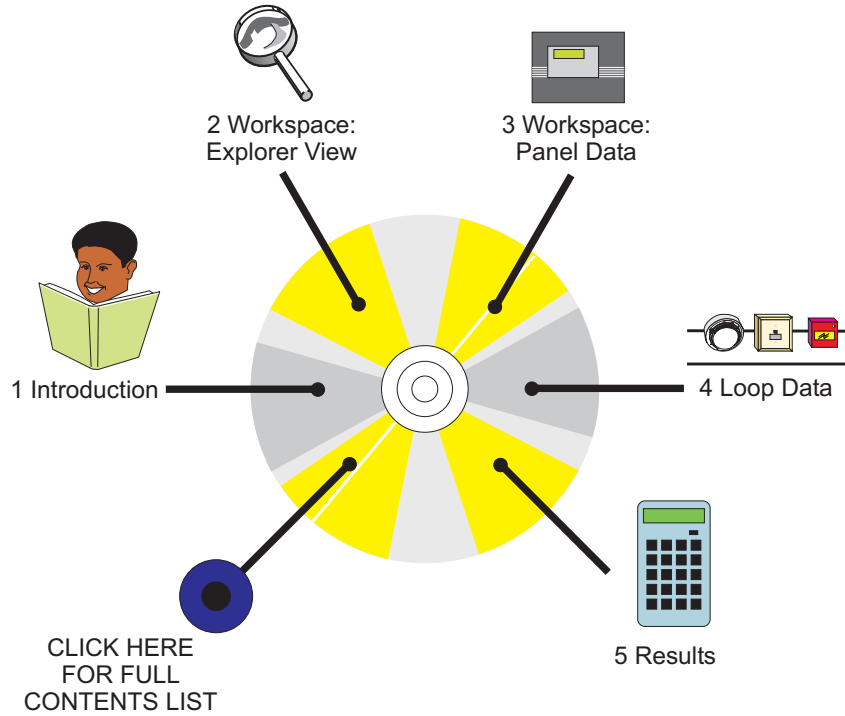


# Loop & Battery Calculator

997-519 Version 4.03a October 2010

user manual

# Quick Contents Reference by Section



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## 1 Introduction

The Loop and Battery Calculator (LBC) provides maximum cable loading and length, and minimum battery size recommendations for a user-defined analogue fire control system.

This manual describes the various panel and loop parameters that can be defined, and the results that can be obtained. The parameters are stored in a database. This LBC is not compatible with the previous NOTIFIER LBC.

For reasons of economy fire alarm control system designs specify the minimum amount of equipment and cabling required. System designs employ additional detection loops only when necessary, because of the high cost of using fire industry-approved cables and fire detection devices. This tool, therefore, must be used with this approach in mind; start with the minimum solution available, such as a Basic Equipment Kit (BEK), and expand the system one or two loops at a time, as required.

### 1.1 PC Specification

The minimum specification for the PC is:

- a. Pentium Class Processor.
- b. Windows XP with SP2 with 128MB memory.
- c. 16MB (application program & device database) + 1MB (this manual) = 17MB disk space available.
- d. CD-ROM.
- e. SVGA 1024 x 768 colour display.



Cross-references (in bold type) in this manual include links. For example, click on (see **Section 4**) to go to that Section.

## 1.2 Installation

To install the LBC:

- 1 The CD should auto-run (if it does not, click on 'Setup.exe').
- 2 Follow the on-screen prompts to complete the process.

**Note:** On some PCs, error message 1931 may be displayed during installation. This has no effect on the LBC; select 'Ignore', after which the installation completes normally.

## 1.3 Starting the LBC

Either :

- a. Double-click on the LBC icon, or,
- b. Select 'Programs/Notifier/Loop and Battery Calculator' from the PC's 'Start' menu.

**Note:** Multiple installations of the LBC may exist on your PC, identified by their version number.



The LBC uses standard windows methods of opening, closing, selecting etc.

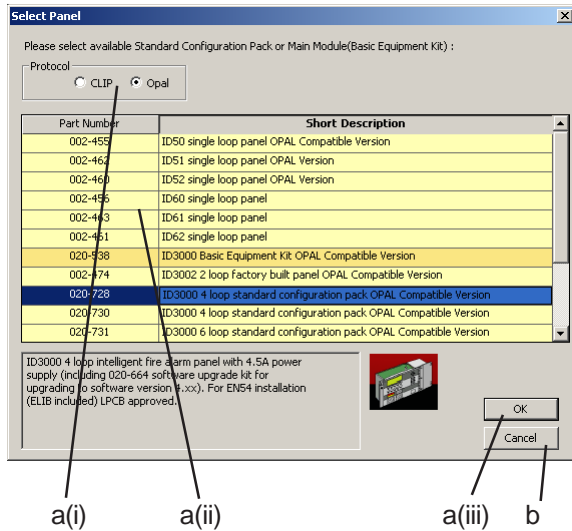
## 1.4 LBC Overview

This section describes the start up and main windows of the Loop and Battery Calculator, and the purpose of each menu option and toolbar icon.

### 1.4.1 Select Panel Window

When the LBC is started it displays the Select Panel window. There are two options:

- a. If a new panel configuration is to be defined:
  - (i) Use these radio buttons to display a list of OPAL or CLIP protocol panels.
  - (ii) Highlight the type of panel (after the loop protocol has been selected) for which loop and battery calculations are to be performed. A description of the currently-highlighted panel is given below the window.
  - (iii) Click 'OK'.
- b. If an existing configuration is to be used or edited, click 'Cancel'. The configuration can be selected via the File menu (**Section 1.4.3**).



In either case the Loop and Battery Calculator window is displayed.

### 1.4.2 Loop and Battery Calculator Window

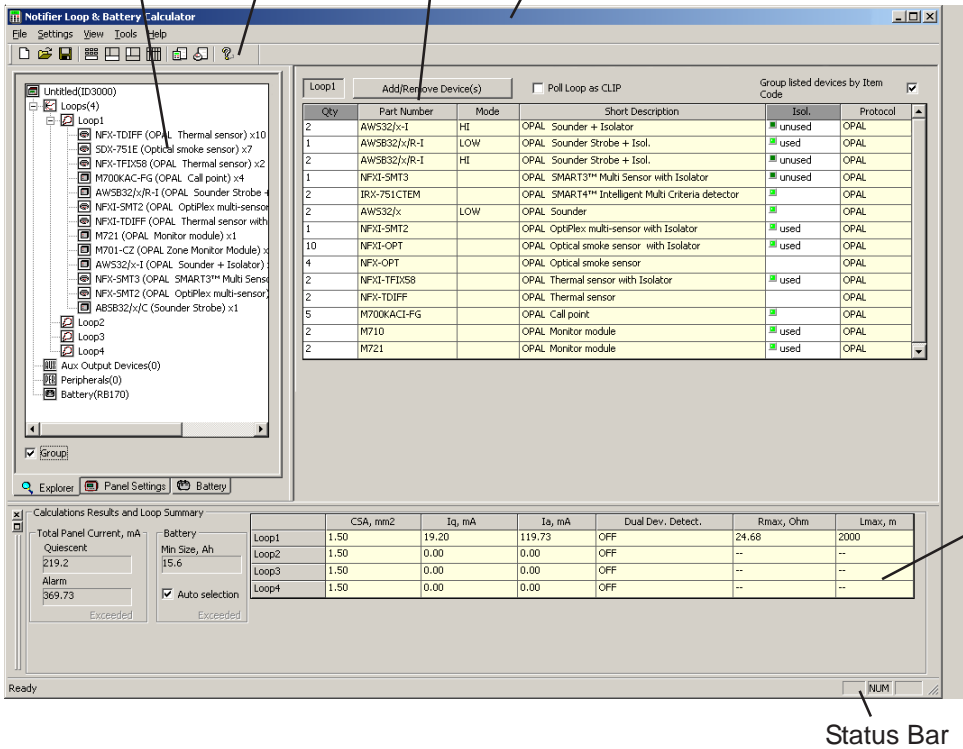
This window has a title bar, status bar and four data areas as shown. The Loop Data Entry area has Basic and Advanced views; the Basic view is shown here.

