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Utgåva 1

**Vägfordon – Gränssnitt för multimedia- och
telematikutrustning i fordon –
Del 5: Gemensam meddelandeuppsättning
(ISO 22902-5:2006, IDT)**

**Road vehicles – Automotive multimedia
interface –
Part 5: Common message set
(ISO 22902-5:2006, IDT)**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22902-5 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 22902 consists of the following parts, under the general title *Road vehicles — Automotive multimedia interface*:

- *Part 1: General technical overview*
- *Part 2: Use cases*
- *Part 3: System requirements*
- *Part 4: Network protocol requirements for vehicle interface access*
- *Part 5: Common message set*
- *Part 6: Vehicle interface requirements*
- *Part 7: Physical specification*

Introduction

This part of the standard Common Message Set concerns a set of application-layer messages that “AMI-C” multimedia networks must support and thus the name Common Message Set (CMS).

This part provides two types of information for system communication:

- *It defines the exact list of functions for, and therefore sets the boundary of, the communication in an “AMI-C” system. The communication could take place between an “AMI-C” compliant vehicle and an “AMI-C” network or between two “AMI-C” networks. The list of the functions is the consensus of ISO experts.*
- *It provides standardized descriptions of the listed functions in network-independent message format.*

The purpose of a CMS is to achieve interoperability and interchangeability among networked components in an “AMI-C” system. It does this by exactly defining the semantics of each message. The CMS is based on, and developed in, ASN.1 (Abstract Syntax Notation One). For any specific network technology, the CMS needs to be encoded in a manner consistent with the network protocol.

Road vehicles — Automotive multimedia interface —

Part 5: Common message set

1 Scope

This document covers the following aspects of an Common Message Set:

- the Common Message Set definition;
- ASN.1 format for the Common Message Set;
- standardized descriptions of the selected functions in a network independent message format.

The descriptions cover the following message categories and classes:

- Management
 - Network management messages
 - Resource management messages
- Vehicle
 - Core messages
 - Body module messages
 - Powertrain messages
 - Vehicle diagnostics messages
- Audio / Video
 - Amplifier messages
 - General player messages
 - Disk media messages
 - Tape media messages
 - Tuner messages
- Phone
 - Basic phone messages
 - Advanced phone messages
- HMI
 - Text Display messages

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO/IEC 8824-2, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 2: Information object specification*

AMI-C 2003, AMI-C vehicle interface requirements, v1.00

ASN.1 Complete, Prof John Larmouth

ASN.1 – *Communication between heterogeneous systems*, Olivier Dubuisson, Morgan Kaufmann Publishers

3 Common Message Set Definition

Feature sets that can be uniquely addressed for messaging are defined as objects. A specific attribute of an object is called property of an object. Each object has one or more properties. For example, the odometer object can provide an absolute mileage property or the changed value (delta) property. Also, an object type can have multiple instances of it present in a vehicle. Multiple instances are designated through position of an object. For example, brake object has enumeration such as hand, engine, right foot, etc. An object with only one instance, e.g., engine, can be designated with a no-position enumerator.

3.1 Common Message Set Transaction

3.1.1 Message Type (Msg Type)

The Message Type indicates the action required on the destination node. Message Type can have 6 values: INQUIRE, REPORT, SET, CONFIRM, COMMAND, and WARNING.

Figure 1 illustrates the relationship between the INQUIRE and REPORT message types.

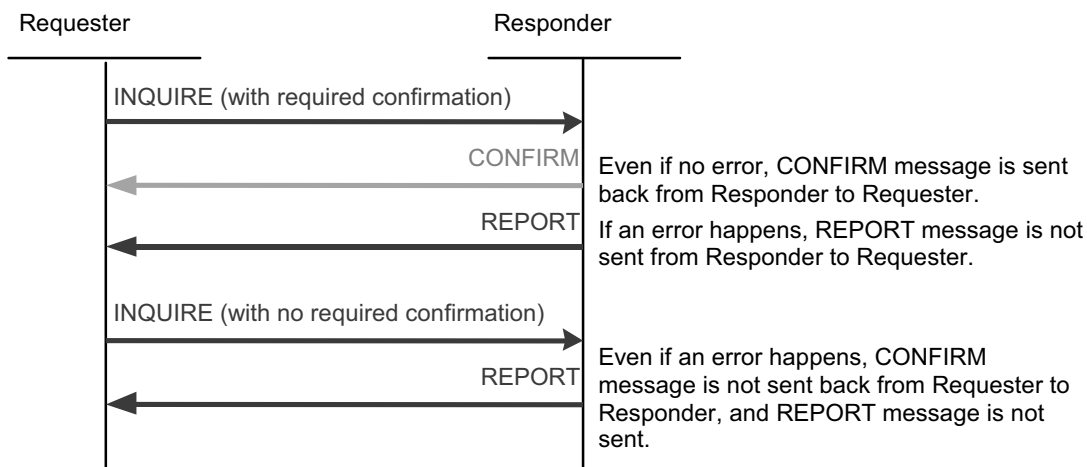


Figure 1 — INQUIRE and REPORT message sequence

Figure 2 illustrates the relationship between the SET and CONFIRM message types.

