Instrument Handbook

Environmental Noise
Measurement Kit

Cirrus
Research plc

Introduction

The latest environmental noise measurement kits from Cirrus are designed for use with the Optimus Sound Level Meters and which provide a fully weather-protected system for outdoor noise measurements.

Both the sound level meter and the measurement microphone are protected against adverse weather conditions and can be transported inside the robust, secure case.

For longer-term measurements, external power can be connected to the kits allowing for operation over extended periods of time.

For remote access to the instrument, the CK:685B kit include a modem and GPS receiver which, when used with Optimus Cloud, allow for measurements to be downloaded to the NoiseTools software, the instrument to be configured and alerts sent when pre-set noise conditions are met.

Alerts can be sent directly to the Optimus Cloud Notification App, email or SMS[1] text, all of which can be easily configured by logging into Optimus Cloud.

The case also has space for the outdoor microphone, cable, an acoustic calibrator, documentation and other accessories that may be needed as well as for the sound level meter itself.

What's covered in this manual?

This manual covers both the CK:675B and CK:685B versions of the environmental noise measurement kit.

The CK:685B contains a modem and GPS receiver whereas the CK:675B does not.

Where information applies only to the CK:685B, this is indicated in the relevant section.

Please refer to the user manuals supplied with the Optimus Sound Level Meter and Acoustic Calibrator for more information about the operation of these instruments and for additional care instructions.

This symbol is shown where important instructions or information are displayed.

Please ensure that you read any information and follow the instructions.

Components of the environmental measurement kits

The kits consist of the following components:

- Weatherproof Case
- MK:172 Outdoor Microphone Unit
- Battery Packs & Charger

The CK:685B version also contains a modem and GPS receiver.

The case can be used to transport the sound level meter, acoustic calibrator and outdoor microphone.

Additional components may also be supplied with this kit that are not listed above.

Fitting a SIM Card to the CK:685B Environmental Noise Measurement Kit.

The SIM card should be installed before the system is powered to ensure that the connection to the cellular network is established.

Please see page 16 for details of fitting the SIM card to the modem.

Assembling the Environmental Noise Measurement Kit

Case layout

MK:172 Outdoor Microphone & 10m Cable

Storage space for manuals & documentation

CB:673 Battery

Space for 2nd Battery - Supplied as standard

Modem & GPS CK:685B Variants only

Connectors for microphone & external power

Space for Sound Level Meter Preamplifier

Space for Acoustic Calibrator

Optimus Green Sound Level Meter (Not included)

In the image above, the second battery has been removed to show the space provided.

The system can run from one or two battery packs and they can be swapped whilst the sound level meter is running.

Putting the Optimus Sound Level Meter into the kit case

⚠️ Care needs to be taken when removing the preamplifier from the sound level meter, because it is delicate and can easily be damaged.

Only the locking ring at the base should be turned. The microphone capsule is also delicate and must not be knocked.

It is easy to get the wires trapped when closing the lid, so please take care to keep them away from the edge of the kit case when shutting it.

Refer to the Optimus Sound Level Meter User Manual for more detailed information regarding the care and operation.

Gently unscrew the preamplifier and microphone from the optimus and stow it in the hole in the kit case to keep it safe.

Connecting the Sound Level Meter

The optimus sound level meter is connected to the outdoor kit case using two cables.

1. Microphone input
2. Multiway input

The grey rubber protective compartment cover on the base of the optimus can be removed completely while it is in the case.

Microphone input to the Sound Level Meter

The microphone signal is connected to the sound level meter via the 6-pin socket at the top of the instrument.

Carefully fit the 6-pin connector to the socket and tighten the locking ring. Do not twist the connector or use excessive force. This may cause damage to the connector and the sound level meter.

Multi-way connector

Power is supplied to the sound level meter via an 18-pin connector running from the Interface Box. The socket for this is behind the protective rubber cover at the bottom of the sound level meter.

Plug the connector gently into the socket. There is an arrow embossed on the upper side of the multiway connector to ensure that it is aligned correctly.

USB input

The USB connection on the bottom of the Optimus sound level meter can be used to download measurement information to the NoiseTools software.

To download data directly via the USB connection, connect a standard USB cable to the socket on bottom of the sound level meter and connect the other end to a PC running the NoiseTools software.

> ⚠️ When the optimus is connected via USB to a PC, modem functionality is disabled and the USB connection will take priority.

External connectors

The environmental noise measurement kits have two input connectors which are located on the outside of the case as shown below:

External Power Connector

Outdoor Microphone Connector
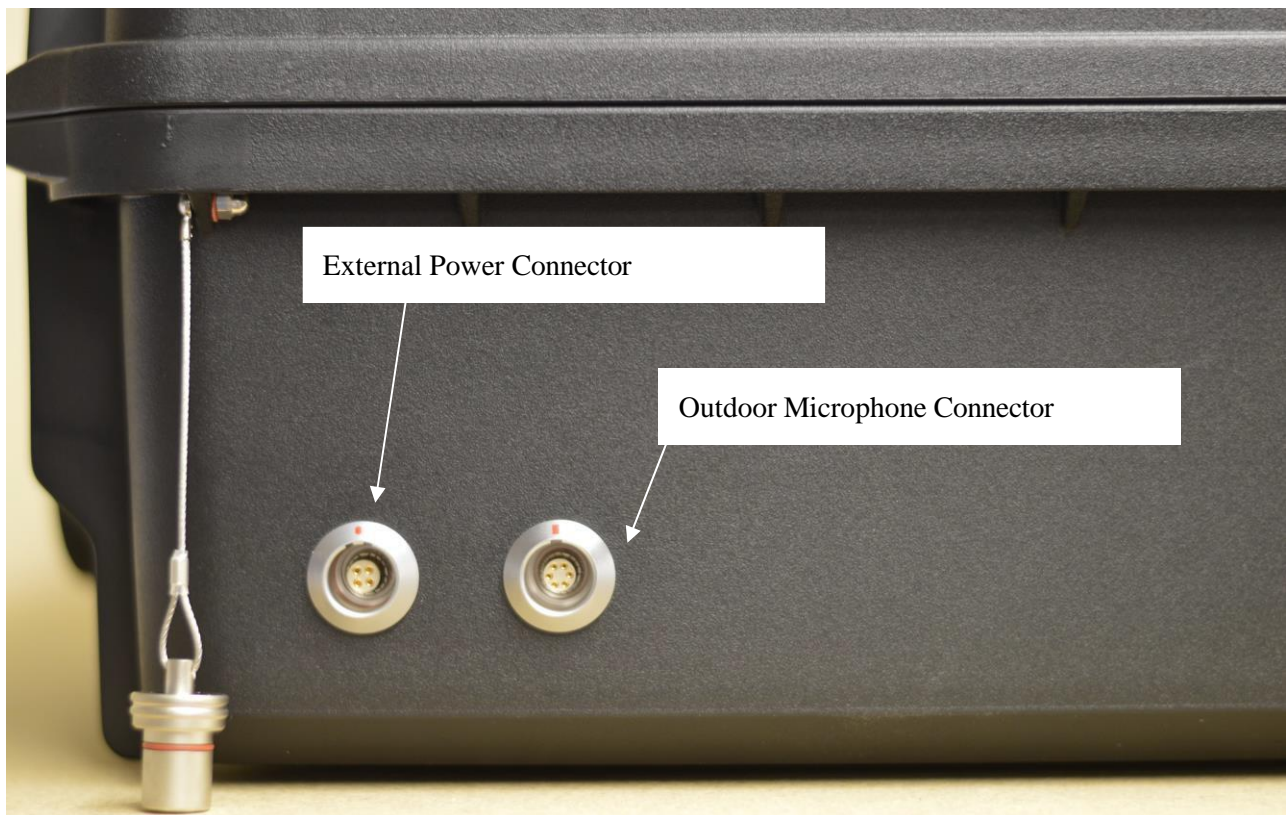
Outdoor Microphone Connector

The microphone input from the MK:172 Outdoor Microphone is connected via the 6-Pin microphone socket.

