CiA Draft Standard Proposal 447

Application profile for special-purpose car add-on devices

Part 2: Virtual device definition

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HISTORY

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2008-05-21	*Publication of version 1.0 as draft standard proposal*

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CONTENTS

1 Scope

This CANopen application profile specifies the CAN physical layer as well as application, configuration and diagnostic parameters for the add-on devices used in special-purpose passenger cars such as taximeter, roof bar, etc. The specification comprises the following parts:

- Part 1: General definitions
- Part 2: Virtual device definition
- Part 3: Detailed process data specification
- Part 4: Pre-defined CAN-IDs and communication objects

This part defines the virtual devices. It also defines, which process data and parameters are used by the virtual devices.

2 Normative references

/CiA447-1/ CiA 447, CANopen application profile for special-purpose car add-on devices – Part 1: General definitions

The normative references given in /CiA447-1/ apply for this specification, too.

3 Definitions and abbreviations

3.1 Definitions

The definitions given in /CiA447-1/ apply to this specification, too.

3.2 Abbreviations

The abbreviations given in /CiA447-1/ apply to this specification, too.

4 Virtual network architecture

4.1 Introduction

A physical CANopen device compliant to this application profile consists of one or more virtual devices. A virtual device shall not be distributed to several physical devices. Each virtual device supports a set of mandatory (M) application objects and may implement additionally a variable set of optional (O) application objects. Physical devices will not be defined, because they may implement multiple functions.

The virtual device implements different application objects, some shall be supported (Mandatory) and some may be supported (Optional). In the virtual device description, there is defined the access attribute indicating if an application object is *ro* (read only), *rw* (read/write) or *wo* (write only). Read only indicates that this shall not be written via the bus; read/write allows to read and to write this object; and write only means that this application object shall be not read via the bus.

One virtual device of the same type may be implemented in each physical CANopen device. Several virtual devices of the same type shall not be implemented in one physical CANopen device.

When the virtual devices are implemented on the very same physical device, the communication between these virtual devices may be handled locally.

The virtual network shown in Figure 1 is used to control the car add-on devices network.

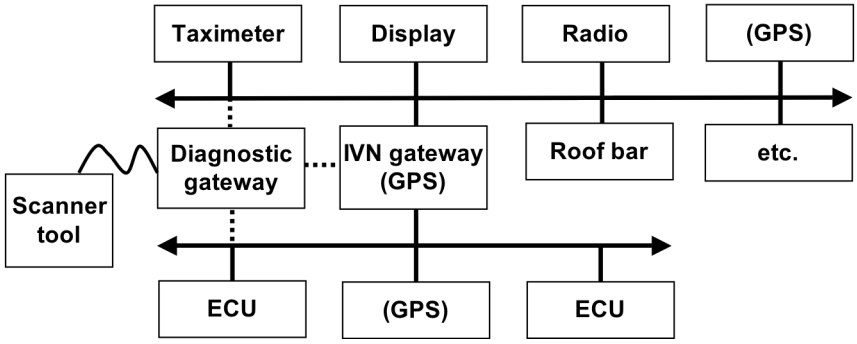

Figure 1 – Virtual network architecture for interconnection of car add-on devices

5 Virtual device specification

5.1 IVN gateway virtual device

This virtual device provides the interface to the in-vehicle networks of the special-purpose passenger car. There are defined classes for IVN gateway. Chapter 5.1 specifies the parameters supported by certain IVN gateway classes.

5.1.1 IVN gateway class 0: Minimal functionality

Table 1 lists the supported parameters by IVN gateway class 0.

Table 1 – Supported parameters by IVN gateway class 0

Index	Name	Category
6005_h	Switch illumination level status	O
6007_h	Ignition switch status	M
6009_h	Central locking system status	O*
$600A_h$	Central locking system command	O
$600B_h$	Window status	O
$600C_h$	Window command	O
$600D_h$	Door status	O
6010_h	Car flap status	O
6011_h	Car flap command	O
6027_h	Occupant classification status	O
6028_h	Buckle switch status	O
$602B_h$	VIN data	O*
6032_h	Accident detection and warning	O
6044_h	Car light command	O
6045_h	Car interior light status	O
6046_h	Car interior light command	O
6050_h	Actual engine revolutions	O
6051_h	Engine status	O
6052_h	Transmission selector lever position	O
6053_h	Wheel rpm	O*

Index	Name	Category
6054_h	Wheel signal source	O
6055_h	Wheel pulse counter	O
6056_h	Wheel pulse counter overrun value	O
6057_h	Pulses per wheel rotation	O
$605A_h$	Displayed vehicle speed	O
$605B_h$	Odometer	O
$605D_h$	Current average fuel consumption	O
NOTE: O* means, that this object is recommended to be implemented		

5.1.2 IVN gateway class 1: Taxi

Table 2 lists the supported parameters by IVN gateway class 1. IVN gateway class 1 implements the functionality of IVN gateway class 0 and additional functionality.

