LCBS-N
BaseStation Network

🇬🇧 Operating instructions

LCBS-N manual

v1.00
Part No:
SU6444

EU DECLARATION OF CONFORMITY

Product: LoadConnect Base Station LCBS-N/LCBS-W

Product Description: The LoadConnect Base Station Network [LCBS-N] version is a telemetry unit which accumulates load cell data from up to 16 load cells and sends the data to the cloud or/and via SMS text to a mobile phone. A series of events can be configured, and the resultant alerts sent as SMS text.

The LoadConnect Base Station Wi-Fi [LCBS-W] is a telemetry unit which accumulates load cell data from up to 16 load cells and sends the data to the cloud. The data is then available via the LoadConnect online application from a web browser.

Marking:

Manufacturer: Straightpoint (UK) Limited,
123 Proxima Park
Houghton Avenue
Waterlooville
Hampshire
PO7 3DU

This conformity is based upon compliance with the application of harmonized or applicable technical standards and, where applicable or required, a European Union Notified Body certification.

Directives: The described product above, is in conformity with:
EU Machinery Directive 2006/42/EC;
EU Radio Equipment Directive 2014/53/EU (RED Directive);
EU RoHS 2015/863/EU

Applicable Harmonised Standards:

EU Machinery Directive 2006/42/EC
EN ISO 12100:2010 Safety of machinery - General principles for design – Risk assessment and risk reduction.

RED Directive
EN301 489-1 v2.2.3 (2019-11) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, Part 1: Common technical requirements;

EN301 489-3 v2.1.2 (2021-03) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, Part 3: Specific conditions for Short Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz;

EN301 489-17 v3.2.4 (2020-09) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, Part 17: Specific conditions for Broadband Data Transmission Systems;

BS EN 62368-1:2020+A11:2020 Audio/video, information and communication technology equipment. Safety requirements.

RoHS
EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Notified Body: Self-declared.

Quality Management: ISO 9001:2015 Quality Management Systems Requirements: BSI Certificate No. FM 584438

Straightpoint (UK) Limited declare that under our sole responsibility for the manufacture and supply of the product detailed above, that it conforms to the essential health and safety requirements of the listed applicable Directives and applicable harmonised technical Standards.

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Signed, on behalf of Authorised Representative:

Name: Thomas Dietvorst
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Date: February 24th 2023

DECLARATION OF CONFORMITY

Product: LoadConnect Base Station LCBS-N/LCBS-W

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Marking:

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123 Proxima Park
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This conformity is based upon compliance with the application of UK Statutory Instruments (and their amendments) and/or applicable technical standards'; and, where applicable, or required, UK Notified Body certification.

UK Regulations: The described product above, is in conformity with:
The Supply of Machinery (Safety) Regulations 2008;
The Radio Equipment Regulations 2017;
The RoHS Regulations 2012.

Applicable Designated Standards:

The Supply of Machinery (Safety) Regulations 2008
EN ISO 12100:2010 Safety of machinery - General principles for design – Risk assessment and risk reduction.

The Radio Equipment Regulations 2017
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UK Notified Body: Self-declared.

Quality Management: ISO 9001:2015 Quality Management Systems Requirements: BSI Certificate No. FM 584438

Straightpoint (UK) Limited declare that under our sole responsibility for the manufacture and supply of the product detailed above, that it conforms to the essential health and safety requirements of the listed applicable UK Regulations and applicable designated technical Standards.

Technical Information Available From: Straightpoint (UK) Limited,
123 Proxima Park
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Signed, on behalf of Straightpoint (UK) Limited:

Name: Thomas Dietvorst
Position: General Manager
Date: February 24th 2023

Index

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Introduction

LoadConnect Base Station Network [LCBS-N] version is a telemetry unit which accumulates load cell data from up to 16 load cells and sends the data to the cloud or/and via sms text to a mobile phone. A series of events can be configured, and the resultant alerts sent as sms text. Ad hoc requests for data can be sent under keyword protection to the LoadConnect Base Station Network unit which will text back with a report.

The unit transmits the data over a mobile phone network, so a suitable mobile phone SIM is required with at least 4G Sim, 4Gb Data and texts, call minutes are not required.

A contract sim is preferable to a PAYG sim as it is not practical to top up units on a regular basis.
The unit operates on the 4G network with fall back to 2G/3G where available. If cloud operation is not required some mobile data plan is still necessary.

