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Handling boards

ESD protection

All the boards described in the following are fitted, among other things, with large-scale integrated circuits. Voltage impulses caused by static charging from people or objects can easily destroy the circuits.

When handling boards, ensure that the electronics cannot be damaged by static charging or discharging.

- CAUTION! Place the printer on an earthed underlay before opening it.
- CAUTION! Earth your body with an ESD protective armband or by using another suitable means. If suitable ESD protection is not available, touch an earthed object, e.g. a radiator, before touching a board.
- CAUTION! Only place boards on an earthed underlay.

Handling

The conductor lines on modern multilayer boards are very thin. Bending the boards can therefore easily break the conductor lines.

- CAUTION! Avoid bending the boards.
- CAUTION! Avoid using excessive force when removing and installing the boards.

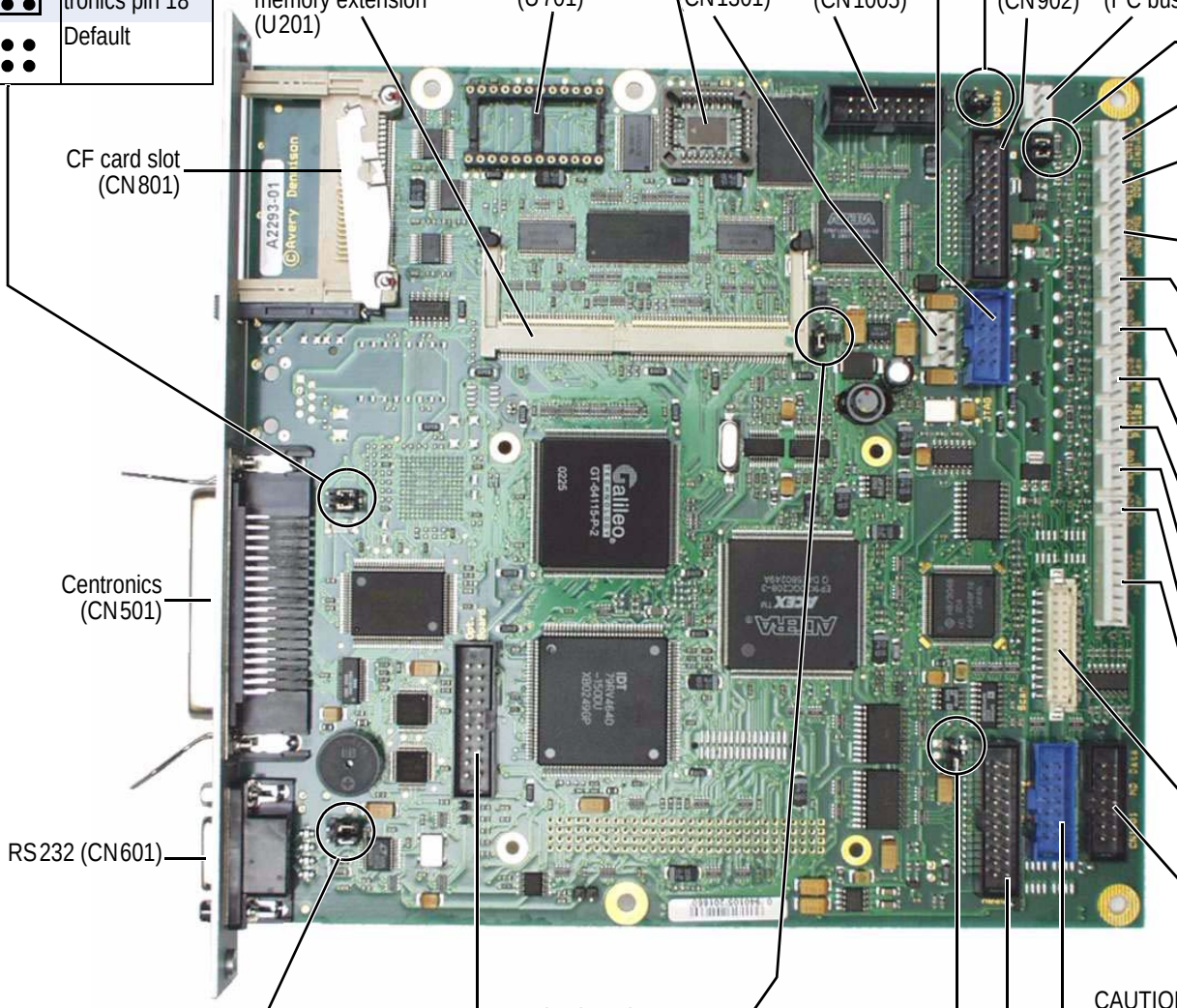
CPU Boards

Layout without Ethernet

JP301	Function
	Boot from U303 Boot-PROM
	Boot from system flash (default)

JP1101/1102	Function
	Constant LED current at dispensing edge sensor
	Constant LED current at Ø-sensor Disp.-Rewinder
	Pulsed LED current at dispensing edge sensor & at Ø-sensor Disp.-Rewinder

JP502/503	Function
	+5V at Centronics pin 35
	+5V at Centronics pin 18
	Default



JP601/602	Function
	RS422/485 termination: RxD
	RS422/485 termination: TxD
	RS232, no RS422/485 termination (default)

CAUTION - Line termination in RS485-mode:
2-wire-interface: close either JP601 or JP602!
4-wire-interface: close JP601 and JP602!

JP102	Function
1-2	8bit boot bus width (for U303 Boot-PROM)
2-3	16bit boot bus width (default)

L CAUTION Only for production purposes!

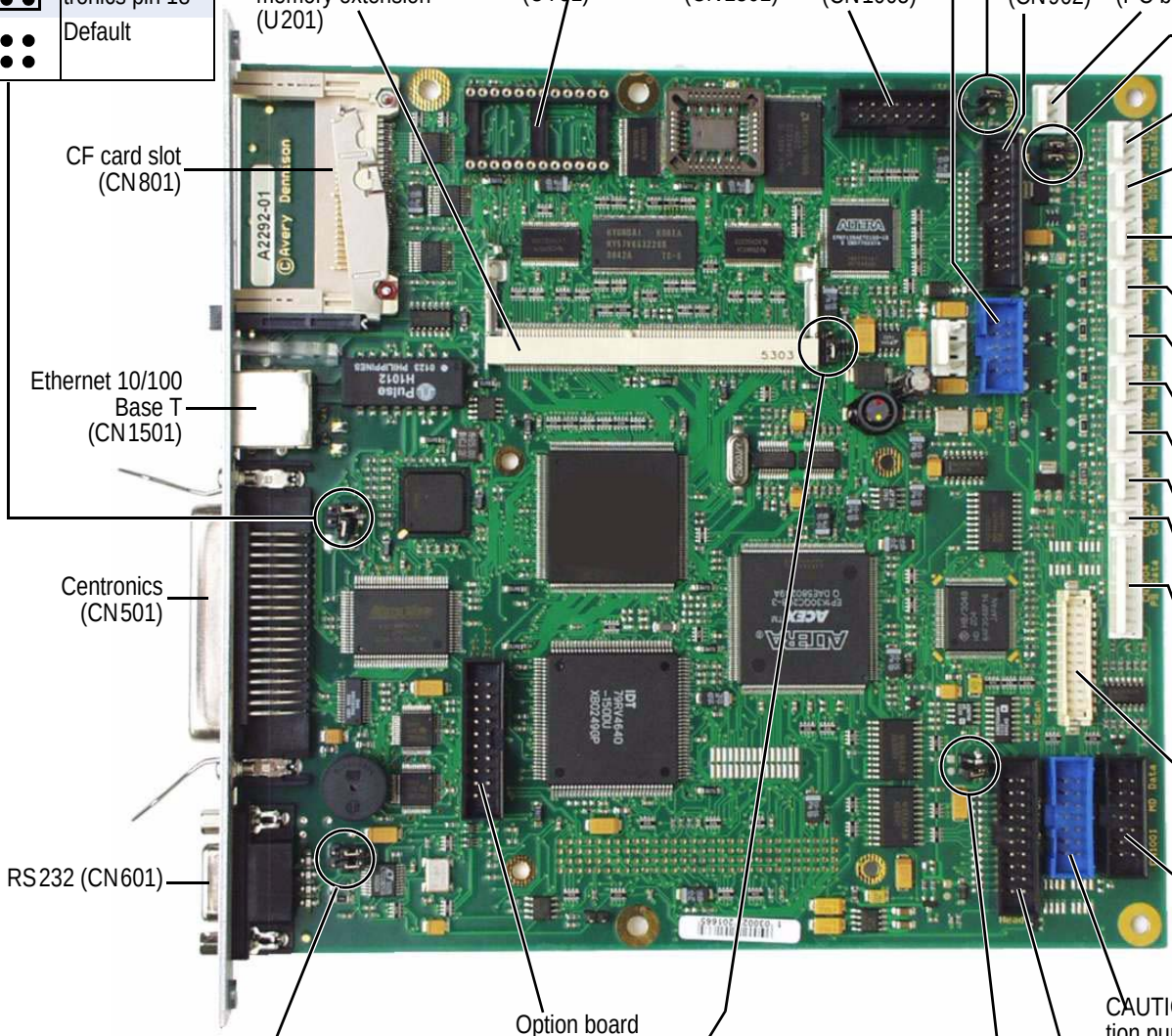
JP1004	Function
	H8: RX1 RS232 level
	H8: RX1 TTL level (default)

Layout with Ethernet

JP 301	Function
	Boot from U303 Boot-PROM
	Boot from system flash (default)

JP 1101/ 1102	Function
	Constant LED current at dispensing edge sensor
	Constant LED current at Ø-sensor Disp.-Rewinder
	Pulsed LED current at dispensing edge sensor & at Ø-sensor Disp.-Rewinder

JP 502 /503	Function
	+5V at Centronics pin 35
	+5V at Centronics pin 18
	Default



Sockel für 8bit Boot-PROM (U303)

CAUTION - Only for production purposes! JTAG interface (CN402)

SO-DIMM 144 socket for memory extension (U201)

RTC socket (U701)

Power supply (CN1301)

USI board (CN1005)

Display (CN902)

Data cable peripheral (I^2C bus) (CN1003)

Sensor dispensing edge (CN1101)

Ø-sensor dispenser rewinder (DDS) (CN1102)

Feed roller sensor (DPM/PEM/ALX=TS, 64-xx Dispenser=DTS) (CN1103)

Material end sensor (MS) (CN1104)

Punch sensor (PS) (CN1105)

Reflex sensor (RS) (CN1106)

Fullsize sensor (FSS) (CN1107)

Singlestart sensor (SSS) (CN1108)

Cover sensor (COS) (CN1109)

Power supply (CN1004)

Internal scaner (CN1006)

Motor output stage (I^2C bus) (CN1001)

CF card slot (CN801)

Ethernet 10/100 Base T (CN1501)

Centronics (CN501)

RS232 (CN601)

Option board (CN602)

CAUTION - Only for production purposes! H8-PRG-Adapter (CN1002)

Printhead (CN901)

JP 601 /602	Function
	RS422/485 termination: RxD
	RS422/485 termination: TxD
	RS232, no RS422/485 termination (default)

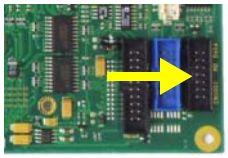
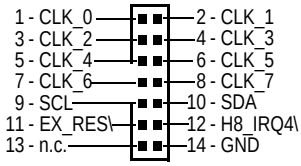
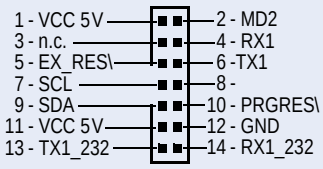
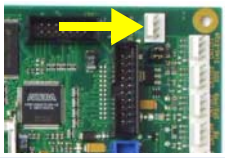
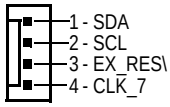
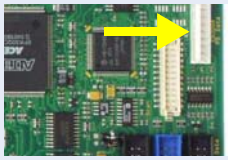
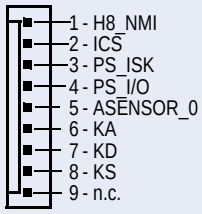
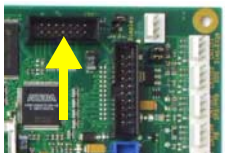
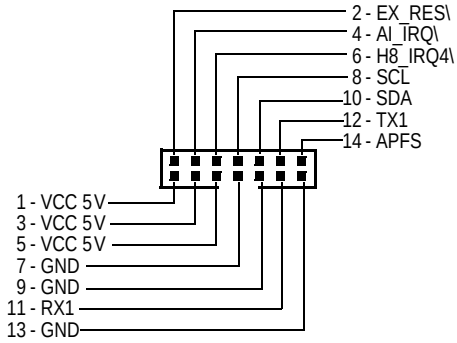
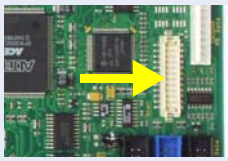
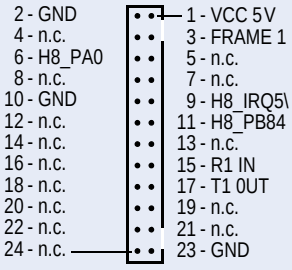
JP 102	Function
1-2	8bit boot bus width (for U303 Boot-PROM)
2-3	16bit boot bus width (default)

CAUTION - Line termination in RS485-mode:
2-wire-interface: close either JP601 or JP602!
4-wire-interface: close JP601 and JP602!

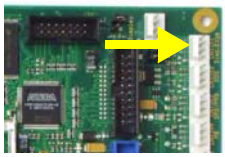
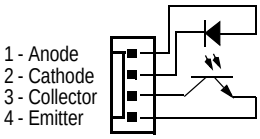
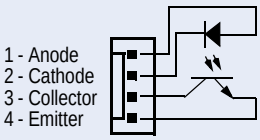
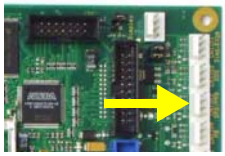
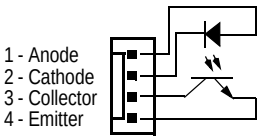
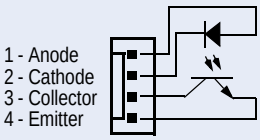
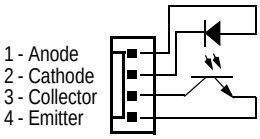
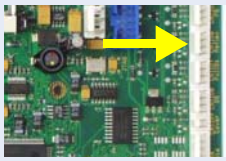
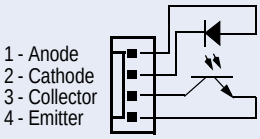
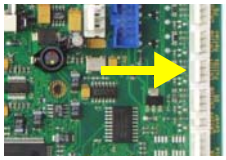
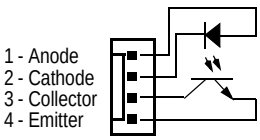
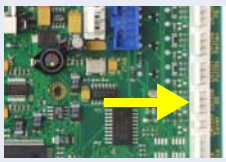
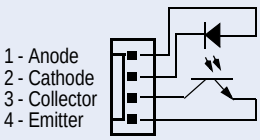
CAUTION - Only for production purposes!

