The D412 diagnostic system is an interface to railway vehicle equipment by the means of the MVB Multifunction Vehicle Bus as defined in the TCN standard IEC61375.

The intention of the D412 diagnostic system is:

- Handle data traffic on the MVB side as an active node like the "normal" bus nodes.
- Perform the bus administrator function, with all functions as specified in the TCN standard: e.g. Bus Mastership Transfers, Event Arbitration, Device Status Polling, etc.
- Support the user with several automatic functions, like scan and learn functions.
- Act as manager for network management, i.e. perform MVB download of duagon devices.

It can operate either in mode MONITOR, which provides a complete set of interactive commands on a PC terminal console.
In mode SERVER the user application can be programmed and executed on a PC using a full featured MVB library.
Duagon Data Sheet Preamble

On having purchased products described in this data sheet, the customer acquires the right to use the products according to its specified purpose and in accordance with all operation, service and maintenance instructions. All other rights to the product, Duagon's intangible assets rights in particular, belong solely to Duagon and may not be deemed to have been assigned along with the sale of the products.

All product properties are fully described in the data sheet under express exclusion of any warranty for other properties. Of decisive relevance is the data sheet valid at the time of the order being placed. Duagon provides a warranty that the product properties are retained during the period of warranty. Evidence that the properties of the product have been retained will be brought, always and exclusively, on Duagon premises by means of a test construction pursuant to the type test.

The customer is obliged to inspect whether the products themselves are suitable for the application intended. In particular, that inspection must include the integration of the products into the intended system configuration and a check on whether the properties as per data sheet can be fulfilled once integrated into the system configuration as planned by the customer. Since the products are not certificated for operation with security applications, the customer must take appropriate measures to ensure that any malfunctions that may occur in a system configuration with other products will be absorbed by supplementary security measures.

The period of warranty for the products is 24 months and it begins on the date the products are shipped from the factory.

The warranty that Duagon assumes for the products will, at Duagon's discretion, be limited either to the repair of or the replacement of the products at the Duagon factory. The warranty solely covers the products or parts thereof which, despite professional handling, have become defective or unusable and which arrive at the Duagon factories for repair or replacement during the period of warranty. The extent of Duagon's warranty is fully set out in this data sheet. Duagon cannot be held liable for consequential damage caused by a defect or for indirect damage or for consequential damage of any kind. Therefore the customer bears all and any costs that occur due to production downtime, for example, or due to the installation or dismantling of products or due to their transportation to Duagon and back.

Duagon's liability and warranty do not obtain if evidence cannot be brought that the products were being operated according to its specified purpose and in accordance with all operation, service and maintenance instructions as issued by Duagon.

These provisions form an integrated part of the product properties. Duagon products cannot be acquired with other or more extensive degrees of warranty and liability on the part of Duagon.

This data sheet is to be evaluated in accordance with Swiss law. The court of jurisdiction is the seat of the vendor. The applicability of the UN agreement as to international sales of goods (also known as "Viennese Purchasing Convention") is herewith expressly excluded.

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Document history

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Introduction

The D412 diagnostic system is an interface to railway vehicle equipment by the means of the MVB Multifunction Vehicle Bus as defined in the TCN standard IEC61375. For more information about the MVB, please refer to the TCN standard (see chapter "Standards Reference" on page 18).

Since there is an active MVB interface D113 board built into the D412 housing, a lot of statements made for the D113 are still valid for the D412. The detailed description of the D113 can be found in the “D113 PC/104 MVB Interface – Data Sheet”, d-000351-nnnnn.

The intention of the D412 diagnostic system is:

• Handle data traffic on the MVB side as an active node like the "normal" bus nodes
• Perform the MVB bus administrator function, with all functions as specified in the TCN standard: e.g. Bus Mastership Transfers, Event Arbitration, Device Status Polling, etc.
• Support the user with several automatic functions, like scan and learn functions.
• Act as manager for network management, i.e. perform MVB download of Duagon devices.

Operation Mode

The D412 diagnostic system can operate in mode MONITOR, which provides a complete set of interactive commands on a PC terminal console. In mode SERVER the user application can be programmed and executed on a PC using a full featured MVB library.

MVB Interface

The MVB interface of the D412 complies the TCN standard IEC61375 (see chapter "Standards Reference" on page 18). It supports both wire based physical layers being on the market today (selectable by switch):

• ESD+: This is the ESD as defined in the TCN standard, enhanced by a galvanic insulation (redundant MVB lines).
• EMD: Transformer based interface (redundant MVB lines).