Table 2 – Supported parameters by IVN gateway class 1

Index	Name	Category
6005_h	Switch illumination level status	O
6007_h	Ignition switch status	M
6009_h	Central locking system status	O*
$600A_h$	Central locking system command	O
$600B_h$	Window status	O
$600C_h$	Window command	O
$600D_h$	Door status	O
6010_h	Car flap status	O
6011_h	Car flap command	O
6027_h	Occupant classification status	O*
6028_h	Buckle switch status	O
$602B_h$	VIN data	M
$602C_h$	User-selected language command	O
$602D_h$	User-selected language status	O
6032_h	Accident detection and warning	O
6044_h	Car light command	O
6045_h	Car interior light status	O
6046_h	Car interior light command	O*
6050_h	Actual engine revolutions	O
6051_h	Engine status	O
6052_h	Transmission selector lever position	O
6053_h	Wheel rpm	M
6054_h	Wheel signal source	O*
6055_h	Wheel pulse counter	O*
6056_h	Wheel pulse counter overrun value	O*
6057_h	Pulses per wheel rotation	O*
$605A_h$	Displayed vehicle speed	O*
$605B_h$	Odometer	O*

Index	Name	Category
$605D_h$	Current average fuel consumption	O
NOTE: O* means, that this object is recommended to be implemented		

5.1.3 IVN gateway class 2: Emergency vehicle

Table 3 lists the supported parameters by IVN gateway class 2. IVN gateway class 2 implements the functionality of IVN gateway class 0 and additional functionality.

Table 3 – Supported parameters by IVN gateway class 2

Index	Name	Category
6005_h	Switch illumination level status	O
6007_h	Ignition switch status	M
6009_h	Central locking system status	O*
$600A_h$	Central locking system command	O
$600B_h$	Window status	O
$600C_h$	Window command	O
$600D_h$	Door status	M
6010_h	Car flap status	O
6011_h	Car flap command	O
6027_h	Occupant classification status	O
6028_h	Buckle switch status	O
$602B_h$	VIN data	O*
6032_h	Accident detection and warning	O
6040_h	Car light status	M
6044_h	Car light command	O
6045_h	Car interior light status	M
6046_h	Car interior light command	O
$604A_h$	Horn status	M
6050_h	Actual engine revolutions	M
6051_h	Engine status	M
6052_h	Transmission selector lever position	M
6053_h	Wheel rpm	O*
6054_h	Wheel signal source	O
6055_h	Wheel pulse counter	O
6056_h	Wheel pulse counter overrun value	O
6057_h	Pulses per wheel rotation	O
$605A_h$	Displayed vehicle speed	M
$605B_h$	Odometer	O
$605D_h$	Current average fuel consumption	O
NOTE: O* means, that this object is recommended to be implemented		

5.1.4 IVN gateway class 3: Vehicle for handicapped persons

Table 4 lists the supported parameters by IVN gateway class 3. IVN gateway class 3 implements the functionality of IVN gateway class 0 and additional functionality.

Table 4 – Supported parameters by IVN gateway class 3

Index	Name	Category
6005_h	Switch illumination level status	O
6007_h	Ignition switch status	M
6009_h	Central locking system status	O*
$600A_h$	Central locking system command	O
$600B_h$	Window status	O
$600C_h$	Window command	O
$600D_h$	Door status	O
6010_h	Car flap status	O
6011_h	Car flap command	O
$601A_h$	Wiper system status	O
$601B_h$	Wiper system command	O
$601C_h$	Steering wheel angle	O
$601D_h$	Turn indicator reset status	O
6027_h	Occupant classification status	O
6028_h	Buckle switch status	O
$602B_h$	VIN data	O*
6032_h	Accident detection and warning	O
6040_h	Car light status	O
6044_h	Car light command	O
6045_h	Car interior light status	O
6046_h	Car interior light command	O
6050_h	Actual engine revolutions	O
6051_h	Engine status	O
6052_h	Transmission selector lever position	O
6053_h	Wheel rpm	O*
6054_h	Wheel signal source	O
6055_h	Wheel pulse counter	O
6056_h	Wheel pulse counter overrun value	O
6057_h	Pulses per wheel rotation	O
$605A_h$	Displayed vehicle speed	O
$605B_h$	Odometer	O
$605D_h$	Current average fuel consumption	O
NOTE: O* means, that this object is recommended to be implemented		

