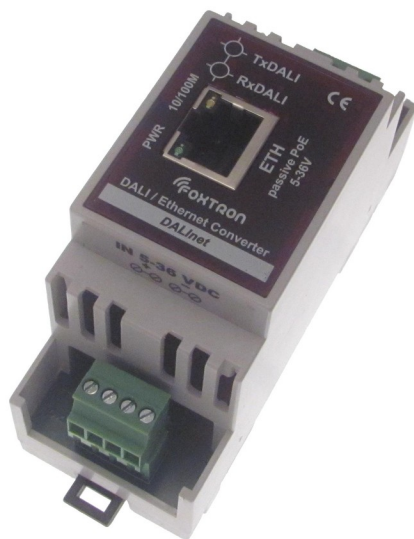# Communication protocol

version 1.1

DALInet

DALI / Ethernet converter
Power supplypassive PoE or 9-32V
Indication of communication on DALI
Din rail mount (2 modules)

Communication protocol serves for controlling DALInet converter on Ethernet. On the ethernet TCP/IP protocol is used. External device communicates with DALInet on the port number 23.

1 Message format

Communication between DALInet and external device is done by messages in ASCII format. DALInet spontaneously sends messages which are recieved from DALI bus and answers to the sent questions or confirms sent commands.

Every ASCII messages starts with SOH (0x01) and ends with symbols ETB (0x17). Other characters of the message (including checksum) can be only ASCII symbols which have value „0" (0x30) - „9" (0x39) or „A" (0x41) - „F" (0x46).

SOH	Data part	Checksum	ETB
0x01	4 – 26 ASCII characters	2 ASCII characters	0x17

Each byte of sent message is written in two ASCII characters. For example byte 0x1B is send in two characters „1" and „B" (0x31 and 0x42).

2 Checksum

Checksum is one byte inserted behind the data part. Checksum is also send in two ASCII characters like every other data parts.

The value of checksum is given by negation of sum of data bytes from part modulo (residue after whole number division) 0x100

Example

Data part: **0x01, 0x00, 0x10, 0xFF, 0x10**, in ASCII characters: **0x30 0x31, 0x30 0x30, 0x31 0x30, 0x46 0x46, 0x31 0x30** (it does not play role for checksum computing).

Checksum = ~(Data part % 0x100) =

= ~((0x01+0x00+0x10+0xFF+0x10) % 0x100) =

= ~(0x120 % 0x100) = ~0x20 = 0xFF-0x20 = **0xDF**

Checksum 0xDF is also written in two ASCII characters: **0x44, 0x46**.

Final message will be in this format:

SOH	Data part										Checksum		ETB
0x01	**0x30**	**0x31**	**0x30**	**0x30**	**0x31**	**0x30**	**0x46**	**0x46**	**0x31**	**0x30**	<u>**0x44**</u>	<u>**0x46**</u>	0x17

www.**foxtron**.eu

3 Types of message

For communication with DALInet serves following types of messages. In each message is detaily elaborated data part. For complete message it is necesarry to convert the message to ASCII characters, add initial byte SOH, checksum and end byte ETB (which is stated in chapter „message formating" and „checksum". DALInet contains buffer for 16 messages.

Brief message for communication with DALInet converter overview:

1	**Sending message on DALI bus** Command serves for sending any message on DALI bus. On DALI bus can be sent messages with different bit length.	master ↓ DALInet
3	**Recieving DALI message with answer** Command is spontaniously sent by DALInet, if the message is recieved on DALI bus by any device which answered correct answer. This command is sent also in case that answer is unreadable (framing error).	master ↑ DALInet
4	**Recieving DALI message without answer** Command is spontaniously sent by DALInet, if the message is recieved on DALI bus on which none of the devices answers. This command is sent also in case that recieved command is unreadable (framing error).	master ↑ DALInet
5	**Recieving special message from DALInet converter** Command is spontaniously sent by DALInet if any of special events occured. For example extrernal device is informed that power supply of DALI bus was disconnected.	master ↑ DALInet
6	**Question on DALInet configuration** Command serves for reading confuguration of DALInet converter. With this command can be for example seen if the proper voltage is connected to DALI bus or serial number of DALInet.	master ↓ DALInet
7	**Return of value configuration DALInet converter** This command returns information about DALInet configuration on which the master asked.	master ↑ DALInet
8	**Change of DALInet configuration** This command serves for setup of DALInet configuration.	master ↓ DALInet
9	**Confirmation of change in DALInet configuration** Command is sent by DALInet as confirmation that it recieved a message for setup DALInet converter. In the message the setup message is repeated and the sign if the setup has been correctly proceeded.	master ↑ DALInet

www.**foxtron**.eu

3.1 Sending messages on DALI bus

Command serves for sending messages on DALI bus. Messages with different bit length can be sent.