Menus and Toolbar.  
See Sections 1.4.3 to 1.4.8

Workspace Window  
(Explorer and Panel Data Entry).  
See Sections 2 & 3

Loop Data Entry.  
See Section 4

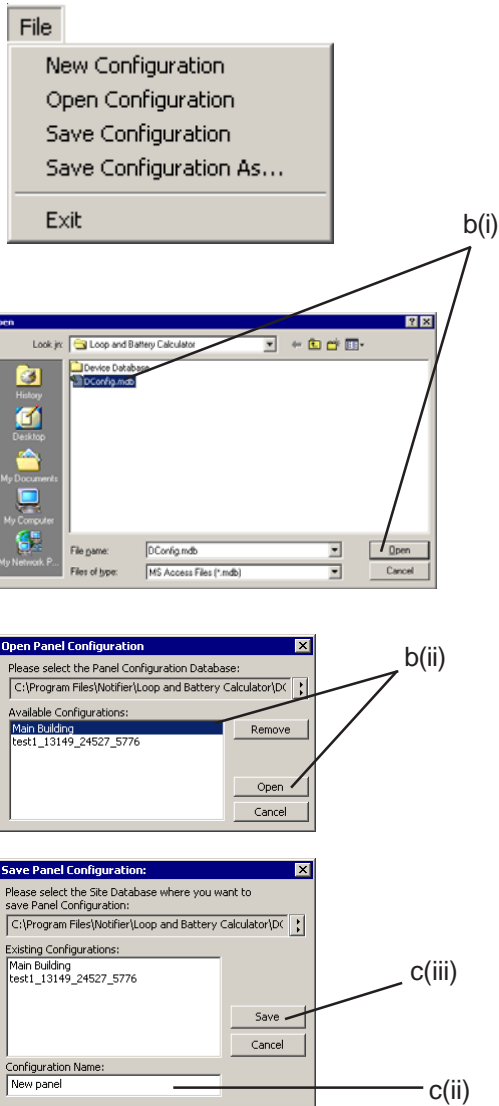
Title Bar



Output View  
(Calculation Results).  
See Section 5

Status Bar





### 1.4.3 File Menu

This menu has the following options:

- a. New Configuration. Displays the Select Panel window (**Section 1.4.1**). Before the existing display is overwritten, a prompt to save the data is given.

LBC version 3.03, or later, has an updated configuration database (3.0). Configurations saved in 1.0 databases can be read by the LBC. The LBC saves changes only into a version 3.0 database (option is provided to select a suitable database or to use the default database).

- b. Open Configuration. (i) Select the required database in the Open window and click on 'Open'. (ii) Select the required panel configuration from those stored in the database. Either double-click it or click on 'Open' to load the data. Before the existing display is overwritten, a prompt to save the data is given.

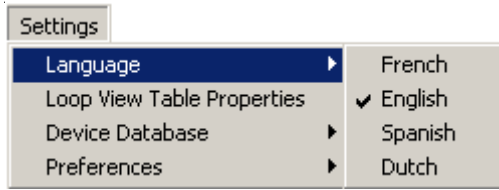
**Note:** To delete the highlighted panel configuration from the database, click on 'Remove'.

- c. Save Configuration. Saves the active configuration in the current database.
- d. Save Configuration As. (i) Select the required database in the Save window (similar to the Open window) and click on 'Save'. (ii) Enter the panel configuration name. (iii) Click on 'Save'.
- e. Exit. Closes the LBC.



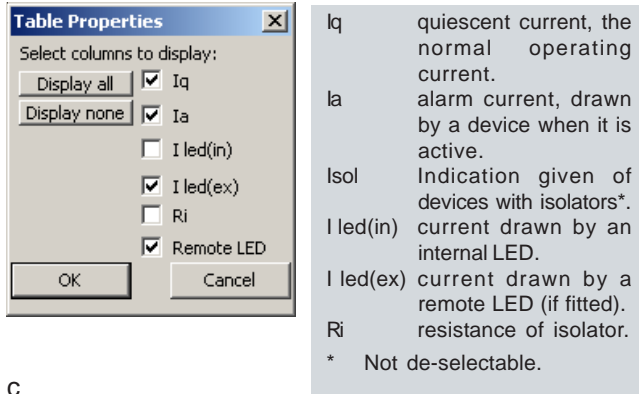
**It is not possible to share databases with the ID3000/2000 Fire Panel Support Tool.**

### 1.4.4 Settings Menu



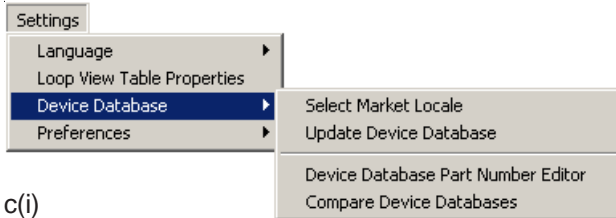
This menu has the following options:

b



- Language. Selects the required language for the LBC windows text (exit and restart the LBC to invoke the language). The language options may vary from those illustrated.
- Loop View Table Properties. Selects which parameters are displayed for the loop(s). Check the appropriate boxes or select 'Display all' or 'Display none' (all boxes checked or unchecked respectively).
- Device Database:
  - Select Market Locale. Selects which database of panel and device part numbers is used by the LBC.
  - Update Device Database. If a new Device Database is received from the Supplier, select it via this option (a 'Select' window is displayed). The database is then updated automatically.
  - Device Database Part Number Editor. For Supplier's use only (access code protected).
  - Compare Device Databases. For Supplier's use only (access code protected).

c

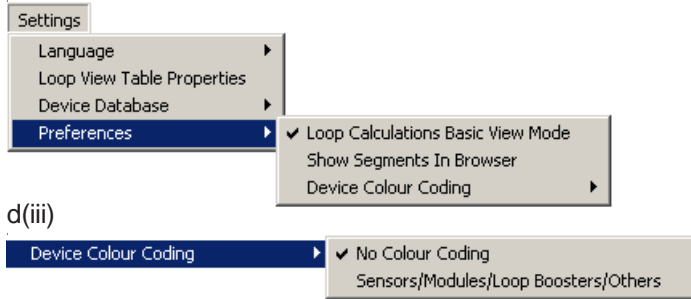


c(i)

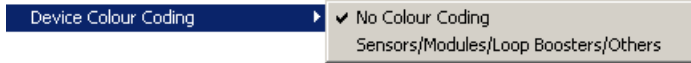


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d



d(iii)



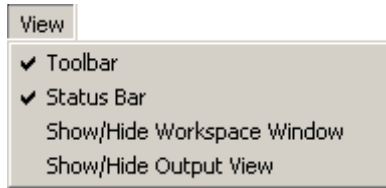
d. Preferences:

- i Loop Calculations Basic View Mode. When checked the Basic mode is displayed, otherwise the Advanced mode is displayed.
- ii Show Segments in Browser. When checked, displays loop segments in the Explorer tab (**Section 2.1**).
- iii Device Colour Coding. Sets or removes background colours on the device list.

### 1.4.5 View Menu

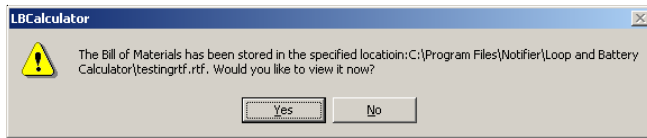
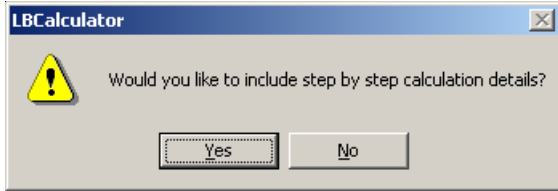
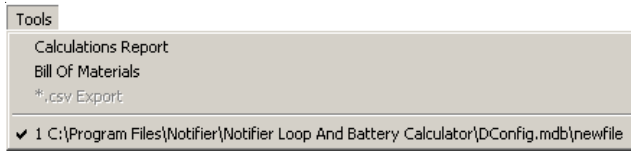
This menu has the following options:

- a. Toolbars. Displays (default) or hides the Toolbar on the Loop and Battery Calculator window (LBC window).
- b. Status Bar. Displays (default) or hides the Status Bar on the LBC window.
- c. Show/Hide Workspace Window. Displays (default) or hides the Explorer/Panel Data Entry area on the LBC window.
- d. Show/Hide Output View. Displays (default) or hides the Calculation Results area on the LBC window.