5.2 Fire extinguishing system virtual device

Table 5 lists the parameters supported by the fire extinguishing system virtual device.

Table 5 – Supported parameters by fire extinguishing system virtual device

Index	Name	Category
6069_h	Fire extinguishing system status	O

5.3 Emergency fresh-air system virtual device

Table 6 lists the parameters supported by the emergency fresh-air system virtual device.

Table 6 – Supported parameters by emergency fresh-air system virtual device

Index	Name	Category
$606C_h$	Emergency fresh-air system status	O

5.4 Power supply virtual device

Table 7 lists the parameters supported by the power supply virtual device.

Table 7 – Supported parameters by power supply virtual device

Index	Name	Category
6070_h	Radio power supply status	O
6071_h	Radio power supply command	O
6073_h	Periphery power supply status	O
6074_h	Periphery power supply command	O

5.5 Discrete inputs virtual device

Table 8 lists the parameters supported by the discrete inputs virtual device.

Table 8 – Supported parameters by discrete inputs virtual device

Index	Name	Category
6078_h	Discrete inputs status	O

5.6 Terminal virtual device

Table 9 lists the parameters supported by the terminal virtual device.

Table 9 – Supported parameters by terminal virtual device

Index	Name	Category
6080_h	Number pad status	O
6081_h	Number pad command	O
6082_h	Number pad user interaction	O
6085_h	Function keys status	O
6086_h	Function keys command	O
6087_h	Function keys user interaction	O
$608A_h$	Control keys status	O
$608B_h$	Control keys command	O
$608C_h$	Control keys user interaction	O
6090_h	Steering wheel switch pad status	O
6091_h	Steering wheel switch pad command	O
6092_h	Steering wheel switch pad user interaction	O
6093_h	Emergency key status	O
6094_h	Emergency key command	O
6095_h	Emergency key user interaction	O
6096_h	Display 1 parameters	O

Index	Name	Category
6097_h	Display 1 status	O
6098_h	Display 1 command	O
6099_h	Display 1 text	O
$609A_h$	Display 1 title	O
$609B_h$	Display 2 parameters	O
$609C_h$	Display 2 status	O
$609D_h$	Display 2 command	O
$609E_h$	Display 2 text	O
$60A0_h$	Buzzer command	O
$60A1_h$	Functional warnings status	O
$60A2_h$	Functional warnings command	O
$60A6_h$	Icon display 1 command	O
$60A7_h$	Icon display 1 status	O
$60AA_h$	Icon display 2 command	O
$60AB_h$	Icon display 2 status	O

5.7 GPS virtual device

Table 10 lists the parameters supported by the GPS virtual device.

Table 10 – Supported parameters by GPS virtual device

Index	Name	Category
$60B0_h$	GPS current position	O
$60B1_h$	GPS satellites	O
$60B2_h$	GPS status	O
$60B3_h$	GPS date	O
$60B4_h$	GPS UTC time	O
$60B5_h$	GPS velocity and heading	O
$60B6_h$	GPS altitude	O

5.8 Navigation system virtual device

Table 11 lists the parameters supported by the navigation system virtual device.

Table 11 – Supported parameters by navigation system virtual device

Index	Name	Category
$60C0_h$	Distance to selected destination	O
$60C1_h$	Position description request	O
$60C2_h$	Position description	O
$60C3_h$	Start route guidance	O
$60C4_h$	Current position request	O
$60C5_h$	Current position	O

5.9 Taximeter virtual device

Table 12 lists the parameters supported by the taximeter virtual device.

