DPI settings			
OK Cancel Appl	/		

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 Through Windows, you now need to open up the DOS Command Prompt. Search for 'Command' or 'CMD', highlight the program, and then right –click on Run as Administrator:



- 8. Inside the Command Prompt window, type in **cd \tgsn** to change to the TGSN folder (presuming the folder has been created in the recommended location of C:\TGSN). Your prompt should now be **C:\TGSN>**
- 9. Type in **tgsn /install** and press return. There is no confirmation this has worked, the prompt will just return to C:\TGSN>

Command Prompt			
C:\TGSN>tgsn C:\TGSN>	/install		

- 10. Now restart the computer.
- 11. Once restarted, browse to TGSN folder. There should now be a new folder in there called Logs. Open this folder and there will be a text file. This is a TGSN debug file, and will be named something like (date) \_PMACDbg.txt
- 12. Open this text file using Windows Notepad and it will display a TGSN key request number, as per the screen below:

2012_09_06_PMACDbg.txt - Notepad	
File Edit Format View Help	
16:16:28.923(tid=01084)TGSN failed to start. Incorrect software key. 16:16:28.923(tid=01084)Please call Technolog Limited (UK) quoting TGSN key request number: "21800	079038 181034 "
4	Þ.

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- 13. Copy this number in an email to Technolog Tech Support: **techsupport@technolog.com** (or your Technolog Sales Representative) and an unlock code registry file will be supplied by return email. **Please state if this is for a 32 or 64-bit computer when you request the unlock key.**
- 14. Rename the unlock code file from **.re\_** to **.reg** upon receipt and run this. Select Yes to copy this to registry, and then OK to exit.
- 15. Now restart the computer again.
- 16. Check that the TGSN service has been installed correctly by typing in **Services** in Windows search and then looking for the TGSN entry. The TGSN service should be running:

A Carriere					_	~
Services				_	Ш.	X
File Action View Help						
Services (Local)						
TGSN	Name	Description	Status	Startup Type	Log On As	^
	🌼 Telephony	Provides Tel		Manual	Network Se	
Stop the service	🖏 TGSN	Technolog G	Running	Automatic	Local System	
<u>Restart</u> the service	🏩 Themes	Provides use	Running	Automatic	Local System	
	🆏 Time Broker	Coordinates	Running	Manual (Trigg	Local Service	
Description: Technolog GPRS Support Node	🎑 Touch Keyboard and Handw	Enables Tou	Running	Manual (Trigg	Local System	
	🎑 Update Orchestrator Service	Manages Wi	Running	Automatic (De	Local System	

- 17. If the service is listed and running then skip to part 18. If it is not listed or not running then continue below.
- 18. Check the security permissions for the TGSN folder as per Step 2. above, and also ensure that users have full permissions for both Technolog entries in Windows registry. If PMAC is installed locally then this should have been set up at the time PMAC Plus was installed. If not then see below

32 bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY LOCAL MACHINE\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Technolog Ltd\

64 bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd entries \
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\Technolog Ltd\

PMAC and TGSN require **full access** to all these keys and the sub branches from each key.
19. Configure PMAC Communications



PMAC Communication Settings (SYSTEM) × 🗑 Psion NWL | 🛞 Global | 👩 PMAC-SMS | 🝙 Pagers

🔐 Local 🛛 📟 Workabout

< Back Next > Cancel

×

Devices

Run PMAC Plus and Log in as System Manager	→ ₩ X28 PADs → ♥ X28 PADs □-■ Cello Modems
Edit, Communication Ports.	☐
Select 'Utility Data Networks' and select 'Add'	Add Remove Properties
	OK Cancel Help
	Select Device Type
20. Select Utility Data Network (TMSC/TGSN) Next >	Select the type of device to be configured for use with FMAC PLus. C Modem C X28 Radio PAD C Calo Modem C Utily Data Network (TMSC/TGSN)
	< Back Next > Cencel
	Utility Data Network (TMSC/TGSN) Connection Address
21. Click on the pulldown to select; Local GPRS Service Select Next >	Please etiter select one of the default Likity Data Network addresses or select "Manual" and enter the details below: Local GPRS Service  Manual Connection Settingst  Server Address Server Port Use Web (HTTP)
	< Back Next > Cancel
22. Leave the Account Name & Password as;	Utility Data Network (TMSC/TGSN) Account Details
Account Name / System ID: PMAC Password: PMAC	Account Name (r System ID) and Password below: Account Name / System ID: PMAC Password: PMAC
	< Back Next > Cancel
23. Select the default Dial-out group: Utility Network	Select Dial-Out Group     Dial-Out Group     Select Dial-Out Grou

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2099UM9000 rev. 'B'.



24. Keep the default selection

Select Next >

Enter Device Name	×
A unique name should be supplied to identify this device within PMAC Plus.	
Name [Local GPRS #1]	1
< Back Next> Cancel	

Add Communication Device
Your communication device will now be added to PMAC.
Finish Cancel

25. Select Finish >

#### 2.2.6 Check that the TGSN connection is visible in PMAC comms driver window

Open the Communications Device(s) and 'click' on this icon in the PC toolbar

The PMAC Communications window should open detailing all communication devices installed in PMAC. The TGSN entries should say "Waiting for Messages" as per below:

Name	Site ID	Activity	
Local Fastrack FXT009 Local GPRS #1T Local GPRS #1R SMS Processor (4) Cello 3 Manager (5) Cello 6 Manager (6)	0000000	Ide Waiting For I Waiting for M Vaiting for M Ide Ide Ide Ide	Port Messages Messages
Selected Comms De Curre Telepho	tails COM Po ent Protoco one Numb	ort: COM1 :ol: E5565 er:	
Selected Comms De Curre Telepho Global Information	tails COM Po ent Protoc one Numb	ort: COM1 :ol: E5565 er:	Setup Comm

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### 2.2.7 Check Cello TCP – IP Inbound Connection

The external IP address / domain name and port number is typically programmed directly into the Cello.

The router (if fitted) should forward incoming traffic arriving on port 1801 to the TGSN Module.

This connection should be tested prior to setting up the Cello.

A typical online site to check this is detailed below:

https://yougetsignal.com/tools/open-ports/



This tool checks that any TCP-IP / UDP data connections to that external IP address are correctly port forwarded to the TGSN server.

Please ensure your port forwarding of data from the router to the TGSN module is configured correctly and the TGSN application is not being blocked by any firewalls.



### 2.3 <u>Sending Data directly to Local Instance of PMAC Plus via a Data Connection</u> <u>through a Demilitarised Zone (DMZ)</u>



### 2.3.1 Configure PMAC Plus <u>AND</u> TGSN server security settings.

Prior to the installation of Technolog PMAC Plus and TGSN software, ensure that all login privileges for the local PC are set to local administrator, with full administrative privileges.

For Technolog software to work correctly, the Windows **User Account Control Settings** needs to be changed to 'Never Notify'. This is accessible by typing **UAC** in the Windows search box. Move the slider to the bottom position, 'Never Notify' as per the image below:

User Account Control Settings	- • ×
Choose when to be notified about changes to your computer User Account Control helps prevent potentially harmful programs from making [tell memore about User Account Control setting] Always notify	changes to your computer.
News solid me when	
Applications try to install software or make cha my computer     I make changes to Windows settings	nges to
Not recommended.	
Never notify	
[	₩OK Cancel

NOTE: Your computer must be restarted for this change to be enabled.



### 2.3.2 Install PMAC Plus on Local Server (Outside of DMZ)

The latest PMAC Plus software is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: techsupport@technolog.com

PMAC Plus will only function correctly on Microsoft Windows 7 and higher, or Windows Server 2012 R2 and higher. Save this zip file to your computer:

To install PMAC Plus, unzip the files from the downloaded PMACPlus.zip file.

Right click on the 'Setup.exe' and right-click to 'Run as Administrator'

🛃 Setup.exe		05/09/2001 0	5
Setup.ini		Open	B
setup.inx	۲	Run as administrator	В
·		Troubleshoot compatibility	

For a new installation, the following screens will appear:



Select Next>

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#### Select All Protocols.

InstallShield Wizard Select Protocol(s)		V	×
Choose the Protocols to Install. At least one protocol must be installed.			
E5565 Protocol (Newlog 4, Metrolog 4)			
GPS Protocol (Newlog 3,Metrolog 3,Cello)			
Cello6 Protocol			
Regulo Support (Requires .Net2)			
nstallShield			
	< Back	Next >	Cancel

#### Next>

The installation process will continue until the process has finished.

#### Note:

If Re-installing/Upgrading your system, the screen below will be displayed:

InstallShie	Id Wizard ×
Setup Type Choose the setup type that best suits your need	s.
Please Select an Install Operation	
Re-Install / Upgrade	
C Remove All	
InstallShield	
	< Back Next > Cancel

Please restart the computer once the installation is complete:

Restar	ting Windows
Setu use	up has finished copying files to your computer. Before you can the program, you must restart your computer.
Cho	ose one of the following options and click OK to finish setup.
	Yes, I want to restart my computer now.
	C No, I will restart my computer later.

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After restarting the PC, you will be requested to update the PMAC Database. Select both options:

Select the	e database file to use within	n PMAC:
c:\pmac\	pmacsite.mdb	Browse
into di	atabase to site names from the LCP	) file contents

#### Select OK.

InstallShield Wizard	
	InstallShield Wizard Complete The InstallShield Wizard has successfully installed %P. Click. Finish to exit the wizard.
	< Back Finish Cancel

PMAC has now successfully installed.

#### **Select Finish**

Ensure PMAC Plus always runs in Administrator mode. Right-click on the Desktop icon, select Properties, Compatibility and 'Run this program as an administrator'

Security	Details	Previous Versions	
General	Shortcut	Compatibility	
his program isn't w nning the compatib Run compatibilit	vorking correctly on this bility troubleshooter. And troubleshooter and the set of the s	version of Windows, try	
Compatibility mod	e am in compatibility mod	e for:	
Windows 8		~	
Settings			
Reduced color	mode		
8-bit (256) color	$\sim$		
Run in 640 x 48	0 screen resolution		
Disable fullscr	een optimizations		
Run this progra	am as an administrator		
Change hi	gh DPI settings		



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When PMAC starts, a pop-up window appears, prompting for a Licence request key. This should be supplied by the company where you acquired the PMAC software, or you could contact Technolog UK In the case of the latter, please send an email to **techsupport@technolog.com** ensuring it contains a clear screen shot of the Key code and the code number, complete with spaces.

PMAC UNLICENSED	×
This software is running under a trial license. You can fully license software by contacting your local distributor or Technolog UK at corelicensing@technolog.com You will need to quote the license request key below.	this :
Licence request key (send this to get your unlocking key):	
020 173215 100213 135189	
Enter a new software licence key then click 'Update':	
Upda	te
Incorrect licence key	

On receipt of the Activation code, enter your software licence key exactly as it reads, containing the spaces. Now select Update.

Alternatively select 'continue trial' to temporarily remove the screen. During the trial period the full features of PMAC are available, with the licence key screen appearing intermittently.

