



**The D217 board is a PCI Mezzanine Card (PMC) and connects the MVB Multifunction Vehicle Bus to the PMC bus.**



Data Sheet

# D217 PMC-MVB Interface

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## Introduction

The D217 is an MVB to PMC (PCI-Mezzanine-Card) interface and consists of a MVB controller chip, a local CPU and a PMC slave interface. In general, it therefore provides very similar technical possibilities like a D113, which is not subject of this document.

The detailed description of the D113 can be found in "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.

The MVB interface of the D217 complies the TCN standard IEC61375 (see chapter "Standards Reference" on page 18). It is available for all wire based physical layers being on the market today:

- 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).

A Bus Administrator is available as an option.

### How to Get Started

This data sheet describes the properties and functions of the D217 PCM-MVB adapter. It includes the essential information required for the use of the D217.

All driver related documentation and source code is contained in a so-called "Driver Kit" (see chapter "Links to other Duagon Documents" on page 21). They include step by step instructions on how to port the driver software to the customer's host system.

### Online Support

For additional information, please visit our web page [www.duagon.com](http://www.duagon.com).

There you will find:

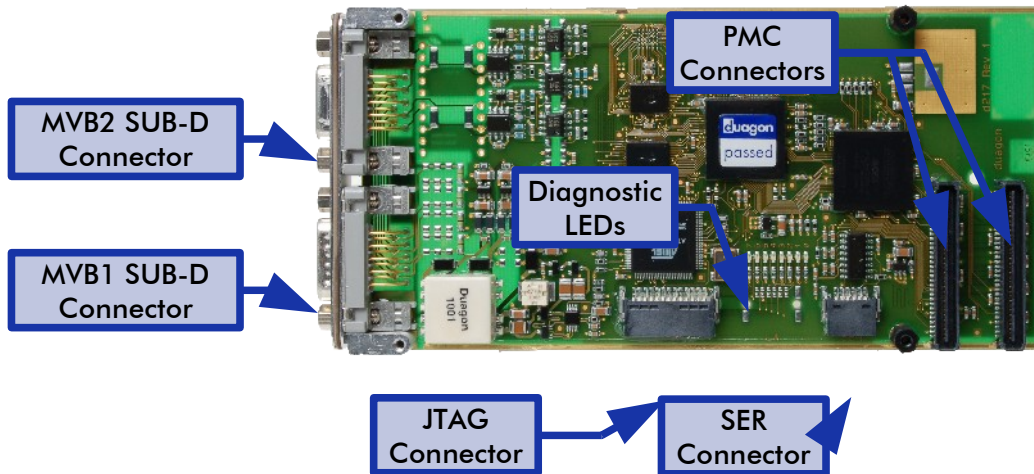
- up to date documents
- frequently asked questions
- description of new product versions

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

# Architecture

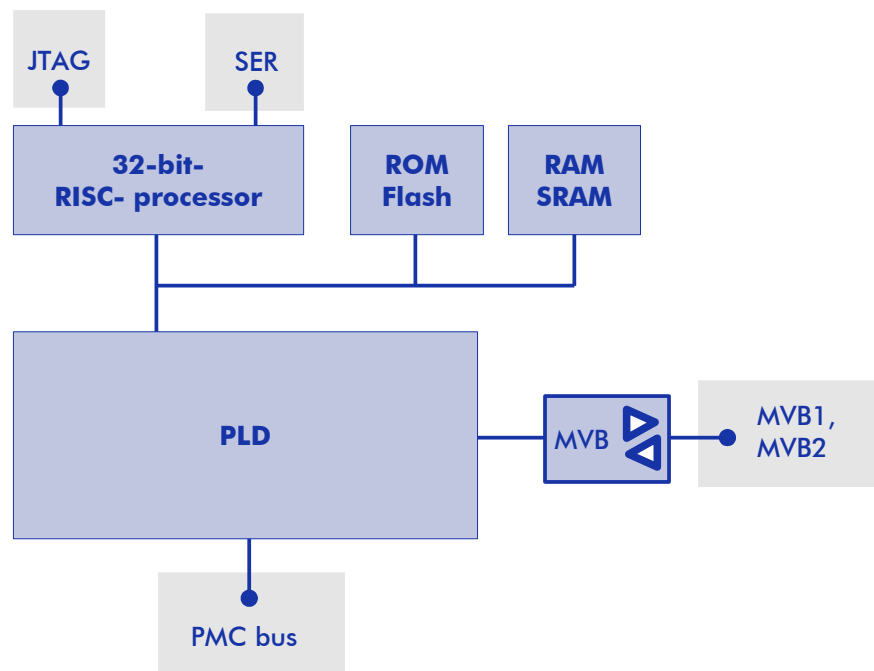
## Hardware Structure

The figure below shows the top view of the D217.