Table 12 – Supported parameters by taximeter virtual device

Index	Name	Category
$60D0_h$	Taxi trip payment	M
$60D1_h$	Taxi trip distance travelled	M
$60D2_h$	Taxi trip time information	M
$60D3_h$	Taxi trip tariff level	M
$60D4_h$	Taxi trip tariff value	M
$60D8_h$	Taximeter status	M
$60D9_h$	Taximeter totalizers	M
$60DA_h$	Taximeter configuration	M
$60DB_h$	Taxi trip data sequence counter	M

5.10 Printer virtual device

Table 13 lists the parameters supported by the printer virtual device.

Table 13 – Supported parameters by printer virtual device

Index	Name	Category
$60E0_h$	Printer status	M
$60E1_h$	Printer errors	M
$60E2_h$	Printer features	M
$60E3_h$	Printer text status	M
$60E4_h$	Printer graphics status	M
$60E5_h$	Printer configuration command	M
$60E6_h$	Printer configuration status	M
$60E9_h$	Printer mode command	M
$60EA_h$	Printer mode status	M
$60EB_h$	Printer transport	M

5.11 Real time clock (RTC) virtual device

Table 14 lists the parameters supported by the real time clock (RTC) virtual device.

Table 14 – Supported parameters by real time clock (RTC) virtual device

Index	Name	Category
$60F0_h$	RTC date	M
$60F1_h$	Set RTC date	M
$60F2_h$	RTC time	M
$60F3_h$	Set RTC time	M
$60F4_h$	RTC type and status	M
$60F5_h$	RTC time zone	O

5.12 Driver identification virtual device

Table 15 lists the parameters supported by the driver identification virtual device.

Table 15 – Supported parameters by driver identification virtual device

Index	Name	Category
$60F9_h$	Unique driver ID	O
$60FA_h$	Driver ID status	M
$60FB_h$	Drivers name	O
$60FC_h$	Driver login and logout time	O

5.13 Tariff display virtual device

Table 16 lists the parameters supported by the tariff display virtual device.

Table 16 – Supported parameters by tariff display virtual device

Index	Name	Category
6100_h	Tariff display information and status	M
6101_h	Tariff display lamp failures 1	M
6102_h	Tariff display lamp failures 2	M
6103_h	Tariff display inputs status	O
6104_h	Tariff display lamps status 1	M
6105_h	Tariff display lamps status 2	M
6106_h	Tariff display lamps command 1	M
6107_h	Tariff display lamps command 2	M
6109_h	Tariff display configuration	M
$610A_h$	Tariff display tariff level	M

5.14 Taxi alarm system virtual device

Table 17 lists the parameters supported by the taxi alarm system device.

Table 17 – Supported parameters by taxi alarm system virtual device

Index	Name	Category
6110_h	Taxi alarm system status	O

5.15 Radio virtual device

Table 18 lists the parameters supported by the radio device.

Table 18 – Supported parameters by radio virtual device

Index	Name	Category
6115_h	Radio status	M
6116_h	Radio device command	M
6117_h	Radio device status	M

5.16 Audio switch virtual device

Table 19 lists the parameters supported by the audio switch virtual device.

Table 19 – Supported parameters by audio switch virtual device

Index	Name	Category
6120_h	Audio switch command	M
6121_h	Audio switch status request	M
6122_h	Audio switch status response	M

5.17 Roof bar light virtual device

Table 20 lists the parameters supported by the roof bar light virtual device.

Table 20 – Supported parameters by roof bar light virtual device

Index	Name	Category
6130_h	Light commands roof bar	M
6131_h	Light status roof bar	M

5.18 Roof bar sound virtual device

Table 21 lists the parameters supported by the roof bar sound virtual device.

Table 21 – Supported parameters by roof bar sound virtual device

Index	Name	Category
6138_h	Country-specific sound command roof bar	M
6139_h	Country-specific sound status roof bar	M
$613A_h$	Sound commands roof bar	M
$613B_h$	Sound status roof bar	M

5.19 “Blue” light flasher module virtual device

Table 22 lists the parameters supported by the “blue” light flasher module virtual device.

Table 22 – Supported parameters by “blue” light flasher module virtual device

Index	Name	Category
6140_h	“Blue” light flasher command	M
6141_h	“Blue” light flasher status	M

5.20 Radio hand-free conversation virtual device

Table 22 lists the parameters supported by the radio hand-free conversation virtual device.

Table 23 – Supported parameters by radio hand-free conversation virtual device

Index	Name	Category
6150_h	Radio hand-free status	M
6151_h	Radio hand-free command	M

