Brightness

LED and Display Lighting Module

USER MANUAL

User Manual Version: [2.0]_a

www.zennio.com

CONTENTS

DOCUMENT UPDATES

Version	Changes	Page(s)
[2.0]_a	**Changes in the application program**: • Internal optimization.	-
[1.0]_a	**Changes in the application program**: • Inactivity time and turn off time are totally independents.	-

1 INTRODUCTION

A variety of Zennio devices feature a module for performing a brightness control of the **display** and the **pushbutton LED** according two operating modes: normal mode and night mode. It also permits controlling the contrast of the **screen** for optimal viewing depending on the ambient brightness.

The lighting control function does not require the connection of any accessories to the device inputs as it is based on the measurement of an internal sensor.

Important: *to confirm whether a particular device or application program incorporates the brightness function, please refer to the* ***device user manual****, as there may be significant differences between the brightness function of each Zennio device. Moreover, to access the brightness proper user manual, please refer to the specific download links provided at the Zennio website (www.zennio.com) within the section of the specific device being parameterised.*

2 CONFIGURATION

Please note that the screenshots and object names shown next may be slightly different depending on the device and on the application program.

2.1 CONFIGURATION

In the "Configuration" tab, a **time to consider inactivity** can be set, so after this period of time has elapsed without any user interaction, the device goes into inactivity state, modifying the display and/or LED buttons backlight.

The devices will also have an additional object that will allow to enter in activity state without taking into account the time set in the parameter.

ETS PARAMETERISATION

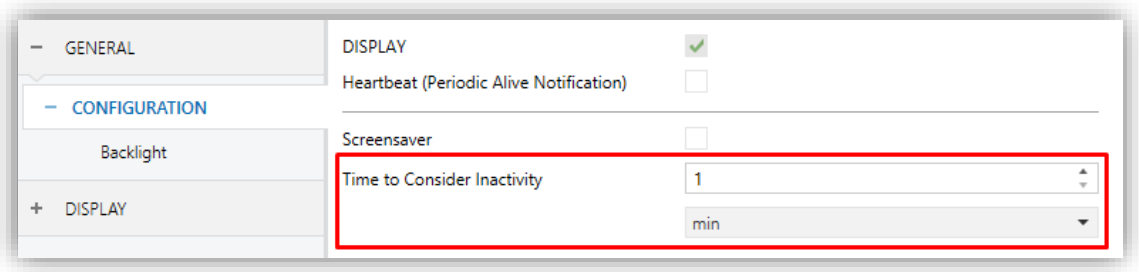

Figure 1 Time to Consider Inactivity

- **Time to Consider Inactivity** [*1…65535*] [*s/min/h*][1]: time after which, if no pulsation or proximity detection has occurred, the LED and display acquire the brightness level configured (see section 2.1.1).

In addition, a 1-bit object "**[General] Activity**" is available to force the state of activity ("1") or inactivity ("0") and its corresponding brightness levels.

[1] The default values of each parameter will be highlighted in blue in this document, as follows: [*default/rest of options*].

2.1.1 BACKLIGHT

It is possible to configure brightness user-defined levels for the display and/or LED of the devices equipped with them. For this purpose, two operation modes are available: the **normal mode** and the **night mode.** The second one is optional. It is provided for temporary situations and environments where an excess of brightness may disturb the user. In such case, it will be possible to switch the mode by means of a one-bit object and/or a scene object.

Within each mode, each LED can commute between three levels: **off** (which not necessarily means “no light”), **on** (which not necessarily means “light on”) or **inactivity** which determines the LED illumination level after the time to consider inactivity (see section 2.1). The display commutes between two levels: **active** or **inactive**. The last one is set, as for the LED, after the time to consider inactivity.

It is also possible to set the display to turn completely off after a certain time without interaction with the device. It is important to note that **activity time and turn off time begin to be considered at the same moment**, so, if the turn off time is shorter than the activity time, the display will directly turn off without attenuation.

When in idle state, both the LED and the display will return to the level set for activity in case of user interaction with the device.

In addition to the custom brightness levels according to the active mode, there will be an object to modify the brightness of the display. The backlight will be applied over the brightness level of the object:

> ***Example:*** *if the general brightness has a value of 80% and the display brightness level is 50%, then the final display backlight will be 40% (50% x 80% / 100).*

Some devices allow changing the display contrast. It is possible to set the display contrast after download and changing it by object.