JP 1004	Function
	H8: RX1 RS232 level
	H8: RX1 TTL level (default)

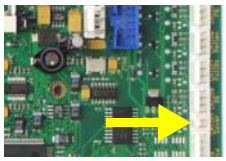
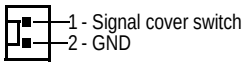
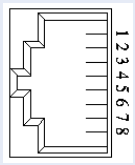
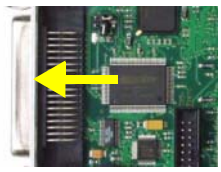
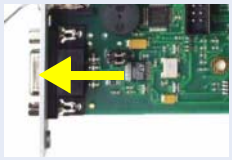
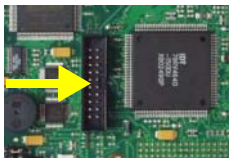
Connectors

Picture	Comp. Diagram	Type on board	Type at cable	Pin assignment on board
I2C Motordr. Bus 	CN1001	3M 2514-6002		
PRG Adapter 	CN1002	3M 2514-6002		
I2C-Bus 	CN1003	PANCON MLSS 100-04		
Power supply 	CN1004	PANCON MLSS 100-09		
USI 	CN1005	3M 2514-6002		
Scanner 	CN1006	Hirose DF11-24DP-2V		

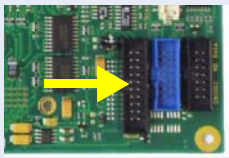
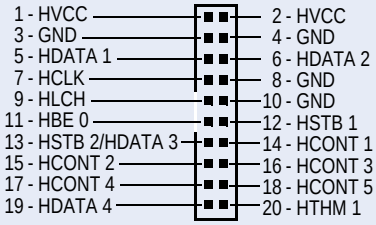
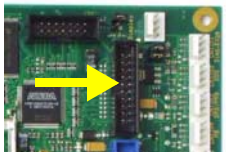
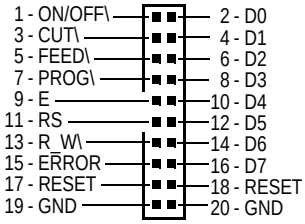
Tab. 1: Connector description CPU board

Picture	Comp. Diagram	Type on board	Type at cable	Pin assignment on board
Sensor dispensing edge 	CN1101	PANCON MLSS 100-04		
Ø-sens. rewinder 	CN1102	PANCON MLSS 100-04		
Sens. feed roller 	CN1103	PANCON MLSS 100-04		
Material end S. 	CN1104	PANCON MLSS 100-04		
Punch Sensor 	CN1105	PANCON MLSS 100-04		
Reflex Sensor 	CN1106	PANCON MLSS 100-04		
Fullsize Sensor 	CN1107	PANCON MLSS 100-04		
Singlestart sens. 	CN1108	PANCON MLSS 100-04		

Tab. 1: (Continued) Connector description CPU board

Picture	Comp. Diagram	Type on board	Type at cable	Pin assignment on board
Cover switch 	CN1109	PANCON MLSS 100-02		
Ethernet 	CN1501 	RJ 45		1 - TD+ 2 - TD- 3 - RD+ 4 - Termination 5 - Termination 6 - RD- 7 - Termination 8 - Termination 
Centronics 	CN501 	IEEE 1284 B 36pin		36 - SELECT_IN\ — 18 - VCC 5V (JP502 geschl.) 35 - VCC 5V (JP503 geschl.) — 17 - n.c. 34 - n.c. — 16 - n.c. 33 - GND — 15 - n.c. 32 - FAULT\ — 14 - AUTO_FEED\ 31 - INIT\ — 13 - SELECT 30 - GND — 12 - PAPER END 29 - GND — 11 - BUSY\ 28 - GND — 10 - ACK\ 27 - GND — 9 - LPT_D7 26 - GND — 8 - LPT_D6 25 - GND — 7 - LPT_D5 24 - GND — 6 - LPT_D4 23 - GND — 5 - LPT_D3 22 - GND — 4 - LPT_D2 21 - GND — 3 - LPT_D1 20 - GND — 2 - LPT_D0 19 - GND — 1 - STROBE\
RS232/422/485 	CN601 	DSub9-F		RS232: 9 - (RI), 8 - CTS, 7 - RTS, 6 - (DSR) — 5 - GND, 4 - (DTR), 3 - TxD, 2 - RxD, 1 - (CD) RS422/485: 9 - n.c., 8 - Tx+, 7 - Rx+, 6 - n.c. — 5 - GND, 4 - n.c., 3 - Rx-, 2 - Tx-, 1 - n.c. L CAUTION! RS232 pin assignment looked at from „PC point of view“! (Printer = DCE)
Option board 	CN602	3M 2520-6002		20 - RESET — 19 - GND 18 - VCC 3V3 — 17 - KBDDAT 16 - KBDCLK — 15 - DXEN_2 14 - ON_2 — 13 - RXEN_2 12 - RS232_2\ — 11 - RI_2\ 10 - GND — 9 - VCC 5V 8 - RTS_2\ — 7 - CTS_2\ 6 - DTR_2\ — 5 - GND 4 - DSR_2\ — 3 - SIN_2 2 - SOUT_2 — 1 - DCD_2\

Tab. 1: (Continued) Connector description CPU board

Picture	Comp. Diagram	Type on board	Type at cable	Pin assignment on board
Printhead 	CN901	3M 2520-6002		
Display 	CN902	3M 2520-6002		

Tab. 1: (Continued) Connector description CPU board

Output stage board

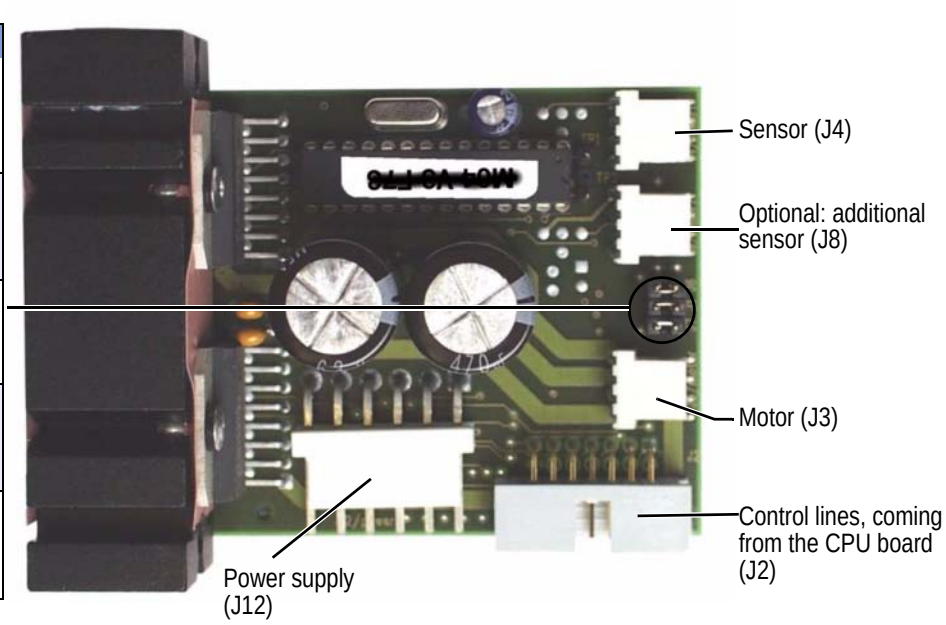
Important Notes

➠ Please keep in mind the following points, when you replace or check an output stage board:

- PIC version:
  The PIC must carry a label with the writing "M04A V3 C73"!
- Jumper setting:
  The jumper setting must match the motor which is ought to be driven by the output stage!

Layout / Connecting

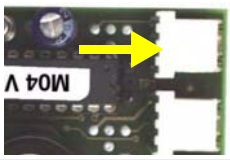
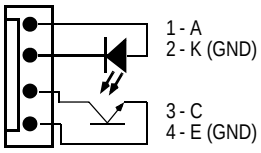
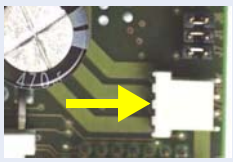
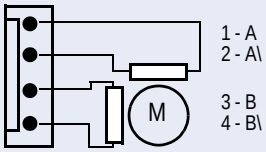
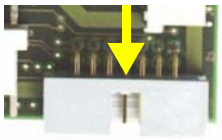
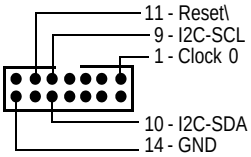
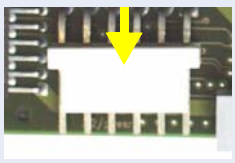
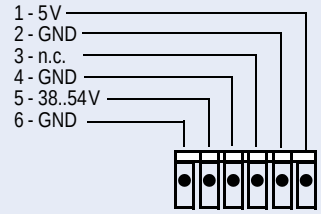
Jumper	Function
J6 ●● J1 ●○ J7 ●○	Options motor (e.g. cutter, ext. rewinder, dispenser: release motor)
J6 ●● J1 ●○ J7 ●●	Printhead motor
J6 ●● J1 ●● J7 ●○	Ribbon motor
J6 ●● J1 ●● J7 ●●	Feed motor
J6 ●○ J1 ●● J7 ●●	Dispenser motor ALX 92x / 64xx Dispenser)



Output stage for	Marker at motor cable	Marker at sensor cable
Feed motor	FM	no sensor
Ribbon motor	RM	RS
Printhead motor	HM	HS
Options motor	OM	OS
Dispenser motor	WM	no sensor

[1] By setting the jumpers, you prepare the output stage board for application with the motor you intend to drive (tab. left side). Connecting the cables: Identify the right motor or sensor cable by its marker on the cable sleeve (tab. below).

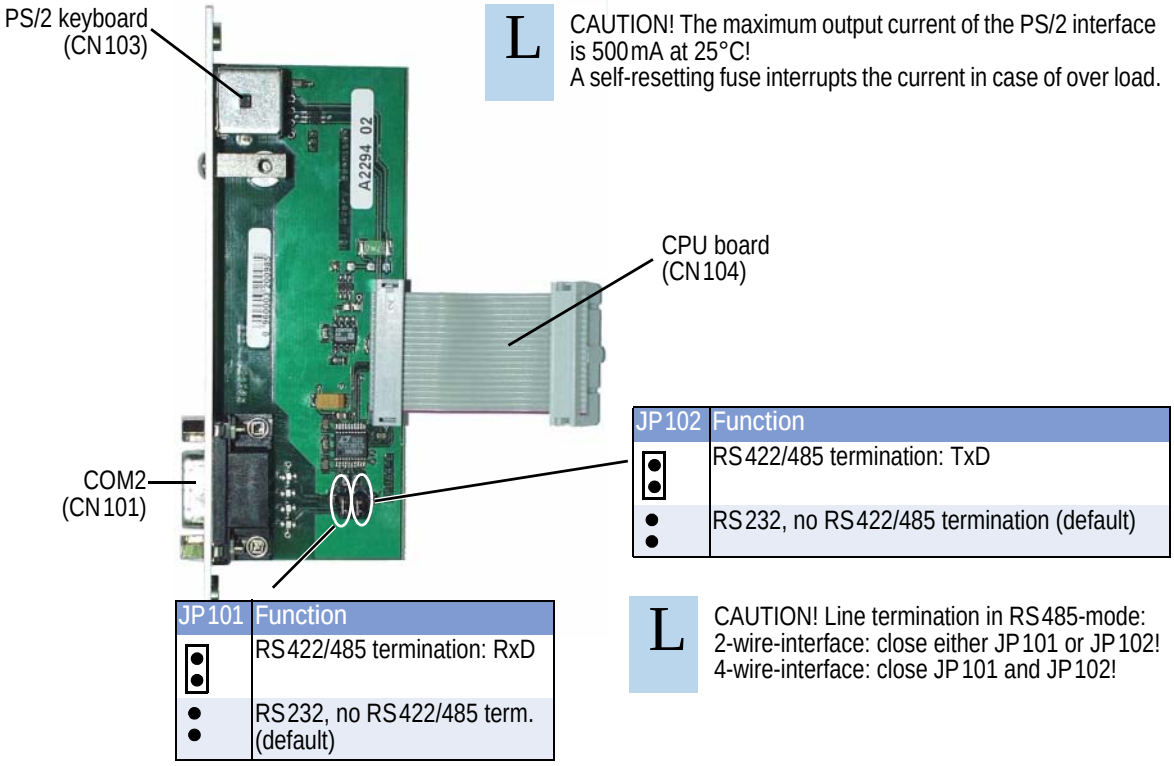
Connectors

Picture	Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
	J4	PANCON MLAS 100-04	AMP 643813-4 oder AUK MK-04H	
	J3	PANCON MLAS 100-04	AMP 643813-4 oder AUK MK-04H	
	J2	Wieson 2120-14RS5	MOLEX 70450 Version b	
	J12	AMP 640389-6	AMP 0-644465-6 MTA 156 18 AWG	

Tab. 2: Connectors on the output stage board.

Option Board

Layout



CAUTION! The maximum output current of the PS/2 interface is 500 mA at 25°C!
A self-resetting fuse interrupts the current in case of over load.

JP102	Function
	RS422/485 termination: TxD
	RS232, no RS422/485 termination (default)

JP101	Function
	RS422/485 termination: RxD
	RS232, no RS422/485 term. (default)

CAUTION! Line termination in RS485-mode:
2-wire-interface: close either JP101 or JP102!
4-wire-interface: close JP101 and JP102!

Connectors

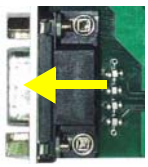
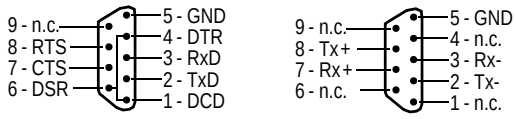
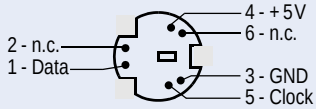
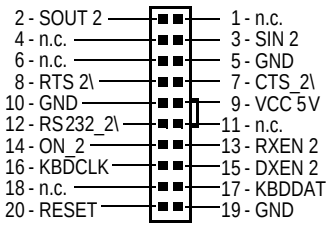
Picture	Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
RS232/422/485 	CN101 	DSub9-F	DSub9-M	
Tastatur 	CN 103 	PS/2	PS/2	
CPU-Platine 	CN104 	Kabel ist an Platine angelötet		

Fig. 2: Connectors on the option board

USI Board

Application notes

Utilization

The USI (Universal Signal Interface) is an optional interface for all machine types listed in the headline of this page.

