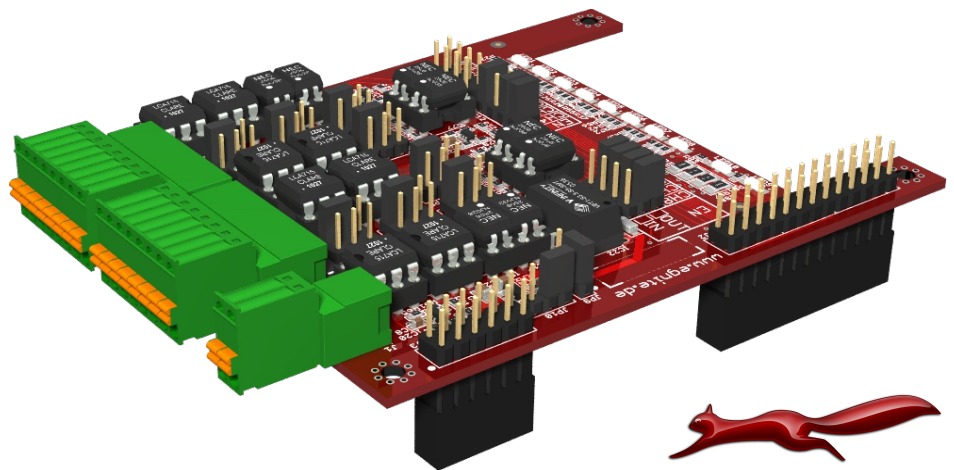


egnite

CMI8848

Hardware Manual



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About CMI8848

The digital I/O card expands the capability of the Ethernet single board computers. With the pluggable add-on AC and DC loads and states can be remotely monitored and controlled over a TCP/IP network.

The end-to-end solution is suited for the quick implementation of your product ideas as well as the direct integration into your product series.

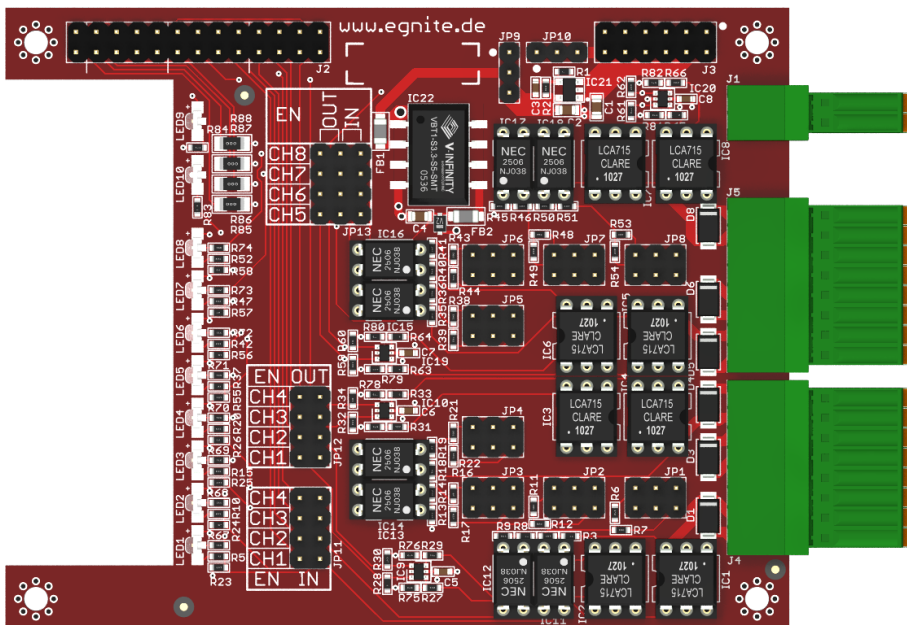
All Nut/OS target source code and the hardware designs are published under the permissive BSD License and can be used in commercial products for any purpose without license fees. In opposite to some other Open Source license models, it does not require to publish your own source code enhancements.

CMI8848 features

The CMI8848 board provides 8 isolated digital I/O channels. Channels are jumper-configurable as either input or output on a channel by channel basis.

- Fits Ethernet 1, 2, 3 and 5
- Optically coupled isolation between inputs, outputs and ground
- Jumper selectable input range from 3.3 V to 48 V
- 48 V, 1.8 A solid-state relay outputs
- Pluggable spring-cage terminal blocks, 2.5 mm pitch
- DC/DC converter providing isolated power supply for I/O hardware: 5 V, 110 mA
- Optical feedback of the status of the I/O-channels

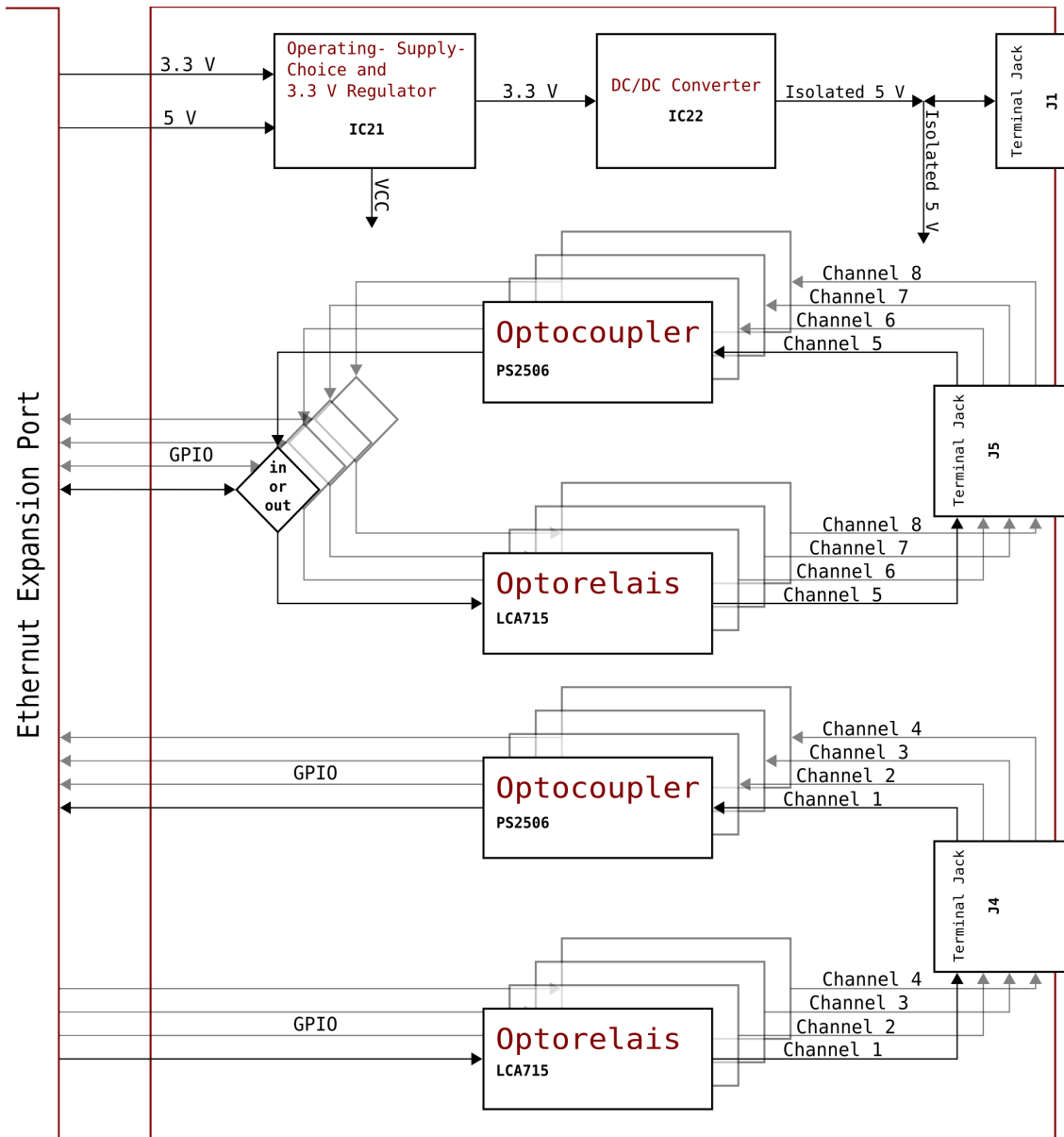
CMI8848 is available in 3 revisions. The standard Rev-B is normally used for providing 8 channels. If more channels are required, one additional Rev-B1 board may be mounted on Ethernet 1, 2 and 3 or a second Rev-B2 board may be mounted on Ethernet 5. This allows to have 16 channels in total.



CMI8848 Rev-B

Block diagram

Block diagram of the CMI8848 board components.