The unit has GPS and hence the position of the unit can be accurately located on a map. It also has a built in temperature sensor.

The LCBS-N network unit can have one cabled load cell attached to it, or a 4-20mA sensor.
The unit has a battery backup of at least 8 hours of use if disconnected from mains electric.

Unpacking

Along with your LCBS-N unit there is a variety of cables, connectors and antenna as follows.
Note: The content may differ from that shown.
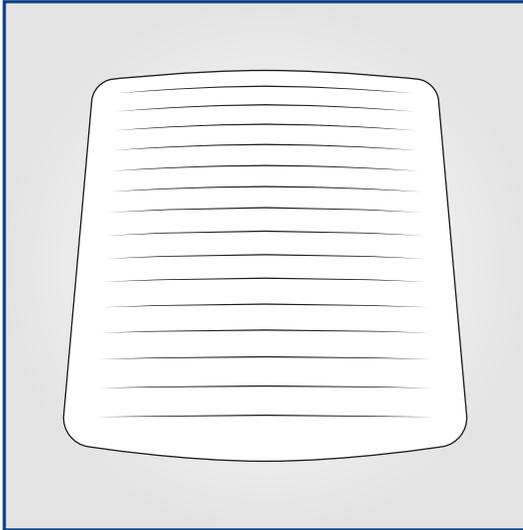
LCBS-N unit as shipped.
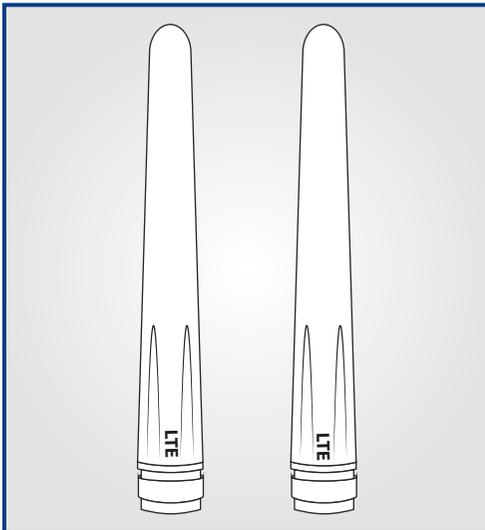
Two 4G antennas.
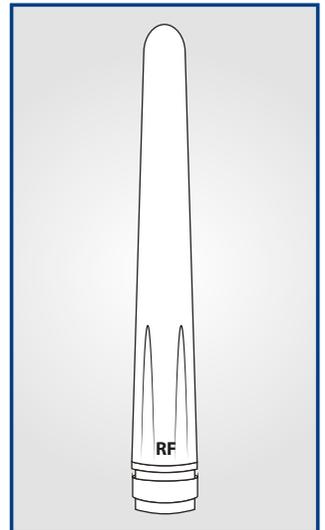
2.4GHz load cell RF antenna.

GPS antenna.

USB dongle required for PC Config software and the toolkit software to communicate with LCBS-N unit.
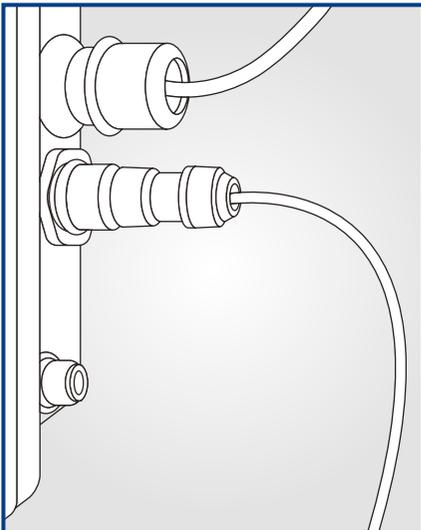
LCBS-N unit showing the Power Supply cable (bottom of illustration) and the USB debug cable (top of illustration) which may be required. If requested this USB debug cable needs to be connected to a PC/Laptop and a terminal emulation program such as Terraterm.

Open source available from:
https://osdn.net/projects/ttssh2/releases/

Logs can then be sent to Crosby Straightpoint. The USB cable is unlikely to require a driver for windows 10 but is available on request or from FTDI.