USI-equipped machines can for example control applicators or scanners. The input signals can be used to trigger the print-dispense-process. The output lines signal the operating status - e.g. material or ribbon end - so that the machine can be integrated completely into a system.

The USI comes on a separate board and can be easily retrofitted.

Compatibility

➠ DPM, PEM, PM 3000, ALX 92x: USI and AI (Applicator Interface) can not be built into the same device.

Version

➠ The functionality described in this section is only then fully available, if USI board, Controller and printer firmware match the following versions:

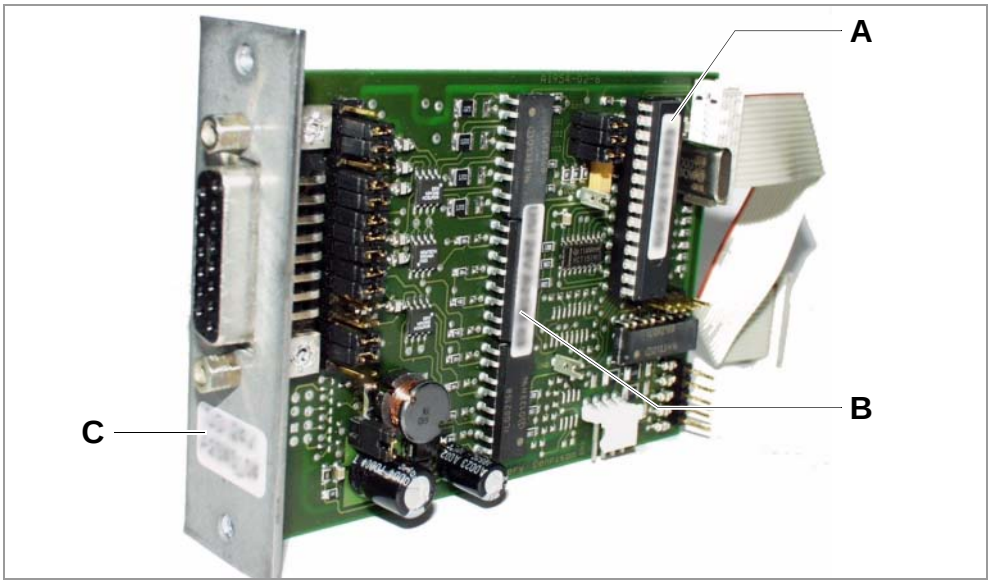
- *USI board*: At least A2345-04 or a later version, which can be recognized by a higher index (-05, -06, …). The version number can be found on a label attached to the board [3B, C].
- *USI controller*: At least V2-T1-F873 or a later version, which can be recognized by the V-section of the version number (V3-, V4-, …). The version number is written on a label attached to the controller [3A].
- *Printer firmware*: 4.12 (is displayed after powering on the printer).

Connection type

NPN

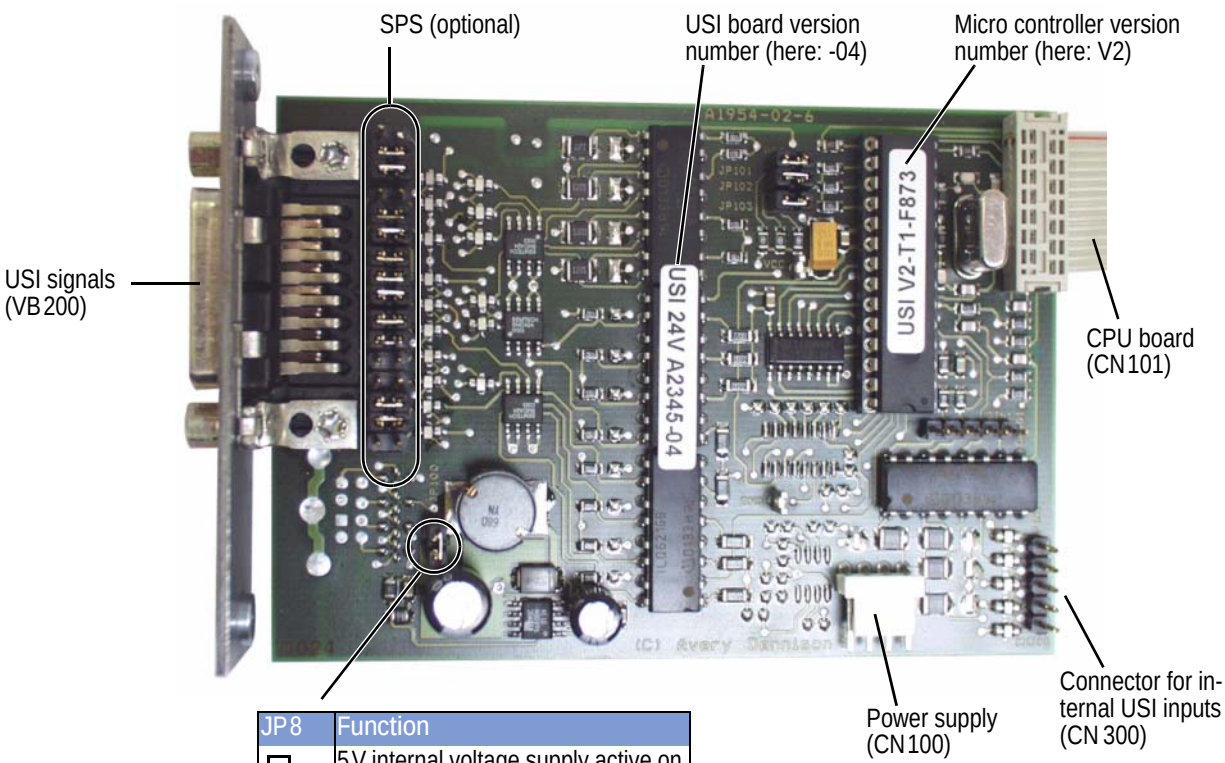
Signal voltage

optionally 5 or 24 V



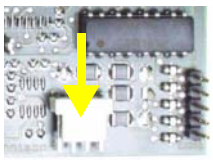
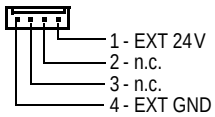
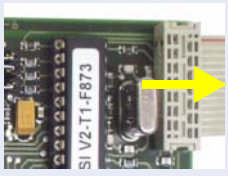
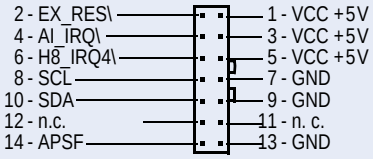
[3] At those places, you find the version designations on the USI board.

View

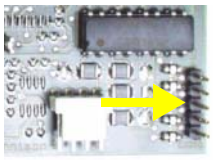
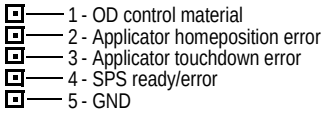
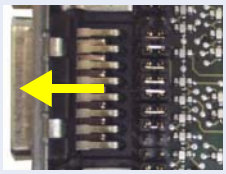
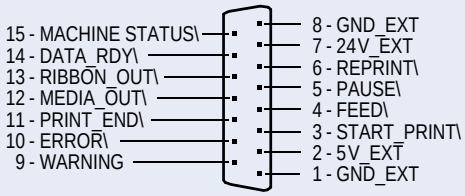


JP8	Function
● ●	5 V internal voltage supply active on Pin 2/DB-15
● ●	5 V external voltage supply on Pin 2/ DB-15

Connectors

Picture	Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
	CN100	AMP 640457-4		
	CN101 	Cable is soldered to the board		

Tab. 3: Connectors on the USI board.

Picture	Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
	CN300			
	VB200 			

Tab. 3: (Continued) Connectors on the USI board.

Signal description (D-Sub 15)

Pin	Signal	Signal type	Function
1	GND_EXT	Ground	Ground contact
2	5V_EXT	Voltage supply	• JP8 connected: Internal 5 V source can be used via the wire for external sensors. • JP8 clear: Wire can be used for an external 5 V source.
3	START_PRINT\	In	The machine starts printing depending on the setting of parameter DP INTERFACE > Start print mode. Preconditions: Printjob is available (DATA RDY\ low), printer is in online mode, no error messages.
4	FEED\	In	Feeding of the label material as long as the signal is low. Minimum feed quantity: 1 label. The display shows „USI feed“ during feeding. Preconditions for feeding: • Offline mode, printing has been stopped or the printer is in USI-paused mode. • Online mode and no print job loaded.
5	PAUSE\	In	A high-low-transition switches the printer into the USI-paused mode. A further high-low-transition switches the printer back into the online mode. If parameter DP INTERFACE > Start print mode is set to *Level high active* or *Level low active*, any activating of the PAUSE\ signal stops the printing after the current label. Features: • „USI Pause“ is displayed • ERROR\ is activ (low) • If a print job is available: DATA RDY\ is inactive (high) • Start print signals are suppressed • Reprint requests are proceeded after switching into online mode. • Precondition: START PRINT\ inactive (high).

Tab. 4: Signal designations and functions of the USI interface.

Pin	Signal	Signal type	Function
6	REPRINT\	In	The last printed label is being reprinted as long as REPRINT\ is low. Minimum reprint quantity: 1 label. Preconditions: • The label which is ought to be reprinted, must be ready printed and dispensed. • Printer is in online mode. If a REPRINT\ is triggered while the printer is in USI-pause mode, the reprint will be proceeded as soon as the printer is switched back in online mode. Precondition: START PRINT\ inactive (high).
7	24V_EXT	Voltage supply	Voltage supply for external sensors
8	GND_EXT	Ground	Ground contact
9	WARNING	Out	• Ribbon low warning: The signal is activated (high), if a) DP INTERFACE > Ribbon signal = *activated* and b) The ribbon stock is below the threshold value, which is set in parameter SYSTEM PARAMETER > Ribbon warning. After changing the ribbon roll, the signal will be inactivated after a short time. • The signal is activated (high), if a) DP INTERFACE > Material signal = *activated* and b) The label material stock is below the threshold, which is set by positioning the light barrier After changing the material roll, the signal will be inactivated. The WARNING output is only then inactivated (low), if ribbon and material both are available in a sufficient amount. If one of both rolls falls below the threshold value, the output switches activ (high). In practice, the more or less eccentric running material roll will trigger the material warning repeatedly, until the roll diameter falls below a certain tolerance zone. This signal is only a warning, what means that the printing goes on.
10	ERROR\	Out	This output is activated (low) during every status which keeps the printer from printing: USI-pause mode, stopped mode, offline mode, hood open, material end, no punch recognized, pressure roller open, ribbon end and other failures which avoid printing. During the initialization of the printer, the output is inactive (high)!
11	PRINT_END\	Out	The manner in which this output is switched depends on the setting of parameter DP INTERFACE > End print mode. Difference to older versions of printer firmware (below 2.46): The output is now also activated as long as labels are fed. Limitation: This functionality is not available in Batch mode!
11	HOME_POS\	Out	Printer operation with LTSI applicator (with PLC version 5.0 and higher): Applicator is in home position (upper limit position)

Tab. 4: (Continued) Signal designations and functions of the USI interface.

Pin	Signal	Signal type	Function
12	MEDIA_OUT\	Out	Low in case of material end. Additionally activated are: • ERROR\ • MACHINE STATUS\
13	RIBBON_OUT\	Out	Low in case of ribbon end. Additionally activated are: • ERROR\ • MACHINE STATUS\
14	DATA_RDY\	Out	This signal is *activated* (low), if the printer has finished image processing and is ready to start printing. The signal is *inactivated*, if • the print job is done, or • the printer is switched to stopped mode, offline mode or USI-pause mode.
15	MACHINE STATUS\	Out	This output is activated (low), if the printing has been interrupted by a disturbance or an error. Examples are: Pressure roll open, hood open, ribbon- or material end error, start print error or another fault that avoids printing. The output is also activated during the initialization of the printer. In comparison to ERROR\, MACHINE STATUS\ is *not* low if the printer has been switched to offline or pause mode. Printer operation with LTSI applicator (with PLC version 5.0 and higher): No function

Tab. 4: (Continued) Signal designations and functions of the USI interface.

Pin assignment internal inputs (CN 300)

The following parameter settings are required to make the internal inputs useable:

PLC

For usage with PLC:

- DP INTERFACE > Interface type = *USI Applicator*
- DP INTERFACE > Internal inputs = *Enabled*

OD sensor

For useage with „OD sensor material“:

- DP INTERFACE > Material signal = *Enabled*
- DP INTERFACE > Internal inputs = *Enabled*

If PLC and „OD sensor material“ are ought to be used, all three parameter settings have to be done.

➠ To all four inputs applies: The input is inactivated if it is connected to ground potential!

