

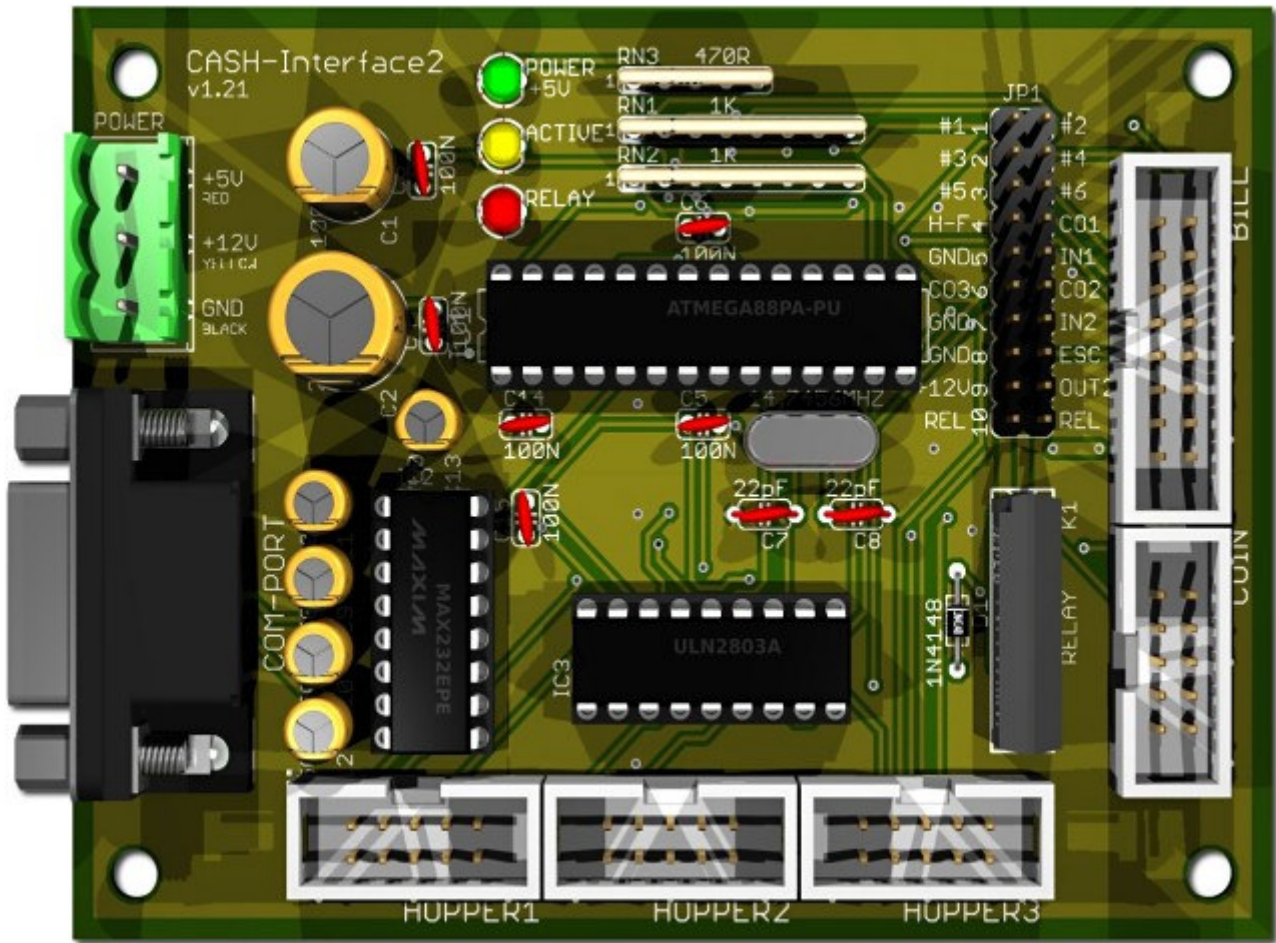
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# CASH-Interface2

v1.21

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Universal CASH Interface



## Features

- Simultaneous operation of a coin and bill validator as well as 3x hopper.
- Connection of cashless systems via PULSE interface
- Works on the USB (with USB to Serial converter) or serial port.
- The interface is monitoring six channels + power supply. Using BINARY Mode there are 15 different bills and 31 different coins possible at the same time.
- The devices are disabled until the software activates them.
- The pinning of the connectors are designed for coin acceptors of the type NRI G13 - RM5 - EMP 800 - EMP 850 - Microcoin SP/QL - MEI CASHFLOW 330 - MONEY CONTROLS C120, CONTROLS C120, and for bill acceptors of the type NV9 or NV10. We offer also specially wired connection cables or adapters for all other types, e.g. NRI G40 or GBA HR1.
- External coin sorter control via hopper full signal (SRT / H-FULL jumper).
- Hopper full and empty signal detection.
- 2 free useable inputs, e.g. to connect push buttons.
- 2 free useable outputs, e.g. to connect lamps or other actuators. 1 output as relay contact.
- Watchdog function, that means the acceptance is deactivated on errors.
- The control of the devices is done with simple commands, or by the free available CASH-Interface2 software.