	byte	name	description
Data part	1.	**Command** (1byte)	**1** (command number)
	2.	**Priority** (1byte)	Priority with which the message will be send on DALI bus. It can be input 0 for automatic setting the priority with DALI net converteror priority in range 1 – 5. 1 is highest priority and 5 is lowest priority.
	3.	**Data length** (1byte)	Number of bits of sent message. Length can be input in range 1 – 64 bits.
	4.-n.	**Data** (1-8byte)	Data contains DALI message. Firstly the most important bytes are send. If the number of bits DALI message are not the multiple of 8 then the highest bits of most important byte are supplemented with zeros. For example for 17b data 1 00100011 01000101 will be on highest position supplemented seven zeros: **0000000**1 00100011 01000101 and an item „Data" will therefore contains 3 bytes 0x01, 0x23 a 0x45.

Standard message length:

8bit	answer
16 bit	Standard messages (fluorescent tube controll)

Example

setting scene 0 all fluorescent tubes (DALI message 16bit – 0xFF, 0x10)

0x01, 0x00, 0x10, 0xFF, 0x10

In the example is written „Data part" of message. For sending this part must be converted to the ASCII characters and filled with SOH, checksum and ETB which is stated in the chapter „Message format" and „Checksum".

After recieving this message DALInet will cue this message for DALI units to send on DALI bus.

www.**foxtron**.eu

3.2 Recieving DALI message with answer

Message is spontaniously sent by DALInet. If the message is recieved on DALI bus on which any of the device answered (also in case that the answer was corrupted). If no answer is recieved message in chapter 3.3 („Recieving DALI message without answer") is sent.

	byte	name	description
Data part	1.	**Command** (1byte)	**3** (command number)
	2.	**Data length** (1byte)	Number of bits in recieved message. Recieved message may contains 1-64bitů.
	3.-n.	**Data** (1-8byte)	„Data" contains DALI message. Firstly are sent most significant bytes. If the number of bits of DALI message is not multiple of 8 then the highest bits of the most significant byte is supplemented with zeros.
	n+1.	**Data length of answer** (1byte)	Number of bits in recieved answer. Standard valit answer contains 8 bits. Zero value indicates that recieved answer is unreadable. This can mean that multiple devices answered at once.
	n+2.	**Data answers** (0-1byte)	Data answers contains 8 bit DALI answer if the answer is readable. If the answer is unreadable this byte is not sent.

Example

On the DALI bus the question „Query lamp failure" was recieved on the device with address 12 (DALI message 16bit – 0x19, 0x92), which answered „Yes" (DALI message 8bit – 0xFF)

DALInet sends following message on the ethernet converter:

0x03, 0x10, 0x19, 0x92, 0x08, 0xFF

On the DALI bus the question „Query lamp failure" was recieved on all devices (DALI message 16bit – 0xFF, 0x92), and was recieved unreadable answer (multiple devices answered at once). DALInet sends following message on the ethernet converter:

0x03, 0x10, 0xFF, 0x92, 0x00

In the example is written „Data part" of the message. Message recieved by external device will have this „Data part" converted to the ASCII characters and will be supplemented by SOH, checksum and ETB which is stated in the chapter „Message format" and „Checksum".

3.3 Recieving DALI message without answer

Message is spontaniously sent by DALInet converter unless the recieved message on the DALI bus has no answer from any device.

	byte	name	description
Data part	1.	**Command** (1byte)	**4** (command number)
	2.	**Data length** (1byte)	Number of bits in recieved message. Recieved valid message may contains 1-64bitů. Zero value indicates that recieved data are unreadable (framing error).
	3.-n.	**Data** (1-8byte)	Data contains DALI message. First the most significant bytes are sent. If the number of bits of DALI message is not multiple of 8 then the highest bits of the most significant byte is supplemented with zeros.

Example

On the DALI bus the question „Query lamp failure" was recieved on the device with address 12 (DALI message 16bit – 0x19, 0x92), on which did not answered (answer „No")

DALInet will send on ethernet converter following message:

0x04, 0x10, 0x19, 0x92

In this example is written the „Data part" of the message. Message recieved by external device will have this „Data part" converted in the ASCII characters and will be supplemented with SOH, checksum and ETB which is stated in the chapter „Message format" and „Checksum".

3.4 Recieving special message from DALInet converter

Message is spontaniously sent by DALInet converter if any of special situations occured. External device is informed by ethernet for example that power supply was disconnected from the DALI bus.

	byte	name	description	
Data part	1.	**Command** (1byte)	**5** (command number)	
	2.	**Type** (1byte)	The meaning of the special message from DALInet.	
			0	Valid voltage is connected to the DALI bus
			1	Loss of voltage on the DALI bus
			2	Mains voltage is connected to the DALI bus
			3	Defective power supplier or power supplier which can not be used to power DALI bus
			4	Full buffer of messages for sending on DALI bus
			5	Error of checksum
			6	Invalid command

Example

The power supply has been disconnected or there is a shirt circuit on the DALI bus.