Signal description (CN300)

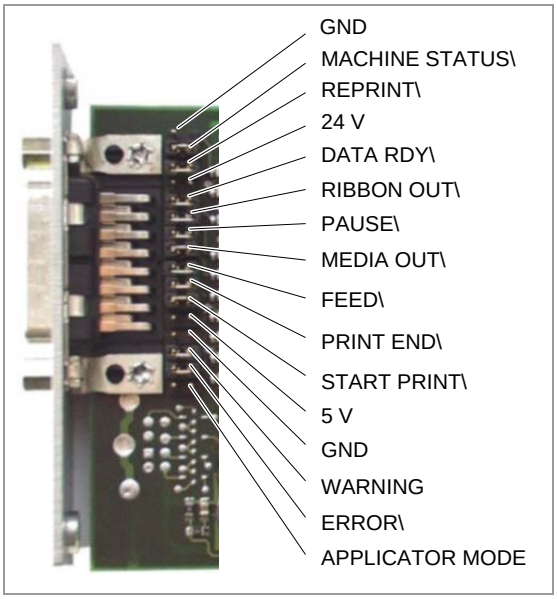
Pin	Signal	Signal type	Function
1	OD control material	In	To be applied to the OD control material option. The signal WARNING at pin 9 of the DB 15 is switched activ, if • Parameter DP INTERFACE > Material Signal = *Activated* and • the input is high
2	Applicator fault home position	In	If one of the inputs is high or makes a low-high-transition, the appropriate status message is displayed at the printer. Additionally, the outputs ERROR\ and MACHINE STATUS\ will be activated (low).
3	Applicator fault touch down	In	
4	PLC ready / fault	In	
5	GND	Ground	GND potential of the internal inputs

[Tab. 5] Signal designations and functions of the internal inputs

Pin assignment jumper block

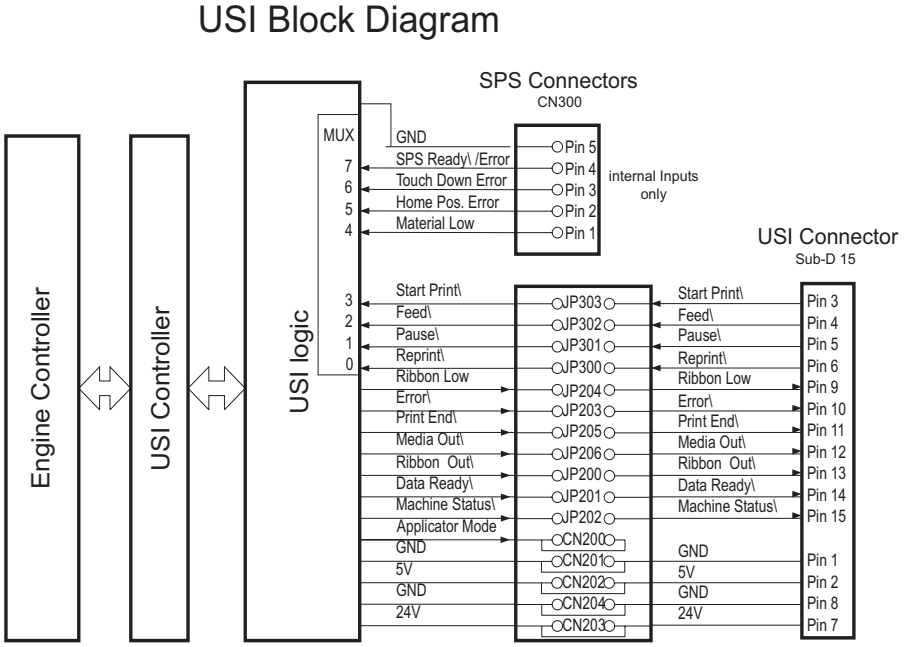
Each signal of the D-Sub connector can be interrupted separately at the jumper block.

➠ The voltage and ground wires are through-connected and cannot be interrupted (see Fig. 4)!



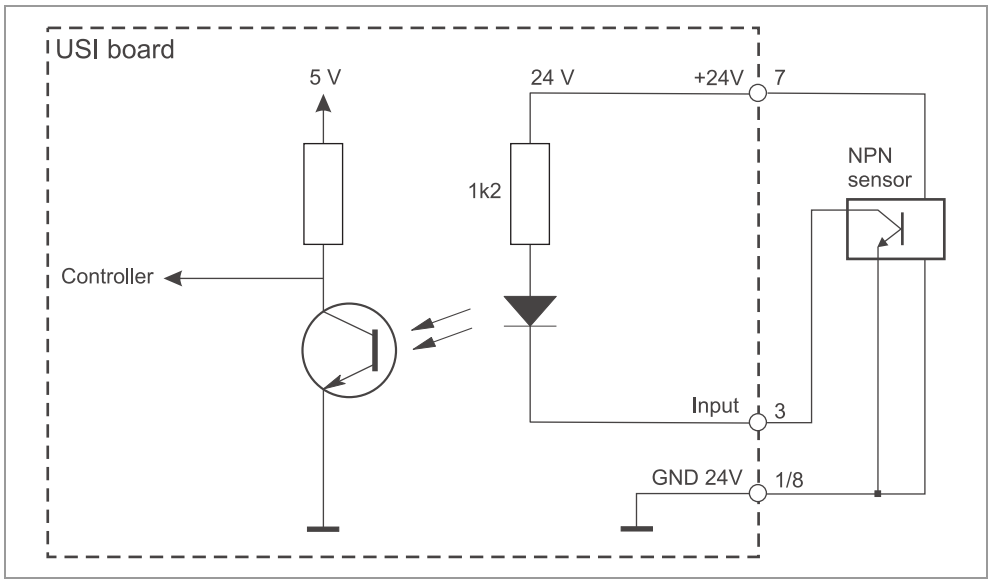
[4] Pin assignment jumper block

Block diagram



[5] Block diagram of the USI

Circuit diagrams for signal inputs

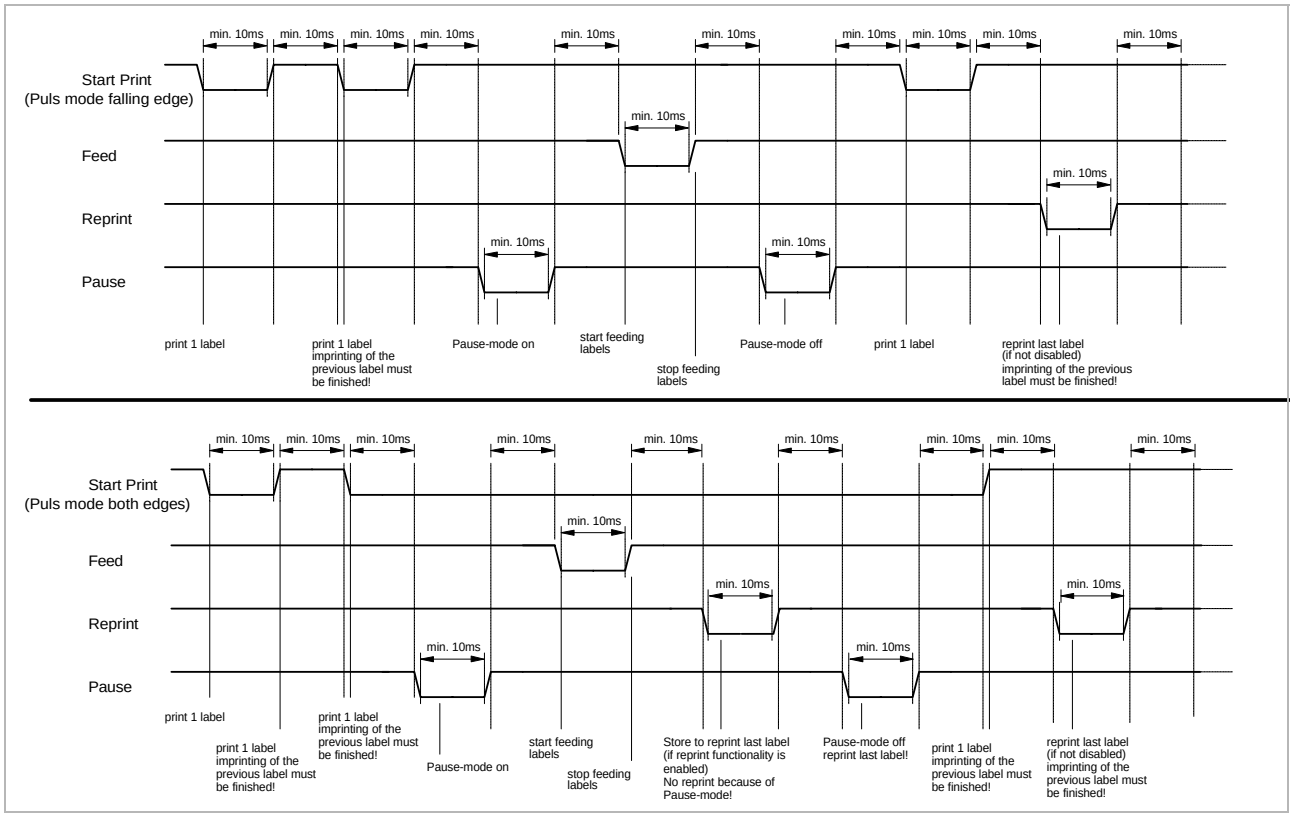


[6] Main circuit for signal inputs (NPN) at the USI interface (here: connecting a start sensor).

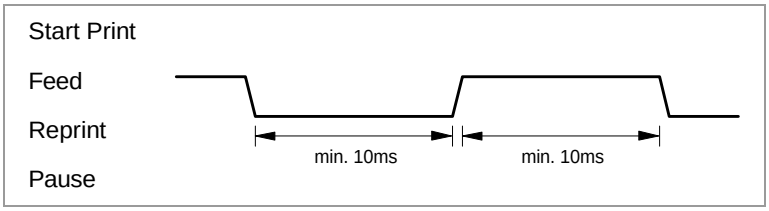
Timing waveform of input signals

The following criteria must be matched by the input signals of the USI:

- Only one signal at a time may be switched active!
- The input signals must switch bounce-free!

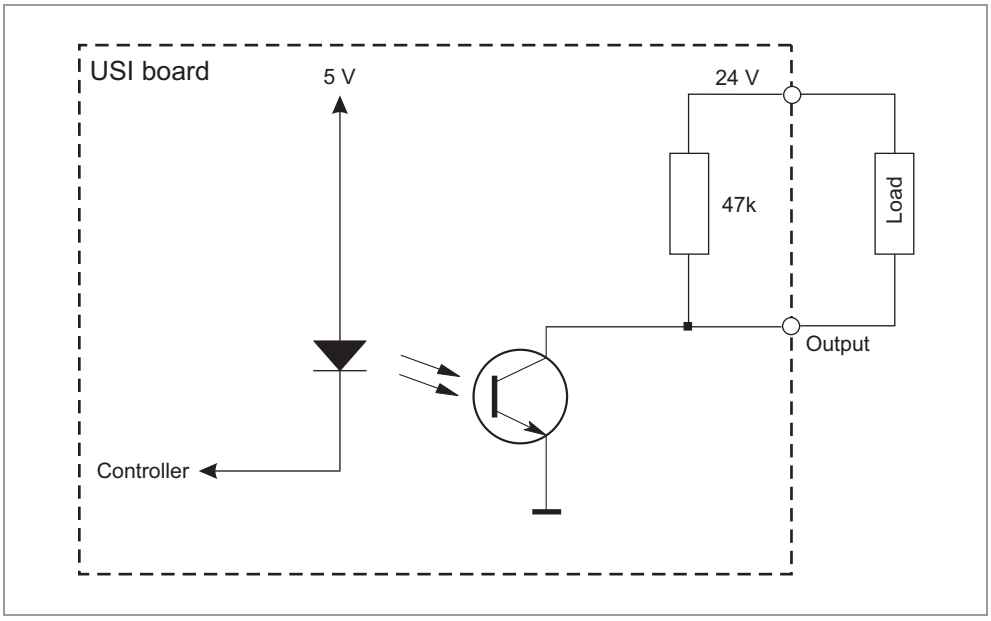


[7] Examples of timing waveform for the USI inputs.



[8] Signal timing - to be met.

Circuit diagrams for signal outputs

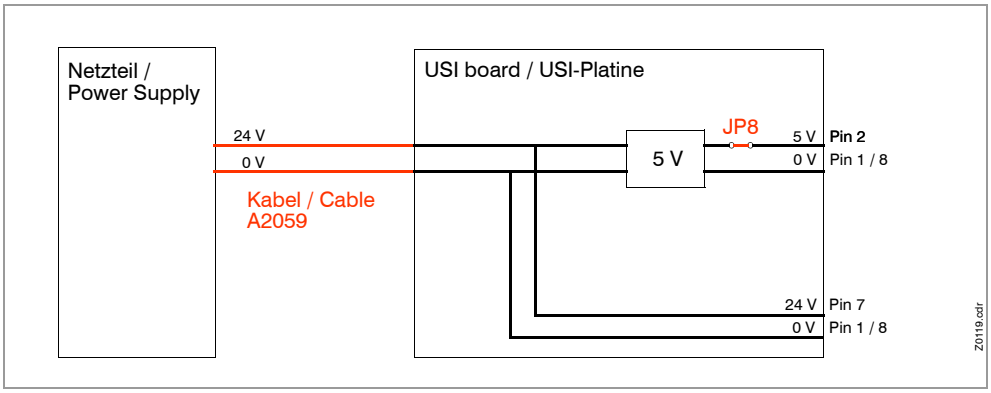


[9] Main circuit (NPN) for signal outputs at the USI interface.

Max output current

In the state of delivery (jumper 8 closed, cable A2059 connected), the supply voltages (5 V on pin 2 and 24 V on pin 8) are provided by the USI. The output current is limited:

➠ Maximum current per output line: 50 mA; all output currents together may not exceed 700 mA.



[10] USI in the state of delivery: The voltage cable is connected, JP 8 is closed.

External supply

CAUTION

In previous versions of this document, the external voltage supply of the USI was described.

External voltage supply without external current limiting elements is no longer permitted (risk of fire) [a].

In case of applications that externally supply voltages, a current limiting element *must* be provided by the system integrator.

Examples of suitable current limiting elements in the supply circuit are:

- Poly fuse with UL 1434 approval
  24 VDC: I_{hold} = 0.65 mA; U_{min} = 30 V
  5 VDC: I_{hold} = 0.65 mA; U_{min} = 6 V
- Micro fuse according to IEC EN 60127
  24 VDC: T 630 mA L 250 V
  5 VDC: T 630 mA L 250 V

a) Due to an update of EN 60950-1.

Firmware update

The firmware of the USI can be updated in the following ways:

- Exchanging the appropriate controller on the USI board (see Fig. 11).
- Loading a firmware file (same procedure as for updating the printer firmware). This procedure requires the following:
  – Controller version: V6-T36 or higher
  – Printer firmware: version 4.30 or higher

Article number of the controller with the most recent firmware: A3379.

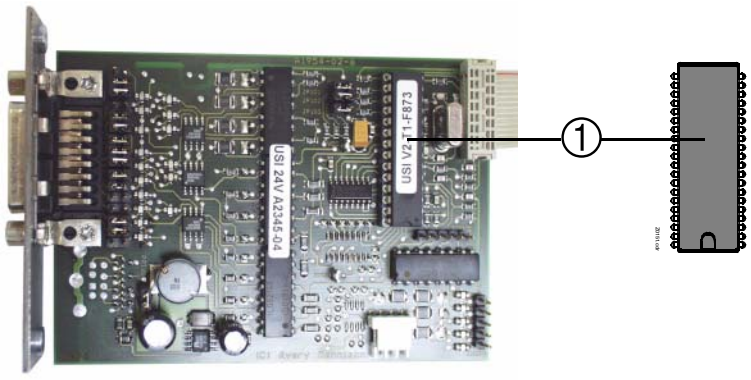
Version check

Displaying the installed controller version:

- Parameter menu: SERVICE DATA > MODULE FW VERS. > USI interface
- Status printout PRINT INFO > Service status, entry „Peripheral driver/USI interface“

Displaying the installed printer firmware:

- Parameter menu: SERVICE DATA > MODULE FW VERS. > System version
- Status printout PRINT INFO > Printer status



[11] The controller (1) contains the USI firmware.