Remove the protective cap and insert the plug. Pull back the body of the connector to release.

External Power Connector

External power is connected via the 4-Pin socket. Remove the protective cover where fitted and insert the plug. Pull back the body of the connector to release.

The kits can be powered from a range of external sources which allow operation over long periods. This can be essential for long term continuous monitoring projects or where it is not possible to access the equipment on a regular basis to replace or recharge the internal battery power.

External power in the range of 12-18V DC can be connected to the kit via the input socket on the side of the case. The optional ZL:673 cable can be used to connect external batteries to the case.

Where mains power is available, the CU:612 External Power Supply can be used. This provides a stable power source to the kit and can be used alongside an internal battery, further extending the operating life of the system.

External power must only be connected via an optional ZL:673 cable or the CU:612 Mains Power Supply.

The charger that is provided with the battery pack is not weatherproof and must only be used to charge the internal battery packs.

Checking the power supply to the sound level meter
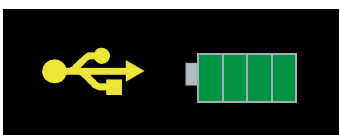
Please ensure that the optimus sound level meter is receiving power from the battery packs and that the battery packs are charged before leaving the equipment.

If the optimus is not receiving external power, it will run for approximately 12 hours on its 4xAA internal batteries (when these are new) and will then switch off.

There are different conditions under which these power indicators will show.

The table below shows the different power states.

Table 1 Battery Indicators

Indicator	Power Source	Notes
	Internal Batteries	External power is not connected
	Internal Batteries	External power is not connected. Internal batteries are low.
	Internal Batteries	USB Data is also connected
	External power	The Optimus is receiving power from an external battery or power supply

	External Power Connected USB Data Connected	The Optimus is receiving power from an external battery or power supply USB is also connected

Internal Battery Packs

The Environmental Noise Measurement Kits are supplied with a rechargeable battery as standard. Within the case there is space for a second battery pack which can be used to extend the operating life of the system.

The battery packs are connected via red and blue spade connectors. Push the connectors onto the battery or batteries and check that they are secure before use.

It is recommended that the batteries are removed from the case for charging.

External power does not charge the internal battery or batteries. This is for safety reasons.

Assembling the MK:172 Outdoor Microphone

The MK:172 is a high performance outdoor microphone that has been designed for long term operation.

The windshield has been coated to repel water and to protect the microphone from harsh weather conditions.

The windshield assembly can be removed for calibration.

A 10m cable is supplied as standard with a LEMO plug that connects to the socket on the side of the main case.

Microphone Capsule

The microphone capsule supplied with the sound level meter should be used with the outdoor microphone. This capsule is usually supplied attached to the instrument preamplifier. The microphone capsule is shown below:

It is possible to use an additional microphone capsule with the outdoor microphone. Please contact Cirrus Research plc or your local representative for details.

To attach the microphone capsule to the outdoor microphone preamplifier, remove the windshield assembly.

- Carefully pull the assembly upwards away from the body of the unit.
- Carefully screw the microphone capsule to the top of the outdoor microphone preamplifier.
- Carefully replace the windshield assembly.

Mounting the Outdoor Microphone

The MK:172 Outdoor Microphone can be mounted onto a standard camera tripod with a ¼" Whitworth thread.

To attach the unit, carefully screw the base onto a tripod and secure.

