CB2/CBF Connector Wiring Diagrams

Version: 07-09-2011

This manual supports: CBF-HP4 - CB2-HP - CB2-XJ128 - CB2-XJ500

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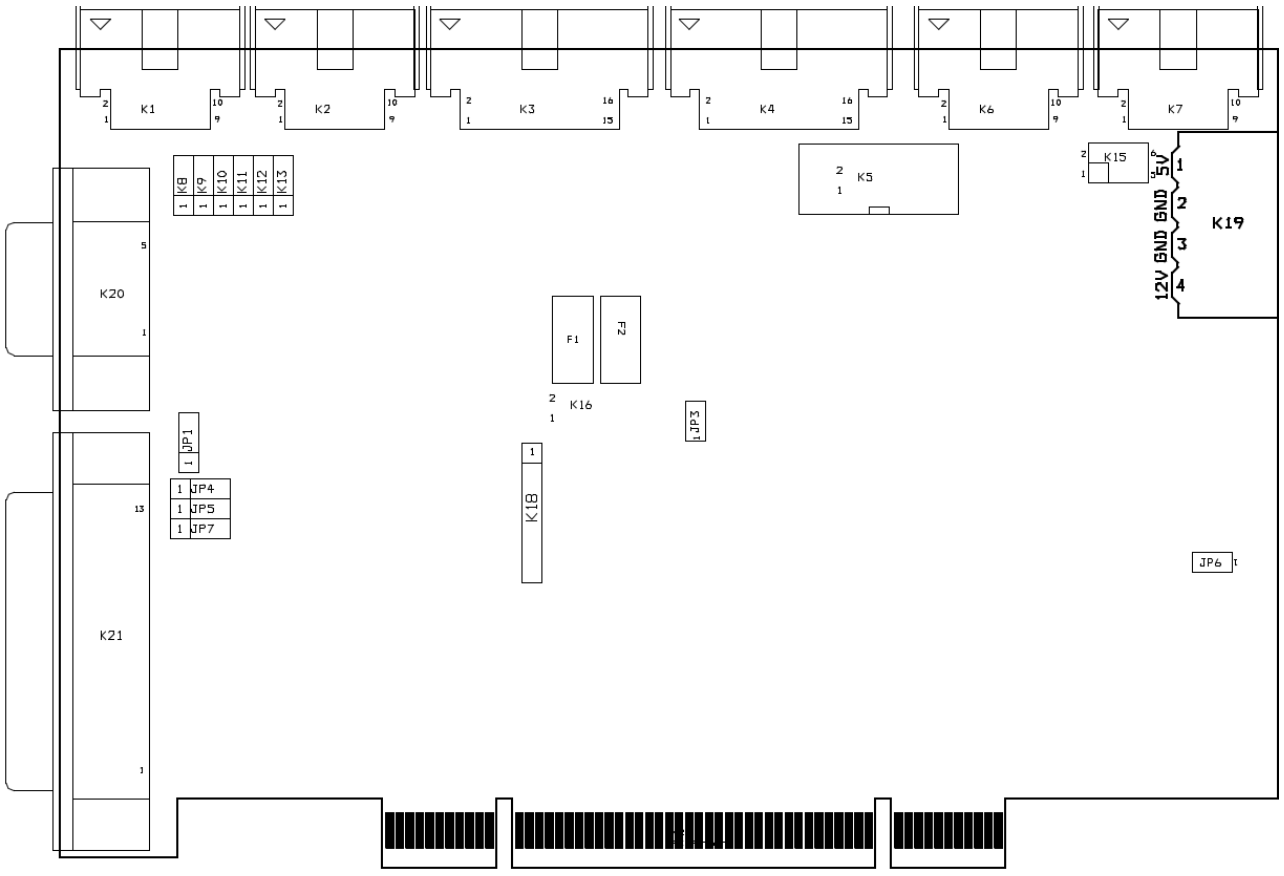
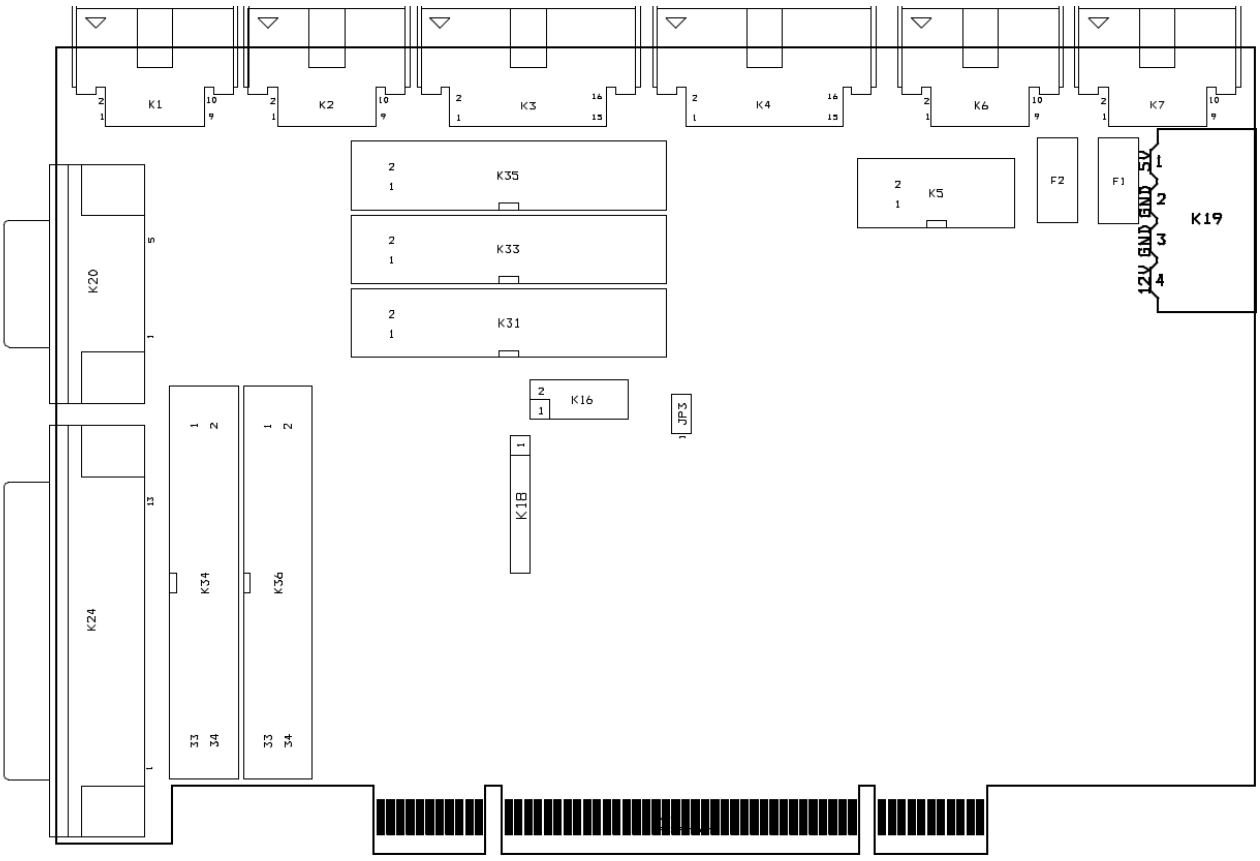
CBF-HP4 drawing

F1, F2	Fuses
K20	I/O connector
K2	Encoder connector
K1	Daisy chain connector
K3	Stack#0 connector



CB2 drawing

F1, F2	Fuses
K20	I/O connector
K2	Encoder connector
K1	Daisy chain connector
K3	Stack#0 connector



Fuses

The controller boards can supply external equipment with 5 and 12V DC from the internal PC power supply.
F1 is the 12V fuse and F2 is the 5V fuse both are 1A SMD Fast acting. The value of the fuses is related to the power available from the PCB. Use only 1A if you need more power you must use an external power supply.

You can buy the fuses from HSA or locally, if you choose locally make sure you get the right fuses, warranty does not cover replacement of burned PCB's because of wrong fuses.