### 2.3.3 Configure PMAC permissions

#### PMAC Plus requires various permissions in the registry to run in Windows.

Windows has two core variants, 32 bit and 64 bit. These variants have different registry structures:

#### 32 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Technolog Ltd\

#### 64 Bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\Technolog Ltd\

#### Note: PMAC requires full access to all these keys and the branches from each key.

#### **Disk Access**

PMAC is usually installed to C:\PMAC and the application requires full access to this folder and all sub folders. If PMAC is installed to another folder, the same rules apply. Please contact your IT administrator or email **techsupport@technolog.com** if you require any assistance with this procedure.

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### 2.3.4 TGSN Installation Overview

To provide both security and communications with the Cello 4s, PMAC Plus uses a TGSN module. This can be installed in between the 'dirty' internet and 'clean' corporate network as required. The TGSN module may be either installed onto the same server as PMAC Plus **or** onto a separate server (as described below) i.e. within what we call a DMZ. For security, we normally recommend the latter option, with the TGSN module situated away from the corporate network, residing between two firewalls creating a Demilitarised Zone (DMZ).



The TGSN module performs two key roles:

- Receives and stores any inbound data / alarms sent by the Cello 4s for subsequent collection by PMAC Plus
- Allows outgoing messages from PMAC to be collected by the Cello 4s upon next inbound connection.

Any outgoing messages to the Cello data logger from PMAC Plus (i.e to fill data gaps) can be thought of as being stored in the TGSN 'outcache' for collection by the Cello. Oubound messages are picked-up when the Cello next communicates with the server installed with the TGSN module.

If the TGSN module is to be installed onto a separate server, away from PMAC, one firewall is normally be configured to allow inbound traffic from the outside world, whilst the firewall separating the TGSN module from PMAC should be configured to allow outbound traffic, i.e. from PMAC to the TGSN module on a specific port. This method prevents any potential unauthorised 'inbound' connections through to the corporate network.

As a minimum requirement, a static IP address / domain name for the Cello to send data to is required. Traffic arriving on this address may need to be port -forwarded to the PMAC server inside the corporate network. The Cello should be configured for GPRS/3G data using a specific configuration file.

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### 2.3.5 Installing TGSN Communication Module inside DMZ

The latest TGSN software module is available via your personal portal on the Technolog Sharefile system. If you do not have access to this then please contact Technolog Technical Support to arrange to set this up. Email: techsupport@technolog.com

- 1. Create a folder called TGSN, ideally on your local computer's C: drive (C:\TGSN), then extract the contents of the downloaded TGSN.zip to that folder.
- 2. Ensure all Users are allowed full permissions for this TGSN folder. Right-click on the folder and select Properties, Security and select the Users group at the bottom of the list. Click Edit and allow Full control before clicking on Apply and OK:

Permissions for Users	Allow	Deny
Full control	$\checkmark$	□ <u>^</u>
Modify	$\checkmark$	
Read & execute	~	
List folder contents	~	
Read	~	
L		
ОК	Cancel	Apply

3. Identify if the computer is running Windows 32 or 64-bit and within the TGSN folder, rename the correct file (either TGSN-PMAC-Setup (32).re1 or TGSN-PMAC-Setup (64).re1) from .re1 to .**reg** 

For example a 64-bit Windows computer you would need to rename the file to: **TGSN-PMAC-Setup (64).reg** 

4. Now double-click on this to run the file. This will copy the TGSN information to Windows registry:

Registry	/ Editor
	Adding information can unintentionally change or delete values and cause components to stop working correctly. If you do not trust the source of this information in C:\TGSN\TGSN-PMAC-Setup (64).reg, do not add it to the registry. Are you sure you want to continue?
	Yes No

#### Select Yes

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() Rec	jistry Editor	×
1	The keys and values contained in C:\TGSN\TGSN-PMAC-Setup (64).reg have badded to the registry.	been successfully
		ОК

5. Still within the TGSN folder, rename the TGSN.ex\_ file to TGSN.exe (confirm the change), before right-clicking on this and choosing Properties, Compatibility, 'Change settings for all users' and select the 'Run this program as administrator; option. Now select OK, and OK again to come out of Properties.

TGSN.exe Properties	$\times$
General Compatibility Security Details Previous Versions	
TGSN.exe Properties	×
Compatibility for all users	
If you're having problems with this program and it worked correctly on an earlier version of Windows, select the compatibility mode that matches that earlier version.	
Compatibility mode	
Windows 8 🗸	
Settings	
Reduced colour mode	
8-bit (256) colour 🛛 🗸	
Run in 640 x 480 screen resolution	
Disable full-screen optimisations	
Run this program as an administrator	
Change high DPI settings	
OK Cancel Appl	У

 Through Windows, you now need to open up Command Prompt. Search for 'Command' or 'CMD' and then right –click on the program to run as Administrator:



7. Inside the Command Prompt window, type in **cd \tgsn** to change to the TGSN folder (presuming the folder has been created in the recommended location of C:\TGSN). Your

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prompt should now be C:\TGSN>

8. Type in **tgsn /install** and press return. There is no confirmation this has worked, the prompt will just return to C:\TGSN>

💽 Command F	Prompt
C:\TGSN>tgsn	/install
C:\TGSN>	

- 9. Now restart the computer.
- 10. Once restarted, browse to TGSN folder. There should now be a new folder in there called Logs. Open this folder and there will be a text file. This is a TGSN debug file, and will be named something like (date) \_PMACDbg.txt
- 11. Open this text file using Windows Notepad and it will display a TGSN key request number, as per the screen below:

I 2012_09_06_PMACDbg.txt - Notepad		_ 0	23
File Edit Format View Help			
16:16:28.923(tid=01084)TGSN failed to start. Incorrect software key. 16:16:28.923(tid=01084)Please call Technolog Limited (UK) quoting TGSN key request number: "	218000 079038	181034 "	
			-
			E LE

- 12. Copy this number in an email to Technolog Tech Support: **techsupport@technolog.com** (or your Technolog area representative) and an unlock code registry file will be supplied by return email. **Please state if this is for a 32 or 64-bit computer when you request the unlock key.**
- 13. Rename the unlock code file from **.re\_** to **.reg** upon receipt and run this. Select Yes to copy this to registry, and then OK to exit.
- 14. Now restart the computer again.
- 15. Check that the TGSN service has been installed correctly by typing in **Services** in Windows search and then looking for the TGSN entry. The TGSN service should be Running:

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Services					_		×
File Action View	w Help						
Services (Local)	Services (Local)						
	TGSN	Name	Description	Status	Startup Type	Log On As	^
	Stop the service Restart the service	TGSN	Technolog G	Running	Automatic	Local System	
	Description: Technolog GPRS Support Node	<ul> <li>Time Broker</li> <li>Touch Keyboard and Handw</li> <li>Update Orchestrator Service</li> </ul>	Coordinates Enables Tou Manages Wi	Running Running Running Running	Manual (Trigg Manual (Trigg Manual (Trigg Automatic (De	Local System Local Service Local System Local System	1

- 16. If the service is listed and running then skip to 18. If it is not listed or not running then continue below.
- 17. Check the security permissions for the TGSN folder as per Step 2. above, and also ensure that users have full permissions for both Technolog entries in Windows registry. If PMAC is installed locally then this should have been set up at the time PMAC Plus was installed. If not then see below for the entries:

32 bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Technolog Ltd\

64 bit

- HKEY\_CURRENT\_USER\Software\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\TechnologLtd\
- HKEY\_LOCAL\_MACHINE\Software\Wow6432Node\Technolog Ltd\

PMAC and TGSN require **full access** to all these keys and the sub branches from each key.

18. Configure PMAC Communications

Run PMAC Plus and Log in as System Manager

Edit, Communication Ports.

Select 'Utility Data Networks' and select 'Add'

PMAC Communication Settings (SYSTEM)	×
📅 Psion NWL   🛞 Global   👩 PMAC-SMS   🝙 Par 🌉 Devices   🙀 Local   📟 Workabou	gens   t
■ PMAC Plus     Modems     Modems     Sello Modems     Cello Modem #1 (COM2)     E-@ Utility Data Network (TMSC/TGSN)	
Add Remove Properties	
OK Cancel Help	



19. Select Utility Data Network (TMSC/TGSN)

Next >

20. From the pull down menu select Manual

Enter the IP address or machine name of where the TGSN module is installed

Enter the Server Port number (8100 by default)

Select Next >

Celo Moden Cutity Data Network (TMSC/TGSN) Cutity Data Network (TMSC/TGSN) Cancel Please either select one of the default Utility Data Network addresses or select "Manual" and enter the details below. Manual Manual Connection Settings Server Address or computer name Server Port 100 Use Web (HTTP)

Select Device Type Select the type of device to be configured for use with PMAC Plus.

X.28 Radio PAD

21. Leave the Account Name & Password as;

Account Name / System ID: PMAC Password: PMAC

22. Select the default Dial-out group: Utility Network

Utility Data	Network (TMSC/TGSN) Account Details	×
	Please enteryour Utility Data Network / TMSC / TGSN Account Name (or System ID) and Password below:	
	Account Name / System ID: [PMAC Password: [PMAC]	
	< Back Next > Cance	

Port For	warding	Tester		
your extern	nal address	S		
81.145.XX.XXX	<			
open port f	inder			
Remote Address	XXX.XXX.XXX	Port Number	1801	Check
	I Use Current IP			
Check a port's sta	atus by entering	an address and p	port nur	nber above.

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23. Enter the name for the TGSN server

Select Next >

24. Select Finish >

**Restart PMAC** 

Enter Device Marine	
A unique name should be supplied to identify this device within FRAC Plus. Name [Local GPRS #1]	
< Baok Next> Canor	k
Add Communication Device	×
Your communication device will now be added to PMAC.	
Finish Cancel	

### 2.3.6 Check that the TGSN connection is visible in PMAC comms driver window

Open the Communications Device(s) and 'click' on this icon in the PC toolbar

The PMAC Communications window should open detailing all communication devices installed in PMAC. The TGSN entries should say "Waiting for Messages".

Name	Site ID	Activity	
Local Fastrack FXT009 Local GPRS #1T Local GPRS #1R SMS Processor (4) Cello 3 Manager (5) Cello 6 Manager (6)	000000	Ide Waiting For Waiting for Vaiting for Ide Ide Ide	Port Messages Messages
Selected Comms De Curre Telepho	tails COM Po ent Protoco one Numb	ort: COM1 col: E5565 eer:	
Selected Comms De Curre Telepho Global Information -	tails COM Po ent Protoco one Numb	ort: COM1 col: E5565 eer:	Setup Comms

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The external IP address / domain name and port number is typically programmed directly into the Cello.

The router (if fitted) should forwards incoming traffic arriving on port 1801 to the TGSN Module.

This connection should be tested prior to setting up the Cello.

A typical online site to check this is detailed below:

https://yougetsignal.com/tools/open-ports/



This tool checks that any TCP-IP / UDP data connections to that external IP address are correctly port forwarded to the TGSN server.

Please ensure your port forwarding of data from the router to the TGSN module is configured correctly and the TGSN application is not being blocked by any firewalls.

