CASH-Interface MC8 [CHANGER]

User manual
Board version: v4.12
Software version: v2.15
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Content

1. DESCRIPTION

With the CI MC8 board it is possible to build a money changer machine, or a token machine, e.g. for car wash or laundry saloon.

Connection options for bill validator, coin validator, 3x hopper or ticket and note dispenser, receipt printer, LCD display, push buttons and switches, as well as a relay output for an output slot lighting. Additionally a cashless system like Nayax , OTI , USA Technologies , Sacoa or Ingenico can be used.

The credits for every coin and bill, as well as the coin value of the hopper are adjusted in the service menu. The display shows "READY" or "CHANGER READY", depends on the used settings. Inserting money the corresponding credits are added and shown in the LCD display. There are two different payout modes, default or user select mode selectable in the settings. With user select mode the customer can select via push button what type of coin he wants to change. For example hopper 1 holds 1 Euro coins and hopper 2 holds 2 Euro coins. The push buttons are illuminated showing the coin type is ready to payout. If a hopper is empty the button is not illuminated and it is not possible to select that coin type. The button illumination can also be controlled via the hopper value, this means if there are enough credits the corresponding button gets illuminated. With the SINGLE COIN setting the customer can select what hopper to pay out from as long as he has credits left.

In default mode the corresponding amount of coins is paid out directly, without a push button. The amount is reduced and shown on the display by every paid coin. It is possible to change bills to coins and small coins to bigger coins or even bills. Using 3 hoppers there can be paid out 3 different coins or bills. In the service menu the amount of coins for hopper 1-3 can be adjusted for every coin and bill separately.

HINT: The hopper value must be always ascending, that means the smallest coin in hopper 1. Using same coin value for the hoppers will payout alternately with an other hopper for every job.

Example change bill to coins
(hopper1=0,50 EUR, hopper2=1 EUR, hopper3=2 EUR):
5 EUR bill:
Pay out 10x 0,50 EUR
or
Pay out 5x 1 EUR
or
Pay out 3x 1 EUR + 1x 2 EUR
or
Pay out 1x 1 EUR + 2x 2 EUR
or
Pay out 2x 0,50 EUR + 2x 2 EUR

The number of coins per hopper can be set separately for each bill, as well as the 1 EUR and 2 EUR coin. Thus, any constellation of output is possible.

Example change coins into coins
(hopper1=0,50 EUR, hopper2=1 EUR, hopper3=2 EUR):
Small coins are inserted, e.g. 10 cent. Reaching a total of 0,50 EUR and no more pay in within 2 seconds a 0,50 EUR coin is paid out, else reaching the total of 1 EUR a 1 EUR coin is paid out, otherwise upon reaching 2 EUR a 2 EUR coin is paid out. The time to wait is adjustable via menu "DELAY" setting, default is 2 seconds. Every inserted coin starts the time until payout begins new.

Example change coins into bill
(hopper 3 note dispenser = 10 EUR):
Coins are thrown in. Reaching a total of 10 EUR a 10 EUR bill is paid out.
It is possible to control 3 hoppers (coin or note dispenser). Every hopper connection can be used for coin or bill pay out. The corresponding coin or bill value can be adjusted in the service menu.

Every of the 3 hoppers is monitored for EMPTY and FULL, that means if one hopper is empty the acceptance of money is disabled and shown in the LCD display. The FULL signal can control a coin sorter and redirect the coin to the main cash box instead to the hopper. The EMPTY control can be activated for every connected hopper by a menu setting. The FULL control is activated via jumper on the board.

2. SERVICE MENU

The SERVICE menu is activated via the SERVICE button on the board. It is possible to connect an external push button to jumper JP 1.5. Select the menu items by further pressing the SERVICE button. Hold down the SERVICE button to automatically switch through all menu items. With the SERVICE button you move forward, with the LEFT button you move backwards thru all menu settings.

Change settings of the active menu item with the START button (increase or toggle value, or select function), or with the DOWN button (decrease or toggle value, or select function). It is possible to connect an external push button to jumper JP 1.4. Hold down the START or DOWN button for repeat function (very fast count after 100 steps).

Push LEFT and SERVICE button at the same time exists the service menu, this is the same then using EXIT.

If there are credits left on leaving the service menu, e.g. after a hopper empty while payout, the pay out will start again.

On SERVICE enter and no button press within 10 seconds in the VERSION screen, the SERVICE is automatically closed and system goes back to ready mode.

2.1 Menu items

Currently the SERVICE menu contains 88 menu items.

1: SOFTWARE and VERSION
   shows the software and version number, e.g. CI MC8 CHANGER, VERSION: 2.03
2: STATUS H-EMPTY
   shows the empty state for hopper 1-3: H1=E H2=E H3=E
   (E=EMPTY, F=FULL means NOT EMPTY)
3: CREDIT
   displays the current balance, e.g. 10.00
4: TOTAL – IN
   shows how much money was totally inserted (cash register counter)
5: HOPPER1 OUT
   shows how many coins have been paid out by hopper 1
   On "CLEAR" and hopper level active, this number is added to HOPPER1 LEVEL.
6: HOPPER2 OUT
   shows how many coins have been paid out by hopper 2
   On "CLEAR" and hopper level active, this number is added to HOPPER2 LEVEL.
7: HOPPER3 OUT
   shows how many coins have been paid out by hopper 3
   On "CLEAR" and hopper level active, this number is added to HOPPER3 LEVEL.
8: HOPPER1 - LEVEL
   Level indicator for hopper1, shows how many coins are remaining in the hopper1.
9: HOPPER2 - LEVEL
   Level indicator for hopper2, shows how many coins are remaining in the hopper2.
10: HOPPER3 - LEVEL
   Level indicator for hopper3, shows how many coins are remaining in the hopper3.
11: HOPPER1 PAYOUT 20 COINS
   pays out 20 coins from hopper1, for example to empty the hopper
12: HOPPER2 PAYOUT 20 COINS
   pays out 20 coins from hopper2, for example to empty the hopper
13: HOPPER3 PAYOUT 20 COINS
   pays out 20 coins from hopper3, for example to empty the hopper
14: EXIT - CLOSE SERVICE
   exits the SERVICE-MENU and saves all settings.
15: BILL1 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill1, number of coins to pay via hopper1
16: BILL1 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill1, number of coins to pay via hopper2
17: BILL1 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill1, number of coins to pay via hopper3
18: BILL2 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill2, number of coins to pay via hopper1
19: BILL2 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill2, number of coins to pay via hopper2

20: BILL2 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill2, number of coins to pay via hopper3
21: BILL3 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill3, number of coins to pay via hopper1
22: BILL3 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill3, number of coins to pay via hopper2
23: BILL3 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill3, number of coins to pay via hopper3
24: BILL4 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill4, number of coins to pay via hopper1
25: BILL4 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill4, number of coins to pay via hopper2
26: BILL4 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill4, number of coins to pay via hopper3
27: BILL5 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill5, number of coins to pay via hopper1
28: BILL5 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill5, number of coins to pay via hopper2
29: BILL5 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill5, number of coins to pay via hopper3
30: BILL6 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill6, number of coins to pay via hopper1
31: BILL6 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill6, number of coins to pay via hopper2
32: BILL6 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill6, number of coins to pay via hopper3
33: BILL7 - HOPPER1, Setting range 0-1000, default setting 0
   On accept bill7, number of coins to pay via hopper1
34: BILL7 - HOPPER2, Setting range 0-1000, default setting 0
   On accept bill7, number of coins to pay via hopper2
35: BILL7 - HOPPER3, Setting range 0-1000, default setting 0
   On accept bill7, number of coins to pay via hopper3
36: EUR 1 - HOPPER1, Setting range 0-1000, default setting 0
   On accept 1 Euro (coin value 100), number of coins to pay via hopper1
37: EUR 1 - HOPPER2, Setting range 0-1000, default setting 0
   On accept 1 Euro (coin value 100), number of coins to pay via hopper2
38: EUR 1 - HOPPER3, Setting range 0-1000, default setting 0
   On accept 1 Euro (coin value 100), number of coins to pay via hopper3
39: EUR 2 - HOPPER1, Setting range 0-1000, default setting 0
   On accept 2 Euro (coin value 200), number of coins to pay via hopper1
40: EUR 2 - HOPPER2, Setting range 0-1000, default setting 0
   On accept 2 Euro (coin value 200), number of coins to pay via hopper2
41: EUR 2 - HOPPER3, Setting range 0-1000, default setting 0
   On accept 2 Euro (coin value 200), number of coins to pay via hopper3
42: COIN #1, Setting range 0-50000, default setting 50 (0,50 EUR)
   value for coin channel 1.