## Supported devices

### Coin validators of the type:

RM5, NRI G13/G18, NRI G40, EMP 800, EMP 850, MARS, MONEY CONTROLS C120, AZKOYEN, FAGE, ICT

### Bill validators of the type:

NV9, NV10, GBA HR1, GBA ST2, JCM, MEI, APEX, MATRIX, VECTOR

You can also connect every coin and bill validator supporting PARALLEL, PULSE or BINARY mode.

### Hoppers of the type:

Universal Hopper MK2, MK3 and MK4, Azkoyen U-II Hopper, Flow Hopper, NRI H2 Hopper, Cube Hopper MK2 intelligent, Evolution Hopper, Escendo Escalator Hopper, Excel Hopper, Rode-U-Hopper, or others that support the PULSE mode.

### Bill dispenser of the type:

ICT ND-300 , ICT CVD-300 or other that support the HOPPER / PULSE mode.

You can also connect every hopper or bill dispenser supporting PARALLEL, PULSE or BINARY mode.

## Power connection

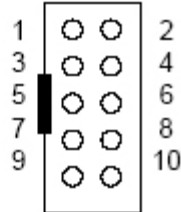
Connect the CASH-Interface2 with a serial cable or USB to serial converter to the PC. Supply the interface with a direct current voltage of +5V and 12V. Ensure that the poles are connected correctly! Be sure to take the precaution of making sure the power supply is strong enough. A bill validator can take up to 1500 mA and a coin acceptor up to 500mA of current. A hopper can take up to 3000mA and more!

## Coin validator connection

The connection of the coin acceptor (e.g. NRI G13) is made by a 10 pole flat ribbon cable to the plug marked with COIN.

Occupation of the 10 pole plug (NRI G13 compatible):

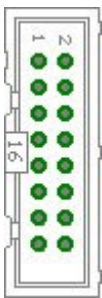
pin	assignment	potential
1	GND	low
2	UB +12V DC	high
3	output line 5	act. low
4	output line 6	act. low
5	return	act. low
6	total blocking	act. high
7	output line 1	act. low
8	output line 2	act. low
9	output line 3	act. low
10	output line 4	act. low



## Bill validator connection

The connection of the bill validator (e.g. NV7/8/9/10) is made by a 16 pole flat ribbon cable to the plug marked with BILL.

Occupation of the 16 pole plug (NV7/8/9/10 compatible):



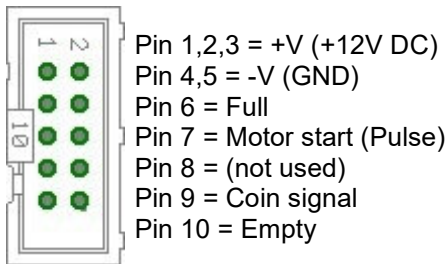
- Pin 1 = +12V DC
- Pin 2 = 0V
- Pin 3,4,5,6 = MDB (not used)
- Pin 7 = Busy (act. low)
- Pin 8 = Escrow (not used)
- Pin 9,10,11,12 = Inhibit 1-4 (Sperrung = High, Annahme = Low)
- Pin 13 = Vend 3 (Note channel 3, act. low)
- Pin 14 = Vend 4 (Note channel 4, act. low)
- Pin 15 = Vend 1 (Note channel 1, act. low)
- Pin 16 = Vend 2 (Note channel 2, act. low)

If you want to connect a other bill validator than NV7/8/9/10 you need to assemble a adapter cable with the above occupancy. On request we also supply you with fitting adapter cables.

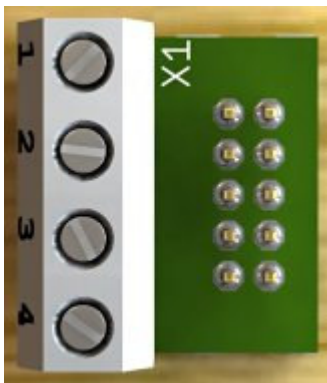
## Hopper connection

The connection of the bill validator (e.g. NV7/8/9/10) or bill dispenser (e.g. ND-300) is made by a 10 pole flat ribbon cable to the plug marked with HOPPER1, HOPPER2 or HOPPER3.

Occupation of the 10 pole plug (Azkoyen compatible):



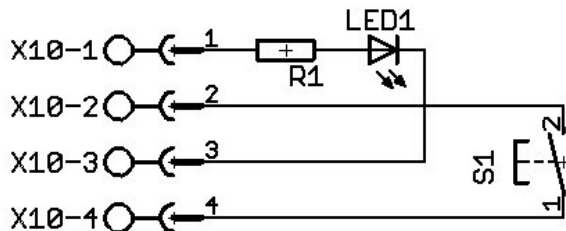
If you want to connect other devices than Azkoyen you need to assemble a adapter cable with the above occupancy or use one of our adapter boards. We offer adapters for MK4 hopper and ND-300 bill dispenser. On request we also supply you with fitting adapter cables.