Part number:

HSA	Farnell	Mouser
ACEL-Fuse-1A-SMD	9922164	576-0451001.MRL

I/O connector

Main function for this connector is to provide the start signal, to begin print. In the same connector are also additional inputs as well as 2 output signals. It is located on the edge of the controller board, as a 9-pin female D-SUB connector.

Output 1 = Active low - print signal / print message signal (open collector)

Output 2 = Active low - low ink warning / print signal (open collector)

Input 1 = Purge active low level trigger

Input 2 = Not used

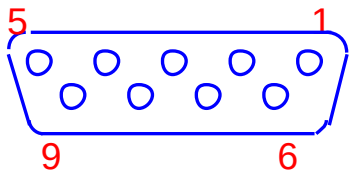
You can use either a simple mechanical switch or a photo cell for the start signal. The I/O connector can supply 5V and 12V DC for the sensor but you can use any sensor in the 3-33V range if you connect an external power source.

You can buy an I/O-ENC test box set from HSA which enables you to test:

- I/O connector - Input 1, Input 2, Output 1, Output 2, Start signal input, 5V and 12V on the I/O connector and an adjustable automatically continuous start signal is available.
- Encoder connector - Enc A & Enc B channels, Low ink, 5V and 12V and an automatically continuous encoder pulse generator is available.

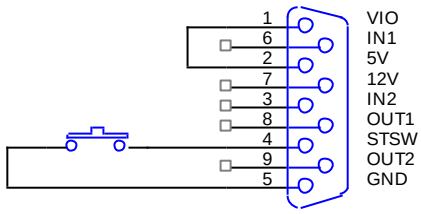
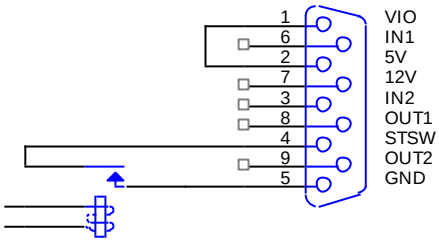
Part number:

HSA	Product category
I/O-ENC test box set	Electric spare parts

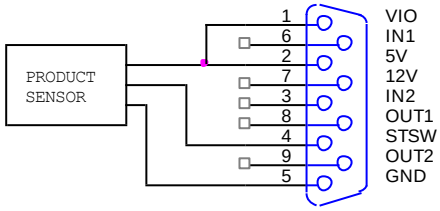
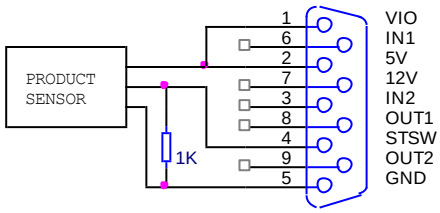


PIN	Description
1	VIO – voltage reference
2	5V
3	Input 2 – Not used
4	Start signal input
5	GND
6	Input 1 – Purge (active low)
7	12V
8	Output 1 - Active low - print/print message signal
9	Output 2 - Active low - ink low warning/print signal

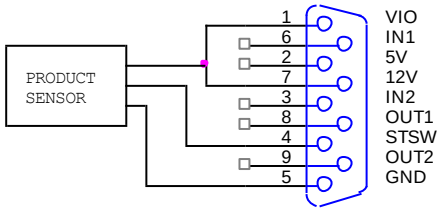
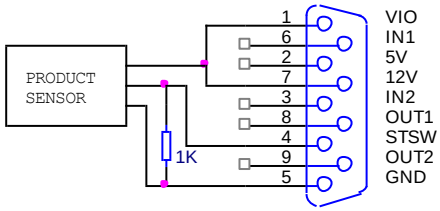
Mechanical start switch

	**Pushbutton** Loop pins 1-2 and connect the switch between pins 4 and 5 N/O contact setup Inkdraw to negative edge trigger N/C contact setup Inkdraw to positive edge trigger
	**Relay** Loop pins 1-2 and connect the switch between pins 4 and 5 N/O contact setup Inkdraw to negative edge trigger N/C contact setup Inkdraw to positive edge trigger

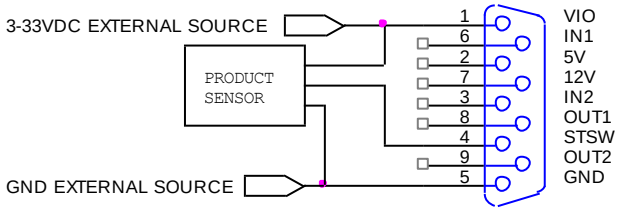
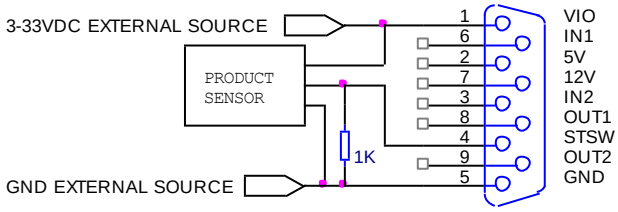
5V DC Sensor

	**5 Volt NPN or PUSH/PULL sensor** VCC to pins 1,2 Signal to pin 4 GND to pin 5
	**5 Volt PNP sensor** VCC to pins 1,2 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

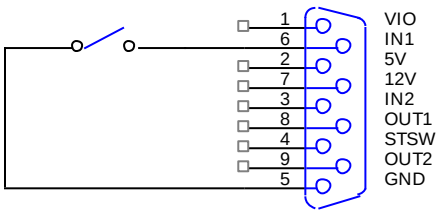
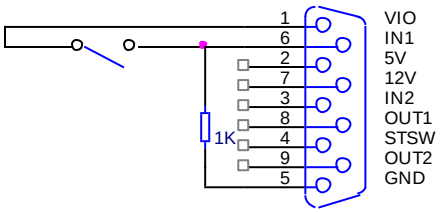
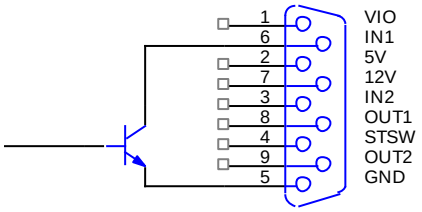
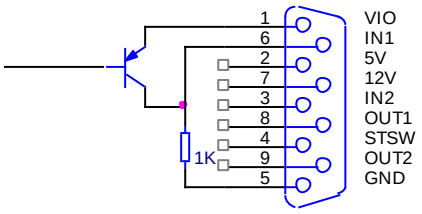
12V DC Sensor

	**12 Volt NPN or PUSH/PULL sensor** VCC to pins 1,7 Signal to pin 4 GND to pin 5
	**12 Volt PNP sensor** VCC to pins 1,7 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

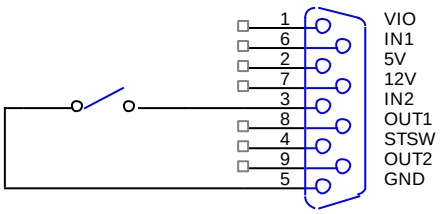
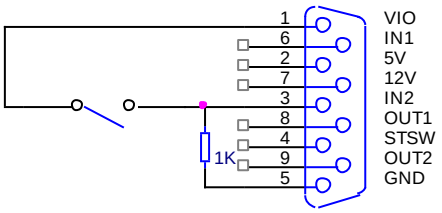
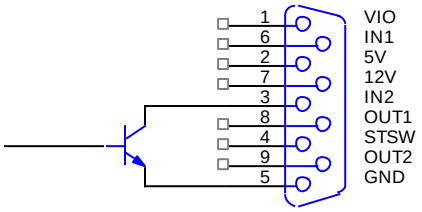
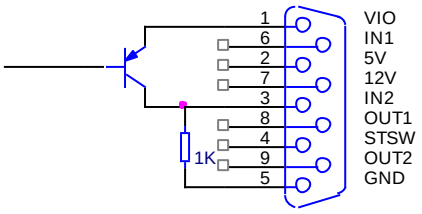
3-33V DC Sensor with external power source