DMR No.: N/A

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### 2.4 Sending Data directly to Utilicore Webserver



Please contact your area sales representative or email Technolog Tech Support: <u>techsupport@technolog.com</u>.

We will require the following information:

- Your full contact details
- Email address
- Serial number of each Cello 4S
- SIM telephone number (if SIM is not provided by Technolog)
- Details of any purchase order / contract
- Details of an existing Utilicore account, including the Utilicore website address if already subscribed. Typically, an email address is used as a username.



### Section 3

### Cello 4s SIM Card Selection and Testing

### 3.1 Select SIM card for use inside Cello 4S

The Cello 4s can be used with 2G & 3G capable SIM Cards for both 2G (SMS/GPRS), 3G, or Cellular IoT Networks (model dependant). Technolog recommends using SIM cards with sufficient credit for either SMS or Data transmission based on the intended network type / frequency of transmission.

#### **3.2 Test the SIM Card intended for use inside Cello modem in a mobile phone** Prior to inserting the SIM Card into any Cello Modem, it is important to check that the SIM card can register and any PIN code is disabled

If SMS communications is being used, you should ensure that the SIM card can send and receives SMS messages. Simply insert into a Cellular phone and attempt to send a text message to and from the SIM card.

### 3.3 Insert the SIM into the Cello 4s

Remove the Cello 4s lid, insert the SIM Card in accordance with the Cello 4s Product Manual (2099PM9000)

Refer to; "Entering the enclosure" and "SIM Card replacement"

When inserted the SIM Card into the holder, the SIM Card becomes locked in place via a sprung latch mechanism.







Black Latch slide away from sim card

If you need to remove the SIM card, it is only possible by withdrawing the latch away from the SIM card allowing the SIM card to be partially ejected. If removed, ensure the SIM card contacts are kept clean and free from fingerprints, before refitting.

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### 3.4 Cellular Signal Testing

Perform a signal / SIM test using WinGPS.

Select 'Modem' → 'Wake GSM Modem Shift+F1' to Wake GSM Modem.

This procedure must be done to validate coverage for the SIM Card Network Service provider and that the Cello 4s can read the SIM Card IMSI



Base station information shows the **dBm level** as an indication of signal strength.

🔥 WinGPS - Termin	al					-	- 🗆	×	
Edit Port Mod	em WITS	Options	Help						
Halring loggon (	W modom	0V							
Modem tune c ver	· IIF910_GI	12 00 4	5.9						
Modem S/N (IMEI)	: 355000 0	8 074276	1						
WITS apr	: No	0 0/42/0	-						
STM TMST	: 24008 00	09700838	Europoli	tan. Swed	len				
SIM ICCII	89460800	251097008	388 Tele	nor, Swed	len				
Access Technology	7: 2G + 3G								
Active 2G bands	: 900/1800								
Active 3G bands	: 850/1900	/2100							
GPRS class	: "CG" (GP	RS/IP)							
GPRS/IP register	: +6 sec,	GPRS not	supported	l					
Service Centre	: "+467080	00999",14	5						
Message reserve	: ** Inval	id **							
Base stations:	Main	Nl	N2	N3	N4	N5	N6		
3G network:	02	02	02	02	02	02	02		
Loc Area Code:	549E								
Cell Identity:	296EF78								
UARFCN:	2963	2963	2963	2963	2963	2963	2963	2	
Band:	900	900	900	900	900	900	900		
Quality(EcIo):	-7.0	-14.0	-15.0	-25.0	-25.0	-25.0	-25.0	-2	
DRX:	64								
Rx dBm:	-74	-81	-82	-121	-121	-121	-121	-	
Scanning									
									V
<								>	
					DTP		COM2 04	00 hr -	
					DIK+	IN13- I POR	. COMP 90	oo ops	

Note: To avoid excessive battery consumption this mode should not be enabled for more than 3 minutes.

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### 3.5. Typical Rx Levels:

Typical Rx Levels:

<100 dBm Poor signal strength Intermittent communications are likely. Repositioning of Cello or use of external antenna advised. Consider alternative network service providers and / or different modes of communication

-86 to -99 dBm Fair signal strength

> -85 dBm
 Good to excellent signal strength
 Reliable transmission expected
 Network registration issues unlikely

### 3.6 Forcing registration onto specific network access / technology – OPTIONAL

Selecting a preference can help reduce network registration time or registration difficulty.

Note:

A Cello 4s supplied with a **2G QB (SMS, TCP-IP and UDP)** modem, the internal antenna supports the following Bandwidths. 800 / 850 / 1800 / 1900 MHz.

A Cello 4s supplied with a **3G\_GL 2G and 3G (SMS, TCP-IP and UDP) modem**, the internal antenna supports: 800 / 850 / 1800 / 1900 MHz.

If selecting a **SIM Card supporting 3G '2100MHz' frequency**, you <u>must</u>ensure that an **external antenna** supporting **2100Mhz** is attached to the external aerial port.



To set a preferred network / access technology, open the Terminal screen and perform a signal Strength test.

Edit         Port         Modem         WITS         Options           Naking loggerOK, modemOK         Modem type & ver:         UE910-GL, 12.00.458           Modem type & ver:         UE910-GL, 12.00.458           Modem S/N (IMEJ):         355000 08 074276 1           WITS app: No         SIM INSI:         24008 0009700838 Europolitan, Sweden           SIM ICCD:         89460800251097008388 Telenor, Sweden           Accive 2G bands:         900           GRS class:         "CG" (GPRS/IP)           GFRS/IP register:         +7 sec, GPRS not supported           Service Centre:         "+46708000999",145           Message reserve:         **           Base stations:         Main           Min         N1         N2         N3           Gantwork:         02         02         02         02         02           Loc Area Code:         549E         -         -         2963         2963         2963         2963         2         2           UARCN:         2965778         -         040         900         900         900         900         900         900         900         25.0         -25.0         -25.0         -25.0         -25.0         -25.0 <td< th=""><th>👌 WinGP:</th><th>S - Terminal</th><th></th><th></th><th></th><th></th><th></th><th>-</th><th>- 🗆</th><th><math>\times</math></th></td<>	👌 WinGP:	S - Terminal						-	- 🗆	$\times$
<pre>Naking logger0K, modem0K Modem type &amp; ver: UE910-GL, 12.00.458 Modem S/N (IMEI): 355000 08 074276 1 WITS app: No SIM IMSI: 24008 0009700838 Europolitan, Sweden SIM ICCID: 89460800251097008388 Telenor, Sweden Access Technology: 2G + 3G Active 2G bands: 900/ GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 900 Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Granning</pre>	Edit Po	ort Moder	m WITS	Options						
Modem type & ver: UE910-CL, 12.00.458 Modem S/N (IMEI): 355000 08 074276 1 WITS app: No SIM INSI: 24008 0009700838 Europolitan, Sweden SIM ICCID: 89460800251097008388 Telenor, Sweden Access Technology: 26 + 36 Active 26 bands: 900/1800 Active 36 bands: 900/ GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 900 Quality(EcIO): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Waking lo	agerOK	. modem	. OK						1
Modem S/N (IMEI): 355000 08 074276 1 WITS app: No SIM IMSI: 24008 0009700838 Europolitan, Sweden SIM ICCID: 89460800251097008388 Telenor, Sweden Access Technology: 2G + 3G Active 2G bands: 900/ GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 900 Quality(ECID): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Modem ty	pe & ver:	UE910-GL	, 12.00.4	58					
WITS app: No SIM INSI: 24008 0009700838 Europolitan, Sweden SIM ICCID: 89460800251097008388 Telenor, Sweden Access Technology: 26 + 36 Active 26 bands: 900/1800 Active 36 bands: 900 GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Modem S/	N (IMEI):	355000 0	8 074276	1					
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SIM ICCID: 89460800251097008388 Telenor, Sweden Access Technology: 26 + 36 Active 26 bands: 900/ GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(ECIO): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning		SIM IMSI:	24008 00	09700838	Europoli	tan, Swed	len			
Access Technology: 26 + 36 Active 26 bands: 900/1800 Active 36 bands: 900/ GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 900 Quality(ECIO): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	S	IM ICCID:	89460800	251097008	388 Tele	nor, Swed	len			
Active 26 bands: 900/1800 Active 36 bands: 900 GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+46708000999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Access Te	chnology:	2G + 3G							
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GPRS class: "CG" (GPRS/IP) GPRS/IP register: +7 sec, GPRS not supported Service Centre: "+4670800999",145 Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 Quality(Eclo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 -5 Scanning	Active	3G bands:	900							
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Message reserve: ** Invalid ** Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 2968778 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(Eclo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Servic	e Centre:	"+467080	00999",14	5					
Base stations: Main N1 N2 N3 N4 N5 N6 3G network: 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARECN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 Quality(ECI0): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Message	reserve:	** Inval	id **						
3G network: 02 02 02 02 02 02 02 02 Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Base st	ations:	Main	Nl	N2	N3	N4	N5	N6	
Loc Area Code: 549E Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2 Band: 900 900 900 900 900 900 900 Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -2 DRX: 64 Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	3G n	etwork:	02	02	02	02	02	02	02	
Cell Identity: 296EF78 UARFCN: 2963 2963 2963 2963 2963 2963 2963 2963	Loc Are	a Code:	549E							
UARTCN:     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963     2963	Cell Id	lentity:	296EF78							
Quality(EcIo): -6.0 -14.0 -21.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.0 -25.		UARFCN:	2963	2963	2963	2963	2963	2963	2963	2
Quality[cc10]:     -6.0     -14.0     -21.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0     -25.0 </td <td></td> <td>Bana:</td> <td>900</td> <td>900</td> <td>900</td> <td>900</td> <td>900</td> <td>900</td> <td>900</td> <td></td>		Bana:	900	900	900	900	900	900	900	
Rx dBm: -73 -81 -88 -121 -121 -121 -121 - Scanning	Quality	(ECIO):	-6.0	-14.0	-21.0	-25.0	-25.0	-25.0	-25.0	-2
KX Ubm:         -73         -61         -66         -121         -121         -121         -           Scanning           >         >         >         >		DRA:	04	0.1		101	1.21	101	101	
	Seenning	KX UDIII:	-75	-01	-00	-121	-121	-121	-121	-
	scanning.	•••								
	<									>
							DTD.		COM2 05	00

Once the modem has responded, press the **<ENTER>** key to stop the sequence like below.