## Basic Function Blocks

The basic function blocks within the D217 are shown in the drawing below:



The "**PMC bus**" ensures a data communication path between the D217 and the local host. The PLD "programmable logic device" of the D217 provides the functionality needed for the Host Interface (i.e. UART device).

The **32bit-RISC processor** together with its support functions **RAM** and **Flash ROM** controls the information flow within the D217. It has a data bus

width of 16 bits. The processing power of up to 20 VAX-MIPS covers a wide area of requirements.

The "**traffic memory**", stores all data transferred to and from the MVB. The microprocessor can read and write the traffic memory through a 16-bit data path.

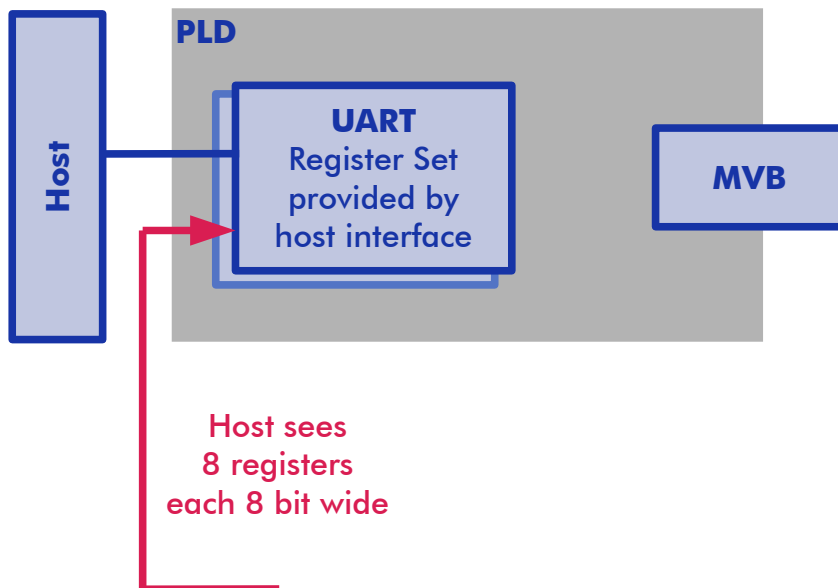
The **MVB Controller** converts the signals coming in/ going out serialized from/to the MVB into parallel data words. It checks the validity of the data and passes it to the traffic memory. It also handles the redundant MVB lines.

The "**buffers**" convert the signals on the MVB into digital levels understandable by the decoding electronics. The bus lines and the other electronics are galvanically insulated, allowing for the MVB long cables running through EMI-prone areas.

In addition to the functionality described above, a set of minor, yet necessary functions is included, too. Examples are: watchdog timer, interrupt logic, power-up circuitry, etc. Please refer to the following paragraphs for a full description.

## Host Interface

The D217 behave like an UART device, i.e. it maps an UART register set into the host system (typically a PC). This register set is used for communication between the host processor and the MVB interface.



Communication with the MVB interface over the duagon UART device basically means transferring data "as if it was sent through a serial line"; i.e. data is sent and received in a sequential manner.

The communication does not really pass a serial line, just the registers of the duagon UART device. Therefore the transmission is very fast (depending on the host microprocessor: approx. 1 to 8 Mbaud).

For more information about Duagon's UART device and its register models, please refer to the duagon document "Integration Guide for Duagon PC/104 Products", d-000529-nnnnnn.

## Software Structure

The D217 is available in the following two configurations:

Configuration	Description
MDFULL	same as configuration "MDFULL" as described in the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.
SERVER	same as configuration "SERVER" as described in the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.

## MVB Interface

The MVB interface of the D217 complies the TCN standard IEC61375 (see chapter "Standards Reference" on page 18). It is available for all wire based physical layers being on the market today:

- 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).

# Physical Interfaces

## PMC Interface

The signals are compliant to "PCI Rev2.2"; with the relevant extensions and mechanical issues from the IEEE1386-2001 and IEEE1386.1-2001. The basic features are 33MHz operation and 32-bit interface with +5.0V- signaling. For +3.3V signaling, please contact duagon for availability.