	**NPN or PUSH/PULL sensor** VCC to pin 1 Signal to pin 4 GND to pin 5
	**PNP sensor** VCC to pin 1 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

Input 1 – Purge active low level trigger

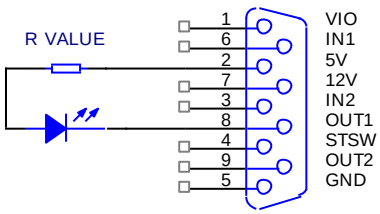
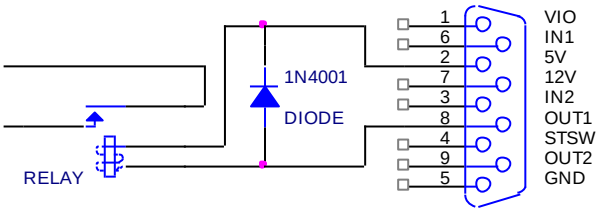
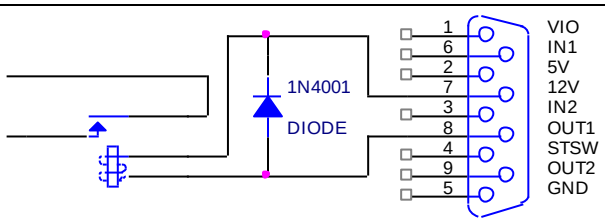
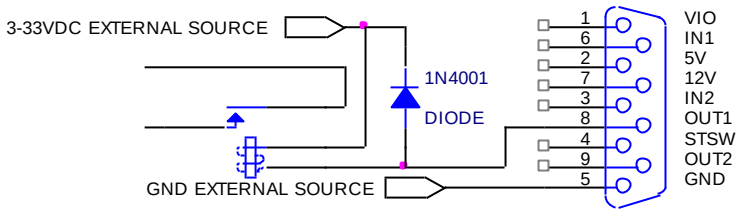
	**N/O normal open mechanical switch or relay** Connect the switch between pins 6 and 5
	**N/C normal closed mechanical switch or relay** Connect the switch between pins 1 and 6 1 K resistor between pin 6 and 5
	**NPN or PUSH/PULL output trigger** Signal to pin 6 GND to pin 5
	**PNP output trigger** VCC to pin 1 Signal to pin 6 1 K resistor between pin 6 and 5

Input 2 – Not used

	**N/O normal open mechanical switch or relay** Connect the switch between pins 3 and 5
	**N/C normal closed mechanical switch or relay** Connect the switch between pins 1 and 3 1 K resistor between pin 3 and 5
	**NPN or PUSH/PULL output trigger** Signal to pin 3 GND to pin 5
	**PNP output trigger** VCC to pin 1 Signal to pin 3 1 K resistor between pin 3 and 5

Output 1 = Active low print / print message signal (open collector)

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

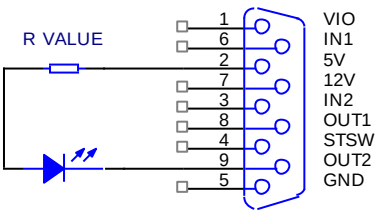
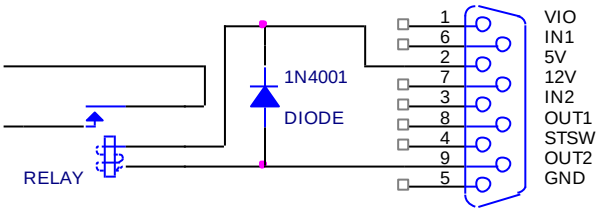
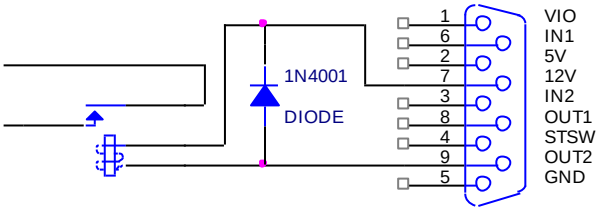
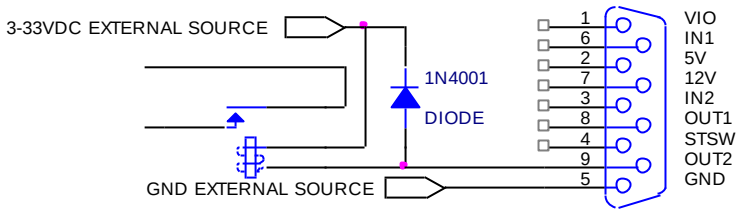
	**LED indicator** Connect the components between pins 2 and 8 The R value can be calculated using the equation below $R = \frac{5 - Ud}{Id}$ Where Ud is diode voltage and Id is diode current
	**5V DC relay** Connect the relay coil between pins 2 and 8 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	**12V DC relay** Connect the relay coil between pins 7 and 8 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	**3-33V DC relay with external power source** Connect the relay coil between external VCC and pin 8 Connect external GND to pin 5 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

The signal type can be selected in Inkdraw preferences.

Output 2 = Active low - low ink warning / print signal (open collector)

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

	**LED indicator** Connect the components between pins 2 and 9 The R value can be calculated using the equation below $R = \frac{5 - Ud}{Id}$ Where Ud is diode voltage and Id is diode current
	**5V DC relay** Connect the relay coil between pins 2 and 9 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	**12V DC relay** Connect the relay coil between pins 7 and 9 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	**3-33V DC relay with external power source** Connect the relay coil between external VCC and pin 9 Connect external GND to pin 5 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.

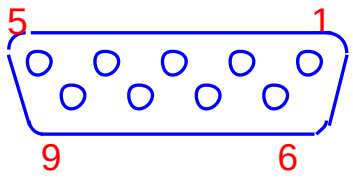
Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

The signal type can be selected in Inkdraw preferences.

Encoder connector

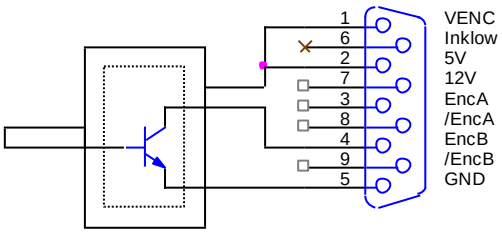
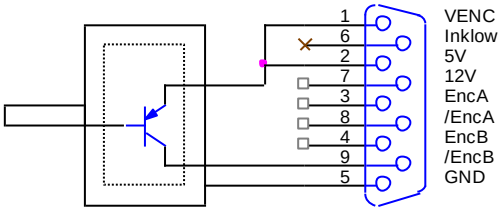
This connector is where the signals for the encoder are coming in. In the same connector is also an additional output signal for low ink level warning on Xaar versions. The connector is located inside the PC on the edge of the controller board. In this section of the manual it is expected that you use an extension wire with a 9 pin female connector.

The encoder connector can supply 5V and 12V DC for the encoder but you can use any encoder in the 3-33V range if you connect an external power source.

