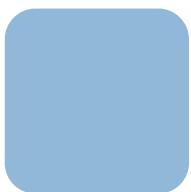
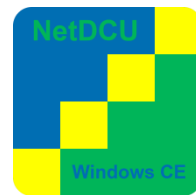
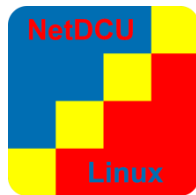


Hardware Documentation

NetDCUA5

Version 1.03
2017-12-15



**Elektronik
Systeme**

© F&S Elektronik Systeme GmbH

Untere Waldplätze 23

D-70569 Stuttgart

Fon: +49(0)711-123722-0

Fax: +49(0)711 – 123722-99

About This Document

This document describes the hardware of the NetDCUA5.

The latest version of this document can be found at <http://www.fs-net.de>.

History

Date	V	Platform	A,M,R	Chapter	Description	Au
2013-02-22	0.01				Initial Release	DB
2013-07-25	0.03		A	5	Change battery current	DB
2014-08-15	0.03		M	*	Change of Company CI	JG
2014-08-18	1.00		M	6	Add power consumption	KW
2014-10-06	1.01		A	2.4.4 , 2.7.2 2.8.1	Fifo depth of UART interfaces	HF
2014-10-06	1.01		M	2.8.3 2.8.4	Add Note regarding compatibility to NetDCU8/NetDCU10	HF
2015-03-11	1.02		R	2.7.2	J5 I/O Interface	HF
2015-03-11	1.02		M	2.7	Changed signal name to CPU internal name.	HF
2017-12-15	1.03		A	7, 8, 9	Add Storage, ROHS and Matirix Code	KW

V Version
A,M,R Added, Modified, Removed
Au Author

Table of Content

About This Document	2
History	2
Table of Content	3
1 Arrangement of Connectors	5
2 Connectors	6
2.1 Counting of the connector pins	6
2.2 Connector type	6
2.3 Signal levels	6
2.4 J1	7
2.4.1 J1 Power Supply.....	8
2.4.2 J1 Ethernet Interface 1	8
2.4.3 J1 Ethernet Interface 2 (Optional)	9
2.4.4 J1 Serial RS232 Port COM2	9
2.4.5 J1 CAN Interface 1	10
2.4.6 J1 CAN Interface 2 (Optional).....	10
2.5 J3 RGB interface	11
2.6 J4 FS-Bus (8 bit Extension interface).....	12
2.7 J5	13
2.7.1 J5 Matrix Keyboard.....	14
2.7.2 J5 serial RS232 COM1	15
2.7.3 J5 I2C.....	15
2.7.4 J5 SPI.....	15
2.8 J7	16
2.8.1 J7 serial RS232 COM3	17
2.8.2 J7 Touchpanel.....	17
2.8.3 J7 USB Host.....	17
2.8.4 J7 USB Device	18
2.8.5 J7 Audio Interface.....	18
2.8.6 J7 Analog Input.....	19
2.9 J11 SD Card.....	19
3 Status Indicators	20
4 Configuration	21
4.1 Display Interface.....	21
4.2 FS-Bus	22
5 Electrical Data	23
5.1 Power consumption	23
5.2 DC electrical characteristics for 3.3V IO pins	23
6 Technical Data	24
7 Appendix	25
7.1 Important Notice	26
7.2 Warranty Terms.....	27
7.3 Figures	28
7.4 List of Tables	28