43: COIN #2, Setting range 0-50000, default setting 100 (1 EUR)
   value for coin channel 2.
44: COIN #3, Setting range 0-50000, default setting 200 (2 EUR)
   value for coin channel 3.
45: COIN #4, Setting range 0-50000, default setting 0
   value for coin channel 4. Hint: needs to use BINARY protocol
46: COIN #5, Setting range 0-50000, default setting 0
   value for coin channel 5. Hint: needs to use BINARY protocol
47: COIN #6, Setting range 0-50000, default setting 0
   value for coin channel 6. Hint: needs to use BINARY protocol
48: COIN #7, Setting range 0-50000, default setting 0
   value for coin channel 7. Hint: needs to use BINARY protocol
49: BILL #1, Setting range 0-50000, default setting 500 (5 EUR)
   value for bill channel 1.
50: BILL #2, Setting range 0-50000, default setting 1000 (10 EUR)
   value for bill channel 2.
51: BILL #3, Setting range 0-50000, default setting 2000 (20 EUR)
   value for bill channel 3.
52: BILL #4, Setting range 0-50000, default setting 5000 (50 EUR)
   value for bill channel 4.
53: BILL #5, Setting range 0-50000, default setting 0
   value for bill channel 5. Hint: needs to use BINARY protocol
54: BILL #6, Setting range 0-50000, default setting 0
   value for bill channel 6. Hint: needs to use BINARY protocol
55: BILL #7, Setting range 0-50000, default setting 0 (for SPECIAL settings see page 25!)
   value for bill channel 7. Hint: needs to use BINARY protocol
56: COIN PROTOCOL, PARALLEL or BINARY, default setting PARALLEL
   coin validator transmission protocol. More than 3 coins needs to use BINARY protocol
57: BILL PROTOCOL, PARALLEL or BINARY, default setting PARALLEL
   bill validator transmission protocol. More than 4 bills needs to use BINARY protocol
58: B-PULSE, Setting range 1-50000, default setting 0 (use with pulse)
   value for one bill pulse if PULSE protocol is used.
59: COMMA, OFF or ON, default setting ON
   OFF=show credits without comma, ON=show credits with comma
60: HOPPER1 VALUE, Setting range 1-50000, default setting 100 (1 Euro)
   value for hopper1 coin
61: HOPPER2 VALUE, Setting range 1-50000, default setting 0
   value for hopper2 coin
62: HOPPER3 VALUE, Setting range 1-50000, default setting 0
   value for hopper3 coin
63: MONITOR H1, OFF or ON, default setting OFF
   hopper1 empty detection. Set to OFF if HOPPER LEVEL COUNT is active!
64: MONITOR H2, OFF or ON, default setting OFF
   hopper2 empty detection. Set to OFF if HOPPER LEVEL COUNT is active!
65: MONITOR H3, OFF or ON, default setting OFF
   hopper3 empty detection. Set to OFF if HOPPER LEVEL COUNT is active!

66: HOPPER LEVEL COUNT, OFF or ON, default is OFF
   activate level indicator. Note hint for level counter!
67: HOPPER USER SELECT, OFF or ON, default setting OFF
   User selects hopper number via push button
68: ILLUM., BY CREDIT or ALWAYS, default setting BY CREDIT
   push button illumination by credit or hopper empty detection
69: SINGLE COIN, OFF or ON, default setting OFF
   if user select is active, only one coin per button press or complete credits
70: H-INT, PULSE or LOGIC, default setting PULSE
   Hopper Interface, e.g. for Asahi Seiko „LOGIC" control is needed.
71: C-SIG, HIGH or LOW, default setting LOW
   Coin Signal, e.g. Asahi Seiko needs „HIGH", CUBE MKII needs „LOW".
72: H-PULSE TIME, Setting range 1-500, default setting 50
   hopper pulse signal time, e.g. MK4 hopper it is min. 5ms
73: PULSE2BILL, OFF or ON, default setting ON
   Credits are accumulated and assignments for BILL1-7 + H1-3 are used.
74: START VALUE, Setting range 1-50000, default setting 0 (0 Euro)
   Min. start value to trigger payout, e.g. 600 for min. 6 Euro credit
75: RANDOM, OFF or ON, default setting OFF
   Payout by random from hopper 1, 2 or 3
76: PRINTER RECEIPT, OFF or ON, default setting OFF
   receipt printer, must support pulse interface, e.g. GP-58 or ICT-SP1
77: P-PULSE VALUE, Setting range 1-50000, default setting 100
   receipt printer pulse value
78: P-MODE PRINT, ALL, H1, H2, H3
   Receipt print all, only Hopper1 amount, Hopper2 amount or Hopper3 amount.
79: DELAY VALUE, Setting range 1-10, default setting 2
   delay until payout job starts.
   Needed if small coins are inserted
80: RELAYS TIME, Setting range 0-10, default setting 0=OFF
   ON time for the on board relays. Follow-up time for output shaft illumination.
81: ACCEPT – MAXCREDIT, Setting range 0-50000, default setting 50000
   If MAXCREDIT is reached cash acceptance is disabled.
82: M-EXIT, Setting range 0-300, default setting 0=OFF
   Auto Exit Settings after x seconds inactivity. If activ min. value is 10 sec.
83: LINGO, ENGLISH or DEUTSCH or HUNGARIAN, default setting ENGLISH
   customer language used in the LCD display. Menu language is always english
84: SHOW, READY or CHANGER READY, default setting CHANGER READY
   display on standby, READY or CHANGER READY.
85: SHOW - COIN COUNT
   Shows the number of coins currently paid out on display line 1
86: SETTINGS BACKUP
   backup all settings to internal EEProm
87: SETTINGS RESTORE
   restore all settings from internal EEProm

88: EXIT CLOSE SERVICE, exits the SERVICE-MENU and saves all settings
  Exits SERVICE and saves all settings.

Acceptance of money is disabled while service.
All data and settings are saved when you EXIT the service menu, means you have to leave the service menu always by EXIT or made changes are lost.
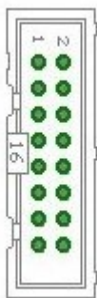
3. DEVICES

3.1 Bill validator

Of the type NV9, NV10 or pin compatible.
GBA HR1/ST1/ST2 via adapter possible.
Protocol: PARALLEL (default), PULSE or BINARY.

Hint: Using the PULSE protocol, the pulse value must be set on B-PULSE setting!

Pin out of the BILL plug:

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 (blocking = High, accept = 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)

3.2 Coin validator

Of the type NRI-G13, RM5, EMP800 or pin compatible.
Protocol: PARALLEL (default), PULSE or BINARY.
Pin out of the COIN plug:

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
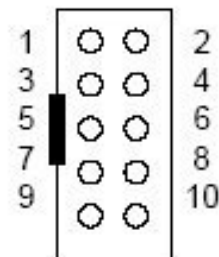
A coin sorter can be directed to the main cash box via hopper full signal,
e.g. EMP 850.00/P V7 /O or. /N /X Pin4 Low sorter control and SRT 800.3X
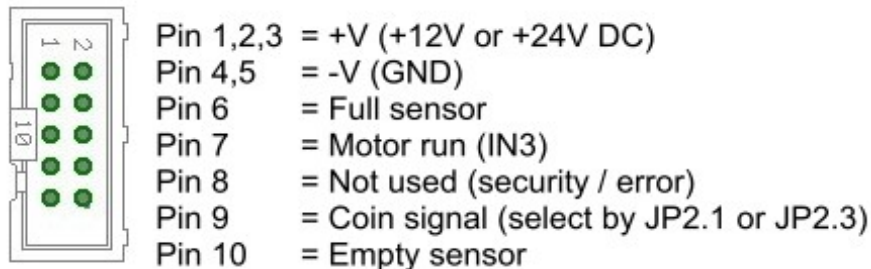
3.3 Hopper

Hopper of the type Azkoyen U-II, Flow-Hopper, Hopper HS-2012 (STD) via MK4 adapter, MK2/3/4 via MK4 adapter, Note dispenser ND300KM via ND300KM adapter, CUBE HOPPER MK2 with driver cable and ND300-Adapter.