👌 WinG	GPS - Termina						-	- 🗆	×
Edit	Port Mode	m WITS	Options	Help					
									$\sim$
Waking 3	logger0	K, modem	.OK						
Modem t	type ۵ ver	: UE910-GL	, 12.00.4	58					
Modem 3	5/N (IMEI)	: 355000 0	8 074276	1					
	WITS app	: No							
	SIM IMSI	: 24008 00	09700838	Europoli	tan, Swed	ien			
	SIM ICCID	: 89460800	251097008	388 Tele	enor, Swed	ien			
Access 1	Technology	: 2G + 3G							
Active	e 2G bands	: 900/1800							
Active	e 3G bands	: 850/1900	/2100						
(	GPRS class	: "CG" (GP	RS/IP)						
GPRS/I	P register	: +6 sec,	GPRS not	supported	1				
Serv:	ice Centre	: "+467080	00999",14	5					
Messa	ge reserve	: ** Inval	id **						
Base :	stations:	Main	Nl	N2	N3	N4	N5	N6	
3G	network:	02	02	02	02	02	02	02	
Loc A:	rea Code:	549E							
Cell :	Identity:	296EF78							
	UARFCN:	2963	2963	2963	2963	2963	2963	2963	2
	Band:	900	900	900	900	900	900	900	
Qualit	ty(EcIo):	-6.0	-14.0	-14.0	-25.0	-25.0	-25.0	-25.0	-2
	DRX:	64							
	Rx dBm:	-72	-79	-80	-121	-121	-121	-121	-
11									

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#### Now select **Modem** tab, then navigate down to **Access Technologies and Bands**

Edit Port Mod	dem WITS	Options	Help					
Vaking logge Modem type Modem S/N ( WII SIM SIM Access Techn	Wake Modem Signal Inform Interpret Mod Recall Low Le Networks And	ation lem Comms vel Comms	Shift+F1 Shift+F4 Shift+F5	Swed	len len			
Active 2G Active 3G GPRS GPRS/IP req Service C	Access Techn Configure DWL Transfer	ologies And	Bands					
Message re Base stati	Request Own	Number (SN	VIS)	N3	N4	NS	NG	
3G network: Loc Area Code: Cell Identity:	02 549E 296EF78	02	02	02	02	02	02	
UARFCN: Band:	2963	2963 900	2963 900	2963 900	2963 900	2963 900	2963 900	
Quality(EcIo): DRX:	-6.0 64	-19.0	-25.0	-25.0	-25.0	-25.0	-25.0	
Rx dBm:	-68	-81	-121	-121	-121	-121	-121	

Preferred networks of 2G or 3G bands can be individually selected. In the example below both 2G + 3G are selected:

👌 Access Technolog	ies And Bands	$\times$
Access Technology:	2G + 3G	1
Active 2G bands:	☑ 2G ☑ 3G	
Active 3G bands:	850/1900/2100	F
Active 4G bands:	×	
Note: modem in l	ogger is kept awake while using this form.	
	Save Cancel	

Perform the Signal test again, ensuring all selected Bands are available. If selecting a **SIM Card supporting 3G '2100MHz' frequency**, you <u>must</u>ensure that an **external antenna** supporting **2100Mhz** is attached to the external aerial port

To avoid excessive battery consumption, do not perform this test for more than 3 minutes.

Refit the lid, ensuring no debris around the top of the Cello 4s body and the rubber seal of the Cello 4s lid assembly.

It is advisable to repeat the signal test to ensure the aerial connection has not become dislodged, after refitting the aerial/lid assembly.

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🛃 WinGPS - Termin	al					_	- 🗆	×	
Edit Port Mod	lem WITS	Options							
Waking logger( Modem type & ver Modem S/N (IMEI) WITS app SIM IMS: SIM ICCII Access Technology	DK, modem r: UE910-GL ): 355000 0 p: No I: 24008 00 D: 89460800 y: 2G + 3G	.0K , 12.00.4 8 074276 09700838 251097008	58 1 Europoli 388 Tele	tan, Swed	ien len			^	
Active 2G bands Active 3G bands GPRS class GPRS/IP register Service Centre Message reserve	s: 900/1800 s: 900 s: "CG" (GP r: +7 sec, e: "+467080 e: ** Inval	RS/IP) GPRS not 00999",14 id **	supported 5	l					
Base stations: 3G network: Loc Area Code:	Main 02 549E	N1 02	N2 02	N3 02	N4 02	N5 02	N6 02		
UARFCN: Band: Ouality(EcIo):	2962170 2963 900 -6.0	2963 900 -14.0	2963 900 -21.0	2963 900 -25.0	2963 900 -25.0	2963 900 -25.0	2963 900 -25.0	2	
DRX: Rx dBm: Scanning	64 -73	-81	-88	-121	-121	-121	-121	-	
									,
<								>	
					DTR+	RTS-   Port	: COM3 9	9600 bps .:	÷.

When you have completed the signal test, press the <ENTER> key to stop the Cello Signal test

Type +++ then <ENTER> and this will force the mode to shut down like the below screen shot.

It is now safe to close the terminal window down close the Terminal window, click on the 'X' at the TOP/RIGHT corner of the Terminal screen.



👌 WinGPS - Termina	al					-	- 🗆	×	
Edit Port Mod	em WITS	Options							
Modem type & ver Modem S/N (IMEI) WITS app	r: UE910-GI : 355000 0 : No	, 12.00.4 8 074276	58 1					1	
SIM IMSI	1: 24008 00	09700838	Europoli	tan, Swee	len				
SIM ICCII	0: 89460800	251097008	388 Tele	nor, Swee	len				
Access Technology	7: 2G + 3G								
Active 2G bands	s: 900/1800	)							
Active 3G bands	s: 900								
GPRS Class	8: "CG" (GE	RS/IP)							
GPRS/IP register	: +/ sec,	GPRS not	supported						
Service Centre	2: "+467080 . ** Terrel	100999",14	5						
Ressage reserve	Main	10 **	NO	MO	NT 4	NE	NG		
3G petwork:	02	02	02	02	02	02	02		
Jog Area Code:	5/05	02	02	02	02	02	02		
Cell Identity:	2065579								
UARFON.	2963	2963	2963	2963	2963	2963	2963	2	
Band:	900	900	900	900	900	900	900	-	
Quality(EcIo):	-5.0	-12.0	-25.0	-25.0	-25.0	-25.0	-25.0	-2	
DRX:	64		2010	2010	2010	2010	2010	-	
Rx dBm:	-73	-80	-121	-121	-121	-121	-121		
+++AT+CGCLASS?									
+CGCLASS: "CG"									
OK									
AT#SHDN									
OK									
GSM OFF									
									4
<								>	
					DTR+	RTS- Port	: COM3 9	600 bps ,	.:

WinGPS Terminal can now be closed.



### Section 4

### Cello 4s Programming

#### 4.1 Connect communications cable to the Cello 4s

- 1. Set up the local communications port in WinGPS as identified in Section 1.3.
- 2. Run WinGPS
- 3. Click on the centre of the WinGPS main screen to communicate with the Cello 4s.
- 4. All Cello 4s data loggers will be supplied preconfigured as per the build specification.

It is important to only reconfigure using configuration files appropriate to the product type and transducer pressure range (if fitted).

#### 4.2 4s Configuration

Cello 4s configuration files are used to determine the 4s application, recording strategy and mode of Cellular communication, i.e. SMS-'Short Message Service' to a 2G &/or 3G SMS Modem or via GPRS/3G TCP/IP Connections to a local instance of PMAC Plus via a TGSN Connection.

It is important to familiarise yourself with the following parameters and recording strategies prior to configuration;

#### Key Parameters:

<u>Timebase:</u>

This is the 'heartbeat' of the logging process. Each timebase interval the Cello 4s examines its configuration and decides if a channel requires a log to be taken and acts accordingly. Using a common timebase, channels may have different logging rates. The timebase may not be changed if the Cello 4s is logging. Refer to Rate.

• Logging rate / Interval:

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase (above). Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

Note: The Logging Rate is renamed to 'Debounce Period' in some software packages when used with the Sate Recording strategy.

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#### **Common Recording Strategies:**

• State Recording:

If configured for this mode, a change of input state is determined from two components; Timebase + Debounce Period

Each 'Timebase', the channel input is examined (i.e. for an open/on or closed/off status) A Debounce period is added since many inputs oscillate between two states in boundary conditions (for example, where a 'wave' action may cause a level switch to open or close repeatedly, or an off / off condition creates a double contact / 'bounce').

A new state is only recorded if the current state condition (sampled by the Timebase) remains unchanged throughout the debounce period.

#### Example 1:

When the input (open/closed) contacts have been in a new state for greater than the additional Debounce period

#### Example2:

To detect when a pump switches on or off, the Timebase (input examination) could be set to 10 seconds and the Debounce period could also set to 10 seconds. In this scenario, it would take 20 seconds before a possible change of state is recorded /actioned.

#### <u>Analogue Recording</u>

This refers to both voltage and 4-20mA input signals.

Each logging interval an instantaneous measurement is taken. Input range is 0 to 2.5V. This is scaled to 0.4 to 2.0V when recording 4-20mA over a 100ohm resistor. Recording strategy is typically used to record 4-20mA inputs from flow meters and other instrumentation.

#### Frequency Recording

Each logging interval the input signal is counted over a specified (typically short, e.g. 2 second) period. At the end of the period a 2 byte value is stored. Maximum input frequency is 16 kHz. This recording strategy is typically used to record meters with high frequency outputs, motor speeds, etc.

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#### <u>Count Recording</u>

Pulses are counted over, and stored at end of each logging interval. Up to 16000 pulses may be stored in any one logging period with a limitation of 45 pulses per second. Recording strategy is typically used to record flow rate and volume from bulk flow meters.

#### Event Recording

Time of an event (typically based on the interval between two pulses) is stored down to a configurable 1 or 10 second resolution. Maximum rate of events for reliable operation is 5 events per second. Recording strategy is typically used to record pulses from meters where a higher level of resolution, greater than fixed interval Count recording, is required. Event recording does not count pulses over logging intervals.

Examples of Cello 4s configurations files are shown below:

#### Cello4s-SMS-BAR-1F B.cfg

Pressure (10 bar, Hi-Res.), Flow (Count), Internal battery voltage, SMS Data Send

#### Cello4s-GPRS-PSI-1FF2-TB.cfg

Pressure - 150PSI / 300 PSI, Dual Flow (Count), Water Temp, Internal battery voltage, GPRS Data Send

Should a configuration file be required for a specific application, or are experiencing issues whilst attempting to reconfigure the Cello 4s, please contact your local Technolog representative or <u>techsupport@technolog.com</u>

On receipt of your requested configuration file, ensure you place this into a subfolder named within the WinGPS directory. It is advised to name the folder according to the specific application type.

#### Note; any data not downloaded will be lost after configuring the Cello 4s.



### 4.2.1 Configuring the Cello 4s

To configure the Cello 4s, select the appropriate configuration file for your application Select Logger  $\rightarrow$  Configure (CTRL+C)  $\rightarrow$  Configuration File Location  $\rightarrow$  Configure

ogger	Tools	Develop	D	iagnosti	ics He	lp .						
Rea	d Data	Ctrl+R	i	Power	Name	Index	Clocked 0	utput	WIFI & NE	5		
Cor	nfigure	Ctrl+C		R	ecording							
Vie	w Logs	Ctrl+L			Statu	s: ST/	NDEY				0.11	
GSN	N		•		Mod	e: Ro	tating store	¥			Start Loggers	24
Chi	inge Pass	word	1									
Fea	tures	Ctrl+F	- 1		Local tim	e Mor	19 Feb 201	8 13 0	9.54			
Dis	connect	Ctrl+D	_		Logos	r: Mor	19 Feb 201	B 13.1	0.27		Set Clock	
Eot			. 1									
	Stena Stel PMAC	me:	lingle	e chann	iel flow (	cum/h	recordin)	g usir	ig Cello			
	Ste na Ste I PMAC	me:	lingk	e chann	iel flow (	cum/h	i) recordini	g usir	ig Cello			
	Ste na Ste 1 PMAC	No:	lingle	ə chanr	el flow (	cum/h	i) recordinj	g use	ig Cello			
	Ste na Ste I PMAC	s me: No.: ID:	lingle	e chann	el flow (	cum/h	i) recordinj	g use	ig Cello			
	Stena Stel PMAC	s me: No: ID:	lingk	e chann	el flow (	cum/h	i) recordinj	g use	ig Cello			
	Ste na Ste I PMAC	S Mo: ID:	lingle	e chann	el flow (	cum/h	) recording	g use	ig Cello			
	Ste na Ste I PMAC	S Ma. ID	lingle	e chann	el flow (	cum/hi	) recordin	g usir	ig Cello			
	Ste na Ste I PMAC	S Me: ID:	lingle	e chann	el flow (	cum/hi	) recordiny	g usir	ig Cello			

Select the configuration file according to intended application by browsing the file location.