1 Arrangement of Connectors

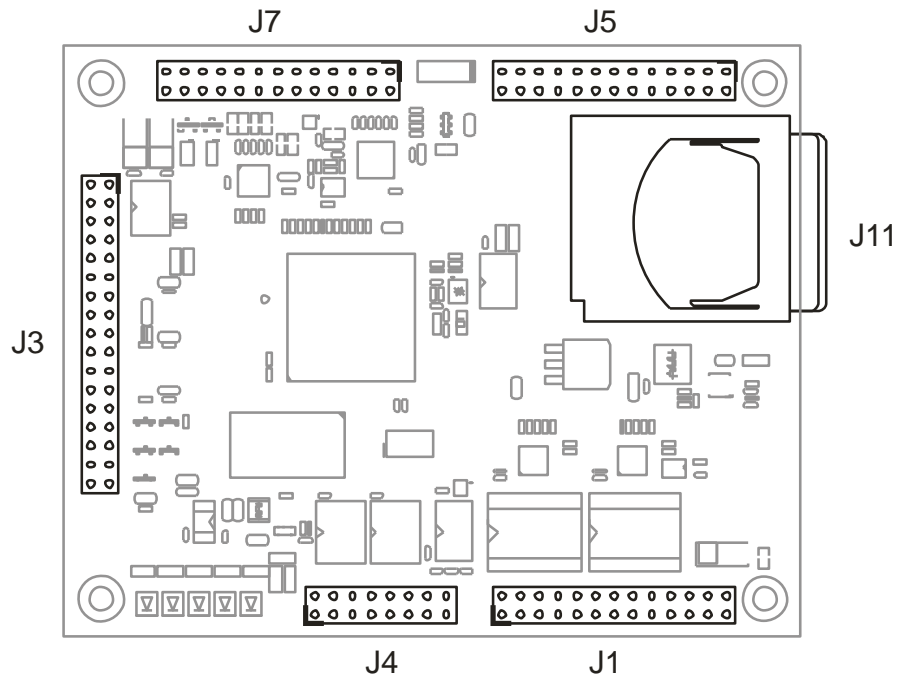


Figure 1.1: Top View

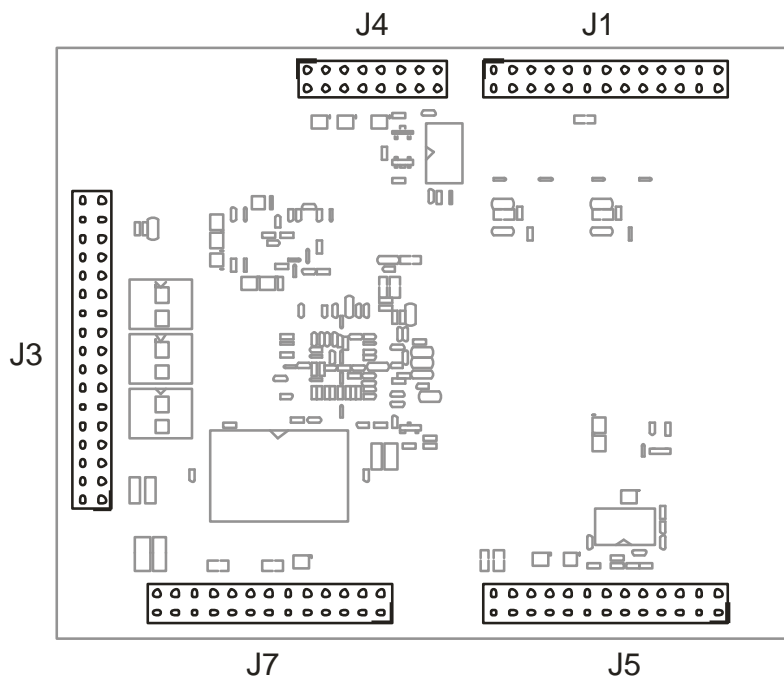


Figure 1.2: Bottom View

2 Connectors

2.1 Counting of the connector pins

All connections prepared for two-row connectors on the NetDCUA5 are treated as follows. The row with pin 1 contains all odd-numbered pins (1, 3, 5, 7, etc.), and, corresponding to this, the row without pin 1 contains all even-numbered pins (2, 4, 6, 8, etc.). Pin 1 is marked with a small triangle on the PCB

2.2 Connector type

Connectors J1, J3, J4, J5, and J7 are 2.54mm pitch dual row holes for THT connectors. All of them are on the same 2.54mm grid. Customer specific connectors can be soldered by F&S. Ask sales (sales@fs-net.de) for a quote.

2.3 Signal levels

The signal level of the I/O pins normally is 3.3V. Exceptions are RS232, Ethernet, CAN, Audio. USB

2.4 J1

J1 on NetDCUA5 combines J1 and J2 on older NetDCUs

J1					
Pin	NetDCU 5.2/6/8	NetDCU 9/10/11	Signal	Function	I/O
1	J2/2	J2/2	RX1+	ETH1-RX (Pin 3 of RJ45 connector)	
2	J2/1	J2/1	RX1-	ETH1-RX (Pin 6 of RJ45 connector)	
3	J2/4	J2/4	RTS2	Request To Send COM2	O
4	J2/3	J2/3	RXD2	Receive Data COM2	I
5	J2/6	J2/6	CTS2	Clear To Send COM2	
6	J2/5	J2/5	TXD2	Transmit Data COM2	O
7	J2/8	J2/8	TX1+	ETH-TX (Pin 1 of RJ45 connector)	
8	J2/7	J2/7	TX1-	ETH-TX (Pin 2 of RJ45 connector)	
9	J2/10	J2/10	V50-OUT	+5V DC Out	Power O
10	J2/9	J2/9	GND	Signal Ground	Power
11	J2/12	J2/12	CAN1-TxD	CAN1 Transmit signal (5V level)	O
12	J2/11	J2/11	CAN1-RxD	CAN1 Receive signal (5V level)	I
13		J2/14	CAN2-TxD	CAN2 Transmit signal (5V level)	O
14		J2/13	CAN2-RxD	CAN2 Receive signal (5V level)	I
15			RX2+	ETH2-RX (Pin 3 of RJ45 connector)	
16			RX2-	ETH2-RX (Pin 6 of RJ45 connector)	
17			TX2+	ETH2-TX (Pin 1 of RJ45 connector)	
18			TX2-	ETH2-TX (Pin 2 of RJ45 connector)	
19	J1/1	J1/1	VCFL-IN	+5V ... +20V Input / max. 2A DC (CFL- Converter)	Power I
20		J1/2	NC	NC	
21	J1/2	J1/3	V50-IN	+5V ±5% DC Input	Power I
22		J1/4	V50-IN	+5V ±5% DC Input	Power I
23	J1/3	J1/5	VBAT	+3V...+3,6V DC Input (RTC battery backup) (*)	Power I
24		J1/6	NC	NC	
25	J1/4	J1/7	GND	GND (Ground Power Supply)	Power
26		J1/8	GND	GND (Ground Power Supply)	Power