Ethernet converter DALInet sends following message:

0x05, 0x01

In the example is written „Data part" of the message. Message is send by external device and will have this „Data part" in the ASCII characters and will be supplemented with SOH, checksum and ETB which is written in the chapter „Message format" and „Checksum".

www.**foxtron**.eu

3.5 Question about configuration of the DALInet converter

This command serves for reading the configuration and parameters of DALInet converter. With this command can be for example seen if the proper voltage is connected on the DALI bus or the firmware version of the DALInet converter.

	byte	name	description
Data part	1.	**Command** (1byte)	**6** (command number)
	2.	**Item number** (1byte)	Item number defines the parameter on which we want to ask. List of parameters is stated in the table „Data area of DALInet converter"

Example

question on the firmware version of DALInet converter.

0x06, 0x02

In the example is written „Data part" of the message. Message is send by external device and will have this „Data part" in the ASCII characters and will be supplemented with SOH, checksum and ETB which is written in the chapter „Message format" and „Checksum".

After recieving this message DALInet converter sends demanded data on the Ethernet thanks the message „Return value of DALInet converter configuration".

3.6 Return value of DALInet converter configuration

Message is answer to the configuration of the DALInet converter question.

	byte	name	description
Data part	1.	**Command** (1byte)	**7** (command number)
	2.	**Item number** (1byte)	Item number defines the parameter on which we want to ask. List of parameters is stated in the table „Data area of DALInet converter"
	3.-4.	**Data** (2byte)	The value of asked parameter. All parameters are 16bits.

Example

External device sent question on the DALInet converter about its firmware. DALInet answers by Ethernet that his firmware version is 1.2

0x07, 0x02, 0x01, 0x02

In the example is written „Data part" of the message. Message is send by external device and will have this „Data part" in the ASCII characters and will be supplemented with SOH, checksum and ETB which is written in the chapter „Message format" and „Checksum".

3.7 Change in DALInet converter configuration

Command serves for setting configuration DALInet converter. With this command can be for example deleted messages in the buffer for sending on the DALI bus.

	byte	name	description
Data part	1.	**Command** (1byte)	**8** (command number)
	2.	**Item number** (1byte)	Item number defines the parameter on which we want to ask. List of parameters is stated in the table „Data area of DALInet converter"
	3.-4.	**Data** (2byte)	The value of asked parameter. All parameters are 16bits.

Example

Delete of the messages in the buffer for sending on DALI bus.

0x08, 0x04, 0x00, 0x00

In the example is written „Data part" of the message. Message is send by external device and will have this „Data part" in the ASCII characters and will be supplemented with SOH, checksum and ETB which is written in the chapter „Message format" and „Checksum".

After recieving message DALInet converter sets desired item and for confirmation of reception sends on the Ethernet message „DALInet change of setting confirmation".

www.**foxtron**.eu

3.8 DALInet change of setting configuration

Message is sent by DALInet as a confirmation that it recieved message for setting of DALInet converter. In the message the setting note and it is also stated if the setting was succesfull.

	byte	name	description
Data part	1.	**Command** (1byte)	**9** (command number)
	2.	**Item number** (1byte)	Item number defines the parameter on which we want to ask. List of parameters is stated in the table „Data area of DALInet converter"
	3.-4.	**Data** (2byte)	The value of asked parameter. All parameters are 16bits.
	5	**Flag** (1byte)	Flag that confirms setting or the reason why the data can not be adjusted. 0 = data not set 1 = Item is read only 2 = current setting value is out of allowed range

Example

DALInet converter sends confirmation on ethernet that the command for deleting messages in buffer for sending on the DALI bus was recieved.

0x09, 0x04, 0x00, 0x00, 0x00

In case of an attempt to change information about state of power supply of DALI bus the converter returns information that item is read only.

0x09 0x03, 0x00, 0x02, 0x01

In the example is written „Data part" of the message. Message is send by external device and will have this „Data part" in the ASCII characters and will be supplemented with SOH, checksum and ETB which is written in the chapter „Message format" and „Checksum".

www.**foxtron**.eu

4 Data area of DALInet converter

Data position	description	read	write
1	Serial number of DALInet	0 – 65536	–
2	Firmware version shape „upper byte. Lower byte" eg. 258 = „1.2"	0 – 65536	–
3	Information about DALI power supply 0 ~ supply is ok 1 ~ disconnected or short-circuit of power supplier 2 ~ Mains voltage on the bus 3 ~ Defective power supplier or power supplier which can not be used to power DALI bus	0 – 3	–
4	Number of messages in DALI tray	0 – 16	0

www.**foxtron**.eu