

Specification for

ControlNet —

Part 7: Device profiles

ICS 25.040.40; 35.100.70

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The preparation of this Draft for Development was entrusted to Technical Committee AMT/7, Monitoring and control aspects of AMT, upon which the following bodies were represented:

- ABB Kent plc
- Cegelec Industrial Controls Ltd.
- Department of Trade and Industry
- Fisher-Rosemount Ltd.
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- Measurement Technology Ltd.
- Phoenix Contact Ltd.
- Process Automation and Computer Systems Ltd.
- Rockwell Automation Ltd.
- Schneider Ltd.
- Siemens Automation Ltd.
- University of Warwick
- Wago Ltd.

This Draft for Development, having been prepared under the direction of the Advanced Manufacturing Technology Assembly, was published under the authority of the Standards Board and comes into effect on 15 November 1997

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The following BSI reference relates to the work on this publication:
Committee reference AMT/7

ISBN 0 580 28683 5

Amendments issued since publication

Amd. No.	Date	Comments

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Foreword

The DD 241 specification was developed by the Allen-Bradley Company, Inc. as “ControlNet”. Allen-Bradley has granted BSI a right to publish the specification as an open communications standard for digital communications networks in industrial control applications.

This part of DD 241 describes the General Description of the deterministic control network.

This publication consists of the following parts:

- *Part 1: General description;*
- *Part 2: Physical layer and media;*
- *Part 3: Data link layer;*
- *Part 4: Network and transport layer;*
- *Part 5: Data management;*
- *Part 6: Object model;*
- *Part 7: Device profiles;*
- *Part 8: Electronic data sheet;*
- *Part 9: Station management;*
- *Part 10: Object library.*

This Draft for Development is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because the subject matter is still under development requiring wider exposure. It should be applied on this provisional basis so that information and experience of its practical application may be obtained.

A review of this Draft for Development will be carried out not later than 2 years after its publication. Notification of the start of the review period, with a request for the submission of comments from users of this Draft for Development, will be made in an announcement in *Update Standards*.

According to the replies received the responsible BSI Committee will judge whether the Draft for Development can be converted into a British Standard or what other action should be taken.

Observations which it is felt should receive attention before the official call for comments will be welcomed.

These should be sent to the Secretary of BSI Technical Committee AMT/7 at BSI, 389 Chiswick High Road, London, W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 27 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

By defining a core standard for each device type, interoperability and interchangeability is achieved. In general, similar devices

- exhibit the same behaviour;
- produce and/or consume the same set of data;
- contain the same set of configurable attributes.

The formal definition of this information is known as a **device profile**. This part provides a detailed definition of a device profile, describes its components and defines many device profiles.

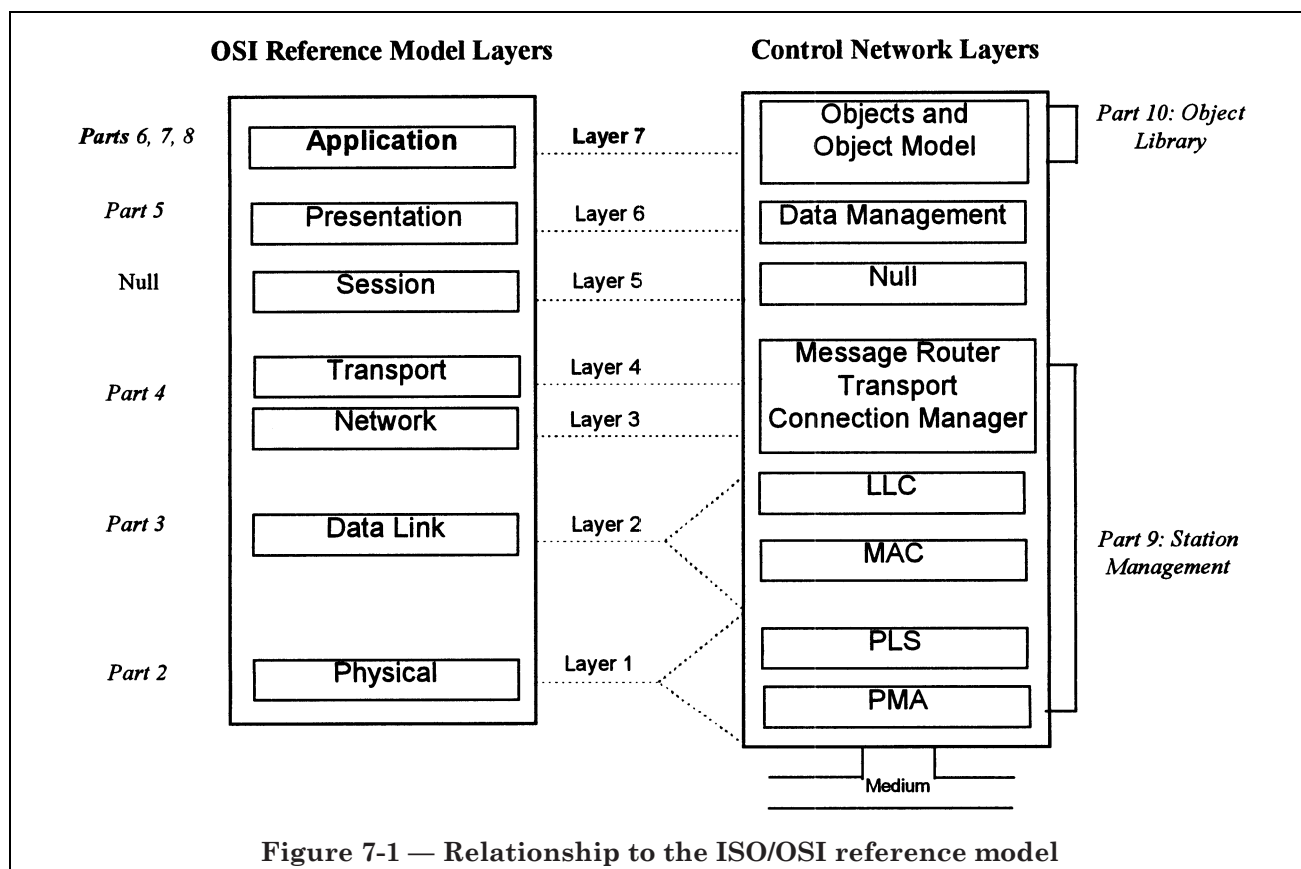
To provide interoperability among similar devices, the same object implemented in two or more devices shall behave identically from device to device. Consequently, each object specification includes a rigid definition of behaviour as specified in part 6, Object Model and part 10, Object Library.