Table 1: Connector J1

2.4.1 J1 Power Supply

J1			
Pin	Signal	Function	I/O
19	VCFL-IN	+5V ... +20V Input / max. 2A DC (CFL-Converter)	Power I
21	V50-IN	+5V \pm 5% DC Input	Power I
22	V50-IN	+5V \pm 5% DC Input	Power I
23	VBAT	+3V...+3,6V DC Input (RTC battery backup) (*)	Power I
25	GND	GND (Ground Power Supply)	Power
26	GND	GND (Ground Power Supply)	Power

Table 2: Connector J1 – Power Supply

VBAT is not required for operation and can be left out if RTC battery backup is not needed. See chapter 5.1 for VBAT power consumption.

If an external 3.3V power supply is used for external logic, we recommend to use a V33-OUT pin as enable signal for this power supply to avoid backdrive leak current through IO pins.

2.4.2 J1 Ethernet Interface 1

J1			
Pin	Signal	Function	I/O
1	RX1+	ETH1-RX (Pin 3 of RJ45 connector)	
2	RX1-	ETH1-RX (Pin 6 of RJ45 connector)	
7	TX1+	ETH1-TX (Pin 1 of RJ45 connector)	
8	TX1-	ETH1-TX (Pin 2 of RJ45 connector)	

Table 3: Connector J1 – Ethernet Interface 1

Connect directly to RJ45 connector

The intra pair mismatch of each differential pair should be <50 mil (1.27mm).

Please also refer our ["Ethernet Routing Guidelines"](#) on our web download area and refer the comments at our forum.

2.4.3 J1 Ethernet Interface 2 (Optional)

J1			
Pin	Signal	Function	I/O
15	RX2+	ETH2-RX (Pin 3 of RJ45 connector)	
16	RX2-	ETH2-RX (Pin 6 of RJ45 connector)	
17	TX2+	ETH2-TX (Pin 1 of RJ45 connector)	
18	TX2-	ETH2-TX (Pin 2 of RJ45 connector)	

Table 4: Connector J1 – Ethernet Interface 2

Connect directly to RJ45 connector

The intra pair mismatch of each differential pair should be <50 mil (1.27mm).

Please also refer our ["Ethernet Routing Guidelines"](#) on our web download area and refer the comments at our forum.

2.4.4 J1 Serial RS232 Port COM2

J1			
Pin	Signal	Function	I/O
3	RTS2	Request To Send COM2	O
4	RXD2	Receive Data COM2	I
5	CTS2	Clear To Send COM2	I
6	TXD2	Transmit Data COM2	O
10	GND	Signal Ground	Power

Table 5: Connector J1 – Serial Interface COM2

- RS232 level
- 16-entry transmit and 16-entry receive FIFOs (Vybrid SCI1)

2.4.5 J1 CAN Interface 1

J1			
Pin	Signal	Function	I/O
9	V50-OUT	+5V DC Out	Power O
10	GND	Signal Ground	Power
11	CAN1-TxD	CAN1 Transmit signal (5V level)	O
12	CAN1-RxD	CAN1 Receive signal (5V level)	I

Table 6: Connector J1 – CAN Interface 1

Note:

The CAN signals can NOT be connected directly to the CAN bus. You need a CAN transceiver to connect to the CAN bus. See starter kit schematics for an example

2.4.6 J1 CAN Interface 2 (Optional)

J1			
Pin	Signal	Function	I/O
9	V50-OUT	+5V DC Out	Power O
10	GND	Signal Ground	Power
13	CAN2-TxD	CAN2 Transmit signal (5V level)	O
14	CAN2-RxD	CAN2 Receive signal (5V level)	I