### Pin Definition

P11 32-bit PMC				P22 32-bit PMC			
Pin	Signal	Signal	Pin	Pin	Signal	Signal	Pin
1	nc	nc	2	1	nc	nc	2
3	GND	INTA/	4	3	nc	TDO	4
5	nu	nu	6	5	TDI	GND	6
7	BMOD-	+5V	8	7	GND	nc	8
9	nu	nc	10	9	nc	nc	10
11	GND	3.3vaux	12	11	BMOD-	+3.3V	12
13	CLK	GND	14	13	RST/	BMOD-	14
15	GND	nu	16	15	+3.3V	BMOD-	16
17	nu	+5V	18	17	nc	GND	18
19	+5V	AD31	20	19	AD30	AD29	20
21	AD28	AD27	22	21	GND	AD26	22
23	AD25	GND	24	23	AD24	+3.3V	24
25	GND	C/BE3	26	25	IDSEL	AD23	26
27	AD22	AD21	28	27	+3.3V	AD20	28
29	AD19	+5V	30	29	AD18	GND	30
31	+5V	AD17	32	31	AD16	C/BE2	32
33	FRAME/	GND	34	33	GND	nc	34
35	GND	IRDY/	36	35	TRDY/	+3.3V	36
37	DEVSEL/	+5V	38	37	GND	STOP/	38
39	GND	LOCK/	40	39	PERR/	GND	40
41	nc	nc	42	41	+3.3V	SERR/	42
43	PAR	GND	44	43	C/BE1	GND	44
45	+5V	AD15	46	45	AD14	AD13	46
47	AD12	AD11	48	47	GND	AD10	48
49	AD09	+5V	50	49	AD08	+3.3V	50
51	GND	C/BE0	52	51	AD07	nc	52
53	AD06	AD05	54	53	+3.3V	nc	54
55	AD04	GND	56	55	nc	GND	56
57	+5V	AD03	58	57	nc	nc	58
59	AD02	AD01	60	59	GND	nc	60
61	AD00	+5V	62	61	nc	+3.3V	62
63	GND	nc	64	63	GND	nc	64



**Notes:**

- Only the pins used by the D217 are listed.
- "nu": not used, but internally connected for optional future use.
- "nc": not connected
- TDI and TDO are simply connected to each other (no JTAG devices onboard).
- The +3.3V- Pins are not used internally on D217, but equipped with block capacitors to GND.

**Operating Conditions 5V Signaling Environment**

The D217 is designed for 5V signaling environment.

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	Supply voltage		4.75	5.25	V
$V_{IH}$	High level input voltage		2.0	$V_{CC} + 0.5$	V
$V_{IL}$	Low level input voltage		-0.5	0.8	V
$I_{IH}$	High level input leakage current	$V_{IN} = 2.7$		70	$\mu A$
$I_{IL}$	Low level input leakage current	$V_{IN} = 0.5$		-70	$\mu A$
$V_{OH}$	High level output voltage	$I_{OUT} = -2.0mA$ DC	2.4		V
$V_{OL}$	Low level output voltage	$I_{OUT} = 3mA / 6mA$ DC <sup>1)</sup>		0.55	V
$C_{IN}$	Input pin capacitance			10	pF
$C_{CLK}$	CLK pin capacitance		5	12	pF
$C_{IDSEL}$	IDSEL pin capacitance			8	pF
$L_{PIN}$	Pin Inductance			20	nH
$I_{OFF}$	PME input leakage	$V_0 \leq 5.25V$ , $V_{CC}$ off or floating	-	1	$\mu A$
$R_{CONF}$	I/O pin pull-up-resistor during PLD configuration	After Reset, for 1s	20	50	kOhm

**Note:**

- 1) Signals without pull-up resistors must have a 3 mA low output current. Signals requiring pull up must have 6 mA; the latter include, FRAME, TRDY, IRDY, DEVSEL, STOP, SERR, PERR, LOCK, INTA, INTB, INTC and INTD.