Online Support

For additional information, please visit our homepage www.duagon.com. There you will find:

• up to date documents
• frequently asked questions
• description of new product versions

On our web page it is also possible to subscribe an email news service. Providing notifications about all kind of news.
Physical Interfaces

The figures below show the D412 with all available hardware interfaces and their location.
MVB Interface

The D412 is equipped with two 9-pin SUB-D connectors for MVB. Independent from the type of physical interface (ESD+ or EMD), the D412 supports two redundant MVB lines A and B. The MVB interface is galvanically insulated from all other circuitry.

Pin Definition

<table>
<thead>
<tr>
<th>Pin#</th>
<th>Pin short-cut</th>
<th>Input / Output as seen from the D412</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A.data.P</td>
<td>bidirectional</td>
<td>non-inverted MVB bus line, with RS485 level</td>
</tr>
<tr>
<td>2</td>
<td>A.data.N</td>
<td>bidirectional</td>
<td>inverted MVB bus line, with RS485 level</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
<td>-</td>
<td>Not connected</td>
</tr>
<tr>
<td>4</td>
<td>B.data.P</td>
<td>bidirectional</td>
<td>non-inverted MVB bus line, with RS485 level</td>
</tr>
<tr>
<td>5</td>
<td>B.data.N</td>
<td>bidirectional</td>
<td>inverted MVB bus line, with RS485 level</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td>-</td>
<td>Not connected</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Both connectors have the same pinout.
RS232 Interface

The D412 provides an RS232 (serial line) interface on a 9-pin male SUB-D connector.

The RS232 interface has no galvanic insulation to the digital logic, and has no hardware handshake switched on by default.

Pin Definition

<table>
<thead>
<tr>
<th>Pin#</th>
<th>Pin short-cut</th>
<th>Input / Output as seen from the D412</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>RxD</td>
<td>Input</td>
<td>Receive data input</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Output</td>
<td>Request To Send (not used by default)</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Output</td>
<td>Transmit data output</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Input</td>
<td>Clear To Send (not used by default)</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>(power line)</td>
<td>Reference potential.</td>
</tr>
</tbody>
</table>

All other pins are not connected.
Configuration Switches

On the bottom side of the D412, there are several configuration switches, which must be set according to the used MVB physical layer. They also define the operation mode.

Several of the switches form a group. All switches of a group must have either the "ON" or the "OFF" state, but never a different state within one group.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pin #</th>
<th>Meaning in ON state</th>
<th>Meaning in OFF state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminator</td>
<td>7,8,9,10</td>
<td>MVB terminators on.</td>
<td>No MVB termination.</td>
</tr>
<tr>
<td>MVB type</td>
<td>2,3,4,5,6</td>
<td>MVB type &quot;ESD+&quot;</td>
<td>MVB type &quot;EMD&quot;</td>
</tr>
<tr>
<td>SW1</td>
<td>1 (SW1)</td>
<td>Operation mode &quot;MONITOR&quot;</td>
<td>Operation mode &quot;SERVER&quot;</td>
</tr>
</tbody>
</table>

Important Remarks:

• External Terminators directly on the D412's MVB connectors are not allowed.

• Never change the setting of the switches when the D412 is powered on. The D412 will not recognize a new setting during run time. This may disturb the traffic on MVB.

• There is no terminator supply voltage delivered to the MVB connectors. Therefore external devices requiring such a voltage like OGF bus couplers will not work.
Power Connector

The power supply must be configured to deliver any voltage between 6.3V and 10V DC.

The plug must be set in a way, that the positive polarity is in the middle (tip), and the negative polarity is on the outside.

In principle, the D412 may also be powered from other sources. This opens the possibilities for working from battery supplies on vehicles. However, take care about these issues:

• Please note, that there may be a direct connection between the DC minus connector and the housing of the D412. The MVB shield is on the same potential as well.

• In addition, the DC power has no galvanic insulation to the signals contained within the RS232 interface. Usually, PCs will connect the RS232 signals to their shield and housing.

Check, whether any DC power converters working from the vehicle battery have an appropriate galvanic insulation. Otherwise you may damage the D412 as well as your PC.

The MVB lines are galvanically insulated from case and DC power.