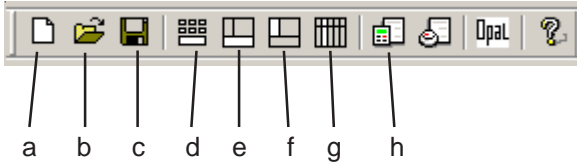
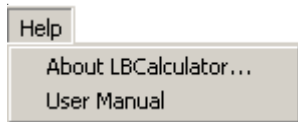
### 1.4.6 Tools Menu

This menu has the following options:



- a. Calculations Report. A Rich Text Format (.rtf) document which details the panel and its settings, the quiescent and alarm current consumptions, the PSU used, the battery requirement and the loop calculations. A prompt to include calculation details is provided; if 'No' is selected only the results are given. The .rtf file can be named via a Save As window and then read via a Word Processing software program (an option to view immediately is given).
- b. Bill of Materials. This option enables the creation of a Bill of Materials (BOM) printed to file at a selected location on your PC. Before saving the BOM file location is displayed and you are prompted whether you would like to view the BOM now or later. Select 'Yes' for immediate viewing.
- c. \*.csv Export. For future development (currently greyed).

The current database is identified at the bottom of this menu.



### 1.4.7 Help Menu

The About Loop and Battery Calculator window displays the version number of the LBC and of the device database.



The user manual can be accessed via Help.

### 1.4.8 Toolbar Options

There are ten icons:

- a. New - same as File menu 'New Configuration' option.
- b. Open - same as File menu 'Open Configuration' option.
- c. Save As - same as File menu 'Save Configuration' option.
- d. Advanced / Basic View - toggles between the Basic (default) and Advanced views.
- e. Show / Hide Output View - toggles the Calculations Results and Loop Summary window at the bottom of the LBC screen.
- f. Show / Hide Workspace Window - toggles the workspace window which contains the Explorer, Panel Settings and Battery tabs.
- g. Select Loop View Table Properties - same as Settings menu Loop View Table Properties option.
- h. Calculation Report - option to 'print to file' as an .rtf all parameters of the panel, loop devices and other current-draw devices.



- i. Bill of Materials - a BOM listing of the system can be exported, as an .rtf file, using this option.
- j. OPAL Protocol 'Master Switch' - By default, OPAL protocol is selected. To enable mixed-protocol operation, click on this icon; selection of mixed protocol is confirmed when the  icon is replaced by .
- k. About - opens the user manual.

## 2 Workspace: Explorer

This tab provides a pictorial display of the panel and loop configuration. It shows loops, devices powered from the panel's auxiliary outputs (e.g. repeaters) and peripherals (e.g. printer). Single-click on an icon to highlight it. Double-click (or click on '+' or '-') to expand/contract the display. Check the 'Group' box to display each device type once only (with quantity in brackets).

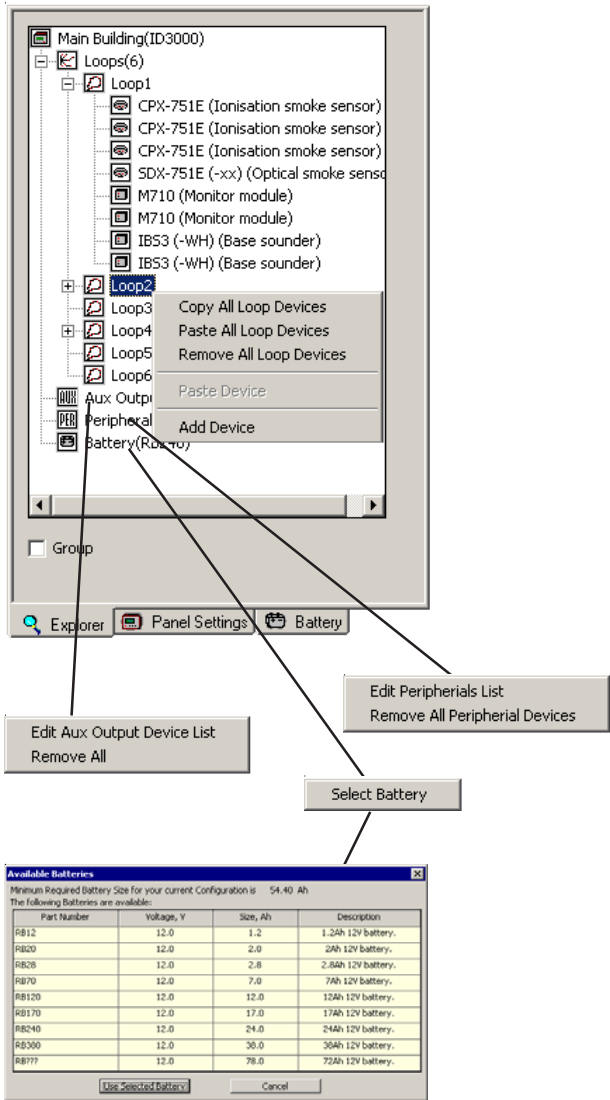
The Loop icon determines which loop the Loop Data Entry area applies to. Right-click the icon to display a menu which allows the following for the highlighted loop:

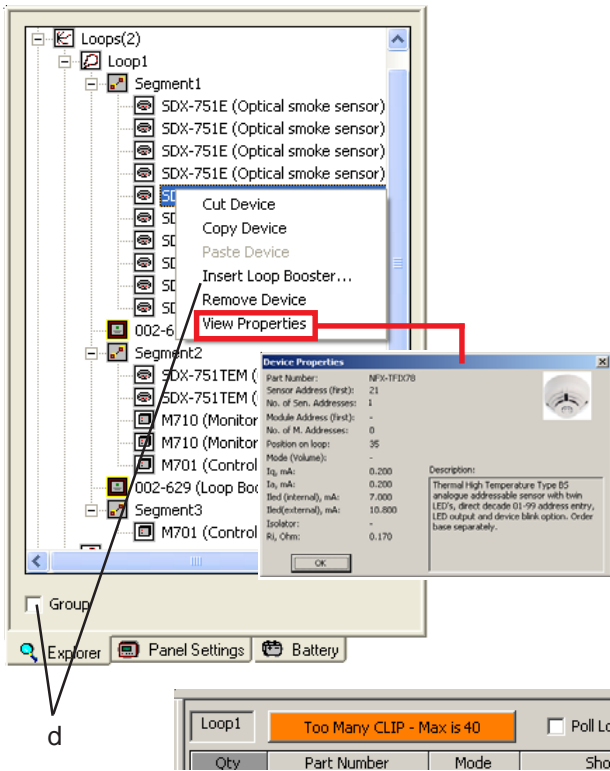
- All or single Loop Device to be copied to the PC's clipboard.
- Copied Loop Device(s) to be pasted into the loop [does not work for removed device(s)].
- All Loop Devices to be removed from the loop.
- A new device to be added via the Select Devices window (**Section 4.2.1**).

Right-click on the Aux Output Devices or the Peripherals icon for options to edit devices (via the Auxiliary Output Devices or Peripheral Devices windows, **Section 3.2**) or to remove all Aux Output or Peripheral devices.

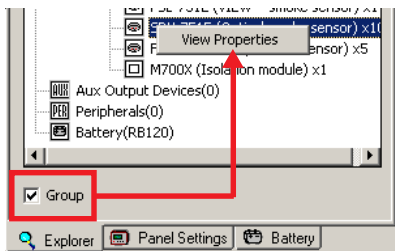
Right-click on the Battery icon and then click on 'Select Battery' to display a list of suitable batteries. This is only available if the 'Auto selection' box in the Calculation Results is **not** checked.