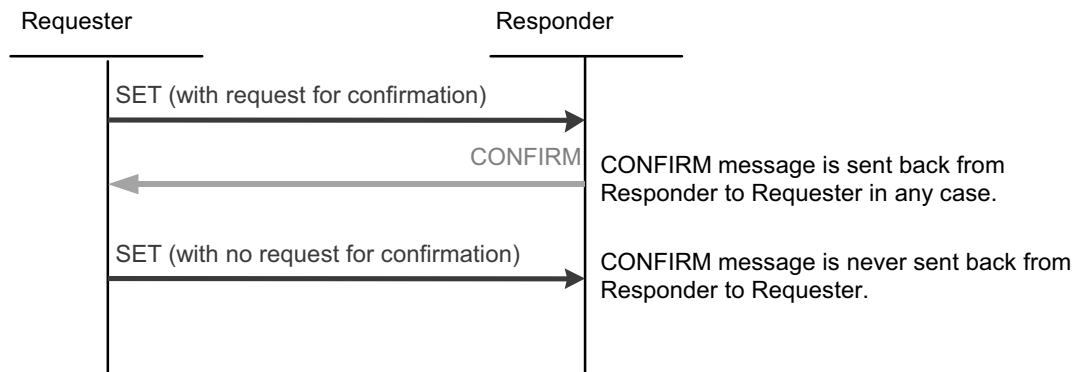


Figure 2 — SET message sequence

- INQUIRE - A request to obtain the current value of a property at one instant of time from an object.
- REPORT - A reply to an INQUIRE message, or asynchronously generated (in response to a request for subscription) message containing current value of one property at one instant of time.
- SET - A request to change the current value of one property at one instant of time.
- COMMAND - A message to perform the following five kinds of actions: start execution of software in a remote component, actuate device in a remote component, request access to resource, start subscription for a property or end subscription for a property.
- CONFIRM - A message to indicate success or error status of requested operation when a confirmation message is requested.
- WARNING - It is a message to send information to notify status to other nodes without any requests.

3.1.2 Message Class

The Message Class indicates to which class a message belongs. Classes are defined as follows:

- Management – network device management, audio/video stream management, and service discovery;
- Core – information that is originally inherent in a vehicle (VIN, static configuration information, etc.);
- Body Module – control and status related with body module (window, seat, mirror, light, trip meter, vehicle speed, etc.);
- Powertrain – status related with powertrain (oil temperature, coolant temperature, gear, etc.);
- Vehicle Diagnostics – message for vehicle diagnostics (ISO 15031-5 emission related, ISO 14229-1 non emission related);
- Amplifier – control related with amplifier and codec (volume, fade/balance, codec, etc.);
- General Player – common functions for disk and tape player;
- Disk Media – audio/video player for disk media (CD, MD, DVD, MP3, etc.);
- Tape Media – audio/video player for tape media (audio tape, VCR, etc.);

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- Tuner – audio/video broadcast tuner (AM, FM, XM, TV, etc.);
- General Phone – basic phone functionality (dial, hang-up, phone book, etc.);
- Advanced Phone – advanced phone functionality (short message, multi party call, conference call, etc.);
- Text Display – command to display simple texts and input texts.

3.1.3 Object Property

This field defines the property of an object that is going to be accessed. For example, a mirror can have 2 properties: vertical position and horizontal position. Their values are defined in Vehicle Interface Messages section.

3.1.4 Extension Possibility

In order to allow the addition of further Object Property codes (beyond 254), ISO 22902 defines the following expansion method. The restricted value 255 (FF16) indicates that the next 8 bit field (in place of Operand 0) contains the extended Object Property code.

3.1.5 Operands

These fields depend on the Message Type and the Object Property.