ETS PARAMETERISATION

Devices with display which incorporate this module have by default a 1-byte object ("**[General] Display - Brightness**") that allow modifying its brightness level. In addition, those where adjusting the contrast is possible will have the 1-byte object "**[General] Display - Contrast**" for its customized adjustment.

In the "Backlight" tab will be configured all aspect related to the backlighting of the display and LED:

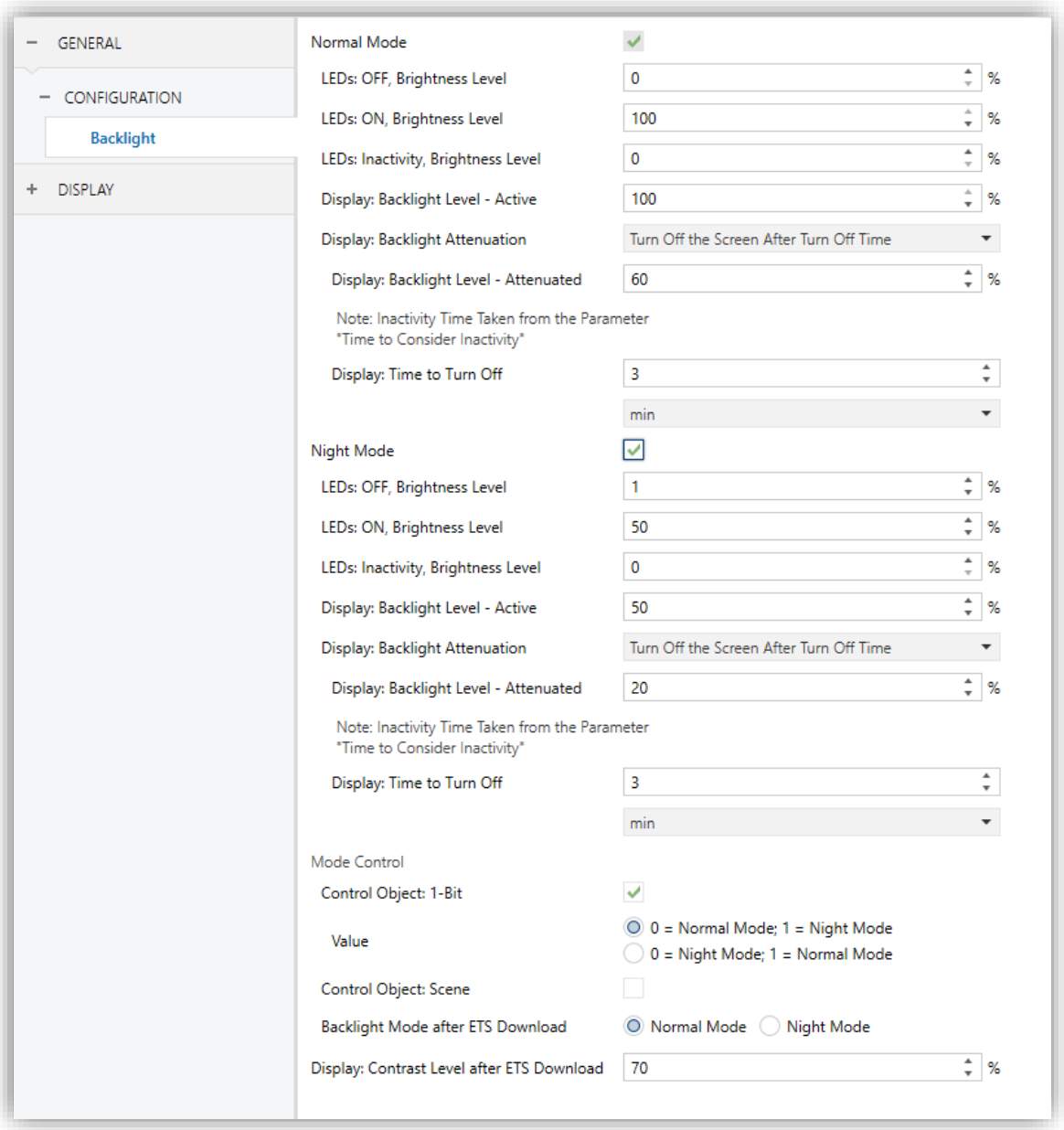

Figure 2 Backlight

- **Normal Mode** [*enabled*]: the following parameters set the LEDs brightness levels for each state in normal mode:

  - **LEDs: OFF, Brightness Level** [*0…100*] [*%*].
  - **LEDs: ON, Brightness Level** [*0…100*] [*%*].
  - **LEDs: Inactivity, Brightness Level** [*0…100*] [*%*].
  - **Display: Backlight Level – Active** [*1…100*] [*%*].
  - **Display: Backlight Attenuation:** sets the display behaviour after the no-activity time or turn off time has elapsed. The available options are:

    - *Turn Off the Screen After Turn Off Time*: the display remains on until the **time to turn off** is exceeded.