(continued)





d



Within any loop and with the Group box unchecked, right-clicking on a device icon displays the following options:

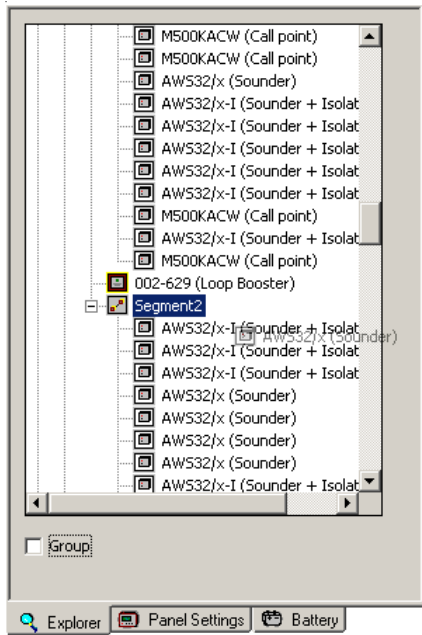
- a. **Cut Device.** Removes a device from the loop. This can be used with the paste command to add this device to another loop.
- b. **Copy Device.** Copies the selected device to the clipboard.
- c. **Paste Device.** The cut or copied device can be added to a loop using the paste command.

**Note:** If copying and pasting devices between loops in mixed-protocol mode, the 'Add/Remove Device(s)' button text is replaced by a warning if the number of CLIP-only devices of the receiving loop now exceeds the limit of 40.

- d. **Insert Loop Booster.** The loop is then divided into segments (i.e. sections of loop either side of the booster), with the loop booster placed below the highlighted device. A maximum of two loop boosters can be configured.
- e. **Remove Device.** Unlike Cut Device, this deletes the currently-highlighted device from the loop without the option to paste it on another loop.
- f. **View Properties.** Displays the Device Properties window for the highlighted device. Click OK to remove the window from the display.

With the Group box checked right-clicking a device displays only the View Properties option.





## 2.1 Loop Booster and Segments

In Explorer view the device is placed in the list at the position of mouse button release (the selected device is 'ghosted' as you move it over the device list of the other loop segment). If required, the position in the list can be moved afterwards, although where it is placed has no effect on any calculations performed by the LBC.

**Note:** Drag-and-dropped devices are placed in the list in position order and not loop address order.

**Note:** The loop length displayed is the maximum *allowable* loop length in order to satisfy any necessary limits.

### 3 Workspace: Panel Data Entry

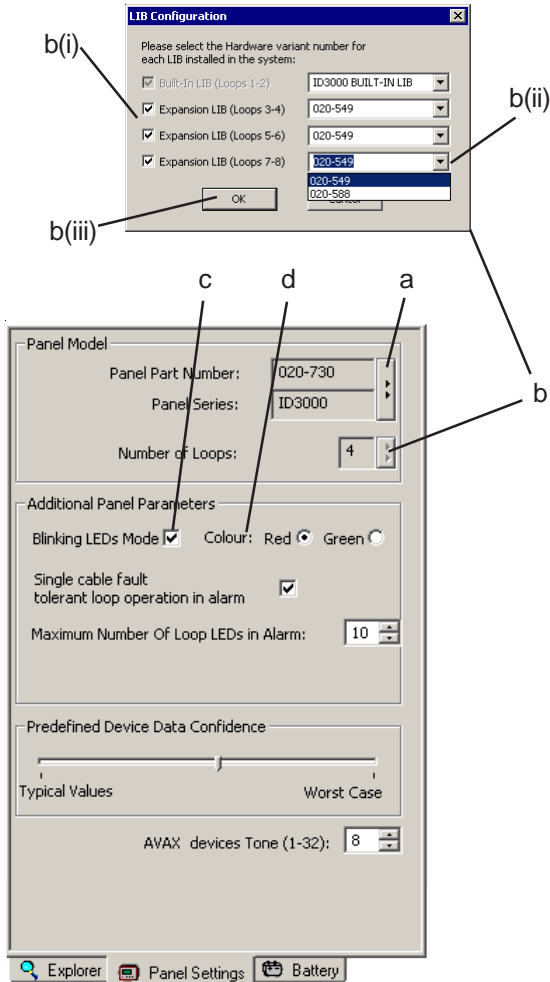
These tabs allow entry of configuration data that applies to the panel rather than to an individual loop. Tabs can also be displayed as separate views (see **Section 1.4.4**), each view selected by clicking on the corresponding item in the Explorer workspace.

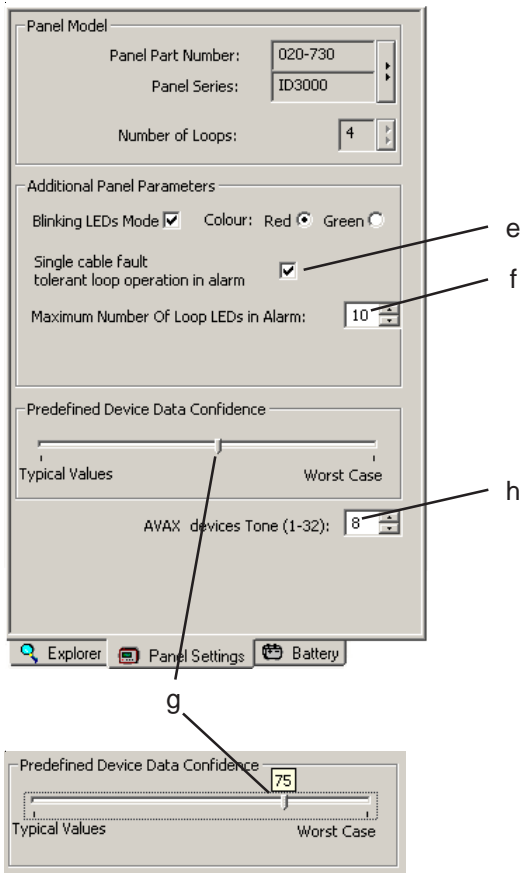
#### 3.1 Panel Settings Tab

This tab has two views, Basic and Advanced, selected at the Settings menu. In the Basic view only items (a) and (b) below are available.

This tab allows the following parameters to be edited:

- a. The Panel type, via the Select Panel window (**Section 1.4.1**).
- b. The Number of Loops (only if configurable on the panel). The LIB configuration window is displayed. (i) Select the number of LIB boards fitted. **ID3000 only**: For each board, (ii) select whether LIB (020-588) or E-LIB (020-549) is fitted. (iii) When finished, click 'OK'. The Loop Data Entry area of the Loop and Battery Calculator window is modified accordingly.
- c. Blinking LEDs Mode. Check this box if device LEDs are set to blink in quiescent (global; the 'individual device' option of the ID3000 panel is not available). The quiescent current is increased.
- d. Colour (OPAL devices only). Default LED colour blink is red. Blink colour can be





changed to green. Green LEDs use more current than red LEDs (red LED = 3.5mA, green LED = 7mA ).

**Note:** When loading configurations from earlier databases the new blinking colour information is inserted and any subsequent save will be in the current format.

e. Single cable fault tolerance. Check this box if the cable is required to continue normal operation with a single fault present. The maximum cable length is reduced.

f. Maximum Number of Loop LEDs on in Alarm. Select the maximum number simultaneously ON in alarm (the panel default is 10, range is 0 to 20). The alarm current increases with the number of LEDs.

**Note:** For the ID5x/6x Series panels this only allows 2 or 10 LEDs in alarm to be selected.

g. Data Confidence. Allows comparison between calculated maximum loop cable lengths when typical (0) or worst case (100) device values are used, and gradations in between. Click on the slider - the current value confidence level is shown above the slider. The maximum cable length reduces as the value increases.