Birdspike

Windshield

Microphone
Capsule

Preamplifier

Tripod Mount
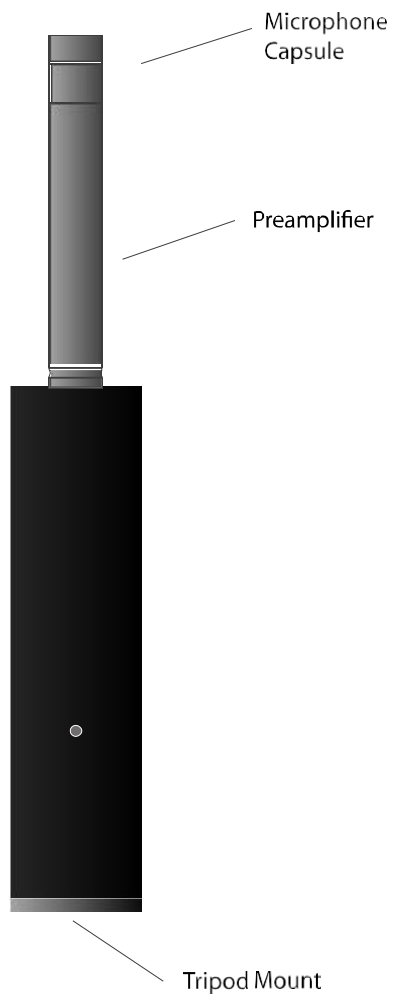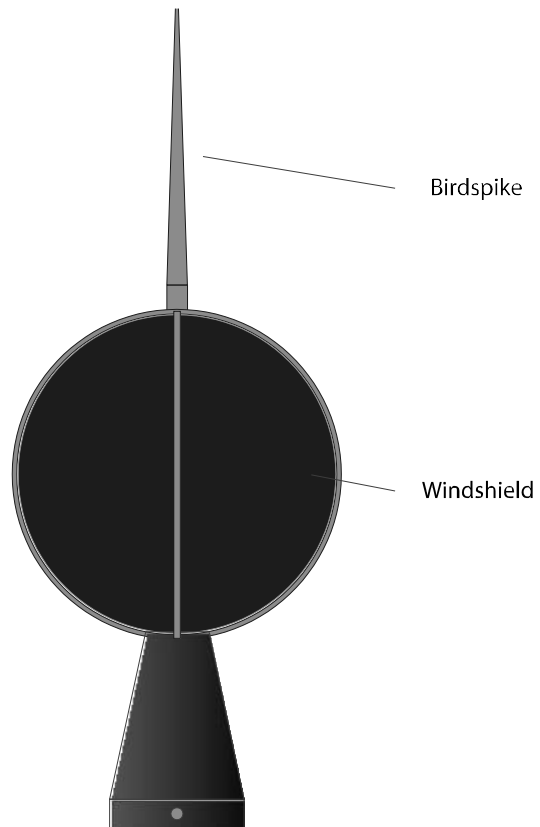
Pull to remove
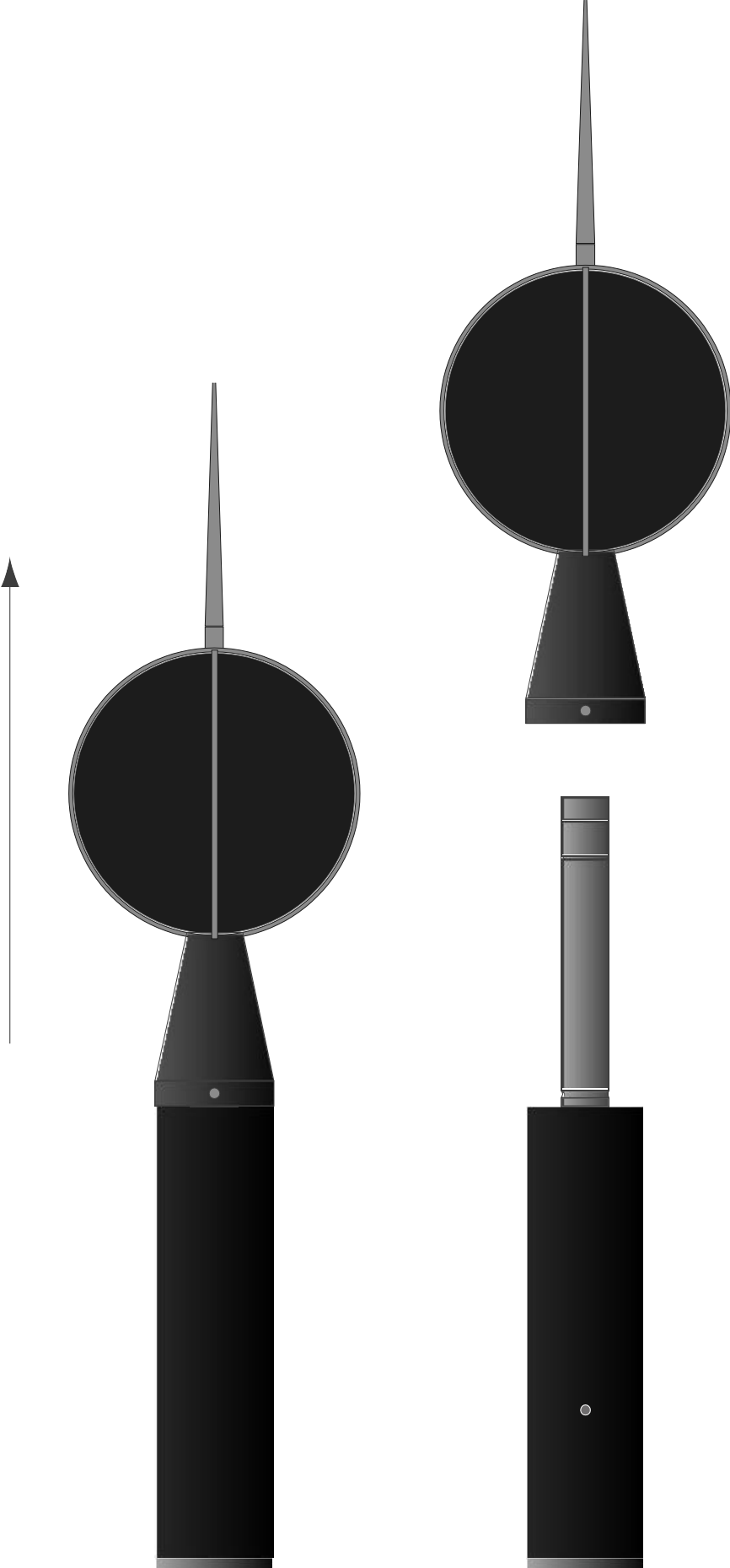
Switching on the system

Before switching on, ensure that all of the cables and connectors are secure.

Ensure that the system has power from either an internal battery (or batteries) or from an external power connection.

Press the power button on the side of the Optimus Sound Level Meter. The Optimus will power up and is then ready to be calibrated and to make measurements.

If the environmental noise measurement kit has a modem fitted (CK:685B), this will power up at the same time and the indicators on the modem will flash to indicate that power is available. The modem does not have a separate power button.

Calibrating the Optimus Sound Level Meter & Outdoor Microphone

Calibration of the entire measurement chain is important to ensure that the noise levels recorded are accurate.

Calibration should always be carried out with the MK:172 outdoor microphone attached, via the 10m cable, to the case of the environmental measurement kit and with the Optimus Sound Level Meter connected and switched on.

1. Remove the windshield from the MK:172 outdoor microphone (See page 12)
2. Ensure that the microphone capsule from the sound level meter is attached to the MK:172
3. Connect the acoustic calibrator to the microphone capsule and switch on the calibrator
4. Press the Calibrate button on the optimus sound level meter and the instrument will calibrate itself
5. When the calibration has been completed, press the Back key
6. Carefully remove the acoustic calibrator from the outdoor microphone and store in the case
7. Replace the windshield assembly on the MK:172 outdoor microphone

Please refer to the user manuals for the Acoustic Calibrator and the Optimus Sound Level Meter for any additional information regarding of the sound level meter.

Making measurements with the Environmental Noise Measurement Kits

Always review the following steps before undertaking noise measurements with the environmental noise measurement kits:

1. Is the outdoor microphone connected?
2. Is the Optimus Sound Level Meter connected to both the multi-way connector and the microphone connector?
3. For the CK:685 Modem version, has the kit been configured for remote communication and a SIM Card inserted?
4. Is the clock in the Optimus Sound Level Meter correct?
5. Has the system been calibrated?
6. Has the Optimus Sound Level Meter been programmed to make measurements and if so, are these settings as expected?
7. Is the Optimus Sound Level Meter measuring & storing data? Check that the red indicator showing in the top left corner of the display of the instrument
8. Has the case been closed and locked securely and are all connectors and cables secure?

Connecting remotely using the CK:685B Environmental Noise Measurement Kit

The following steps are specific to the CK:685B Environmental Noise Measurement Kit that contains a modem and GPS receiver.

The modem allows measurement data to be downloaded to the NoiseTools software and for Optimus Cloud to send real-time alerts to the Notifications App as well as via Email, SMS and Twitter.

The GPS receiver allows the clock in the instrument to be synchronised

The following information details how to enable and test the remote connectivity between the NoiseTools software and the measurement kit.

1. Connect the Optimus Sound Level Meter to NoiseTools using a USB cable
2. Enable remote communications for the instrument
3. Configure the Optimus Sound Level Meter for the modem
4. Configure settings for the SIM Card into the Optimus Sound Level Meter
5. Reconnect the Optimus to the Environmental Noise Measurement Kit
6. Install a SIM Card into the Modem
7. Switch on the Optimus Sound Level Meter
8. Allow the modem to connect to the wireless network
9. Connect to the instrument from the NoiseTools software

Each of these steps is detailed below. More information may be found at support.cirrusresearch.co.uk

Please note that these steps are for the connection method using Optimus Cloud.

If the Optimus Dynamic connection method (which requires a SIM Card with a Public IP address is used, the setup and configuration is different to that detailed below. Please contact Cirrus Research for more information.

An Optimus Cloud account is required to access the full functionality of the system. Please ensure that your Optimus Cloud account is connected within NoiseTools. Click Tools, Optimus Cloud to check that NoiseTools is connected to your Optimus Cloud account.

A new account can be created if you do not already have one. Please follow the on-screen instruction to create and enable an account.