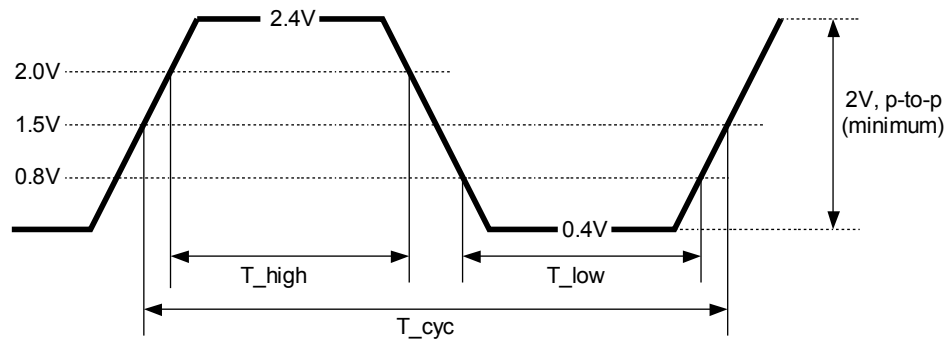
## AC Specifications

Symbol	Parameter	Conditions	Min	Max	Unit
$I_{OH(AC)}$	Switching current high	$0 < V_{OUT} \leq 1.4$	-44		mA
		$1.4 < V_{OUT} < 2.4$	$-44 + (V_{OUT} - 1.4) / 0.024$		mA
		$3.1 < V_{OUT} < V_{CC}$		Eq't'n A <sup>1)</sup>	mA
	(Test point)	$V_{OUT} = 3.1$		-142	mA
$I_{OL(AC)}$	Switching current low	$V_{OUT} \geq 2.2$	95		mA
		$2.2 > V_{OUT} > 0.55$	$V_{OUT} / 0.023$		mA
		$0.71 > V_{OUT} > 0$		Eq't'n B <sup>2)</sup>	mA
	(Test point)	$V_{OUT} = 0.71$		206	mA
$I_{CL}$	Low clamp current	$-5 < V_{IN} \leq -1$	$-25 + (V_{IN} + 1) / 0.015$		mA
$slew_r$	Output rise slew rate	0.4V to 2.4V load	1	5	V/ns
$slew_f$	Output fall slew rate	2.4V to 0.4V load	1	5	V/ns

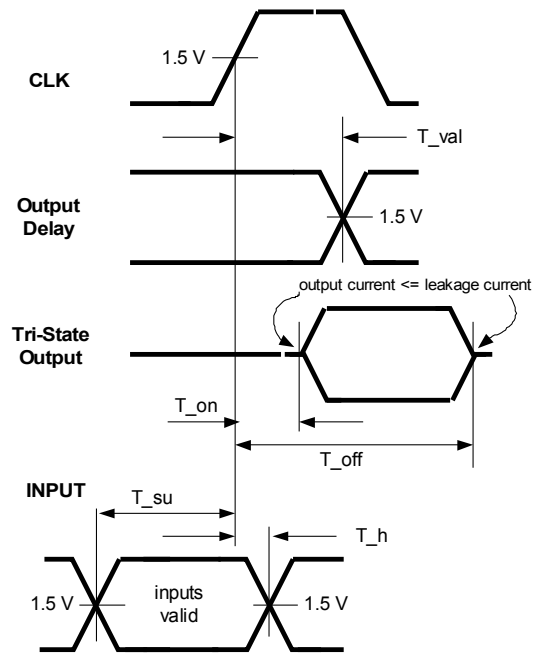
### Notes:

- Equation A:  $I_{OH} = 11.9 * (V_{out} - 5.25) * (V_{out} + 2.45)$  for  $V_{CC} > V_{out} > 3.1V$
- Equation B:  $I_{OL} = 78.5 * V_{out} * (4.4 - V_{out})$  for  $0V < V_{out} < 0.71V$

## Timings



Symbol	Parameter	Min	Max	Unit
$T_{CYC}$	CLK Cycle Time	30	$\infty$	ns
$T_{HIGH}$	CLK High Time	11		ns
$T_{LOW}$	CLK Low Time	11		ns
-	CLK Slew Rate	1	4	V / ns
-	RST* Slew Rate	50	-	mV / ns



Symbol	Parameter	Min	Max	Unit
T <sub>VAL</sub>	CLK to Signal Valid Delay – bused signals	2	11	ns
T <sub>VAL(ptp)</sub>	CLK to Signal Valid Delay – point to point	2	12	ns
T <sub>ON</sub>	Float to Active Delay	2		ns
T <sub>OFF</sub>	Active to Float Delay		28	ns
T <sub>SU</sub>	Input Setup Time to CLK – bused signals	7		ns
T <sub>SU(ptp)</sub>	Input Setup Time to CLK – point to point	10, 12 <sup>1)</sup>		ns
T <sub>H</sub>	Input Hold Time from CLK	0		ns
T <sub>RST</sub>	Reset active time after power stable	1		ms
T <sub>RST-CLK</sub>	Reset active time after CLK stable	100		us
T <sub>RST-OFF</sub>	Reset Active to Output Float delay		40	ns
T <sub>RHFA</sub>	RST* High to First configuration Access	2 <sup>25</sup> 2)		clocks
T <sub>RHFF</sub>	RST* High to First FRAME* assertion	5		clocks

**Notes:**

- 1) REQ\* and GNT\* are point-to-point signals and have different output valid delay and input setup times than do bused signals. GNT\* has a setup of 10; REQ\* has a setup of 12. All other signals are bused.
- 2) During the first 2<sup>25</sup> clocks after RST\* high, the D217 ignores all (configuration) accesses.

## MVB Interface

The D217 is designed to be mounted in a PMC slot.

Two SUB-D connectors, mounted on a front bezel, are used for the MVB connection. One of the SUB-D connectors is "male", the other is "female"; as it is defined in the TCN standard. The SUB-D screw locks are available with M3 metric inner threading.

For further information about the MVB interface, such as ESD+, EMD and the optional Bus Administrator, as well as shielding and insulation concepts, please refer to the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.