Table 7: Connector J1 – CAN Interface 2

Note:

The two CAN signals can NOT be connected directly to the CAN bus. You need a CAN transceiver to connect to the CAN bus. See starter kit schematics for an example

2.5 J3 RGB interface

J3			
Pin	Signal	Function	
1	GND	Ground	Power
2	R3	Digital R1	O
3	R2	Digital R0	O
4	G7	Digital G5 (MSB)	O
5	G6	Digital G4	O
6	G5	Digital G3	O
7	G4	Digital G2	O
8	GND	Ground	Power
9	B5	Digital B3	O
10	B4	Digital B2	O
11	B3	Digital B1	O
12	B2	Digital B0	O
13	G3	Digital G1	O
14	G2	Digital G0	O
15	B7	Digital B5 (MSB)	O
16	B6	Digital B4	O
17	GND	Ground	Power
18	VEEK	BL dimming voltage (0..3.3V)	O
19	CLK	Digital CLK	O
20	VSYNC	Digital Vsync	O
21	DE	Digital Data Enable	O
22	HSYNC	Digital Hsync	O
23	DEN	Display On Signal	O
24	GND	Ground	Power
25	VLCD	Display voltage (3.3V/5V) set with Jumper J1 and J2	Power O
26	NC		
27	NC		
28	GND	Ground	Power
29	NC		
30	VCFL	Switched voltage from J1	Power O
31	R4	Digital R2	O
32	R5	Digital R3	O
33	R6	Digital R4	O
34	R7	Digital R5 (MSB)	O

Table 8: Connector J3 – Display Interface

2.6 J4 FS-Bus (8 bit Extension interface)

J4 parallel extension interface			
Pin	Signal	Function	
1	D0	Data Bit D0, I/O	I/O *
2	D1	Data Bit D1, I/O	I/O *
3	D2	Data Bit D2, I/O	I/O *
4	D3	Data Bit D3, I/O	I/O *
5	D4	Data Bit D4, I/O	I/O *
6	D5	Data Bit D5, I/O	I/O *
7	D6	Data Bit D6, I/O	I/O *
8	D7	Data Bit D7, I/O	I/O *
9	VIO	IO Voltage Out, +3,3V / +5V	Power O
10	RD	Read, output, active High	O *
11	NCS	Chip Select, output, active Low	O *
12	ADE	Address Enable, output, active High	O *
13	NIRQ	Interrupt, input, active Low	I *
14	NRES	Reset, input, active Low	I
15	PWM	PWM Output	O
16	GND	Signal Ground	Power

Table 9: Connector J4 – FS-Bus

*: Input/output with Pull Up resistor 4,7kΩ to VIO

FS-Bus voltage can be 3.3V or 5V depending on configuration. See chapter [4.2](#) for jumper settings.

PWM is always 3.3V.

2.7 J5

J5			
Pin	Signal	Function	I/O
1	PTB18	I/O	I/O
2	PTA12	I/O	I/O
3	PTA11	I/O	I/O
4	PTA10	I/O	I/O
5	PTA9	I/O	I/O
6	PTA8	I/O	I/O
7	PTD26	I/O	I/O
8	PTD25	I/O	I/O
9	PTD24	I/O	I/O
10	I2C2-DAT / SPI0-MISO / PTB20	I2C Data / SPI MISO / I/O	I/O *
11	I2C2-CLK/SPI0- MOSI / PTB21	I2C Clock / SPI MOSI / I/O	I/O *
12	RXD1	Receive Data COM1	I
13	SPI0-CS0 / PTB19	SPI Chip Select / I/O	I/O *
14	TXD1	Transmit Data COM1	O
15	SPI0-CLK / PTB22	SPI Clock / I/O	I/O *
16	GND	Signal Ground	Power
17	PTD31	I/O	I/O *
18	PTD30	I/O	I/O *
19	PTD29	I/O	I/O *
20	PTD6	I/O	I/O *
21	PTD5	I/O	I/O *
22	PTD4	I/O	I/O *
23	PTD3	I/O	I/O *
24	PTD2	I/O	I/O *
25	V50-OUT	+5V DC Out	Power O
26	V33-OUT	+3.3V DC Out	Power O

Table 10: Connector J5

*: pull-up resistor 4,7kΩ to +3,3V.