Unit Set Up

Antenna
Connect the four antenna as shown below:

      1) LTE antenna (Main 4G)   2) LTE antenna (Auxilliary 4G)
      3) RF antenna (2.4GHz load cell) 4) GPS antenna
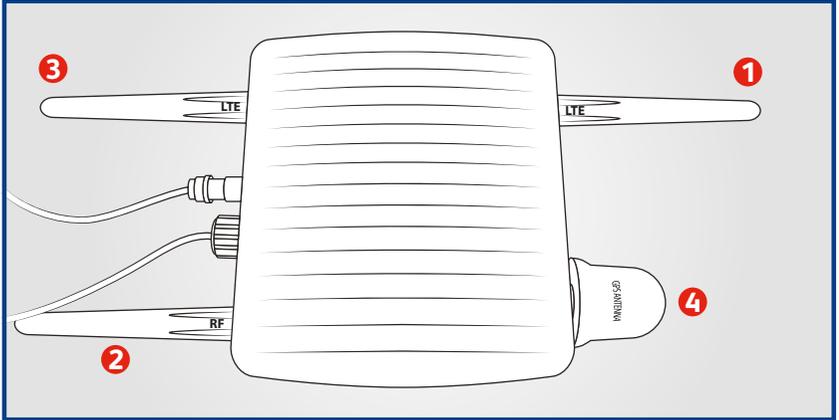
Carefully attach the antenna in the above arrangement making sure not to mis-thread them.
Mount the unit outdoors in a position with good GSM and GPS reception.

Sim
Push the sim lid away from the corner cut-out, which will unlock the sim lid and hinge it upright.
Insert the sim into the base of the sim holder, noting the orientation of the sim cut-out corner.
Then shut the sim lid onto the sim holder and push the sim lid towards the hinge, thus locking the sim in place.
The SIM holder takes a micro SIM. If a nano sim is used it will need a microsim carrier.
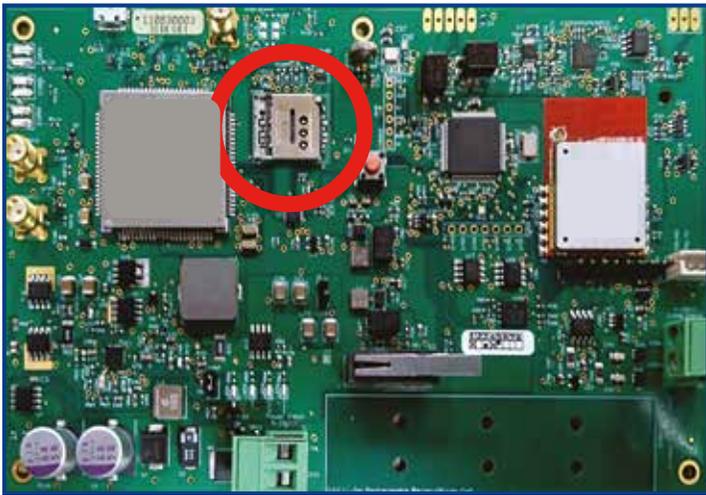
Locate the SIM Holder in the LCBS-N unit.