Since software version 1.78 it is also possible to control hoppers via "LOGIC CONTROL", for example Asahi Seiko WH3, CUBE HOPPER MKII (with driver cable), EXCEL hopper via CUBE HOPPER MKII adapter, means virtually any hopper that supports standard hopper mode (LOGIC CONTROL).

Protocol: PULSE or LOGIC CONTROL

Pin out of the HOPPER plug:

Pin 1,2,3 = +V (+12V or +24V DC)
Pin 4,5   = -V (GND)
Pin 6   = Full sensor
Pin 7   = Motor run (IN3)
Pin 8   = Not used (security / error)
Pin 9   = Coin signal (select by JP2.1 or JP2.3)
Pin 10   = Empty sensor

If a hopper becomes empty while pay out process, e.g. a 500 Euro banknote shall be changed into 2 Euro coins (corresponds to 250 coins), the control tries to pay out the remaining coins by the next hopper. Is the coins count bigger or equal than 10 coins, the hopper empty detection will be monitored again every 10 coins and pay out is changed to the next hopper if needed.

If all hoppers become empty while pay out process, the control signals "HOPPER EMPTY".
In the second row of the LCD display the remaining credits are still shown. Now the service personal must fill up the hoppers. To continue the pay out of the remaining coins, the service personal must push a button connected to the A.5 input, or the START button on the CI MC8 board, after the fill up job is finished. The input A.5 (JP2.6) normally is the "OUT OF SERVICE" trigger, but if there are credits left, the pay out job continues.

With "LOGIC" control the input of the empty detection is used for COIN signal, because of that there is no real empty detection available. Here you can simply activate the HOPPER LEVEL COUNT function.

On the jumper JP2 there are the coin signals of every hopper available.
CO1 = COIN signal Hopper1, CO2 = COIN signal Hopper2, CO3 = COIN signal Hopper3
e.g. to connect an external counter (coin meter).

We suggest to use the hopper with PULSE interface, means MODE 2 - COIN COUNTING
But it is also possible to use MODE 1 - LOGIC CONTROL.

Example to use LOGIC CONTROL with a MK4 hopper:

1. On the MK4-Adapter: change Jumpers to select MODE1 - LOGIC CONTROL
=> Mode 1 (Logic control / motor run) : JP1.3 closed + JP1.4 closed

2. On the CI MC8 board you have to change the Jumper to route the "coin signal" to the MC input instead of the "empty signal". There is H1 (hopper1) to H3 (hopper3) input signal settings selector by default we have hopper empty signal routed to the MC input (H1E= hopper1 empty), but using logic control you need the coin signal, so set the jumper to A0+CO1 (coin signal hopper1) and same for hopper2 + hopper3
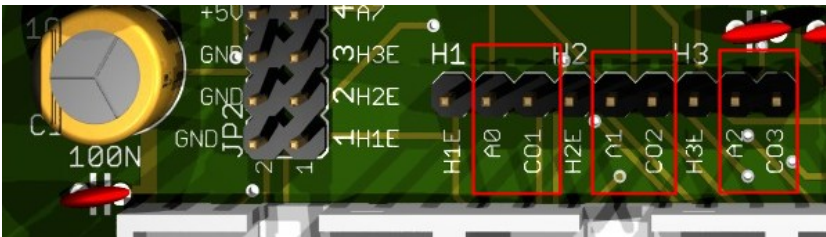
3. In the CI MC8 setting set H-Int (Hopper Interface) to LOGIC.

There is one more thing you can select on the MK4 adapter:
you can select to use coin signal RAW or coin signal µC.

JP2.1 : Coin (µP Sensor Output) => short JP2.1 to JP2.2
JP2.3 : Coin raw (Raw Sensor Output) => short JP2.3 to JP2.2

3.4 Hopper Level Count

A level indicator can be activated with the HOPPER – LEVEL COUNT setting.
The level number, means amount of coins, can be set at the HOPPER1-3 LEVEL setting, e.g. 1000 coins. The level counter decreases with every paid coin and shows for every hopper the exactly number of remaining coins.

If the hopper level count function is activated, this is used to set the machine to "out of order" state instead of the real hopper empty detection. In order to automatically check if there are enough coins left for a change job, the control first checks if there are numbers assigned for the hoppers in the bill settings. The highest coin number for hopper1-3 is the border line for "HOPPER EMPTY – OUT OF ORDER". If there is no hopper assignment done for the bills, the border line is calculated by the highest banknote, e.g. max. 20 Euro banknote, and 50 cent in the hopper means 2000 div 50 = 40 coins. Not used bill channels (BILL #1-7) must be set to 0.

If one of the hopper1-3 OUT counters is cleared, we add that number to the level counter. This is exactly the number of coins the operator has to refill to have the start level, e.g. 1000.

3.5 Printer

It is possible to connect a receipt printer to the JP2-9 connector. The printer must work with PULSE protocol, e.g. the printer ICT SP1. In the SERVICE menu the printer can be activated and the pulse value can be adjusted. Default value 100, this means there is one pulse on JP2-9 for 100 credit. If receipt printing is activated, the customer can select to print a receipt via the START push button (connect a push button to jumper JP1.4). The push button can be illuminated via Pin A.7 output (jumper JP2.4). Pressing the START push button the printer button illumination is active for 60 seconds and signals printing of a receipt. This is shown in the display, too. After 60 seconds of inactivity, the selection for receipt printing is canceled. The printer must be configured accordingly with the Windows printer software, so it only prints by the YELLOW wire (Payout Trigger) ! The BROWN wire (Coin in signal) is used as total counter only, without using the print function.
We have made a PDF (German only) with detailed instructions for printer setup here:
https://www.casino-software.de/download/anleitung_pulse-drucker.pdf

3.6 LCD-Display

Type 162 with 44780 controller via 10 pin flat ribbon cable + LCD Interface
or compatible, e.g. OLED with KS0070 or KS0073 controller. We suggest to use a shielded cable for the display to avoid display problems. Current OLED displays are preferable older LCD displays.

3.7 Relays output

Closer contact, NO 200 VDC, 15 Watts e.g. illumination output shaft.
For larger loads or higher voltage, an external relay must be connected!

3.8 Cashless systems

Currently the following credit and smart card systems can be connected:

Nayax cashless payments vpos
Otiglobal cashless payment systems otipulse
USA Technologies ePort G9 and ePort G10-S
Sacoa Debit Card, POS and Redemption System
Ingenico pos solutions smart pos self-service

Please inform about the exact features of the cashless systems directly at the manufacturer. You can also find suitable devices in our web-shop.
The above listed devices can be connected without any problems to the CI MC8 board.
The device must work with PULSE Interface. Further information on the wiring of the corresponding system can be obtained from us on request.