2.7.1 J5 Matrix Keyboard

J5			
Pin	Signal	Function	I/O
2	ROW7	Matrix Keyboard Row 7	O
3	ROW6	Matrix Keyboard Row 6	O
4	ROW5	Matrix Keyboard Row 5	O
5	ROW4	Matrix Keyboard Row 4	O
6	ROW3	Matrix Keyboard Row 3	O
7	ROW2	Matrix Keyboard Row 2	O
8	ROW1	Matrix Keyboard Row 1	O
9	ROW0	Matrix Keyboard Row 0	O
10	COL8	Matrix Keyboard Column 8	I *
11	COL9	Matrix Keyboard Column 9	I *
13	COL10	Matrix Keyboard Column 10	I *
15	COL11	Matrix Keyboard Column 11	I *
16	GND	Signal Ground	Power
17	COL7	Matrix Keyboard Column 7	I *
18	COL6	Matrix Keyboard Column 6	I *
19	COL5	Matrix Keyboard Column 5	I *
20	COL4	Matrix Keyboard Column 4	I *
21	COL3	Matrix Keyboard Column 3	I *
22	COL2	Matrix Keyboard Column 2	I *
23	COL1	Matrix Keyboard Column 1	I *
24	COL0	Matrix Keyboard Column 0	I *
25	V50-OUT	+5V DC Out	Power O
26	V33-OUT	+3.3V DC Out	Power O

Table 11: Connector J5 – Matrix Keyboard

*: pull-up resistor 4,7kΩ to +3,3V.

Not all pins are required for matrix keyboard functionality. Unused pins can be configured for different functions.

2.7.2 J5 serial RS232 COM1

J5			
Pin	Signal	Function	I/O
12	RXD1	Receive Data COM1	I
14	TXD1	Transmit Data COM1	O
16	GND	Signal Ground	Power

Table 12: Connector J5 – Serial Interface COM1

- RS232 level
- 8-entry transmit and 8-entry receive FIFOs (SCI2)

2.7.3 J5 I2C

J5			
Pin	Signal	Function	I/O
10	I2C-DAT	I2C Data	I/O *
11	I2C-CLK	I2C Clock	I/O *
16	GND	Signal Ground	Power
26	V33-OUT	+3.3V DC Out	Power O

Table 13: Connector J5 – I2C Interface

Pins 10/11 shared with SPI, software configurable.

2.7.4 J5 SPI

J5			
Pin	Signal	Function	I/O
10	SPI-MISO	SPI MISO	I/O *
11	SPI-MOSI	SPI MOSI	I/O *
13	SPI-CS	SPI Chip Select	I/O *
15	SPI-CLK	SPI Clock	I/O *
16	GND	Signal Ground	Power
26	V33-OUT	+3.3V DC Out	Power O

Table 14: Connector J5 – SPI Interface

Pins 10/11 shared with I2C, software configurable.

2.8 J7

J7			
Pin	Signal	Function	I/O
1	LINEOUT-L	Audio Line Out Left	O
2	LINEOUT-R	Audio Line Out Right	O
3	GND	Ground	Power
4	LINEIN-L	Audio Line In Left	I
5	LINEIN-R	Audio Line In Right	I
6	GND	Ground	Power
7	MIC	Microphone In	I
8	MICBIAS	Microphone Bias Voltage	Power
9	RXD3 (AD2)	Receive Data COM3 (opt. Analog IN 2)	I (I)
10	TXD3 (AD3)	Transmit Data COM3 (opt. Analog IN 3)	O (I)
11	AD0	Analog IN 0	I
12	AD1	Analog IN 1	I
13	V50	+5V DC Out	Power O
14	GND	Ground	Power
15	TOUCH X+	Touchpanel X+	
16	TOUCH Y+	Touchpanel Y+	
17	TOUCH X-	Touchpanel X-	
18	TOUCH Y-	Touchpanel Y-	
19	V33	+3.3V DC Out	Power O
20	GND	Ground	Power
21	USBD-	USB Device -	I/O
22	USBD+	USB Device +	I/O
23	USBH-	USB Host-	I/O
24	USBH+	USB Host+	I/O
25	USBD Detect	USB Device Detect (5V In)	I
26	USBH Power	USB Host Power (5V Out)	O

Table 15: Connector J7

2.8.1 J7 serial RS232 COM3

J7 COM3			
Pin	Signal	Function	I/O
9	RXD1	Receive Data COM3	I
10	TXD1	Transmit Data COM3	O
14	GND	Ground	Power

Table 16: Connector J7 – Serial Interface COM3

- RS232 level
- 8-entry transmit and 8-entry receive FIFOs (SCI3)

2.8.2 J7 Touchpanel

J7 Touchpanel			
Pin	Signal	Function	I/O
15	TOUCH X+	Touchpanel X+	
16	TOUCH Y+	Touchpanel Y+	
17	TOUCH X-	Touchpanel X-	
18	TOUCH Y-	Touchpanel Y-	

Table 17: Connector J7 – Touchpanel Interface

2.8.3 J7 USB Host

J7 USB Host			
Pin	Signal	Function	I/O
20	GND	Ground	Power
23	USBH-	USB Host-	I/O
24	USBH+	USB Host+	I/O
26	USBH Power	USB Host Power (5V Out)	O

Table 18: Connector J7 - USB Host

ESD protection is required nearby the USB connector.