Unit Set Up (contd.)
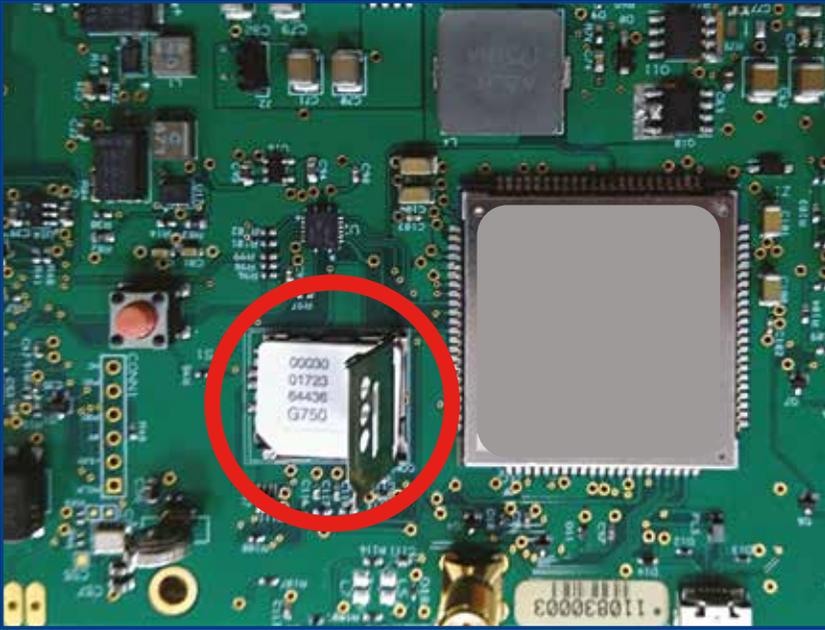
Insert the SIM into the base of the SIM holder.
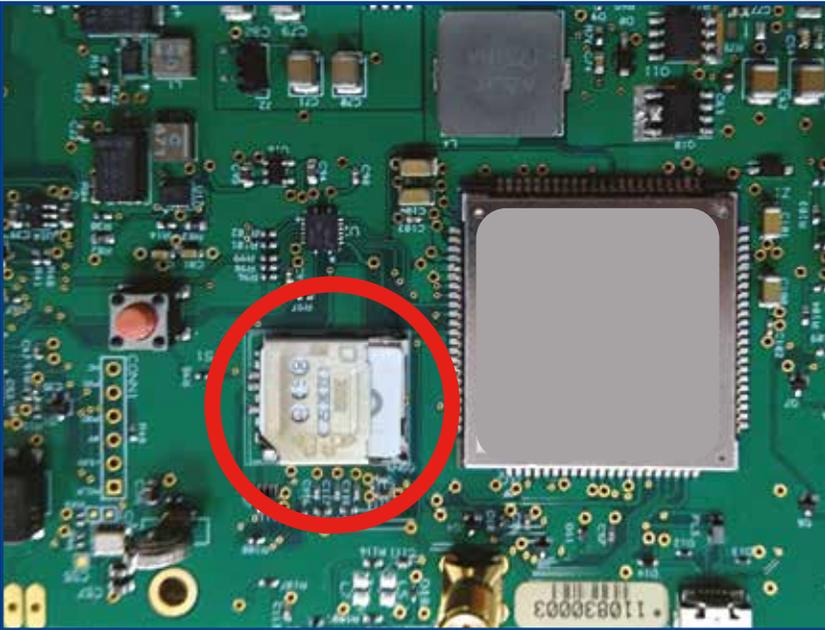
Close and lock the SIM.

LCBS-N Toolkit Software

The LCBS-N unit can be used to configure the mode of operation of the unit as follows :-

> Send regular data to the cloud.
> Send regular data as SMS texts to a mobile phone.
> Set up the window and frequency of the polled data.
> Set up events to produce alerts as SMS texts.
> Set up which load cells the unit is to receive data from.
> Set up system parameters.

The LCBS-N unit connects to the toolkit software in the same way that you would connect PC Config to a load cell.
To connect, power off the LCBS-N unit and open the case.
Run the toolkit software on the computer with the USB dongle plugged in and press the 'Connect' button.
Then power on the LCBS-N unit and press the reset button on the pcb.
The toolkit software will connect and read the parameters from the unit.

LCBS-N Toolkit Software

System Settings
Click on the Systems Settings Tab to edit.

Site Name
Enter the Site Name of this LCBS-N unit up to 20 character long.
This will appear in SMS text and cloud reports.

Access Point Name, APN Name and APN Password
These are required for the mobile phone data connection, whether you intend to send data to the cloud or not.

These will need to be provided by your mobile network operator.
There are some global sites which list these, but the lists are rarely kept up to date, also be aware that contract and PayAsYouGo APN are usually different.
A good reference is: https://apnsettings.gishan.net/

Common UK APN Settings

Contract Sim

Service Provider	Access Point Name	APN User Name	APN Password
Vodafone	wap.vodafone.co.uk	wap	wap
O2	mobile.o2.co.uk	o2web	password
EE	everywhere	eesecure	secure
Three	three.co.uk	(blank)	(blank)

PAYG Sim

Service Provider	Access Point Name	APN User Name	APN Password
Vodafone	pp.vodafone.co.uk	wap	wap
O2	payandgo.o2.co.uk	payandgo	password
EE	everywhere	eesecure	secure
Three	three.co.uk	(blank)	(blank)

LCBS-N Toolkit Software

SIM PIN Code

It is possible to lock the SIM in order to protect it, using a PIN code. Some countries SIMs always have PIN code associated with them.

Enter the 4-digit PIN code to unlock your SIM in this field.

