Controller topex 7100

Controller for printer, dispenser

and handling device

USER MANUAL

Version 1.5

Keep for further use

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User Manual

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Keeping

The user manual has to be kept at the labelling machine all times and must be always readily to hand.

Types

topex 7100:Controller	• 7100 • 7100S • 7100SS • 7100T Optional TCP/IP interface
Firmware:	• Version 4.xx

Safety devices

Warning!

The drawings and figures of this user manual are shown partly without safety devices.

⇒ **Never operate the labelling system without the factory-made provided safety devices.**

Extent of user manual

The present user manual describes the controller topex 7100.

The control unit is designed to control the labelling machine and for the integration in industrial systems.
The user manual is part of the project-specific documentations folder.

Further data of the control unit and of the project-specific devices as e.g. of the handling device can be found in the documentation folder. They are not part of this user manual.

Operating personnel

Only personnel authorized by topex GmbH are allowed to operate the topex labelling machine.

Additional requirements, qualifications and skills that are required for special works can be found in the respective chapter.

Contents

1 Safety Devices

1.1 Explanation of symbols and reference notes

Danger!

This reference note means an immediate threatening danger for life and health of persons.

⇒ **Failure to observe these notes will result in severe damages to your health or even to your life.**

Warning!

This reference note means a possible threatening danger for life and health of persons.

⇒ **Failure to observe these notes will result in severe damages to your health or even life.**

Caution!

This note means a possible dangerous situation.

⇒ **Failure to observe these notes will result in slight injuries or in damages to property.**

Information!

This symbol provides you with especially useful information and application tips for appropriate usage of the labelling machine.

⇒ **They help to use all functions of the labelling machine properly and to avoid troubles.**

Further danger symbols indicate special threats e.g.:

Danger!

Warning of dangerous electrical voltage.

1.2 Dangers at the controller unit

1.2.1 Sources of danger

There can be a dangerous electrical voltage on the supply cable of the labelling machine:

- On the supply cable between control unit and labelling machine
- On the electrical connectors of driving motor, on the printer and inside the housing of the labelling machine.

1.2.2 Rest dangers

Danger!

Missing safety devices or safety devices without function can endanger your life.

⇒ **Operate the machine only with properly working safety devices!**

⇒ **Shut the machine immediately down if a faulty or ineffective safety device is recognized.**

As operator you are responsible!

Danger!

Electric shock by touching live parts.

⇒ **Never work at live parts.**

⇒ **Works on the electrical equipment of the machine shall only be carried out by qualified electrical personnel.**

⇒ **Switch off the mains plug before performing works on the machine and secure against startup by mistake.**

Caution!

Risk of infeeding or crushing at the rollers of the drive unit.

⇒ **Switch off the mains plug before performing works on the machine and secure against startup by mistake.**

1.3 Safety instructions

1.3.1 Duty of care by the operator

The controller was designed and built under due consideration of a threat analysis and after careful selection of the harmonising standards to be complied with, as well as according to state-of-the-art technology.

In production practice, machine safety can only be achieved when all measures and precautions required for this purpose have been made. The operator is obliged to exercise care when planning these measures and to inspect them for compliance as required.

In particular, the operator must ensure that:

- The controller is only used for its designed purpose refer to chapter 2.1,
- the controller is operated only in an unobjectionable and functioning condition and that, in particular, the safety facilities are regularly inspected for correct functioning capacity as required,
- protective equipment/outfits are available for the operating, maintenance and repair personnel as required and that these are used according to the requirements,
- the user manual is always available in a legible and complete condition on site of the machine,
- only sufficiently qualified and authorised personnel operate, maintain and repair the machine,
- this personnel is regularly trained in all relevant questions on industrial safety and environmental protection and that this personnel is fully aware of the contents of the user manual and the safety instructions contained therein,
- all safety and warning signs/instructions are not removed and that they are legible at all times.

Warning!

Exclusively authorized stuff, trained by topex GmbH and with the required qualifications, may operate and adjust the control unit topex 7100.

⇒ **Improperly made changes on the control unit might result in faults or damages to the labelling system and in injuries for the operator.**

Information!

Changes in design of the machine are only allowed by written approval of the manufacturer!

1.3.2 Responsibility of stuff

All persons that work on the machine are, before start of work, obliged to:

- follow the basic regulations of job safety and the rules of accident prevention,
- read the safety chapters and warnings of this user manual.

1.3.3 Safety measures in normal operation

The machine shall only be operated by trained and authorised personnel who are acquainted with the user manual and who can work according to it.

Before switching on the machine, check and ensure that:

- only authorised persons are within the working area of the machine,
- nobody can be injured when the machine starts to run.

Before starting each production cycle, inspect the machine for any visible damage and ensure that

- it is only being operated in an unobjectionable condition
- all safety facilities are functioning as required.

1.3.4 Safety measures for maintenance and servicing

We recommend that maintenance or repairs are carried out in principle by specially trained personnel only or to assign topex service technicians for this purpose.

Carry out the setup-, maintenance- and inspection works on the due date.

Take also note of the maintenance and repair instructions of the purchased parts.

