di-soric

Flash controller for flashable lights

di-soric
Made in Germany   www.di-soric.com

BC-100-20A
24V DC

31.13   CE

RS485	Trigger In	Trigger out	Ready out	Flash LED light	Supply voltage
B- A+	- +	GND S1	GND S2	+ -	V+ GND

Error   Flash   Power

Inhalt

1 Description

The BC-100-20A is a configurable power source for flashable LED lights. It can deliver both pulsed current and constant current. The level of the current, the time parameters and numerous additional functions are configured via the RS485 interface (point-to-point connection). For this purpose, the BC-100-20A is connected via a USB adapter to a PC. A corresponding parameter and command set and a suitable terminal program are used for communication and configuration.

After connecting an LED lighting system and entering the parameters, the BC-100-20A conducts a calibration run upon initial startup to determine the internal control values needed for operation and saves them in non-volatile memory (EEPROM). The flash function can be started and stopped with corresponding commands. Automatic startup after availability of the supply voltage is also possible. In this case, no further connection with the interface is necessary. The BC-100-20A operates with the saved parameters, also after a shut-down and re-start.

In addition to the most common use in externally triggered pulse mode, the BC-100-20A can also be controlled internally triggered, i.e. in strobe mode. In the case of lower current values, it can also be used as a constant power supply for continuous operation.

Note: The BC-100-20A becomes hot during operation. Depending on the flash parameters used, a heat sink temperature of up to 60°C can occur. It is necessary to provide for sufficient heat dissipation.

2 Safety notice

Flashing LED lights can generate very strong light impulses that can be harmful to the human organism (for example, eye damage, headaches, epileptic reactions). They may be used only by trained personnel. Effective protective measures may be necessary.

3 Operation without LED lighting

3.1 Starting BC-Config
- Procure an RS485/USB adapter, if not already present
  (available in the di-soric product portfolio as a ready-to-use accessory).

- Install the correct device drives for the RS485/USB adapter.

- Connect the BC-100-20A to the PC/controller via the adapter.

- Start BC-Config.

3.2 Operation of BC-100-20A
- First make sure that no LED lighting is connected.

- Connect device to 24 V DC power supply and switch on. Make sure that the power supply can deliver pulsed current of at least 6 A, if maximum pulsed current is needed.