Select the configuration file location

퉬 CONFIG	^	Name	Date modified	Туре	Size	
🐌 Cello4s		C2M4.cfg	06/11/2017 10:31	CFG File	2 KB	
Cello-to-N2		Cello4S-GPRS-MWG-1FF TB.cfg	18/12/2017 15:12	CFG File	2 KB	
Loggers		Cello4S-SMS-MWG-1FB.cfg	08/01/2018 12:08	CFG File	2 KB	



Once you have selected your specific configuration file, select 'Configure' to continue.

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### 4.2.2 Select General Tab

These details should be automatically completed following configuration, with the exception of the site specific details.

	WinGPS - Cello 4.42 – 🗆	×
Logger Tools Develop Diagno	ostics Help	
General Channels Remote Comms Pov	wer Alams Index Clocked Output WiFi & NFC	
Logger	Recording	
Logger type: Cello 4.42	Status: STANDBY	
Serial Number: 165019130	Mode: Rotating store V	
Memory size: 512 Kbytes	~ ·	- 1
Temperature: 22.5°C	Lock Local time: Tue 03 Apr 2018 12:08:12 Set Clock	
	Logger: Tue 03 Apr 2018 11:09:23	
Notepad		
Pressure (100m), Flo	ow (count) & Rainfall (event) recording using Cello.	
Site No : 00000001		
PMAC ID:		
		0
Ork to disconnect (click / unplug / Ctrl+D).	Connected U3:24   COM1 9600 bps CID=	=V

### 4.2.2.1 Populate the following General Fields

• PMAC ID:

This is a unique main reference for all data sent to the server. Enter up to 10 numbers

- Site Name: Enter up to 28 characters to identify location of installation
- Site No: Optional.
- Mode:

*Rotating Store:* When the memory becomes full, the oldest data is removed and new data <u>is</u> stored in the vacated area

*Store until Full*: Data is logged until the channel memory is exhausted; when the memory is full, the logger stops logging and reverts to a standby condition.

• Set Clock: Synchronise Cello 4s to Computer clock

#### Note: As soon as changes are made a red prompt will appear. Click *Save changes* when complete.



### 4.2.3 Select Channels Tab

Key Parameters:

• <u>Timebase:</u>

This is the 'heartbeat' of the logging process. Each timebase interval the Cello 4s examines its configuration and decides if a channel requires a log to be taken and acts accordingly. Using a common timebase, channels may have different logging rates. The timebase may not be changed if the Cello 4s is logging. Refer to Rate.

• Logging rate / Interval:

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase (above). Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

### 4.2.3.1 Configure all Absolute Pressure channels

8		١	WinGPS - Ce	ello 4.42			×
Logger Tools General Channels	Develop [ Remote Comms	Diagnostics s Power A	Help lams Index	Clocked Output	ut WiFi & NFC		
General Channels Channel Pressure Count (Row) Event (Rainfall)   Recording Param Event/State/	Remote Comms Range L 100.0 m 0.010 cum 0.2 mm eters Tir Threshold time res	nebase: 15	Iams Index I Live Input ? ? ? ? Minutes seconds v	Clocked Outpr Rate 15 Minutes 15 Minutes	tt   WiFi & NFC   Total Since Start Total Since Start Uve Input Cancel Input Read data	Memory Used/Left 0 / 22338 0 / 41150 0 / 41150 Edit Value Edit Value Edit Channel Advanced	11 D D
OK to disconnect (clic	:k / unplug / Ctrl	+D).		Co	onnected 00:58 CC	M1 9600 bps CID:	=0 <u></u> ;

- 1. Set the Timebase to the required value (typically 15 minutes) Note: Changing this value will affect the logging rate of ALL channels
- 2. Select a pressure channel by positioning the mouse 'cursor' over the channel line and click the mouse. The selected channel will now be highlighted with a blue banner as shown above.
- 3. With the pressure port vented to atmosphere, set or zero any existing pressure offset:

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Click on 'Live Input'

Select 'Edit Value'

Overwrite value with '0' (or add an offset). Select OK to save the changes.

WinGPS	WinGPS
Edit Pressure value           12.0         m	Edit Pressure value
OK Cancel	OK Cancel

Repeat process for any additional pressure channels

4. From the main 'Channels' tab screen, select Edit Channel.

\$	WinGPS - Edit	channel: Pressure 1		×
Recording Parameters Logging rate: (multiple of Timebase)	15 Minutes V	Threshold: ±	0.0 <b>≑</b> m	
Notepad Pres. 1 name: Press	ure 1			
			ОК	Cancel

Enter the following parameters:

• Logging rate: (Typically set to 15 minutes or same as Timebase)

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase. Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

- Channel name
- Threshold: Leave as default value. Select OK
- 5. Validate Pressure input
  - Attach the Cello 4s pressure port to the pipe/vessel and again click on 'Live Input'.

Ensure that the sensed reading is as expected.

• Repeat the process for any additional pressure channels.



### 4.2.3.2 Configure Digital Count Inputs

With Count recording, pulses are counted over, and stored at end of each logging period. Up to 16000 pulses may be stored in any one logging period. Pulse (flow) input should not exceed more than 45 pulses per second.

8		١	WinGPS - Ce	ello 4.42			×
Logger Tools	Develop	Diagnostics	Help				
General Channels	Remote Com	ms Power A	lams Index	Clocked Output	t WiFi & NFC		
Channel	Range	Last Log	Live Input	Rate	Total Since Start	Memory Used/Left	П
Pressure	100.0 m		?	15 Minutes		0 / 22338	D
Count (Flow)	0.010 cum		81 cum/hr	15 Minutes		0 / 41150	D
Event (Rainfall)	0.2 mm		?			0 / 41150	
							_
1						_	,
						_	_
Recording Parame	ters				Live Input	Edit Value	
		Timebase: 15	✓ Minutes	×	Cancel Input	Edit Channel	
Event/State/T	hreshold time i	resolution: 10	seconds 🗸 🗸				
					Read data		
						Advanced	
Counting pulses 2				Co	nnected 03:54 CC	OM1 1200 bps CID=	=0:

- 1. Set the Timebase to the required value (typically 15 minutes) Note: Changing this value will affect the logging rate on ALL channels
- 2. Select the Count (Flow) channel, by positioning the mouse 'cursor' over the channel and click. The selected channel will now be highlighted with a blue banner as shown above.

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3. Select 'Edit Channel'

Configure the following parameters:

• Logging rate: Typically set to 15 minutes, or a multiple of the Timebase

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase. Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

- Channel name
- Threshold: Leave at default value.
- Pulse Scale factor, representing the weight of the flow meter pulse output.

WinGPS - Edit channel: Flow	×
Recording Parameters	
(multiple of Timebase)	
✓ Pull-up	
Debounce	
Notepad	
Ch 2 Name: Row	
Scale factor: 0.01 cum	
OK Car	cel

Ensure Pull-up and Debounce are selected for count (flow) input channels



#### Note:

The pulse weight / significance should be so that:

- No more than 16000 pulses are counted over the logging interval
- Maximum input frequency should not exceed 45 pulses per second

Based on the formulae below; Logging rate x 60 \* x = 16000, where 'x' denotes the max input frequency.

Therefore: 16000 / (logging rate \* 60) = 'x' (max pulse input freq. (pulses per second))

#### Example:

For a 15 minute logging rate, the max pulse input from a flow meter would be 17Hz since this doesn't exceed any of the above criteria.

- Repeat for all remaining 'Count' channels
- 4. Validate Count (Flow) input

Return to main Channel Tab and highlight the Count (Flow) channel

- Click on 'Live input'
- Using the appropriate input cable, create a series of pulses by quickly touching the Channel input and Ground wires together. WinGPS should indicate that pulses are being received at the bottom of the screen.
- Make a permanent, watertight connection between the Cello 4s input cable and the pulse unit.
- Click on 'Live input' again to test and validate pulses are being received from the flow meter whilst the meter is registering flow. WinGPS should indicate that pulses are being received at the bottom of the screen. Changes to the weight of the pulse output from the meter may be necessary.
- Repeat the above process for any additional Count channels



### 4.2.3.3 Configure Digital Event Inputs

Times of an event (typically based on the interval between two pulses) are stored down to a configurable 1 or 10 second resolution. Maximum rate of events for reliable operation is 5 events per second. This recording strategy is typically used to record pulses from rain gauges or where a higher level of resolution, greater than fixed interval Count recording, is required, typically from flow meters. Unlike Count recording, Event recording does not count and record pulses over logging intervals.

8		١	WinGPS - Ce	llo 4.42			×
Logger Tools	Develop	Diagnostics	Help				
General Channels	Remote Com	ms Power A	larms Index	Clocked Outpu	t WiFi & NFC		
Channel	Range	Last Log	Live Input	Rate	Total Since Start	Memory Used/Left	п
Pressure	- 100.0 m		?	15 Minutes		0 / 22338	D
Count (Flow)	0.010 cum		?	15 Minutes		0 / 41150	D
Event (Rainfall)	0.2 mm		418 mm/hr			0 / 41150	
4						_	>
							_
Recording Parame	ters				Live Input	Edit Value	
	1	Timebase: 15	✓ Minutes	~	Cancel Input	Edit Channel	
Event/State/T	hreshold time r	resolution: 10	) seconds 🛛 🗸		Pood data		
					nedu udid		
						Advanced	
Counting pulses 2				Co	nnected 01:22 CC	M1 1200 bps CID:	=0:

- 1. Leave Timebase set to the default / pre-configured value
- 2. Select the Event channel, by positioning the mouse 'cursor' over the channel and click. The selected channel will now be highlighted with a blue banner as shown above.
- 3. Select 'Edit Channel'

Configure the following parameters:

- Event divider (1 255)
   Sets the number of pulses detected before calculating the intensity of events.
   Please leave as default value.
- Channel name

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- Pulse Scale factor:
   i.e. Pulse weight, or in this case, representing the Rain gauge pulse volume
- Ensure that the Pull-up & Debounce check boxes are enabled.

