DiiA Specification

DALI Part 251 – Memory Bank 1 Extension

(Device Type 50)

Version 1.1

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Document History

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August 2018		First publication.
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DALI Part 251 – Memory Bank 1 Extension

1 Scope

This standard specifies an extension to memory bank 1 to enable asset management functionality. This standard builds on the Digital Addressable Lighting Interface as specified in the IEC62386 series of standards.

2 References

2.1 Normative references

The following normative documents are adopted, in whole or in part as indicated, in this Standards Publication. The latest edition of the publication applies (including amendments).

IEC 62386-102:2014, Digital addressable lighting interface – Part 102: General requirements – control gear

IEC 62386-102:2014/AMD1:2018, Digital addressable lighting interface – Part 102: General requirements – control gear

IES 901.11, Diagram 5

2.2 Informative references

This standard is intended to be used in conjunction with the following publications. The latest edition of the publication applies (including amendments).

None

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 3 and the following apply.

3.1 NVM-RO

Non-Volatile Memory Read-Only (cannot be changed through DALI)

3.2 NVM-RW

Non-Volatile Memory Read-Write

3.3 ROM

Read Only Memory (cannot be changed by the control gear)

3.4 RAM-RO

Random Access Memory Read-Only (cannot be changed through DALI)

3.5 RAM-RW

Random Access Memory Read-Write

4 General

4.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 4 apply, with the restrictions, changes and additions identified below.

4.2 Version number

In 4.2 of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, “102” shall be replaced by “251”, “version number” shall be replaced by “extended version number” and “*versionNumber*” shall be replaced by “*extendedVersionNumber*”.

5 Electrical specification

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 5 apply.

6 Interface power supply

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 6 apply.

7 Transmission protocol structure

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 7 apply.

8 Timing

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 8 apply.

9 Method of operation

9.1 Introduction

IEC 62386-102:2014 defines memory bank 1 for basic luminaire information. This document expands memory bank 1 to enable asset management functionality.

9.2 Memory banks

9.2.1 General

The requirements of Clause 9.10 of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018 apply with the following additions and changes.

This standard adds Read-Only and Read-Write attributes to locations in a memory bank as per the following table.

Table 1 – Memory bank Read-Only and Read-Write attributes

Memory Type	Accessibility via DALI bus RO: Read-Only RW: Read-Write	V: volatile (reset at power down) NV: non-volatile	May be changed autonomously by the control gear during run time	Description
ROM	RO	NV	No	ROM as defined in IEC62386-102:2014. For all fixed value that will not change during run time of control gear. Note: ROM is RO by its nature. A ROM value may change if control gear is programmed during production.
RAM-RO	RO	V	Yes	For all measured values and flags that will be reset at power down.
RAM-RW	RW	V	Yes	For all input values that will be reset at power down.
NVM-RO	RO	NV	Yes	NVM as defined in IEC62386-102:2014 but with additional specification RO For all counter values. No reset at power down.
NVM-RW	RW	NV	Yes	NVM as defined in IEC62386-102:2014 For all input values that are non-volatile.

9.2.2 Vendor-specific protection

Requirements of Clause 9.11.2 “Memory map” of IEC62386-102:2014 and IEC 62386-102:2014/AMD1:2018 apply with the following additions and changes.

A manufacturer may provide a vendor-specific means to prevent read and/or write access to individual memory locations. Locations featuring this vendor-specific protection mechanism are marked as: “(protectable)”.

The read/write properties of such (protectable) locations are set by the vendor-specific protection mechanism and are specified with each location.

For protectable writable memory locations that are currently protected, an attempt to write a value shall result in the same behaviour as if the memory location is not implemented.

Note: This means no reply to the WRITE MEMORY LOCATION command when attempting to write to a protected location.

9.2.3 Memory bank writing

Requirements of Clause 9.10.5 “Memory bank writing” in IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018 apply with the following additions and changes.

All writable memory locations other than location 0x02 shall be lockable.

For writable memory locations, unless specified otherwise in the memory bank table, if any of the following conditions are true when attempting to write to a location, the result shall be the same behaviour as if the memory location is not implemented:

- an attempt to write a value outside of the permitted range, or
- an attempt to write a value to a lockable memory location other than the lock byte, when the value of the lock byte is not 0x55, or
- an attempt to write a value to a protectable writable memory location that is currently protected.

Note: This means that when any of the above conditions apply, there will be no reply to the WRITE MEMORY LOCATION command.

9.2.4 Memory bank reading

Requirements of Clause 9.11.4 “Memory bank reading” in IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018 apply.

9.2.5 Memory bank 1 (Mandatory)

Memory bank 1 is reserved for use by an OEM (original equipment manufacturer, e.g. a luminaire manufacturer) to store additional information, which has no impact on the functionality of the control gear. The control gear manufacturer shall implement at least the memory locations up to and including address 0x77.