To complete the configuration, you may need to have details of the APN (Access Point Name) for the SIM Card network provider that you are using. This information will be available from the network provider's website.

The information that you will need is as follows:

APN Name

APN Username

APN Password

Please note that NoiseTools 1.8.2 or later is required to use the recommended Optimus Cloud connection method.

The Optimus Sound Level Meter must have firmware version v3.0 or later and be an Optimus Green (CR:17x Series)

Connect the Optimus Sound Level Meter to NoiseTools using a USB cable

Open the NoiseTools software and connect the Optimus Sound Level Meter via a USB cable.

When the connection is made, the instrument will appear in the Instruments window as shown below:
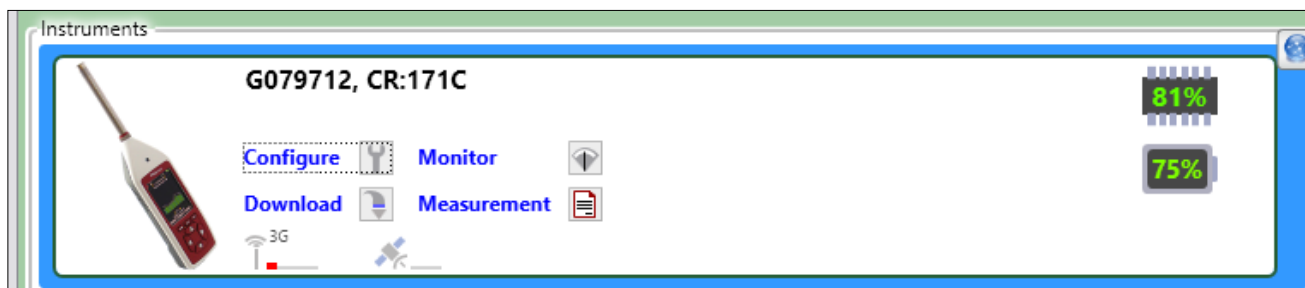
Enable remote communications for the instrument

Click the world icon to open the remote instruments options:
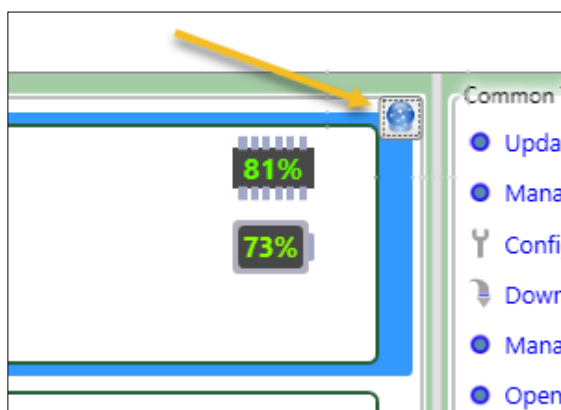
In the options box that opens, click the "Allow Remote Access" and "Link to Optimus Cloud" for the Optimus Sound Level Meter that is connected via USB. NoiseTools will save this information when the OK button is clicked.
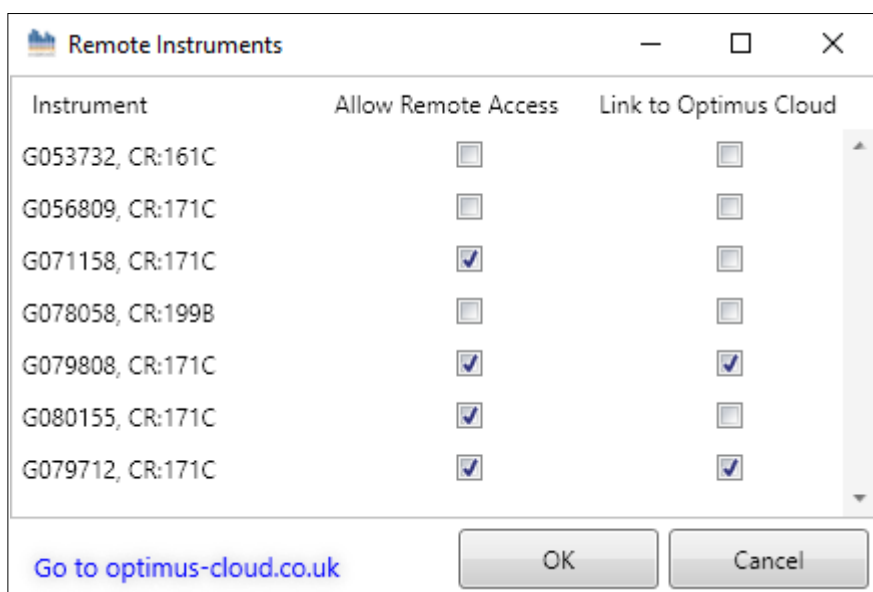
Configure the Optimus Sound Level Meter for use with the modem

In the NoiseTools software, click on 'Configure', then on the 'Advanced' tab as below:

Check the settings of the Serial Ports Modes options.

The serial ports need to be set to:

Port A: Modem_HE910

Port B: GPS

If the Port A and Port B settings are not correct, click the options and select Modem_HE910 and GPS accordingly.
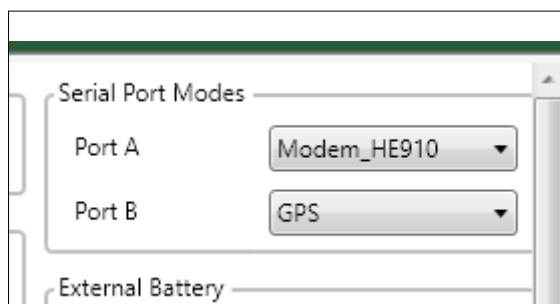
Communication port settings can only be changed while the optimus is connected to a PC via USB.

These settings cannot be changed when the instrument is connected to NoiseTools remotely.

Click **'save to instrument'** on the configuration window and the optimus screen will update to show the new settings (Port A: Modem_HE910, Port B: GPS).

Configure the settings for the SIM Card into the Optimus Sound Level Meter

Ensure that the SIM card does not have a PIN Lock. This can prevent the modem from being able to connect to the network. See page 26 for more information.

Before a modem or other device can connect to a cellular network, it may need to be programmed with the correct APN or Access Point Name.

This tells the modem what to connect to and may also contain a username and password, depending upon how the network is configured.