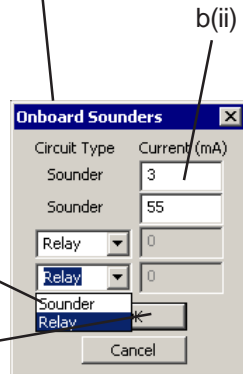
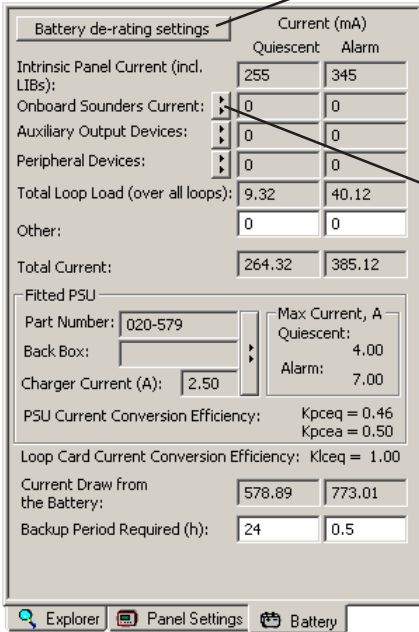
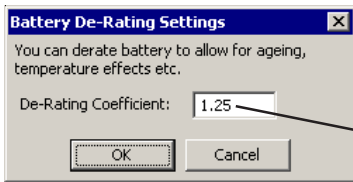
h. AVAX devices tone. If the loops contain devices that have a tone setting, that setting must be entered here so that the correct power consumption is calculated. All devices must be set to the same tone.

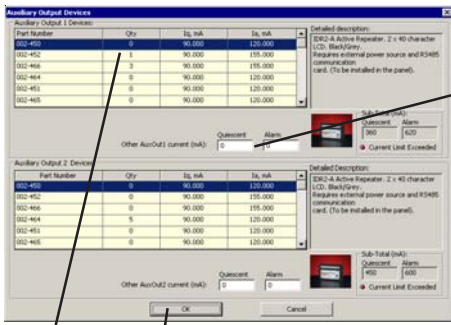
### 3.2 Battery Tab

This tab displays Quiescent and Alarm currents and the Current Draw from the Battery. It allows the following parameters to be edited:

- a. De-rating Coefficient. On the Battery De-Rating Settings window, enter the required spare capacity to be added to the calculated minimum battery size (e.g. the default of 1.25 adds 25%).
- b. Onboard Sounders current. On the Onboard Sounders window: (i) For those onboard circuits that are configurable, select whether the usage is Sounder or Relay. (ii) For all Sounder circuits that are in use, enter the alarm current of the devices driven by the circuit. (iii) Click 'OK'.

continued...





c(i)      c(iii)

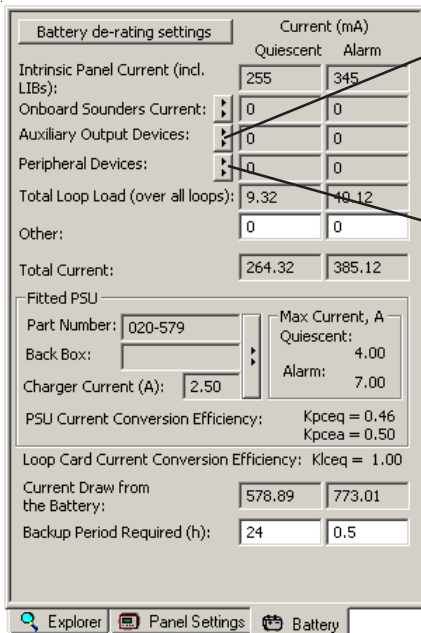
c(ii)

- c. Auxiliary Output Devices. On the Auxiliary Output Devices window, for auxiliary output 1: (i) Enter the quantity of each listed device (e.g. repeater) driven by the output. (ii) Enter the quiescent and alarm current of any device(s) driven by the output but not in the list. (iii) Click 'OK'. Repeat for auxiliary output 2 if there is such an output present on the panel currently being edited.

**Note:** The window displays the sub-total currents for each output.

- d. Peripheral Devices. On the Peripheral Devices window: (i) Enter the quantity of each listed device with which the panel is configured. (ii) Click 'OK'.

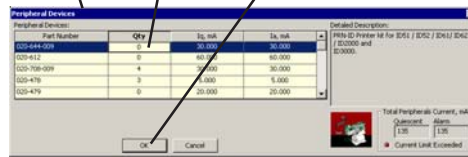
**Note:** The window displays the sub-total current for peripheral devices.



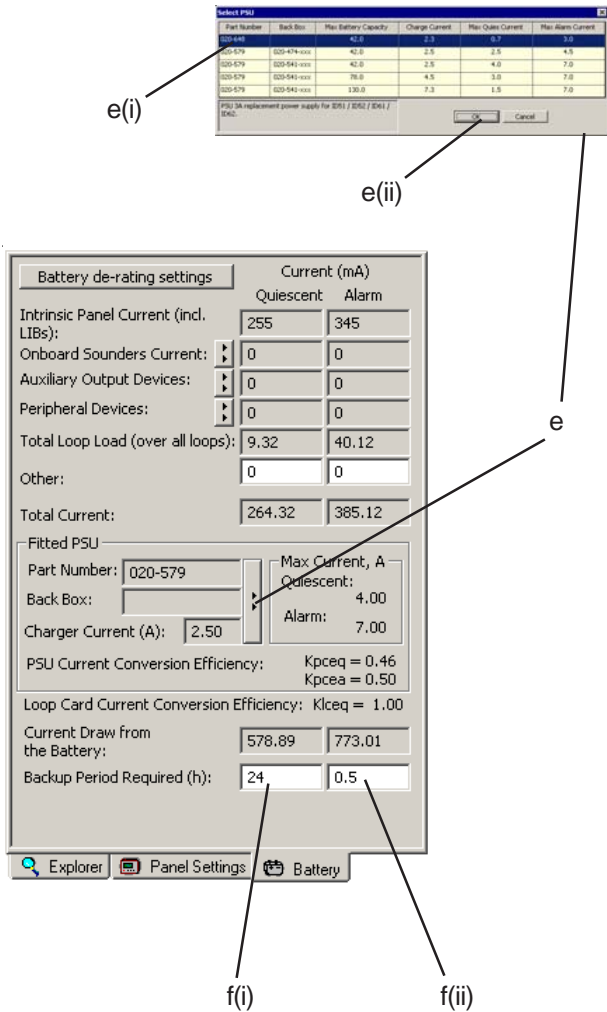
d

d(i)

d(ii)



continued...

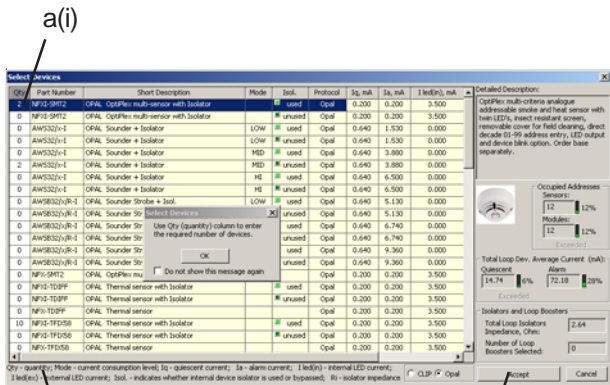


e. Fitted PSU (only if configurable on the panel). On the Select PSU window: (i) highlight the PSU which is fitted to the panel. (ii) Click 'OK'.

**Note:** Some PSUs (e.g. PSU7A) may have a configurable battery charge current. If so, the Select PSU window contains multiple entries for the PSU, each entry corresponding to one of the possible values of charge current. **Select the correct entry!** The window identifies (by part number) the enclosure needed to house the maximum capacity batteries chargeable by the selected current.

f. Backup Period Required. (i) Enter the Quiescent backup time. (ii) Enter the Alarm backup time.