We have made a PDF file that describes the connection of Nayax cashless systems:
Nayax Connection

3.9. PULSE-Adapter

Another possibility to connect the Nayax (or other cashless system) PULSE wire is to use our PULSE-Adapter. There are two types of the PULSE-Adapter available, a COIN and a BILL version.
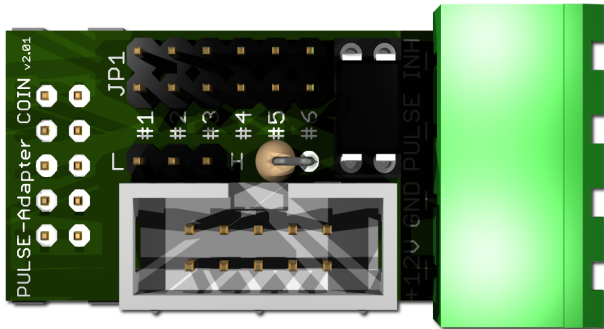
The **PULSE-Adapter COIN** has a 10 pin connector that fits to default coin plugs, and offers again a 10 pin coin plug to plug in the originally coin acceptor cable, so you do not lose the coin acceptor connector. The cashless device can be connected easily via plugable terminal connector. With a jumper you can select the coin channel on which the external credit signal is transferred. Additionally there is an INHIBIT out, to control the acceptance of the Nayax device.
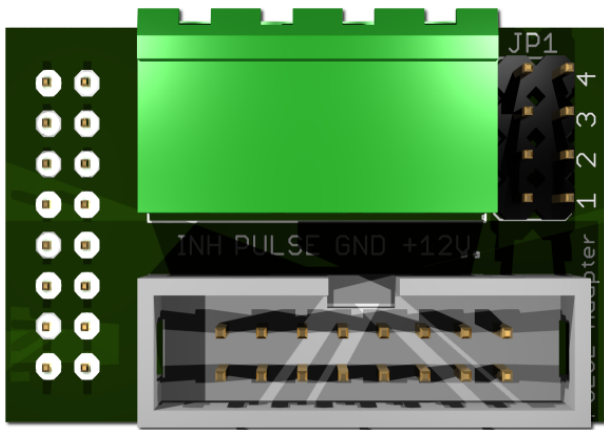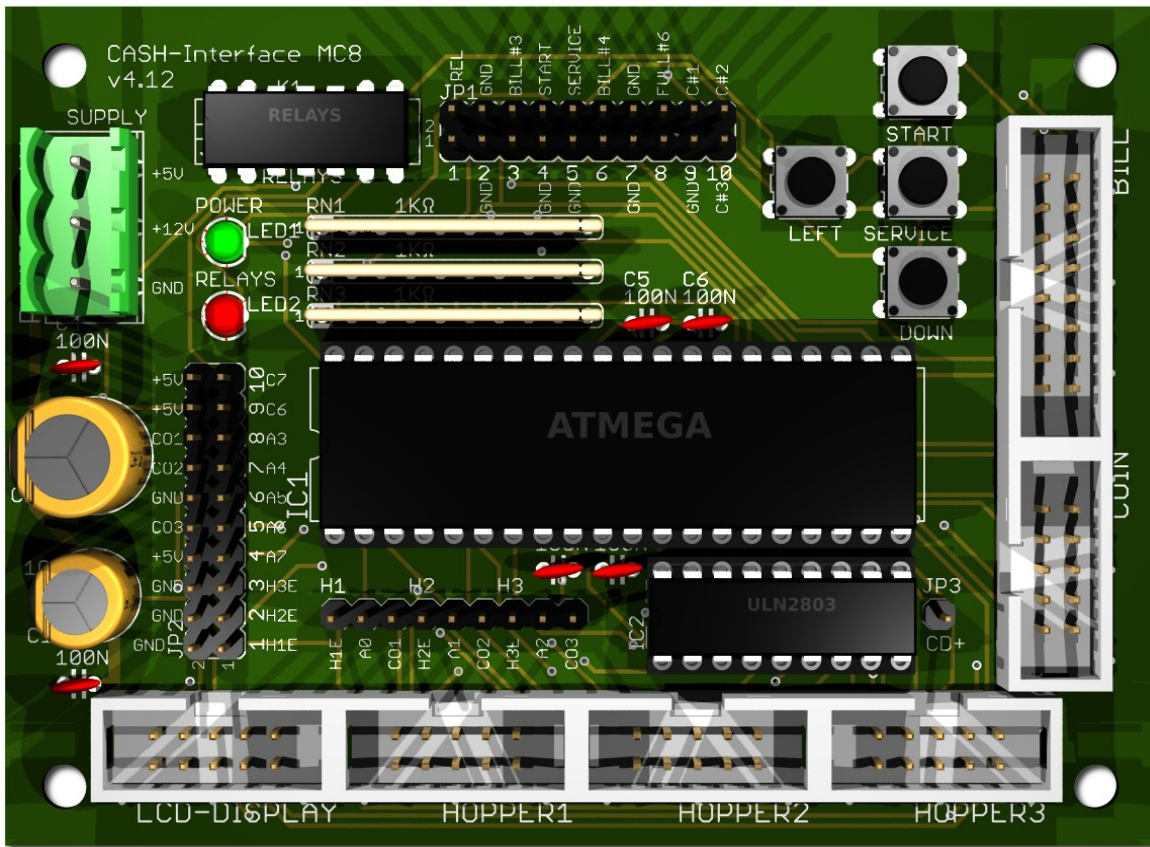

The **PULSE-Adapter BILL** has a 16 pin connector that fits to default NV9/NV10 plugs, and offers again a 16 pin plug to plug in the originally bill acceptor cable, so you do not lose the bill acceptor connector.

The PULSE-Adapter BILL offers the same options as the above PULSE-Adapter COIN, select the bill channel by jumper and a INHIBIT output.

4. CASH-INTERFACE MC8 BOARD

4.1 Jumper

JP1.1 - RELAYS, Pin1=K1/14, Pin2=K1/8	Relays closer contact (NO)
JP1.2 - GND, Pin3=GND, Pin4=GND	GROUND
JP1.3 - C.2, Pin5=bill #3, Pin6=C.2	monitor bill #3
JP1.4 - START, Pin7=GND, Pin8=C.4	external START button / Menu value UP
JP1.5 - SERVICE, Pin9=GND, Pin10=C.5	external SERVICE button / Menu RIGHT
JP1.6 - C.3, Pin11=bill #4, Pin12=C.3	monitor bill #4
JP1.7 - GND, Pin13=GND, Pin14=GND	GROUND
JP1.8 - Hopper Full, Pin15=coin #6, Pin16=H1-H3 FULL	monitor Hopper FULL
JP1.9 - COIN, Pin17=GND, Pin18=coin#1	COIN#1
JP1.10 - COIN, Pin19=coin#2, Pin20=coin#3	COIN#2 + COIN#3
JP2.1 - Pin1=Hopper1 EMPTY, Pin2=GND	Hopper1 EMPTY, GROUND
JP2.2 - Pin3=Hopper2 EMPTY, Pin4= GND	Hopper2 EMPTY, GROUND
JP2.3 - Pin5=Hopper3 EMPTY, Pin6= GND	Hopper3 EMPTY, GROUND
JP2.4 - A7, Pin7=A7, Pin8=+5V	Illumination Print or Payout button 3 or error signal ACTIVE LOW
JP2.5 - Menu EXIT, Pin9=A.6, Pin10= COIN3 SIGNAL	Menu EXIT, Hopper3 coin signal
JP2.6 - Out of service, Pin11=A.5, Pin12=GND	manually Out of order input
JP2.7 - Menu DOWN, Pin13=A.4, Pin14=COIN2 SIGNAL	Menu value DOWN, Hopper1 coin signal
JP2.8 - Menu LEFT, Pin15=A.3, Pin16= COIN1 SIGNAL	Menu LEFT, Hopper1 coin signal
JP2.9 - Printer PULSE, Pin17=C.6, Pin18=+5V	Printer PULSE or illumination payout button 1
JP2.10 - Printer pulse total, Pin19=C.7, Pin20=+5V	Printer PULSE total or illumination payout button 2

4.2 Micro controller

ATMega1284 (8 MHz internal clock) I/O ports:

Port A.0 - Hopper1 Empty, not empty=LOW
Port A.1 - Hopper2 Empty, not empty=LOW
Port A.2 - Hopper3 Empty, not empty=LOW
Port A.3 - Menu LEFT (select pay out hopper 1)
Port A.4 - Menu value DOWN (select pay out hopper 2)
Port A.5 - Out of service (pull down to GND, e.g. via daily timer or switch,
          or push button to restart payout after hopper empty and refill.
Port A.6 - Menu EXIT (select pay out hopper 3)
Port A.7 - illumination print ticket button, or pay out button 3,
          or ERROR (H-EMPTY) signal = ACTIVE LOW

Port B.0 - Coin #1, Active LOW
Port B.1 - Coin #2, Active LOW
Port B.2 - Coin #3, Active LOW
Port B.3 - Hopper3 pulse
Port B.4 - Hopper1 pulse
Port B.5 - Hopper2 pulse
Port B.6 - Accept coin and bill validator, Active LOW (INHIBIT)
Port B.7 - Relays, Active HIGH, JP1.1 is a closer contact NO