Some SIM cards are provided with the APN details pre-set but others do not. Your SIM provider should also confirm if the APN is pre-set. If it is not, confirm with the provider the following information:

1.   APN Name

2.   APN Username

3.   APN Password

This information must be programmed into the Optimus using the Communications tab in the Setup window as shown below:
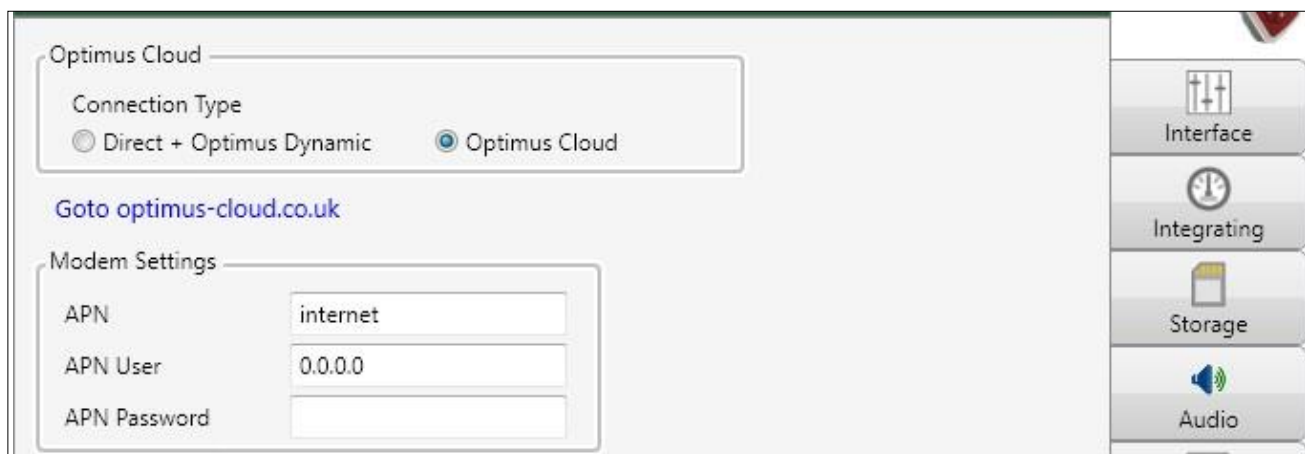
Ensure that the Optimus Cloud option is selected.

Enter the APN details into the Modem Settings boxes.

If a Username and Password are required by your network provider, enter these into the APN User and APN Password boxes.

Click 'save to instrument' to configure the Optimus.

Reconnect the Optimus to the Environmental Noise Measurement Kit

Disconnect the USB cable from the Optimus Sound Level Meter and reconnect it to the Environmental Noise Measurement Kit.

Ensure that the multi-way connector is secured to the instrument.

Do not switch on the Optimus at this point. Wait until the SIM Card has been installed into the modem.

Installing a SIM Card into the Modem

1. Carefully lift the modem up so that you can see the SIM Card slot. Take care not to disconnect the cables from the modem
2. Locate the SIM card slot on the side of the modem. This slot is labelled SIM
3. Slide the SIM Card into the SIM Card slot with the contact side facing down as shown. When the SIM Card is installed, it locks into place.
   A SIM Card adaptor is supplied with the kit to allow for different sized SIM Cards to be used.

Switch on the Optimus Sound Level Meter

Press the power button the Optimus Sound Level Meter and allow the instrument to power up.

This will also power up the modem and GPS receiver.

Allow the modem to connect to the wireless network

The Optimus Sound Level Meter will connect to the modem and send the appropriate settings needed to connect to the wireless network.

The modem will then connect to the wireless network. This may take a short time depending upon the signal strength.

Once the connection to Optimus Cloud has been made, the status screen on page 3 of the General View will show Connected.
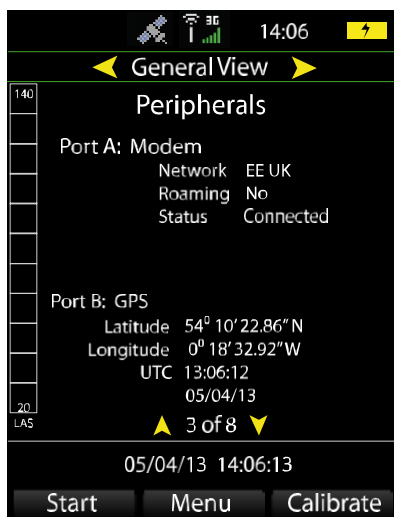
This shows that the instrument is connected to Optimus Cloud and NoiseTools can now connect to the instrument.

Connect to the instrument from the NoiseTools software

Open the NoiseTools software. The Instrument window will show any instruments that are connected directly by USB and any that are available via Optimus Cloud.

Instruments that are connected remotely will have a "Connect" link next to the instrument details.

The time shown (in this example 42 minutes) shows the last time that the instrument was connected to Optimus Cloud.

If this is greater than 1 hour, this will indicate that the instrument has stopped communicating with Optimus Cloud which may be an indicator that the batteries have gone flat or that the instrument has been switched off.

Click on the Connect link to connect to the instrument.
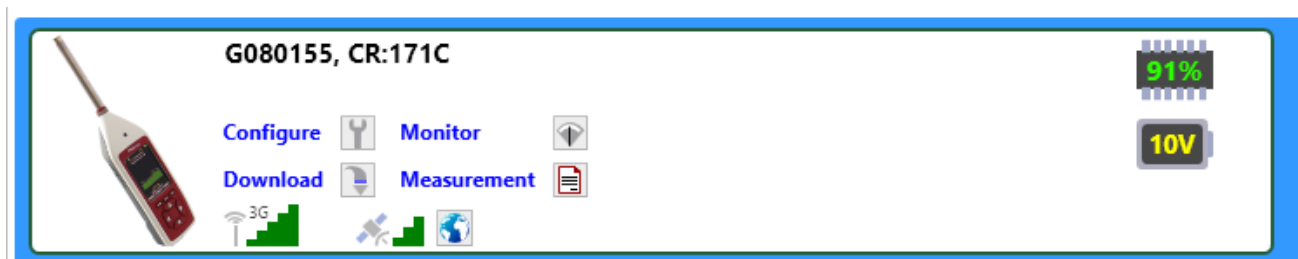
When an instrument is connected via Optimus Cloud, it can be configured or measurements downloaded as if it was connected directly to NoiseTools via a USB cable.

In addition to the standard options of Configure, Download, Monitor & Measurement, the software shows the signal strength for the modem and GPS as well as giving a world icon that allows the location of the instrument to be shown on a map.

Configuring the notifications & alerts from the Optimus Cloud website

Optimus Cloud is a web-based platform that allows Cirrus noise measurement instruments to communicate with either the NoiseTools desktop software, the Optimus Cloud Notifications App or a web page on a handheld device such as a smartphone or tablet.

Optimus Cloud also allows alerts and notifications to be sent via Email or SMS text. Charges may apply for using SMS texts.

For more information, please refer to the Optimus Cloud and Optimus Cloud Notifications technical notes that can be downloaded from the Cirrus Research plc website at www.cirrusresearch.co.uk/library

Appendix 1 Optimus Sound Level Meter Remote Connection Status
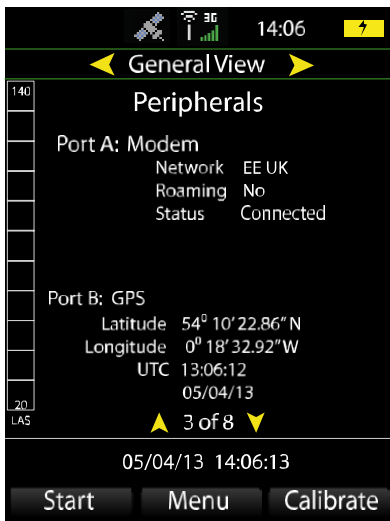
In the Port A: Modem section, the status of the connection will be shown using one of the following messages:

- Initializing Modem
- Registering
- Connected
- Disconnected

If the optimus encounters an error during this communication, it will display this information as an error code. This will be shown in **red** in the Port A: Modem section next to the status.
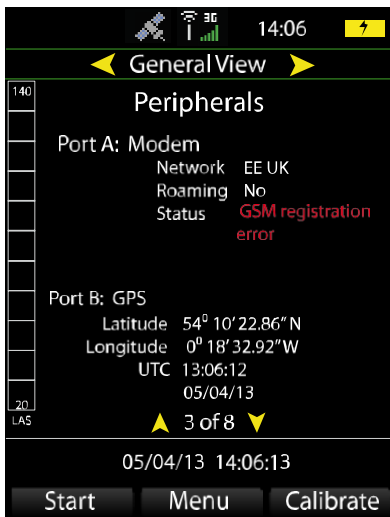
The error codes are:

- SIM error
- GSM registration error
- GPRS registration error
- Configuration error
- Initializing modem error
- Instrument registering error
- SMS error

This information can be used to diagnose connection problems between the instrument and the Optimus Cloud server.