## Serial Line Interface (SER)

There is one serial line interface (RS232) implemented. It has no galvanic insulation to the digital logic, and has no hardware handshake switched on. It is intended for internal D217 software debugging, only. It is recommended to use this serial line for no other purposes.

## Pin Definition

Pin #	Signal Name	Input / Output as seen from the D217	Description
1	nc	-	not connected
2	nc	-	
3	RxD	Input	Receive data input
4	RTS	Output	Request To Send (not used by default)
5	TxD	Output	Transmit data output
6	CTS	Input	Clear To Send (not used by default)
7	nc	-	not connected
8	nc	-	
9	GND	(power line)	Reference potential
10	+5V	(power line)	Power line, internally connected to the PC/104 +5V power line. May be used to power the D217 in certain situations.
11	nc	-	not connected
12	nc	-	not connected

The serial line interface is not accessible from the outside of the computer, i.e. there is no corresponding connector on the PMC front bezel.

For further information about the serial line interface, please refer to the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.

## JTAG Interface

The D217 uses the JTAG connector for debugging and loading the flash memory (at virgin state after production).

### Pin Definition

Pin #	Signal Name	Comment
1	+3.3V	Local power line
2	+3.3V	Local power line
4	GND	Local power reference
5	TDI	JTAG signal line
6	GND	Local power reference
7	TMS	JTAG signal line
8	GND	Local power reference
9	TCK	JTAG signal line
10	GND	Local power reference
12	GND	Local power reference
13	TDO	JTAG signal line
14	GND	Local power reference
15	nRST	JTAG signal line
16	GND	Local power reference
18	GND	Local power reference
19	BURNIN	For Duagon internal purposes, only
20	GND	Local power reference

#### Note:

- All other pins are not connected (NC).

The JTAG interface is only accessible directly on the D217 board, i.e. there is no corresponding connector on the PMC front bezel.

#### Important Remark:



As a matter of fact, new firmware versions may occur. In order to avoid dismounting and mounting for reprogramming, we strongly recommend to keep the access to the JTAG connector free (when the D217 is mounted in your system).

For further information about the JTAG interface, please refer to the "D113 PC/104 MVB Interface – Data Sheet", d-000351-nnnnnn.

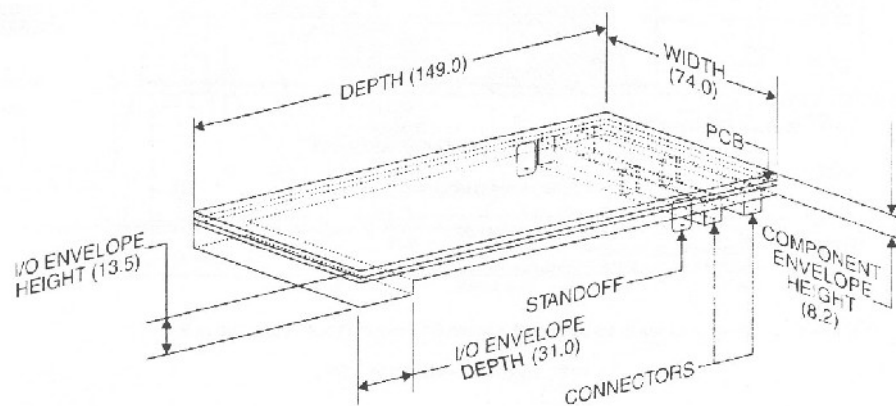
## Mechanical Data

### Mechanical Dimensions and Weight

#### PMC / CMC Format

The mechanical format is of the D217 is "single CMC" size. The available space for components varies for different locations. For more details, please refer to IEEE1386 (see chapter "Standards Reference" on page 18).

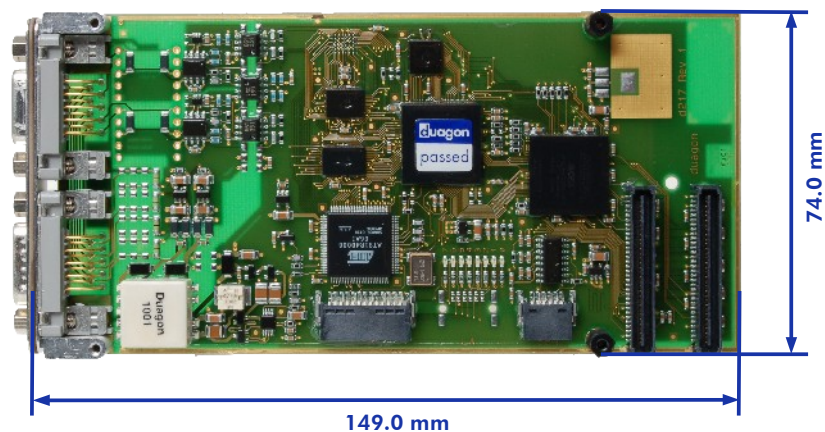
The mounting on the host card is done "upside down", i.e. the components of the host card and of the PMC module are located face-to-face.