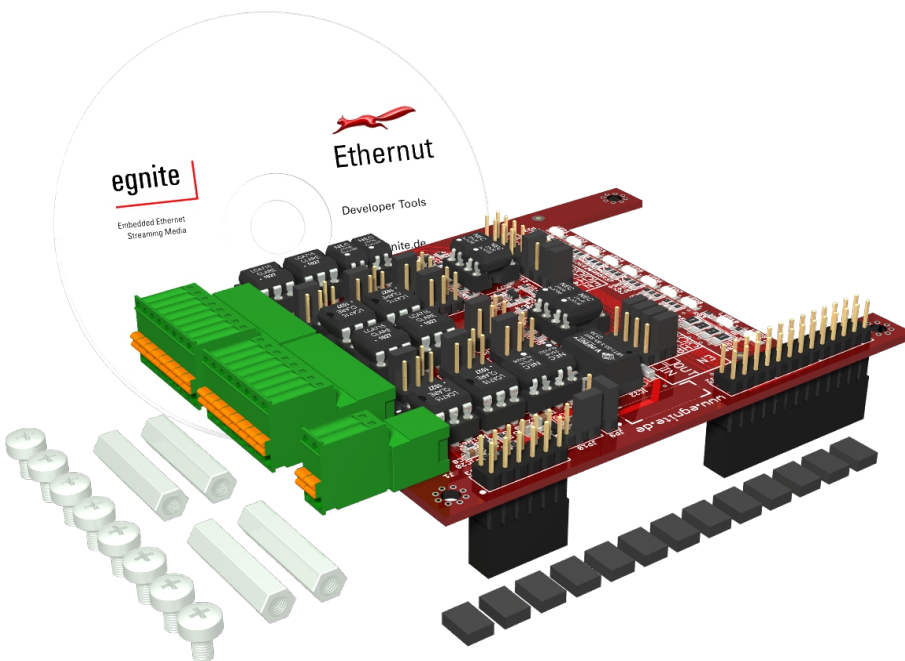


Board installation

Getting started

The following items are included in delivery:

- CMI8848 board
- 2 terminal plugs, 8-pin, 2.5 mm
- 1 terminal plug, 2-pin., 2.5 mm
- 4 spacers, M3 x 16 mm
- 8 screws, M3 x 6 mm
- 30 Jumpers, 2.54 mm
- CD



You also need:

- Ethernut board, rev. 1, 2, 3 or 5
- Power supply sufficient for Ethernut and CMI8848. Max. consumption of the CMI8848 is 205 mA @ 5 V and 89 mA @ 3.3 V.

Caution: Remove the CMI8848 board from its antistatic bag by grasping the green terminal connectors. Handle the board only by the edges, otherwise the electronic parts can be damaged by electrostatic discharge. Keep the antistatic bag to store the board if it is not used.

Before shipping the CMI8848 board was carefully inspected both visually and electrically. It should be free of scratches and marks.

Mounting the CMI8848

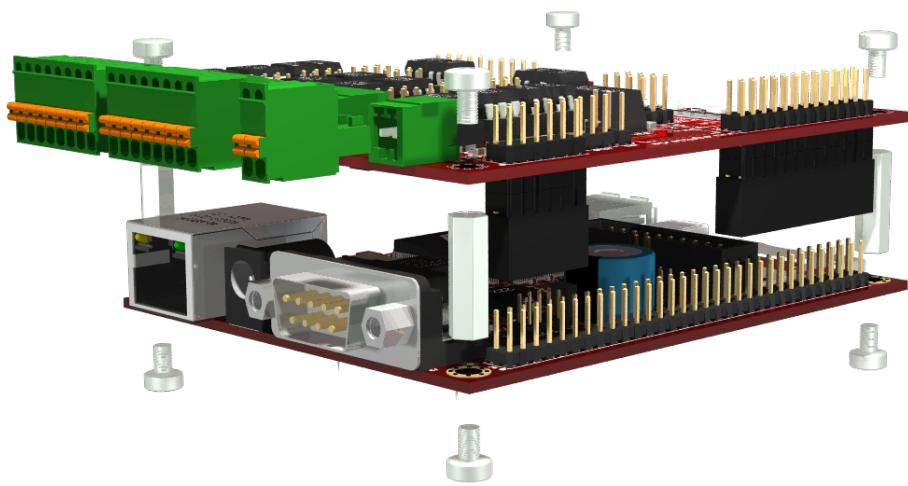
The CMI8848 is designed to be mounted on top of the Ethernut board. All connectors and mounting holes are in corresponding positions to make a perfect fit.

Caution: Make sure, that the Ethernut board is not loaded with firmware, which may interfere with the CMI8848. If in doubt, remove the currently loaded firmware. Power must always be switched off when attaching or removing the board.

First screw four M3 x 16 mm spacers on the four corners of the Ethernut board with four M3 x 6 mm screws. Spacers go on the component side of the board, screws go on the bottom side.

Then gently push the CMI8848 onto the double row of pins along the long edge of the Ethernut board. This should be possible without applying too much force.

Finally secure the CMI8848 in place with the remaining four M3 x 6 mm screws. The four mounting holes should be perfectly aligned with the spacers. Do not apply force if this is not the case, check the alignment of the connectors instead.



Now it is time to configure the CMI8848 board by setting the right jumpers.

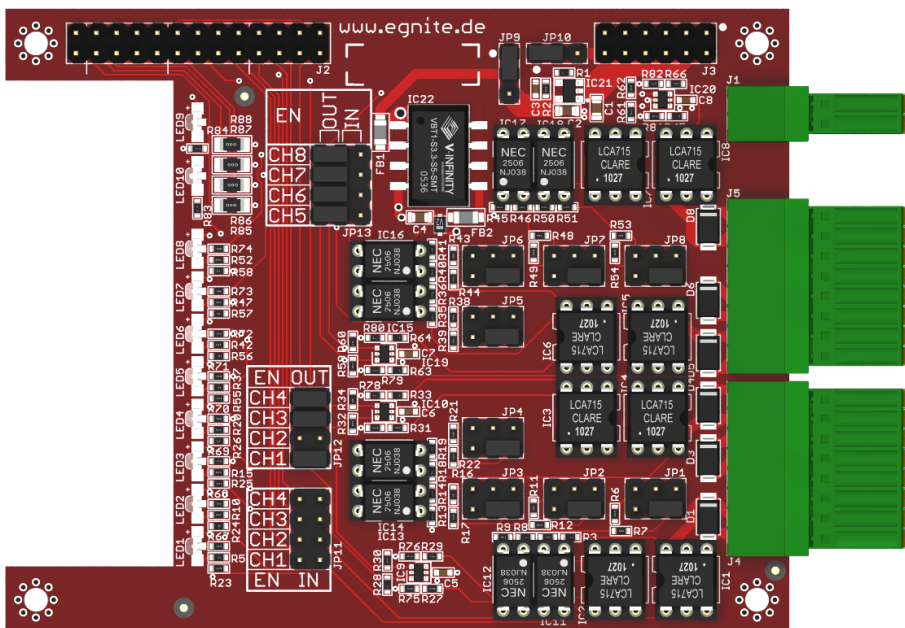
Jumper configuration

The board is shipped with the following configuration:

Channel 1, 3 – 8	Output, normally open
Channel 2	Not used
Power supply	3.3 V

Verify, that the jumper configuration is the factory default.

The factory default configuration makes sure, that no damage will occur with any Ethernet board version, but typically it needs to be modified.



Factory default

Jumper settings for Ethernet versions

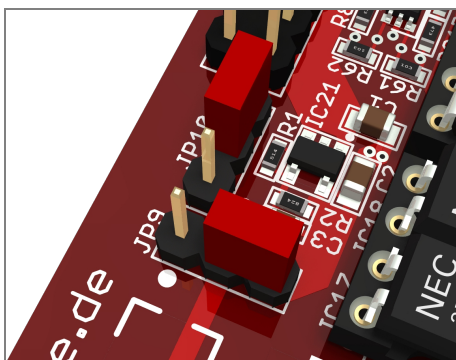
The board is powered from the Ethernet board via connector J3.

The first thing to check is whether the jumper configuration for the power supply lines is correct for your Ethernet board. This configuration is handled by setting JP9 and JP10 in the correct position.

JP9 determines the power source for DC/DC converter IC22. IC22 has to be powered with 3.3 V, either directly from the Ethernet board (Ethernet 3 and 5) or via the on-board voltage regulator IC21 (Ethernet 1 and 2).

JP10 determines the power source for the rest of the board, the VCC power supply rail.

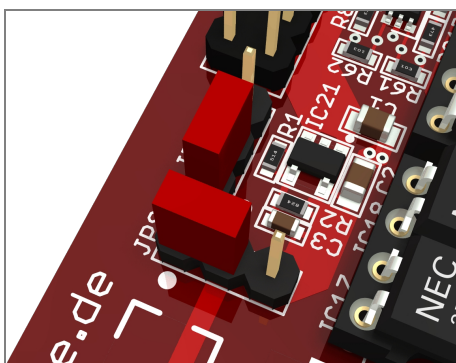
Jumper settings for Ethernet 1 and 2



For these boards make sure, that the power supply is configured for 5 V. Set a jumper at JP10 on pin 2+3.