Port C.0 - Bill #1, Active LOW
Port C.1 - Bill #2, Active LOW
Port C.2 - Bill #3, Active LOW
Port C.3 - Bill #4, Active LOW
Port C.4 - Push button 1, START, JP1.4, Active LOW, (select print receipt)
Port C.5 - Push button 2, SERVICE MENU, JP1.5, Active LOW,
Port C.6 - Printer pulse (or illumination pay out button 1)
Port C.7 - Printer pulse total (or illumination pay out button 2)

Port D.0 - LCD 1, DB4
Port D.1 - LCD 1, DB5
Port D.2 - LCD 1, DB6
Port D.3 - LCD 1, DB7
Port D.4 - LCD 1, Enable
Port D.5 - LCD 1, RS
Port D.6 - LCD 1, RW
Port D.7 - LCD 2, Enable => 2 LCD
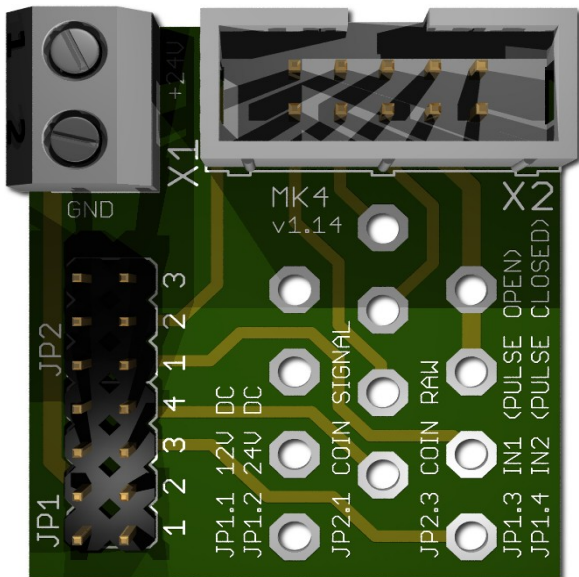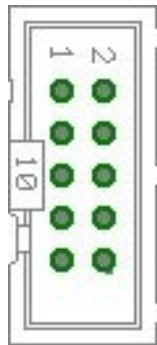
5. CONNECTIONS

5.1 Power supply

The power supply is connected to terminal plug X1.

The CASH-Interface MC8 needs a supply voltage of +5V and +12V DC. The ground connections (GND) of both voltage must be connected. The interfacing of +5V, +12V and GND is printed on the board.

5.2 MK4-Adapter

Occupation of the 10 pole plug (Azkoyen compatible):

Pin 1,2,3 = +V (+12V o. +24V DC)
Pin 4,5 = -V (GND)
Pin 6 = Full Sensor
Pin 7 = Motor run
Pin 8 = Not used
Pin 9 = Coin signal
Pin 10 = Empty sensor

We offer beside this CHINCH also an BULGIN version in our web shop.

X1-1: +24V DC
X1-2: GND

JP1.1 : +12V Hopper, power from CASH-Interface
JP1.2 : +24V Hopper, power from external power supply on plug X1
JP1.3 : IN1 (mode selector)
JP1.4 : IN2 (mode selector)
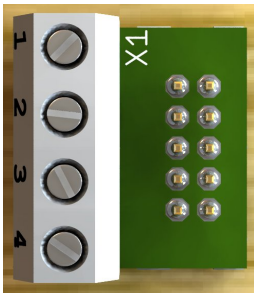
Mode 0 (Direct switching 24V) : JP1.3 open + JP1.4 open
Mode 1 (Logic control / motor run) : JP1.3 closed + JP1.4 closed
Mode 2 (Coin counting / pulse) : JP1.3 open + JP1.4 closed

JP2.1 : Coin (µP Sensor Output) => short JP2.1 and JP2.2
JP2.3 : Coin raw (Raw Sensor Output) => short JP2.3 and JP2.2

5.3 ND300-Adapter

Connects a ND300 note dispenser on the HOPPER plug.

Usage:	ND-300	CUBE HOPPER MKII
1 = +12V DC	GRAY	RED
2 = GND	BLACK	BLACK
3 = Motor	ORANGE	WHITE (RUN)
4 = Empty	GREEN	ORANGE (COIN))

The ND300 adapter can also be used to connect hoppers, which do not have a 10 pin ribbon cable connection, with the 10 pin. Hopper connector on the CI MC8 board.

Via ND300-Adapter the PULSE signals can be also redirected to other devices, for example to ″charge″ smartcards or RFID cards.

CUBE HOPPER MKII:
Connecting a CUBE HOPPER MKII hopper, the original for the hopper available „driver cable" is needed:

```
DRIVER CABLE        CUBE HOPPER MKII

GREY                Pin 1  low level
PURPLE              Pin 2  low level (common).
-                   Pin 3  pin cut out, optional lock.
GREEN               Pin 4  continuous monitored optic control,
                           power +12 / +24VDC.
YELLOW              Pin 5  Reserved
ORANGE              Pin 6  optic-sensor signal: coin out
-                   Pin 7  +24VDC supply and motor control.
RED                 Pin 8  +12VDC supply and motor control.
BLACK               Pin 9  Ground common supply.
```
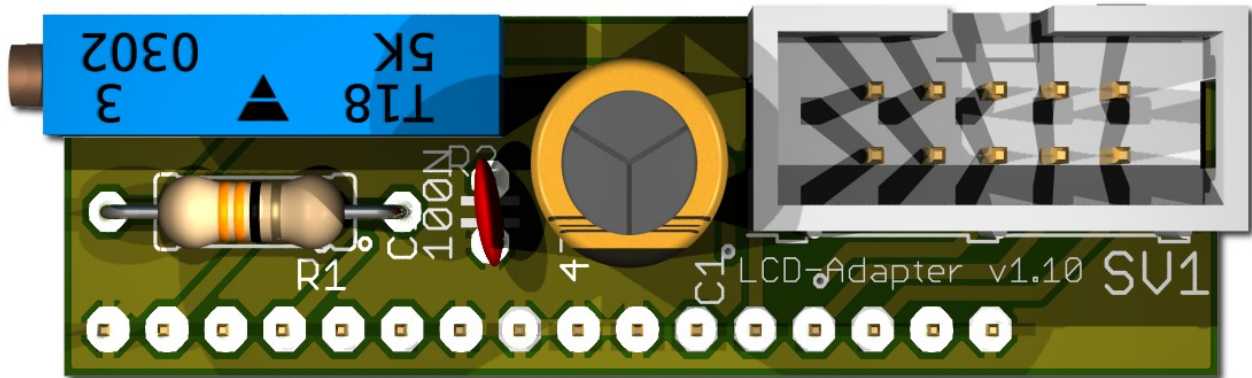
CUBE HOPPER MKII must be set up to
LOGIC CONTROL (Menu item 70: H-INT, PULSE or LOGIC, default setting PULSE) and
COIN SIGNAL LOW (Menu item 71: C-SIG, HIGH or LOW, default setting HIGH)
Using a ND300-Adapter the Jumper for H1, H2 or H3 must be set to H1E or H2E or H3E!

5.4 LCD-Adapter

Depends on the used LCD display, the adapter has to be mounted on the left or right side. Some displays have the power pins on the left side others on the right side! Hint: since version 1.10 the LCD-Adapter only

5.5 Pin out LCD-Adapter

Pin1 = LED L–   Pin10 = DB1
Pin2 = LED L+   Pin11 = DB2
Pin3 = VSS (GND)   Pin12 = DB3
Pin4 = VDD (+5V)   Pin13 = DB4
Pin5 = V Contrast   Pin14 = DB5
Pin6 = RS   Pin15 = DB6
Pin7 = R/W   Pin16 = DB7
Pin8 = E   Pin17 = LED L+ (since v1.10 this does not not longer exists)
Pin9 = DB0   Pin18 = LED L- (since v1.10 this does not not longer exists)

With the CASH-Interface MC8 the LCD-Display is controlled in 4Bit mode. The contrast is adjustable via the spindle pots. Newer OLED displays do not need contrast adjustments anymore.