Please check USB2.0 high speed compatibility of routing and protection on baseboard by using USB2.0 devices on this port.

The usb.org webpage provides “[High Speed USB Platform Design Guidelines](#)“ with highly recommended information for a proper working USB design.

Note: NetDCU8/NetDCU10 has USB 1.1 on the board.

2.8.4 J7 USB Device

J7 USB Device			
Pin	Signal	Function	I/O
20	GND	Ground	Power
21	USBD-	USB Device -	I/O
22	USBD+	USB Device +	I/O
25	USBD Detect	USB Device Detect (5V In)	I *

Table 19: Connector J5 – USB Device

*: USB detect voltage level 4.4V..5.25V

ESD protection is required nearby the USB connector.

Please check USB2.0 high speed compatibility of routing and protection on baseboard by using USB2.0 hosts on this port.

The usb.org webpage provides “[High Speed USB Platform Design Guidelines](#)“ with highly recommended information for a proper working USB design.

Note: NetDCU8/NetDCU10 has USB 1.1 on the board.

2.8.5 J7 Audio Interface

J7 Audio			
Pin	Signal	Function	I/O
1	LINEOUT-L	Audio Line Out Left	O
2	LINEOUT-R	Audio Line Out Right	O
3	GND	Ground	Power
4	LINEIN-L	Audio Line In Left	I
5	LINEIN-R	Audio Line In Right	I
6	GND	Ground	Power
7	MIC	Microphone In	I
8	MICBIAS	Microphone Bias Voltage	Power

Table 20: Connector J7 – Audio Interface

2.8.6 J7 Analog Input

J7 Analog IN			
Pin	Signal	Function	I/O
9	(AD2)	(Analog IN 2)	I *
10	(AD3)	(Analog IN 3)	I *
11	AD0	Analog IN 0	I
12	AD1	Analog IN 1	I
14	GND	Ground	Power

Table 21: Connector J7 – Analog Input

Input Voltage: 0V to 3,3V
47kΩ Pull Down resistor to GND

*: AD2/3 shared with COM3, default configuration is COM3, hardware configurable, on request only, please contact sales@fs-net.de for details.

2.9 J11 SD Card

A standard SD Card can be used in this slot.
For specification and licensing please refer the website of the SD Association <http://www.sdcard.org>.

3 Status Indicators

The NetDCUA5 has five LED status indicators.

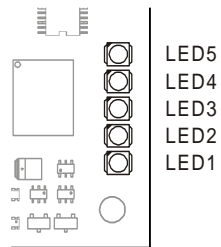


Figure 3.1: Status LED

The following status information is displayed:

Status LED		
LED	Signal	Description
1	RUN	CPU in Run-Mode
2	STA1	Status indicator 1 (see SW documentation)
3	ETH1	Ethernet1 link and activity
4	STA2	Status indicator 2 (see SW documentation)
5	ETH2	Ethernet2 link and activity

Table 22: Status LED

4 Configuration

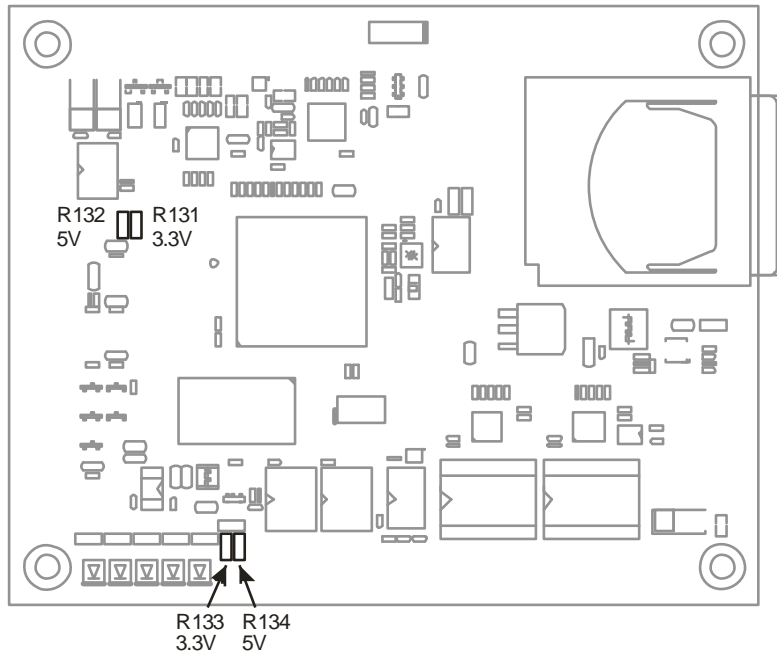


Figure 4.1: Top View

4.1 Display Interface

Power supply for the display and display type are configured with jumpers

Configuration	
LCD Power Supply +3.3 (*)V	R131
LCD Power Supply +5	R132

Table 23: LCD voltage configuration

Warning: Do not set both resistors at the same time, this will short the power supply and will damage the board.