The instrument will keep trying to connect until it gets a good signal, so this may take a while in poor signal areas.

When the instrument is ready for connection to the NoiseTools software, the antenna icon will turn white.

If there are any problems, there will be a red error message displayed on the screen. If this should happen make a note of the code number and contact Cirrus for advice.

4G/3G/GPRS Signal Indicators

The icons at the top of the instrument display show the current status of the cellular data network connection.

4G is available depending on modem fitted (contact Cirrus if upgrade required).

Network connection type

The type of network available is displayed next to the signal strength.

| 4G-data connection | 3G-data connection | GPRS-data connection |

The 4G indicator is dependent on the Optimus firmware version. If pre V5.9, the signal strength will be displayed without any connection type if connected to 4G.

Signal strength

The signal strength is shown using 5 bars and the antenna icon.

| Very poor signal strength | Poor signal strength | Medium signal strength | High signal strength | Full signal strength |
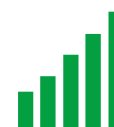
The antenna icon will show in white when the modem has been successfully setup and a connection is available.
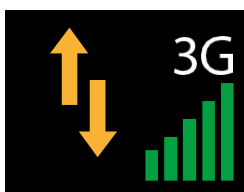
| The modem has been successfully configured | No data connection is available or system initialising |

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Examples of the different status displays are shown below.
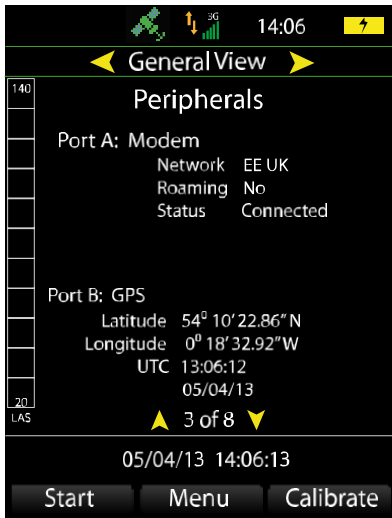
| A full 3G signal is available and the modem has been successfully configured | A weak GPRS signal is available and the modem has been successfully configured | No signal is available |
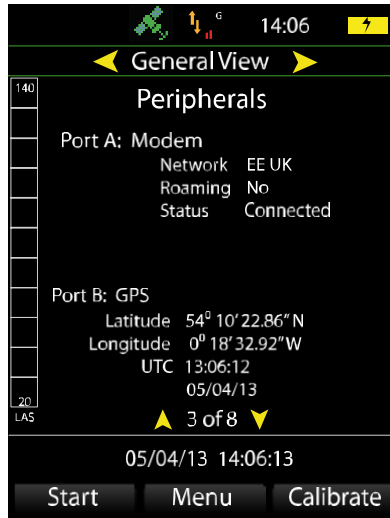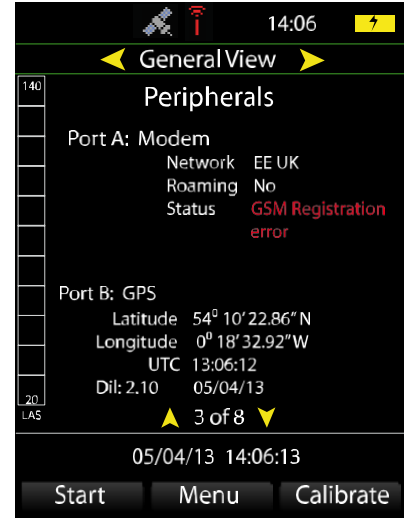
Data communication

When data is being transferred from to the Optimus Cloud, yellow arrows replace the antenna icon to show that communication is in progress.
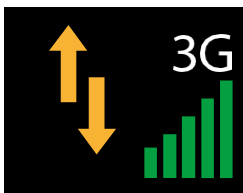
System ready for data transfer or
data transfer in progress

GPS Signal

When a measurement is started (either on the instrument, remotely triggered, or on a timer) the GPS location is recorded.

The satellite icon at the top of the instrument display shows the current status of the GPS signal strength.
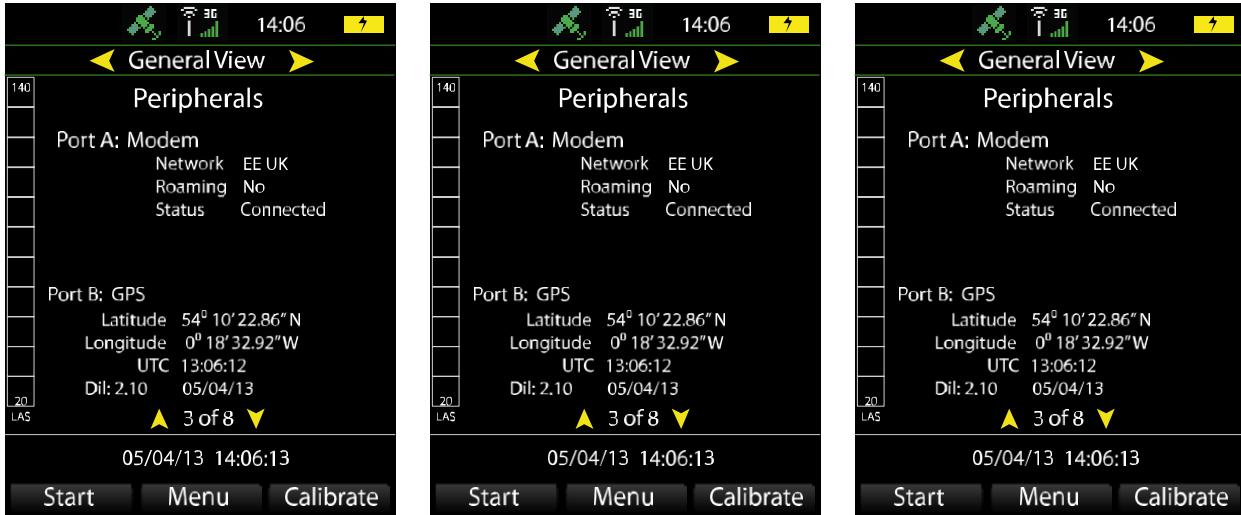
| No GPS signal available | Poor GPS signal | Good GPS signal |

The current UTC time and date are also read from the GPS signal and the instrument's clock is also adjusted at the start of each measurement using the information from the GPS signal.

The GPS clock will adjust the seconds and minutes on the optimus clock to within half an hour to match UTC. This corrects for any drift automatically. The date and time must be set by the user to the correct local date and time before the measurement session.