3.3 Login procedure
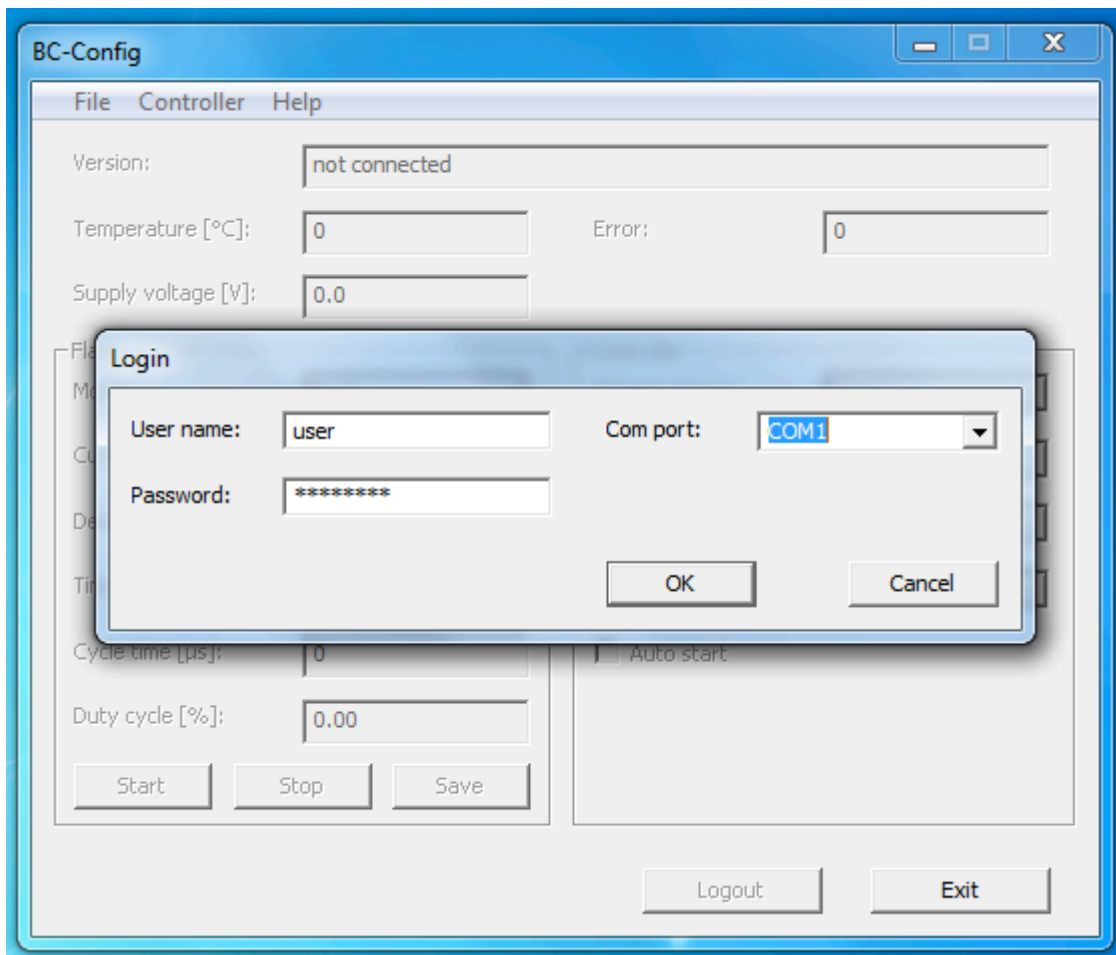
User name: *user*
Password: *di-soric*

Choose the correct Comport and press the *"OK"* button. The connection to the BC-100-20A will be established.
The device is now ready to receive commands and parameters (described separately).