The View (Basic or Advanced) and the Table Properties (the parameters displayed) are selected on the Settings menu (Section 1.4.4).



a(i)

a(ii)

a(iii)



Part Number	Isol	Short Description	q, mA	q, mA	I led(n), mA	I led(ex), mA	Isol.	Remote LED	Protocol
1 ABSB32x/C	LOW	Sounder Strobe	0.450	3.900	0.000	0.000	CLIP	Opal	
2 AWS32x-1	MID	OPAL Sounder + Isolator	0.640	3.880	0.000	0.000	unus	Opal	
4 NFV1-SMT3	OPAL	SMART3™ Multi Sensor with Isolator	0.200	0.200	3.500	10.800	usec	Opal	
4 AWB/R-1	OPAL	Strobe + Isolator	0.640	0.000	0.000	0.000	usec	Opal	
1 ABSB32x/C	LOW	OPAL Sounder Strobe + Isol.	0.640	4.090	0.000	0.000	unus	Opal	
2 NFV1-SMT2	OPAL	OptiPlex multi-sensor with Isolator	0.200	0.200	3.500	10.800	unus	Opal	
2 NFV1-SMT2	OPAL	OptiPlex multi-sensor	0.200	0.200	7.000	10.800	unus	Opal	
7 SDV-751E	OPAL	Optical smoke sensor	0.200	0.200	7.000	10.800	unus	CLIP	
10 NFV1-TFIXSE	OPAL	Thermal sensor with Isolator	0.200	0.200	3.500	10.800	unus	Opal	
10 NFV1-TDIFF	OPAL	Thermal sensor	0.200	0.200	3.500	10.800	unus	Opal	
6 M700KAC-FC	OPAL	Call point	0.260	0.300	7.600	0.000	unus	Opal	
1 M721	OPAL	Monitor module	0.340	0.340	2.200	0.000	unus	Opal	
2 M701-CZ	OPAL	Zone Monitor Module	0.300	0.300	5.100	0.000	unus	Opal	
2 M701	OPAL	Control module	0.310	0.310	0.220	0.000	usec	Opal	

Editable columns are in white

## 4 Loop Data Entry

This area of the Loop and Battery Calculator window allows various loop-dependent parameters to be edited. The area has two views:

- Basic View. Allows devices to be added and removed from the loop configuration.
- Advanced View. Has all the functionality of the Basic View together with various cable and other configuration options.

Use the Explorer Tab (Section 2) to select the loop to be edited. The loop number is displayed at the top left of the view.

The first time you use this data entry screen a pop-up is displayed advising you to use the Quantity column to enter the required number of devices. To prevent this appearing again check the box at the bottom.

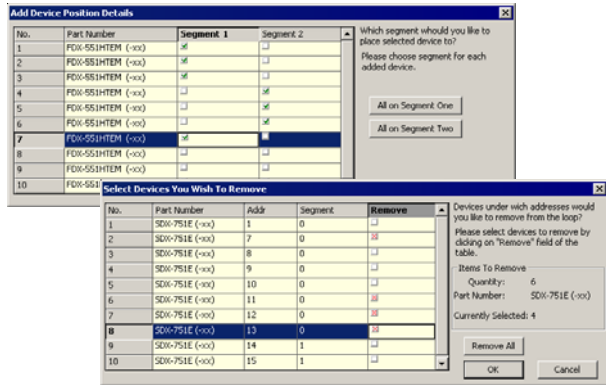
### 4.1 Basic View

#### 4.1.1 Adding/Removing Devices

- To add/ remove for **any** device type: On the Loop and Battery Calculator window, click 'Add/ Remove Device(s)' to display the Select Devices window. (i) For each device type used on the loop enter the required number of devices or amend the displayed existing total of devices (set to '0' to remove all devices of the type). Devices with integral isolators can be selected with the isolator used or unused. (ii) If insufficient isolators are selected the Accept button is highlighted in yellow with the warning '!!! Add More Isolators !!!'. (iii) Click 'Accept'.

**Note:** The window gives running total of number of addresses occupied by sensors/modules, total quiescent and alarm currents, isolator impedance and number of loop boosters.

**Loop booster** - If a loop booster is configured on the loop, and after the number of devices to be added is entered, the Add Device Position window is displayed. For each added device select into which loop segment the device is to be placed. Similarly, if devices are removed then the Select Devices You Wish To Remove window allows the individual devices to be specified.



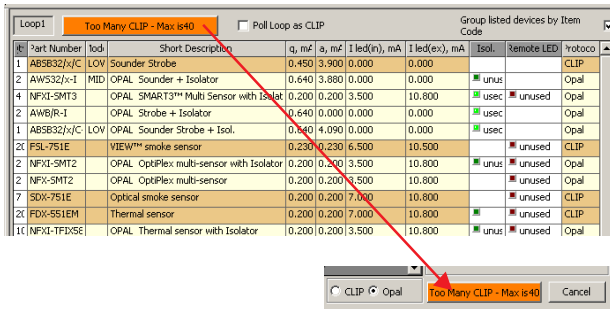
**CAUTION!**

**VIEW devices are CLIP protocol only. When these are used on an ID3000 or ID6x mixed CLIP/OPAL protocol loop a maximum of 40 can be supported. The loop will not be able to support any other CLIP devices once this limit is reached.**

**OPAL Loop Protocol**

The LBC supports OPAL loop protocol. A number of sensors and modules are compatible with OPAL protocol but retain CLIP protocol compatibility. Most OPAL protocol sensors have built-in isolators and in order to use these the new sensor bases must be used. However, OPAL protocol devices work with existing CLIP-type bases, although the isolators will not function.

OPAL and CLIP protocol devices may be mixed on a loop or across loops (ID3000) but the number of CLIP devices configurable on a mixed protocol loop is 40. When loading a mixed protocol loop with devices, a warning is displayed when this limit is exceeded. If this is ignored and more devices are added the ACCEPT button, when clicked, momentarily changes to repeat this warning. Remove any excess devices to stop the occurrence of these warnings.





Part Number	Isol	Short Description	$i_q$ , mA	$i_a$ , mA	I led(in), mA	I led(ext), mA	Isol.	Remote LED	Protocol
1 AWS32/x-1	LOW	OPAL Sounder + Isolator	0.640	1.530	0.000	0.000	us	unused	Opal
4 AWSB32/x/R	LOW	OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	us	unused	Opal
1 SDX-751TEM		OptiPlex multi-sensor	0.200	0.200	0.000	10.800		unused	CLIP
1 NFPI-SMT2	OPAL	OptiPlex multi-sensor with Isolab	0.200	0.200	7.000	10.800	us	unused	Opal
20 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP
10 FDX-51EM		Thermal sensor	0.200	0.200	0.000	10.800		unused	CLIP
2 NFPI-TDIFF	OPAL	Thermal sensor with Isolator	0.200	0.200	7.000	10.800	us	unused	Opal

b(ii)

b(iii)

b(i)

**BASIC VIEW**

Part Number	Isol	Short Description	$i_q$ , mA	$i_a$ , mA	I led(in), mA	I led(ext), mA	Isol.	Remote LED	Protocol
1 NFPI-SMT2	OPAL	OptiPlex multi-sensor with Isolab	0.200	0.200	7.000	10.800	us	unused	Opal
2 AWS32/x-1	LOW	OPAL Sounder + Isolator	0.640	1.530	0.000	0.000	us	unused	Opal
3 SDX-751TEM		OptiPlex multi-sensor	0.200	0.200	0.000	10.800		unused	CLIP
4 AWSB32/x/R	LOW	OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	us	unused	Opal
5 AWSB32/x/R	LOW	OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	us	unused	Opal
6 AWSB32/x/R	LOW	OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	us	unused	Opal
7 AWSB32/x/R	LOW	OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	us	unused	Opal
8 NFPI-TDIFF	OPAL	Thermal sensor with Isolator	0.200	0.200	7.000	10.800	us	unused	Opal
9 NFPI-TDIFF	OPAL	Thermal sensor with Isolator	0.200	0.200	7.000	10.800	us	unused	Opal
10 NFPI-TDIFF	OPAL	Thermal sensor	0.200	0.200	7.000	10.800		unused	Opal
11 NFPI-TDIFF	OPAL	Thermal sensor	0.200	0.200	7.000	10.800		unused	Opal
12 NFPI-TDIFF	OPAL	Thermal sensor	0.200	0.200	7.000	10.800		unused	Opal
13 NFPI-TDIFF	OPAL	Thermal sensor	0.200	0.200	7.000	10.800		unused	Opal
14 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP
15 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP
16 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP
17 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP
18 SDX-751E		Optical smoke sensor	0.200	0.200	0.000	10.800		unused	CLIP

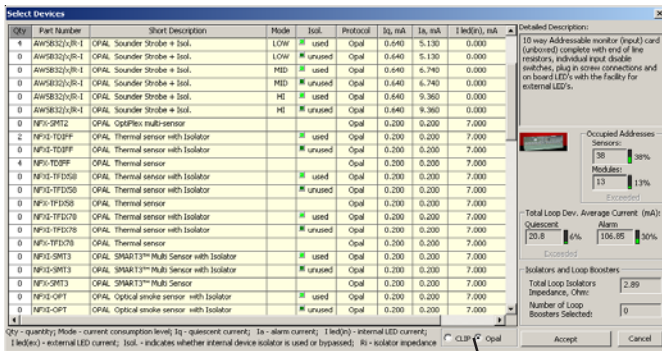
b. To add/remove for those device types for which at least one device is already configured: (i) On the Loop and Battery Calculator window, check the 'Group listed devices by Item Code' box. (ii) The total quantity of each device is then displayed and can be amended (increased or decreased) directly; enter the new total then click outside of the area (set to '0' to remove all devices of the type). If a loop booster is configured the windows described in the note above will be displayed. (iii) Isolators can be changed for this device type from 'used' to 'not used' or vice versa by clicking on the isolator icon.