For all maintenance and inspection works:

- Secure the operating medium, as e.g. compressed air against accidental commissioning.
- Prevent access of unauthorised persons to the working area of the machine.
- De-energize the control unit machine.
- Secure the control unit against accidental restart. If necessary lock the main switch of system and remove the key.
- Put up an instruction sign to indicate that maintenance or repair work is in progress.

Before commissioning after maintenance and repairs:

- Check loosened screw connections for solid seating
- Ensure that
  - removed parts are reassembled,
  - all materials, tools and various equipment required for maintenance or repair work have been removed from the working area of the machine,
  - any possible leaking liquids have been removed,
  - all safety devices of the system are reinstalled correctly and functioning properly.

Information!

For all works on and with the machine, the legal requirements for waste prevention and orderly usage / elimination must be observed.

Provide for orderly disposal of ecologically hazardous lubricating, cooling and cleaning agents.

1.3.5 Risks by electrical power

Repair work on the electrical equipment of the machine shall only be carried out by qualified electrical personnel or by topex personnel.

- Check the electrical equipment on a regular basis.

- Refasten loose connections.
- Replace damaged wires and cables immediately.

1.3.6 Works on the pneumatic equipment

Maintenance and repair work on the pneumatic equipment shall only be assigned to specially trained personnel.

- Remove the pressure of the pneumatic system before doing any maintenance and repair work.
- Replace regularly the hose lines within the framework of preventive maintenance, even when these have no visible damage or defects. Observe the instructions of the manufacturer.

1.3.7 Noise on the machine

- The continuous sound pressure level of the system is less than 75 dB(A).
- Depending on the local terms a higher continuous sound pressure level can occur causing noise induced hearing loss. In this case the operators have to be equipped with respective protection devices.

2 Product description

2.1 Use according to requirements

The system is designed for the integration in existing industrial systems. The machine must not be operated in potentially explosive atmosphere.

2.2 Marking of Controller

The nameplate is mounted on the rear side. The systems comply with the machine directive 98/37/EG inclusive appendix.

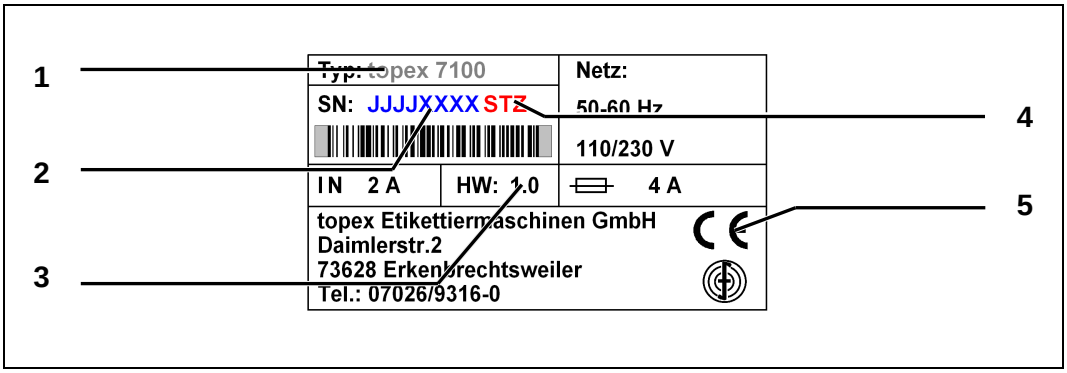


Figure 1 nameplate of controller, example

Item	Description	Item	Description
1	Type	4	Hardware options
2	Year of manufacture and serial number	5	CE-label
3	Hardware version		

2.3 Workplace

The control unit can be mounted independent of its position in superior systems. The system works automatically in normal operation mode.

In order to change the label rolls and transfer ribbon enough space must be provided so that the loading side of the system is easily accessible.

2.3.1.1 Interface of labelling system:

For the operation the labelling machine is connected via cable to the control unit 7100. The control unit supplies the electrical power for the stepping motor and the printhead.

- Power supply
  - Connection designation on the labelling machine: Power,
  - Connection designation on control unit: Power 24 V,
- Date cable,
  - Connection designation on labelling machine: Data,
  - Connection designation on control unit: Print Ctrl,
- I-/O-interface – for connection to a superior controlling (24 V, potential free)
  - Connection designation on labelling machine: I/O,