An appropriate power adapter is included with the D412.
**Software Protocol**

The standard delivery of the D412 diagnostic system is in configuration "NAVIGATOR", i.e. two operation modes selectable by configuration switch "SW1".

<table>
<thead>
<tr>
<th>SW1</th>
<th>Operation Mode</th>
<th>Description</th>
</tr>
</thead>
</table>
| **ON** | MONITOR also known as "MVB Monitor" | In operation mode "MONITOR" the D412 diagnostic system provides a complete set of commands to investigate MVB devices on the bus. Several interactive commands are available on a PC terminal console:  
  - Force MVB by read/write process data.  
  - MVB network investigation with device status poll and scanning of all device ports.  
  - Self learning BA (BA configuration is learned by listening on MVB bus).  
  - MVB network management: supports MVB download of duagon devices.  
  
  **Note**: For more information about the operation mode "MONITOR", please refer to the "MVB Monitor – User’s Guide", d-000551-nnnnn. |
| **OFF** | SERVER also known as "MVB Server" | In the operation mode "SERVER" the user application can be programmed and executed on the PC which is connected to the D412 diagnostic system via serial line (RS232). The application is based on the full featured MVB programming library (DLL for windows as well as ANSI C source code).  
  
  **Note**: For more information about the operation mode "SERVER" and the MVB driver (i.e. API interface description and driver files), please refer to the "NAVIGATOR Driver Kit for D412", d-000888-nnnnn.  
  
  **Note**: Same as configuration "SERVER" for D113. For more information, please refer to the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnn. |
# Mechanical Data

## Mechanical Dimensions and Weight

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVB SUB-D connectors with cable locks</td>
<td>5</td>
<td>mm</td>
<td>size outside housing</td>
</tr>
<tr>
<td>Serial line SUB-D connector with cable locks</td>
<td>5</td>
<td>mm</td>
<td>size outside housing</td>
</tr>
<tr>
<td>Rubber feet at bottom side</td>
<td>5-10</td>
<td>mm</td>
<td>height</td>
</tr>
<tr>
<td>Weight of board</td>
<td>0.400</td>
<td>kg</td>
<td></td>
</tr>
</tbody>
</table>
Cabling / Cable Locks

The MVB connectors use M3 thread for the cable locks. In contrast the RS232 connector is equipped with the UNC4-40 thread.

Be sure not to apply the wrong thread; it will damage the thread.

The D412 is delivered with an MVB cable and a Serial Null Modem cable. Also a USB-Serial converter is included.

Notes:

- The MVB cable being delivered with the D412 is not intended for use within vehicles. In order to keep the cable slim and flexible for lab use, some technical parameters may be degraded from the requirements of the TCN standard.
- The threads of the included cables match the threads on the D412.
- The USB-Serial converter serves two different purposes:
  - Make a serial line available on laptops, which do not have one.
  - The serial lines contained in some PC are not fast enough. Even if they are able to deal with baud rates of 115k-Baud in general, they must be able to sustain this data rate with blocks of 30 – 40 characters in short sequence. This small USB adapter has an internal FIFO buffer of 96 characters, which perfectly solves this problem. If you encounter lost serial data on your serial line, then use this USB adapter as a buffer device. The related driver software is included.
Environmental Data

The D412 is designed for the use in laboratory, only. In particular, it does not necessarily meet special requirements for the use in train applications and does not support the extended temperature range.

Application Hints

Diagnostic by LEDs

On the D412 device, six LEDs reflect the state of the MVB node:
<table>
<thead>
<tr>
<th>LED #</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Red</td>
<td>PLD loaded and reset released.</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
<td>The logic level on MVB Line_A is changing; i.e. activity is assumed.</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>The logic level on MVB Line_B is changing; i.e. activity is assumed.</td>
</tr>
<tr>
<td>3</td>
<td>Yellow-ish green</td>
<td>MVB bus administrator is in idle mode, i.e. loaded and ready to run, but probably some other BA is regular master.</td>
</tr>
<tr>
<td>2</td>
<td>Green</td>
<td>MVB bus administrator is in &quot;regular master&quot; state (see MVB standard).</td>
</tr>
<tr>
<td>1</td>
<td>Blue</td>
<td>The D412 is ready for MVB communication, i.e. at least one MVB line is enabled.</td>
</tr>
</tbody>
</table>
Operation Example

MVB Monitor

Follow these steps to take the D412 into operation in configuration "MONITOR":

• Choose the settings for the MVB related configuration switches on the bottom side of the D412.
• Set configuration switch "SW1" to ON in order to select operation mode "MONITOR" (also known as "MVB Monitor").
• Connect the serial line to your PC and start up your preferred terminal emulation program, e.g. Hyperterminal on Windows-based operating systems. Be sure to have it configured to 115kBaud, 8 bits, no parity, 1 stop bit.
• Connect the DC power supply and switch power on.