In this case IC22 is powered from the on-board 3.3 V voltage regulator IC21. Set a jumper at JP9 on pin 2+3.

Jumper settings for Ethernet 3 and 5



When the CMI8848 is used with Ethernet 3 and 5 boards, then JP10 must be configured for 3.3 V supply. Set a jumper at JP10 on pin 1+2.

In this case IC22 is powered from the 3.3 V-line powered directly by the Ethernet board. Set a jumper at JP9 on pin 1+2.

Caution: Do not use 5 V jumper configuration with Ethernet 3 or 5, this would damage the Ethernet board.

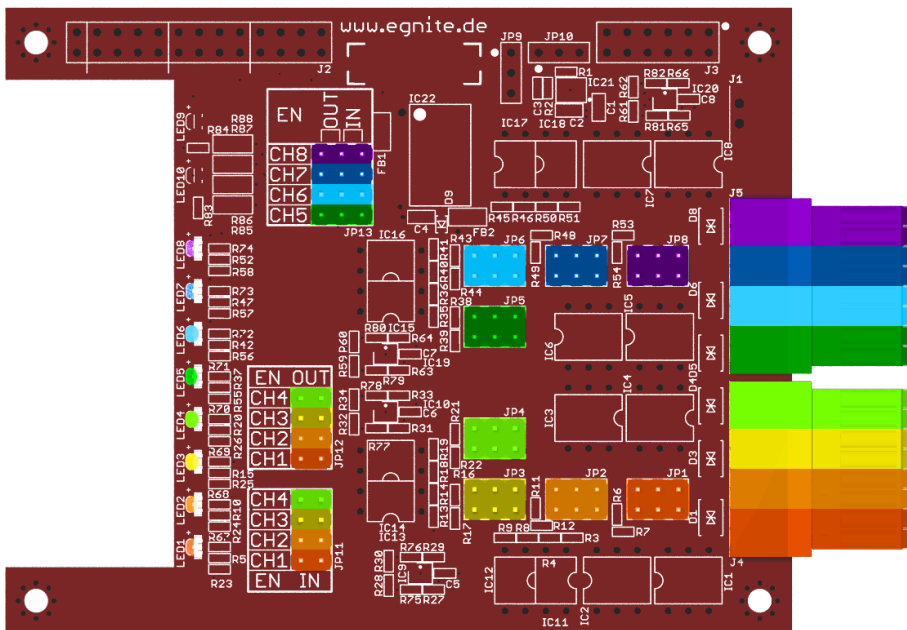
Jumper settings for input / output

After configuring the board for the right Ethernet version, you can proceed to select which channels will function as inputs and which channels will be outputs.

There are 8 channels available.

Channel 1 to 4 (J4) can be configured as input and output at the same time; channels 5 to 8 (J5) can be either input or output, but not both at the same time. This explains the way the jumpers for these channels are laid out.

Jumper configuration

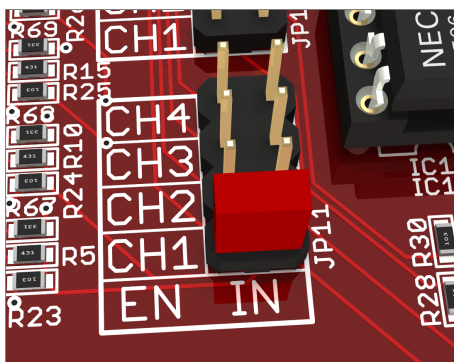


Each channel can be individually configured as an input or an output. Inputs or outputs are enabled by setting the corresponding jumper.

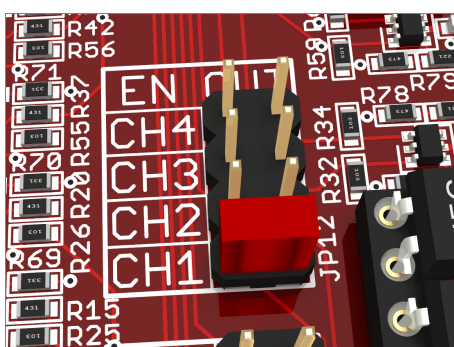
Channel 1 to 4

Channels 1 to 4 can be configured as input even if the same channel is used for output. This way it is possible to monitor the output.

For channel 1 to 4 there are two groups of jumpers, JP11 and JP12.



Set a jumper at JP11 to enable a channel for working as an input.

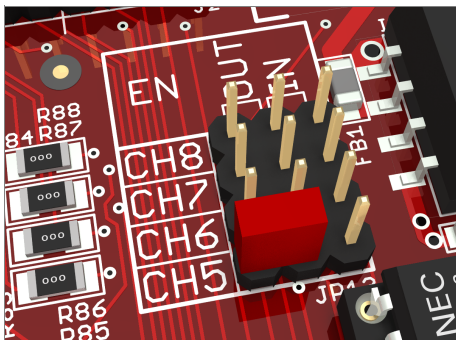


Set a jumper at JP12 to enable a channel for working as an output.

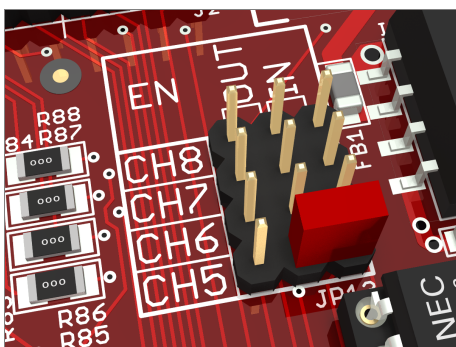
Channel 5 to 8

Channels 5 to 8 can be either input or output, but not both at the same time.

For channels 5 to 8 there is only one group of jumpers, JP13 with 3 pins per channel.



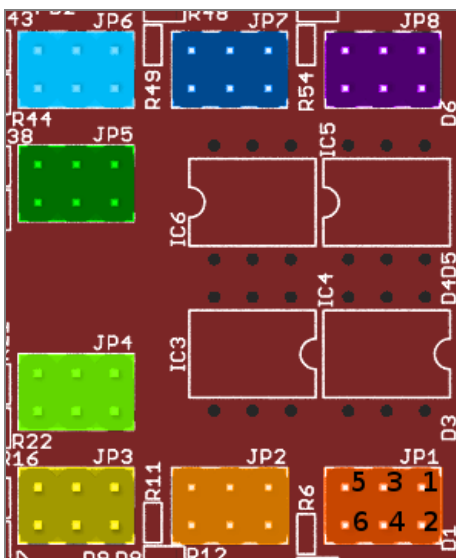
Set a jumper on the two left pins to configure the corresponding channel as an output.



Set a jumper on the two right pins to configure a channel as an input.

Jumper settings for voltage range and powering

Finally, there is a choice in voltage range and power source for the I/O pins. Each input has an associated group of six jumper pins for its configuration, JP1 to JP8. The configuration sets the voltage range and the way the channel is powered.



Pin 1: Connected to $+V_{ISO}$, the positive output of the DC/DC converter

Pin 2: Connected to the optocoupler via a 6.8 k resistor

Pin 3: Connected to the terminal a of the channel.

Pin 4: Connected to the terminal a of the channel.

Pin 5: Connected to the optocoupler via a 2.7 k resistor

Pin 6: Connected to GND_{ISO} , the negative output of the DC/DC converter

We can use this to configure inputs for different voltage ranges and to configure inputs and outputs for using an internal or external power source.

The internal power source is a great feature of the CMI8848 board, it can make the external circuits you need a lot more simple.

Caution: With this great flexibility you also get a great responsibility. Take great care when setting up these jumpers. Making a mistake here can short circuit the DC/DC converter and/or unintentionally spoil the mutual isolation between channels. Isolation between the I/O channel side and the processor side of the board is always guaranteed.

If no jumpers are placed here for a channel, that channel will be completely isolated from all the other channels and from the ground. In this case the channel can only be used as an output, because there is no connection with one side of the in-going optocoupler.

The outputs work as an electronic on/off switch between the terminals a and b for the channel, completely isolated from the other channels and from your power supply.

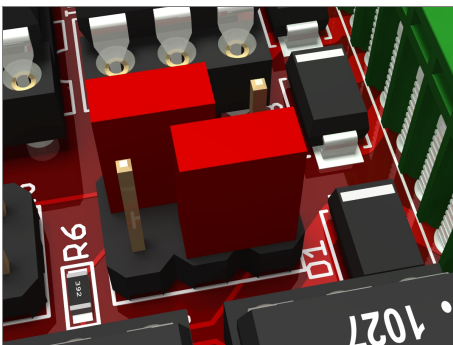
The terminal a of each channel is connected to pins 3 and 4 in the channel's jumper pin group. The terminal b of each channel is permanently connected to one side of the channel's in-going optocoupler.

The terminals a and b are always connected to the two sides of the electronic switch in the out-going optocoupler.