If your SIM does not have a PIN Code leave the field blank.

It is essential you enter the correct PIN code (or leave blank for none) here. If an incorrect PIN code is entered and the unit is started the SIM will become locked due to the incorrect PIN being entered too many times. If this occurs the SIM will need to be put into a mobile phone and the PIN lock removed by entering a PUK code , obtained from you mobile service provider.

HTTP Url

This is the url to connect to the cloud server and should be left as is.

API Username and Password

Enter the API username and password that are presented in the Admin settings screen in the LoadConnect online application. These API settings will normally be emailed to you. As shown below:
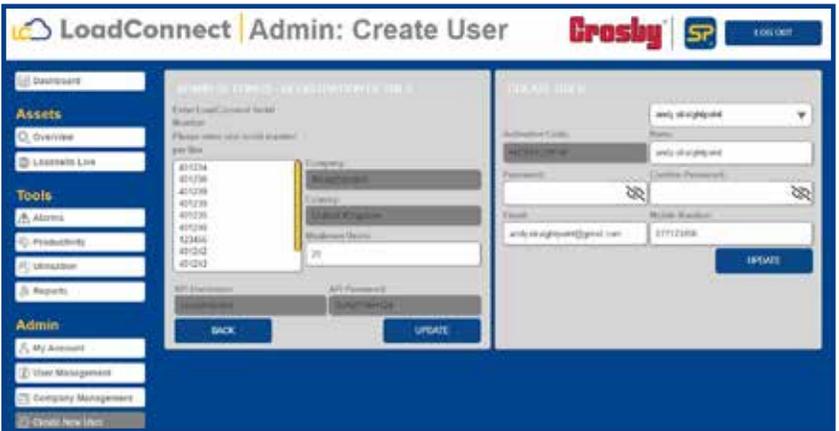
Setting up the connected Load Cells

LCBS-N Toolkit Software

Up to 16 load cells can be connected to a LCBS-N unit. The serial numbers of the load cells to connect are added in the LoadCells screen on the previous page.
The unit can have the first load cell as the internal cabled load cell or a 4-20mA sensor or a wireless load cell.
The remaining 15 load cells are regular wireless load cells.
Enter the serial numbers of the load cells you wish to connect to.
The entries must be contiguous with no gaps left.
You can also select the display units which the weight values will be sent to the cloud and sent via SMS text in.
Further to this if the units are set to pounds (lbs) the temperature readings via SMS text will automatically be set to fahrenheit (otherwise, it will be in centigrade).
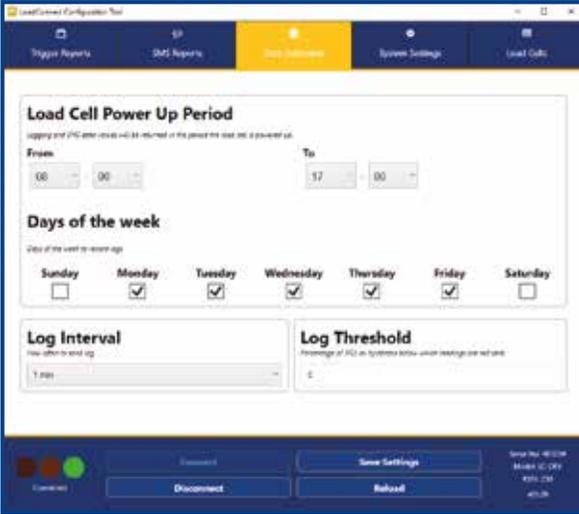
Load Cell Power Up Period specifies the period in which the LCBS-N unit keeps the connected load cells awake. This is a power saving aid for the connected load cells, so they are not permanently powered up and using battery life when they do not need to be.
These times affect data logging and events via the cloud and SMS text as they also form the bounds when data is available from the load cell, thus these are the cloud and sms logging period.

Log Interval is the measurement interval at which data from the load cells is gathered and send to the cloud. Options of 1min, 5min, 15min and 30 mins are selectable. A value of zero disables cloud data logging.

Log Threshold is the threshold of a data value above which data is sent to the cloud.
It is used to curtail the amount of data send for cloud storage.
This threshold is a percentage of the Working Load Limit (WLL) value of the attached load cell.
Hence if the WLL of a load cell is 250te and the Log Threshold is 0.1 %, then the current data value must be 250te*0.1 % greater or less than the last value sent to the cloud.
If a value of zero is specified, then every data value is sent to the cloud.