Note—Basic dimensions are to be true position within 0.15 mm of Datum A and Datum B.

Figure 5—Single size CMC envelope (front panel not shown)

#### Top View



#### Side View



The mass of the D217 is approximately 75g.

## Cabling / Cable Locks



The MVB cables on the outside are usually very stiff and heavy. From the mechanical point of view the SUB-D connectors are not strong enough to keep vibration or bending stress without any strain relief. The solder junctions are not able to carry this high mechanical stress. Instead any other fixture must be used (e.g. front plate, or other strain relief).



The screw locks have an inner threading M3. Do not try to mount the wrong connectors, it will destroy the thread!



The maximum torque for the screw locks is 40cNm. A higher torque may destroy the thread!

For more information see the "Material and Components for Wiring – Technical Note", d-000842-nnnnnn.

## Environmental Data

Issue	min	typ.	max.	Unit	Remarks
Operational temperature range	-40	+25	+85	°C	EN50155:2007 4.1.2: Class TX
Temperature rise of directly surrounding air after power-on		1	4	°C	measurement 10min after power on
Altitude above sea level			1800	m	EN50155:2007 4.1.1 For derating of maximum temperature with respect to altitude levels in excess please call duagon.
Relative humidity		<75%	95%		Typical value for yearly average, max value for 30 consecutive days per year. Short term moisture condensation without malfunction (DIN EN 60068-2-30:2006-05)
Vibration			2 50	mm m/s <sup>2</sup>	EN50155:2007 12.2.11 for 5-25 Hz for 25- 150 Hz
Shock			50	m/s <sup>2</sup>	duration 50ms
RFI susceptibility from 0.15 to 2000 MHz.	20			V/m	class FS2 in EN50155 (in rack housing)



## Application Hints

### Diagnostic by LEDs

A set of eight general purpose diagnostic LEDs is used for self test purposes. When an error is encountered during self tests, the LEDs display the test number. This can be used in order to find the reason for a failure more efficiently.

The particular meaning of the LED diagnostic codes is highly application specific. Please refer to the related documentation in the Driver Kits (see chapter "Standards Reference" on page 18).

### Reset Mechanism

The D217 board generates its own undervoltage supervision circuitry on-board. The switching level for the internal RESET is below the lower  $V_{CC}$  limit.

The pin "RST" of the PMC bus is monitored by the onboard CPU in order to correctly reflect the system reset status.

### PLD Load Procedure

On the D217 the two PLD chips have to be loaded after power-on. This procedure takes up to approx. twice 0.5 seconds and is automatically performed. However, the device is completely passive during this time, "as if nothing is plugged in".

On the PMC side, a target is required to not complete any request during initialization time, which is defined to be  $2^{25}$  clocks (~1 second at 33MHz). This approximately matches the PLD load time; therefore no additional initialization wait time is implemented.

## Standards Reference

The D217 complies to the listed "normative references" in general. For more detailed information about testing, not applicable subclauses, etc. please contact duagon.

### Electromagnetic Compatibility

**EN50121-3-2:2006:** The D217 MVB interface product line complies to EN-50121 under the precondition, that it is used in an environment being on acceptable technical level. The reason for this restriction is, that our product cannot be tested according to the mentioned standard as it is (it is a board level product, not a device). A high amount of EMI will be generated from other components like power supply, local CPU board, housing, cabling. We do not have an influence on these parameters. In addition, these parameters change from application to application, which voids the statements from previously made tests; i.e. the tests have to be repeated.

The statements apply in a similar way to both emission and immunity.

For a typical MVB interface application, most of the statements about "**transients**" have no influence to the D217. There are no battery referenced inputs or outputs from the D217 available on the outside of the devices. We assume, that the D217 power supply is galvanically insulated and/ or the D217 signal lines have no connection with unshielded cables to the outside.

Please note, that the MVB must be used with shielded cables. This leads to the fact, that the successful survival under these tests depends from a well working grounding structure. We therefore highly recommend to have a low impedance path from the MVB cable shield to the housing ground.

### Insulation

**IEC61375-1:2007:** MVB physical layer, applied to EMD and ESD in the same way, according to IEC60571:2006, 500Vrms, 1M $\Omega$  for 1 minute. Each individual device is tested prior to shipment (routine testing). During routine testing, the testing is optionally changed to sinusoidal 708Vrms or 1000Vdc, 1M $\Omega$  for 10sec.

**EN50155:2007 12.2.9:** Insulation measurement test / Voltage withstand test. Same as for IEC61375.

Note: From EN50155:2007 7.2.1 it is assumed that the power supply for the D016 is galvanically insulated from the vehicle battery.