(*) default setting

Jumper: 0Ω Resistor, size 0805

4.2 FS-Bus

The voltage level of the FS-Bus (J4) can set by jumpers.

Configuration	
5V I/O Parallel Interface (*)	R134
3.3V I/O Parallel Interface	R133

Table 24: FS-Bus voltage configuration

Warning: Do not set both resistors at the same time, this will short the power supply and will damage the board.

(*) default setting

Jumper: 0Ω Resistor, size 0805

5 Electrical Data

Power Supply:	+5V DC / $\pm 5\%$
Max. current on 3.3V DC Out:	100mA combined on all outputs
Max. current on 5V DC Out:	100mA combined on all outputs
Max. current on VLCD Out:	1A
Max. current on VCFL Out	2A
Min. voltage on VCFL In	3.3V
Max. voltage on VCFL In	30V

5.1 Power consumption

Maximum power consumption ¹⁾ :	1 A
Capacitor charge current on power on:	1.5 A
Typical Current Consumption @25°C	
• Desktop Idle:	360 mA
• CPU full load:	410 mA
Power supply RTC battery:	2.0 ... 3.6 V
Power consumption @25°C:	typ. 10 μ A max. 45 μ A

1) Theoretical value, Summary of max. datasheet value all chips on module w/o SD card, LCD, USB, backplane logic & transceiver.

Power consumption of connected devices like display, USB devices, SD card has to be added for power calculation.

F&S doesn't guarantee the above values. They are only presented for informational use. Customer has to check power requirement in customer's application.

5.2 DC electrical characteristics for 3.3V IO pins

VDD= 3.3V +/- 5%

Parameter	Description	Condition	Min	Max	Unit
Vih	High Level Input Voltage		0.7*VDD	VDD+0.3	V
Vil	Low Level Input Voltage		-0.3	0.3*VDD	V
Voh	High Level Output Voltage	Ioh=-100 μ A	VDD-0.2		V
Vol	Low Level Output Voltage	Ioh=100 μ A		0.2	V
Io	Output current	VDD=3.3V		2.6	mA

Table 25: electrical characteristic 3.3V IO pin

6 Technical Data

Board Size:	100mm x 80mm
Board thickness:	1.6mm
Height of parts on top side:	6.0mm (3.0mm without Ethernet transformers)
Height on parts on bottom side:	1.5mm (without connectors)
Pin grid of connectors J1-J7	2.54mm
Mounting hole diameter	3.4mm

Interfaces:	3x RS232 (1x with RTS/CTS) 1x USB2.0 HighSpeed Host 1x USB2.0 HighSpeed Device 2x Ethernet 10/100 Mbit 2x CAN2.0 4x analog input SD-Card slot FS-BUS 8bit expansion bus Line.IN stereo Line OUT stereo Microphone IN 4wire resistive touch panel Digital RGB display interface I2C interface SPI interface 21x I/O port
-------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

LCD Interface:	TBD
RAM:	256MB / 512MB
Flash:	128MB / 1GB
CPU:	Freescale Vybrid
Temperature:	0-70°C / -25-85°C
Dimensions:	100 x 80 x 11 mm (l x w x t)
Weight:	45 gr.

See NetDCUA5 Starterkit documentation for connection examples.

7 Storage conditions

Maximum storage on room temperature with non-condensing humidity: 6 months

Maximum storage on controlled conditions 25 ±5 °C, max. 60% humidity: 12 months

For longer storage we recommend vacuum dry packs.

Exceed storage temperature is allowed as long as it is inside the product specification, but reduce product lifetime. Condensing humidity is not allowed at the product.

8 ROHS and REACH statement

All F&S designs are created from lead-free components and are completely ROHS compliant. The products we supply do not contain any substance on the latest candidate list published by the European Chemicals Agency according to Article 59(1,10) of Regulation (EC) 1907/2006 (REACH) in a concentration above 0.1 mass %.

Consequently, the obligations in No. 1 and 2 paragraphs in Annex are not relevant here.

Please understand that F&S is not performing any chemical analysis on its products to testify REACH compliance and is therefore not able to fill out any detailed inquiry forms.

9 Matrix Code Sticker

All F&S hardware is shipped with a matrix code sticker including the serial number. Enter your serial number here <https://www.fs-net.de/en/support/serial-number-info-and-rma/> to get information on shipping date and type of board.



