

COSINE DEVELOPMENTS

LEADERS IN LIGHTING TECHNOLOGY

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Emergency Lighting Control via DALI

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REGULATIONS

The Occupational Health and Safety Act: Act 95 of 1993 states that emergency lighting must be provided in any workplace without natural lighting, that it should be kept in good working order and tested at least every three months. Also, the compulsory specification VC8055 requires that the emergency lighting conforms to stringent performance requirements of SANS 1464 Part 22. Up until now the emergency lighting testing took the form of manually switching the power off and checking the functionality of each fitting. In reality this testing is seldom conducted and many emergency lighting installations are not functional. The use of self-testing control gear eased the maintenance task somewhat in that the operational status of each fitting is displayed. However, assessment still requires inspection of each fitting. In the author's experience few self-testing installations are functional – nobody seems interested in their flashing status lights. This sorry state will, however, be changing. Firstly, load shedding is highlighting dysfunctional systems. Retail outlets plunged into darkness face theft and customer panic – issues hardly conducive to good business. Secondly, spiralling electricity costs and the relentless drive towards energy efficiency is spawning a massive growth smart buildings with emergency lighting monitoring via digital control.

Hello DALI

The introduction of the DALI (Digital Addressable Lighting Interface) protocol has enabled the development of centralised assessment of all emergency lighting fittings. Simple “daisy chain” wiring connects each emergency light back to a DALI Bridge which is connected via USB, RS232 or Ethernet port to a resident computer (see Figure 1). The DALI connections are not polarity sensitive and wiring runs can be up to 300 metres (using 1.5 mm² cables). Up to 64 emergency fittings can be connected to one DALI Bridge thereby suiting even large installations. The importance of using the industry standard DALI system cannot be over-emphasised. Future upgrades, support and long term functionality are ensured whereas the use of non-standard “in-house” type protocols may cause issues in the future.

Testing and control of the emergency lighting fittings is therefore conducted from the resident computer or via a BMS system. It is now possible to:

- Provide automatic testing of all emergency fittings
- Automatically generate a testing log
- Automatically e-mail the test results to maintenance crews
- Graphically identify faulty units

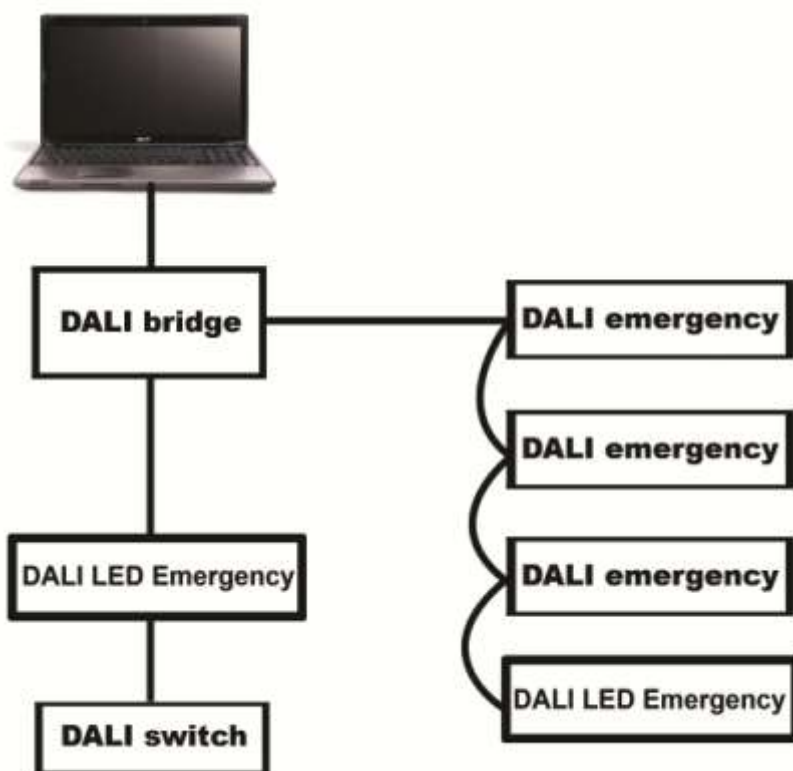


Figure 1- A DALI emergency lighting system

These features provide unprecedented control and verification of emergency lighting. The good news is that our SABS has adopted the international standard for DALI control (IEC 62386). In this way products designed in South Africa will be fully compatible with control systems or software platforms developed elsewhere. Emergency control units using the DALI protocol are available for the following light sources:

- Fluorescent lamps
- 230Vac ES lamps (fluorescent and LED)
- LED's (constant current drivers)
- Exit signs (see Figure 2)
- Any lighting load (via uncommitted DALI controlled switches)



Figure 2- A DALI Exit Sign

Stand –alone DALI based emergency lighting systems have been designed to suit even the smallest of installations. What is more locally written software precludes the hefty license fee normally accompanying full DALI installations. DALI emergency lighting systems are now cost effective enough to compete with traditional emergency lighting systems. Of utmost importance is simplicity of operation. The DALI installation must not require a resident rocket scientist or costly maintenance contracts. Also, local support is vital.

SIMPLE IMPLEMENTATION

Building floor plans (in .jpg/.bmp/.png format) are entered into the system to provide the basis for the visual representation. Other non-emergency devices can also be connected such as door locks and normal lighting. A sample is shown in Figure 3 together with the device connection “tree”.



Figure 3 - Floor Plan Example

The master bedroom has an emergency light (the red bulb icon) and the front door has a DALI addressable lock. It is possible to control and monitor all DALI devices on the floor using this screen using simple mouse clicks. The graphic representations will display what states the

Both short (two minutes) and long (one or three hours) emergency duration tests can be initiated on any fitting. The test status colours provide a quick means to identify the problem units and faulty components. The results are displayed in a very simple form (see Figure 6).

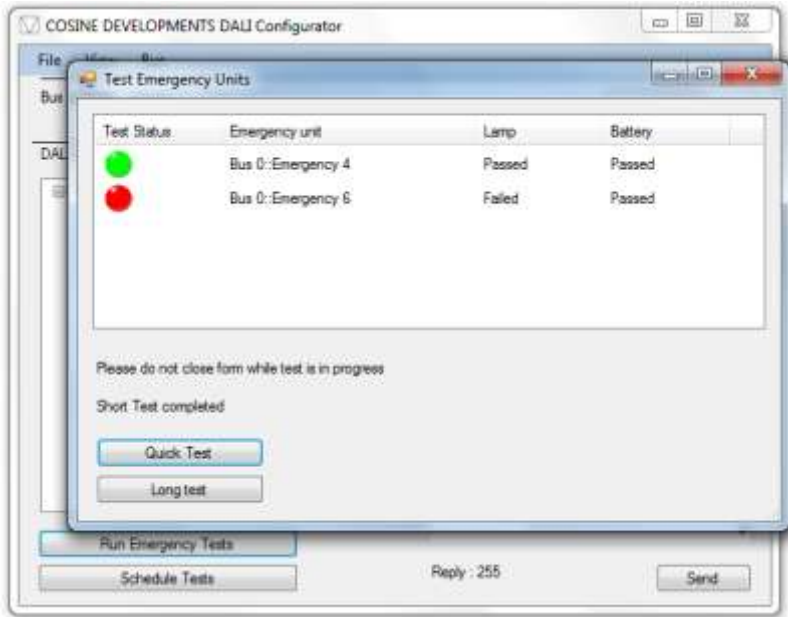


Figure 6- Test Results

The sample screen in Figure 7 shows how emergency tests are scheduled. Once set the test will automatically run without the need for any further intervention.