### Useful Life

**EN50155:2007 6.2:** There are reprogrammable components used in the D217. These are specified from the manufacturer with 20 years data retention at 125° Celsius, which fits clause 6.2. The actual "useful life" can be extended by reprogramming these devices.

There are no other components with a limited useful life. Particularly, there are no electrolytic capacitors, which typically introduce a limitation to useful life.

### Components

**EN50155:2007 8.1.5 and 8.1.7:** There may be specialized components/ single source components included in the product. Contact Duagon for more information about repair and long term shipment procedures.

## Shock and Vibration

**EN50155:2007 4.1.3:** The D217 product line complies to EN50155 under the precondition, that it is used in an environment being on acceptable technical level. The reason for this restriction is, that our product cannot be tested according to the mentioned standard as it is (it is a board level product, not a device). Resonance effects are influenced by the housing. We do not have an influence on these parameters. In addition, these parameters change from application to application, which voids the statements from previously made tests; i.e. the tests have to be repeated.

## MVB

**IEC61375-1:2007:** International Electrotechnical Commission, "Electric Railway Equipment, Train bus, Train Communication Network": Clause 3 describes the MVB "Multifunction Vehicle Bus".

## Common Mezzanine Card

**IEEE1386:2001:** IEEE Standard for a Common Mezzanine Card (CMC) family. This document basically defines mechanical board size and mechanical connector features.

## PMC

**IEEE1386.1:2001:** IEEE Standard Physical and Environmental Layers for PCI Mezzanine Cards (PMC).

This document describes the pin allocation of a CMC- module for the use with PCI signals; which in turn are defined in the "PCI 2.2" definition.

## PCI 2.2

PCI Local Bus Specification, Revision 2.2, December 1998, PCI Special Interest Group, 5440 SW Westgate Drive, Suite 217, Portland, OR 97221, USA.

## 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.

## Fire and Smoke

**EN45545-2:2010:** The D217 falls in the category of "not-listed" products. There are no special requirements for products with a mass lower than 100g (interior location) and 400g (exterior location). The mass of the D217 is approximately 75g.

**NF F16-102:1992:** According to the French standard NF F16-102 no requirements are necessary for electrical systems with a mass lower than 300g, which are situated in a technical compartment, in the open air, a box, a cabinet or as a block equipment. The mass of the D217 is approximately 75g.

## Humidity

**EN60068-2-30:2006:** Provides a composite test procedure, primarily intended for component type specimens, to determine, in an accelerated manner, the resistance of specimens to the deteriorative effects of high temperature/humidity and cold conditions.

## Links to other Duagon Documents

In general, most of the documents are located on [www.duagon.com](http://www.duagon.com), and may be downloaded from there in the most up to date version.

### **Integration Guide for Duagon PC/104 Products, d-000529-nnnnnn**

This document contains the description of Duagon's UART device and its register model, which is provided by the D217 host interface.

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

Since the D217 was derived from a D113 product, a lot of statements made for the D113 are still valid for the D217.

### **MDFULL Driver Kit for D217, d-000902-nnnnnn**

The MDFULL Driver Kit is intended for the D217 running in configuration "MDFULL". The Driver Kit provides an easy way to implement the communication between your application and the MVB interface. The Driver Kit contains the needed documents and driver software (e.g. ANSI C source code of driver, driver porting guide, API interface description, as well as board specific firmware with documentation how to download).

### **SERVER Driver Kit for D217, d-000903-nnnnnn**

The SERVER Driver Kit is intended for the D217 running in configuration "SERVER". The Driver Kit provides an easy way to implement the communication between your application and the MVB interface. The Driver Kit contains the needed documents and driver software (e.g. ANSI C source code of driver, driver porting guide, API interface description, as well as board specific firmware with documentation how to download).

### **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.

### **Life Cycle of Duagon's Products – Technical Note, d-000526-nnnnnn**

Opens up some MTBF and Life Cycle considerations of other duagon products; may be used to get a rough impression about planning the life time repair stock in order to ensure long support times.

### **Material and Components for Wiring – Technical Note, d-000842-nnnnnn**

This document is intended for engineers to help them select the right components.

## D217 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.

Both information will build the order code.

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

### Hardware Options

<b>D217F</b>	<b>.T</b>
<b>Product Type: *</b>	
MDFULL SERVER	<b>D217LF</b> <b>D217F</b>
<b>MVB Type:</b>	
EMD	<b>.T</b>
ESD+	<b>.D</b>

(\*) MVB Bus Administrator is included in both product types

### Software Options ("OP" number)

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.

### Order Code Example

Hardware Options	downloadable & other options (also known as "OP")
D217.T	d-000915-002671

If the user is not sure, what has been delivered: Locate the serial number of the product and call duagon. We can give you the information back, what downloadable options were programmed to the board at delivery time.

