

LMS *MODULAR*

Cerberus Dati Standard Format

Application Protocol Description

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Table of contents

1 Introduction	1
1.1 Physical device modeling	1
2 Applications Protocol CDSF	3
2.1 Messages	3
2.2 Commands	4
2.3 CDSF General commands	4
2.3.1 Subsystem status request	5
2.3.2 Date sending command	5
2.3.3 The general acknowledge command	6
2.3.4 The general reset command	6
2.4 Overall limits of CDDL transport of CDSF frames	6
3 Index	7

1 Introduction

This document supplies the specifications about the CDI internal standard application protocol, CDSF. CDSF specifies a format to transmit the states assumed by a generic hardware device to a supervising unit and to send commands from the supervising unit to the hardware device.

1.1 Physical device modeling

A generic hardware device is represented in CDSF conventions by one or more subsystems. A subsystem is a set of independent information points which can assume a finite number of mutually exclusive states.

As an example of a subsystem, lets consider a 3 zone fire control panel. The subsystem is modeled as described in the following table:

Point no	Description	Status	1	2	3	4
		Value	0	1	2	3
1 (*)	Communication link	NORMAL	FAULT	-	-	-
2 (*)	Out_of_scan status	NORMAL	OUT OF SCAN			
3	General_fault	NORMAL	FAULT	-	-	-
4	Power_supply	NORMAL	MAINS OFF	BATTERY LOW	-	-
5	Fire_alarm_zone_1	NORMAL	ALARM	FAULT	EXCLUDED	EXCLUDED
6	Fire_alarm_zone_2	NORMAL	ALARM	FAULT	EXCLUDED	EXCLUDED
7	Fire_alarm_zone_3	NORMAL	ALARM	FAULT	EXCLUDED	EXCLUDED

(*) Points 1 and 2 are always reserved for these statuses

A subsystem can also receive a set of defined commands. For instance, the "Exclude zone 3" command can be sent to the above mentioned subsystem.

An information point could be digital and/or analog. A digital point can have up to 16 different states, represented by integers in the 0-15 range. Analog values are represented in the IEEE format. Each point in a subsystem is identified by its number. Numbers must be consecutive.

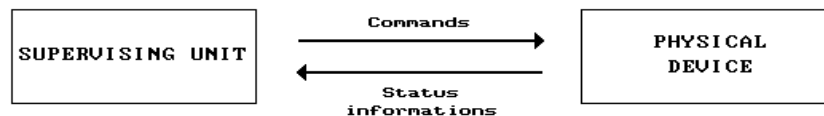


Fig.: 1

In the point list, the subsystem **point no. 1 is reserved** to allow the supervising unit to represent the connection status of the subsystems. The point value is 0 if the connection status is normal and the value is 1 if the connection status is faulty. Therefore the subsystem doesn't generate messages for this point, but the gateway notifies to the LMS or CMS the link status by message exchange. **Point 2** is a setting internal to the supervising unit and it does not correspond to any CDSF message. A subsystem is set out of scan using the CMS or LMS configuration package. **Points 1 and 2 are the same for all types of subsystems.**

Any logical point value modification causes a message being issued toward the supervising unit. The message contains the new value taken by the point.

The commands available represent the actions that the supervising unit is able to perform on the controlled subsystem.

A standard lay-out has been defined to send commands to the subsystem. The subsystem interprets the command and performs the corresponding action.

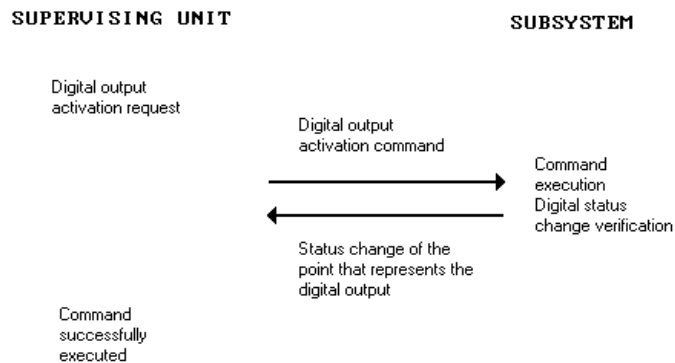


Fig.: 2

The subsystem sends upward the command results by issuing one or more messages that contain the status changes caused by the commands.

The drawing below shows a command example. The supervising center forces the activation of a subsystem digital output.

If a physical unit is modeled using more than one subsystem, we refer to it as a "cluster of subsystems". Inside a cluster, each component is identified by a subsystem cluster address.

If the connection status is faulty (i.e. the point no. 1 value is 1) and the cluster address is 0FFFFH, the whole cluster is out of order. This message is managed by the Monitor System.

2 Applications Protocol CDSF

The protocol application level CDSF (Cerberus Dati Standard Format) specifies the messages and commands lay-out.

2.1 Messages

Each CDSF message is 16-bytes long and has the following lay-out:

byte	0	Message type (binary value)
		bits 7-4 direction
		0000 message
		bits 3-0 message/command standard type
		0000 digital
		0001 analog
		0010 access control
		0011 wireless system configuration
		1111 reserved
		All other values of byte 0 are reserved for future extensions
	1	Year (two BCD figures)
	2	Month (two BCD figures)
	3	Day (two BCD figures)
	4	Hour (two BCD figures)
	5	Minutes (two BCD figures)
	6	Seconds (two BCD figures)
	7	Subsystem cluster address LSB (binary value)
	8	Subsystem cluster address MSB (binary value)
	9	Point number LSB (binary value)
	10	Point number MSB (binary value)
	11	Point treatment flag (binary value):
		0 normal
		1 not to be acknowledged, not to be reset
		2 to be acknowledged, not to be reset
		3 not to be acknowledged, to be reset
		4 to be acknowledged, to be reset
	12-15	Present point value
		If the value is digital, the 12-15 bytes follow this lay-out:
		byte 12 = 0
		byte 13 = 0
		byte 14 = 0
		byte 15 = range 0-15 (binary value)
		if the value is analog, the 12-15 bytes follow the IEEE lay-out for analog measurements.

