Lunatone

DALI-2 RTC+ Timer

Datasheet
Control Device

DALI Real Time Clock
with Scheduler

Art. Nr. 86457142

DALI-2 RTC+ Timer Control Device

Overview

- DALI Real Time Clock.

- Time can be set and queried via DALI instance (type 0 generic – real time clock).

- Scheduler Function with up to 32 schedule entries.

- Astro-clock function.

- For each scheduler job: weekday, day of month, moths, time stamp and DALI commands can be defined.

- periodic repetitions can be easily realized by entering multiple time stamps.

- Supports sending of DALI/DALI-2 control commands as well as multiple command sequences (macros) – thereby including DT8 and Tc control and configuration-commands (twice).

- Allows simple enabling and disabling scheduler entries via DALI scene commands.

- Daylight saving mode.

- Easy schedule configuration via DALI-Cockpit Software tool and suitable DALI PC interface.

- No additional power supply needed, the DALI RTC+ module is supplied directly via the DALI line.

- The time and date settings are retained for approx. 3 days after the storage has been fully charged.

- suitable for backbox installation or installation in protection class II devices.

- Multi-master capable: Several modules can be installed within a DALI circuit.

Specification, Characteristics

type	DALI-2 RTC+ Timer
article number	86457142
GTIN	9010342014147

DALI-Interface, supply: DA, DA

input type	DALI, supply
marking terminals	DA, DA
input voltage range	9,5Vdc … 22,5Vdc (acc. to IEC62386)
max. current consumption DALI	5mA
number of DALI addresses	none
DALI-2 addresses	1

insulation data

impulse voltage category	II
pollution degree	2
rated insulation voltage	250V
insulation DALI / housing	reinforced isolation
Insulation test voltage DALI / housing	3000Vac

environmental conditions

|	
storing and transportation temperature	-20°C … +75°C
operational ambient temperature	-20°C … +60°C
rel. humidity, none condensing	15% … 90%

general data

dimensions (l x w x h)	41mm x 28mm x 15mm
mounting	back box integration in class II devices
rated max. temperature tc	50°C
protection class	II in intended use
protection degree housing	IP40
protection degree terminals	IP20
real time clock (accuracy)	quartz based (~20ppm)
time and date - sustainability if not supplied	up to 3 days, if fully charged (6h supplied)

terminals

connection type	spring terminal connector
wire size solid core	0,5 … 1,5 mm^2 (AWG20 … AWG16)
wire size fine wired	0,5 … 1,5 mm^2 (AWG20 …AWG16)
wire size using wire end ferrule	0,25 … 1 mm^2
stripping length	8,5 … 9,5 mm / 0,33 … 0,37 inch
release of wire	push button

standards:

DALI	IEC62386-101:2014 IEC62386-103:2014
EMC	EN 61547 EN 50015 / IEC CISPR15
safety	EN 61347-2-11 EN 61347-1
markings	DALI-2, CE, UKCA
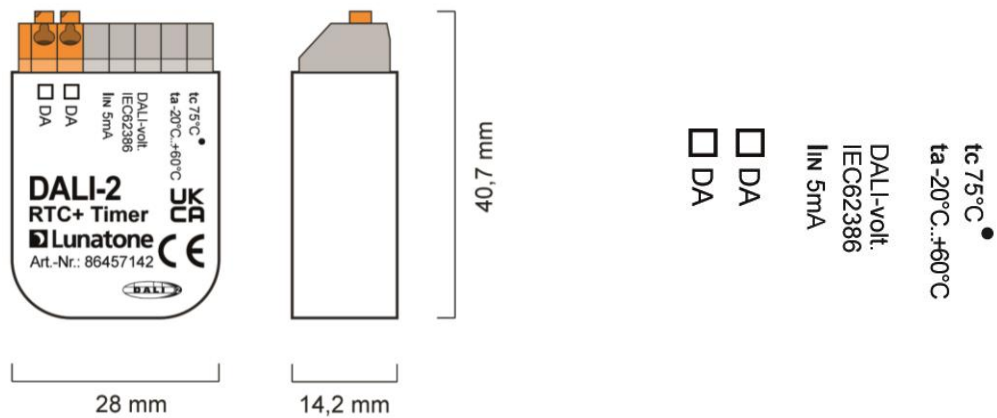
dimensions 86457142   connection plan 86457142

Factory Default Settings

A basic configuration is already implemented on delivery (factory default setting), this can be changed and adapted.

application controller	active
Instance – event message	inactive
Scheduler entries	none