3.1.6 Message naming convention and 'opcode' for messages

Each ISO 22902 message name is concatenation of strings using "polish" notation. All the ISO 22902 messages start with the "Amic" label to distinguish them from other standard (such as AV/C, AT commands, etc.) or automaker proprietary messages. The next string in the convention is the abbreviated message class name. For example "core" message class is abbreviated by "Co" string. These two strings are concatenated with message type from BM (Body Module), PT (Powertrain), VD (Vehicle Diagnosis), Ap (Amplifier), GP (General Player), DM (Disk Media), TM (Tape Media), Tu (Tuner), BP (Basic Phone), AP (Advanced Phone), and TD (Text Display). The next three-letter string shows message type; for example, a "inquire message" is abbreviated by "Inq" string, Rpt (Report), Set (Set), Cmd (Command), and Cnf (Confirm). The last part of a message name contains object names and command modifier. Any name must use at most one literal from Message Classes, Message Types, Object Types and prefix with 'Amic', for example, "AmicCoRptVIN". The operands for each message are object tag, location (position) of the object, and the property identifier or the current value of the property.

- Generation of new messages

If a feature is introduced (due to new technology or re-allocation) for which there are no existing messages are defined, the following process is followed:

- 1) Survey existing messages in ISO 22902 for this feature. If extension of existing functional modules does not provide the feature, follow step 2. If extension is sufficient, verify & validate.
- 2) Survey external sources for messages for this feature. If adoption of external source is limited to a specific network, create a corresponding message description for convenience of mapping to other network. Verify & validate. If adoption or extension does not provide the feature, follow step 3.
- 3) Create a new message description based on the feature. Verify & validate using ISO 22902 adopted procedure.

4 Management Messages

4.1 Release Version Number

This message is a request to get the ISO 22902 release and version number.

Supported Messages

Class = Management class

Object = Release Version number

Name	Operator	Type	Class	Object	Parameter
AmicMnInqRelVerNum	Inq	'000'B	'02'H	'00'H	N/A
AmicMnRptRelVerNum	Rpt	'001'B	'02'H	'00'H	Report
AmicMnCnfRelVerNum	Cnf	'011'B	'02'H	'00'H	Confirm

Parameter Definition

Report Parameter(s)			
Type	Name	Value / Type	Description
SEQUENCE	majorRelease	INTEGER (2..31)	Major release number
	minorRelease	INTEGER (0..31)	Minor release number
	majorVersion	INTEGER (0..31)	Major version number
	minorVersion	INTEGER (0..31)	Minor version number

Confirm Parameter			
Type	Name	Value / Type	Description
	errorStatus	AmicMnAttError	Error Status

AmicMnAttError			
Type	Name	Value / Type	Description
ENUMERATED	noError	0	Request successful without error.
	unspecifiedError	1	Error, which impossible to identify.
	notSupported	2	Incoming request not supported.
	noResource	3	No other resources to be allocated

4.2 System Power Mode

This message is a request to get system power mode state.

Supported Messages

Class = Management class

Object = System power mode

Name	Operator	Type	Class	Object	Parameter
AmicMnInqSystemPMode	Inq	'000'B	'02'H	'01'H	N/A
AmicMnRptSystemPMode	Rpt	'001'B	'02'H	'01'H	Report
AmicMnCnfSystemPMode	Cnf	'011'B	'02'H	'01'H	Confirm

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Parameter Definition

Report Parameter(s)			
Type	Name	Value / Type	Description
	moduleState	AmicMnAttPowerMode	Power mode attribute

Confirm Parameter			
Type	Name	Value / Type	Description
	errorStatus	AmicMnAttError	Error Status

AmicMnAttPowerMode			
Type	Name	Value / Type	Description
ENUMERATED	off	0	Power off
	active	1	Power on or wakeup
	lowPower	2	Description of this state is manufacturer specific.
	ultraLowPower	3	Ultra low power for specific devices that have this functionality. Description of this state is manufacturer specific.

AmicMnAttError			
Type	Name	Value / Type	Description
ENUMERATED	noError	0	Request successful without error.
	unspecifiedError	1	Error, which impossible to identify.
	notSupported	2	Incoming request not supported.
	noResource	3	No other resources to be allocated

4.3 Power State

This message is a request to get power state information of each module, power off, low power, or active (power-on or wake-up). A state of component itself as a physical node is managed by its transaction management module.

Supported Messages

Class = Management class

Object = Power state

Name	Operator	Type	Class	Object	Parameter
AmicMnInqPowerState	Inq	'000'B	'02'H	'02'H	N/A
AmicMnRptPowerState	Rpt	'001'B	'02'H	'02'H	Report
AmicMnSetPowerState	Set	'010'B	'02'H	'02'H	Set
AmicMnCnfPowerState	Set	'011'B	'02'H	'02'H	Confirm

Parameter Definition

Report Parameter(s)			
Type	Name	Value / Type	Description
	moduleState	AmicMnAttPowerState	Power state attribute

Set Parameter(s)			
Type	Name	Value / Type	Description
	moduleState	AmicMnAttPowerState	Power state attribute

Confirm Parameter			
Type	Name	Value / Type	Description
	errorStatus	AmicMnAttError	Error Status