**DEFINITIONS.**

- $i_q$  quiescent current, the normal operating current.
- $i_a$  alarm current, drawn by a device when it is active.
- I led(in) current drawn by an internal LED.
- I led(ext) current drawn by a remote LED (if fitted).
- Isol. the device's integral isolator, either used or not used.
- Remote LED shows use of remote LED function for an OPAL sensor. Click in column to change state for each sensor.
- Ri resistance of isolator.
- Protocol Loop polling protocol: CLIP or OPAL

**Note:** The examples shown here (except Protocol) include the columns selectable through the Settings/Loop View Table Properties menu.

c. When adding devices to a mixed protocol loop, a warning message (see left) is displayed if the limit of 40 CLIP devices is exceeded. Either select OK to change polling protocol to CLIP (the 'Poll Loop as CLIP' box is selected automatically), alternatively, select Cancel to remove the additional devices.



d

d. The Select Devices dialogue window can now display CLIP and OPAL protocol devices in the database. To the left of the ACCEPT button radio buttons are provided to toggle the list of devices between OPAL (only) or CLIP (only). Each list uses a different colour to help identify the protocols when viewing a loop when mixed-protocols are used.

The ID Series panel allows a mixture of protocols to be configured. However, there are certain limitations when using mixed protocols:

- i) To meet the timing If OPAL and CLIP protocols are used on the same loop there is a limit of 40 CLIP devices only. DO NOT exceed this limit. See previous page.
  - ii) All Manual Call Points (MCPs) should be OPAL protocol-based except on a CLIP protocol-only loop.
- Note:** In order to meet the 3-second time requirement of BS5839 (UK only), CLIP MCPs should not be used with ID50/60 Series panels if **any** VIEW™ sensors are configured on the loop.
- iii) Any CLIP-protocol sounders on a mixed-protocol loop cannot be pulsed. Do not select these sounders if pulsing is required.
  - iv) With the default of 10 LEDs active in alarm a loop cable of 1km will allow a total of 70+70 sounder/sensor pairs to be supported. The sounders must be set at medium volume and only with tone 14 selected. If 2 LEDs active in alarm is selected, alternative tones may be selected.

LOW	used	OPAL	0.640	5.130	0.000
LOW	unused	OPAL	0.640	5.130	0.000
MID	used	OPAL	0.640	6.740	0.000
MID	unused	OPAL	0.640	6.740	0.000
HI	used	OPAL	0.640	9.360	0.000
HI	unused	OPAL	0.640	9.360	0.000
		OPAL	0.200	0.200	10.800
	used	OPAL	0.200	0.200	10.800
	unused	OPAL	0.200	0.200	10.800

Total Loop Dev. Average Current (mA):  
 Quiescent: 13.6 4% Alarm: 95.45 27%  
 Exceeded

Isolators and Loop Boosters  
 Total Loop Isolators Impedance, Ohm: 0.99  
 Number of Loop Boosters Selected: 0

Ia - alarm current; Iled(in) - internal LED current; Isolator is used or bypassed; Ri - isolator impedance

CLIP  Opal !!! Add More Isolators !!!

If insufficient isolators have been included on the loop:

- a. The Accept button is replaced momentarily with a yellow warning worded as follows:

**!!!Add More Isolators!!!**

Clicking the '!!!Add More Isolators!!!' warning will allow a return to the Loop and Battery Calculator window but with the following warnings displayed:

- b. The Add/Remove Device button turns yellow bearing the warning text:

**!!!Add More Isolators!!!**

- c. The Loop reference cell remains yellow in the Loop and Battery Calculation Results window until a sufficient number of isolators has been added.

Thus it is possible to exceed isolator limits - but not without warnings.

b

a

Part Number	Task	Short Description	q <sub>1</sub> , m <sup>2</sup>	q <sub>2</sub> , m <sup>2</sup>	I led(in), mA	I led(ex), mA	Isol.	Removable LED	Protocol
1	AW532e-I	LOW OPAL Sounder + Isolator	0.640	5.130	0.000	0.000	used		Opal
4	AW5832e/R	LOW OPAL Sounder Strobe + Isol.	0.640	5.130	0.000	0.000	unused		Opal
1	SDX-751TEM	OptiPlex multi-sensor	0.200	0.200	0.000	10.800	used	unused	CLIP
1	NFX-SMT2	OPAL OptiPlex multi-sensor with Isolator	0.200	0.200	7.000	10.800	used	unused	Opal
2C	SDX-751E	Optical smoke sensor	0.200	0.200	0.000	10.800	unused	unused	CLIP
2C	NFX-OPT	OPAL Optical smoke sensor	0.200	0.200	7.000	10.800	used	unused	Opal
1C	FDX-551EM	Thermal sensor	0.200	0.200	0.000	10.800	used	unused	CLIP
1C	NFX-TDIFF	OPAL Thermal sensor	0.200	0.200	7.000	10.800	used	unused	Opal
6	MS00KACW	Call point	0.300	0.300	0.000	0.000			CLIP

Loop	CSA, mm <sup>2</sup>	I <sub>q</sub> , mA	I <sub>a</sub> , mA	Dual Dev. Detect.	R <sub>max</sub> , Ohm	L <sub>max</sub> , m
Loop1	1.50	25.40	111.45	ON	15.28	1288
Loop2	1.50	0.00	0.00	ON	--	--

c

ADVANCED VIEW

The screenshot shows the 'ADVANCED VIEW' of the software. At the top, there are several control panels: 'Cable characteristics' with a 'Dual Device detection' checkbox and 'Max Remote LEDs in Alarm' set to 2; 'Total Load (average), mA' showing 42.51 (12% of 350mA) and 'Peak: 59.38'; 'Max Loop Resistance and Length' with 'Maximum supportable resistance of negative conductor, Ohm' set to 7 and 'Maximum allowable cable length, m' set to 606. Below these is a table of devices:

ID	Part Number	Model	Short Description	Q, mA	A, mA	I led(in), mA	I led(ex), mA	Isol.	Remote LED	Protocol
1	NP1-SMT2	OPAL	OptiPlex multi-sensor with Isolator	0.198	0.198	7.000	10.800	used	used	Opal
2	AWS32/-I	OPAL	Sounder + Isolator	0.640	1.496	0.000	0.000	used	used	Opal
3	SDX-751TEM		OptiPlex multi-sensor	0.198	0.198	0.000	10.800		used	CLIP
4	SDX-751E		Optical smoke sensor	0.198	0.198	0.000	10.800		unused	CLIP
5	SDX-751E		Optical smoke sensor	0.198	0.198	0.000	10.800		unused	CLIP
6	SDX-751E		Optical smoke sensor	0.198	0.198	0.000	10.800		unused	CLIP
7	SDX-751E		Optical smoke sensor	0.198	0.198	0.000	10.800		unused	CLIP

The 'Cable Characteristics' dialog box is shown with the following fields and callouts:

- a:** Cable Temperature (degC): 55
- b:** Cable Size: 1.5000 (mm/in)
- c:** Loop Distribution Efficiency: 75 (indicated by a slider below)
- d:** 'Apply for This Loop' button

Other buttons in the dialog include 'Cancel' and 'Apply for All Loops'.

4.2 Advanced View

The Advanced View allows devices to be added or deleted in the same manner as on the Basic View. The Advanced View also provides the options described in the following sections.