5.6 LCD-Adapter position for DISPLAYTECH 162C
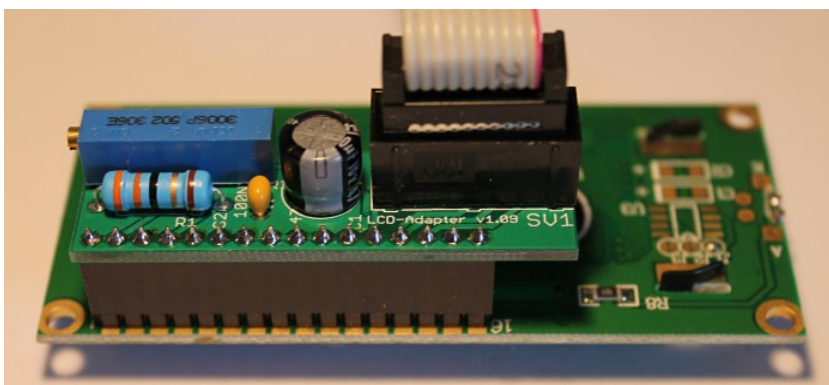
The manufacturer of the LCD display suggests to NOT use flat ribbon cables longer than 10cm to avoid display problems by interfering signals!
If you use longer cables and get problems change to a shorter cable length or use an shielded cable.

5.7 Shielded LCD-Cable

In environments with strong interfering signals, e.g. generated by motors or solenoid valves, faults in the view of the LCD or OLED display may occur!

The display shows then weird characters (hieroglyphics).

This can be remedied by usage of a shielded cable that blocks the interference signals.

We recommend the use of a shielded cable for the LCD or OLED display, to avoid problems with the display.
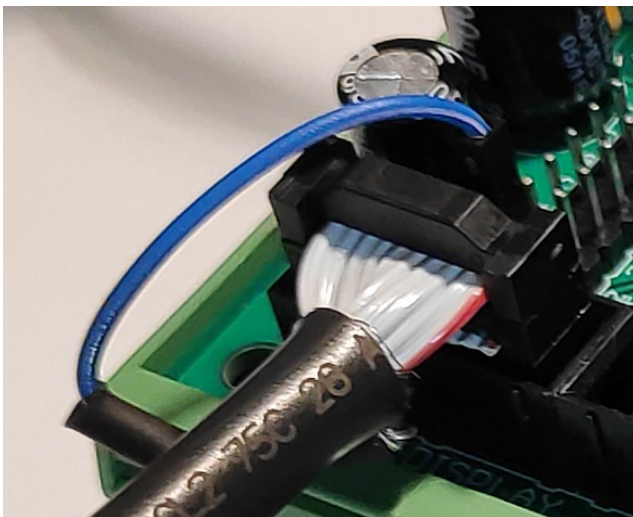
For the grounding of the cable shielding, the shielding is carried out on one side with a single dupont cable with an female connector, and can therefore simply be plugged onto GROUND (JP2 - GND) on the CI MC8 circuit board.

In addition, we offer Y-cables, this enables the connection of 2 displays to one LCD connector, e.g. one display on the outside visible for the customer (OLED), and a second display (LCD) on the inside of the machine for SERVICE purpose.

We offer shielded flat ribbon cable, as well as Y-cables as accessories in the web shop at www.casino-software.de/shop

5.8 Standard mode (Ticket printer + Out of service)

In default mode the C6 and C7 outputs are PULSE outputs for the printer.
Receipt printing is selected by a push button connected to the START input.
Illumination of the receipt push button is output A.7 (ACTIVE LOW)

With A5 input it is possible to set the machine to "OUT OF SERVICE" state,
that means "OUT OF SERVICE" is shown in the display and acceptance of cash is disabled.
For example this is interesting in the car wash sector to disable the machine thru the night
by a timer.

The A5 input is used also to restart the payout job after a hopper empty error.
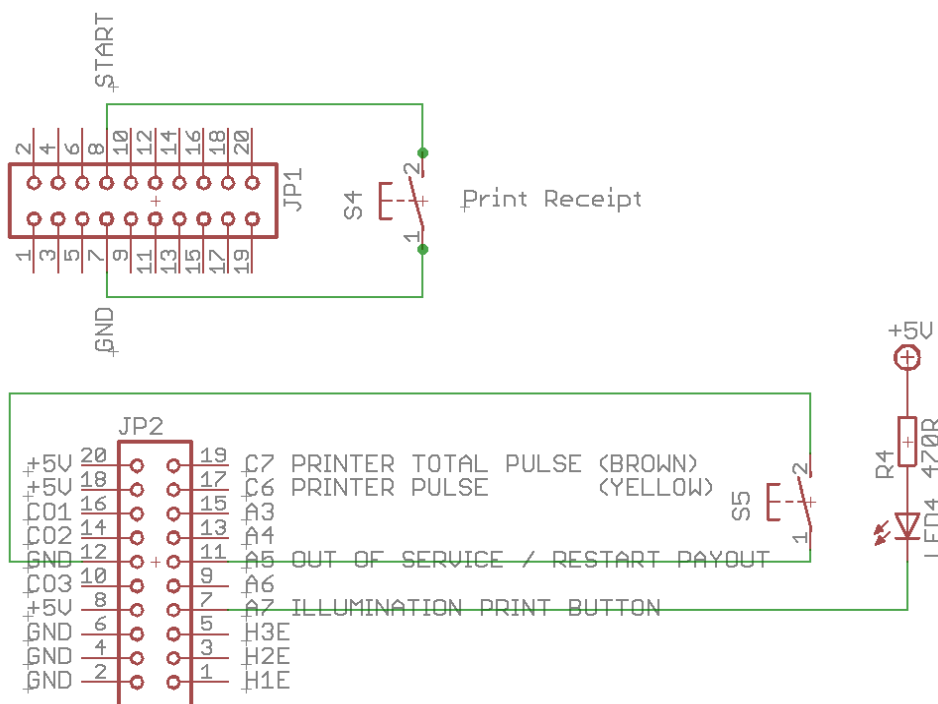
The PRINTER PULSE output is an OPEN COLLEKTOR Output, with max. 500mA current
(ULN2803). Instead of a printer it is possible to connect an external counter or hard meter.
If a relay is used, a free-wheeling diode must be connected parallel to the relay coil,
otherwise the output will be destroyed!