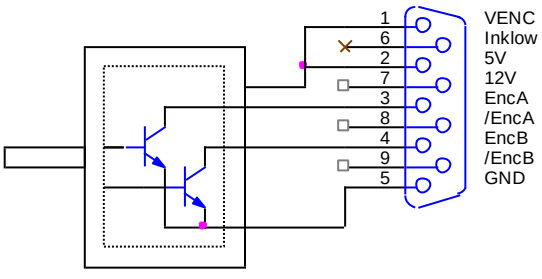
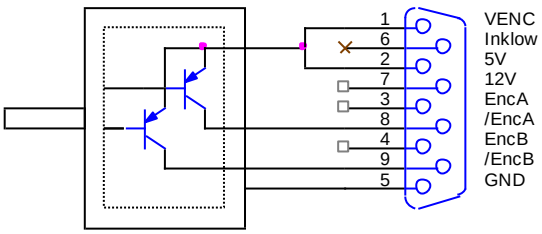


PIN	Description
1	VENC – voltage reference
2	5V
3	Encoder A
4	Encoder B
5	GND
6	Inklow - output
7	12V
8	/Encoder A (inverted)
9	/Encoder B (inverted)

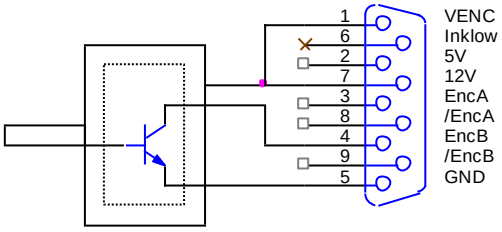
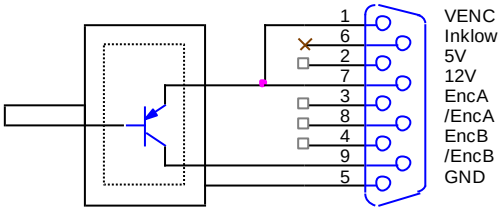
5V DC Encoder single channel

	**5V DC NPN or PUSH/PULL** VCC to pins 1, 2 Signal to pin 4 GND to pin 5
	**5V DC PNP** VCC to pins 1, 2 Signal to pin 9 GND to pin 5

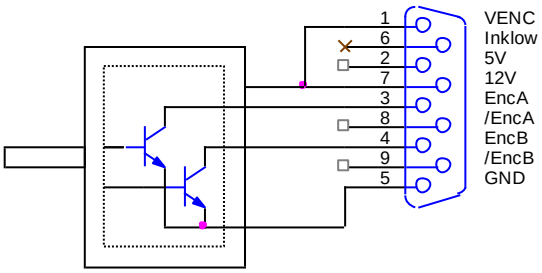
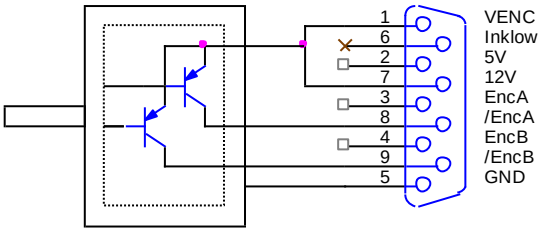
5V DC Encoder dual channel

	**5V DC NPN or PUSH/PULL** VCC to pins 1, 2 Signals to pins 3, 4 GND to pin 5
	**5V DC PNP** VCC to pins 1, 2 Signals to pins 8, 9 GND to pin 5

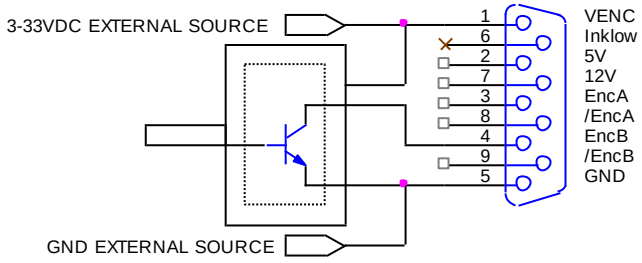
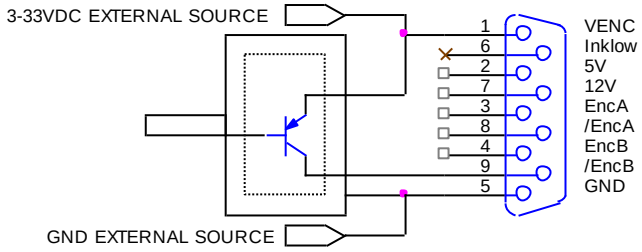
12V DC Encoder single channel

	**12V DC NPN or PUSH/PULL** VCC to pins 1, 7 Signal to pin 4 GND to pin 5
	**12V DC PNP** VCC to pins 1, 7 Signal to pin 9 GND to pin 5

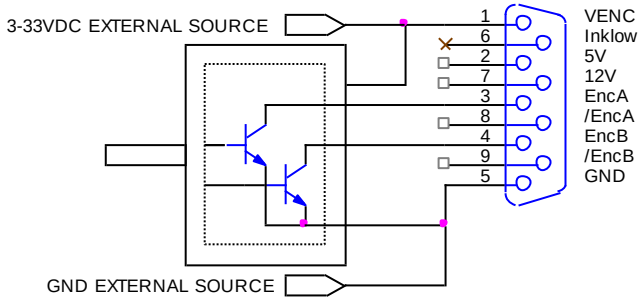
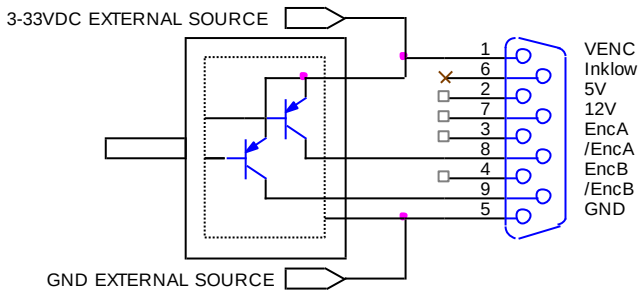
12V DC Encoder dual channel

	**12V DC NPN or PUSH/PULL** VCC to pins 1, 7 Signals to pins 3, 4 GND to pin 5
	**12V DC PNP** VCC to pins 1, 7 Signals to pins 8, 9 GND to pin 5

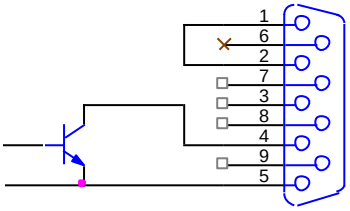
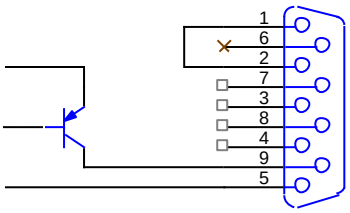
3-33V DC Encoder with external power source single channel

	**3-33V DC NPN or PUSH/PULL with external power source** VCC to pin 1 Signal to pin 4 GND to pin 5
	**3-33V DC PNP with external power source** VCC to pin 1 Signal to pin 9 GND to pin 5

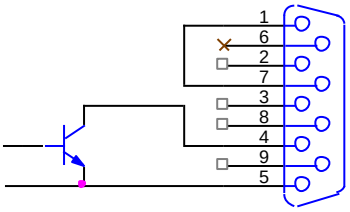
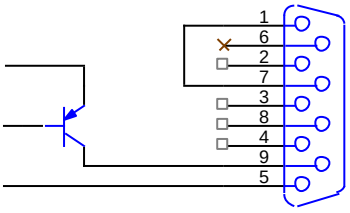
3-33V DC Encoder with external power source dual channel

	**3-33V DC NPN or PUSH/PULL with external power source** VCC to pin 1 Signal to pin 3, 4 GND to pin 5
	**3-33V DC PNP with external power source** VCC to pin 1 Signal to pin 8, 9 GND to pin 5

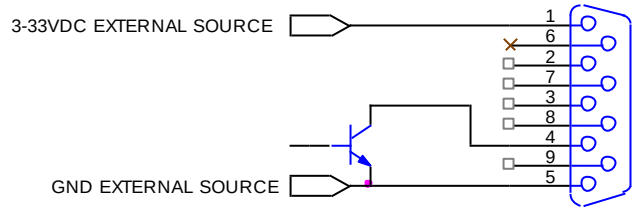
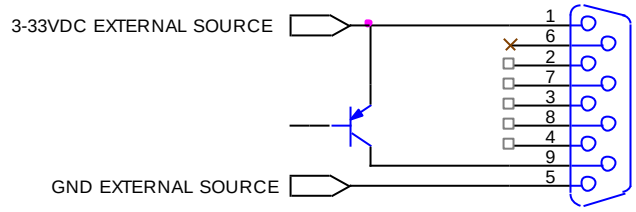
5V DC simulated encoder with external power source

	**5V DC NPN or PUSH/PULL with external power source** Loop pins 1-2 Signal to pin 4 GND to pin 5
	**5V DC PNP with external power source** Loop pins 1-2 Signal to pin 9 GND to pin 5