The default value for all the digital points is 00H.

2.2 Commands

Each CDSF command is 16-bytes long and it has the following lay-out:

byte	0	Command type
		bits 7-4 direction
		1000 command
		bits 3-0 message/command standard type
		0000 digital
		0001 analog
	1	Subsystem cluster address LSB (binary value)
	2	Subsystem cluster address MSB (binary value)
	3	Command number LSB (binary value)
	4	Command number MSB (binary value)
	5	Command first parameter LSB (binary value)
	6	Command first parameter MSB (binary value)
	7	Command second parameter LSB (binary value)
	8	Command second parameter MSB (binary value)
	9	Command third parameter LSB (binary value)
	10	Command third parameter MSB (binary value)
	11	Command fourth parameter LSB (binary value)
	12	Command fourth parameter MSB (binary value)
	13	Command fifth parameter LSB (binary value)
	14	Command fifth parameter MSB (binary value)
	15	Available

Should the command be analog, bytes 5-6 shall contain the point number, the bytes from 7 to 10 conform to IEEE lay-out for analog measurements, whilst the bytes from 11 to 15 are set to 00H.

Should the command be digital, the bytes from 5 to 15 shall have the values foreseen by command parameters. The bytes that are not used by the command shall be forced to 00H.

The command layout and the meaning of various parameters are device related and are specific for each subsystem. They must be defined during physical device modeling.

Commands number 0, 1 and 2 are reserved and they have the meaning described below .

2.3 CDSF General commands Fehler! Verweisquelle konnte nicht gefunden werden.

The general commands **Fehler! Verweisquelle konnte nicht gefunden werden.** are the commands no. 0 (used for subsystem status request command and for the date sending to subsystems), the command no. 1 (general acknowledge) and the command no. 2 (general reset)

The command no. 0 (i.e. bytes 3 and 4 set to 0) is reserved.

The parameter no. 1 (bytes 5 and 6) is used to specify the command type:

0	subsystem status request
1	date sending to subsystem

2.3.1 Subsystem status request

The subsystem status request command is used to allow the supervising unit to update its map of the subsystem, e.g. after a communication interruption.

When the supervising center issues a status request command, the standard subsystem must send to it the messages dealing with the points which have a value other than the default. This procedure lets reduce at the minimum the data flow during the restarts.

This command has the following lay-out

byte	0	80H
	1	Subsystem cluster address LSB (binary value)
	2	Subsystem cluster address MSB (binary value)
	3	00H
	4	00H
	5	00H
	6	00H
	7	00H
	8	00H
	9	00H
	10	00H
	11	00H
	12	00H
	13	00H
	14	00H
	15	00H

2.3.2 Date sending command

The date sending command is used to synchronize the date and time to be used in the messages. This command has the following lay-out on bytes 3-15:

byte	0	80H
	1	Subsystem cluster address LSB (binary value) (see note below)
	2	Subsystem cluster address MSB (binary value) (see note below)
	3	00H
	4	00H
	5	01H
	6	00H
	7	Year (two BCD figures)
	8	Month (two BCD figures)
	9	Day (two BCD figures)
	10	Hour (two BCD figures)
	11	Minutes (two BCD figures)
	12	Seconds (two BCD figures)
	13	00H
	14	00H
	15	00H

For standard subsystems bytes 1 and 2 (LSB and MSB subsystem cluster address, respectively) have to be set to FFH.

No feedback is foreseen for this command.

2.3.3 The general acknowledge command

The general acknowledge command is the command no. 1. It has the following layout :

byte	0	80H
	1	Subsystem cluster address LSB (binary value)
	2	Subsystem cluster address MSB (binary value)
	3	01H
	4	00H
	5	00H
	6	00H
	7	00H
	8	00H
	9	00H
	10	00H
	11	00H
	12	00H
	13	00H
	14	00H
	15	00H

The feedback to this command is device dependent.

2.3.4 The general reset command

The general reset command is the command no. 2. It has the following layout :

byte	0	80H
	1	Subsystem cluster address LSB (binary value)
	2	Subsystem cluster address MSB (binary value)
	3	02H
	4	00H
	5	00H
	6	00H
	7	00H
	8	00H
	9	00H
	10	00H
	11	00H
	12	00H
	13	00H
	14	00H
	15	00H

The feedback to this command is device dependent.

2.4 Overall limits of CDDL transport of CDSF frames

Due to implementation limits the CDDL (Cerberus Dati Data Link) can transport up to 8 commands/messages which belong to the application level (CDSF). This puts the DTPL limit actually to 128 bytes, instead of the theoretical limits of 512 bytes. See CDDL documentation for more details.

3 Index

A

access control..... 3
Analog values 1
Application protocol 3

C

CDDL 6
CDSF 1, 2, 3, 4, 6
Cerberus Dati Data Link 6
cluster address..... 2, 3, 4, 5, 6
CMS..... 2
Command number..... 4
connection status..... 2

D

Date sending command..... 5
digital output..... 2
digital point..... 1, 3
DTPL 6

G

general acknowledge..... 4, 6
General command 4

general reset..... 4, 6

I

IEEE format 1
information point 1

L

LMS 2

P

Point treatment flag..... 3
point value 2, 3

S

status request..... 4, 5
supervising unit..... 1, 2, 5

W

wireless system 3