Exchanging the controller

1. Switch the printer off, pull out the mains connector.
2. Open the rear hood.

❍ For details, refer to topic section „General Service“, section „Housing“, chapter „Rear hood“.

3. Take the controller (1) out of the socket.
4. Insert the new controller into the socket.

➠ The dent in the controller housing must show in the pictured direction (see Fig. 11)!

USI testbox

Application

- Simulating USI inputs
- Checking USI outputs
- Monitoring of drive signals sent by the system control
- Aid for setting up the machine.

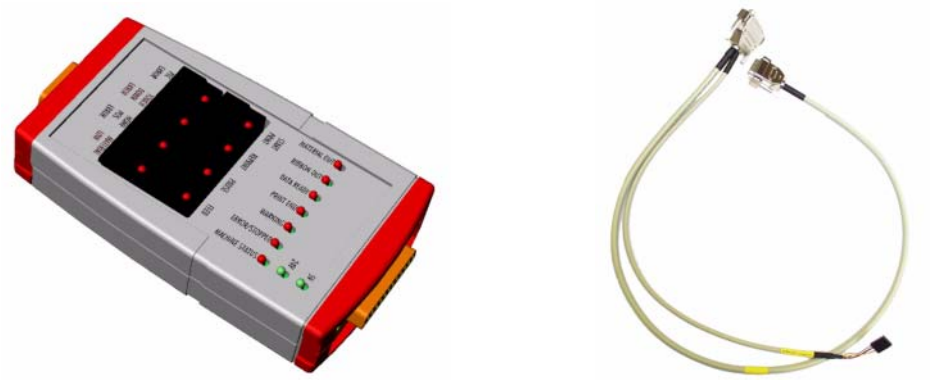


Fig. 12: Left side: USI testbox (A2739); right side: connecting cable (A2842). Both parts are required for application.

View

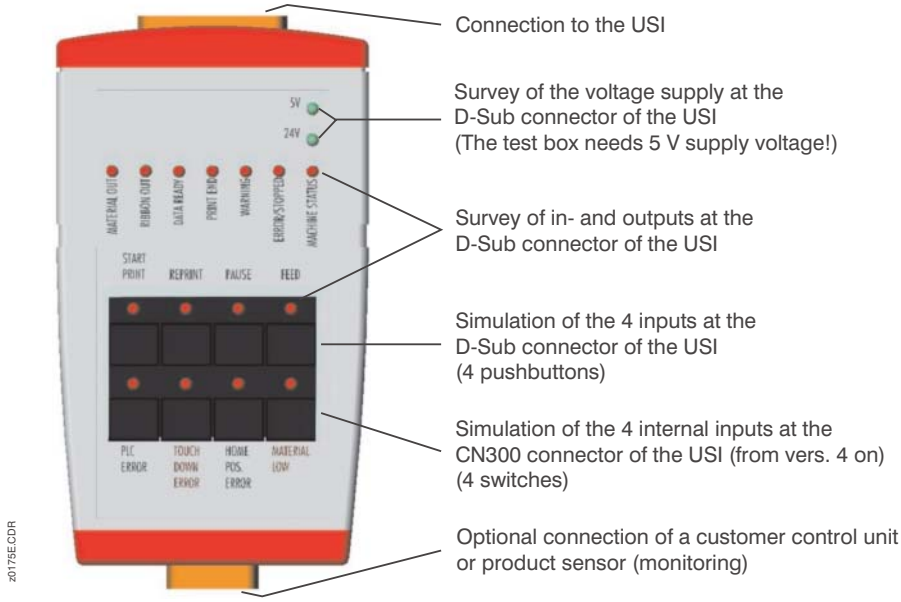


Fig. 13: Operating parts and connections of the USI testbox.

Connecting the test box

- Connect the connecting cable D-Sub25 connector to the appropriate socket at the testbox.
- Connect the connecting cable D-Sub15 connector to the appropriate socket at the USI.
- Given version 4 of the USI, the 5-pin connector of the connection cable can be connected to the *internal inputs* of the USI:
- Plug the connector strip onto CN300.

➠ Connect the black cord of the connector strip to pin 1!
(see Fig. 14 and Fig. 15)

Fig. 14: The connector strip for connecting the testbox to the internal inputs of the USI. The mounting orientation is printed on the cable: „black on CN300 pin 1“.

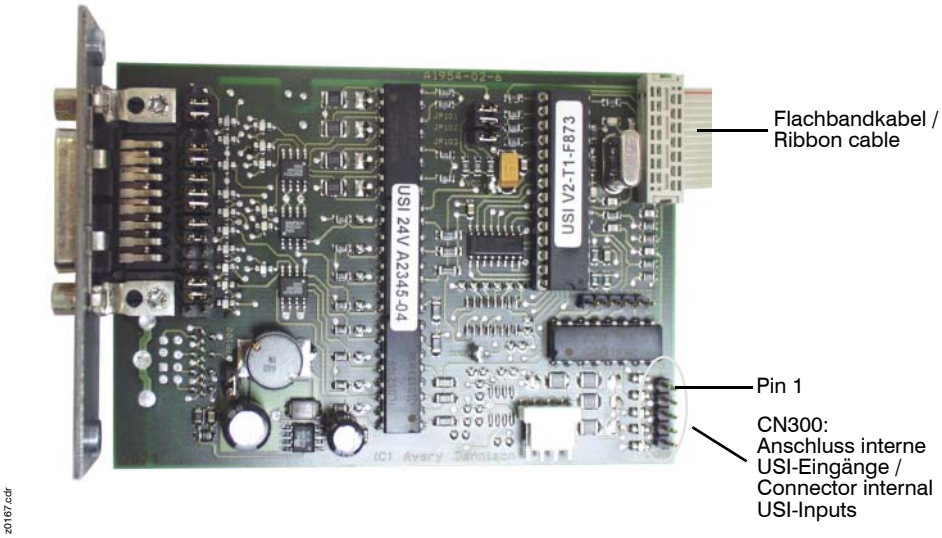


Fig. 15: Pin 1 is the first pin in direction of the ribbon cable; the writing CN300 Pin 1 can be found beside the pins on the USI board.

- The D-Sub15 socket at the testbox has the same pin assignment as the D-Sub socket of the USI. Plug the system control into this socket and connect the testbox to the USI as described above, in order to monitor the 4 USI inputs.

Operation

LEDs

- After powering on the printer, the LEDs on the testbox show the current levels of the USI outputs, with the following meaning:
  – LED *off*: USI output = *High*
  – LED *on*: USI output = *Low*
- The supply voltage LEDs indicate:
  – LED *off*: Voltage not applied
  – LED *on*: Voltage applied
- Each pressing of a key or switch pulls the respective input level down to *Low*, with the LED on the key or switch lighting up.
- The LEDs on the keys also light up, if the level of the corresponging input at the D-Sub15 socket is pulled to *Low* (monitoring). This can e.g. be done by a connected system control or light barrier.

  Even with a system control connected can the USI inputs be activated by pressing the appropriate key (set-up operation).
- With the testbox being connected to the USI merely by the D-Sub15 connector, the following functions are available:
  – Displaying the USI output levels
  – Simulation and monitoring of the 4 USI inputs START_PRINT\, REPRINT\, PAUSE\ und FEED\.
  – Survey of the voltage supply with 5 V and 24 V.

Internal inputs

- Additionally, the internal USI-inputs can be simulated, if the 5-pin connector strip is plugged into CN300 on the USI board (see Fig. 15).

Internal USI-input	Switch
PLC ready / fault	PLC ERROR
Applicator fault touch down	TOUCH DOWN ERROR
Applicator fault home position	HOME POS. ERROR
OD control material	MATERIAL LOW

[Tab. 6] The switch designations (right column), which are printed on the testbox, differ slightly from the signal designations (left column).

➠ Befor starting the simulation, the following parameter settings are required:

Menu	Parameter	Setting
DP INTERFACE	Interface type	USI applicator
	Material signal	Enabled
	Internal inputs	Enabled

[Tab. 7] Parameter settings which should be done before starting the simulation.

➠ The internal inputs are high-active, what means that the switches PLC ERROR, TOUCH DOWN ERROR or HOME POS. ERROR respectively have to be pressed before starting the simulation!
Releasing one of those switches (LED off) stops the machine; additionally, the appropriate status message is displayed. The machine can only be further operated, if the testbox switch is pressed again (error withdrawn, LED on) and the status message is acknowledged at the printer operating panel.

Internal input „OD control material“ (switch MATERIAL LOW):
Releasing this switch (LED off) switches the WARNING-output of the USI *high*. Thus, the WARNING-LED on the testbox goes out. The machine is not being stopped.

➠ The WARNING-output also shows the close end of ribbon stock; what means that this ouput can change its level without the MATERIAL LOW switch being pressed.

Diagram of a USI input

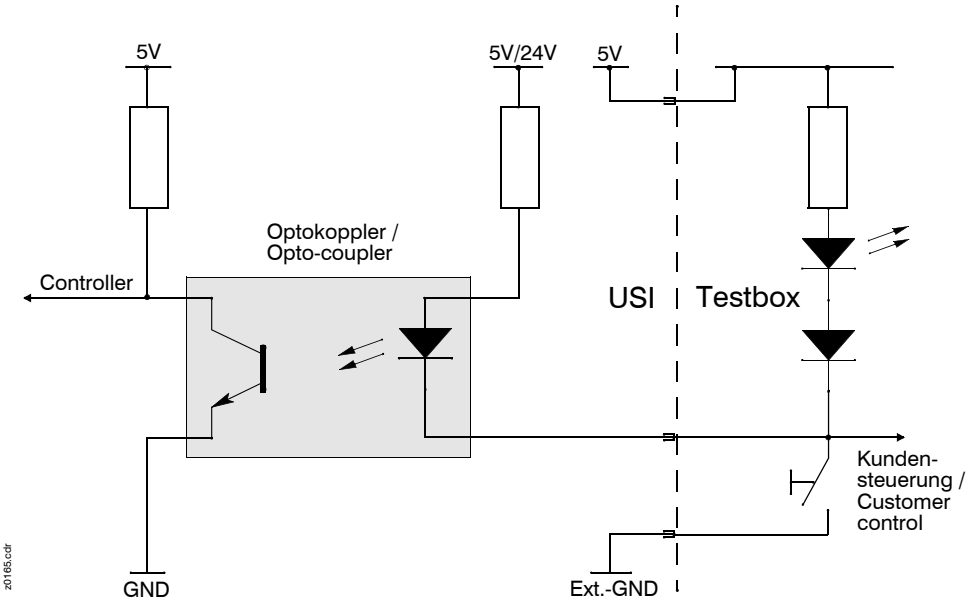
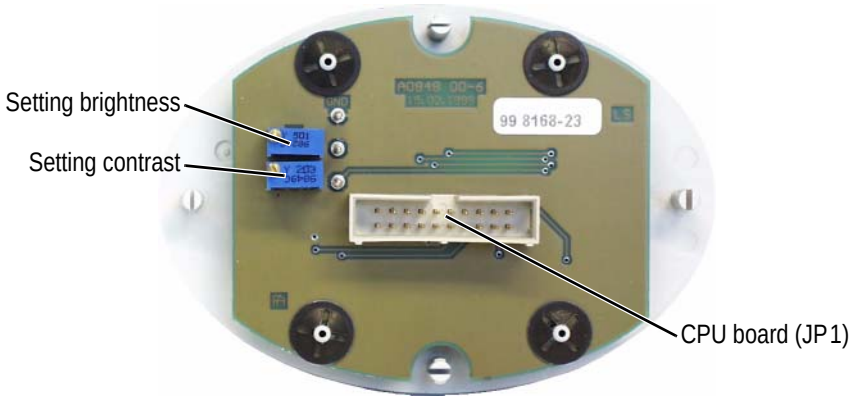


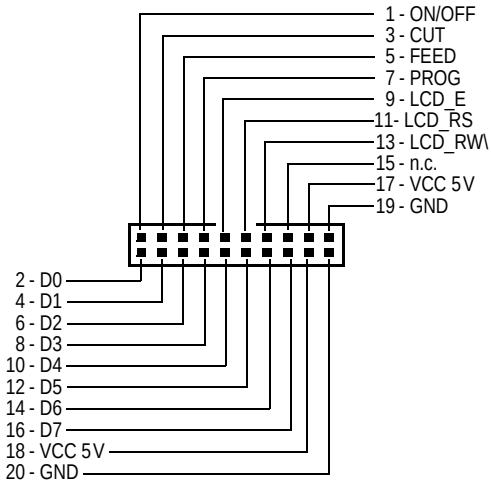
Fig. 16: Simplyfied diagram of a USI input.

Display 64-xx

Layout



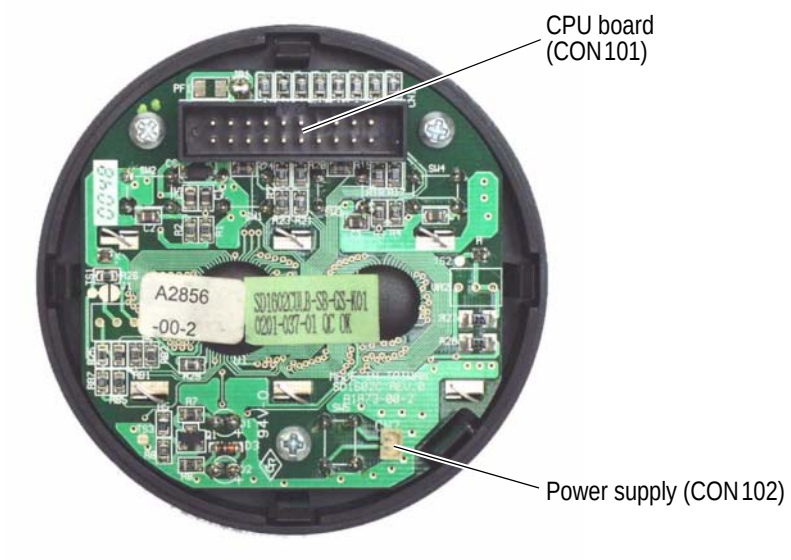
Connector

Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
JP1	3M 2520-6002		

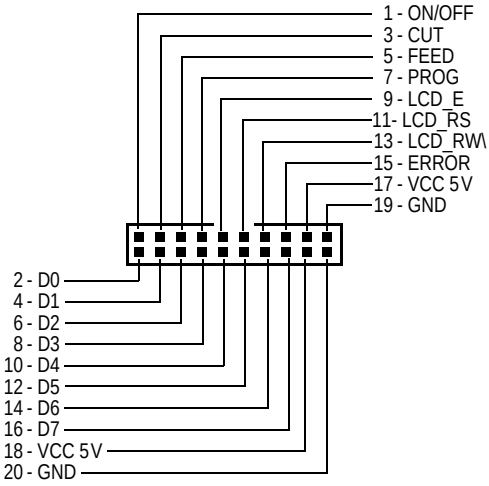
[Tab. 8] Connectors on the 64-xx display board.