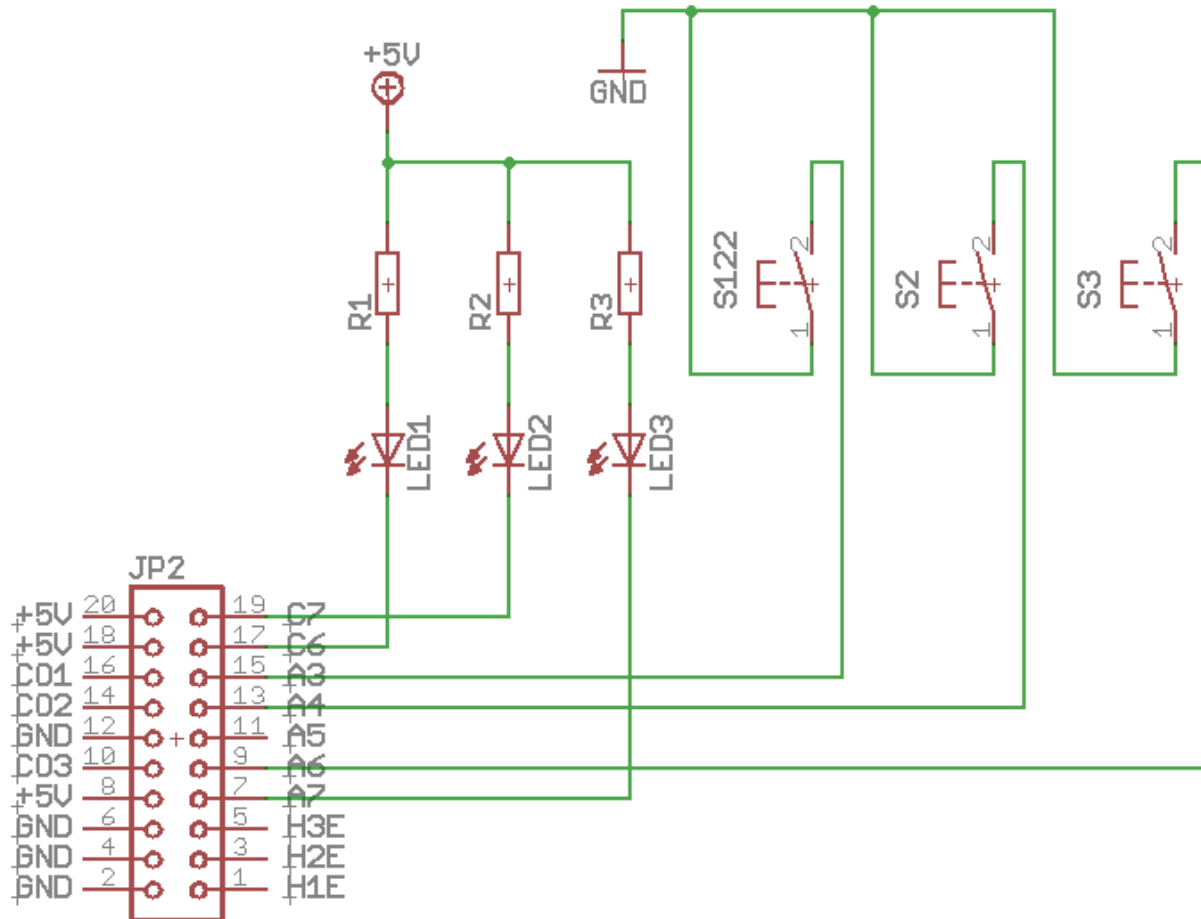Internal connection of the pulse output (OPEN COLLECTOR):
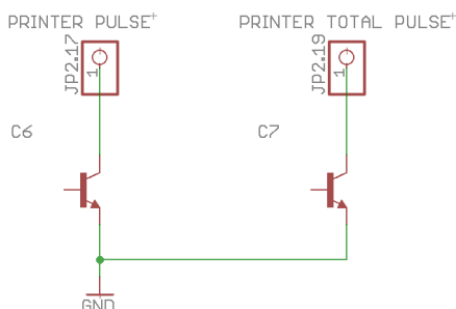
5.9 User select mode (Push buttons + illumination)

Push button connection:
S1 = push button pay out hopper 1 (e.g. 0,50 Euro coin), LED1 = illumination push button 1
S2 = push button pay out hopper 2 (e.g. 1 Euro coin), LED2 = illumination push button 2
S3 = push button pay out hopper 3 (e.g. 2 Euro coin), LED3 = illumination push button 3

To illuminate the buttons there should be LEDs used because they need less current. Every output can supply 500mA, for higher current use an external relays. If you use a relays, be sure to add a freewheeling diode to the relays coil, or the output on the CI MC8 gets destroyed!

HINT: if the USER SELECT function is not activated, it is possible to get an ERROR signal (ACTIVE LOW) on pin A7. The ERROR signal appears if we get the HOPPER EMPTY state. If receipt print is activated, the A7 is used for push button illumination and can not be used as ERROR signal.

5.10 External menu buttons (SERVICE)

It is possible to connect 5 external buttons to use the settings menu by "remote",
for example if the CASH-Interface MC8 is build into a case.

There are 5 possible buttons:
Menu RIGHT   => JP1.5 SERVICE (Pin10)   SERVICE
Menu LEFT   => JP2.8 A3 (Pin15)   LEFT
Menu UP   => JP1.4 START (Pin8)   START
Menu DOWN   => JP2.7 A4 (Pin13)   DOWN
Menu EXIT   => JP2.5 A6 (Pin9)   EXIT
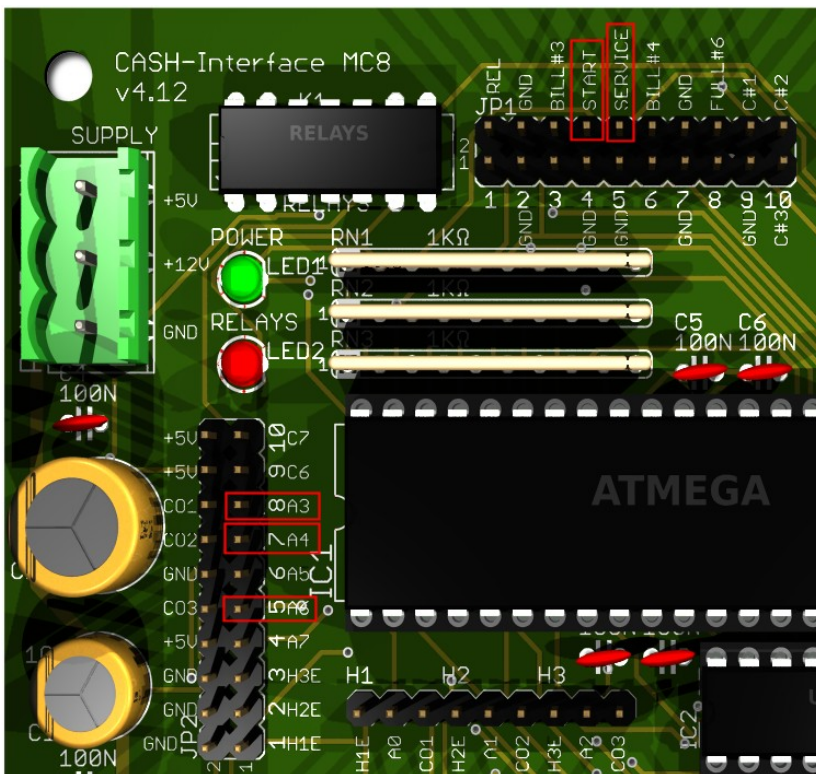
DUPONT CABLES fits best to the pins!
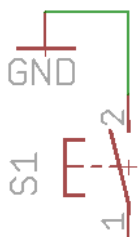
 We want GROUND to every Pin, so simply wire the switch with GROUND!

6. GETTING STARTED

To make the settings, the service menu is called via the SERVICE button. Press the SERVICE button to navigate to the next menu item. First set up the coin and bill acceptor values. For COIN #1 set the value for the first coin, e.g. 10 for 10 Cent. Then for COIN #2 set the value for the second coin, e.g. 20 for 20 Cent, and so on. Same for the banknotes, for BILL #1 set the value for the first banknote, e.g. 500 for 5 Euro. For BILL #2 set the value for the second banknote, e.g. 1000 for 10 Euro, and so on.

Next set the communication protocol for the coin validator (COIN) and bill validator (BILL). Hint: using more than 3 coins or banknotes BINARY protocol must be used. Using BINARY protocol, of course the validator device must be set to BINARY, too!

Now set the value for the hopper1-3. The smallest coin value must be placed in hopper 1, the biggest coin value in hopper 3. This way the control can calculate by itself how many coins should be paid from what hopper, starting with the biggest coin. If there are settings for BILL1-7 + HOPPER1-3 the control does not calculate the number of coins.

Next important setting is the hopper empty detection for hopper 1-3 (H1-EMPTY, H2-EMPTY, H3-EMPTY). It is recommended to activate the hopper empty detection.

For the very first test run connect coin and bill validator, as well as fully filled hoppers, and test several different banknotes.

In the service menu the sum of all pay ins is shown on the TOTAL IN entry. There is also a pay out counter for every hopper.

7. OTHER

The protocol for coin and bill validator can be separately selected,
PARALLEL or BINARY (PAR or. BIN).
Coin validator in PARALLEL protocol: 3 coins possible (#1 - #3)
Coin validator in BINARY protocol: 7 coins possible (#1 - #3 BINARY CODED)

Bill validator in PARALLEL protocol: 4 bills possible (#1 - #4)
Bill validator in BINARY protocol: 7 bills possible (#1 - #4 BINARY CODED)
Using bill validator with pulse protocol, the pulse value must be set at the B-PULSE setting,
e.g. 100 if the bill validator gives out 1 pulse per Euro.

If bill validator works with PARALLEL or BINARY protocol, the value for B-PULSE must
be set to 0 !!!