8	WinGPS - Edit channel: Rainfall	×
Recording Parameters Event divider:	h ✿ putes	
✓ ✓	Pullup Debounce	
Notepad Ch 2 Name:	Deinfall	
Bucket Size:	0.2 mm	
	ОК С	ancel

- Click OK
- 4. Validate Event (Rain gauge) input

Return to main Channel Tab and highlight the Event (Rainfall) channel

- Click on 'Live input'
- Using the appropriate input cable, create a series of pulses by quickly touching the Channel input and Ground wires together. WinGPS should indicate that pulses are being received at the bottom of the screen.
- Make a permanent, watertight connection between the Cello 4s input cable and the pulse unit.
- Click on 'Live input' again to test and validate pulses can be received directly from the instrument. WinGPS should indicate that pulses are being received at the bottom of the screen.
- Repeat the above process for any additional Event channels


#### 4.2.3.4 Configure Digital State Inputs

The Cello 4s can record a change in state, typically a pump switching on or off or even a door closing.

8				WinGPS	- Cello 4.	42	-	×
Logger	Tool	s Deve	lop Diagno	stics Help				
General	Channel	s Remote	e Comms Pow	er Alams Inc	lex Clocke	d Output   WiFi &	NFC	
Channe	əl	Range	Last Log	Live Input	Rate	Total Since Start	Memory Used/Left	Threshold
Pump N	No.1	Off/On		< Off >	15 Minutes		0 / 63488	
<								>
Record	ding Para	meters				Live Ir	nput Edit \	/alue
			Timebase	: 15 v M	inutes N	Cancel	Input Edit Ch	annel
Eve	ent/State	/Threshold	d time resolution	10 seconds	~		Lon or	
						Read	data	
							Adva	inced
OK to disco	onnect (c	lick / unpl	ug / Ctrl+D).			Connected 02	:31 COM1 9600 b	ps CID=0;

- 1. Select the State (Pump) channel, by positioning the mouse 'cursor' over the channel line and clicking the mouse button. The selected channel will now be highlighted with a blue banner.
- 2. Select 'Edit Channel'

Configure the following parameters:

• Timebase (referenced in the main Channels tab screen, above) and Debounce period

A change of input state is determined from two components; Timebase + Debounce Period

Each 'Timebase', the channel input is examined (i.e. for an open/on or closed/off status) A Debounce period is added since many inputs oscillate between two states in boundary conditions (i.e. for example, where a 'wave' action may cause a level switch to open or close repeatedly, or an off / off condition creates a double contact / 'bounce').

A new state is only recorded if the current state condition (sampled by the Timebase) remains unchanged throughout Debounce period). i.e when the input (open / closed contacts) have been in a new state for greater than the additional Debounce period.



For example, to detect when a pump switches on or off, the Timebase (input examination) could be set to 10 seconds and the Debounce period could also set to 10 seconds. In this scenario, it would take 20 seconds before a possible change of state is recorded / actioned.

- Channel name
- Status descriptions representing contact input status, i.e. Open / Closed, On / Off, Pump On, Pump Off
- Ensure the Pull-up & Debounce check boxes are enabled.
- 3. Validate State input
  - Using the appropriate input cable, touch the channel input wires together
  - Click on live input to validate that a change of state is detected.
  - Make a permanent, watertight connection between the Cello 4s input cable and the 'state' device / contact.
  - Repeat the process for any additional state channels



#### 4.2.3.5 Configure Digital Frequency Inputs

Each logging interval the input signal is counted over a specified (typically short, e.g. 2 second) period. Maximum input frequency is 16 kHz. This recording strategy is typically used to record flow meter velocity with high frequency output signals, motor speeds, etc.

8			WinGPS -	Cello 4	.39	-	□ ×
Logger Tools	Develop	Diagnost	ics Help				
General Channels	Remote C	Comms Power	Alarms Inde	x Clock	ed Output   WiFi &	NFC	
Channel	Range	Last Log	Live Input	Rate	Total Since Start	Memory Used/Lef	Threshold
Forward Flow	1.00 m/s	-171.11 m/s		1 Minute		20 / 63468	Disabled
Reverse Flow	1.00 m/s	Waiting		1 Minute		18 / 63470	Disabled
<							>
Recording Para	neters				Live	loout Edit	Value
		Timebase:	1 V Min	ites			Value
Europt /State	(Throohold ti	no modution :	10		Cance	Input Edit (	Channel
Evenit/ State	rniesnoid u	ne resolution.	TU seconds	v	Read	l data	
						Ad	vanced
OK to disconnect (c	ick / unplug	/ Ctrl+D).			Connected 0	1:35 COM1 9600	bps CID=0:

- 1. Set the Timebase to the required value (typically 15 minutes) Note: Changing this value will affect the logging rate on ALL channels
- 2. Select the Frequency channel, by positioning the mouse 'cursor' over the channel line and click the mouse button. The selected channel will now be highlighted with a blue banner.
- 3. Select 'Edit Channel'

Configure the following parameters:

 Logging rate: Typically set to 15 minutes or same as Timebase

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase (above). Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

- Channel name Up to 28 characters
- Threshold: Leave at default value.

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- Enter max frequency range / input (i.e. up to 16000Hz), corresponding to 100% scaling and units. Both the range and scaling fields are editable
- Pull-up and Debounce are typically disabled whilst in this mode.
- Repeat for all other 'Frequency' channels
- 4. Validate Frequency input
  - Make a permanent, watertight connection between the Cello 4s input cable and the Frequency input
  - Highlight Frequency Channel
  - Click on 'Live input' to test that a frequency signal is being received.
  - WinGPS should indicate the correct scaling based on the frequency range entered. Please contact Technolog if you require any assistance with this strategy.
  - Repeat the above process for any additional Frequency channels



#### 4.2.3.6 Configure Voltage / 4-20mA Analogue Inputs

Each logging interval an instantaneous measurement is taken. Maximum input voltage is 0-2.5V DC. 4-20mA is scaled to 0.4 to 2.0V when applied across a 100ohm resistor. This recording strategy is typically used to record 4-20mA inputs from flow meters and other instrumentation.

#### Refer to;

Cello 4s Manual 2099PM9000 Product Manual for DIP Switch settings

8			WinGPS	5 - Cello 4.	39		-	□ ×	
Logger To	ools Deve	elop Diagn	ostics Help						٦
General Chan	nels Remot	te Comms Po	wer Alarms Ir	ndex Clocke	d Output   WiFi	& NFC			_
Channel	Range	Last Log	Live Input	Rate	Total Since Star	Memory Use	d/Left	Threshold	
Voltage 1	100.00 %	_	45.00 %	15 Minutes		0 / 63488		Disabled	
Voltage 2	100.00 %		< 0.00 % >	15 Minutes		0 / 63488		Disabled	
<								>	
Recording Parameters       Live Input       Edit Value         Timebase:       15 v       Minutes v       Cancel Input       Edit Channel         Event/State/Threshold time resolution:       10 seconds v       Read data									
Advanced									

- 1. Set the Timebase to the required value (typically 15 minutes) Note: Changing this value will affect the logging rate on ALL channels
- 2. Select the analogue channel by positioning the mouse 'cursor' over the channel line and clicking the mouse button. The selected channel will now be highlighted with a blue banner.



3. Select 'Edit Channel'

Complete the following parameters:

• Logging rate: Typically set to 15 minutes or same as Timebase

The logging rate is the time between samples taken and must be a multiple of the Cello 4s Timebase (above). Logging rates may be defined individually for each channel. Rates may only be changed if the Cello 4s is at standby.

- Channel name
- Threshold: Default value.
- Enter maximum scaling (i.e. 100) and units (i.e. %) corresponding to the maximum input voltage or 20mA value, as determined by the configuration file.
- Pull-up and Debounce are typically disabled whilst in this mode.
- Repeat for all other Analogue channels
- Refer to Cello 4s product manual 2099PM9000 with respect to applying 4-20mA signals according to your build variant

The "Universal 8 signal input" variant of Cello 4S features internal PCB mounted 'dip switches' that allow a user to individually configure 12v Outputs for energising external transmitters or applying 4-20mA signal inputs

- 4. Validate Analogue input
  - Make a permanent, watertight connection between the Cello 4s input cable and the Analogue input
  - Highlight Analogue Channel
  - Click on 'Live input' to test that the expected analogue signal is being received.
  - WinGPS should indicate the correct scaling based on the maximum analogue range and units entered. Please contact Technolog if you require any assistance with this strategy.
  - Repeat the above process for any additional analogue channels



#### 4.2.3.7 Configure Flow Encoder Inputs

This recording strategy is specifically used for encoder enabled flow meters. The Encoder meter register is polled each logging interval. Each encoder register connected to the Cello 4s has a unique identifier.

#### Refer to;

Cello 4s Manual 2099PM9000 Product Manual for DIP Switch settings

WinGPS - Cello 3.98 –  × Uogger Tools Develop Diagnostics Help General Channels Remote Comms Alarms Index						
Channel	Range 0.01 Gal	Last Log	Live Input 0000, ID=40108857	Rate 15 Minutes	Total Since Start	Memory Used/Left T 0 / 63488 C
<	arameters				Live Input	> Edit Value
Timebase:     15 v     Minutes v     Cancel Input     Edit Channel       Event/State/Threshold time resolution:     10 seconds v     Read data						
OK to disconnec	t (click / un	nplug / Ctrl+D).		Cor	nnected 05:43 CO	M2 9600 bps CID=0 .::

1. Set the Timebase to the required value (typically 15 minutes)

Note: Changing this value will affect the logging rate on ALL channels

- 2. Select the Encoder channel by positioning the mouse 'cursor' over the Encoder Meter input and clicking OK. The selected channel will now be highlighted with a blue banner.
- 3. Connect the encoder meter register (refer to Cello 4s product manual 2099PM9000)



4. Click Live Input. The current read should match the register display and confirm Cello connectivity.

	Live Input	F
Live Input	000443, ID=	1

- 5. Click Edit Channel.
- 6. Leave the Logging Rate as the default value.
- 7. Channel Name / MUI ID: Type the corresponding MIU ID (typically the Cello serial number).
- 8. Edit the Scale Factor field to match the utilities preferred unit of measure, i.e. gal= gallons, cum = cubic meters, etc.

otepad		Notepad	
MUI ID:	1412345672	MUI ID:	1412345672
Ch 2 Name:	н	Ch 2 Name:	HI
Scale factor:	1 gal	Scale factor:	1 gal

9. Repeat the above process for any additional Flow Encoder channels



#### 4.2.4 Meter Indexes

This is supplementary to Pulse Count or Encoder Channel inputs. This tab is only required when meter indices need to be transmitted to a remote server

1. Select the Index tab and Edit Format to represent the meter's moving dials.

	$\mathbf{X}$					
3	WinGl	PS - Cello 3.98				×
Logger Tools Devel General Channels Remote	op Diagnotics Hel comms Alams Index	p Index	Units	]		
	Row	1000.9200	Gal			
	/					
	Edit Values Edit Format	Save cha Canc	anges el			
OK to disconnect (click / unplu	ug / Ctrl+D).		Connected 08:34	COM2	9600 bps	CID=0 .;;