Every device contains several objects. These objects interact to provide basic device behaviour. Because the behaviour of individual objects is fixed, the behaviour of identical groupings of objects is also fixed. Therefore, the same group of objects arranged in a specified order interact to produce the same behaviour from device to device.

1 Scope

This part of volume 5 of this standard defines the requirements for the Device Profile of a device on the deterministic control network.

The Device Profile of the deterministic control network corresponds to the definition of Layer 7 of the seven layer OSI model in accordance with ISO 7498. Figure 7-1 shows the location of the Object Model within the OSI model.



2 Device Profile

2.1 Contents

- A device profile shall
- document the object model for the device type (device object model);
 - list the object interfaces;
 - describe the produced and consumed data formats for the device type;
 - document the configuration data and the public interface(s) to that data.

Device implementers may adopt or extend one of the existing profiles defined in clause 5, or define their own profile based on the format contained in this standard. Device profiles shall be defined using the format specified in Table 7-1. The order that the sections appear in Table 7-1 are the same order they shall appear in each device profile.

Table 7-1 — Device Profile specification format

Section Required?	Section Name	Section Information
Yes	Device Type Number, Profile Name and Description	See clause 2.2 for details
Yes	Device Object Model and Interface	See clause 2.3 for details
Yes	— Object Model Table	See clause 2.3.2 for details
Yes	— Object Interface Table	See clause 2.3.4 for details
—	Device Data Format	See clause 2.4 for details
Conditional ^a	— Assembly Instance Table	See clause 2.4.2 for details
Conditional ^a	— Assembly Instance Data Attribute Table	See clause 2.4.3 for details
Conditional ^a	— Assembly Instance Data Attribute Mapping Table	See clause 2.4.4 for details
Conditional ^a	Defining Device Configuration	See clause 2.5 for details
Conditional ^a	Configuration Parameter Definitions (EDS)	See clause 2.5.2 for details
Conditional ^a	Effect of Configuration on Behaviour	See clause 2.5.4 for details

^a These sections are not required unless needed for their pertinent functions.

2.2 Device Type Number, Profile Name and Description

Each device profile shall have a unique device type number and name. The device type number shall be a hexadecimal value with the range specified in clause 4 and Table 7-9. This specification defines the allocation of the device type numbers. The format of the device type number and device profile name shall be:

Device Type: 0xCC PROFILE NAME

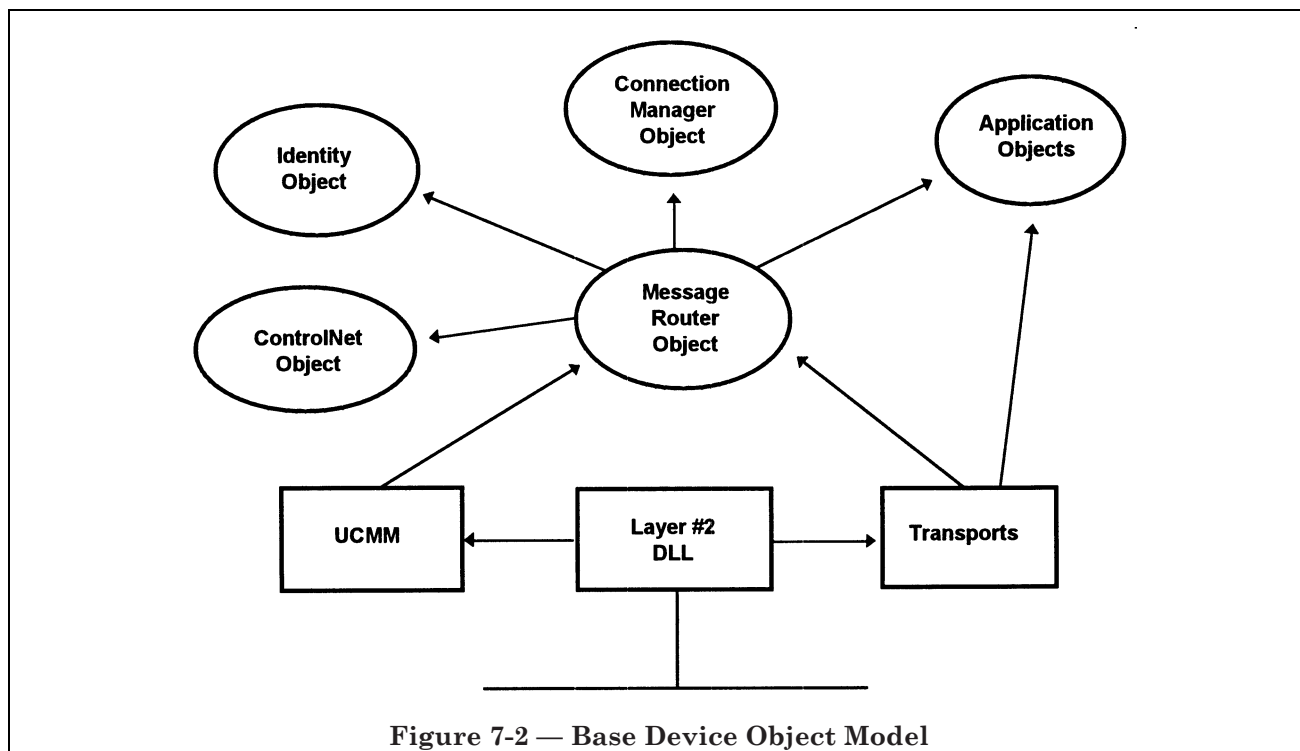
where CC shall represent the device profile device type number in hexadecimal format, e.g. the device type number and profile name for photoelectric sensor is: Device Type: 0x06 PHOTOELECTRIC SENSOR.

The device type number and profile name shall be the first line in the device profile specification. Immediately following this shall be a short description of the profile. The device type number is a required attribute, instance attribute 2, of the Identity object as described in part 10, Object Library. All devices with the same device type number shall meet the requirements specified in the Device Profile for that device type.

2.3 The Device Object Model and Interface

2.3.1 Grouping

The *grouping* of objects used in a device shall be referred to as that device’s *object model*. Figure 7-2 shows the base device object model. For similar devices to produce identical behaviour, they shall have identical object models. Therefore, an object model shall be included with every device profile which shall list the objects for this device profile and the interconnections between them.



2.3.2 Object Model Table

2.3.2.1 Format

Each device profile shall contain an **Object Model Table** which shall list the objects specified for that device type. A device object model table shall have the format as specified in Table 7-2. The Object Model Table shall immediately follow the device profile name and description.

Table 7-2 — Object Model Table format and terms

Object Class	Optional/Required	Instance numbers	Number of connections
NOTE 1	NOTE 2	NOTE 3	NOTE 4
NOTE 1	See clause 2.3.2.2		
NOTE 2	See clause 2.3.2.3		
NOTE 3	See clause 2.3.2.4		
NOTE 4	See clause 2.3.2.5		

2.3.2.2 Object Class List

The object model table shall identify (list) all object classes present in the device (required and optional) other than those objects required in every device by this specification (see Table 7-4: Required Object Classes).

2.3.2.3 Optional or Required

Each object in the object class list shall be specified as either optional or required in the **Optional/Required** portion of the Object Model Table. An object class identified as “required,” shall be required for *all* devices of that device type. Some object classes may be included that provide functions beyond the minimum required of a particular device type or that have no effect on device behaviour. These types of object classes shall be identified in the object model table as “optional”. An object class identified as “optional,” shall be optional for *all* devices of that device type. The device type shall dictate what objects are necessary to provide the required basic function using the object model table.

Object classes shall be specified as required or optional according to Table 7-3.