Mutually isolated inputs with external power supply

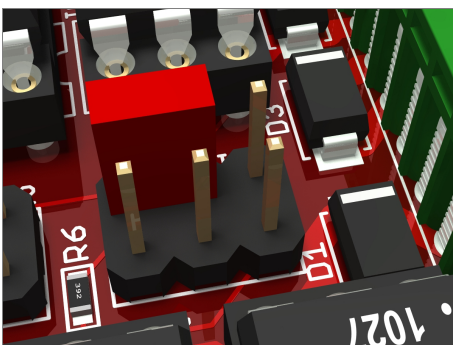
The optocoupler is connected with pins 2 and 5 in the group of six jumper pins via resistors, a 6.8 kOhm resistor on pin 2 and a 2.7 kOhm resistor on pin 5.

If you want to use a channel as an input, you will need to set at least one jumper in the group of six to establish a connection between the terminal a and the in-going optocoupler. Setting the pins in this way, you will retain the mutual isolation between channels.



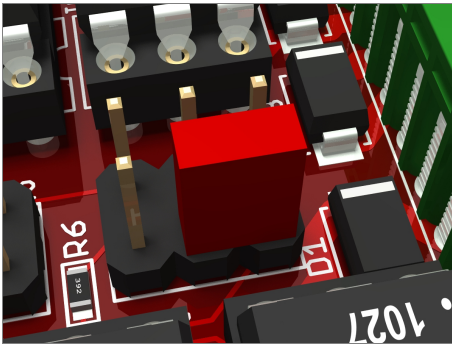
Input range: 3.3 V to 14 V, max. low level: 1.3 V.

In this case pins 2+4 and 3+5 are connected together by two jumpers, effectively switching the 2.7 kOhm resistor and the 6.8 kOhm resistor in the input circuit in parallel.



Input range: 12 V to 26 V, max. low level: 1.5 V.

In this case pins 3+5 are connected together by a single jumper, enabling the 2.7 kOhm resistor in the input circuit.



Input range: 22 V to 48 V, max. low level: 2.5 V.

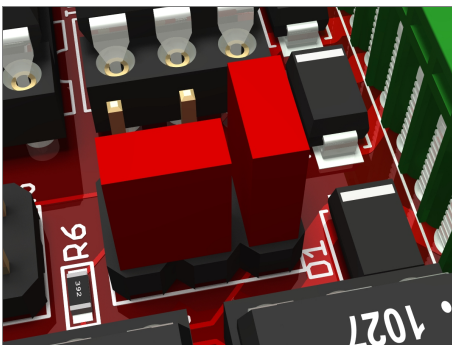
In this case pins 2+4 are connected together by a single jumper, enabling the 6.8 kOhm resistor in the input circuit.

There is an overlap between the voltage ranges. If there is a choice, always go for the highest range that matches your situation: That will increase the expected lifetime of the optocouplers.

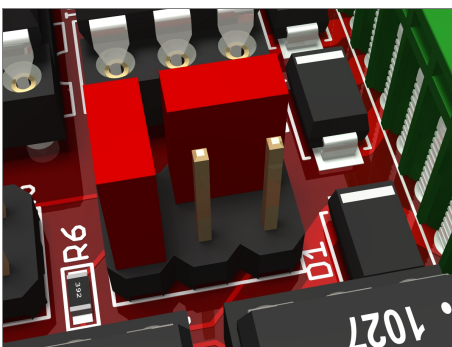
Inputs with common ground and internal power supply

The internal power supply can be used to reduce the complexity of the external circuitry considerably.

This is where pins 1 and 6 come into play. In this case the input circuit is powered from within the PCB, the only external component that is needed is a switch.



To enable an input for dry contacts, a jumper between pins 4+6 is used to connect the terminal a of a channel with the ground of the isolated power supply GND_{ISO} . A second jumper on pins 1+2 connects terminal b with V_{ISO} via a 6.8 kOhm resistor.



Alternatively, a jumper between pins 1+3 can be used to connect the terminal a of a channel with the internal power supply voltage V_{ISO} and pins 5+6 to connect terminal b with isolated power supply GND_{ISO} .

Caution: Do not place both these jumpers at the same time. Doing that would short circuit the power supply.

If more than one channel makes use of the isolated power supply, they will no longer be mutually isolated. Isolation with the processor side of the circuit is always retained.

Mutually isolated outputs with external power supply

In this case no jumper needs to be set in the six pin group for the channel.

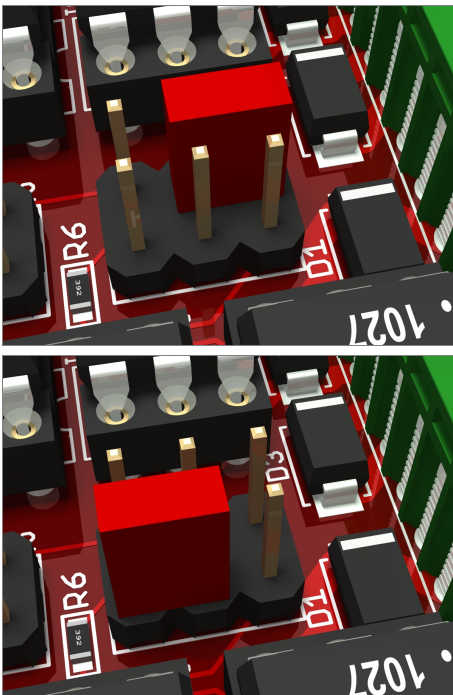
Jumper configuration

The terminals a and b can simply be used as an electronic switch in any circuit, rated at max. 48 V, 1.8 A, AC or DC.

Outputs with common ground and internal power supply

The internal isolated power supply can also be used to power output lines. If you do this, you have to take the maximum available output current (110 mA) of the isolated power supply into account. This available current is shared between all the input and output channels that use internal powering. If all channels are configured for output using internal power, you are on the safe side if you limit current usage to 12 mA per channel.

The isolated power supply is available on connector J1. It is possible to use this without setting any jumpers in the six pin groups for the channels.



You can, however, save yourself some external wiring by setting a jumper between the isolated power supply rail ($+V_{ISO}$) and the terminal a of the channels on pins 1+3. The load can then be connected between the terminal b and GND_{ISO} .

Alternatively, you can connect the terminal a of a channel with GND_{ISO} by setting a jumper on pins 4+6. In that case you would connect the load between the terminal b and $+V_{ISO}$.

Caution: Again, do not place jumpers on 1+3 and 4+6 at the same time.

Jumper configuration summary

Jumper settings for Ethernet versions

Ethernut 1 and 2	JP9, pins 2+3 and JP10, pins 2+3
Ethernut 3 and 5	JP9, pins 1+2 and JP10, pins 1+2

Jumper settings for input / output

Channel 1 to 4	Set a jumper at JP11 to enable a channel for input. Set a jumper at JP12 to enable a channel for output.
----------------	---

Channel 5 to 8	Set a jumper at JP13 on the two left pins for output. Set a jumper at JP13 on the two right pins for input.
----------------	--

Jumper settings for voltage range and powering

Mutually isolated inputs with external power supply

Input range: 3.3 V to 14 V Max. low level: 1.3 V	JP1 to JP8, pins 2+4 and 3+5
Input range: 12 V to 26 V Max. low level: 1.5 V	JP1 to JP8, pins 3+5
Input range: 22 V to 48 V Max. low level: 2.5 V	JP1 to JP8, pins 2+4

Inputs with common ground and internal power supply

	JP1 to JP8, pins 1+3 and pins 5+6
Alternative	JP1 to JP8, pins 1+2 and pins 4+6

Caution: Do not place both these jumpers at the same time. Doing that would short circuit the power supply.

Mutually isolated outputs with external power supply

Do not set any jumper.

Outputs with common ground and internal power supply

	JP1 to JP8, pins 1+3
Alternative	JP1 to JP8, pins 4+6

Caution: Again, do not place jumpers on 1+3 and 4+6 at the same time.

LEDs

Dual color LEDs 1 to 8 indicate the states of channels 1 to 8 resp. Each LED turns red when the output is active and green when the input is active.

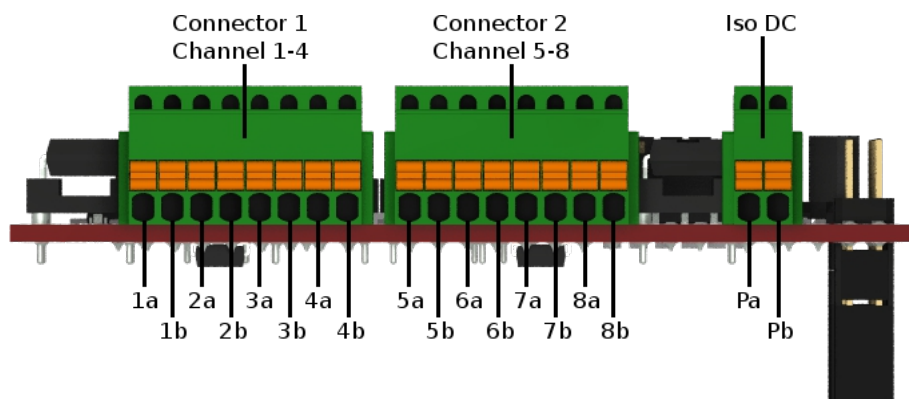
LEDs 9 and 10 indicate the status of the isolated power supply and the board power supply. As soon as the board is powered, both LEDs should turn red.