Display DPM/ALX

Layout



Connector

Comp. Diagr.	Type on board	Type at cable	Pin assignment on board
CON101	3M 2520-6002UB		

[Tab. 9] Connectors on the DPM/PEM/ALX display board.

Power Supplies

WARNING!

The outputs of the power supplies are energy hazard. Touching the output connectors with the machine switched on can cause exposure to hazardous electrical currents and may lead to burns.

➜ Switch off the machine before touching the power supply.

Application Notes

The following two types of power supplies are applied:

Printer	Power supply
64-04/05/06	Up to 01/2008: NT400 Since 01/2008 ME500
64-08, DPM, ALX 92x	HME

[Tab. 10] Application of the two power supply types.

For article numbers refer to the Spare Part Catalog 🗋.

Retrofitting the ME500

CAUTION

If the power supply NT400 is replaced by a ME500, the printer firmware must possibly be updated.

- The printer will not print with a not matching firmware.
- A faulty updated patch causes I^2C bus errors and disturbs the printing operation.

➜ Check carefully, if a firmware update is required.
➜ Update the firmware, if this is required, immediately after assembling the ME500 into the printer.

64-04/05/06 printers with Gen. 2 electronics may be retrofitted with a ME500 power supply, if the printer is updated to the appropriate firmware version.

- Recommended: update to firmware version 4.32
- If an update to firmware v. 4.32 is not possible, different patches for older firmware versions are available:

Printer firmware	Patch
4.00	h8R_4.00.s3b
4.10 / 4.11 / 4.12	h8R_4.11_4.12.s3b
4.21 / 4.22 / 4.30 / 4.31	h8R_4.22_4.31.s3b

[Tab. 11] Patches for older firmware versions.

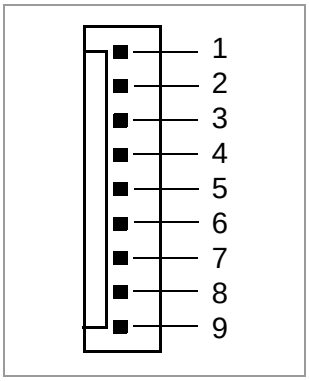
NT400 (A1680)

➠ The NT400 is discontinued since 01/2008. It is replaced by the ME500 (see next chapter).

> WARNING!
> Fire hazard by overheating.
> ➜This power supply *must not* be applied with a dust filter.

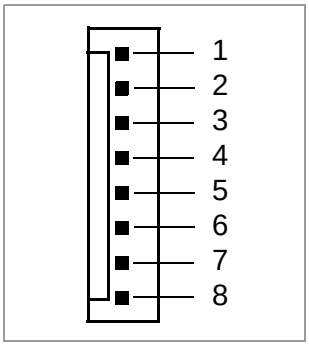
A CPU board connection (control signals)

Pin	Function
1	NMI
2	ICS
3	ISK
4	I/O
5	TK
6	KA
7	KD
8	KS
9	GND



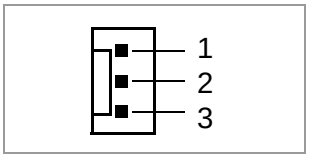
B Printhead connection

Pin	Function
1	20-28 V
2	20-28 V
3	20-28 V
4	20-28 V
5	GND
6	GND
7	GND
8	GND



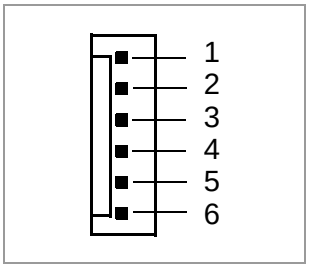
C CPU board connection (supply voltage) / Logic

Pin	Function
1	GND
2	+5 V
3	GND



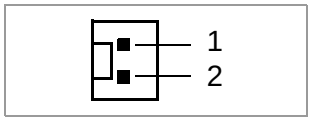
D Output stage boards connection

Pin	Function
1	5 V
2	0 V
3	38 V
4	0 V
5	52 V
6	0 V



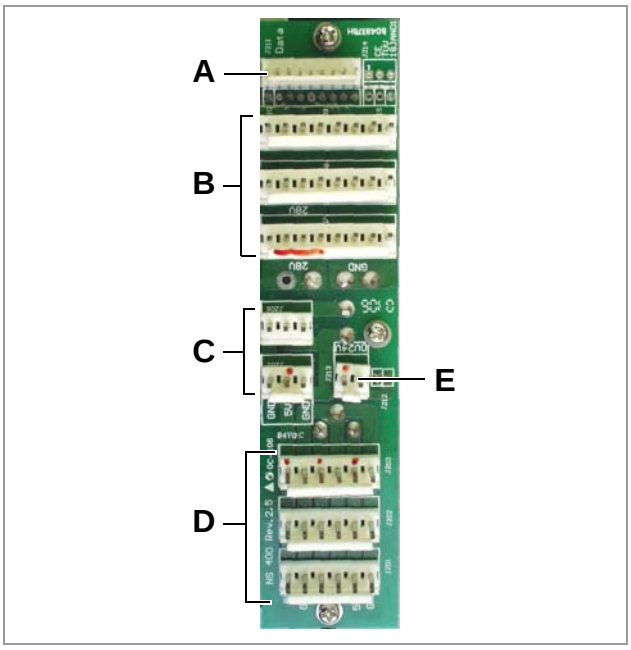
E USI board (optional)

Pin	Function
1	+24 V [a]
2	GND



a) galvanically separated

[1] Power supply NT400.



[2] Connections at the NT400.

ME500

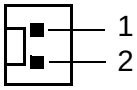
- The ME500 replaces the NT400 since 01/2008.
- Operation with dust filter is admissible. Part number of the dust filter kit see spare parts catalog. Mounting instructions for the dust filter kit: see topic section Service Mechanics, chapter „Assembling accessories“.

➠ Wait at least 15 s between switching off and on again.

A Remote on/off

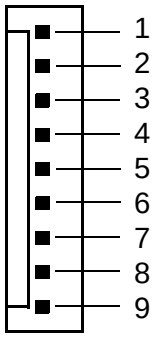
➠ 64-xx: bridge the connector using a jumper.

Pin	Function
1	On/off
2	GND



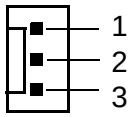
B CPU board connection (control signals)

Pin	Function
1	NMI
2	I2C detect
3	SCL
4	SDA
5	PG
6	n. a.
7	n. a.
8	n. a.
9	GND



C CPU board connection (supply voltage) / Logic

Pin	Function
1	GND
2	+5 V
3	GND

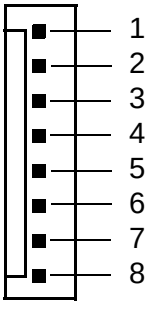


D Ground connection

➠ The cable end must be screwed to the printer housing.

E Printhead connection

Pin	Function
1	20-28 V
2	20-28 V
3	20-28 V
4	20-28 V
5	GND
6	GND
7	GND
8	GND

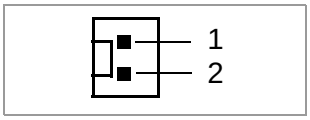


F Operation indicator

G USI board (optional)

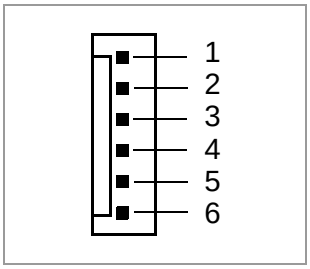
Pin	Function
1	+24 V [a]
2	GND

a) galvanically separated

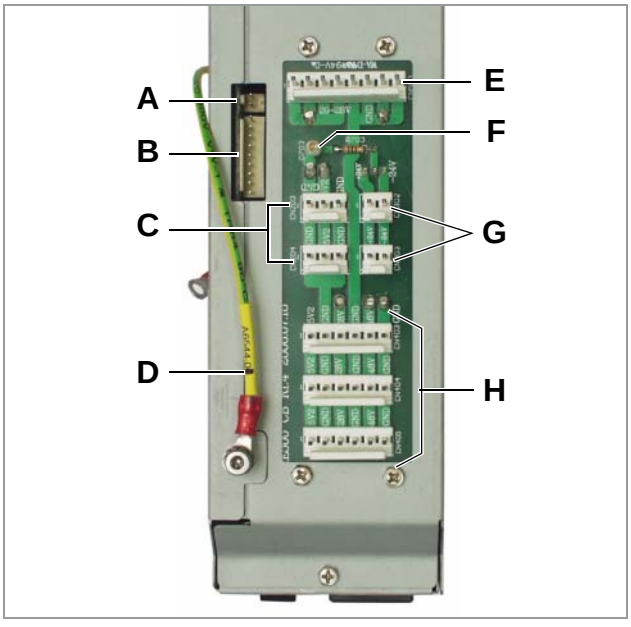


H Output stage boards connection

Pin	Function
1	5.2 V
2	GND
3	28 V
4	GND
5	48 V
6	GND



[3] Power supply ME500.



[4] Connections at the ME500.

HME

- Operation with dust filter is admissible.
- Part number of the dust filter kit see spare parts catalog.
- Mounting instructions for the dust filter kit: see topic section Service Mechanics, chapter „Assembling accessories“.

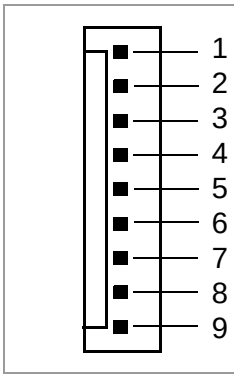
A Applicator Interface connection

B Ground connection

➠ The cable end must be screwed to the printer housing.

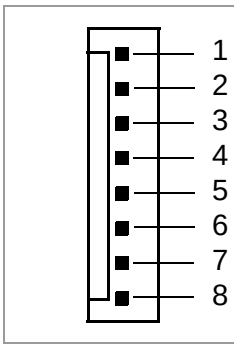
C CPU board connection (control signals)

Pin	Function
1	NMI
2	I2C detect
3	SCL
4	SDA
5	PG
6	n. a.
7	n. a.
8	n. a.
9	GND



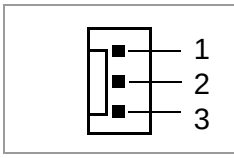
D Printhead connection

Pin	Function
1	20-28 V
2	20-28 V
3	20-28 V
4	20-28 V
5	GND
6	GND
7	GND
8	GND



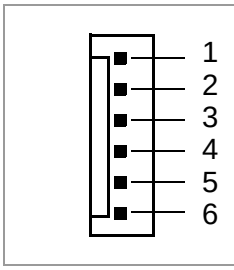
E CPU board connection (supply voltage) / Logic

Pin	Function
1	GND
2	+5 V
3	GND



F Output stage boards connection

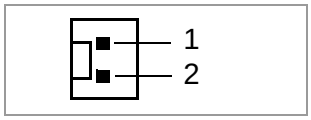
Pin	Function
1	+5 V
2	GND
3	n. a.
4	GND
5	+48 V
6	GND



G Remote on/off

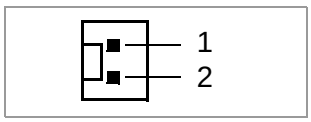
➠ 64-xx: bridge the connector using a jumper.

Pin	Function
1	On/off
2	GND

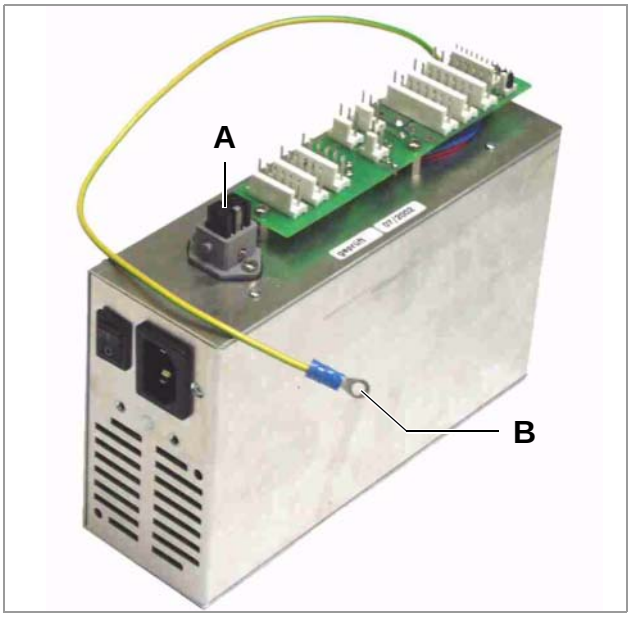


H CPU board connection (supply voltage, only ALX 92x/DPM) / USI board (optional)

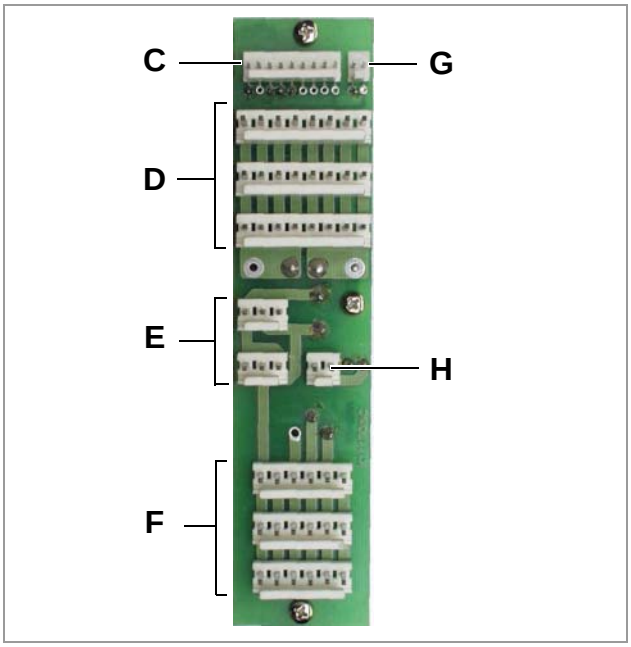
Pin	Function
1	+24 V [a]
2	GND



a) galvanically separated



[5] Power supply HME.



[6] Connections at the HME.