Our ND-300 bill dispenser adapter can be plugged into the CASH-Interface2 HOPPER connector. It offers the hopper's motor run pin (OUT) and empty sensor (IN) so you can connect easily a ND-300 bill dispenser and use it in hopper mode.

The adapter can also be used to have an extra INPUT and OUTPUT for the CASH-Interface2 if there is no hopper connected. For example we use this for the photo booth control to have external illuminated push buttons. Hint: The output can switch a maximum current of 500 mA, on more load you have to connect a relays between load and output.

Connection of an illuminated push button on the HOPPER plug via ND-300 adapter:



## Cashless systems connection

The CASH-Interface2 supports the connection of cashless devices via PULSE-Interface. To do this, simply connect the PULSE output of the cashless device to a channel, e.g. COIN #1 - #6. We offer a PULSE-Adapter for easy connection, see [PULSE-Adapter](#)

Currently the following credit and smartcard systems can be connected:

- [Nayax cashless payments vpos](#) => Instructions in PDF format: [CASH-Interface2 Nayax Connection](#)
- [Ingenico pos solutions smart pos self-service](#)
- [CCV InSync](#)
- [Otiglobal cashless payment systems otipulse](#)
- [Sacoa Debit Card, POS and Redemption System](#)
- [USA Technologies ePort G9](#) and [ePort G10-S](#)

## Devices settings

For simultaneous operation of coin and bill acceptor we suggest this configuration:

Bill validator and coin validator in BINARY mode. You have to adjust the channels of coin and bill validator accordingly. You can get the software and cable to reprogram the respective device from the manufacturer, or just choose the desired channel occupancy with your order.

### **Example bill and coin validator (bill validator BINARY mode, coin validator BINARY mode):**

Channel 1-4 = bill validator binary coded value (up to 15 different bills)

Channel 1 (1) = bill validator 5 Euro bill  
Channel 2 (2) = bill validator 10 Euro bill  
Channel 3 (1+2) = bill validator 20 Euro bill  
Channel 4 (3) = bill validator 50 Euro bill  
Channel 5 (1+3) = bill validator 100 Euro bill  
Channel 6 (2+3) = bill validator 200 Euro bill  
Channel 7 (1+2+3) = bill validator 500 Euro bill  
and so on  
up to 15 different bills possible...

Channel 1-5 + 6 = coin validator binary coded value (up to 31 different coins)

Channel 1 (1+6) = coin validator 1 Cent coin  
Channel 2 (2+6) = coin validator 2 Cent coin  
Channel 3 (1+2+6) = coin validator 5 Cent coin  
Channel 4 (3+6) = coin validator 10 Cent coin  
Channel 5 (1+3+6) = coin validator 20 Cent coin  
Channel 6 (2+3+6) = coin validator 50 Cent coin  
Channel 7 (1+2+3+6) = coin validator 1 Euro coin  
Channel 8 (4+6) = coin validator 2 Euro coin  
Channel 9 (1+4+6) = coin validator token coin  
and so on  
up to 15 different coins possible...

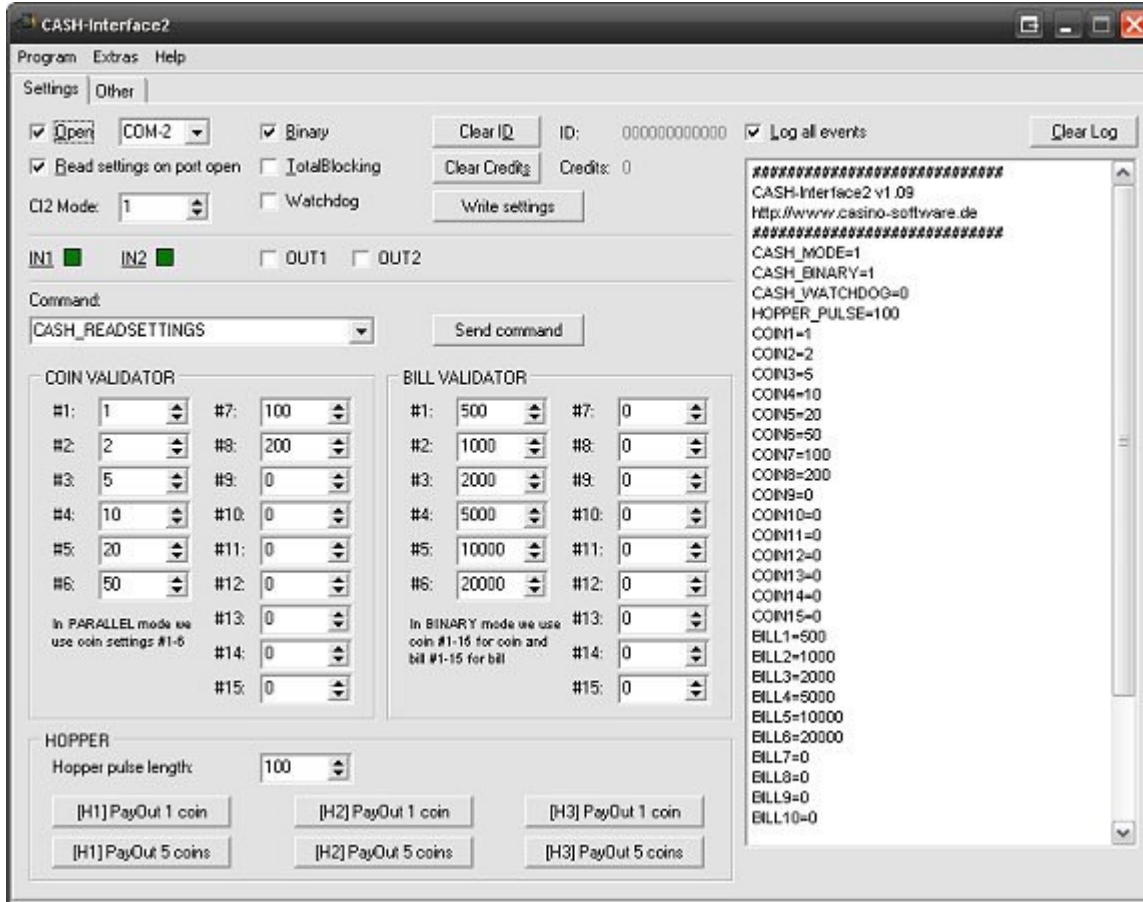
### **Example for connecting a bill and coin acceptor (PARALLEL mode):**