LED	Function
LED1	Channel 1 status
LED2	Channel 2 status
LED3	Channel 3 status
LED4	Channel 4 status
LED5	Channel 5 status
LED6	Channel 6 status
LED7	Channel 7 status
LED8	Channel 8 status
LED9	Isolated power supply
LED10	Board power supply

Terminal wiring

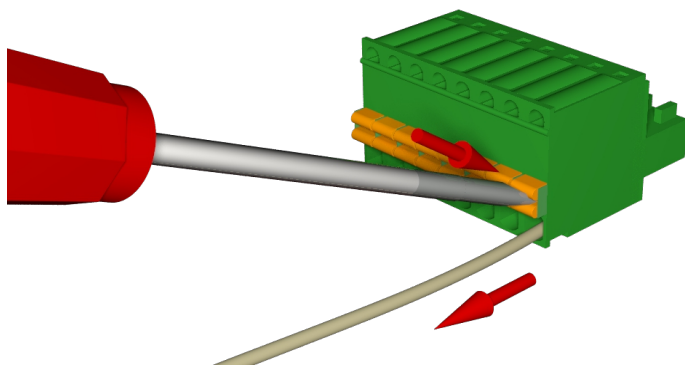
The I/O channels are available at two 8-pin terminal plugs, one for the four lower channels and one for the four upper channels. The isolated DC supply is available at a 2-pin terminal plug.

Minimum wire diameter is 0.016" (area 0.14 mm²) or AWG 26, maximum diameter is 0.032" (area 0.5 mm²) or AWG 20. Values are for solid and stranded wires.



First strip the insulation back approximately 0.3" (8 mm). There is no need to tin the ends with solder or to add end sleeves. Insert the wire into the larger terminal hole. The wire will be held by the spring clamp. Pull gently on the wire to ensure it is securely clamped. If you use stranded wires or if the wire does not easily enter into the hole, press the orange lever with a small screwdriver (0.1" / 2.5 mm width) to lift the spring. There should be strain relief on the cable to prevent them being pulled out of the connector.

To pull out a wire, press a small screwdriver against the orange lever.



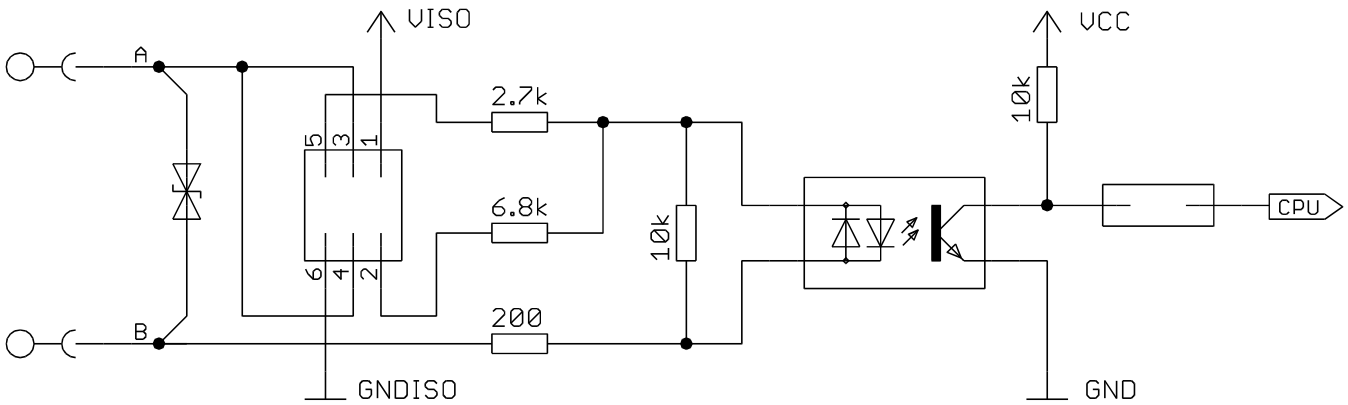
You may affix self-adhesive labels on your terminal module above the orange levers.

The CMI8848 is a true isolated I/O board. There is no electrical connection between each channel's pins and the Ethernet ground. However, all inputs that are configured as contact inputs share the same ground and are internally connected to a single power supply.

Bidirectional clamping diodes protect the I/O channels against spike voltages caused by inductive loads and long circuit wires.

Isolated inputs

Characteristics



The input section drives an optoisolator through a resistor threshold setting network. Your system must provide at least 1 mA of current to drive the optoisolator. The threshold setting network controls this drive current for various input voltages ranging from 3.3 volts to 48 volts.

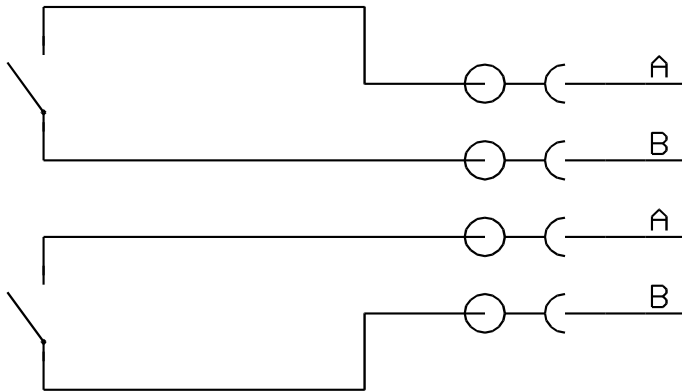
3.3 V		N/A	N/A
4.2 V			N/A
5.0 V			
7.5 V			
12.0 V			
24.0 V			
27.0 V			
32.0 V	N/A		
48.0 V	N/A		

Note, that the original signal will be inverted. When a high level is applied to the input, the Ethernet port will receive a low level.

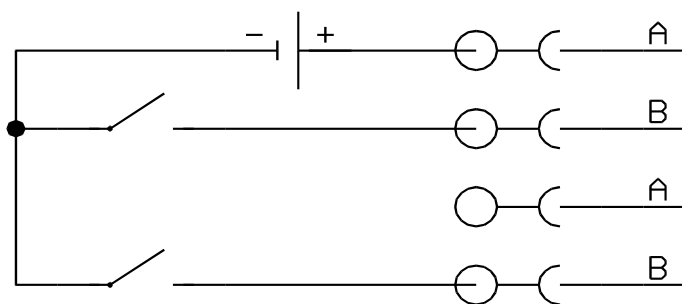
Input wiring

When the switch is closed, the corresponding port bit contains "0".

Connecting a switch contact with internal power supply

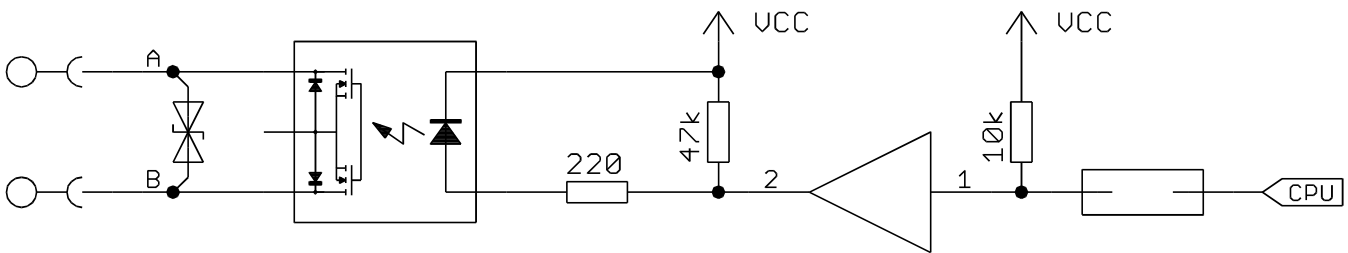


Connecting a switch contact with external power supply



Isolated outputs

Caution: When the Ethernet board is switched on, all outputs are reset to off.



Characteristics

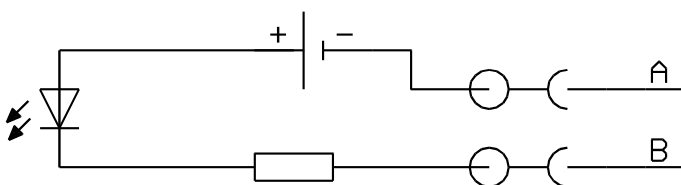
Driving an output port high will close the channel switch.

The opto-isolated output provides a solid-state relay and relay protection voltage clamping diode. The solid state relay is non-polarized. The voltage clamping diode limits voltage at the relay output to 80 VPEAK (begins to conduct at about 60 VPEAK). The relay's on-resistance is 10 Ohms, off-resistance is at least 10^{10} Ohms. The relay's turn-on time is 3 milliseconds.