After a short time, a start-up text like the following should appear on the terminal console:

```
- test SRAM at CS1 (detected size=512KB)
- test SRAM at CS2 (detected size=512KB)
- PLD status = OFF
- use PLD firmware file 'pld.bin'
- load PLD firmware
- PLD status = LOADED
- configure PLD firmware (BCR=0xE000)
- PLD status = CONFIGURED
```

MICRO MONITOR
CPU: Atmel AT91R40807
Platform: duagon D113H-STANDALONE
Built: 04/01/2003 @ 15:12:40
Version: d-000531-002028
Monitor RAM: 0x100000-0x103d00
Application RAM Base: 0x2080000

Press any key to stop execution of file 'autostart'.

...<clear screen>

MVB Monitor, d-000565-001994, (c) Duagon GmbH
m vb MON>

Make yourself familiar with the basic commands of the "MVB Monitor"; see the "MVB Monitor – User's Guide", d-000551-nnnnnn, which is part of the "NAVIGATOR Driver Kit for D412", d-000888-nnnnnn.
As a short test, you may issue the following commands:

```bash
mvbMON>svc -a 10 -1 ab
device address: 0x00A (10)
line config : AB
mvbMON>sva auto
Configure dynamic BA..........
BA state: AUTO
mvbMON>...
<wait about 20seconds>
mvbMON>svd -a
nr of devices: 1
---------------------------------------------------------------
| device       | device | S B G M | S S S S | A L S D R R N E |
| address      | status | P A W D | 0 1 2 3 | T D D D D C R R |
---------------------------------------------------------------
| 0x00A (  10) | 0x4380 | 0 1 0 0 | 0 0 1 1 | 1 0 0 0 0 0 0 |
---------------------------------------------------------------
mvbMON>
```

**Notes:**

- The list contains only the own device address 0x00A (see command "svc"). The bits BA=1, CS2=1 and CS3=1 show the configured and active MVB bus administrator on the own device.

As a second step, connect the MVB devices under test to the D412. In order to recognize the first activities on MVB, issue the following command:

```bash
mvbMON>...
<wait about 20seconds>
mvbMON>svd -a
nr of devices: 2
---------------------------------------------------------------
| device       | device | S B G M | S S S S | A L S D R R N E |
| address      | status | P A W D | 0 1 2 3 | T D D D D C R R |
---------------------------------------------------------------
| 0x00A (  10) | 0x4380 | 0 1 0 0 | 0 0 1 1 | 1 0 0 0 0 0 0 |
| 0x010 (  16) | 0x0080 | 0 0 0 0 | 0 0 0 0 | 1 0 0 0 0 0 0 |
---------------------------------------------------------------
mvbMON>
```

**Notes:**

- Now the list contains more than one device, the own device (i.e. address 0x00A) and the device under test (e.g. address 0x010).
Troubleshooting

The D412 actively sends data to an MVB device, but this one does not respond.

Check the following list:

1. Writing data to the D412 by the MVB monitor command "dsp" (dataset put) loads the data to the traffic memory, only. Is there a BA on the outside? As an alternative: is the own BA configured and running? Please refer to MVB monitor command "sva" (supervision administration).

2. Are all cables and terminators firmly seated? During any activity, e.g. sending data from the D412.

3. Is the MVB input line set to LINE A/B? Please refer to MVB monitor command "svc" (supervision control).

The D412 (or any other MVB device) is sometimes not able to receive data from the MVB, but sending data to MVB is always possible.

Note: In an MVB network, it is not allowed to mix redundant and not redundant devices.

Check the following list:

1. Does the MVB device under test support redundant lines?

2. Is the MVB input line set to LINE A or A/B?

The communication to another MVB node is not possible.

In general, MVB supports redundant lines (A and B). However, not every device/ cable/ terminator makes use of both lines.