- 2. Carefully enter the index values for all configured Flow channels.
- 3. Wait for sufficient flow to pass through, then re-read the meter index and confirm the Cello index corresponds to the water meter index.
- 4. Click Save Changes to finish setup

Sheet 81 of 92





#### 4.2.5 Configure Remote Communications

These details should be automatically completed by the configuration file. However, for clarity, a table with the various communication settings is shown below. Typical default values shown in **bold** 

	GPRS		Configures the logger to send and receive messages over via 2G or 3G data connection		
Modem Mode	lodem lode CSD Call		This is an older form of communication which allows the 4s to establish a communications link directly with the host modem. This is used infrequently.		
	SMS		Configures the log using SMS over a	gger to set send data a 2G or 3G Network	
Operate Modem Every	Day/Week/Mont	h	Determines when the modem is operated. Normally this is set to "Send Data Daily" Enter the time when communication is to start.		
Retry Mode	Repeat Every 2	Hours	In the event of an to send data the o attempt to retry at	unsuccessful attempt data logger will fter a 2 hour period.	
	Single Sequenc	:e	After an unsuccessful attempt to send data, the data logger will wait until the next send period to send the data.		
	Send Latest Data		Sends the Latest Data during the daily send		
	Send Index		Sends the flow Index Values during the daily Send		
	Synchronise Clock Weekly		Allows for clock synchronisation with the network. The Logger will always stay within the latest hour.		
And Send Data sub daily every	1min to 12 hours	Determines when data is sent to the host for intervals more frequent than daily. Note higher send rates will have an impact on battery performance	Synch to	Allows synchronisation/and sub daily send of the logger either at midnight or the time specified in "Operate Modem every" (to allow the sub-daily communications to coincide with the daily session time)	

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Data Send Mode	a Send de			Data is sent using UDP and contains the latest values, in addition to a short history of values which can be used to fill missing data gaps if messages are lost. Typically used during fast transmission rates		
	Latest		Data is sent using data is sent since session.(daily or s	ŋ TCP. Only the latest the last 'latest data' sub-daily)		
And receive msgs sub- daily-every	Determines when messages are received from the host for intervals 1min to 12 more hours frequent than daily. Note higher rates will have an impact on battery performance		Synch to	Allows synchronisation/and sub daily send of the logger either at midnight or the time specified in "Operate Modem every" (to allow the sub-daily communications to coincide with the daily session time )		
Receive Message (120 secs)	When using GPRS t TCP connection. Wh messages when GS	he logger always receive nen using SMS, 120 sec M registered.	es messages from t s is the time the log	he server during a ger waits to receive		
Send Error Log	Determines if the error log is sent during daily Send transmissions.					
Send status every 100 msgs/30 days (i.e. local sgnal strength info).	When using GPRS the status is always sent to the server during a TCP connection, so at least daily, and sub-daily when using the 'Latest' option. When using SMS this option controls whether Status is sent or not. Status occupies one SMS message so it is sent at intervals of every 100 messages or 30 days, whichever occurs first.					
Send index Every Data Send	Sends the index data Option is disabled w	a on every SMS or GPR hen "1 Msg burst" (UDP	S-TCP data send.			
Send Errors with Categories>=	Allows the user to sp These types of error	becify which categories on sare found by pressing	of errors are sent du the ? icon. <b>12</b> is	uring the daily send. a typical value		

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#### 4.2.5.1 2G / 3G SMS Communications:

🛚 WinGPS - Cello 4.42 – 🗆 🗙
Logger Tools Develop Diagnostics Help
General Channels Remote Comms Power Alarms Index Clocked Output WiFi & NFC
Modem mode: SMS v Retry mode: Single sequence v
- Operate modem every Day v at 05:00 🜩
✓ Send latest data ✓ Receive SMS msgs (120 secs)
Send index Send GSM Log Send errors with category >= 0 ÷ ?
✓ Synchronise clock weekly ✓ Send status every 100 msgs/30 days
— ☐ And send data sub-daily every ✓ Sync to: 00:00 ✓
Data send mode: Latest V Send index every Data Send
And receive sub-daily every V Sync to: 00:00 V
Bearer SIM Low Pressure Point Modern Advanced
General SMS to:
OKto disconnect (click / unplug / Ctrl+D). Connected 00.13 COM1 9600 bos CID=0 ::

- 1. Configure as per 4.2.5
- 2. Select Bearer tab.
- 3. In the 'General SMS to:' field, enter the destination number of the SIM Card fitted inside the host PC / server modem. This must be entered in international format.
- 4. Select SIM Tab

SIM info from last modern operation IMSI:	Own number:	
Network:		
SMS Messages		
Message Reserve: n/a (SN undefined)		
Total messages sent:		
Update:		

5. *Own Number* should be set to the telephone number of the SIM fitted inside the Cello. This is necessary for both SMS and GPRS operation. If using international format then prefix with "+", e.g. "+44 ..."

SIM information (IMSI & network), will only be obtained after modem operation

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#### 4.2.5.2 2G / 3G TCP IP & UDP Data Communications

S Wind	PS - Cello 4.42 – 🗆 🗙
Logger Tools Develop Diagnostics He	lp
General Channels Remote Comms Power Alarms	Index Clocked Output WiFi & NFC
Modem mode: GPRS	Retry mode:       Single sequence         at       05:00       Image: model of the sequence         at       05:00       Image: model of the sequence         velve SMS msgs (120 secs)       Receive msgs daily at 05:00         ad GSM Log       Send errors with category >=       0 model of the sequence         v       Sync to:       00:00       Image: model of the sequence
Data send mode: Latest 🗸	Send index every Data Send
And receive sub-daily every	✓ Sync to: 00:00 ✓
Bearer SIM Low Pressure Point Modem Adva	anced
Primary APN	Secondary APN
Server: internet.cxn	Fill Params
User name:	APN mode:
Password:	Balance V
Server URL/IP: gprs.utidat.net	Port: 1801
OK to disconnect (click / unplug / Ctrl+D).	Connected 00:11 COM1 9600 bps CID=0:

- 1. Configure as per 4.2.5
- 2. Select Bearer tab.



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#### 3. Complete fields based on preferences below. **Bold** text is mandatory.

Primary	Server	GPRS Network Access Point (Provided my Network Provider)
APN	User name	GPRS Network Username (Provided my Network Provider)
	Password	GPRS Network Password (Provided my Network Provider)
Server	URL/IP	Destination Local Server URL/IP Details
	Port	Destination Local Port Details
APN	Balance	The 2 APNs are used in a round robin fashion to balance the network. APNs share the workload by alternating after each transmission
Mode	Failover	The Primary APN is used unless there is an error in which case communication is retried with the Secondary APN.
Fill Params		Fill Params provides a worldwide list of Network provider APN Settings. Once selected these will be automatically populated in the Bearer Setting Tab. Note that the Server URL/IP & Port may be populated with Technolog's default server.

#### 4. Select SIM Tab

Bearer SIM	Low Pressure Point	Modem		
SIM info IM Netwo	from last modem operati SI: rk:	on	Own number:	
SMS Me Mess Total m	ssages iage Reserve: n/a (St essages sent: Update:	l undefined)		

5. *Own Number* should be set to the telephone number of the SIM. This is necessary for both SMS and GPRS operation. If using international format then prefix with "+", e.g. "+44 …"

SIM information (IMSI & network), will only be obtained after modem operation



#### 4.2.5.2 Advanced

These are optional / application specific settings.

Please discuss with Technolog before making any changes.

Bearer SIM Low Pressure Point Modem		<b>S</b> M	lodem Alway	/s-On Modes	×
Modem always on to receive alarms & commands Advanced	H	Mode	GSM	GPRS	PDP Context
Settings for modem always on	Ш	Disabled	Detached	Detached	Detached
Poll for SMC meanages suppris	н	Enabled (CC)	Attached	On Demand	On Demand
✓ Pointor Sims messages every.	н	Enabled (CG)	On Demand	Attached	On Demand
Receive alams from server by GPRS when called from:	н	Enabled (B)	Attached	Attached	On Demand
or.	н	Enabled (CG+PDP)	On Demand	Attached	Attached
	н	Enabled (B+PDP)	Attached	Attached	Attached
✓ Reset modem daily at: 02:00 ♣	н				
	Н		OK	Cancel	

Modem always on to receive alarms and commands (2G Networks Only)	If very frequent sub-daily communication more efficient on network and server ac- continue to power the modem. An extern for very frequent communication.	n is required (e.g. 1 min), it becomes tivity, and power consumption, to nal supply is strongly recommended
	Poll for SMS messages every:	Specifies the interval that the Cello 4s polls for incoming SMS messages.
Settings for Modem always on	Receive alarms from server by GPRS	Forces the Cello 4s to initiate a data connection to the server when called from either of the specified telephone numbers.
	Reset Modem Daily	Some network connectivity issues can be avoided by resetting the GSM modem once per day.
	Disabled	Disabled
	Enabled (CC)	Continuously GSM registered for SMS. GPRS registered on demand.
	Enabled (CG)	Continuously GPRS registered. GSM registered on demand for SMS.
Advanced	Enabled (B)	Continuously GSM (for SMS) and GPRS registered.
	Enabled (CG+PDP)	As CG above, but additionally keeps PDP context continuously open for GPRS. Consumes more power than CG only.
	Enabled (B+PDP)	As B above, but additionally keeps PDP context continuously open for GPRS. Consumes more power than B only. Recommended for high data rate.



### Section 5

#### **Starting Recording**

#### 5.1 Starting Cellular Communications

1. Return to General tab,

8	WinGPS -	Cello 4.42	- 🗆 🗙	
Logger Tools De	velop Diagnostics Help			
General Channels Rem	note Comms Power Alarms Inde	ex Clocked Output WiFi & NFC		Select Start logging
Logger	Recording			
Loggertype: Cello	4.42 Status: 5	TANDBY		
Serial Number: 16501	19130 Mode:	Rotating store 🗸 🗸	Start Logging	
Memory size: 512 K	bytes			
Temperature: 24°C	Local time: T	hu 29 Mar 2018 13:45:44	Set Clock	
	Logger: T	hu 29 Mar 2018 12:46:50		
Notepad	Pressure (100m, Hi-Res) & C	ount recording using Cello 4S		
Site name:	Technolog House			
Site No.:	00000001			
PMAC ID:	01234567			
OK to disconnect (click / ur	nplug / Ctrl+D).	Connected 07:30 CO	OM1 9600 bps CID=0;	

- 2. Select Clear Data and Start Recording.
- 3. Select either 'Now' or a specified date.
- 4. Click on "Send Logger Settings to Server" & "Monitor Modem Comms After Start"

Start recording	×
Clear data and start recording Now Today V at 00:00 V	
Send logger settings to server Monitor modem comms after start. OK Cancel	

5. Click OK.



The Terminal window will open showing the Cello 4s has started logging and Cellular communication has commenced;

8						WinGF	PS -	Terminal				-		x
Edit	Port I	Modem	WIT	S	Options									
Logging	start	ed. Wa	iting	for	modem	Comms	to	start						^
<														>
Interpreti	ng Mode	em Com	ms						DTR+	RTS-	Port: CO	M1	9600	bps:

After 30 seconds, the following status screen will appear, depending on chosen mode of communication.