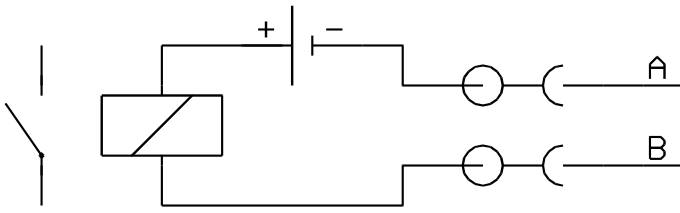
The output section incorporates a "crowbar" protection type voltage clamping diode. In normal operation with the relay voltage at or below 56 volts peak, the diode has virtually no effect (other than about 10 nanoamperes of leakage current). At 60 volts, the diode starts to conduct to limit further voltage excursions. In this region, the diode effectively clamps momentary voltage spikes from inductive loads. If an overvoltage condition occurs that drives a voltage surge in the diode to 80 volts, the diode will latch-on, clamping the voltage to a few volts. This latched-on condition will continue until the current surge through the diode is reduced to less than 150 mA, whereupon the diode returns to its off state.

Output wiring

Connecting an external LED



Connecting an electromechanical relay



Power supply

The CMI8848 board draws power from the Ethernet on-board regulator. For Ethernet 1 and 2 the 5 V power line will be used. With Ethernet 3 and 5 the CMI8848 board uses the 3.3 V supply.

Caution: Although available, do not use the 5 V power supply with Ethernet 5. Doing so, would drive the input ports with 5 V high level, which may damage the Ethernet CPU.

Max. consumption is 205 mA @ 5 V and 89 mA @ 3.3 V.

Isolated power

The 2-pin terminal J1 provides a 5 V isolated power supply output, which may be used by external hardware. It will be shared by inputs configured for contact sensing.

While still isolated from all other channels and the Ethernet board, contact sense inputs use the same common ground and supply wires.

The maximum current provided by the on-board DC/DC-converter is 110 mA. Each input that has been configured as a contact sense will consume 1 mA. The current used by outputs will depend on the load. Make sure the total current from all outputs does not exceed 110 mA.

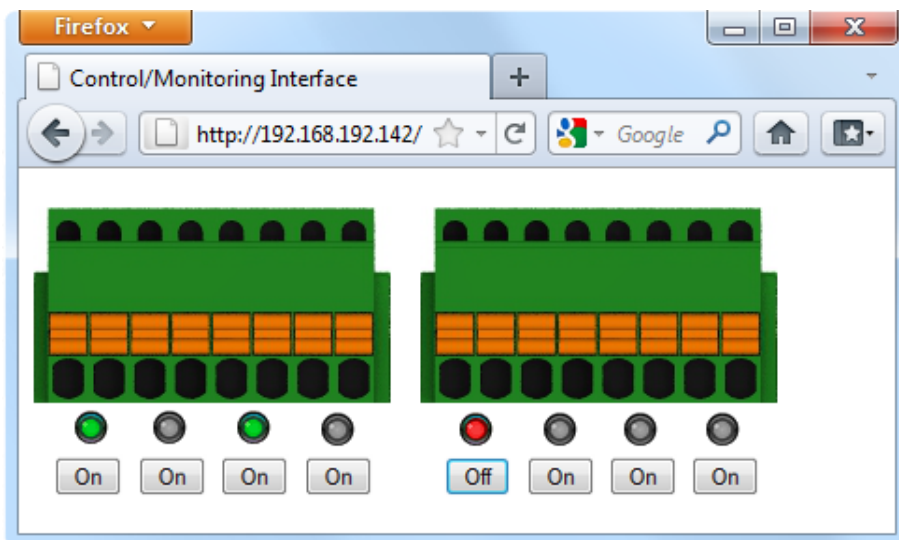
Ethernut software

For details about programming Ethernut boards, please refer to the specific documents that came with your Ethernut.

CMIWeb

This Nut/OS application allows to configure, control and monitor the CMI8848 board by using a web browser. It uses Ajax to continuously monitor the current board status and CGI to the relay outputs. It may also be used as a simple working example to help developing a custom web interface.

It is recommended to run the application the first time without the CMI8848 board mounted. During this initial run you should configure inputs and outputs according to the jumper configuration of the CMI8848.



The CMIWeb sample application is available on the CD and can be downloaded from egnite's website.

Using Ethernut 1 and 2 ports

The following table shows the port usage of Ethernut 1 and 2 with CMI8848 Rev-B and Rev-B1.

Terminal	Rev-B		Rev-B1	
	In	Out	In	Out
1	PE2	PE3	PE2	PE3
2	PE6	PE4	PE6	PE4
3	PE7	PB5	PE7	PB5
4	PB6	PB7	PB6	PB7
5	PD4		PD2	
6	PD5		PD3	
7	PD6		PD0	
8	PD7		PD1	

Initialize channel 1 for output

```
sbi(PORTE, 3);
sbi(DDRE, 3);
```

Relay close

```
cbi(PORTE, 3);
```

Relay open

```
sbi(PORTE, 3);
```

Using Ethernut 3 ports

The following table shows the port usage of Ethernut 3 with CMI8848 Rev-B and Rev-B1. Note that channel 1 is available for input only.

Channel	Rev-B		Rev-B1	
	In	Out	In	Out
1	P13	P8	P13	P8
2	P11	N/A	P11	N/A
3	P12	P5	P12	P5
4	P6	P7	P6	P7
5	P23		P22	
6	P20		P21	
7	P19		P17	
8	P18		P16	

Using Ethernut 5 ports

The following table shows the port usage of Ethernut 5 with CMI8848 Rev-B and Rev-B2.

Terminal	Rev-B		Rev-B2	
	In	Out	In	Out
1	PA29	PC6	PA29	PC6
2	PC15	PC7	PC15	PC7
3	PC13	PB19	PC13	PB19
4	PB17	PB18	PB17	PB18
5	PA28		PA26	
6	PA27		PA25	
7	PC5		PB16	
8	PA22		PC4	

Ethernut expansion port connector

The following table shows the expansion port interconnection of the CMI8848 board revisions B, B1 and B2 with Ethernet 1, 2, 3 and 5.

Ethernet					CMI8848									Ethernet			
1	2	3	5	Rev-B2	Rev-B1	Rev-B	Pin	J3	Pin	Rev-B	Rev-B1	Rev-B2	5	3	2	1	
				3.3 V			1		2	3.3 V							
				5.0 V			3		4	5.0 V							
				Ground			5		6	Ground							
				Ground			7		8	Ground							
							9		10								
				5.0 V			11		12	5.0 V							
PE0	P15	PB7					39		40					PB6	P14	PE1	
PE2	P13	PA29	1-In	1-In	1-In		41	42	1-Out	1-Out	1-Out	PC6	P8	PE3			
PE4	PC7		2-Out	2-Out	2-Out		43	44			8-In/Out	PC4	P27	PE5			
PE6	P11	PC15	2-In	2-In	2-In		45	46	3-In	3-In	3-In	PC13	P12	PE7			
PB0	P0	PB3					47	48				PB2	P1	PB1			
PB2	P2	PB1					49	50				PB0	P3	PB3			
PB4	P4	PB16	7-In/Out				51	52	3-Out	3-Out	3-Out	PB19	P5	PB5			
PB6	P6	PB17	4-In	4-In	4-In		53	54	4-Out	4-Out	4-Out	PB18	P7	PB7			
PD0	P17	PA24		7-In/Out			55	56		8-In/Out		PA23	P16	PD1			
PD2	P22	PA26	5-In/Out	5-In/Out			57	58		6-In/Out	6-In/Out	PA25	P21	PD3			
PD4	P23	PA28			5-In/Out		59	60	6-In/Out			PA27	P20	PD5			
PD6	P19	PC5			7-In/Out		61	62	8-In/Out			PA22	P18	PD7			
NC							63	64	NC								
1	2	3	5	Rev-B2	Rev-B1	Rev-B	Pin	J2	Pin	Rev-B	Rev-B1	Rev-B2	5	3	2	1	
Ethernet					CMI8848									Ethernet			

Changing socketed ICs

All the optocouplers and relays on the board are mounted in sockets. This makes it possible to exchange them for identical or pin-compatible ones.

Reasons to exchange these components can be:

- To replace defective devices in case they have been damaged.
- To exchange the standard components for higher-rated ones.
- To exchange the normally open relays for the outputs for normally closed types. In that case the channel can only be used as an output, since the normally closed contact would short circuit the input channel.

Press down on all the socketed ICs to make sure that they are properly seated. Do this only with the board placed on a firm flat surface.