Channel 1 = bill acceptor 5 Euro bill  
Channel 2 = bill acceptor 10 Euro bill  
Channel 3 = bill acceptor 20 Euro bill  
Channel 4 = bill acceptor 50 Euro bill  
Channel 5 = coin acceptor 1 Euro coin  
Channel 6 = coin acceptor 2 Euro coin

# Programming

The software integration into your projects is done via default COM port commands or with the free CASH-Interface2 software (CI2.EXE). The source code of the CI2.EXE is available in the corresponding subdirectory. ([Download CASH-Interface2 Software](#))

## ci2.exe



Another possibility to implement the CASH-Interface2 into own projects is to use the demo project. The CI2.EXE sends a WM\_CopyData Message with every event in the format ID,DATE,TIME,CHANNEL,VALUE which can be received from your software. Additionally the program writes a logfile LOG.TXT in the same format, which can be evaluated externally from your software.

To load CASH.EXE on system run just put a shortcut into the autostart folder. Simply activate the HIDE checkbox to run it invisible in the background.

## Change settings for coins and banknotes

If the connection to the CASH-Interface has been established, means the Com port is open, all settings have been read on port open from the CASH-Interface2 board and are shown in the software. Now the values for coins (COIN VALIDATOR) and banknotes (BILL VALIDATOR) can be set to any value of your needs. Hint: In PARALLEL mode we only use coin 1-6 settings, this is shown in the software, too!

Now just set the coin or bill value for the corresponding channel.

Example: The coin validator has been set up to this, #1 - 10 Cent, #2 - 20 Cent, #3 - 50 Cent, #4 - 1 Euro, #5 - 2 Euro, so set for #1: 10, for #2: 20, for #3: 50, for #4: 100 and for #5: 200. Finally all settings must be sent to the board by pressing the "Write settings" button.

To verify the new settings are really stored correctly onto the CASH-Interface2, just send the command CASH\_READSETTINGS by the "Send command" button, the CASH-Interface2 sends then all settings to the PC again. If "Log all events" is active all data is shown in the log. Alternatively close the Com Port and open it again, with activated "Read settings on port open" the settings are read again from the CASH-Interface2.

## Commands

Commands to the CASH-Interface2 have to end with a "carriage return". In computing, the carriage return (CR) hexadecimal 0D or decimal 13, is one of the control characters in ASCII code. The CASH-Interface2 detects a byte with the value #13 (\$0D) as command end.

Example: CASH\_READSETTINGS\$0D

All data from the CASH-Interface2 ends with a "carriage return" and "line feed" (CRLF = Enter). This way you can detect the end of the data. When you receive the bytes \$0D\$0A all data has been received and the data can be processed.

The communication from and to the CASH-Interface2 can be tested with a terminal program.  
COM port settings: Baud 19200, Data bits 8, Parity none, Stop bits 1, Handshaking none

The CASH-Interface2 sends for every accepted coin or bill a string in the format: IN=n  
(n is the value you have set for the coin or bill channel, e.g. inserting 10 cent coin you get a IN=10 message).

