Input paper: [[1]](#footnote-1) ENG4-9.19

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **X** ENG **□** PAP **□** Input

**□** ENAV **□** VTS **X** Information

Agenda item [[2]](#footnote-2) 9

Technical Domain / Task Number 2 TD#1

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Development of compatible flashing control system

for LED lanterns(7-8NM)

## LED lanterns have been developed according to the standard specification as optical, electrical properties and functions. However, standardization of flashers and LED modules are required because every manufacturer has different configuration. Also, if users of AtoN replace the LED module and flasher, only the manufacturer's products must be replaced. So the problems of maintenance and economic burden have occurred. In order to improve this problem, we developed compatible flashing control system with compatible flasher and control device. Compatible flasher set up operating current of the LED modules. And control device can set the electrical characteristics of compatible flasher for application in other device.

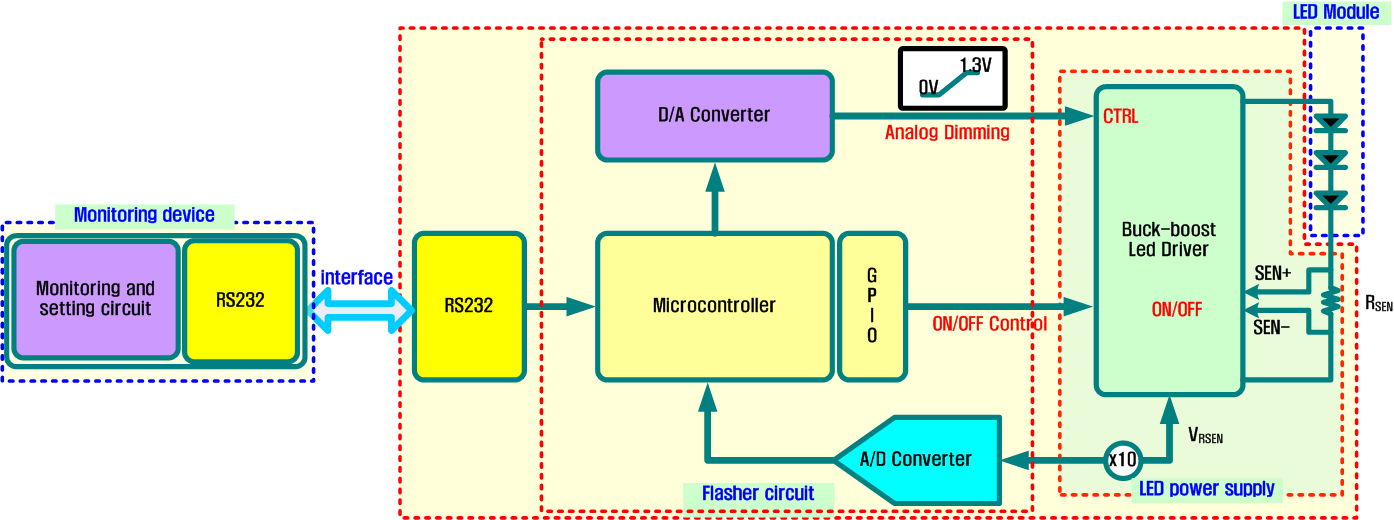
The flasher of Small LED lanterns (7-8NM) supplies the power by applying constant voltage and constant current circuit. However, power conversion efficiency is low.

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| --- |
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1. Developed LED lantern circuit status

Each manufacturer have differently designed flasher and LED module configuration of lantern control circuit, LED power supply and circuit components. So, difficulty of maintenance occurs because the lantern can only use flasher of the same manufacturer.

In order to improve this problem, we designed the flasher control circuit and the LED module power supply circuit. Monitoring device set the flasher operation conditions through interface (RS-232c).



1. Block diagram of Compatible flasher system for LED lantern

Compatible Flasher specification

­ Function: flashing(226), CDS, GPS module, Interface(RS232), LED Module Dimming control

­ Input voltage: DC 9~35Vdc

­ Output voltage: 4~20Vdc

­ Output current: 0.1~2.8A

­ Driven: Buck-boost driver

­ No-load power consumption: <5mA(Except interface and GPS Module)

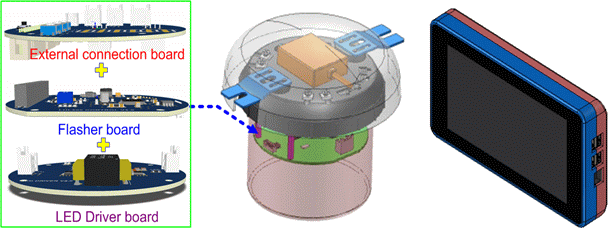
­ Interface: 2port RS232( Setting port, Output interface port)

1. Compare to existing small LED lantern flasher circuit configuration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Flasher circuit** | **LED module circuit** | **Manufacturer** | **Remarks** |
| LED-200/  LED-200HI | Flasher control circuit,  CV\* circuit | CC☨ circuit | A | Value diversity |
| Flasher control circuit,  CV circuit, CC circuit | - | B | Value diversity |
| Flasher control circuit | CV circuit, CC circuit | C | Value diversity |

\*CV : Constant Voltage, ☨CC : Constant Current

The compatible flasher was designed to be assembled inside a LED lantern. The touch panel LCD was applied as an input method of monitoring device.



1. Compatible Flasher for LED lantern and Monitoring device

The following table shows measurements of average luminous intensity and operating power before and after compatible flasher was applied.

1. Comparison of the electrical/optical characteristics before and after replacement of the compatible flasher

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | | **LED-200(A)** | | **LED-200HI(B)** | | **LED-200(C)** | |
| Color | | Red | | White | | White | |
| LED Module circuit | | CV circuit | | - | | CV, CC circuit | |
| Apply | | Before | After | Before | After | Before | After |
| **operating power**[w] | | **17.78** | **9.95** | **19.21** | **19.16** | **23.59** | **23.22** |
| **Luminous intensity\***\*[cd] | Reference | 500 | 500 | 700 | 700 | 400 | 400 |
| Measure | **584.1** | **662.8** | **1,965** | **1,967** | **504** | **508.1** |

\*\* Luminous intensity : the average luminous intensity

|  |  |
| --- | --- |
| Apply before | Apply after |
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| EMB00000f243396 | EMB00000f243397 |
| EMB00000f243398 | EMB00000f243399 |

We measured and analysed the electrical and optical properties before and after compatible flasher was applied. The results show that the compatible flasher could substitute flasher of existing small LED lantern. Also, some existing circuit configuration method of small LED lantern flasher reduced the operating power. In addition, luminous intensity maintained the same level in general.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)