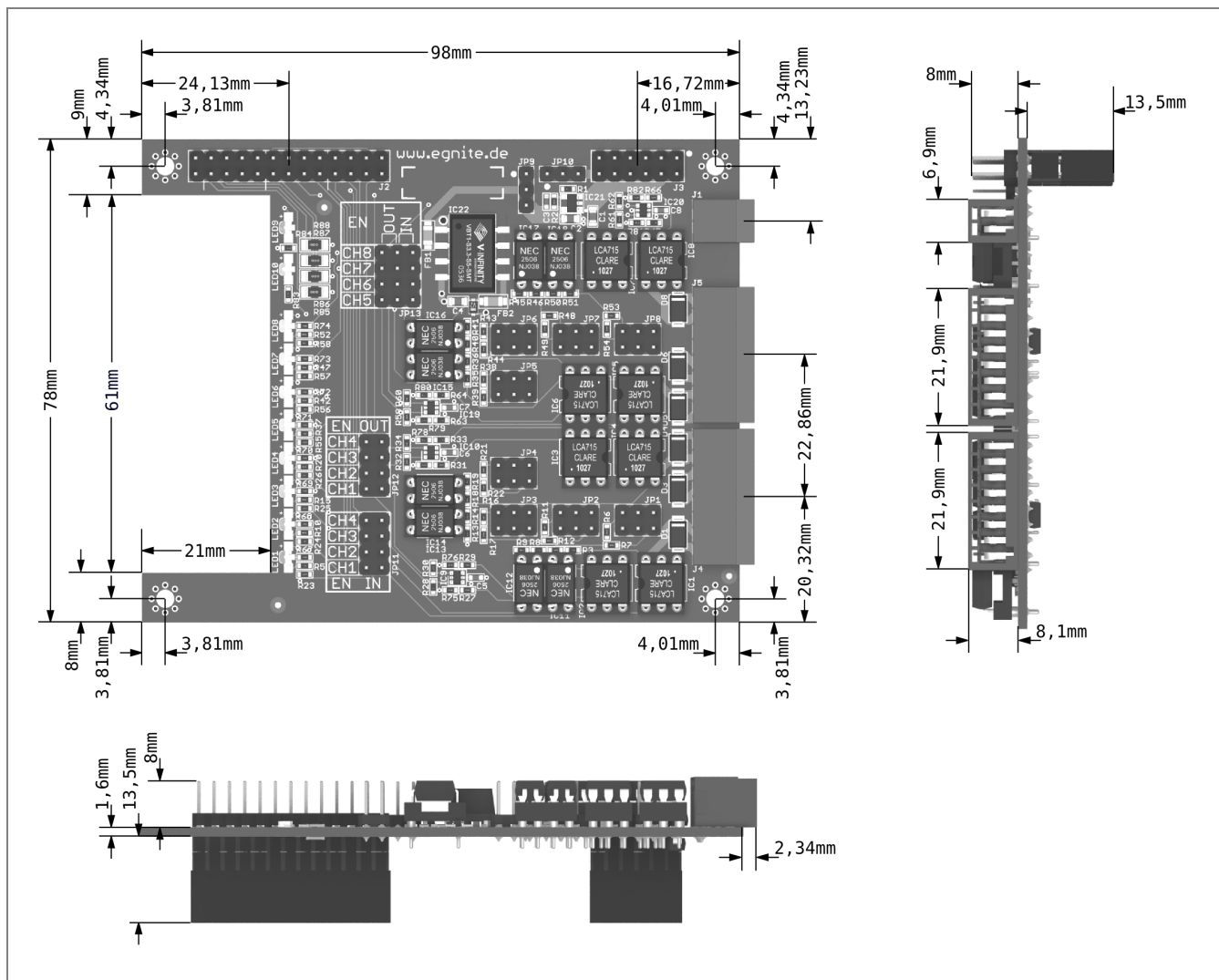
Specifications

Digital I/O	
Channels	8, individually configurable as inputs and/or output
Connector	Phoenix 1881480
Wire size	Min. 0.14 mm ² (AWG 26) Max. 0.5 mm ² (AWG 20) Solid and stranded wires
Digital inputs	
Voltage	3.3 V to 48 V, non polar
Current	0.8 mA to 8.7 mA
Isolation	3750 V _{RMS}
Bandwidth	165 Hz
Digital outputs	
Voltage	48 V max.
Current	2.2 A max.
Latency	350 µs on, 113 µs off @ 3.3 V 200 µs on, 115 µs off @ 5V
Power supply	
Voltage	3.3 V or 5.0 V
Max. consumption	89 mA @ 3.3 V 205 mA @ 5 V
Environmental	
Operating temperature	-40 to 85 °C (-40 to 185 °F)
Storage temperature	-65 to 140°C (-85 to 284 °F)
Humidity	5% to 95%, non-condensing
Approvals	
Safety	PCB flammability rating UL94-V-0
RoHS compliance	EU directive 2002/95/EC
Metrics	
Dimensions (L x W x H)	98 x 78 x 26 mm (3.86 x 3.07 x 1.02 in)
Weight	60 g (0,13 lb)
Product identification	
PCB revision	Written in copper on the PCB's backside
Serial number	Barcode sticker label

Dimensions

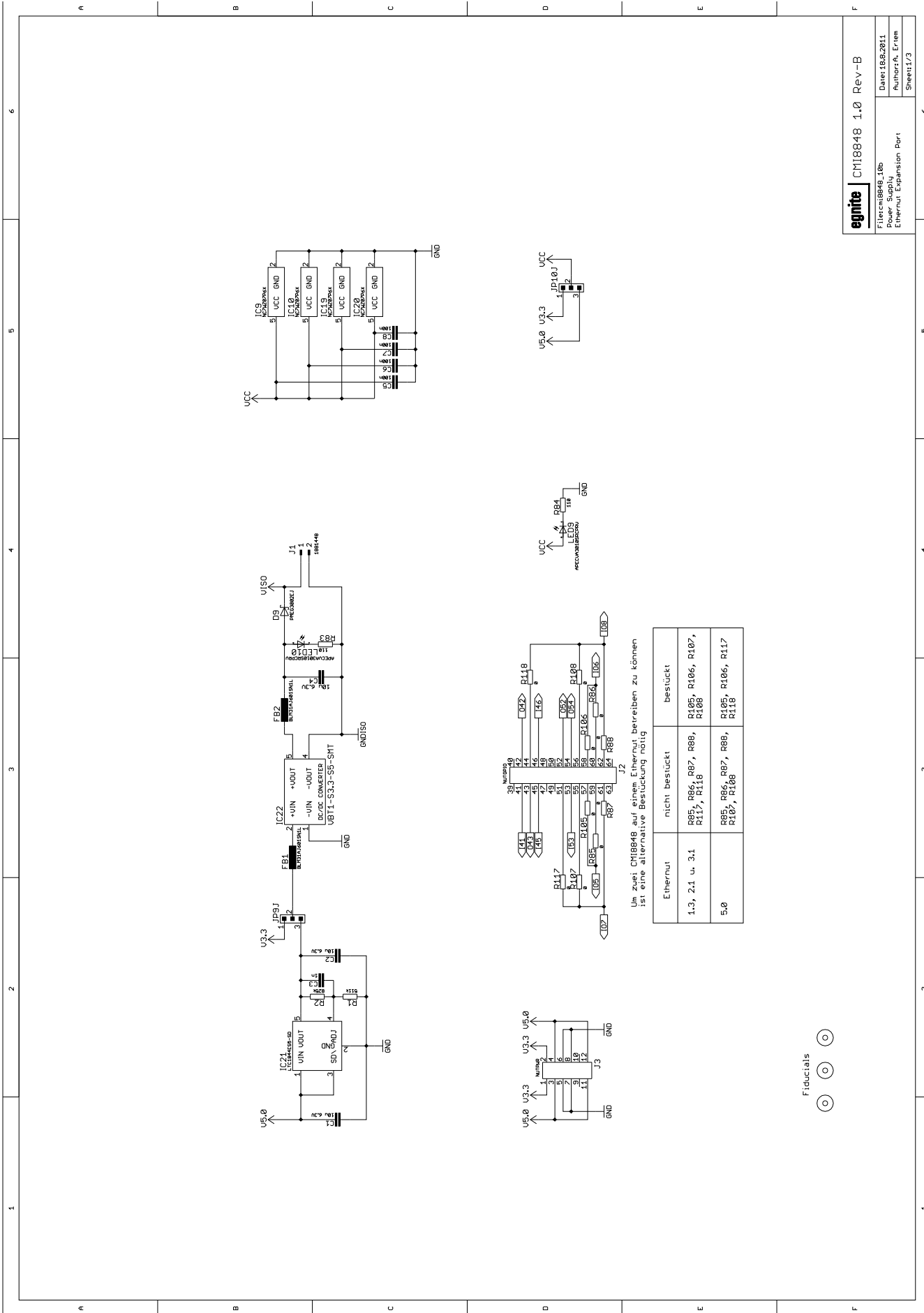
The CMI8848 is a 4-layer board using 8 mil clearance and 8 mil tracks.

The following drawing shows the physical dimensions of the mounted board. Measures are in mm.