Printhead Voltages HME & Standard

Printhead resistance / Ohm	Printh. Voltage / V	Printhead resistance / Ohm	Printh. Voltage / V	Printhead resistance / Ohm	Printh. Voltage / V	Printhead resistance / Ohm	Printh. Voltage / V
1000	21,40	1190	23,30	1380	25,05	1570	26,68
1010	21,50	1200	23,39	1390	25,14	1580	26,77
1020	21,61	1210	23,49	1400	25,23	1590	26,85
1030	21,71	1220	23,58	1410	25,31	1600	26,93
1040	21,81	1230	23,68	1420	25,40	1610	27,01
1050	21,92	1240	23,77	1430	25,49	1620	27,10
1060	22,02	1250	23,87	1440	25,58	1630	27,18
1070	22,12	1260	23,96	1450	25,66	1640	27,26
1080	22,22	1270	24,05	1460	25,75	1650	27,34
1090	22,32	1280	24,14	1470	25,84	1660	27,42
1100	22,42	1290	24,24	1480	25,92	1670	27,50
1110	22,52	1300	24,33	1490	26,01	1680	27,58
1120	22,62	1310	24,42	1500	26,09	1690	27,66
1130	22,72	1320	24,51	1510	26,18	1700	27,74
1140	22,81	1330	24,60	1520	26,26	1710	27,82
1150	22,91	1340	24,69	1530	26,35	1720	27,90
1160	23,01	1350	24,78	1540	26,43	1730	27,98
1170	23,11	1360	24,87	1550	26,52		
1180	23,20	1370	24,96	1560	26,60		

[Tab. 1] The table shows the voltages which the power supply should provide, if it is connected to a printhead with the respective resistance. The values are valid for both, Standard and HME power supply.

Checking the headvoltage

Proceed as follows to check the printhead voltage:

1. Find out the printhead resistance.
   The printhead resistance can be found written on the printhead or by calling the parameter SYSTEM PARAMETERS > Head resistance (Given, that the resistance value is typed in correctly).
2. Measure the printhead voltage at the power supply with a voltmeter and compare the result with the value in the table.

➠ Maximum admissible deviation: +/- 0.2V!

Characteristics HME power supply

Inputs

Characteristic	Value
Range of input voltage	100-240VAC
Admissible range of deviation	88-264VAC
Frequency range	50-60Hz
Admissible range of frequency	47-63Hz

[Tab. 2] Characteristics of the input voltages.

Outputs

Characteristic	Outputs			
	1	2	3	4
Output voltages (U_{nom})	5V	24V	24V	48V
Setting range		20-28V		
Output currents (I_{nom})	2.7A	6.3A	1.5A	5.2A
Max. output currents (I_{peak})		10A		7.3A (t<=10s)
Pulsed output current (I_{puls})		40A (50% ED; t<=0.5ms)		
Tolerance	±2.5%	±5%	±10%	+5% / -10%

[Tab. 3] Characteristics of the output voltages.

➠ The total power of the outputs 2 and 4 may not exceed 250W!
➠ Output 2: May only be activated by an I^2C-bus-command!

AC output

Characteristic	AC output
Output voltage	max. 250V(AC)
Output current at 230VAC	max. 4A(AC)
Output current at 110VAC	max. 1A(AC)

[Tab. 4] Characteristics of the AC output.

The AC output of the HME power supply is internally protected together with the power supply input by one single fuse (6.3A). The input current of the HME power supply depends on the application as well as on the mains voltage. Therefore, there can be drawn a maximum current of 4A(AC) at 230V and 1A(AC) at 110V from the power supply.

Settings

Sensor setting

➠ The button designations mentioned in this description count only for 64-xx printers. With DPM, PEM or ALX 92x, please press the *Apply* button instead of the *Cut* button!

LS

LS means light sensor.

Proceed as follows to set the sensors:

1. Switch on the printer while you keep the Feed and Prog buttons pressed for approx. 5s. After the printer has started, „Enter code“ is displayed.
2. Press the following buttons one after the other:
   Cut, Online, Feed, Cut, Online, Online, Online.
3. Call the parameter SERVICE FUNCTION > Sesor adjust.

Material-end-LS

This text is displayed:

```
Sensor adjust
220   Matend   255
```

The number on the *left side* is the setting value of the LED current (standard: 220).
The number on the *right side* is the value measured by the sensor (here: 255).
The higher the setting value, the lower is the measured value.

4. Remove the label material from the material-end-LS. The measured value should now change to 0. If not, increase the setting value to 220.
5. Decrease the setting value by pressing the Cut button, until the measured value changes to 255.
6. *64-xx*: Increase the setting value by 30.
   DPM/PEM/ALX 92x: Increase the setting value by 5.
   The measured value changes to 0.
7. Insert some label material. The measured value should now be 255.

➠ The punch may not be recognized as material end! If this is the case, adjust the setting once more!

8. Press the online button to save the setting value.

Punch LS

Now, the settings of the punch sensor are displayed:

```
Sensor adjust
70   Punch   12
```

The number on the *left side* is the setting value of the LED current (default: 70).
The number on the *right side* is the value measured by the sensor (here: 12).

9. Insert some backing paper of standard label material (with the labels peeled off), to check the sensor measurement.
   Inserting material means here inserting a material sample into the LS fork.

➠ The material sample must be big enough to cover the LS!

10. Set the setting value to 75 ±5 by pressing the Cut or Feed button respectively. The measured value should match the range of 11..25.

11. Insert standard self-adhesive material (paper label on backing paper) into the printer.
    The value measured now should count at least 100 digits *higher* than the value measured with bare backing paper.

    If the measured value doesn´t match this range, please modify it by pressing the Cut respectively Feed button.

12. Press the online button to save the setting value.
    By doing so, the punch sensor is ready set.

Reflex LS

Now, the settings of the reflex sensor are displayed:

```
Sensor adjust
128   Reflex   176
```

The number on the *left side* is the setting value of the LED current (default: 128).
The number on the *right side* is the value measured by the sensor (here: 176).

➠ The reflex LS is an *option*. If your printer is not equipped with a reflex LS, skip this section by pressing the online button!

13. Push the reflex mark on the label material over the reflex LS.
14. Set the setting value to 95 ±5. The measured value should now match a range of 230..255.
15. Position the label material with an area without reflex mark over the reflex LS. The measured value should now...
    – match the range of 12..48 and
    – lie at least 100 digits below the value measured with reflex mark.

    If the measured value doesn´t match this range, please modify the setting value by pressing the Cut respectively Feed button.

16. Press the online button to save this value.
    By doing so, the reflex sensor is ready set.

Fullsize LS

Now, the settings of the Fullsize sensor are displayed:

```
Sensor adjust
128   Fullsz   154
```

The number on the *left side* is the setting value of the LED current (default: 128).
The number on the *right side* is the value measured by the sensor (here: 154).

➠ The Fullsize LS is an *option*. If your printer is not equipped with a reflex LS, skip this section by pressing the online button!

17. Insert some backing paper of standard label material (with the labels peeled off), to check the sensor measurement.
    Inserting material means here inserting a material sample into the LS fork.

➠ The material sample must be big enough to cover the LS!

18. Set the setting value to 155 ±5 by pressing the Cut or Feed button respectively. The measured value should match the range of 12..18.
19. Insert standard self-adhesive material (paper label on backing paper) into the printer.
    The value measured now should count at least 100 digits *higher* than the value measured with bare backing paper.

    If the measured value doesn´t match this range, please modify it by pressing the Cut respectively Feed button.

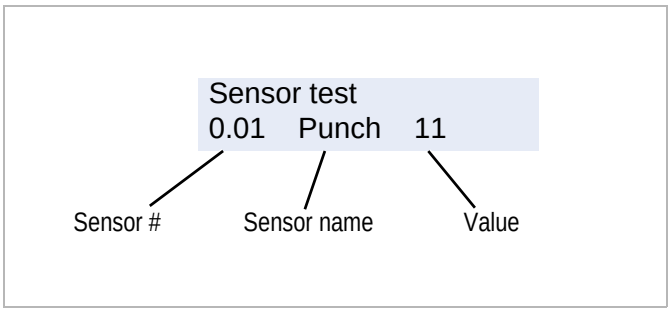
20. Press the online button to save the setting value.
    By doing so, the Fullsize LS is ready set.

Sensor test

General notes

➜Activating the sensor test: call parameter SERVICE FUNCTION > Sensor test.
By means of the sensor test, you can check the function of each sensor:

- If the value shown on the printer display exceeds the range given in the chart below, the respective sensor is possibly dirty and has to be cleaned (blow the dirt off with compressed air).
- Check the function of light barriers by covering it, and of micro switches by triggering it. If the displayed value doesn´t change when the sensor is covered or switched, it is possibly or defective.
- Sensors which are not connected show values about 255 in the sensor test.
- General rule for all sensor values:
  – Full light leads to values <= 10
  – No light leads to values >= 220
- To sensors which function as a switch applies the following: Values between 10 and 220 mean that the sensor is poorly set, dirty or close to the end of its life.



[1] Display after calling „Sensor test“.

➠Extraneous light must be avoided when checking the sensors. Therefore, keep the front cover and the housing cover closed during the sensor test.
After starting the sensor test, the following is displayed:

Sensor test 0.01 Option 255	0.01 = Sensor ID, Option = Sensor designation, 255 = Sensor setting

➜ Press the Feed or Cut button („Apply“ button with ALX/DPM/PEM) to select the individual sensors (if present).

❍ For details refer to paragraph Sensor setting on page 35.

➠If the following message shows up, a communication error occured between the CPU board and the motor driver board belonging to the sensor:

Sensor test
No sensor found

Sensors on the CPU board (64-xx)

Sensor #	Sensor name	Description	Typical Value	Condition
0.01	Option	*64-xx dispenser only*: Dispense light barrier	255	Light barrier covered by a dispensed label
			0	Light barrier clear
0.02	Option	*64-xx dispenser only*: microswitch at the internal rewinder	255	Internal rewinder not full
			0	Internal rewinder full
0.03	Press	*64-xx dispenser only*: microswitch at the pressure roller	255	Pressure roller closed
			0	Pressure roller open
0.04	Matend	Material end light barrier	0	Without material (light barrier clear)
			255	With material inserted
0.05	Punch	Punch sensor	7 to 10	Without material (typical: 7)
			11 to 255	With material
0.06	Reflex	*Optional*: reflex sensor [a]	> 200	Without material (approx. 253) or opposite of the reflex mark > 200)
			10 bis 20	With white material
0.07	FullSz	*Optional*: Full size light barrier	10	Without material
			11 to 255	With material
0.09	Cover	Hood switch	0	Hood closed
			255	Hood opened
0.12	H-Temp	Printhead temp. sensor	105 to 235	Displayed value drops when the printhead temp. rises (see Tab. 7)

[Tab. 5] Test conditions for sensors connected to the CPU board.

a)Precondition: parameter „SYSTEM PARAMETER > Sens. punch LS“ = 30%

Sensors on the CPU board (DPM/ALX)

Sensor #	Sensor name	Description	Typical Value	Condition
0.03	Press	Microswitch at the pressure roller on the feed roller (*not* available at PEM)	255	Pressure roller closed
			0	Pressure roller open
0.04	Matend	Material end light barrier	0	without material (light barrier clear)
			255	with material inserted
0.05	Punch	Punch sensor	7 to 10	without material (typical: 7)
			11 to 255	with material
0.09	Cover	Hood switch	0	Hood closed
			255	Hood opened
0.12	H-Temp	Printhead temp. sensor	105 to 235	Displayed value drops when the printhead temp. rises (see Tab. 7)

[Tab. 6] Test conditions for sensors connected to the CPU board.

Value table for sensor 0.12 (printhead temp.)

Sensor value	235	230	225	220	215	210	205	200	195	190	185
Printhead temp.	12,9	17,8	22,1	26,0	29,5	32,7	35,8	38,7	41,4	44,0	46,6

[Tab. 7] Sensor values of the print head temperature sensor (no. 0.12). The lower the displayed value is, the higher is the print head temperature.

Sensor value	180	175	170	165	160	155	150	145	140	135	130
Printhead temp.	49,1	51,5	53,9	56,3	58,6	60,9	63,2	65,5	67,8	70,2	72,5

[Tab. 8] Tab. 7 continued

Sensor value	120	110	105
Printhead temp.	77,3	82,3	84,9

[Tab. 9] Tab. 8 continued

Sensors on the output stage boards (64-xx)

Sensor #	Sensor name	Description	Typical Value	Condition
2.01	Foil	Foil sensor	0	Sensor above a hole in the oscillator disc (light barrier clear)
			254	Sensor covered
3.01	Head	Light barrier at the printhead raising mechanism	0	Printhead in economy position (raised)
			254	Printhead in print position (lowered)
4.01	Option	Sensor for options (application for cutter, external rewinder or release motor sensor at the *64-xx dispenser*)	>10	Light barrier covered
			<10	Light barrier clear

[Tab. 10] Testbedingungen für Sensoren, die an eine der Endstufen-Platinen angeschlossen werden.

Sensors on the output stage boards (ALX/DPM)

Sensor ID	Sensor-Name	Beschreibung	Typische Werte	Bedingung
2.01	Folie	Foil sensor	0	Sensor above a hole in the oscillator disc (light barrier clear)
			254	Sensor covered
3.01	Kopf	Light barrier at the printhead raising mechanism	0	Printhead in economy position (raised)
			254	Printhead in print position (lowered)

[Tab. 11] Testbedingungen für Sensoren, die an eine der Endstufen-Platinen angeschlossen werden.

Options

Installing a Memory Extension

Requirements

- 64-xx, DPM, PEM or ALX 92x with CPU board no. A2292 or A2293 installed
- Upgrade kit for 32 MB memory extension no. A4413 or
- Upgrade kit for 64 MB memory extension no. A4414

The upgrade kit contains a bag with the memory module (fig. 1) and an installation guide.

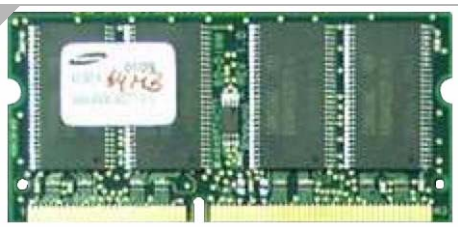
Installation

Proceed as follows to install the memory module:

1. Remove the CPU board from the printer.
   ❍ How to? - Read topic section „Service Mechanics“, chapter „Replacing the boards“, „CPU board“.
2. Take the memory module out of the bag. The slot for the memory module is located in the upper third of the CPU board (fig. 2, white circle).
3. Plug the memory module into the slot (U201) as illustrated (fig. 3).
   ➠ The memory module is coded by a dent (fig. 3). Make sure, that the memory module fits into the slot as illustrated!