Application Example
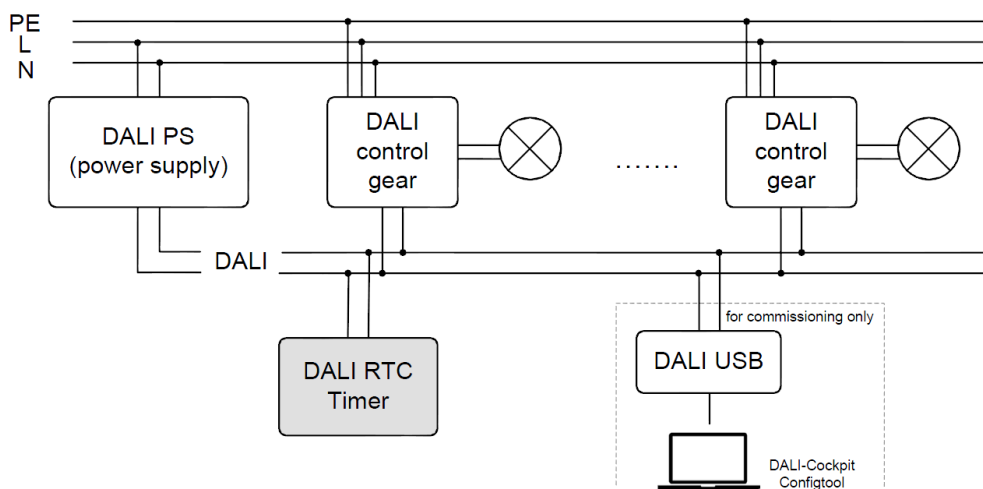
Figure 1 Typical Application

Installation

- The DALI-2 RTC+ Timer is intended for back box installation or integration in protection class II devices.

- The device is directly connected and supplied by the DALI bus. A DALI bus power supply (e.g. DALI PS) is required, an additional power supply is not necessary.

- The connection to the DALI terminals can be made regardless of polarity. The bus input is protected against overvoltage (mains voltage).

- The wiring should be carried out as a permanent installation in a dry and clean environment.

- Installation may only be carried out in a voltage-free state of the system and by qualified specialists.

- National regulations for setting up electrical systems must be followed.

- The DALI wiring can be realised with standard low-voltage installation material. No special cables are required.

- Wiring topology of the DALI-line: Line, Tree, Star

- Only 1 wire may be connected to each terminal. When using double wire end ferrules, the connection capacity of the terminal must be considered.

👉 **Attention:** The DALI-signal is not classified as SELV circuit (Safety Extra Low Voltage). Therefore, the installation regulations for low voltage apply

👉 The voltage drop on the DALI line must not exceed 2V at maximum length (300m) and maximum bus load (250mA).

Commissioning

- After installation the DALI RTC+ Timer is ready for use

- The configuration can be done with the help of the DALI Cockpit Software. The PC must be connected to the DALI bus via a suitable interface module (DALI-2 USB; DALI USB, DALI-2 WLAN, DALI-2 Display, DALI-2 IoT, DALI 4Net, DALI SCI RS232).

- The DALI-2 RTC+ is automatically recognised by the DALI Cockpit during the addressing process and listed in the device overview.

- The addressing is done according to the DALI-2 specification and the device receives a corresponding address.
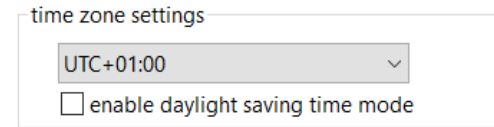
Selecting the device in the list, opens the device page where date and time can be set and the scheduler entries can be configured, see section Function below.

Function

The DALI RTC+ timer sends out DALI commands to the DALI-line based on the entries defined in the scheduler. The command sent can be a DALI command or a sequence of DALI commands (macro). The schedules can be defined as active for different months, weekdays or days of the month. The following DALI-2 RTC+ settings are made via the DALI Cockpit, see also Figure 2 on page 6 for configuration.

General time settings

The current time and date can be set, as well as the time zone and the automatic daylight saving.

Figure 2 DALI Cockpit application settings – creating a schedule

Scheduler entries

In the scheduler up to 32 scheduler jobs can be defined. Each entry consists of:

- **Status**: entry is active/inactive
- **active months**
- **active days of the month**
- **active days of the week**
- **time:** as absolute time input or as astro-clock (see section "Time", page 8)
- **effective range**: the destination address (Broadcast, DALI group or DALI address)
- **DALI command:** selection of a DALI command or command sequence (see section "Commands" page 7)
- **External Control**: selection of a scene and control address via which the entry can be activated and/or deactivated.

Status

The entry can be activated or deactivated globally. If an entry is deactivated, it will not be executed but will remain available in memory. Entries can be globally activated or deactivated via DALI scene commands (see section "External Control", page 8)

Effective Range

The effective range of a command can be selected as Broadcast (All), DALI group, or DALI address.