4 Operating options / command set

4.1 User interface
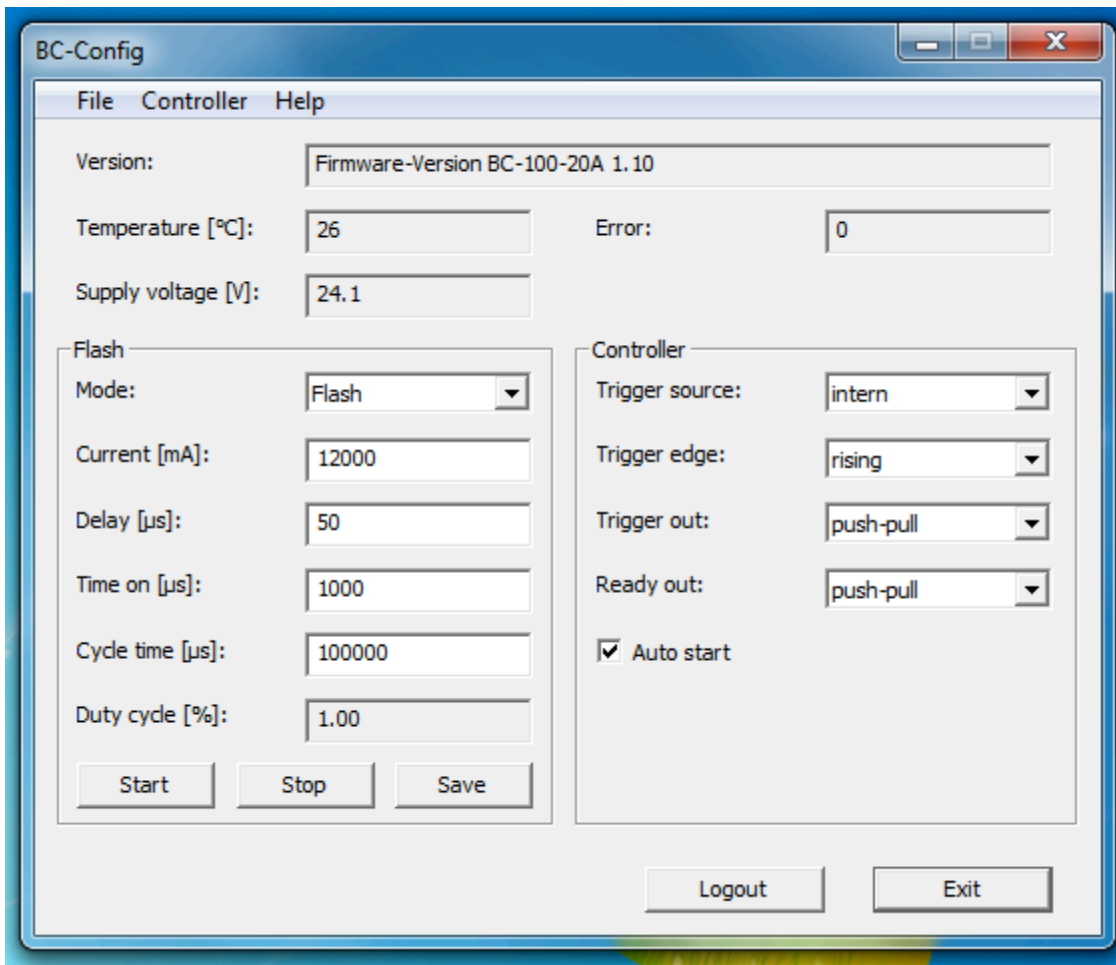
4.2 Higher-level commands

Command/parameter	Explanation
Start	Check the parameter set for consistency, save the configuration if OK, enable LED driver
Stop	Disable LED driver
Save	Check the parameter set for consistency and save the configuration if OK
Logout	Disconnect connection

4.3 Configuration commands / parameters

Command/parameter	Permissible values	Explanation
Version		Display the current firmware
Temperature		Display of the current temperature
Supply Voltage		Display of the supply voltage
Error		Display of an error code for the customer support
Mode		Select flash mode or constant current mode
Current	100 … 20000	Set the LED current in mA
Delay	5 … 1000000	Set the trigger delay time in µs (Minimum values: 50 µs at current <2A, 5 µs at current ≥ 2A)
TimeOn	10 … 50000	Set the flash duration (time on) in µs
CycleTime	100 … 60000000	Set the repeat rate (cycle time) in µs
DutyCycle		Display the ratio of time on to duty cycle (duty factor) in %
TriggerSource		Select the trigger source internal or external
Trigger Edge		For external triggering, select falling or rising flank
TriggerOut		Configuration of the trigger output: push-pull, push-pull inverted, npn, npn inverted, pnp, pnp inverted
ReadyOut		Configuration of the ready output: push-pull, push-pull inverted, npn, npn inverted, pnp, pnp inverted
Autostart		Select the start option of the LED driver at start-up: automatic or manual by command

5 Operation of the LED lighting

5.1 Operating the BC-100-20A with LED lighting
Procedure was already described above

5.2 Execution of the login procedure
Procedure was already described above

5.3 Connection of LED lighting to corresponding terminals
Use only LED lighting systems that are expressly suitable for flash operation. Check for correct polarity and tight connections. Failure to comply can result in damage to the connected LED lighting or to the BC-100-20A. It is also absolutely necessary to ensure that neither of the two electric potentials is combined with other potentials. This can result in damage to the BC-100-20A!

5.4 Configuration of the BC-100-20A for LED lighting
Now the desired lighting parameters and values can be entered. Make sure that the lighting system used is operated within the data sheet specifications. Enter the values and parameters one after the other, the input order is not important. Each input is immediately checked by the BC-100-20A for compliance with the permissible single value limits; if a limit is exceeded, a corresponding error message prompts the user to enter a corrected parameter/value.

Once all parameters and values have been set, it is highly recommended that you check the configuration again. Incorrect values can result in damage to the connected LED lighting system, without warning.

If all parameters and values are correct and you press the button *"Save"* the BC-100-20A will again check the overall configuration for consistency and save it in non-volatile memory. If the BC-100-20A detects during this check that a combination of parameters/values of this configuration is outside of the permissible limits, instead of saving the data, a corresponding error message is displayed. New parameters/values must be entered.

5.5 Startup of BC-100-20A with connected LED lighting

Press the button *"Start"* to execute the new configuration, enable the LED drivers and start the calibration phase.

Note: As a safety function, the *"Start"* command also saves the current parameters and values as does the *"Save"* command.

Note: The yellow LED indicates monitoring of the flash process and always lights up when the connected lighting system is active. This is the case both in the calibration phase and in flash mode or constant current mode.

5.6 Calibration phase

After each *"Start"* command and when switched on in *Autostart* mode, the calibration phase is first executed. This is used to test the connected LED lighting and to optimize the BC-100-20A for the connected LED lighting.

The *"Stop"* command can be used to stop the ongoing calibration procedure or normal operation at any time. The LED driver is immediately switched off in this case.

Note: Do not change any parameters during the calibration phase!

The entire calibration phase is indicated by flashing of the green LED.

NOTE: The duration of the calibration phase depends on the connected LED lighting system and the configured parameters. In the case of high T_{on} values it can lock up for a very long time (up to 100 seconds).
During this calibration phase the LED lighting will light up, flicker or flash. Protective measures may be necessary.

After successful calibration the green LED lights up continuously. If the BC-100-20A detects errors or violation of the permissible limits during the calibration procedure, the calibration is discontinued and the red LED indicates the error. In this case it is necessary to adjust the parameters.