Continued overleaf

1



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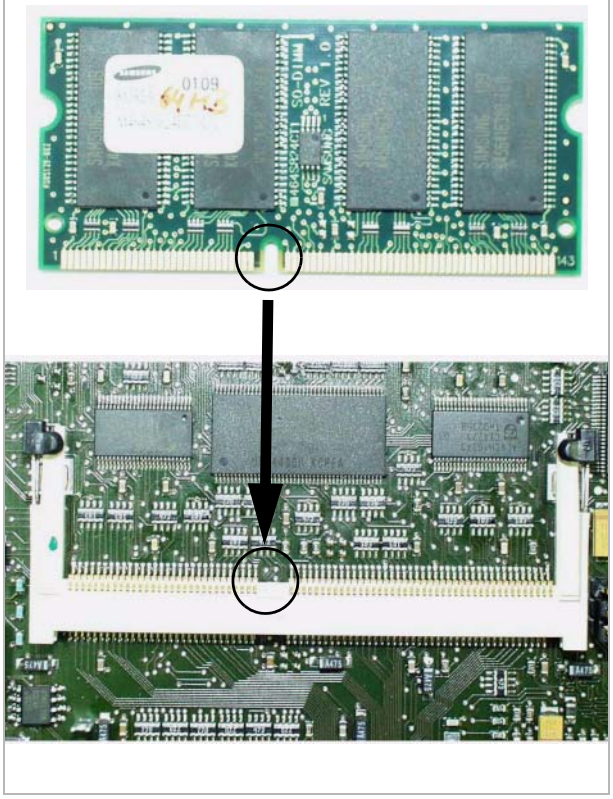


➠ Plug in the memory module under an angle of about 20° (fig. 1)!

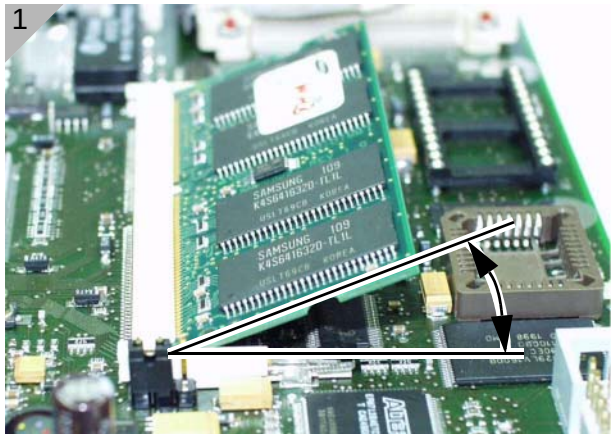
4. Press the memory module towards the CPU board (fig. 2), until it snaps autibly into the lateral clips (fig. 3, cicles).
5. Reinstall the CPU board into the printer. The new memory capacity is indicated when the printer is powered up:

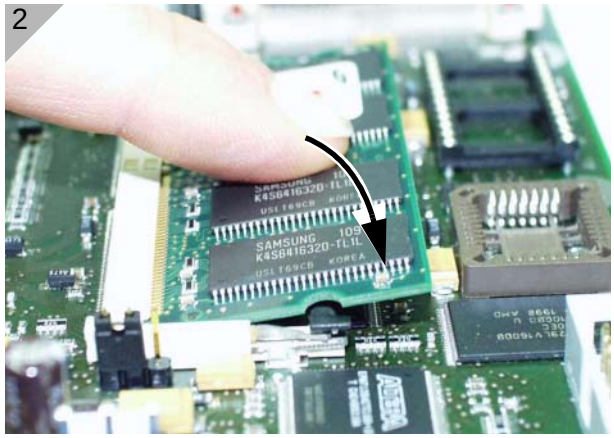
Memory: 40 MB

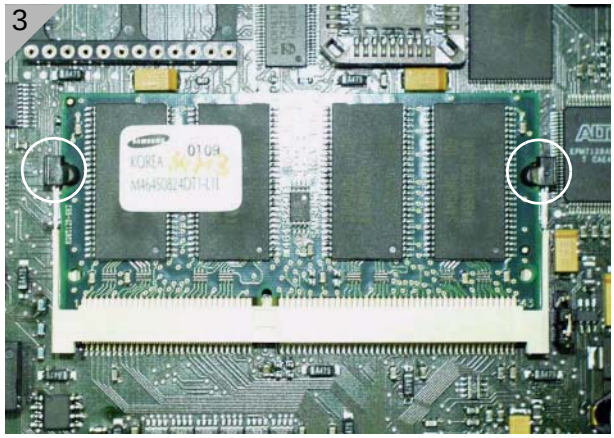
with 32 MB memory extension, respectively

Memory: 72 MB

with 64 MB memory extension.







Installing the Option Board

Requires:

- 64-xx, DPM, PeM or ALX 92x with CPU board no. A2292 or A2293 installed.
- Option board no. A2294 (fig. 1).

Install the Option board as follows:

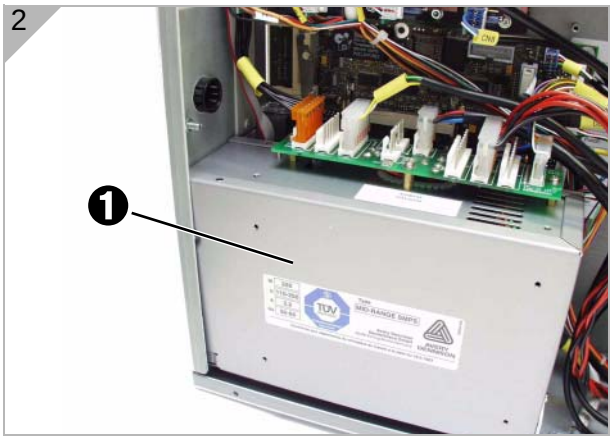
1. Remove the rear hood of the printer.
2. Remove the power supply (1) in order to get to the CPU board.
3. Remove the cover plate (2) (fig. 3).
4. Set the jumpers on the Option board.

❍ How to? - read paragraph Option Board on page 11.

5. Install the Option board instead of the removed cover plate and connect it as illustrated (fig. 4).
6. Reinstall the power supply.
7. Close the rear hood.

1

2



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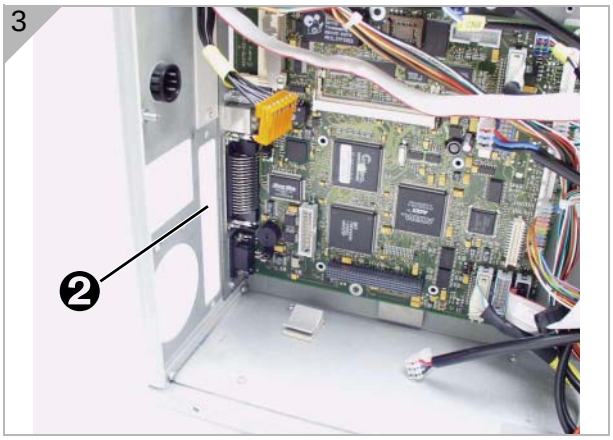

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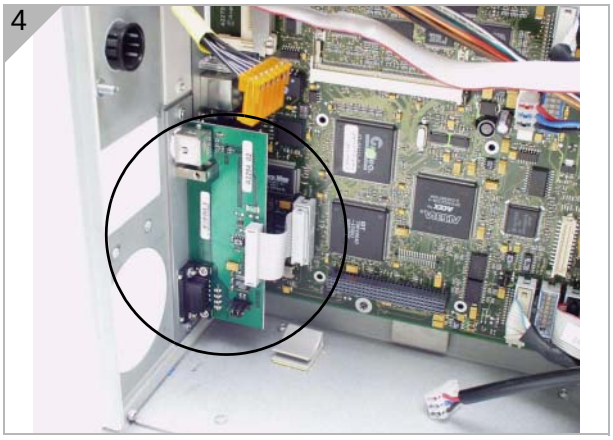


Installing a Realtime Clock

This requires:

- 64-xx, DPM, PEM or ALX 92x with a CPU board no. A2292 or A2293 installed
- Upgrade kit realtime clock no. A4201

The upgrade kit contains a box with the realtime clock (RTC) (fig. 1) and an installation guide.

Install the RTC as follows:

1. Remove the CPU board from the printer.
   ❍ How to? - Read topic section „Service Mechanics“, chapter „Replacing the boards“, „CPU board“.
2. Plug the RTC into the socket U701 on the CPU board (fig. 2).
   The RTC socket is located in the upper left area of the CPU board (fig. 2, white circle).

➠ Hold the RTC in a way, that the molded spot is in the lower left corner, when plugging the chip onto the socket (figs. 3 and 4)! The molded spot marks pin 1.

3. Reinstall the CPU board into the printer.

Setting the RTC

1. Call the parameter SYSTEM PARAMETERS > Realtime clock.

   Realtime clock
   dd.mm.yyyy hh:mm

   ...shows up on the display.

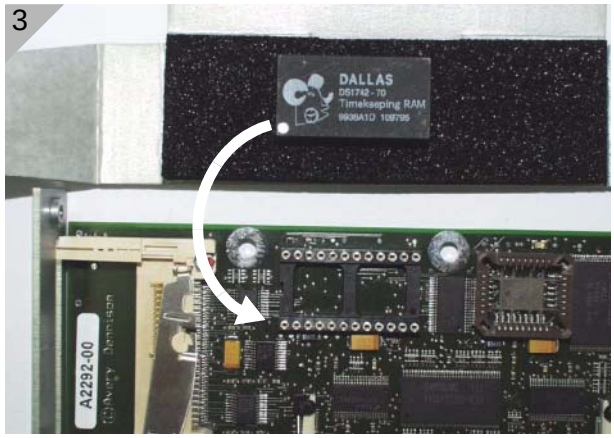
   With dd=day, mm=month, yyyy=year, hh=hour, mm=minute.

2. Key in date and time: *Cut* (ALX/DPM/PEM: *Apply*) moves the cursor, *Feed* changes the setting and *Online* saves it.

1

2

3



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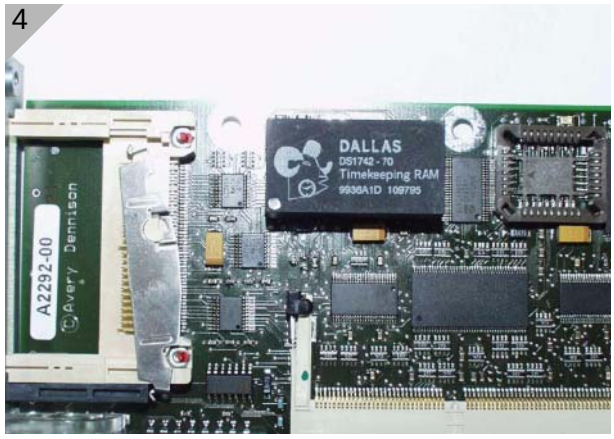


Attaching locking clips for flat strap plugs

An unfavourable combination of installation position and load may loosen the on board flat strap plugs inside of the ALX 92x and DPM/PEM.

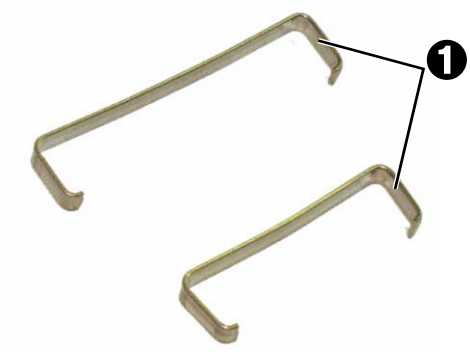
An appropriate countermeasure are the follwing locking clips:

- A5386 (14pin)
- A5387 (20pin)

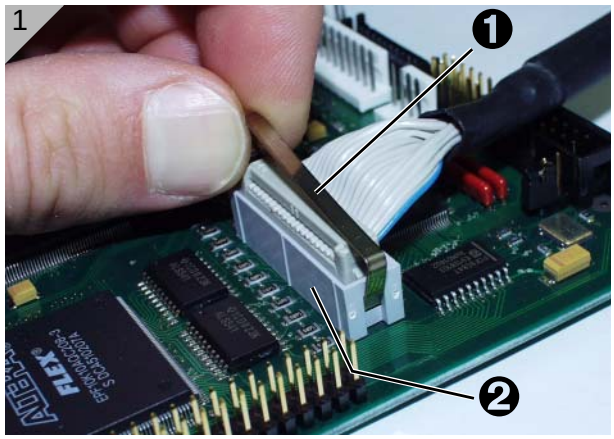
Those clips must be attached to all flat strap plugs inside of ALX 92x and DPM/PEM machines.

➠ Exception: Flat strap plug at the printhead.
To attach the clips:

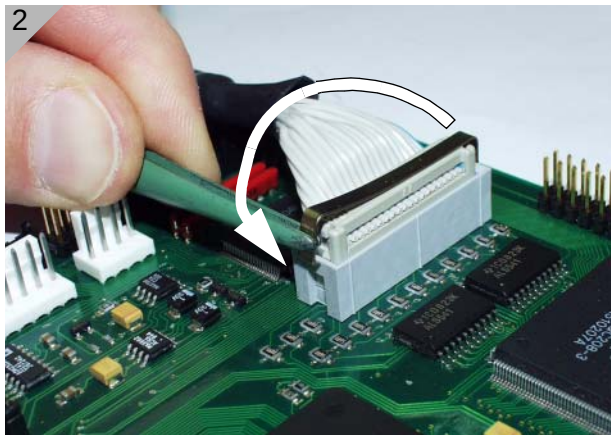
Tweezers or flat pliers



1. Hang the clip (1) into the hole in the plug housing (2) (Fig. 1).

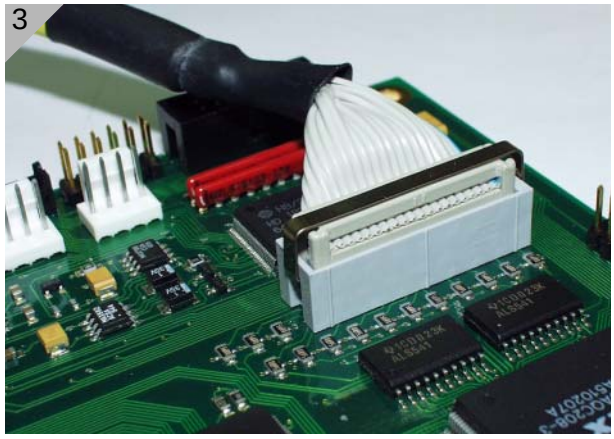


2. Use the tweezers to pull the clip end over the plug (Fig. 2).



❍ Continued overleaf.

3. Snap the clip end into the hole in the plug housing (Fig. 3).
   The plug is locked now.



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