AmicMnAttPowerState			
Type	Name	Value / Type	Description
ENUMERATED	sleep	0	Power off
	active	1	Power on or wakeup
	boot	2	the system is initializing
	shutdown	3	the system is preparing for sleep

AmicMnAttPowerState			
Type	Name	Value / Type	Description
ENUMERATED	sleep	0	Power off
	active	1	Power on or wakeup
	boot	2	the system is initializing
	shutdown	3	the system is preparing for sleep

AmicMnAttError			
Type	Name	Value / Type	Description
ENUMERATED	noError	0	Request successful without error.
	unspecifiedError	1	Error, which impossible to identify.
	notSupported	2	Incoming request not supported.
	noResource	3	No other resources to be allocated

4.4 Node Information Announcement

This message is to announce services about a certain node registered / un-registered in a master node to manage service information of each node. This message is sent to a master node to each node within the network.

Supported Messages

Class = Management class

Object = Node information announce

Name	Operator	Type	Class	Object	Parameter
AmicMnCmdNodeInfoAnnounce	Cmd	'100'B	'02'H	'05'H	Command
AmicMnCnfNodeInfoAnnounce	Cnf	'011'B	'02'H	'05'H	Confirm

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Parameter Definition

Command Parameter(s)			
Type	Name	Value / Type	Description
SEQUENCE	registration	BOOLEAN	TRUE is registration, FALSE is un-registration.
	functionType	AmicCmAttFunctionType	Function type
	instanceNum	INTEGER (1..14)	Instance number assigned
	numOfServices	INTEGER (0..255)	Number of services available in a certain module
	services	SEQUENCE OF AmicMnAttSpecificService	Specific service information

Confirm Parameter			
Type	Name	Value / Type	Description
	errorStatus	AmicMnAttError	Error Status

AmicCmAttFunctionType			
Type	Name	Value / Type	Description
ENUMERATED	transManage	0	Transaction management module
	vehicleServiceInterface	1	Vehicle Service Interface
	clock	2	Clock
	gps	3	GPS unit
	antenna	16	Vehicle Antenna
	door	17	Door
	doorLock	18	Door lock
	window	19	Window
	mirror	20	Mirror
	mirrorRetract	21	Mirror Retract
	seat	22	Seat
	seatbelt	23	Seat Belt
	horn	24	Horn
	wiper	25	Wiper
	headLight	26	headlights
	parkingLight	27	parking Lights
	interiorLights	28	interior Lights
	hazardSignal	29	Hazard Signal
	thermometer	30	Thermometer
	steering	31	Steering
	seatOccupation	32	Seat Occupation
	odometer	33	Odometer
	tripCounter	35	Trip counter
	airbag	36	Air bag
	indicator	37	Warning indicator
	driverID	38	Driver ID
	rainSensor	39	Rain Sensor
	sunSensor	40	Sun Sensor value
washingLiquid	41	Washing Liquid	
engineStartDisable	48	Engine Start Disable	
remoteStart	49	Remote Start	

AmicCmAttFunctionType			
Type	Name	Value / Type	Description
	performanceMode	50	Performance Mode
	coolantTemperature	51	Coolant Temperature
	engineRPM	52	Engine RPM
	engineOilPressure	53	Engine Oil Pressure
	engineOilTemperature	54	Engine Oil Temperature
	gearPosition	55	Gear Position
	prndlPosition	56	PRNDL Position
	cruiseControlState	57	Cruise Control State
	brakeFluidLevState	58	Brake Fluid Level State
	diagUnit	64	Diagnostic unit
	cd	80	CD (Compact Disc) player
	md	81	Mini Disc player
	dvdVideo	82	DVD video player
	dvdAudio	83	DVD audio player
	mp3	84	MP3 Player
	audioCassette	85	Audio cassette Player
	vcr	86	VCR Player
	amFmTuner	87	AM/FM radio tuner
	xmTuner	88	XM radio tuner
	tvTuner	89	TV tuner
	monitor	90	Monitor
	amplifier	111	Amplifier
	navigationUnit	112	Navigation unit
	phone	128	Phone
	textDisplay	144	Text display
	keyboard	145	Keyboard
	remoteController	146	Remote controller
	voiceUnit	147	Voice interface unit
	pda	160	PDA

AmicMnAttSpecificService			
Type	Name	Value / Type	Description
ENUMERATED	service0	0	
	service1	1	
	service2	2	
	service3	3	

AmicMnAttError			
Type	Name	Value / Type	Description
ENUMERATED	noError	0	Request successful without error.
	unspecifiedError	1	Error, which impossible to identify.
	notSupported	2	Incoming request not supported.
	noResource	3	No other resources to be allocated