1. Check, whether the other devices use the same line, of course matching the D412 configuration.

2. Check, whether the cabling supports the desired line(s).

3. Check, whether terminators on both ends support the desired line(s).
Standards Reference

Insulation

IEC61375-3:2007 MVB physical layer. High voltage test, applied to EMD and ESD in the same way, according to IEC60571, 500V<sub>rms</sub>, 1MΩ for 1 minute. Each individual device is tested prior to shipment (routine testing). During routine testing, the testing is optionally changed to sinusoidal 708V<sub>rms</sub> or 1000V<sub>dc</sub>, 1MΩ for 10sec.

MVB


Manufacturing

The manufacturing of the PCB assembly is done according to IPC-A-610D:2005 level 2.

The product complies to the European Union directive EC/2002/95 (RoHS compliance).

REACH

Concerning the European Union directive EC/1907/2006 (REACH compliance), Duagon does not need to register any substance. Duagon's products do not use quantities of more than 1 ton of a certain substance and the substances are not released under normal conditions of use. For a registration, both criteria would have to be fulfilled.
Links to other Duagon Documents

In general, most of the documents are located on www.duagon.com, and may be downloaded from there in the most up to date version.

**NAVIGATOR Driver Kit for D412, d-000888-nnnnnn**

The NAVIGATOR Driver Kit for D412 provides all required information to use the D412 diagnostic system in operation mode "MONITOR" (e.g. user's guide for MVB Monitor) and "SERVER" (e.g. driver software and API interface description). It also provides board specific firmware with with documentation how to download.


This document describes the MVB MONITOR operation mode. A command line interface to establish MVB communication.

**D113 PC/104 MVB Interface – Data Sheet, d-000351-nnnnnn**

Since there is an active MVB interface D113 board built into the D412 housing, a lot of statements made for the D113 are still valid for the D412.

**Labeling and Packaging – Specification, d-000778-nnnnnn**

This document describes all product labels (e.g. serial number label) used in relation with customers. It describes furthermore how duagon packs the products for shipment.

**Quality Plan for Duagon Products – Specification, d-000796-nnnnnn**

This document is a specification about test procedures for series testing of duagon products. It is valid for all duagon products in general. For each specific product an applicable subset of the described tests is selected; according to the procedures specified here.
D412 Order Information

The following paragraphs show options being possible upon customer request. Please note the following:

- The hardware options are required to be specified prior to manufacturing (normally at order time). These options have an influence on pricing. Any changes at a later date may cause significant trouble with respect to cost and/or delivery time.

- The downloadable options (…and other options; also known as "OP") are required prior to delivery of boards, i.e. after hardware manufacturing. **Note:** When not being sure what downloadable options to order, call Duagon and discuss your application with our software experts.

These information will build the order code.

**We highly recommend to specify both, hardware and downloadable options at order time.**

Order Code Example

<table>
<thead>
<tr>
<th>Hardware Options</th>
<th>downloadable &amp; other options (also known as &quot;OP&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D412</td>
<td>d-000598-002651</td>
</tr>
</tbody>
</table>

If it is not sure anymore which options were delivered with a certain product, locate the serial number of the product and call Duagon. With the serial number the programmed options at board delivery time can be backtracked.

**Note:** The serial number is an eight-digit number. For more information about the serial number label on the product, please refer to the "Labeling and Packaging – Specification", d-000778-nnnnnn.

**Note:** Obviously, we do not track any changes outside of Duagon. Be sure to document these changes yourself.

Hardware Options

There are no hardware options on the D412

**D412**

**Note:**

- MVB Bus Administrator is included
Downloadable Options (...and other options)

The downloadable options (also known as "OP") are specified by a duagon identification number. The related document describes the architectural features of the product and may refer to additional documents, like product related firmware or API interface description, etc.

As a matter of fact, products will be subject to changes during their life time. According to the technical details of such updates, duagon may decide to deliver the most up to date version. The customer will be notified about this fact by a new identification number in the delivery note.

In addition, the customer may specify additional product related requirements of any type: for example customized labels, specific test procedures, etc. In these cases, the customer will get a unique identification number for his individual requirements.

Please note: Testing of the products after production will be done with a standard configuration, i.e. the hardware sanity is confirmed. However, in special custom configurations, features may not be tested since there is no test equipment that emulates the customer's hardware. In these cases, we recommend our customers to submit one of his target systems to duagon.