Please ensure any errors reported are immediately resolved by the Cello during SMS retransmission.

#### Cellular 'SMS' communications

👌 WinGPS - Terminal		-		$\times$
Edit Port Modem WITS Options Help				
Logging started. Waiting for modem comms to start				$\sim$
11:25:59.7 GPRS class: "CC" CSD + SMS				
11:25:59.7 SIM IMSI: 240080009700838 Europolitan, Sweden				
11:26:01.9 CSD+SMS register: Searching				
11:26:03.8 CSD+SMS register: Roaming				
11:26:04.0 Signal: 58				
11:26:11.5 Send SMS: to 81714F, Parameters 1				
11:26:16.9 Send SMS: to 81714F, Parameters 2				
11:26:22.5 Send SMS: to 81714F, Parameters 3v2				
11:26:28.2 Send SMS: to 81714F, Parameters 4				
11:26:33.9 Send SMS: to 81714F, Parameters 5				
11:26:39.5 Send SMS: to 81714F, Parameters 6				
11:26:44.8 Send SMS: to 81714F, Parameters 7				
11:26:49.1 Send SMS: to 81714F, Parameters Misc				
11:26:53.6 Send SMS: to 81714F, Notepad, line 1				
11:26:58.5 Send SMS: to 81714F, Notepad, line 2				
11:27:03.1 Send SMS: to 81714F, Notepad, line 4				
11:27:08.4 Send SMS: to 81714F, Notepad, line 6				
11:27:08.5 Deregistering				
11:27:09.1 Modem off				
				$\sim$
<				>
Interpreting Modem Comms D	TR+   RTS-	- Port: COM	3 9600	bps 🔡

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### Cellular 'TCP IP / UDP' Communications

👌 Wi	nGPS -	Terminal					_		$\times$
Edit	Port	Modem W	VITS Options	Help					
Loggin 11:05: 11:05: 11:05: 11:05: 11:05: 11:05: 11:05: 11:05: 11:05:	ng sta 40.6 40.7 44.7 44.1 46.2 46.2 50.2 50.5 51.4	rted. Waitin GPRS class: SIM IMSI: 2 Set GPRS cl CSD+SMS reg GPRS/IP reg CSD+SMS reg Starting GP 2G network:	g for modem c "CG" GPRS/IP 4008000970083: ister: Search jister: Search jister: Roaminu gister: Roaminu GS/IP bearer. 23410 02, UI	omms to start 8 Europolitan, S + SMS + GPRS/IP ing g g  K	weden				^
11:05:	51.8								
Base	stat	lons: Ma	11n						
- 2	G net	work:	02						
Loc	Area	Code: 54	41						
Cell	Iden	tity: 91	.02						
		B51C:	6/						
	A	RECN: I	.04						
	0	banu: 9	,00						
	Qua D.	dBm.	60						
	KX	авш: –	-00						
11:05: 11:05: 11:05: <<	51.9 52.1 52.2	Contacting Socket conn Connected t	109.234.193.5 Nected So server	3, port 1801					
11:06:	03.6	Disconnecte	d from server	*					
11:06:	03.7	Set GPRS cl	ass: "CG" GPR	S/IP					
11:06:	05.2	Deregisteri	ng						
11:06:	06.6	Modem off	-						
									$\sim$
<									>
Interpre	ting M	dem Comms			DTR+	RTS- P	ort: COM	3 9600	bps 🤃

WinGPS can now be closed and Cello 4s Setup is complete



### Section 6

#### **Diagnostic Options**

#### 6.1 Logger Menu



From the Logger drop down menu you may select the following;

Read Data Manually read data from the logger.

- Configure Program the logger.
- Features Details the capability of the attached logger.

GSM Modem commands;

Error log, listen for messages, force data send

View Error Log

The error log displays all recent errors.

Selecting one will provide details and a possible reason in the grey area below.

Jate & Time	On time	Signal	Category	Reported	Error
4 Nov 2012 12:58	26 secs	59	4	Yes	+CMS ERROR: 512, SMS MM establishment failure
4 Nov 2012 12:58	37 secs	59	4	Yes	+CMS ERROR: 512, SMS MM establishment failure
4 Nov 2012 13:00	25 secs	59	4	Yes	+CMS ERROR: 512, SMS MM establishment failure
4 Nov 2012 13:00	36 secs	59	4	Yes	+CMS ERROR: 512, SMS MM establishment failure
21 Nov 2012 12:50	55 secs		0	Yes	Modem failed to register (GPRS)
1 Nov 2012 12:53	55 secs		0	Yes	Modem failed to register (GPRS)
21 Nov 2012 12:56	55 secs		0	Yes	Modem failed to register (GPRS)
6 Nov 2012 12:50	55 secs		0	Yes	Modem failed to register (GPRS)
26 Nov 2012 12:53	60 secs	13	8	Yes	+CME ERROR: 812, Bearer connection failure: G
26 Nov 2012 12:56	55 secs		0	Yes	Modem failed to register (GPRS)
7 Nov 2012 12:50	39 secs	15	8	Yes	+CME ERROR: 842, Destination host unreachable
2 Jan 2013 12:51	66 secs	5	8	Yes	+CME ERROR: 842, Destination host unreachable
21 Jan 2013 12:50	55 secs		0	Yes	Modem failed to register (GPRS)
21 Jan 2013 12:53	55 secs		0	Yes	Modem failed to register (GPRS)
21 Jan 2013 12:56	55 secs		0	Yes	Modem failed to register (GPRS)
5 Feb 2013 12:51	68 secs	45	0	Yes	No response to TCP/IP attach request
8 Feb 2013 05:01	40 secs	47	8	Yes	+CME ERROR: 842, Destination host unreachable
ME ERROR: 812 B	aarer connec	tion failura:	GPRS netwo	de failura	

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#### 6.2 Tools Menu

👌 WinGPS	5						
Logger	Тос	ols	Simulat	or	Diagnostics	;	Help
Local comm		Ec	lit Contro	l Pro	ofile		
		Te	erminal		Ctrl+T		
		0	ptions		Ctrl+O		

From the *Tools* drop down menu you can select: Terminal.

This will open up a blank screen.

To perform a signal test in the terminal window, press Shift + F1 on the keyboard. The modem will now start and run a signal test.

Roaming SIM Cellos will tend to use the last network which they logged on to or the first on their available Network list.

						_	10
Edit Port	Modern	WITS	Options				
aking logg	er OK,	modem	.OK				
Modem type	a ver: 1	JE910-GL	, 12.00.4	58			
Modem S/N	(IMEI):	355000 0	8 074341	3			
WI	IS app: 1	No.					
SI	M IMSI;	23433 04	22062270	Orange,	UK		
SIM	ICCID:	89441256	504397271	92 Orang	e, UK		
ccess Tech	nology:	2G					
Active 20	bands:	900/1800					
Active 3G	bands:	900					
GPB S	class:	·cc· (cs	D + SHS)	100			
CSD+SMS re	gister:	+8 sec, 1	nome netw				
CSD+SMS re Service	gister: - Centre: -	+8 sec, 1 +447973.	100972",1	45			
CSD+SMS re Service Message r	gister: - Centre: - eserve: 1	+8 sec, 1 *+447973. Unlimited	100972",1 d	45			
CSD+SMS re Service Message r Total me	gister: Centre: eserve: 1 ssages: Undere: 1	+8 sec, 1 +447973. Unlimited 2727	100972",1	45			
CSD+SMS re Service Message r Total me	gister: Centre: eserve: 1 ssages: Update: 1	+8 sec, 1 +447973 Jnlimite 2727 Jnlimite Main	100972",1	45			
CSD+SMS re Service Message r Total me Base Stat	gister: - Centre: ' eserve: I ssages: Update: I ions: work:	+8 sec, 1 *+447973 Jnlimite 2727 Jnlimite Main TMOB	d N1 TMOB	N2 TMOB			
CSD+SMS re Service Message r Total me Base Stat 26 net Loc Brea	gister: - Centre: ' eserve: I ssages: Update: I lons: work: Code:	+8 sec, 1 *+447973 Julimite 2727 Julimite Main TMOB 0816	100972",1 d d N1 TMOB	N2 TMOB	>		
CSD+SMS re Service Message r Total me Base Stat 2G net Loc Area Cell Iden	gister: - Centre: ' eserve: 1 ssages: Update: 1 ions: work: Code: tity:	+8 sec, 1 *+447973 Jnlimite 2727 Jnlimite Main TMOB 0816 EB1C	100972",1 d M TMOB 0816 1241	N2 TMOB 0816 FFFF	>		
CSD+SMS re Service Message r Total me <u>2G net</u> Loc Area Cell Iden	gister: - Centre: ' eserve: 1 ssages: Update: 1 ions: work: Code: tity: BSIC:	+8 sec, 1 *+447973. Jnlimite 2727 Jnlimite Main TMOB 0816 EB1C 71	0000 Network 1000972",1: d d 1000972",1: d 11008 00016 1241 62	N2 TMOB 0816 FFFF 64	>		
CSD+SMS re Service Message r Total me <u>Base Stat</u> <u>2G net</u> Loc Area Cell Iden	gister: - Centre: ' eserve: 1 ssages: Update: 1 ions: work: Code: tity: BSIC: RFCN:	+8 sec, 1 *+447973. Jnlimite 2727 Jnlimite Main TMOB 0816 EB1C 71 666	NUME Network 100972",1 d d MI TMOB 0816 1241 62 653	N2 IMOB 0816 FFFF 64 668	>		
CSD+SNS re Service Message r Total me Base Stat 2G net Loc Area Cell Iden A	gister: - Centre: ' eserve: 1 ssages: Update: 1 ions: work: Code: tity: BSIC: RFCN: BADd:	+8 sec, 1 *+447973. Jnlimite 2727 Main TMOB 0816 EB1C 71 666 1800	NI 100972",1 d MI TMOB 0816 1241 62 653 1800	N2 TMOB 0816 FFFF 64 668 1800	>		
CSD+SMS re Service Message r Total me Base Stat 2G net Loc Area Cell Iden A	gister: - Centre: ' eserve: N ssages: Update: N ions: work: Code: tity: BSIC: BSIC: BSIC: BSIC: Band: htty:	+8 sec, 1 *+447973. Jnlimite 2727 Main TMOB 0816 EB1C 71 666 1800 0	N1 100972",1 d M1 TMOB 0516 1241 62 653 1800	N2 TMOB 0816 FFFF 64 668 1800	>		
CSD+SMS re Service Message r Total me Base Stat 2G net Loc Area Cell Iden A Rx	gister: - Centre: ' eserve: N ssages: Update: N lons: work: Code: tity: BSIC: tity: BSIC: BSIC: Band: hity: dBm:	+8 sec, 1 *+447973. Jnlimite 2727 Main TMOB 0816 EB1C 71 666 1800 0 -94	N1 100972",1 d N1 TMOB 0516 1241 62 653 1800 -93	N2 TMOB 0816 FFFF 64 668 1800 -107	$ \land \land$		

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