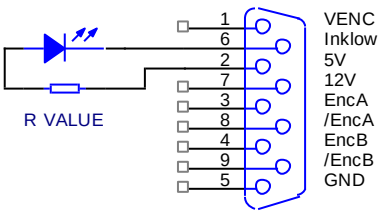
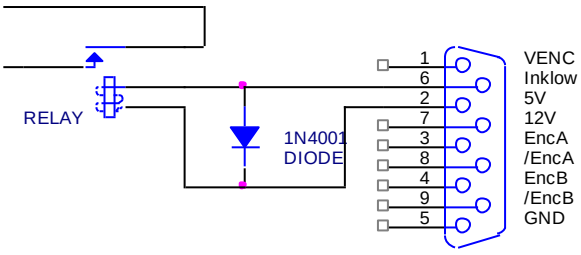
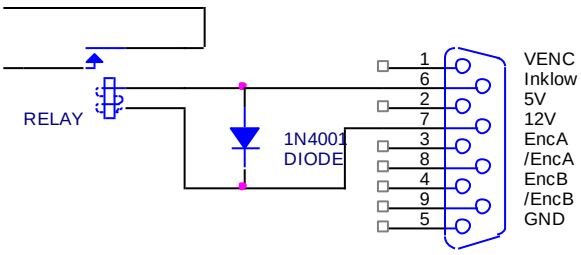
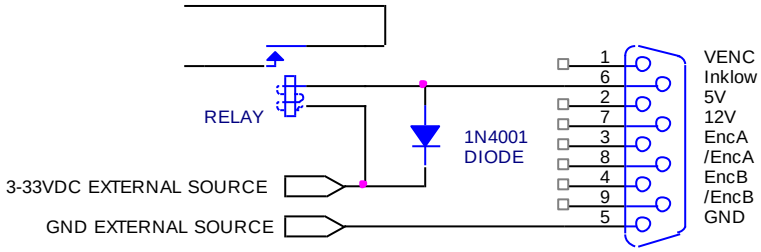
12V DC simulated encoder with external power source

	**12V DC NPN or PUSH/PULL with external power source** Loop pins 1-7 Signal to pin 4 GND to pin 5
	**12V DC PNP with external power source** Loop pins 1-7 Signal to pin 9 GND to pin 5

3-33V DC simulated encoder with external power source

	**3-33V DC NPN or PUSH/PULL with external power source** VCC to pin 1 Signal to pin 4 GND to pin 5
	**3-33V DC PNP with external power source** VCC to pin 1 Signal to pin 9 GND to pin 5

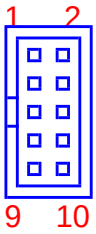
Low ink level output active low (open collector) XJ128 and XJ500 versions only.
Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VENC pin1 you will damage the unit.

<table>
<tr>
<td> 
</td>
<td>LED indicator
Connect the components between pins 2 and 6
The R value can be calculated using the equation below
$R = \frac{5 - Ud}{Id}$
Where Ud is diode voltage and Id is diode current</td>
</tr>
<tr>
<td> 
</td>
<td>5V DC relay
Connect the relay coil between pins 2 and 6
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
<tr>
<td> 
</td>
<td>12V DC relay
Connect the relay coil between pins 6 and 7
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
<tr>
<td> 
</td>
<td>3-33V DC relay with external power source
Connect the relay coil between external VCC and pin 6
Connect external GND to pin 5
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
</table>

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VENC pin1 you will damage the unit.

Daisy chain connector

The CB2/CBF has a build in daisy chain connector for I/O and encoder signals that is used when you wish to use one photocell or encoder on more than one controller board in the same pc. You can also choose a lot of other configurations, in this manual the jumper system is explained and examples for the most common configurations are illustrated, if other configurations are needed please see the jumper system illustration or contact HSA support for more information.



PIN	Description
1	Start signal
2	Not used
3	Encoder A
4	Encoder B
5	Input 1
6	Input 2
7	GND
8	GND
9	GND
10	GND

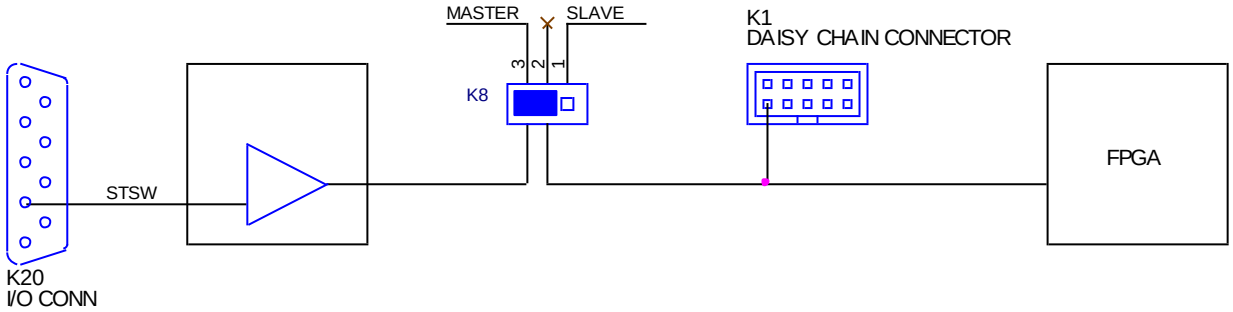
Daisy chain cable

The daisy chain cable connects all the boards internally, the daisy chain cable is not affected by the jumpers, so if you need some signals to be standalone you must cut the corresponding wire in the daisy chain cable before mounting it. Example: you wish to use common encoder and individual photocells. Then you must use the daisy chain cable to connect the encoder signals internally, but before mounting it you must cut the wire on pin 1 between all the connectors so that the photocell signal is not connected internally. Please see the examples on the next pages.

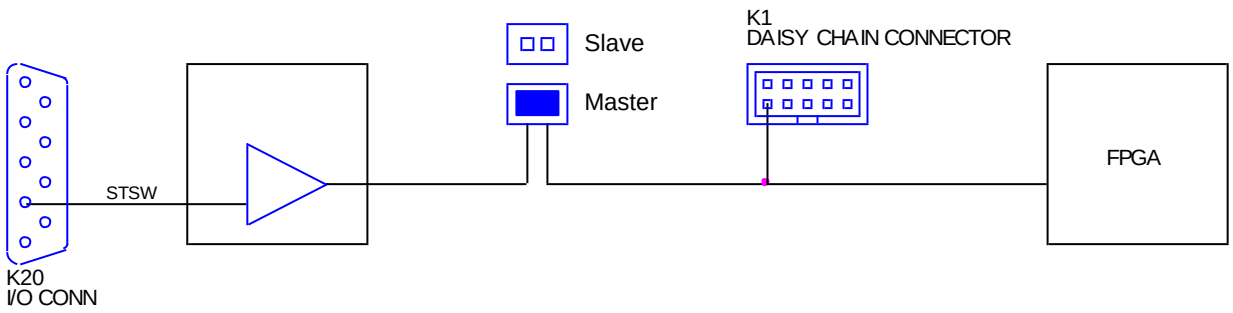
The jumper system explained

Basically the jumpers connect the external connector to the system, which means that with the jumpers the user controls which signals are coming from which connector. If the user wishes then it is possible to choose 1 signal from each connector on up to four different controller boards. The illustration below is made to help the user understand how the system works if the desired configuration is not represented in the examples on the next page.