NAVIGATOR Preferred Option Set Combinations

The functionality as described (no customer specific changes) can be identified with the following document numbers:

<table>
<thead>
<tr>
<th>Intended for hardware...</th>
<th>Document number downloadable options (also known as &quot;OP&quot;)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D412</td>
<td>d-000598-nnnnnn</td>
<td>Supports the operation mode &quot;MONITOR&quot; as as described in this data sheet. User configurable the configuration &quot;SERVER&quot; (PD, MD, BA) as described in the D113 data sheet, too.</td>
</tr>
</tbody>
</table>

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Document History

d-000597-009002

- REACH, RoHS statements added
- company address and phone number updated

d-000597-007493

Standardization and actualization
- regrouping of chapters
- editorial changes
- removed explicit cable sections (merged under "cabling/cable locks")

d-000597-002637

- Modify chapter "Configuration Switches" – introduce operation modes "MONITOR" and "SERVER" for switch "SW1".
- Modify chapter "Firmware Configuration" – delete flash file system content; introduce operation modes "MONITOR" and "SERVER".
- Up-to-date picture of MVB cable and USB-to-serial converter.
- Add chapter "D412 Order Information".
- Update chapter "References – Links to other Duagon Documents":
  - Add NAVIGATOR Driver Kits for D412. Delete all other references, which are part of this Driver Kits.
  - Add document "Labeling and Packaging".
  - Add document "Quality Plan for Duagon Products".
- Multiple minor changes, mainly editorial.

d-000597-002074

- First release of this document.
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Appendix A: Document Numbering System

All duagon documents have a unique identification number. The identification number has a certain internal structure in order to ease the tracking of different documents. In general, there are two parts:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Document number</th>
<th>Filing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>-000310</td>
<td>-001952</td>
</tr>
</tbody>
</table>

Always constant

- Specifies a certain purpose of a document with the intention to link several documents with different filing number.
- Please note, that the purpose of the document number is not stored for each document number, but can be derived from the document title, which is stored for each Filing number.
- The format is either 6 digits or not available.

Unique number, that identifies a particular document. Released in sequential manner as the documents are filed in the archive. A duagon internal data base contains exactly one document title text for each filing number.
Always 6 digits.

Examples for identification numbers

<table>
<thead>
<tr>
<th>Identification number</th>
<th>Document Title / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>d-000310-001606</td>
<td>&quot;DXIO data sheet Rev 2.2&quot;</td>
</tr>
<tr>
<td>d-000310-001952</td>
<td>&quot;DXIO data sheet Rev 2.3&quot;</td>
</tr>
</tbody>
</table>

A document, that is updated from time to time: the document number has the purpose to link several versions of the "DXIO data sheet" together. The filing number distinguishes between different versions.

- Please note, that the document number part is kept the same, as long as the basic intention of the early versions is still kept, for example during revisions due to debugging or manufacturing updates.
- In case a significant change happens, another document number would be applied.

| d-000719               | "Notes from prototype meeting ..." |

A document, that is obviously not updated after release. The "document number" part is missing and the filing number remains the only used part for identification.

Recommendation:

In your order, you may specify for example "d-000584-nnnnnn" in order to get the "newest" version of a specific product. When you do not want to follow the sequence of newer versions, i.e. you want to stick to a specific version, then specify the full identification number like "d-000584-002043".
Appendix B: Software Licensing

The software components used on the D412 are subject to specific license agreements. The following sections describe the relevant issues in a generalized form for Duagon products:

TCN Driver, MVB Client Driver, MVB Server

The following software is released under the terms of the DUAGON SOFTWARE LICENSE:

- TCN Driver Software
- MVB Client Driver Software
- MVB Server Application

These software packages (source code and/or binary) and their license agreement are available for registered download on Duagon's Web Site (http://www.duagon.com/) as part of the product specific Driver Kit.

Note: The following software parts are delivered as binary, only:
- "JDP MD-stack Software" of the CONTROLLER configuration (if needed for the product at all)
- MVB Server application

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The packages below are delivered under the terms of the "eCos license":

- The eCos Package Distribution "AT91DUAGON" is available for registered download on Duagon's Web Site (http://www.duagon.com/) as part of the Product specific Driver Kit.

- The "eCos Library for D113" is based on a public available eCos release and duagon's eCos Package Distribution "AT91-DUAGON" both configured using eCos template "duagon_D113".