COMMANDS:

- CASH\_READ  
read state of all channels + NV busy signal  
Example: "CASH\_READ"  
Returns: "CASH\_READ=n"  
bit 0 = channel 1  
bit 1 = channel 2  
bit 2 = channel 3  
bit 3 = channel 4  
bit 4 = channel 5  
bit 5 = channel 6 or coin validator binary line  
bit 6 = NV busy  
bit 7 = power supply ok
- CASH\_SENSOR 0|1  
activate external sensor on input IN1  
CASH\_SENSOR=1 does send cash IN commands only if sensor signals coin or bill  
"CASH\_SENSOR 0"  
"CASH\_SENSOR 1"  
Example: "CASH\_SENSOR 0" or "CASH\_SENSOR 1"  
Returns: "CASH\_SENSOR=n". On Error "ERROR".
- CASH\_TOTALBLOCKING 0|1  
set the totalblocking line to enable or disable acceptance of cash  
"CASH\_TOTALBLOCKING 0" enables acceptance of cash  
"CASH\_TOTALBLOCKING 1" disables acceptance of cash  
Example: "CASH\_TOTALBLOCKING 0" or "CASH\_TOTALBLOCKING 1"  
Returns: "CASH\_TOTALBLOCKING=n". On Error "ERROR".
- CASH\_BINARY 0|1  
sets the protocol of the connected coin and bill validator  
"CASH\_BINARY 0" the coin and bill validator work with PARALLEL protocol  
"CASH\_BINARY 1" the coin and bill validator work with BINARY protocol  
Example: "CASH\_BINARY 0" or "CASH\_BINARY 1"  
Returns: "CASH\_BINARY=n". On Error "ERROR".
- CASH\_IN1  
read state of external input IN1  
Example: "CASH\_IN1"  
Returns: "CASH\_IN1=n" state of the external input IN1  
0 = IN1 is LOW  
1 = IN1 is HIGH

- CASH\_IN2
  - read state of external input IN2
  - Example: "CASH\_IN2"
  - Returns: "CASH\_IN2=n" state of the external input IN2
  - 0 = IN2 is LOW
  - 1 = IN2 is HIGH
  
- CASH\_OUT1 0|1
  - set state of output OUT1
  - Example: "CASH\_OUT1 0" set OUT1 to LOW
  - Example: "CASH\_OUT1 1" set OUT1 to HIGH
  - Returns: "CASH\_OUT1=n". On Error "ERROR".
  
- CASH\_OUT2 0|1
  - set state of output OUT2
  - Example: "CASH\_OUT2 0" set OUT2 to LOW
  - Example: "CASH\_OUT2 1" set OUT2 to HIGH
  - Returns: "CASH\_OUT2=n". On Error "ERROR".
  
- CASH\_READSETTINGS
  - read all settings from the CASH-Interface2
  - Example: "CASH\_READSETTINGS"
  - Returns: all stored settings

```
#####
CASH-Interface2 v1.21b
http://www.casino-software.de
#####
CASH_SENSOR=1
CASH_BINARY=0
CASH_WATCHDOG=0
HOPPER_PULSE=50
COIN1=1
COIN2=2
COIN3=5
COIN4=10
COIN5=20
COIN6=50
COIN7=100
COIN8=200
COIN9=0
COIN10=0
COIN11=0
COIN12=0
COIN13=0
COIN14=0
COIN15=0
BILL1=500
BILL2=1000
BILL3=2000
BILL4=5000
BILL5=10000
BILL6=20000
BILL7=0
BILL8=0
BILL9=0
BILL10=0
BILL11=0
BILL12=0
BILL13=0
BILL14=0
BILL15=0
#####
```



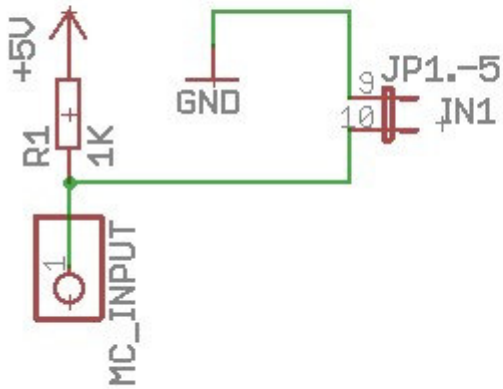
- HOPPER <hopper number> <coins>
  - pay out a coin with specific hopper
  - "HOPPER 1 1" pay out 1 coin with hopper 1
  - "HOPPER 1 5" pay out 5 coins with hopper 1
  - "HOPPER 2 1" pay out 1 coin with hopper 2
  - "HOPPER 2 5" pay out 5 coins with hopper 2
  - "HOPPER 3 1" pay out 1 coin with hopper 3
  - "HOPPER 3 5" pay out 5 coins with hopper 3
  - Example: "HOPPER 1 1"
  - Returns: "HOPPER\_n=x". On Error "ERROR".
  