CBF illustration:



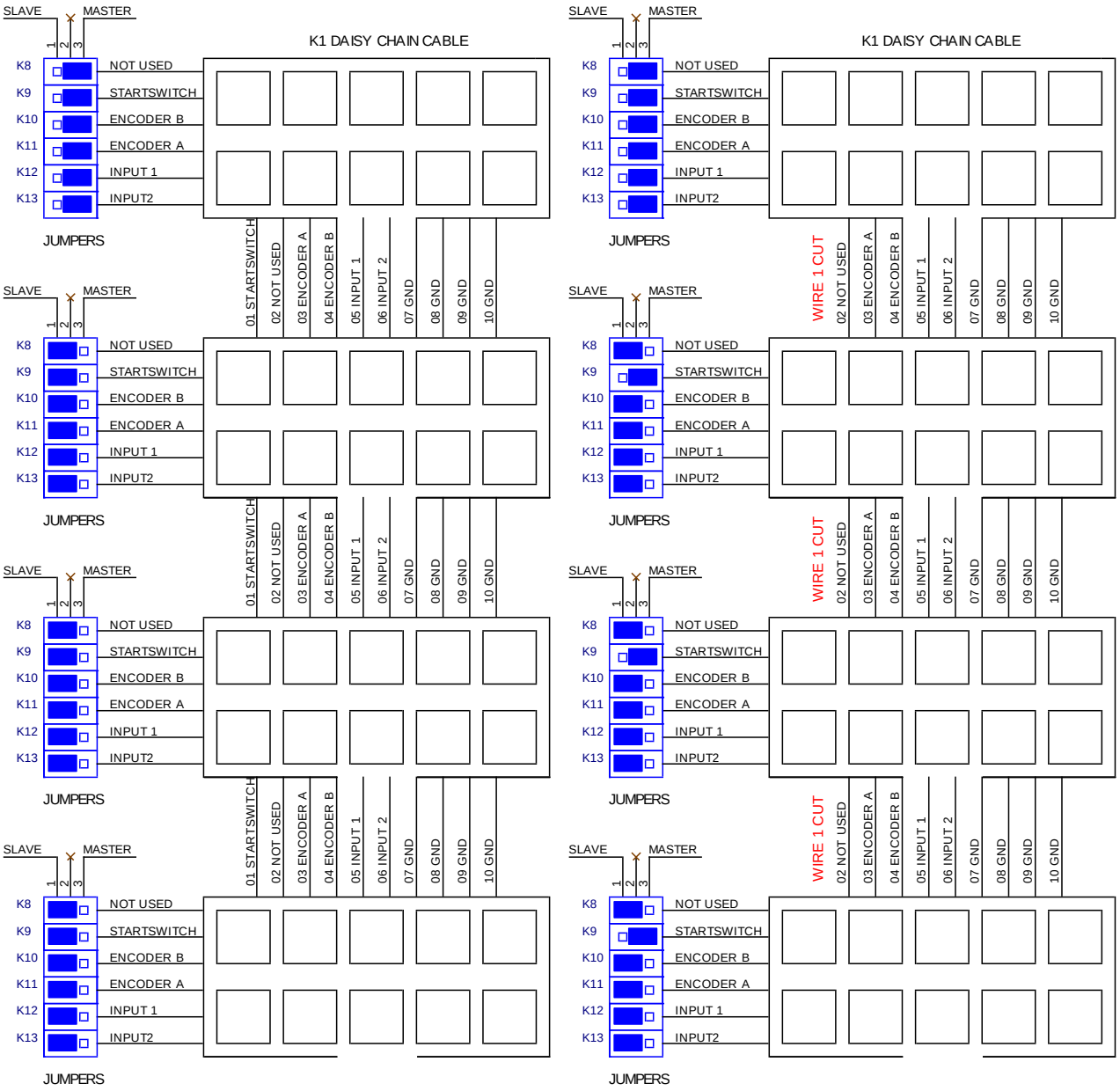
CB2 illustration:



There is no actual difference in the way the two controller boards operate, but the illustration is a little bit different because CB2 has 2 pin solder jumpers and CBF has 3 pin moveable jumpers.

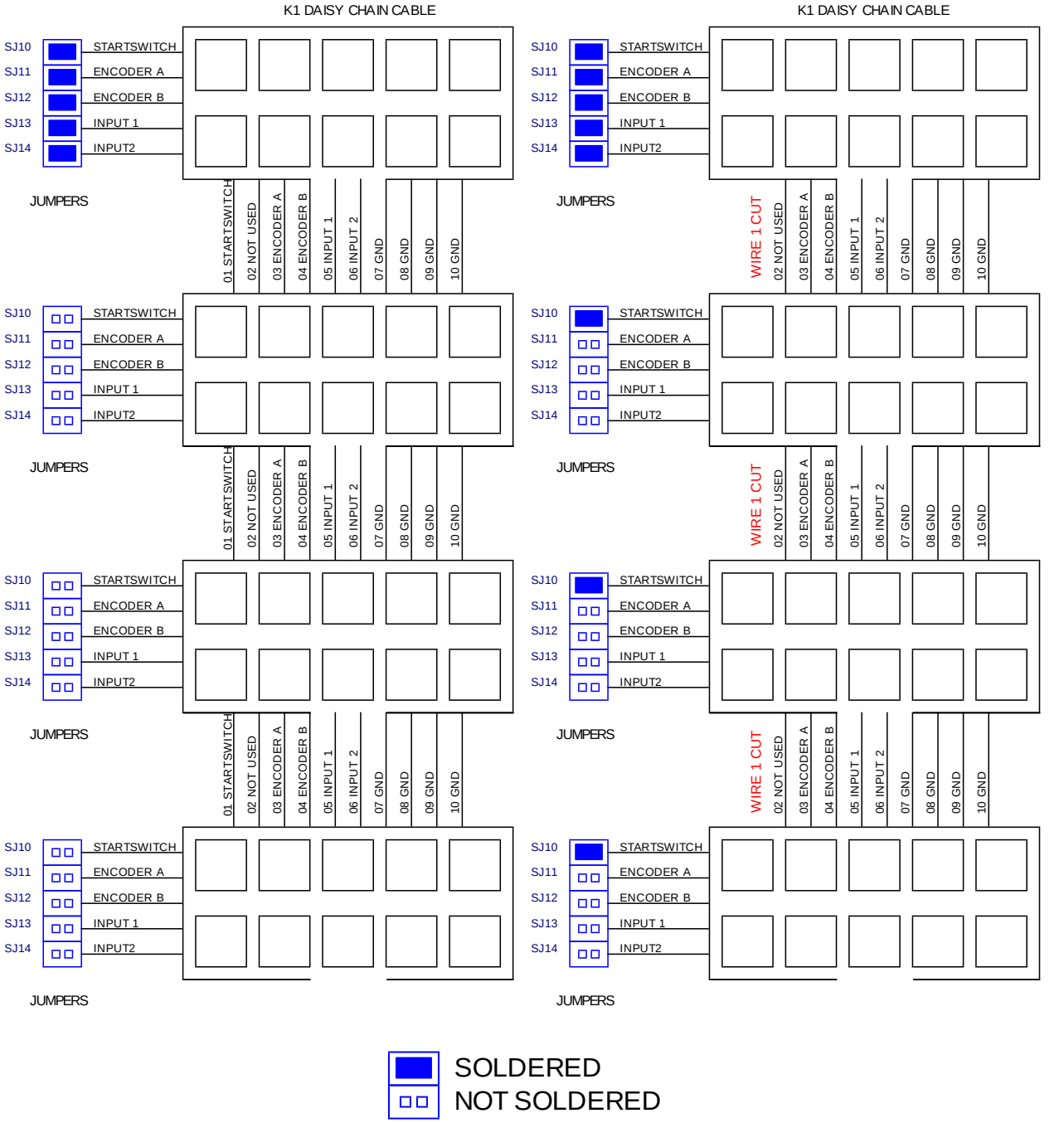
CBF Jumper settings (for CB2 see next page)

Common photocell and encoder	**Individual photocells and common encoder**
On the master CBF all jumpers are put in master position. On the slave CBF's all jumpers are put in slave position. The 10 pin daisy chain cable is with all 10 connections	On the master CBF all jumpers are put in master position. On the slave CBF's all start switch jumpers are put in master position all the remaining jumpers are put in slave position. The 10 pin daisy chain cable is with 9 connections, pin 1 start switch daisy chain wire is cut between all 4 controller boards (3 cuts).