Schematics

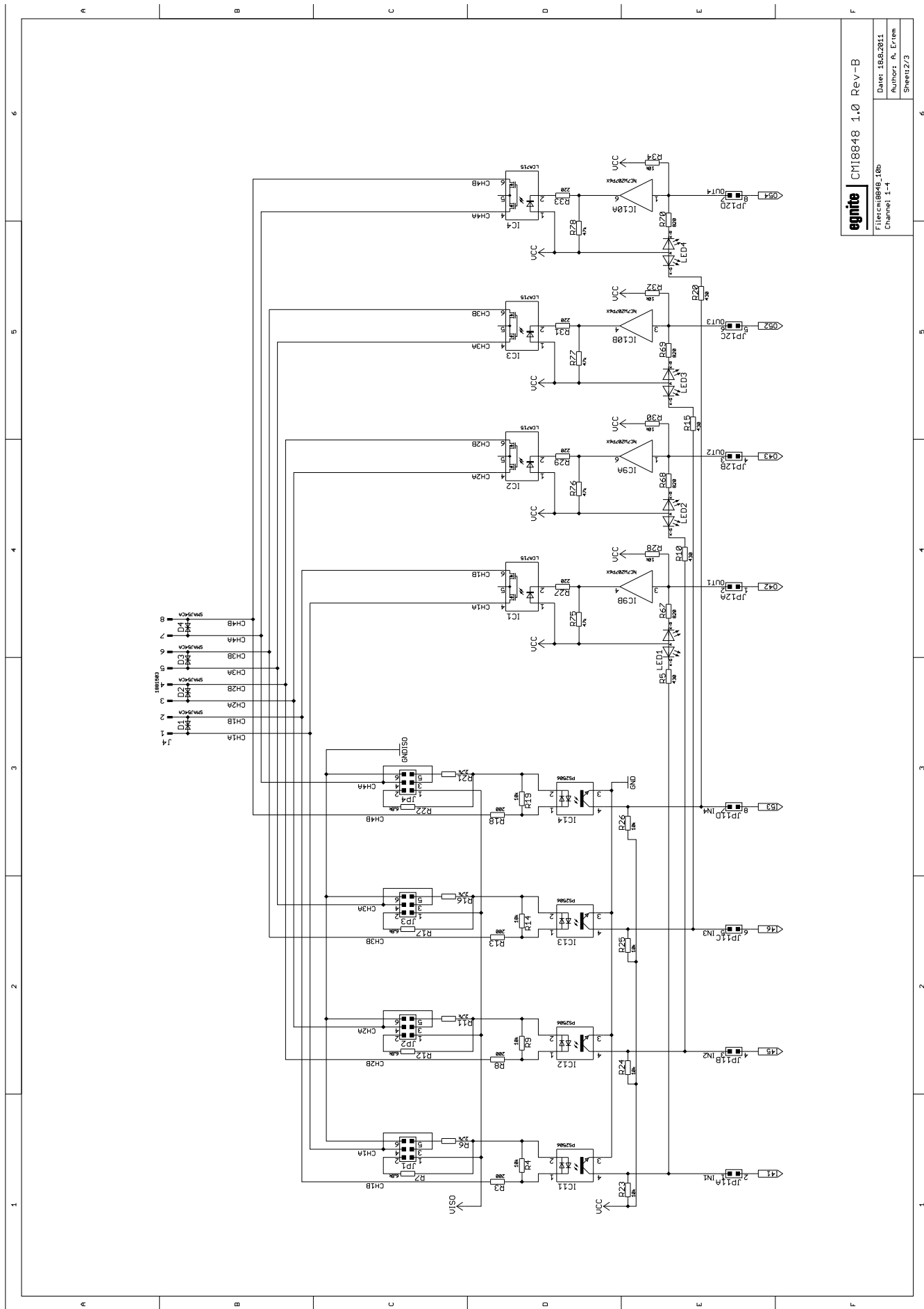
Full schematics are provided on the next 3 pages.



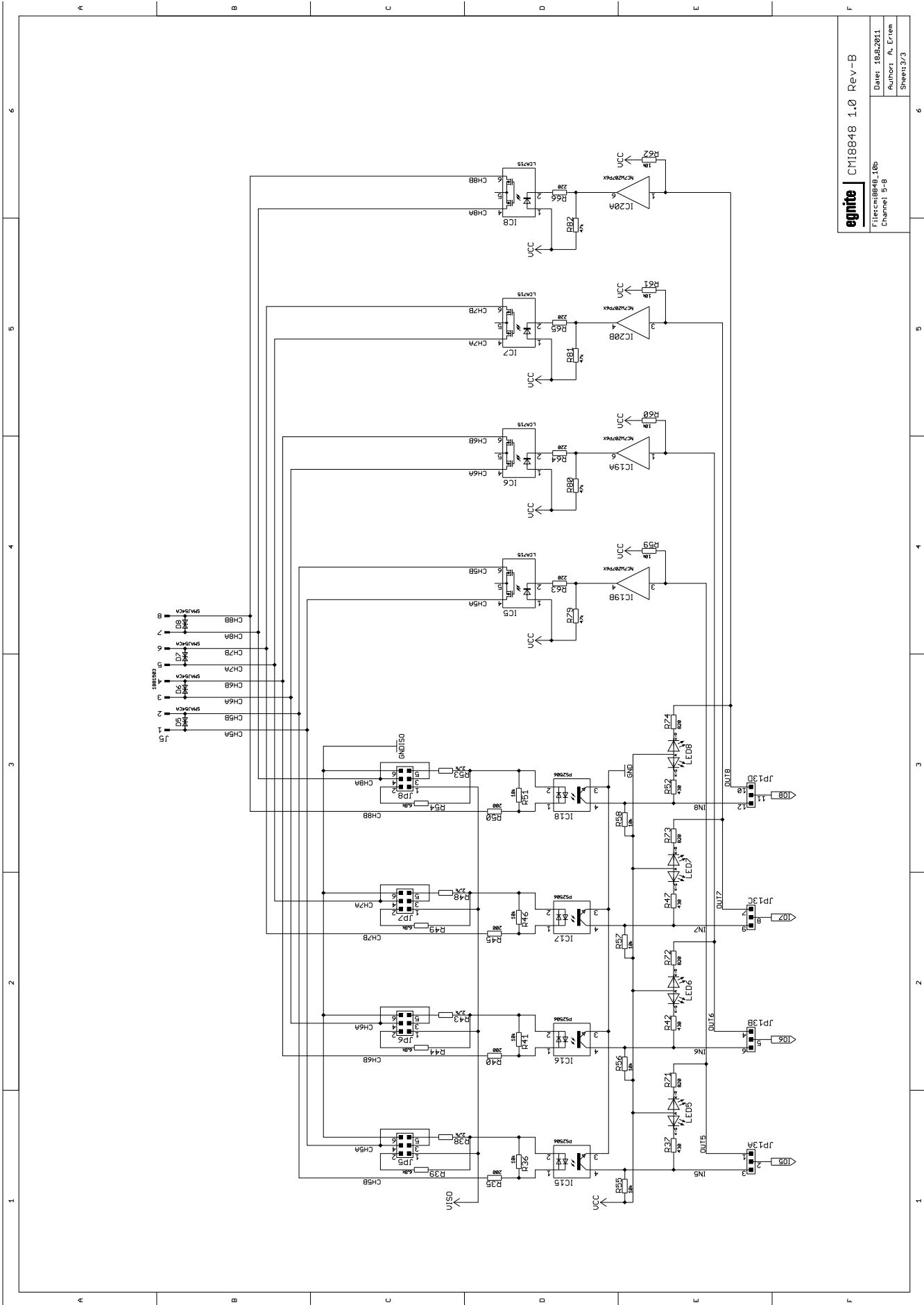
egnite CMI8848 1.0 Rev-B

File:cmi8848_10b
 Power Supply
 Ethernet Expansion Port
 Sheet1/3

Datei:18.02.2011
 Autor:FA. Ertem
 Sheet1/3



egnite	CMI8848 1.0 Rev-B
	F:\Hercules\8848_10b
	Author: A. Erlen Channel: 1-4 Sheet: 2/3



egnite CM18848 1.0 Rev-B

File: cm18848_1.0b
 Channel: 5-8
 Author: A. Ernie
 Sheet: 3/3

Warranty

Our warranty scheme is simple. All CMI8848 boards have been extensively tested before shipment and we feel responsible, that the board continues to work reliable after passing it to you.

If your board is broken, send an e-mail to info@egnite.de, including the following information:

- CMI8848 revision, printed on the back side of the board.
- Serial number of your board, written on top of the board and on the invoice.
- Description of your problem. You may keep it simple, we may request details later.

Please understand, that we are not able to provide any warranty, if you destroyed the board because of ignoring our ESD precautions advises or attaching badly designed hardware.

Contact

egnite GmbH
Erinstrasse 9
44575 Castrop-Rauxel
Germany

Tel.: +49 (0)23 05-44 12 56

Fax: +49 (0)23 05-44 14 87

E-mail: info@egnite.de

For the latest development software and further informations about the products, please visit www.egnite.de.

For information about the open source project Ethernut, please visit www.ethernut.de.