**Note:** The serial number is an eight-digit number. For more information about serial number label on the product, please refer to the duagon document "d-000778, Labeling and Packaging" (see page 21).



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

### Preferred Option Set Combinations

The functionality as described in this data sheet (no customer specific changes) is intended to be identified with the following document numbers:

Intended for hardware...	Document number downloadable options (OP)	Description
D217F.D	d-000914-nnnnnn	Supports <b>MVB Server</b> with 4096 PD ports of 32-byte length each, MD support, MVB bus administrator. <ul style="list-style-type: none"> <li>• IO-mapped UART device</li> <li>• full UART register set (i.e. COM emulation)</li> <li>• interrupt support</li> <li>• Big Endian data representation for internal UART Emulation</li> </ul>
D217F.T	d-000915-nnnnnn	

Intended for hardware...	Document number downloadable options (OP)	Description
D217LF.D	d-000912-nnnnnn	Supports the <b>MDFULL</b> UART Emulation with 4096 PD ports of 32-byte length each, MD support, MVB bus administrator. <ul style="list-style-type: none"> <li>• IO-mapped UART device</li> <li>• reduced UART register set</li> <li>• no interrupt</li> <li>• Big Endian data representation UART emulation</li> </ul>
D217LF.T	d-000913-nnnnnn	

For any additional custom specific modifications, please call duagon. We will submit an offer about your implementation.

## Document History

### d-000739-008856

- Update Standard References
- company address and phone number updated
- Various minor changes, mainly editorial

### d-000739-007530

#### Standardization and actualization

- regrouping of chapters
- several minor changes / mainly editorial
- updated Standards Reference
  - Manufacturing
  - Humidity
  - Fire and Smoke

### d-000739-003046

- Renaming in section "D215 Order Information": Always use D217F.x to indicate the included MVB bus administrator.
- Update OP numbers for SERVER (section "Preferred Option Set Combinations").
- Update of EN50155 standard references (EN50155:1999 to EN-50155:2001).
- Update reference to D113 data sheet (new document number d000351-003403).
- Generalization of Appendix A "Document Numbering System" to "General Order Information" and adaption of the Chapter "D217 Order Information".
- Add new Appendix "Software Licensing"

### d-000739-003046

- Modifications to release series production (status "official").
- Introduce configurations "MDFULL" and "SERVER" (see chapter "Introduction").
- Add new top level chapter "Architecture", which includes "Hardware Structure" and "Application Hints".
- Add new section "Host Interface" and corresponding references (see chapters "Architecture" and "References").
- Multiple minor changes, mainly editorial.

### d-000739-002553

- New photos (status "preliminary").

### d-000739-002318

- Preliminary release of this document (status "preliminary").



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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:

Prefix	Document number	Filing number
d	-000310	-001952
Always constant	<p>Specifies a certain purpose of a document with the intention to link several documents with different filing number.</p> <p>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.</p> <p>The format is either 6 digits or not available.</p>	<p>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.</p> <p>Always 6 digits.</p>

### Examples for identification numbers

Identification number	Document Title / Remarks
d-000310-001606	"DXIO data sheet Rev 2.2"
d-000310-001952	"DXIO data sheet Rev 2.3"
	<p>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.</p> <p>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.</p> <p>In case a significant change happens, another document number would be applied.</p>
d-000719	"Notes from prototype meeting ..."
	<p>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.</p>

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 D215 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

#### DUAGON SOFTWARE LICENSE

Duagon cedes the present software to the customer in source code and/or binary form exclusively in order that the customer may modify or test it for running on the customer's system containing the Duagon products.

The binary form of the software or the modified software, regardless of whether the modifications to the software were made by the customer or by Duagon, is ceded to the customer to be used exclusively under a run time license

All rights, especially the intangible property rights to the software and the modified software shall belong exclusively to Duagon regardless of whether the modifications to the software were made by the customer or by Duagon. Also the rights to the modified software shall belong exclusively to Duagon.

The customer may not, either in source code or binary form - transmit the software or the modified software to third parties, or - use the software or the modified software for purposes other than those specifically mentioned above.

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By copying, installing or using the present software, the customer declares that it has taken cognizance of these software license regulations and has accepted them.

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## MicroMonitor

The "MicroMonitor for D217" is based on the Original MicroMonitor software as it was released by Bell Labs as open source software under the terms of the LUCENT PUBLIC LICENSE.

The Original MicroMonitor Software and its license agreement are available for public download on Lucent Technologies' Research Software Distribution Web Site (<http://www.umonfw.com/>).

Duagon distributes the Object Code as well as the modified Source Code of the "MicroMonitor for D217" under the terms of the same LUCENT PUBLIC LICENSE.

Please contact Duagon to get a copy of the Source Code.