CB2 Jumper settings (for CBF see previous page)

Common photocell and encoder	**Individual photocells and common encoder**
On the master CB2 all jumpers are soldered. On the slave CB2's all jumpers are not soldered. The 10 pin daisy chain cable is with all 10 connections	On the master CB2 all jumpers are soldered. On the slave CB2's all start switch jumpers soldered, all the remaining jumpers are not soldered. The 10 pin daisy chain cable is with 9 connections, pin 1 start switch daisy chain wire is cut between all 4 controller boards (3 cuts).

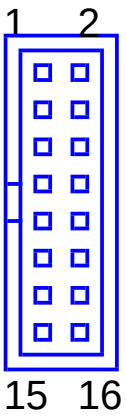


Stacker#0 board connector

I/O extension for mailing - The CB2/CBF must be mail coded in order to use these functions.

This connector is an I/O extension for mailing systems and special projects. The controller board can support up to 8 outputs and 4 inputs on this connector but only with project specific or mailing FPGA's. The connector is located inside the PC on the edge of the controller board.

The stacker connector can supply 5V and 12V DC for the external devices but you can use any device in the 3-33V range if you connect an external power source. Please note that this connector share power supply and fuses with the I/O and encoder connector



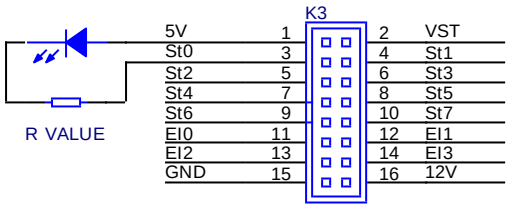
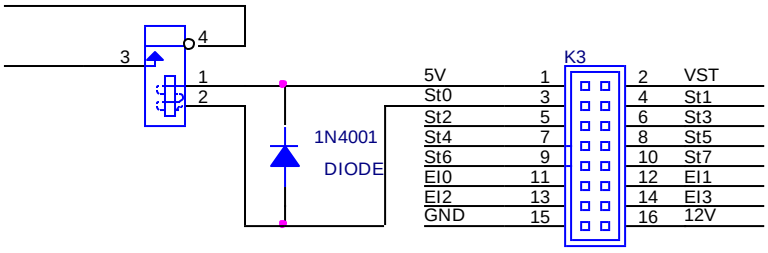
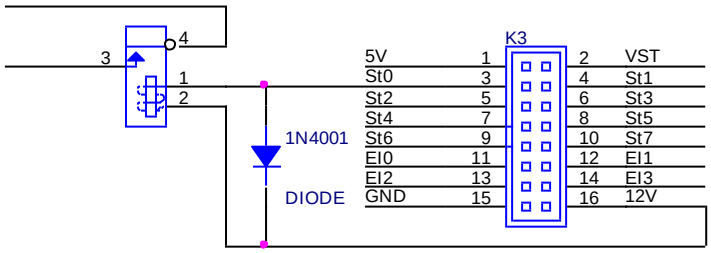
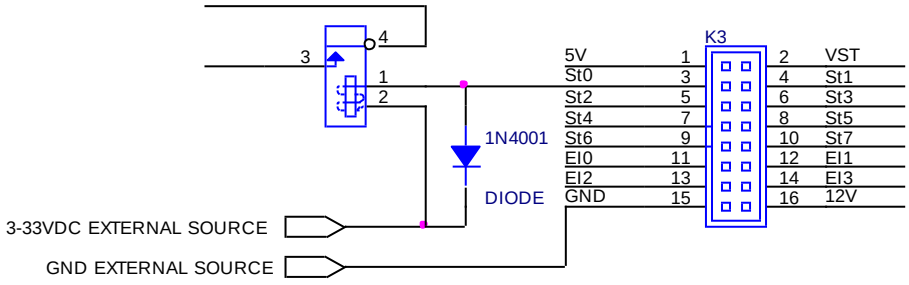
PIN	Description
1	5V
2	VST – voltage reference
3	St0 output
4	St1 output
5	St2 output
6	St3 output
7	St4 output
8	St5 output
9	St6 output
10	St7 output
11	EI0 Input
12	EI1 Input
13	EI2 Input
14	EI3 Input
15	GND
16	12V

The schematics in this manual show how to connect the output called St0. The other outputs on the connector can be connected using St0 as a model, move the wire from St0 to St1-7 the other wires are the same for all outputs.

Stacker#0 outputs

The schematics in this manual show how to connect the output called St0. The other outputs on the connector can be connected using St0 as a model, move the wire from St0 to St1-7 the other wires are the same for all outputs.

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VST pin 2 you will damage the unit. If you do not use the inputs on this connector you must connect VST to the highest voltage supply that you use on this connector.

<table>
<tr>
<td> 
</td>
<td>LED indicator
Connect the components between pins 1 and 3
The R value can be calculated using the equation below
$R = \frac{5 - Ud}{Id}$
Where Ud is diode voltage and Id is diode current</td>
</tr>
<tr>
<td> 
</td>
<td>5V DC relay
Connect the relay coil between pins 1 and 3
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
<tr>
<td> 
</td>
<td>12V DC relay
Connect the relay coil between pins 3 and 16
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
<tr>
<td> 
</td>
<td>3-33V DC relay with external power source
Connect the relay coil between external VCC and pin 3
Connect external GND to pin 15
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
</table>

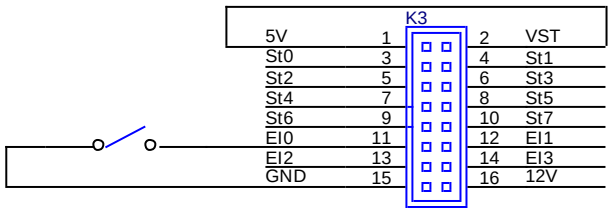
Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VST pin 2 you will damage the unit. If you do not use the inputs on this connector you must connect VST to the highest voltage supply that you use on this connector.

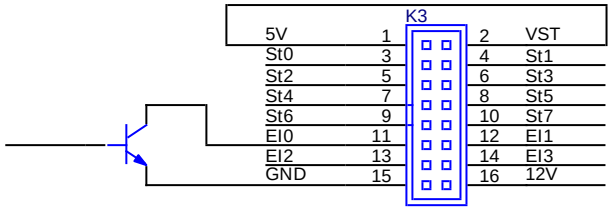
The signal type can be selected in Inkdraw preferences.

Stacker#0 inputs

The CB2/CBF must be mail coded in order to use these functions.

The schematics below show how to connect the input called Ei0 if you need other inputs on the connector you can just move the wire on Ei0 to Ei1-3 the other wires are the same for all inputs.

<table>
<tr>
<td> 
</td>
<td>N/O normal open mechanical switch or relay
Connect the switch between pins 11 and 15
Connect a reference voltage to VST in this example 5V is chosen.

(if you need to use the outputs with a higher voltage than 5 volts you must connect VST to the highest voltage that you use)</td>
</tr>
<tr>
<td></td>
<td>N/C normal closed mechanical switch or relay
You cannot use a relay of this type on this input</td>
</tr>
<tr>
<td> 
</td>
<td>NPN output trigger
Connect a reference voltage to VST in this example 5V is chosen.
Signal to pin 11
GND to pin 15</td>
</tr>
<tr>
<td></td>
<td>PNP output trigger
There is no standard option for PNP on this input. If you cannot use one of the options above you can contact support for more information.</td>
</tr>
</table>

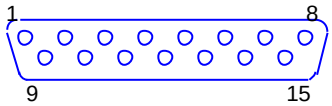
Warning: If you need to use the outputs with a higher voltage than 5 volts you must connect VST to the highest voltage that you use.

Stacker#0 D-Sub 15 connector

I/O extension for mailing - The CB2/CBF must be mail coded in order to use these functions.

This connector is an I/O extension for mailing systems and special projects. The controller board can support up to 8 outputs and 4 inputs on this connector but only with project specific or mailing FPGA's.