- HOPPER1\_EMPTY
  - read state of hopper1 empty detection
  - Example: "HOPPER1\_EMPTY"
  - Returns: "HOPPER1\_EMPTY=n" state of the hopper1 empty signal
  - 0 = no hopper1 empty signal detected, hopper is not empty
  - 1 = hopper1 empty signal detected, hopper is empty
  
- HOPPER2\_EMPTY
  - read state of hopper2 empty detection
  - Example: "HOPPER2\_EMPTY"
  - Returns: "HOPPER2\_EMPTY=n" state of the hopper2 empty signal
  - 0 = no hopper2 empty signal detected, hopper is not empty
  - 1 = hopper2 empty signal detected, hopper is empty
  
- HOPPER3\_EMPTY
  - read state of hopper3 empty detection
  - Example: "HOPPER3\_EMPTY"
  - Returns: "HOPPER3\_EMPTY=n" state of the hopper3 empty signal
  - 0 = no hopper3 empty signal detected, hopper is not empty
  - 1 = hopper3 empty signal detected, hopper is empty
  
- HOPPER\_FULL
  - read state of hopper full detection
  - Example: "HOPPER\_FULL"
  - Returns: "HOPPER\_FULL=n" state of the hopper full signal
  - 0 = no hopper full signal detected, hopper is not full
  - 1 = hopper full signal detected, hopper is full
  - Hint: The hopper full signal is normally used to control the coin sorter via coin #5 line. To activate this the jumper JP1.1 must be set.
  
- HOPPER\_PULSE <pulse length in ms>
  - sets the hopper pulse length in milli seconds. Default is 100.
  - Example: "HOPPER\_PULSE 100"
  - Returns: "HOPPER\_PULSE=n". On Error "ERROR".
  
- HOPPER1\_ON <run motor H1 ON>
  - sets the Pin7 on the Hopper1 connector to GND.
  - If you do not use a hopper you can use this as an output.
  - The ULN2803 output is able to switch 500mA current.
  - Example: "HOPPER1\_ON"
  - Returns: "HOPPER1\_ON". On Error "ERROR".
  
- HOPPER1\_OFF <run motor H1 OFF>
  - resets the Pin7 on the Hopper1 connector to HIGH.
  - Example: "HOPPER1\_OFF"
  - Returns: "HOPPER1\_OFF". On Error "ERROR".
  
- HOPPER2\_ON <run motor H2 ON>
  - sets the Pin7 on the Hopper2 connector to GND.
  - If you do not use a hopper you can use this as an output.
  - The ULN2803 output is able to switch 500mA current.
  - Example: "HOPPER2\_ON"
  - Returns: "HOPPER2\_ON". On Error "ERROR".

- HOPPER2\_OFF <run motor H2 OFF>  
resets the Pin7 on the Hopper2 connector to HIGH.  
Example: "HOPPER2\_OFF"  
Returns: "HOPPER2\_OFF". On Error "ERROR".
  - HOPPER3\_ON <run motor H3 ON>  
sets the Pin7 on the Hopper3 connector to GND.  
If you do not use a hopper you can use this as an output.  
The ULN2803 output is able to switch 500mA current.  
Example: "HOPPER3\_ON"  
Returns: "HOPPER3\_ON". On Error "ERROR".
  - HOPPER3\_OFF <run motor H3 OFF>  
resets the Pin7 on the Hopper3 connector to HIGH.  
Example: "HOPPER3\_OFF"  
Returns: "HOPPER3\_OFF". On Error "ERROR".
  - CASH\_COIN <channel> <value>  
sets the channel value for a coin  
"CASH\_COIN 1 1" sets coin1 to 1  
"CASH\_COIN 1 10" sets coin1 to 10  
"CASH\_COIN 2 1" sets coin2 to 1  
"CASH\_COIN 2 10" sets coin2 to 10  
Example: "CASH\_COIN 1 1"  
Returns: "CASH\_COIN\_n=x". On Error "ERROR".
  - CASH\_BILL <channel> <value>  
sets the channel value for a bill  
"CASH\_BILL 1 1" sets bill1 to 1  
"CASH\_BILL 1 10" sets bill1 to 10  
"CASH\_BILL 2 1" sets bill2 to 1  
"CASH\_BILL 2 10" sets bill2 to 10  
Example: "CASH\_BILL 1 1"  
Returns: "CASH\_BILL\_n=x". On Error "ERROR".
  - CASH\_WATCHDOG 0|1  
disable acceptance of cash if there is no command received  
within 60sec  
"CASH\_WATCHDOG 0" disables the watchdog  
"CASH\_WATCHDOG 1" enables the watchdog  
Example: "CASH\_WATCHDOG 0" or "CASH\_WATCHDOG 1"  
Returns: "CASH\_WATCHDOG=n". On Error "ERROR".
  - CASH\_WATCHDOG\_RESET  
Reset the internal watchdog timer.  
Should be sent from the host application around every 50 seconds.  
Watchdog timeout is 60 seconds.
  - Wrong command  
Returns: "UNKNOWN\_COMMAND="
-

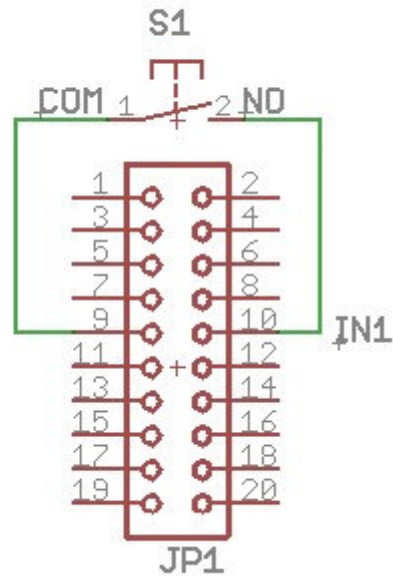
## IN1+2 connection

IN1 + IN2 provides an ACTIVE LOW input designed as follows:

Internal IN1 connection



IN1 example

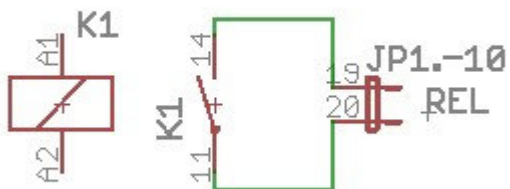


## REL connection

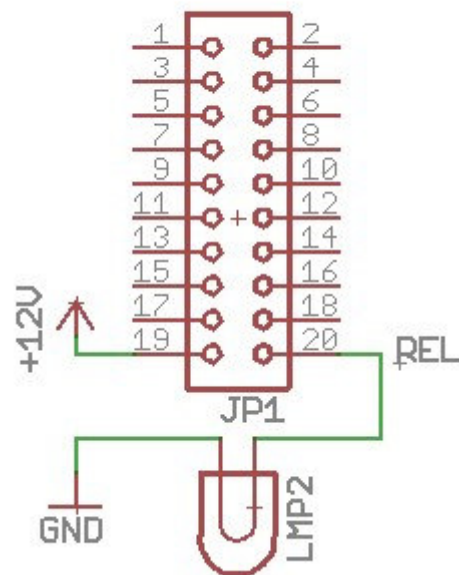
REL provides a potential-free relay output designed as follows:

The on board relays max. voltage is 200V, max. switching load is 15W.

Internal REL connection



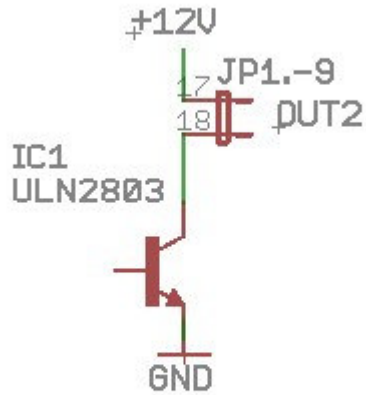
REL example



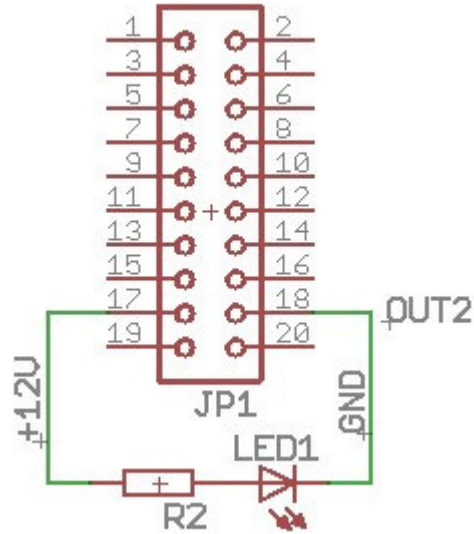
## OUT2 connection

OUT 2 provides a +12V output designed as follows:  
The transistor max. current is 0,5A.