Figure 8: matrix code sticker

10 Appendix

10.1 Important Notice

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. F&S Elektronik Systeme assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained in this documentation.

F&S Elektronik Systeme reserves the right to make changes in its products or product specifications or product documentation with the intent to improve function or design at any time and without notice and is not required to update this documentation to reflect such changes.

F&S Elektronik Systeme makes no warranty or guarantee regarding the suitability of its products for any particular purpose, nor does F&S Elektronik Systeme assume any liability arising out of the documentation or use of any product and specifically disclaims any and all liability, including without limitation any consequential or incidental damages.

Products are not designed, intended, or authorised for use as components in systems intended for applications intended to support or sustain life, or for any other application in which the failure of the product from F&S Elektronik Systeme could create a situation where personal injury or death may occur. Should the Buyer purchase or use a F&S Elektronik Systeme product for any such unintended or unauthorised application, the Buyer shall indemnify and hold F&S Elektronik Systeme and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, expenses, and reasonable attorney fees arising out of, either directly or indirectly, any claim of personal injury or death that may be associated with such unintended or unauthorised use, even if such claim alleges that F&S Elektronik Systeme was negligent regarding the design or manufacture of said product.

10.2 Warranty Terms

Hardware Warranties

F&S guarantees hardware products against defects in workmanship and material for a period of two (2) years from the date of shipment. Your sole remedy and F&S's sole liability shall be for F&S, at its sole discretion, to either repair or replace the defective hardware product at no charge or to refund the purchase price. Shipment costs in both directions are the responsibility of the customer. This warranty is void if the hardware product has been altered or damaged by accident, misuse or abuse.

Software Warranties

Software is provided "AS IS". F&S makes no warranties, either express or implied, with regard to the software object code or software source code either or with respect to any third party materials or intellectual property obtained from third parties. F&S makes no warranty that the software is useable or fit for any particular purpose. This warranty replaces all other warranties written or unwritten. F&S expressly disclaims any such warranties. In no case shall F&S be liable for any consequential damages.

Disclaimer of Warranty

THIS WARRANTY IS MADE IN PLACE OF ANY OTHER WARRANTY, WHETHER EXPRESSED, OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A SPECIFIC PURPOSE, NON-INFRINGEMENT OR THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION, EXCEPT THE WARRANTY EXPRESSLY STATED HEREIN. THE REMEDIES SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDIES OF ANY PURCHASER WITH RESPECT TO ANY DEFECTIVE PRODUCT.

Limitation on Liability

UNDER NO CIRCUMSTANCES SHALL F&S BE LIABLE FOR ANY LOSS, DAMAGE OR EXPENSE SUFFERED OR INCURRED WITH RESPECT TO ANY DEFECTIVE PRODUCT. IN NO EVENT SHALL F&S BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT YOU MAY SUFFER DIRECTLY OR INDIRECTLY FROM USE OF ANY PRODUCT. BY ORDERING THE PRODUCT, THE CUSTOMER APPROVES THAT THE F&S PRODUCT, HARDWARE AND SOFTWARE, WAS THOROUGHLY TESTED AND HAS MET THE CUSTOMER'S REQUIREMENTS AND SPECIFICATIONS

10.3 Figures

Figure 1.1: Top View	5
Figure 1.2: Bottom View	5
Figure 4.1:Top View	21

10.4 List of Tables

Table 1: Connector J1	7
Table 2: Connector J1 – Power Supply	8
Table 3: Connector J1 – Ethernet Interface 1	8
Table 4: Connector J1 – Ethernet Interface 2	9
Table 5: Connector J1 – Serial Interface COM2	9
Table 6: Connector J1 – CAN Interface 1	10
Table 7: Connector J1 – CAN Interface 2	10
Table 8: Connector J3 – Display Interface	11
Table 9: Connector J4 – FS-Bus	12
Table 10: Connector J5	13
Table 11: Connector J5 – Matrix Keyboard.....	14
Table 12: Connector J5 – Serial Interface COM1	15
Table 13: Connector J5 – I2C Interface	15
Table 14: Connector J5 – SPI Interface	15
Table 15: Connector J7	16
Table 16: Connector J7 – Serial Interface COM3	17
Table 17: Connector J7 – Touchpanel Interface	17
Table 18: Connector J7 - USB Host.....	17
Table 19: Connector J5 – USB Device	18
Table 20: Connector J7 – Audio Interface.....	18
Table 21: Connector J7 – Analog Input	19
Table 22: Status LED	20
Table 23: LCD voltage configuration.....	21
Table 24: FS-Bus voltage configuration.....	22
Table 25: electrical characteristic 3.3V IO pin	23