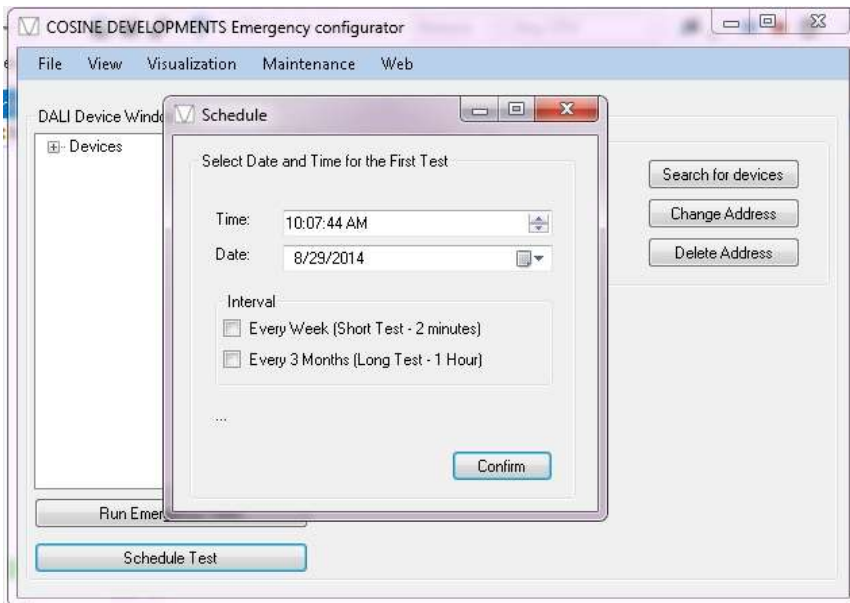


Figure 7- Test Schedules

The results also have the option to be automatically emailed to maintenance personnel. An example of the simple text file is shown below:

Friday, 11/29/2013
09:47:37

Bus 0 :: Emergency 0	Test: Passed	Lamp: Passed	Battery: Passed
Bus 0 :: Emergency 2	Test: Passed	Lamp: Passed	Battery: Passed
Bus 0 :: Emergency 3	Test: Passed	Lamp: Passed	Battery: Passed
Bus 0 :: Emergency 5	Test: Failed	Lamp: Passed	Battery: Failed

SOFTWARE CUSTOMISATION AND SUPPORT

The software elements of the visualization screen can be modified at run time. Therefore, functions of dimming, switching and emergency can all be changed on the go without having to endure rigorous key strokes. If a required function or component does not exist then this can simply be created.

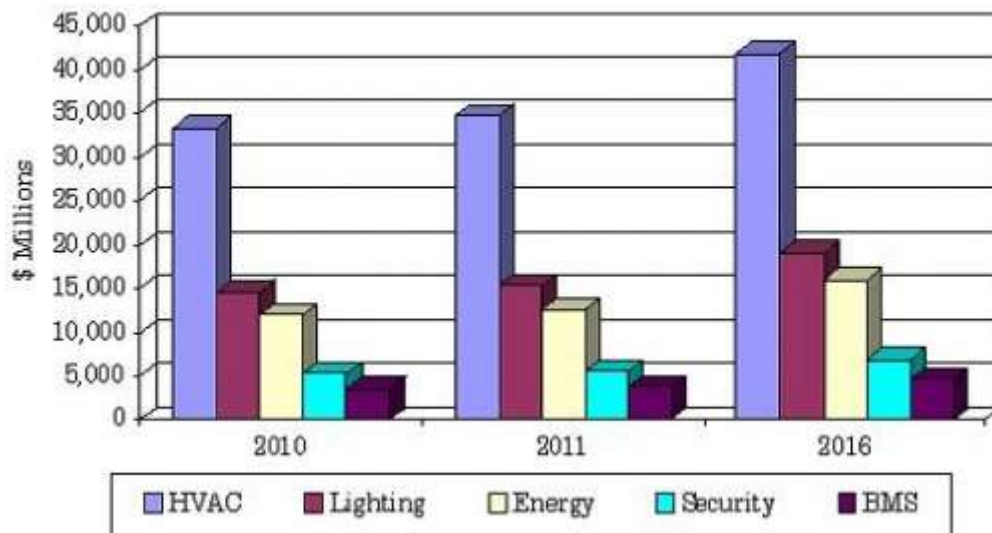


Figure 8- Global growth of Building Automation

The relentless pace of progress is driving the growth of building automation globally (see Figure 8). It is now time for South Africans to include smart emergency lighting systems in their building designs and renovations. The powerful supervisory facilities and control of a DALI based emergency lighting system are now too obvious to ignore.