So if -
The threshold is 0.1 % and the WLL is 250te then the data change will be 250x0.1/100 -> 0.25te
data value item at interval 1 is 60.0te it is sent to the cloud for logging.
data value item at interval 2 is 60.1te it is not sent to the cloud.
data value item at interval 3 is 60.3te then the value is sent to the cloud for storage.

LCBS-N Toolkit Software

SMS Reports

SMS Passphrase is a 16 character keyword which during normal LCBS-N unit operation the user will text to the LCBS-N unit in order to be texted back by the LCBS-N unit with the current data values report from the connected load cells.

SMS Report Header is a 32-byte string which forms a heading line in the above text report back to the user.

Unit Number
This field is used to store the mobile phone number of the SIM in the LCBS-N unit for user reference and reports.
With some SIMs it is possible to obtain the phone number of the SIM and some it is not. If you leave this Unit Number field blank and power up the LCBS-N unit, if the mobile number is in the SIM it will be copied to this field automatically. If you enter the mobile number manually here, it will not be overwritten.

Trigger Reports

LCBS-N Toolkit Software

Trigger Reports are a series of user specified events which, when triggered sends a SMS text message to up to three defined mobile phone numbers.
Up to 20 triggers can be specified.
Most triggers work on all load cells paired to this LCBS-N unit.
There is a value parameter associated with a trigger. This is not used in all triggers, but generally specifies a threshold limit.

The Report Triggers are available to be selected from a drop-down box as follows.
LoadCell Greater Than Limit
LoadCell Less Than Limit
Value Parameter - Specifies the Threshold
If the data value of any connected load cell exceeds the specified threshold limit, then an SMS Event Triggered text is sent. Once the load cell returns below the limit an SMS Event Cleared text is sent.

LoadCell Error	Load Cell Overrange error occurs
LoadCell Low Battery	Load Cell has a low battery
Loadcell Permanent Overload 110%	Load Cell has a permanent overload condition set
Loadcell Transient Overload 101%	Load Cell has a transitory overload detected
LoadCell Calibration Due	Load Cell calibration is due
LoadCell No RF Error	The Load Cell is not communicating with the LoadConnect unit
Cloud Data Transfer Error	The LCBS-N unit has failed to send up a number of readings to the cloud

Value Parameter – Not Used
If any of the connected load cells generates one of these events, then an SMS Event Triggered text is sent. Once the load cell event is cleared an SMS Event Cleared text is sent.

The **LoadCell No RF Error**, which is defined as a Load Cell is not communicating with the LCBS-N unit, may be generated for several reasons including :-.
The Batteries have expired in the load cell.
The Load cell is out of RF range of the LCBS-N unit.
There is RF interference causing loss of RF signal to the LCBS-N unit.

LoadCell SMS Log Interval
Value Parameter - Specifies the interval at which text messages are sent in minutes
This sends a regular SMS text message defined by the value parameter in minutes to the specified phone numbers. The SMS report contains the data values from the attached load cells along with temperature and location information. This is data logging to SMS Text

Lid Open
BaseStation Power Out
Value Parameter – not used
If the LCBS-N unit is opened or suffers a power outage (so is running on backup battery) an SMS Event Triggered text is sent. Once the event clears an SMS Event Cleared text is sent.

BaseStation High Temperature
BaseStation Low Temperature
Value Parameter - specifies the Threshold
If the temperature of the LCBS-N unit exceeds the specified threshold limit, then an SMS Event Triggered text is sent. Once the LoadConnect unit returns below the limit an SMS Event Cleared text is sent.

LCBS-N Toolkit Software

Trigger Reports Header

These are user specified 32-byte strings which are displayed as one of the first lines in an SMS text event report dependant on whether the event is triggered or cleared.

Trigger Reports Destination

Enter up to three destination phone numbers which will be the destinations for the SMS Trigger Reports. The destinations should be used consecutively from destination 1.

After all the required settings are completed, click 'Save Settings' tab to save the changes back to the board.
Disconnect is used to disconnect the device from the toolkit software.
Reload is used to reload the LCBS-N unit parameters again to the software, this will work only if the LCBS-N unit already connected with the toolkit software.

Web Application
To access the data connect to the LoadConnect online application, link available at:
loadconnect.corefid.net

Distributor Stamp