After successful completion of the calibration phase, the BC-100-20A operates with the detected control parameters and the LED driver remains enabled.

6 Flash mode / constant current mode

6.1 Flash mode

In flash mode, controlled over-current ("flashing") of the connected LED lighting is possible. Only current pulses can be generated. The relevant lighting parameters are *"Current", "TimeOn", "CycleTime"* and *"Delay"*. Both the permissible limits of the BC-100-20A (see Chapter 10 and 13) and the limits of the connected LED lighting (see corresponding data sheet) must be complied with.

6.2 Constant current mode

In constant current mode, the connected LED lighting is operated with a constant current; triggering is not possible in this case. The relevant lighting parameter is *"Current"*. Both the permissible limits of the BC-100-20A (see Chapter 13) and the limits of the connected LED lighting (see corresponding data sheet) must be complied with.

7 Autostart function

This function is needed if the BC-100-20A is to automatically start with previously saved parameters and values after availability of the supply voltage. It is enabled during the configuration with the tick next to *"Autostart"*.

If this function is enabled, an active terminal connection is no longer needed. The login procedure is then also not necessary. In this operating mode, the full range of functions is possible, both with internal and external triggering.

If this operating mode is disabled (*"Autostart"* tick is deactivated), the commands *"Start"* and *"Stop"* of the tool BC-Config must be used with an active terminal connection.

8 Faults and errors

8.1 General

If the BC-100-20A detects a fault, the LED driver is immediately switched off to prevent further damage to the controller or the LED lighting. The red LED lights up continuously.

8.2 Troubleshooting

The BC-100-20A features internal temperature monitoring, which switches off the LED driver as a safety function if the internal device temperature exceeds 65°C. A short circuit, broken cable or defective components in the LED lighting can also cause a malfunction. Incorrect supply voltage can also cause a fault, for example in case of a supply voltage fluctuation or outage. A maximum supply voltage fluctuation of ± 1V is permitted. Errors or limit violations during the calibration phase can also result in a fault message.

For every fault message we recommend making a thorough check of all electrical connections, the LED lighting system, the power supply and the device configuration.

8.3 Resetting an error / fault

To reset a fault in Autostart operating mode, you should reboot the device, by briefly disconnecting it from the power supply. When the terminal connection is active, the commands *"Stop"* and *"Start"* can be used to trigger a new calibration phase of the connected lighting.

If the fault cannot be reset despite a correct hardware environment and valid configuration, there may be a defect in the BC-100-20A. In this case, you need to contact the di-soric customer service department.

9 Trigger function

9.1 Internal trigger function

The option *"intern"* in the drop down selector *"Trigger source"* enables the internal trigger function. The BC-100-20A now flashes autonomously with a cycle time that is set via the parameter *"CycleTime"*. In this operating mode the BC-100-20A can be used as a stand-alone device, for example to execute a stroboscope function.

In this mode it can also be operated as the master. The configurable control output "Trigger OUT" outputs the internal trigger signal and can trigger a camera or other components, for example.

9.2 External trigger function

The option *"extern"* switches to the external trigger function. The BC-100-20A now flashes only on request from the configurable control input "Trigger IN" and operates in slave mode. The flash request now comes from the higher-level controller or other components.

The option *"rising"* in the drop down selector *"Trigger edge"* triggers the external signal with the rising flank, *"falling"* with the falling flank.

Also in this operating mode the internal trigger signal is output via the configurable control output "Trigger OUT".

9.3 Trigger signals

The following levels are permissible for the control input "Trigger IN": High = 5 … 24V, Low = 0V.

The signal levels of the control output "Trigger OUT" can be configured with the options under *"TriggerOut"*; a list can be found in the overview of commands in section 4.3.

10 Delay function

The BC-100-20A features a configurable pre-trigger delay. This delay function provides for a reproducible delay between the trigger signal and the flash pulse. The delay can be used to optimise synchronisation of the controller to the trigger and delay times of the connected peripheral equipment, such as a camera.

The pre-trigger delay time can be set under *"Delay"* in a range from 5 … 1,000,000 µs, although the following limits must be observed for technical reasons:

Parameter	Value [in µs]	Limiting condition: LED current (*current*) in
Delay	**≥ 50**	< 2000 mA
Delay	**≥ 5**	≥ 2000 mA

The following restriction generally applies:
Delay ≤ (CycleTime / 2) – TimeOn

The pre-trigger delay time can be set during operation under *"Delay"*. In this case the entered value is immediately checked, saved and applied, if it is within the permissible limits. Otherwise, the old value is retained unchanged. No new calibration phase is necessary.