The bonus is also working when you use PULSE protocol.
1. In the CI MC8 settings set the pulse value to 500, means one pulse on bill#1 is 5 Euro.
2. In the CI MC8 settings set the bill values you would normally have,
e.g. bill#1=500, bill#2=1000, bill#3=2000
3. In the CI MC8 settings set the number of coins to payout for bill1-3,
e.g. bill1 hopper1=5, bill2 hopper1=11, bill3 hopper1=23
The CI MC8 detects that you have set special amount of coins for the banknotes, and uses
the numbers of that value (total credits) customer paid in.

The coin value must be ascending, that means the smallest coin in hopper1. On same coin
value the payout is done alternately between that hoppers.

In the service menu the hopper empty state is shown for hopper1-3.
Additionally there can be 20 coins paid for every hopper, e.g. this is useful to empty a
hopper.

If there are more then 10 coins to pay out via a hopper we do a 2 seconds delay between
every 10 coins to avoid coin jam.

"DELAY - VALUE" setting is the time to wait on insert coins, before the pay out job starts,
e.g. if there are several 50 cent coins are inserted.

„RELAYS – TIME" setting is the time the relays stays on after a payout job, e.g. to
illuminate the output shaft.

Empty state of the hopper while payout is only checked if the numer of coins is bigger than
20 coins.

Using the coin validator with PARALLEL protocol only line 1-3 can be evaluated due to
insufficient inputs on the micro controller and because the hoppers are connected to the
upper coin lines. With more than 3 coins the coin validator should be used with BINARY

protocol. This way with the 3 output lines #1-#3 it is possible to detect 7 different coins.

For EUR 1 and EUR 2 coin it is possible to adjust the coins number for each hopper.
With a 1 or 2 EUR coin in the payout is done immediately according settings.

Using the same coins value the payout is done alternately via hopper1, hopper2 and hopper3. Settings for hopper1 is used for all hoppers. Example: hopper1=50 cent, hopper2=50 cent, setting BILL1-HOPPER1=10 (5 Euro gives 10x 50 cent). Payout is 10x 50 cent from hopper1, or 10x 50 cent from hopper2 alternately. This way the capacity for one coin or token can be increased by filling the same coin to max. 3 hopper.

A START VALUE can be set, this requires a min. credit to start the payout, e.g. 600 for min. 6 Euro credit.

Special payout function for BILL#4 pin of the CASH-Interface MC8: If BILL #7 is set to "123" and the pay-in happened on BILL#4 line of the board, the assignments made for bill1-7 + H1-H3 are ignored and the coins to payout are calculated by the control. This is needed for example if you want to have this setup: A Nayax cashless device shall pay out only tokens stored in hopper 2. Connect the Nayax pulse line to bill#4 pin of the CASH-Interface MC8 and set bill7 value to 123.

8. INSTALLATION IN THE CABINET

The CI MC8 board is simply clamped on a DIN rail pcb holder and wired. In this example with a bill and coin acceptor (right side) and 3x hopper:
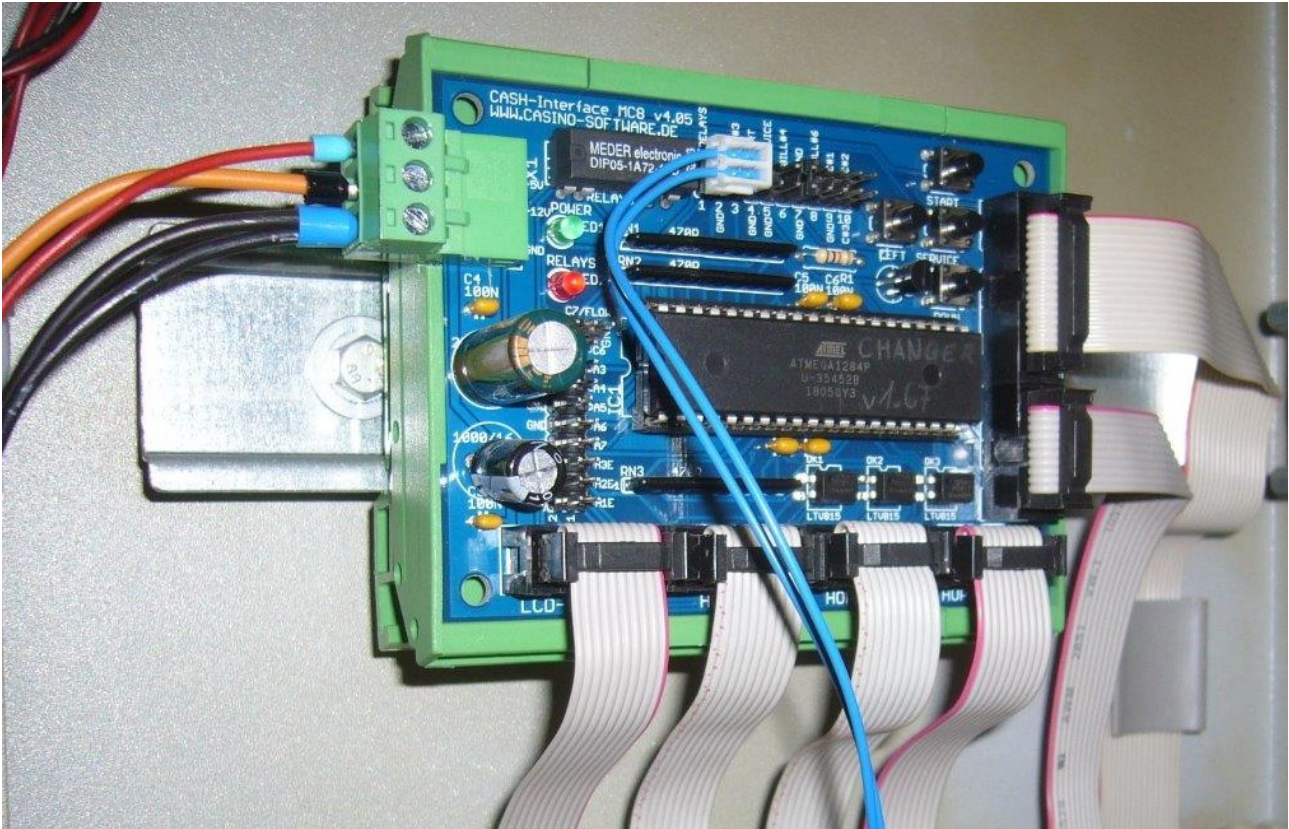
The display is installed accordingly, maybe with its own adapter, in the cabinet's front:

9. SAFETY INSTRUCTIONS

Read the user manual completely and carefully before use. The user manual is part of the product and contains important information for correct use.

Use the product, product parts and accessories only in perfect condition. Compare the specifications of all used devices to ensure compatibility. In case of questions, defects, mechanical damage, trouble and other problems, non-recoverable by the documentation, contact your dealer or producer.

The CASH-Interface MC8 module is intended to use in a housing.

Only use the CASH-Interface MC8 module in low-voltage circuits (max. 24V). Higher voltage rates are not permissible. There is danger to life through an electric shock and a risk of fire!

Ensure that all the electrical connections and connection cables conform to the regulations.

The entire product may not be modified or reassembled. Operation is only permissible in dry indoor locations. Never operate the device immediately after bringing it from a cold to a warm room. The resulting condensation water may damage the device. Do not expose the CASH-Interface MC8 module to high temperatures, strong vibrations, high degrees of humidity or chemically aggressive dusts, gases and vapors.

Electronic components of the CASH-Interface MC8 module may heat up during operation. Ensure sufficient air circulation around the device to prevent heat build-up and overheating.

In case of damage incurred by disregarding these operating instructions, the warranty claim is void. Liability for any and all consequential damage is excluded! We do not assume any liability for damage to property or personal injury caused by improper use or the failure to observe the safety instructions!

10. DISPOSAL INSTRUCTIONS

According to the European WEEE directive, electrical and electronic equipment must not be disposed with consumers waste. Its components must be recycled or disposed apart from each other. Otherwise contaminative and hazardous substances can pollute our environment.

11. LIABILITY NOTICE

We reserve the right to printing errors and changes to product, packaging or product documentation. See our term of warranty.