> ⚠️ The UTC time and date can be updated when there is only 1 satellite available to the GPS receiver. This will allow the time and date in the optimus to be set automatically.
>
> The UTC (time) shown on the display for port B is the GPS clock, not the optimus clock, and will show 12:00:00 until GPS contact has been made.
>
> The GPS location is available when 3 or more satellites are available to the GPS receiver. This will allow the measurement location to be recorded.

When the fix is satisfactory, the GPS is turned off to save power.

If no fix can be made within 2 minutes the GPS turns off with no location recorded. For repeated timed measurements, the GPS will turn on at the beginning of each measurement.

This means that every measurement has an accurate GPS location (if possible) so it doesn't matter if the kit has been moved around between measurements.

GPS position accuracy is approximately ten metres under optimum conditions. Nearby obstacles can block signals from some satellites and cause greater inaccuracy. The best orientation of the kit case is with the lid upwards, facing open sky.

Whenever the optimus is not recording a measurement, the GPS is on and the location is displayed on the instrument screen on General View, Page 3, under Port B/GPS. This can be used to accurately position the instrument at a pre-determined location

Improving the signal

The modem automatically uses the best available data rate (GPRS, 3G or 4G). If reception is poor, there are a few measures you can take to improve the signal.

Try moving the kit by a few metres, positioning it higher off the ground, keeping it away from nearby obstacles or rotating it by ninety degrees

The GPS will find the time and date first, and then the location. In poor signal areas this can also take a few minutes.

If the battery pack in the case remains plugged in, the GPS will remember the last location and (if necessary) will find the new location much more quickly than from a cold start.

Appendix 2 Requirements for the SIM Card

PIN Locked SIM Cards

Supported SIMS and Networks

Please refer to page 32 'Modem Approval and Certifications' for a list of Networks supported by Optimus Cloud.

Some SIM Cards are supplied with a PIN code that needs to be entered before a connection is made to the cellular network.

The CK685 does not support PIN locked SIM cards and the PIN has to be removed from the SIM before it may be used in the outdoor kit.

To do this, the SIM card should be inserted into to a suitable mobile phone/handset and the PIN or SIM Lock disabled.

Connecting via Optimus Cloud

By combining Optimus Cloud with an industry-standard modem with multi-network certifications, a standard SIM card with a data connection can be used in the CK:685B kit, removing the need for specialised data connections or complex setup processes.

Connecting via Optimus Dynamic

Also supported is the Optimus Dynamic connection method which, when used with an public-IP enabled SIM card with a public IP address, allows for communication directly between the Optimus and the NoiseTools software.

If this connection method is to be used, please contact Cirrus Research for details of the type and specification of SIM card required.

Appendix 3 Removing a SIM Card

To remove the SIM Card, push the SIM Card in. The modem will eject the SIM Card and it can be pulled gently from the modem.
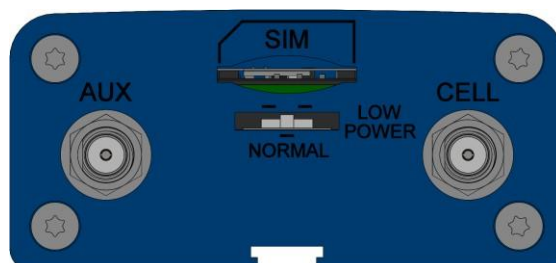
Appendix 4 Modem Status Indicators
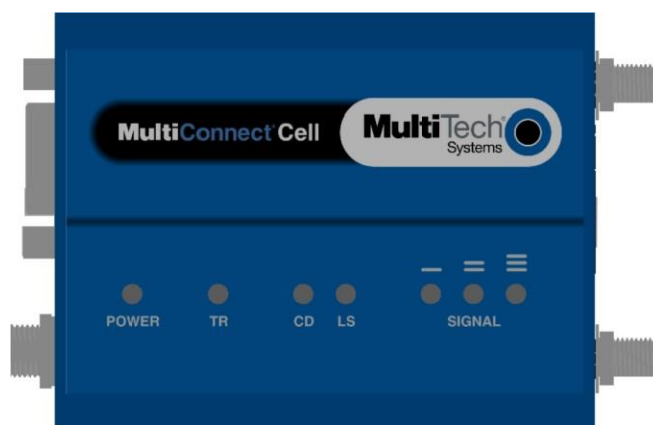
The top panel of the modem contains the following LEDs:

Power & TR

The Power LED shows when the Optimus Sound Level Meter has switched on the modem. The TR LED shows when the modem is ready to receive data from the Optimus Sound Level Meter

CD & LS

The two modem LEDS indicate carrier detection and link status.

LS will flash slowly when it modem is searching for, or has made, a connection.

CD will be lit when a connection is made between the Optimus Sound Level Meter and the modem.

Signal

Three signal LED's display the signal strength of the wireless connection

Appendix 5 NoiseTools Internet Access

In order to function properly NoiseTools requires access to the following locations:

- update.crplc.co.uk
- sms.crplc.co.uk
- error.crplc.co.uk
- mycirrus.cloud
- ics*.mycirrus.cloud
- dynamic.optimus-cloud.co.uk
- optimuscloud2.azurewebsites.net
- cirrusics.blob.core.windows.net

Note: NoiseTools only uses outgoing HTTPS connections to port 443.

If you have a firewall on your PC, you will need to add NoiseTools to the list of allowed programs. This is often automatic and you may see a prompt the first time you run NoiseTools.

If your network has other firewalls blocking outgoing connections, or if you are unable to allow NoiseTools on your machine, you will need to contact your IT department and ask them to configure the firewall to allow the NoiseTools program to access these locations.

If your network uses a proxy server to provide access to the internet this will need to be correctly configured on your PC.

NoiseTools supports most proxy servers and will automatically detect these when configured in Windows, via Control Panel > Internet Options.

If this is not configured or if NoiseTools has trouble connecting to the internet, you will need to contact your IT department and ask them to configure your firewall to allow access.

Appendix 6 Troubleshooting

If you are experiencing problems connecting to your Optimus Sound Level Meter in the CK:685B Environmental Noise Measurement Kit, follow the steps below.

Firmware & Software Versions

Check the firmware version on your Optimus Sound Level Meter. This can be seen on the first page of the general view.

The firmware version must be 3.0 or later

If you have an older version of firmware in your Optimus, please contact Cirrus Research plc to arrange for your instrument to be updated.

On Screen Error Messages

If your firmware version is correct but you are still unable to connect, check the on-screen error messages against this table.

This can be found on the peripherals page of the general view of the Optimus display.

Error code	Typical Cause	Solution	Notes
0	The modem not powered on	Check power to the Modem from the battery pack. Power off the Optimus, wait 30 seconds and switch on the Optimus.	If problem persists, please contact Cirrus Research or your local distributor.
1	SIM missing / not inserted correctly / not active	Check that the SIM is inserted correctly. Power off the Optimus, wait 30 seconds and switch on the Optimus.	If problem persists, contact SIM provider to verify that the SIM is correctly provisioned.
2	Internal modem problem	Wait for the unit to automatically retry.	If problem persists, please contact Cirrus Research or your local distributor.
3	No GSM signal detected	Check that the antenna is connected properly. Check that the system is in a location where there is good signal availability. Check that the SIM does not have a PIN lock	This error may also be caused when the SIM card is requesting a PIN.
4	No Data (GPRS/3G/4G) service detected	Check data service availability with operator. Check that the system is in a location where there is good signal availability.	
5-7,9,10	Unable to connect to the network	Wait for the unit to automatically retry.	If problem persists, please contact Cirrus Research or your local distributor.
8	Unable to obtain IP address	If custom APN settings are required, check that these have been set via NoiseTools.	
11,12	Unable to connect to	Check the Optimus Dynamic/Cloud	If problem persists, please contact

	Optimus Dynamic/Cloud	server setting via NoiseTools.	Cirrus Research or your local distributor.
13-24	Internal modem problem	Wait for the unit to automatically retry.	If problem persists, please contact Cirrus Research or your local distributor.