      If the inactivity time is greater than the turn off time, the display will switch off without previous attenuation. If the inactivity time is less than the turn off time, the display acquires the attenuated backlight level after the inactivity time and switches off after the turn off time.

      ***Example**: Assuming the following setting:*

      - Time to Consider Inactivity: 1 min.
      - Display: Backlight Attenuation: Turn off the screen after a long period of inactivity.
      - Display: Backlight Level - Attenuated: 60%.
      - Display: Time to Turn Off: 3 min

      After one minute of inactivity the display illumination goes down to 60%. After two more minutes the display turns off completely.

      On the other hand, if we invert the inactivity time and the off time:

      - Time to Consider Inactivity: 3 min.
      - Display: Time to Turn Off: 1 min.

      After one minute of inactivity the display is completely turned off, so the attenuated backlight level is never achieved.

    - *Attenuate the Screen After Inactivity Time*: the display remains at maximum brightness until the inactivity time is exceed. After this time, the display will change to the attenuation level.

- *Max Illumination Always*: the display will not attenuate or turn off at any time.

If either of the first two options is selected, sending "0" by the object "**[General] Activity**" will cause the immediate attenuation or or shutdown, depending on whether the brightness was at its maximum or was attenuated.

Depending on the option chosen, certain parameter will be shown:

- **Display: Backlight Level - Attenuated** [*0…60…100*] [*%*]: percentage of display brightness after reaching inactivity time. This parameter is not available if the option "Max Illumination Always" is selected.
- **Display: Time to Turn Off** [*1…3…65535*] [*s/min/h*]: time that must elapse without activity (non-interacting) for the display to turn off. This parameter will be only available when the option "Turn Off the Screen After Turn Off Time" is selected.

- **Night Mode** [*enabled/disabled*]**:** in case of being this mode necessary, this checkbox needs to be marked. The parameters to be configured are the same as those of the normal mode, changing only the default values:
  - **LEDs: OFF, Brightness Level** [*0…1…100*] [*%*].
  - **LEDs: ON, Brightness Level** [*0…50…100*] [*%*].
  - **LEDs: Inactivity, Brightness Level** [*0…100*] [*%*].
  - **Display: Backlight Level - Active** [*0…50…100*] [*%*].
  - **Display: Backlight Attenuation** [*Turn Off the Screen After Turn Off Time / Attenuate the Screen After Inactivity Time / Max Illumination Always*]**.**
    - **Display: Backlight Level - Attenuated** [*0…20…100*] [*%*].
    - **Display: Time to Turn Off** [*1…3…65535*] [*s/min/h*].

- **Mode Control:** allow managing the transition between normal mode and night mode through two types of objects:
  - **Control Object: 1-Bit** [*enabled/disabled*]: after marked, switching the mode by writing to the binary object "**[General] Backlight Mode**" will be possible. Then the **value** to activate which mode [*0 = Normal Mode; 1 = Night Mode / 0 = Night Mode; 1 = Normal Mode*] will have to be selected.

- **Control Object: Scene** [*enabled/disabled*]: when marked, switching the mode by writing a certain scene value to "**[General] Scene: Receive**" will be possible. Two specific textboxes will show up to enter what scenes [*0/1…64*] will trigger each mode.

- **Backlight Mode after ETS download** [*Normal Mode / Night Mode*]: sets which of the two modes will be active after an ETS download.

- **Display: Contrast Level after ETS Download** [*1…70…100*] [*%*]: sets the contrast level at which the screen will be initialized after an ETS download. This value can be modified through the object "**[General] Display - Contrast**".

  Note: *this functionality may not be available on some devices.*

Join and send us your inquiries
about Zennio devices:

http://support.zennio.com

Zennio Avance y Tecnología S.L.
C/ Río Jarama, 132. Nave P-8.11
45007 Toledo (Spain).

Tel. +34 925 232 002.

www.zennio.com
info@zennio.com