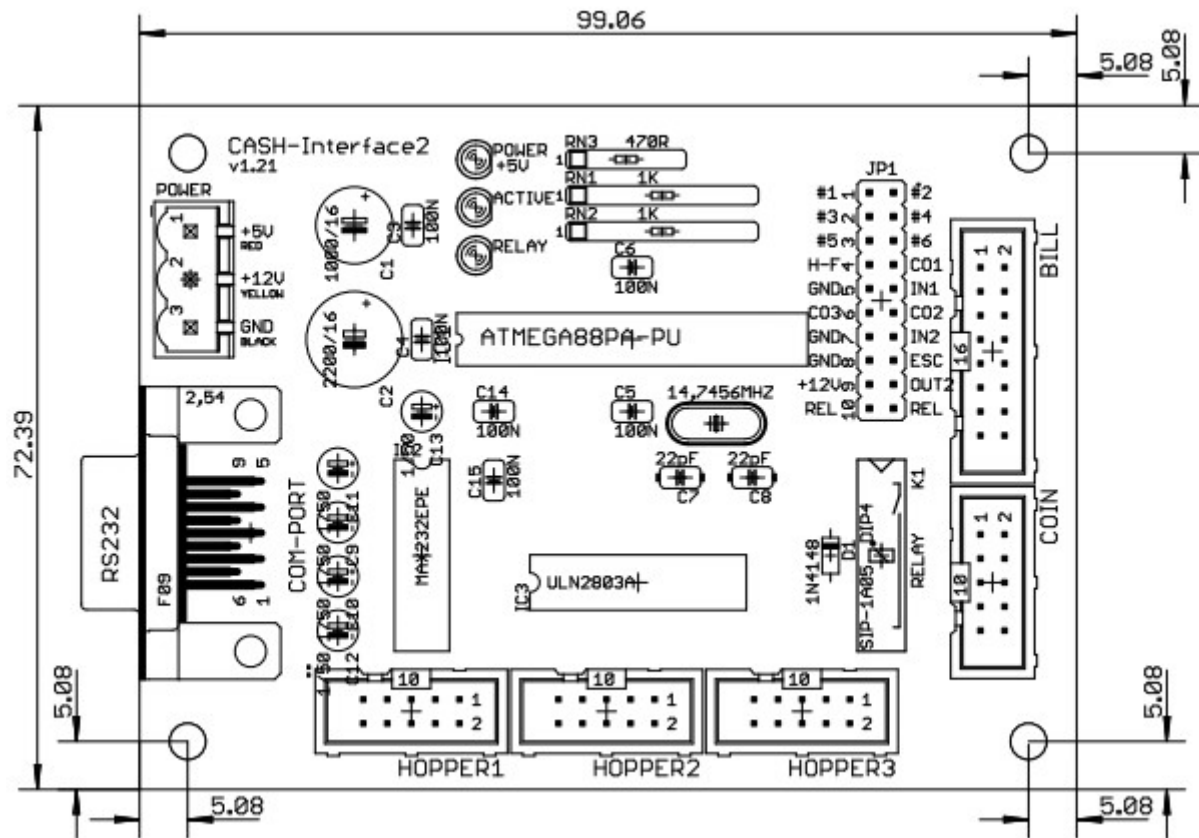
Internal OUT2 connection



OUT2 example



## CI2 dimensions



## Getting started / testing

Connect the CASH-Interface via the 9pol. com cable to the serial port on your PC. It is possible to use a USB to serial converter, too. Connect the coin and bill validator via the flat ribbon cable to the CASH-Interface2. Connect the +5V and +12V power supply. If you use the PC power supply use the RED cable for +5V, the YELLOW cable for +12V and the BLACK cables for 0V. Ensure that the poles are connected correctly!

By use of an external power supply the power supply should min. support 12 V/1.5 amps current for the bill validator. For a coin validator the power supply should min. support 12 V/0.5 amps current. To supply both devices you need a power supply with at least 12V/2A. On the CASH-Interface2 the green LED indicates the power supply is ok.

To test the CASH-Interface2 please use the Delphi example program ci2.exe. The example program can be found in the folder /delphi/example/ci2.exe or a shortcut in the Windows startmenu, all programs, CI2, Example.

Start the example program and set the right com port. Activate the "Open" checkbox. The connection to the CASH-Interface2 is open now and commands can be sent and data received. Select the command "CASH\_READSETTINGS" and send it to the CASH-Interface2 with the "Send command" button. The CASH-Interface2 answers to this command with sending all stored settings.

Now insert a coin or a bill. The CASH-Interface2 sends for every accepted coin or bill a string in the format: IN=n (n is the value you have set for the coin or bill channel, e.g. inserting 10 cent coin you get a IN=10 message).

To avoid manipulation via EMP signals it is possible to connect a external sensor to IN1 input (CASH\_SENSOR=1). Only if the sensor signals a bill or coin the IN=x command is sent.

## Problems

Having problems work thru this checklist, this should help to fix your issues!

- If the COM port is open, the answer from the board with all settings must appear in the log. If not, there is something wrong with the connection to the CASH-Interface2, or simply the wrong COM port setting. Important: Check tight cable connections and the power supply is connected correctly. Using a USB to serial converter the correct COM port number can be found in the Windows device manager, see above video.
- Check all cables if they fit tight.
- Remove all extension cables, e.g. USB extension cord or USB hub.
- Disconnect the power cable on the CI2, then connect it again.
- If the connection to the CASH-Interface2 is working, but no cash is accepted, maybe the TotalBlocking function in the software is activated. The yellow LED on the board must lit to accept money. If coins or bills are rejected with illuminated ACTIVE LED, either the cable or the cash device itself is broken.
- Use a different COM or USB plug on the PC, and replace all cables if problems still appear.
- If the PC main board offers a free PCI Express slot, it is possible to add a cost-effective PCI Express serial card to have a pure COM port available.
- A COM port can be opened only once, so be sure the COM port is not open by an other application.
- Be sure the coin validator is placed horizontal so the device can measure correctly.
- We figured out that some customers using a serial touch screen, the serial touch screen driver screws up all other Com ports, which results in communication errors with the CASH-Interface2. Try to get a USB controller for your touch screen and uninstall the serial touchscreen drivers. Visit the manufacturer website of the touch screen and download latest touch screen driver, but be sure to do not install serial drivers. A working 3M driver can be downloaded here: [3M touch screen driver win32-64](#)
- Check the log file for error messages, this gives you hints what exactly is the problem.
- Check the power supply for the board.  
Measure the +5V (green LED) and +12V with a Voltmeter.
- Sometimes it helps to completely uninstall the software via Windows control panel, and do a fresh install. Doing this visit the CI2 website to download the latest version.

## Support

For your inquiry please use our online [E-Mail form](#).