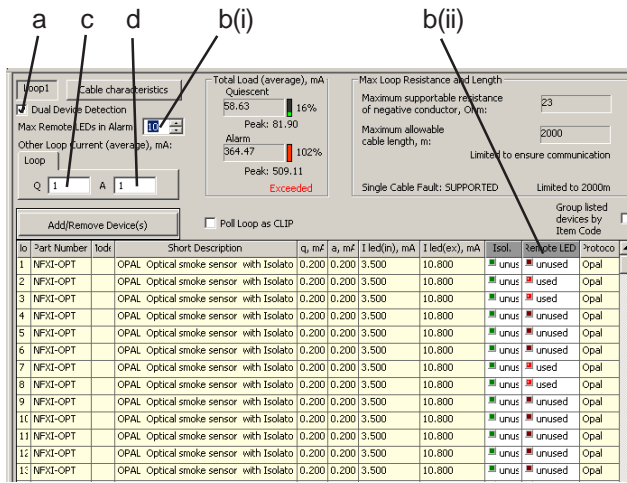
4.2.1 Cable Characteristics

The following can be edited:

- Cable Temperature, range -20°C to 80°C, default 35°C. Maximum cable length reduces with increasing temperature.
- Cable size. This can be entered as a diameter or area, in metric or imperial units.
- Loop Distribution Efficiency. Click on the slider - the current value, range 0 to 100%, is shown above the slider (default is 75%). Maximum cable length reduces as the efficiency decreases.
- Either apply for this loop only or for all loops (if the latter, selecting 'Cable Characteristics' on another loop, changing some parameters and then selecting 'Apply for This Loop' allow subsequent editing for a single loop).

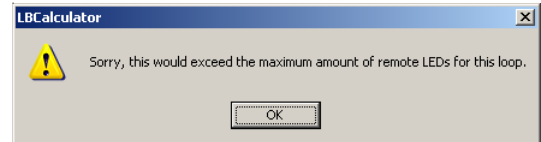
### 4.2.2 Miscellaneous Parameters

The following additional parameters can be edited on the Advanced View:



- Dual Device Detection. Check this box if the loop is required to detect two devices with the same address. The maximum cable length is reduced.
- (i) Maximum number of LEDs in Alarm. Enter the number of LEDs on this loop that are driven externally in alarm by loop devices. This limits the number of LEDs selectable in the 'Remote LED' column.  
 (ii) Remote LED column - the example at left shows used remote LEDs (bright red) and unused remote LEDs (dark red).

**Note:** If the user attempts to configure a new remote LED that would exceed the maximum set in b(i) the following warning is displayed:



- Other Loop Current. For each loop segment, enter any additional current that may be derived from the panel in quiescent and that is not accounted for by other Loop Data Entries. Useful to see the effect of adding an additional device without having to configure it.
- As (c) above but in alarm.

The screenshot shows the software interface with the following details:

- 1**: Total Loop (average), mA: Quiescent 58.63, Alarm 364.47, Peak: 509.11 (Exceeded). A 16% indicator is shown.
- 2**: Alarm current value: 364.47 mA.
- 3**: Peak current value: 509.11 mA, with a red 'Exceeded' label.
- 4**: Max Loop Resistance and Length: Maximum supportable resistance of negative conductor, Ohm: 23.
- 5**: Maximum allowable cable length, m: 2000.
- 6**: Maximum allowable cable length, m: 2000.

ID	Part Number	Mod.	Short Description	q <sub>i</sub> mA	a <sub>i</sub> mA	l led(m), mA	l led(ox), mA	Isol.	Remote LED	Protocol
1	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
2	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
3	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
4	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
5	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
6	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
7	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
8	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
9	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
10	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
11	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
12	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal
13	NFXI-OPT		OPAL Optical smoke sensor with Isolato	0.200	0.200	3.500	10.800	unus	used	Opal

An additional option 'Concurrent Number of Devices in Alarm' is available only if the Market Locale is set to 'Germany' (**Section 1.4.4**). Set the number of devices that are on simultaneously (check 'Use All' or select the number on the slider bar). The LBC incorporates their current, expressed as a percentage of the loop's total load current, into the loop calculations.

The control shows the 'Use All' checkbox is unchecked. The slider bar is positioned at approximately 4 devices, which corresponds to the 50% mark on the scale.

**DISPLAYS:**

- 1 Running total of quiescent current.
- 2 Running total of alarm current.
- 3 If text flashes red, alarm current exceeds maximum allowed.
- 4 Running total of maximum loop resistance.
- 5 This line shows if any of the following limitations are currently being imposed on the loop configuration:  
 Limited to 2000m  
 Limited to ensure communication  
 Limited to ensure Dual Device Detection  
 Only one of these will be displayed at any one time showing the most relevant of the limitations imposed.
- 6 Running total of maximum cable length, in metric or imperial units.

## 5 Calculation Results

The results of the loop and battery calculation are displayed at the bottom of the Loop and Battery Calculator window.

Calculations are updated automatically each time panel or loop data is entered.

Loop	CSA, mm2	Iq, mA	Ia, mA	Dual Dev. Detect.	Rmax, Ohm	Lmax, m
Loop1	1.50	141.45	311.19	OFF	19.53	1582
Loop2	1.50	139.20	258.72	OFF	10.73	870
Loop3	1.50	5.30	25.10	OFF	39	2000
Loop4	1.50	10.20	79.00	OFF	40	2000
Loop5	1.50	8.80	67.30	OFF	40	2000
Loop6	1.50	13.80	54.80	OFF	40	2000

If this box is checked, a suitable battery is selected automatically for the Calculations Report and cannot be selected from the Explorer tab.

The loop displayed in the loop data entry window can be changed by clicking the desired loop label, e.g. loop 2, in the Calculations Results & Loop Summary window.

### 5.1 Total Panel Current

This shows:

- Calculated total quiescent current for panel.
- Calculated total alarm current for panel.
- If text is flashing red, the total alarm current exceeds that available from the panel.

### 5.2 Battery Size

This shows:

- Calculated required minimum battery size.
- If text is flashing red, the calculated battery size exceeds the largest battery size available for the panel.

Loop	CSA, mm <sup>2</sup>	I <sub>q</sub> , mA	I <sub>a</sub> , mA	Dual Dev. Detect.	R <sub>max</sub> , Ohm	L <sub>max</sub> , m
Loop1	1.50	141.45	311.19	OFF	19.53	1582
Loop2	1.50	139.20	258.72	OFF	10.73	870
Loop3	1.50	5.30	25.10	OFF	39	2000
Loop4	1.50	10.20	79.00	OFF	40	2000
Loop5	1.50	8.80	67.30	OFF	40	2000
Loop6	1.50	13.80	54.80	OFF	40	2000

### 5.3 Loop Summary

This shows **for each loop**:

- a. Cable size selected on the Cable Characteristics window.
- b. Calculated quiescent current.
- c. Calculated alarm current.
- d. Whether Dual Device Detection is selected (ON) or not (OFF).
- e. Calculated maximum loop resistance.
- f. Calculated maximum loop length.



### 5.4 Resolving Loop Loading Issues

The calculator results window may indicate that there is a problem with your configuration. The area affected is highlighted in red (see example below):

	CSA, mm2	Iq, mA	Ia, mA	Dual Dev. Detect.	Rmax, Ohm	Lmax, m
Loop1	1.50	100.49	279.04	ON	11.26	912
Loop2	1.50	62.29	212.34	ON	0.75	61
Loop3	1.50	35.20	66.70	ON	10.51	851
Loop4	1.50	34.55	97.55	OFF	18.20	1474

Loop Booster Fitted?	Singal Fault Tolerant?	Max. Current Limit
N	N	0.5A
1	Y	0.5A
1	N	1.5A
2	Y	0.5A
2	N	2.5A

This can result from one of the following reasons:

- a. The current consumption of the loop exceeds the maximum allowed (refer to table at left). Solution - remove devices from the loop until the current consumption falls below the allowable limit or add one or two loop booster(s).
- b. There are not enough devices on the loop to require a loop booster (or second loop booster). Solution - remove the loop booster.