Commands

In addition to the standard DALI commands (light level (DAP), OFF, MIN, MAX, LAST ACTIVE; SCENES,…), following DALI command sequences are also available: sequential scenes, dynamic scenes and macros (see also Figure 3).
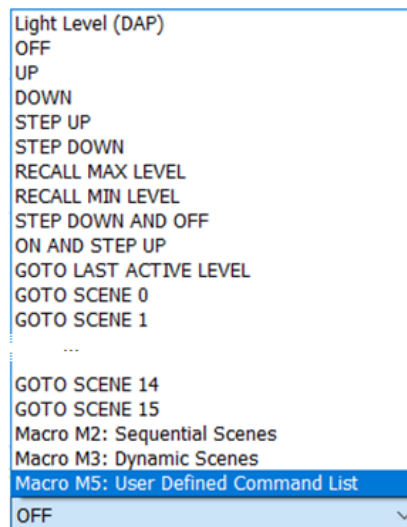

Figure 3 available commands

Macro M2: with each occurrence of the scheduled entry the next scene in the list is recalled. The scene numbers in the sequential scene list can be customized.

Macro M3: A dynamic sequence of up to 16 scenes can be defined. The fade time and the delay between scenes are adjustable.

Macro M5: A custom macro script with up to 19 commands can be executed. Delays between commands can be set from 0 seconds to a maximum of 3 hours. For Macro M5 the entry's effective range is disabled and only the effective range(s) within the macro will be referenced.

Date

In tab "Date Selection" it can be set at which months, days of the month and weekdays the scheduler entry will be executed. Any combinations can be entered.

For selection of active days of the month, the row defines the first digit and the column the second digit of the date. e.g.26:
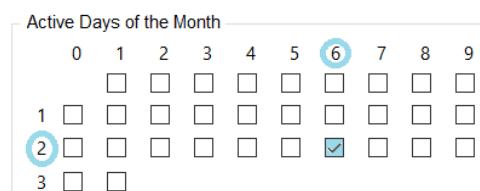
Time

In tab "Time Selection" the time can be specified, either as absolute time input or as offset in relation to sunrise or sunset (astro-clock functionality).

For selection of the time, the hour and minute need to be set. For entering the Minute: the row defines the first digit and the column the second digit of the minute. e.g. 12

The input allows multiple selection, so the command can be sent periodically, for example every 15 minutes, using just one DALI-2 RTC entry.

Using the Astro-clock functionality, a time delay (minutes and hours) relative to sunrise or sunset can be set. For this functionality, information about the GPS-coordinates in decimal degree format is required.

Please note that it is not possible to postpone actions based on sunset/sunrise beyond midnight.

External Control

In tab "External Control", a control address (broadcast, DALI group, DALI address) and scenes can be defined. The respective scene command to the set control address will activated and/or deactivated the scheduler entry respectively.

Time queries

Date and time can be queried via the DALI-2 Instance nr. 0 (QUERY INPUT VALUE & QUERY INPUT VALUE LATCH) see section "Instance 0 – Real Time Clock"

DALI-2 instances

The DALI-2 RTC+ supports 2 instances of type 0 (generic instance):

- **Instance nr. 0 – real time clock:** information about date and time – see section Instance 0 – Real Time Clock
- **Instance nr. 1 – timed jobs:** information about the last recalled scheduler entry – see section Instance 1 – Timed Jobs

Parameters of the instance can be configured via the DALI Cockpit Software, see Figure 4 on page 10.

General information on the DALI-2 instance mode and the instance types, event settings, event scheme etc. can be found in the instance guide: https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2_Instance-Guide_EN_M0024.pdf

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Instance 0 – Real Time Clock

Date and time can be determined using queries or the event message.

Available event filters are: second, minute, hour, day, month, year, day of the week. To query the instance, "Query Input Value" and "Query Input Value Latch" are sent to the DALI-2 address and instance number 0 and can then be evaluated using the information *Table 1* below.

Below is an example for query and evaluation.

Table 1 Evaluation of Instance nr. 0 – real time clock

event source information	bits										event data type	
	event data											
23...10	9	8	7	6	5	4	3	2	1	0		
Depends on event scheme settings according to the DALI-2 standard	0	0	0	0							0	seconds
	0	0	0	1							1	minutes
	0	0	1	0							2	hours
	0	0	value								3	0-5: day of the month 0-7: weekday
	0	1	0	0							4	month
	0	1	0	1							5	year

Example – Query and Evaluation: Instance 0 . date and time:

Type	Hex Data	Address	Command
DALI24 Inst Query	01 00 8C	A0, iN0	QUERY INPUT VALUE
DALI8 Answer	24		= 36 (0x24)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH
DALI8 Answer	28		= 40 (0x28)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH
DALI8 Answer	11		= 17 (0x11)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH
DALI8 Answer	75		= 117 (0x75)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH
DALI8 Answer	09		= 9 (0x09)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH
DALI8 Answer	17		= 23 (0x17)
DALI24 Inst Query	01 00 8D	A0, iN0	QUERY INPUT VALUE LATCH

hex	bits							
	7	6	5	4	3	2	1	0
0x24	0	0	1	0	0	1	0	0
0x28	0	0	1	0	1	0	0	0
0x11	0	0	0	1	0	0	0	1
0x75	0	1	1	1	0	1	0	1
0x09	0	0	0	0	1	0	0	1
0x17	0	0	0	1	0	1	1	1

1	0	0	1	0	0	= 36	seconds
1	0	1	0	0	0	= 40	minutes
0	1	0	0	0	1	= 17	hours
	1	0	1	0	1	= 21	day of the month
		0	1	1	= 3	weekday*
0	0	1	0	0	1	= 9	month
0	1	0	1	1	1	= 23	year

*0: Mon, 1: Tue, 2: Wed, 3: Thu, 4: Fri, 5: Sat, 6: Sun

→ **Thursday 21.09.2023 17:40:36**

Instance 1 – Timed Jobs

Instance 1 sends an event message when an RTC entry is executed (Event filter selection: Timed job).

The returned value corresponds to the number of the DALI RTC entry (0-31).

For queries, the answer corresponds to the number of the last RTC entry sent.

Table 2 *Evaluation of Instance nr. 1 – timed jobs*

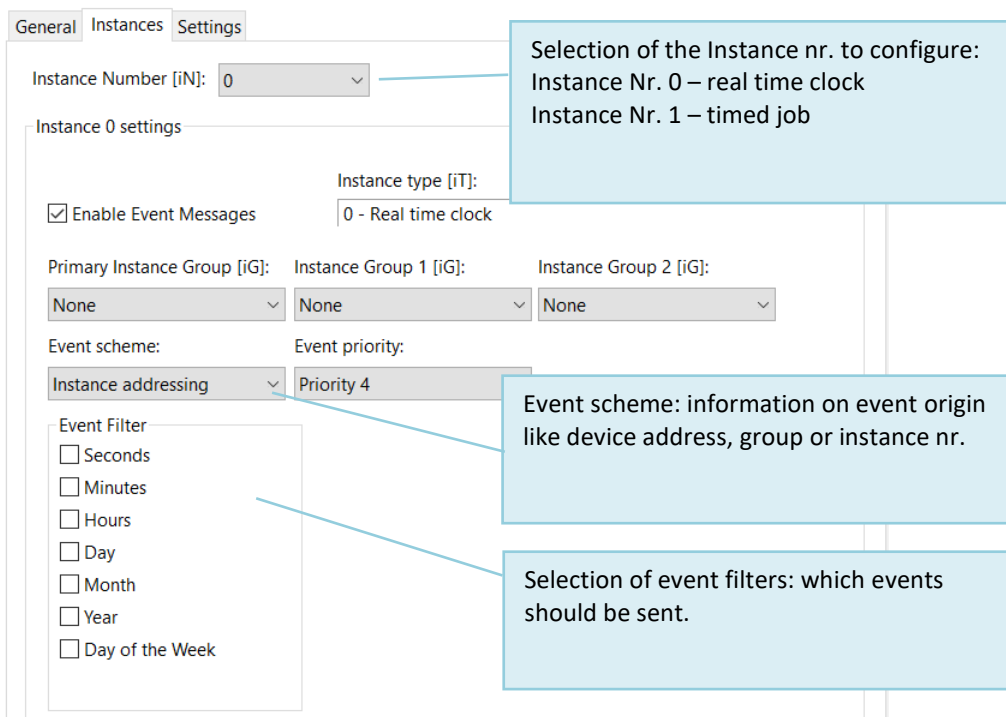| Bits												Event Daten Typ
Event Source information	Event Data											
23…10	9	8	7	6	5	4	3	2	1	0		
Abhängig von Event Scheme Einstellungen folgend der DALI-2 Norm	0	0	0	0	Wert							Nr. des Zeitgesteuerter Eintrags

Figure 4 DALI Cockpit instance settings

Purchase Information

Art.Nr. 86457142: DALI-2 RTC+ Timer, DALI real time clock with scheduler functionality, back box installation and class II device integration

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Additional Information and Equipment

DALI-Cockpit – Lunatone configuration tool for DALI systems
https://www.lunatone.com/en/product/dali-cockpit/

Lunatone DALI products
https://www.lunatone.com/en

Lunatone datasheets and manuals
https://www.lunatone.com/en/downloads-a- z/

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Requests: sales@lunatone.com

www.lunatone.com

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The datasheet refers to the current delivery.

The compatibility with other devices must be tested in advance to the installation.