11 Ready output

The BC-100-20A is equipped with a ready control output "Ready OUT". This configurable output is always enabled when the BC-100-20A is ready for the next flash pulse, i.e. when the cycle time has expired. Upon request of the next flash pulse via the external trigger signal, the output is disabled until the BC-100-20A has processed the cycle time. In operation with the internal trigger this output has no function.
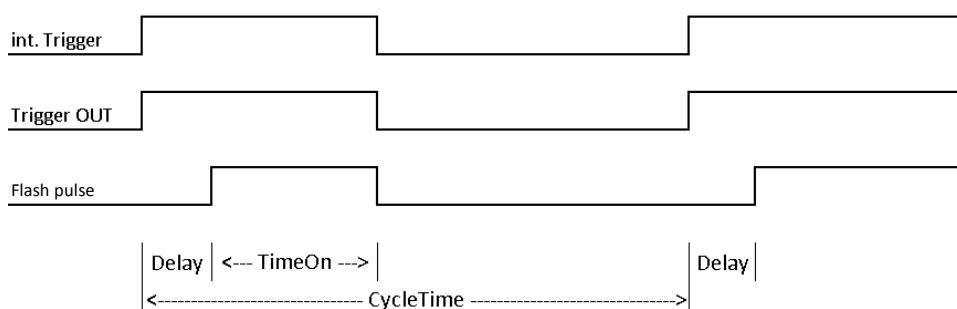
The signal levels of the control output "Ready OUT" can be configured with the drop down selector *"ReadyOut"*; a list can be found in the overview of commands in section 4.3.

12 Time diagrams and example

12.1 Time diagram based on example with external trigger (*„Trigger source: extern"*):
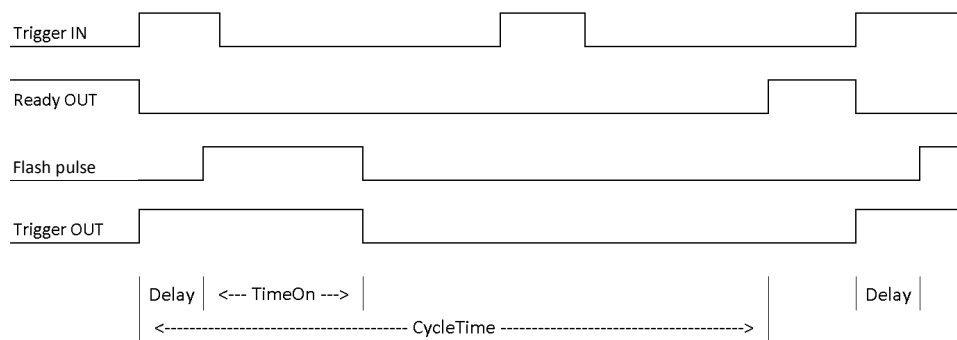
12.2 Time diagram based on example with internal trigger (*„Trigger source: intern"*):

13 Limit values

13.1 Description

Due to the numerous possible parameter configurations in combination with the different LED lighting systems available on the market, limits and restrictions must be complied with to protect the BC-100-20A against overload and damage.

The following limit values and restrictions are always checked when the *"Save"* and *"Start"* commands are executed. If they are exceeded, an error is output. The configuration must then be checked and adjusted.

13.2 Limit values in constant current mode

Maximum LED lighting current	
Current	**≤ 1800 mA**

13.3 Limit values in flash mode

Duty Cycle	Flash current I	max. TimeOn
≤ 1 %	≤ 2000 mA	50000 µs
	≤ 5000 mA	5000 µs
	≤ 10000 mA	2500 µs
	≤ 12000 mA	1000 µs
	≤ 20000 mA	400 µs
≤ 3 %	≤ 20000 mA	100 µs
≤ 5 %	≤ 15000 mA	100 µs
≤ 10 %	≤ 10000 mA	100 µs
≤ 20 %	≤ 7000 mA	100 µs

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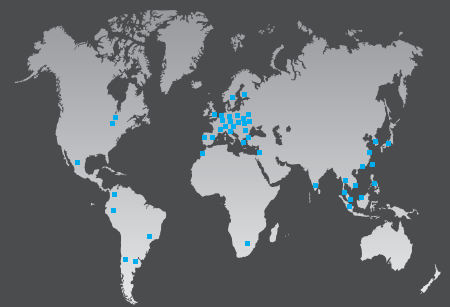
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