Specifications

Acoustic Measurements	Determined by Optimus Green Sound Level Meter
Microphone Capsule	From Optimus Sound Level Meter The microphone capsule provided with the sound level meter should be used with the MK:172 outdoor microphone to maintain the calibrated measurement chain.
Connectors	Microphone input from MK:172 Outdoor Microphone
	External Power
External power	12-18v DC
Weight & dimensions	
CK:675B	465x180x355mm 14.1 kg/31 lbs including 2 x CB:673 batteries, charger & MK:172 Outdoor Microphone
CK:685B	465x180x355mm 14.5 kg/32 lbs includes modem, 2 x CB:673 batteries, charger & MK:172 Outdoor Microphone
CB:673 Battery	4.4 kg/9.7 lbs
MK:172 Microphone	335mm with 75mm UA:253 coated windshield & birdspike. Includes 10m cable with connector

For detailed specifications for the Optimus Sound Level Meters, please refer to the appropriate product data sheet which can be downloaded from the Cirrus Research website at www.cirrusresearch.co.uk/library

Dimensions & weights do not include the optional CT:9 Tripod.

Battery life

The table below shows typical battery life under different operation conditions.

Kit Type	Battery Life with 1 x CB:673 Battery	Battery Life with 2 x CB:673 Batteries
CK:675B (No Modem or GPS)	> 6 days	> 12 days
CK:685B with Modem & GPS	> 4 days	> 8 days

*Please note that these are typical values

Battery Type

The kits can accommodate up to 2 internal batteries which provide power to the Sound Level Meter, Outdoor Microphone and where fitted, the modem and GPS receiver.

The spaces in the case are designed to take a 12v/14Ah battery with dimensions of 151mm x 98mm x 100mm and which provide 6.35mm tags (Faston 250).

Examples of suitable batteries include:

Panasonic	LC-CA1215P with Faston 250 tags
MK	ES14-12

Modem fitted to the CK:685B Environmental Noise Measurement Kit

The CK:685B version of the environmental noise measurement kit include a modem for remote data connection to the Optimus Cloud. This modem provides multi-region approvals and certifications and can be used with a standard SIM card.

Modem Approvals & Certifications

Modem Type	Multitech MultiConnect MTC-H5-B0-1
Compliance	FCC Class B (US), IC (Canada), R&TTE (EU Economic Area, A-Tick (Australia/NZ), and IFT (Mexico)
Safety	UL 60950-1 (US), cUL 60950-1 (Canada), IEC60950-1 (EU Economic Area), AS/NZS 60950-1 (Australia/NZ)
Network Support	PTCRB, GCF approved module, AT&T, T-Mobile, Rogers, Bell, EU carriers Pending: Telus, Telstra
SIM Card Type	Mini SIM; 1.8v & 3V

Modem Type	Multitect MultiConnect MTC-L4G2D-B01 4G LTE Cat 4 Modem, Global
Compliance	FCC, IC, RED (EU), RCM (AU)
Safety	UL 60950-1 (US), cUL 60950-1 (Canada), IEC60950-1 (EU Economic Area)
Network Support	PTCRB, AT&T, Verizon
SIM Card Type	Mini SIM: 1.8V and 3V

Modem Type	Multitect MultiConnect MTC-LNA4-B01 4G LTE Cat 4 Modem, North America
Compliance	FCC Class B (US), IC (Canada)
Safety	UL 60950-1 (US), cUL 60950-1 (Canada)
Network Support	PTCRB, AT&T, Verizon
SIM Card Type	Mini SIM: 1.8V and 3V

Modem Type	Multitect MultiConnect MTC-LEU4-B01 4G LTE Cat 4 Modem,
Compliance	RED (EU Economic Area)
Safety	IEC60950-1 (EU Economic Area)
Network Support	N/A
SIM Card Type	Mini SIM: 1.8V and 3V

Options & Accessories

A range of options and accessories are available to enhance or extend the capabilities of the environmental noise measurement kits.

Code	Description
CB:673	Additional/Spare 14Ah Lead Acid Battery for CK:675/685
ZL:671	5m Microphone Extension Cable
ZL:672	10m Microphone Extension Cable
ZL:673	External Power Cable with Crocodile Clips for external 12v battery
CU:612	External Weatherproof Power Supply - Specify Plug Type: 110V 16A UK Type US Type EU Type
UA:253	Replacement Windshield for MK:172 Outdoor Microphone
CT:9	Tripod for Outdoor Microphone

Instrument Compatibility

The kits have been designed to be used with the Optimus Green Sound Level Meters and can be used with instruments with firmware version v3.0 shipped from 1st February 2018.

Instruments with firmware version 2.9 or earlier will need to be updated to version 3.0. Please contact Cirrus Research for details of update options.

Declarations
EU Declaration of Conformity

Manufacturer:

Cirrus Research plc

Acoustic House, Bridlington Road

Hunmanby, North Yorkshire, YO14 0PH

United Kingdom

Equipment Description

The following equipment manufactured after 1st January 2018:

CK:675 Environmental Noise Measurement Kit
CK:685 Environmental Noise Measurement Kit

Along with standard accessories

According to:

EMC Directive 2014/30/EU

Low Voltage Directive 2014/35/EU

RoHS Directive 2011/65/EU

meet the following standards

EN 61000-6-3:2007+A1:2011

Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

EN 61000-6-1:2007

Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments

Signed   Dated 1st April 2022

Martin Williams

Chief Engineer

Product Guarantee & Extended Warranty

1. Every new product is provided with a 12-month no-quibble warranty. This covers everything we provide against failure, poor workmanship and accidental damage.
   NB - European Union law states a product has to be fit for purpose for 24 months after purchase. This two-year period covers failure and poor workmanship only.
2. If the product is calibrated by Cirrus Research or an authorised calibration and service centre, then the initial 12-month warranty is extended by a further 12 months, with the same conditions, for up to 15 years in total.
3. If a product has not been calibrated annually by Cirrus Research or an authorised calibrationand service centre, then you may buy back into the warranty scheme for a small fee, plus the cost of calibration. This can only be done once during the life of the product.
4. If a microphone capsule fails under warranty and is physically damaged, we will replace it with a refurbished capsule.
5. If you don't wish to have a refurbished capsule, then you can trade in your damaged capsule for a new one, which will incur a fee.

Cirrus Research Offices

The addresses given below are the Cirrus Research plc offices. Cirrus Research plc also have approved distributors and agents is many countries worldwide. For details of your local representative, please contact Cirrus Research plc at the address below. Contact details for Cirrus Research authorised distributors and agents are also available from the Internet Web site at the address shown below.

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