Address	Description	Default value (factory)	RESET value[b]	Memory type
0x00	Address of last addressable memory location; Range [0x77,0xFE]	factory burn-in	No change	ROM
0x01	Indicator byte	Manufacturer specific	Manufacturer specific	Manufacturer specific
0x02	Lock byte Lockable bytes in the memory bank shall be read-only while the lock byte has a value different from 0x55.	0xFF	0xFF[c]	RAM-RW
[0x03, 0x08]	Luminaire manufacturer GTIN with manufacturer specific prefix to derive manufacturer name	0xFF	No change	NVM-RW (protectable)[e]
[0x09, 0x10]	Luminaire identification number	0xFF	No change	NVM-RW (protectable)[e]
0x11	Content Format ID[a] (MSB)	0x00	No change	NVM-RW (protectable)[e]
0x12	Content Format ID[a] (LSB)	0x03	No change	NVM-RW (protectable)[e]
0x13	Luminaire year of manufacture [YY] [0,99] = YY; [100,MASK] = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x14	Luminaire week of manufacture [WW] [1,53] = WW; 0,[54,MASK] = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x15	Nominal Input Power [W] (MSB)	0xFF	No change	NVM-RW (protectable)[e]
0x16	Nominal Input Power [W] (LSB); [0,MASK-1] = Power; MASK = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x17	Power at minimum dim level [W] (MSB)	0xFF	No change	NVM-RW (protectable)[e]
0x18	Power at minimum dim level [W] (LSB); [0,MASK-1] = Power; MASK = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x19	Nominal Minimum AC mains voltage [V] (MSB)	0xFF	No change	NVM-RW (protectable)[e]
0x1A	Nominal Minimum AC mains voltage [V] (LSB); [90,480] = Voltage; [0,89],[481,MASK] = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x1B	Nominal Maximum AC mains voltage [V] (MSB)	0xFF	No change	NVM-RW (protectable)[e]
0x1C	Nominal Maximum AC mains voltage [V] (LSB); [90,480] = Voltage; [0,89],[481,MASK] = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x1D	Nominal light output [Lm] (MSB)	0xFF	No change	NVM-RW (protectable)[e]
0x1E	Nominal light output [Lm]	0xFF	No change	NVM-RW (protectable)[e]
0x1F	Nominal light output [Lm] (LSB); [0,MASK-1] = Light output; MASK = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x20	CRI [0,100] = CRI; [101,MASK] = unknown	0xFF	No change	NVM-RW (protectable)[e]
0x21	CCT [K] (MSB)	0xFF	No change	NVM-RW (protectable)[e]

Address	Description	Default value (factory)	RESET value[b]	Memory type
0x22	CCT [K] (LSB); [0,17000] = CCT; [17001,MASK-2],MASK = unknown; MASK – 1 = Part 209 implemented	0xFF	No change	NVM-RW (protectable)[e]
0x23	Light Distribution Type; 0 = not specified; 1 = Type I; 2 = Type II; 3 = Type III; 4 = Type IV; 5 = Type V; 6-254 = reserved for additional types MASK = unknown According to IES 901.11, Diagram 5	0xFF	No change	NVM-RW (protectable)[e]
[0x24, 0x3B]	Luminaire color [24 ascii character string, first char at 0x24][d] Range [0, 0xFF]	0x00	No change	NVM-RW (protectable)[e]
[0x3C, 0x77]	Luminaire identification [60 ascii character string, first char at 0x3C][d] Range [0, 0xFF]	0x00	No change	NVM-RW (protectable)[e]
[0x78, 0xFE]	Manufacturer-specific.	Undefined	Undefined	Undefined
0xFF	Reserved – not implemented	Answer NO	No change	n.a.

[a] Must be set to 0x0003 when this format is used.
[b] Reset value after “RESET MEMORY BANK”.
[c] Also used as power on value.
[d] Null terminated if shorter than defined length.
[e] This field is write protectable.

10 Declaration of variables

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 10 apply, with the following additional variables for this device type, as indicated in following Table.

Table 2 – Declaration of variables

VARIABLE	DEFAULT VALUE (factory)	RESET VALUE	POWER ON VALUE	RANGE OF VALIDITY	MEMORY TYPE
“extendedversionNumber”	2.0	no change	no change	00001000b	ROM
“deviceType”	50	no change	no change	50	ROM

11 Definition of commands

11.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 11, apply with the following additions.

11.2 Overview sheets

Following Table gives an overview of the application extended commands for this device type. Unused opcodes of application extended commands shall be reserved for future needs.

Table 3 – Standard commands

Command name	Address byte		Opcode byte	Ed. 1 cmd number	DTR0	DTR1	DTR2	Answer	Send twice	References	Command reference
	See Error! R eference source not found.	Selector bit									
QUERY EXTENDED VERSION NUMBER	*Device*	*1*	*0xFF*	-				✓			11.3.2
ENABLE DEVICE TYPE	*0xC1*		*0x32*								11.4.2

11.3 Application extended commands

11.3.1 General

Application extended commands as defined in this document shall be preceded by “ENABLE DEVICE TYPE (data)” where data equals *“deviceType”*. For device types other than *“deviceType”* these commands may be used in a different way.

11.3.2 QUERY EXTENDED VERSION NUMBER

The answer shall be “*extendedVersionNumber”*.

11.4 Special commands

11.4.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 11.7 apply with the following additions.

11.4.2 ENABLE DEVICE TYPE (data)

To enable the command set as defined in this document, *“data”* shall be *“deviceType”*.