The stacker connector can supply 5V DC for the external devices but you can use any device in the 3-33V range if you connect an external power source. Please note that this connector share power supply and fuses with the I/O and encoder connector



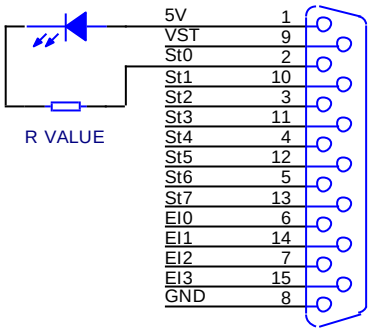
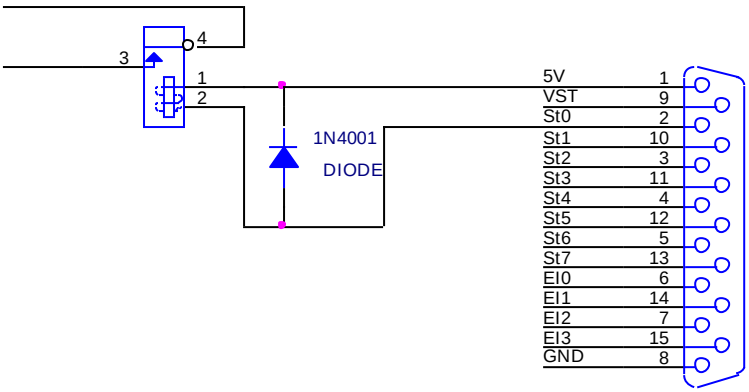
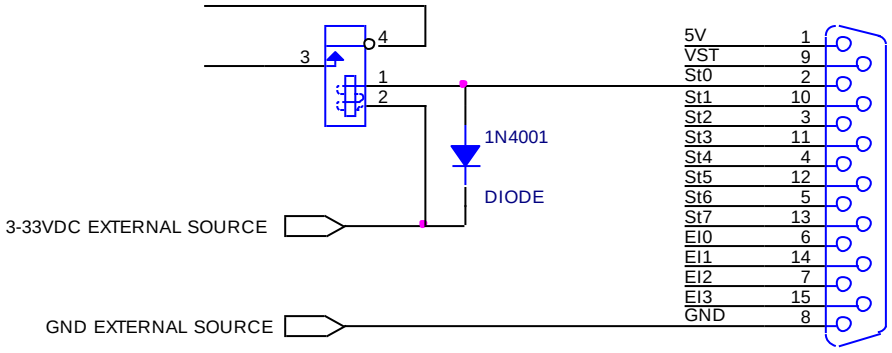
PIN	Description
1	5V
2	St0 output
3	St2 output
4	St4 output
5	St6 output
6	EI0 Input
7	EI2 Input
8	GND
9	VST – voltage reference
10	St1 output
11	St3 output
12	St5 output
13	St7 output
14	EI1 Input
15	EI3 Input

The schematics in this manual show how to connect the output called St0. The other outputs on the connector can be connected using St0 as a model, move the wire from St0 to St1-7 the other wires are the same for all outputs.

Stacker#0 D-Sub 15 outputs

The schematics in this manual show how to connect the output called St0. The other outputs on the connector can be connected using St0 as a model, move the wire from St0 to St1-7 the other wires are the same for all outputs.

Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VST pin 9 you will damage the unit. If you do not use the inputs on this connector you must connect VST to the highest voltage supply that you use on this connector.

<table>
<tr>
<td> 
</td>
<td>LED indicator
Connect the components between pins 1 and 2
The R value can be calculated using the equation below
$R = \frac{5 - Ud}{Id}$
Where Ud is diode voltage and Id is diode current</td>
</tr>
<tr>
<td> 
</td>
<td>5V DC relay
Connect the relay coil between pins 1 and 2
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
<tr>
<td></td>
<td>12V DC relay
12V is not available on this connector</td>
</tr>
<tr>
<td> 
</td>
<td>3-33V DC relay with external power source
Connect the relay coil between external VCC and pin 2
Connect external GND to pin 8
Some relays have a built in diode, if not please also mount the protection diode on the coil connections.</td>
</tr>
</table>

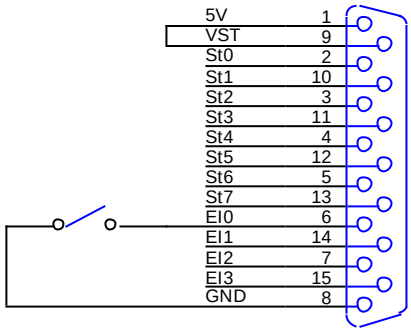
Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VST pin 2 you will damage the unit. If you do not use the inputs on this connector you must connect VST to the highest voltage supply that you use on this connector.

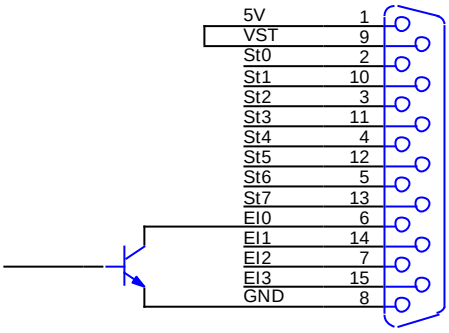
The signal type can be selected in Inkdraw preferences.

Stacker#0 D-Sub 15 inputs

The CB2/CBF must be mail coded in order to use these functions.

The schematics below show how to connect the input called Ei0 if you need other inputs on the connector you can just move the wire on Ei0 to Ei1-3 the other wires are the same for all inputs.

<table>
<tr>
<td> 
</td>
<td>N/O normal open mechanical switch or relay
Connect the switch between pins 6 and 8
Connect a reference voltage to VST in this example 5V is chosen.

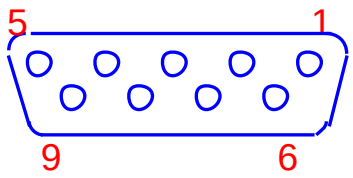
(if you need to use the outputs with a higher voltage than 5 volts you must connect VST to the highest voltage that you use)</td>
</tr>
<tr>
<td></td>
<td>N/C normal closed mechanical switch or relay
You cannot use a relay of this type on this input</td>
</tr>
<tr>
<td> 
</td>
<td>NPN output trigger
Connect a reference voltage to VST in this example 5V is chosen.
Signal to pin 6
GND to pin 8</td>
</tr>
<tr>
<td></td>
<td>PNP output trigger
There is no standard option for PNP on this input. If you cannot use one of the options above you can contact support for more information.</td>
</tr>
</table>

Warning: If you need to use the outputs with a higher voltage than 5 volts you must connect VST to the highest voltage that you use.

RS-232 connector

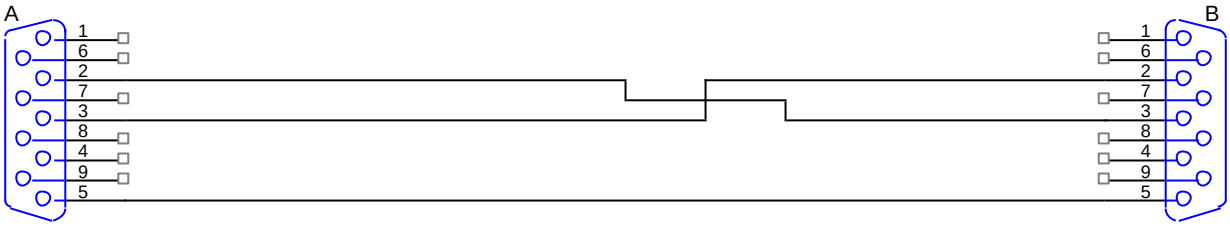
This connector is used for remote communication with the TIPC15, this section will tell you how to connect the wires, please see the remote communication manual for port setup and commands.

The connector is 9 pin Male, and the pins are configured as master. If you wish to connect from a standard PC com port you must use a crossed cable.



PIN	Description
1	
2	Rx
3	Tx
4	
5	GND
6	
7	
8	
9	

Crossed cable
Connector A pin 5 is connected to connector B pin 5
Connector A pin 2 is connected to connector B pin 3
Connector A pin 3 is connected to connector B pin 2



Support

For support please contact your local distributor or HSA Systems customer service

E-mail: techsupport@hsasystems.com

Phone: +45 66 10 34 01