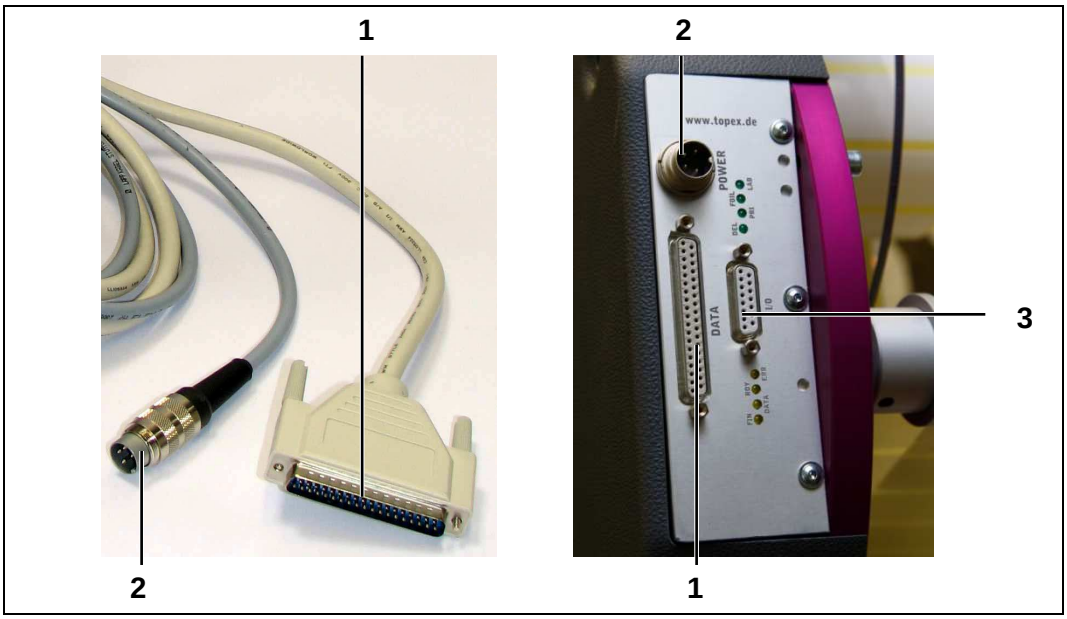


Figure 2 Connection plugs

Item	Description	Item	Description
1	Connection data cable	3	I/O-interface
2	Connection power supply		

Optional PC programs:

- TopTerm:
  - Terminal program supporting the data exchange between PC and control unit, see details in chapter 10.
- TopTerm - RemoteControl:
  - Graphical user interface to create PLC programs for handling devices. Condition in this case is an optional PLC-card. See details in chapter 11.
- toplabel:
  - Graphical user interface to design label layouts for printing.

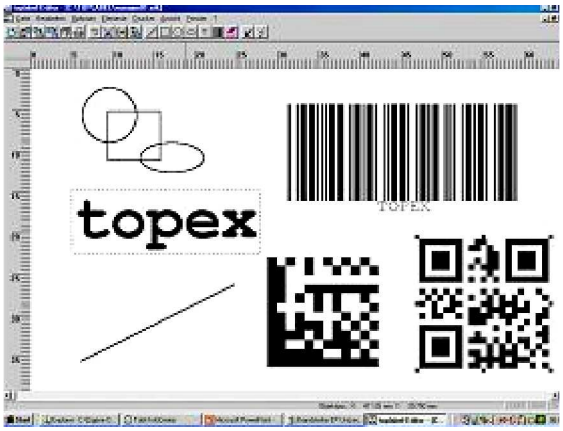


Figure 3 Design of label layouts with toplabel. Example

Further details for the optional PC programs can be provided by the sales department of topex.

2.3.2 Control unit topex 7100

The controller consists of the control unit and the corresponding firmware. It serves to position the stepping motor and to control the printhead as well as the input and output signals and the handling devices. The control unit is equipped with a touch panel. The handling is menu-driven.

The control unit topex 7100 can be equipped depending on its function with a PLC to control the handling device and/or with a TCP/IP interface for the integration in a network.

For creation of a PLC program an interpreter is integrated that provides predefined modules, see chapter 11.

Figure 4 Front view of control unit topex 7100

Item	Description
1	8“ Touch panel display

Types of the control unit topex 7100 with different functions:

topex 7100	Standard Controller
topex 7100 S	Function Standard + With PLC board to control a handling device
topex 7100 T	Function Standard + with TCP/IP interface
topex 7100 ST	Function Standard + With PLC board and TCP/IP interface
topex 7100 SS	Function Standard + With 2 PLC boards to control a expanded handling device

Information!

Detailed information about the interface configuration see chapter 8.

Detailed information about the operation of the control unit see chapter 9.

Further detailed information concerning the control commands and printer functions can be found in the **Programming Manual – Control unit topex 7100**.

2.4 Technical Data

2.4.1 Control unit topex 7100

General data

Basic function	Stepping motor- and printer control
Handling	Menu-driven

Controlling unit

Construction	1/2 19“-housing, with ventilator, excess temperature protection and real time clock
Controller	32 Bit CISC Microprocessor
Memory to save label layouts, character sets and monochrome logos	• 128 MB Flash memory • battery packed, • expandable to 512 MB
TFT-Display:	• 8“ TFT with 800x600 pixel • Touch panel • Error and warning messages in clear text • Menu-driven settings
Electrical power:	
• Voltage	• 230 V AC / 110 V AC
• Frequency	• 50 Hz / 60 Hz
• Rated current	• 3 A
• Power supply machine	• 24 V DC

Interfaces of controlling unit — See chapter 8

Character set

Zeichensätze	• Arial und Courier, fest skaliert • Arial frei skalierbar
Fontgenerator (optional)	all True Type Fonts
Invertierbarkeit	• Inverse print • Mirror print

Barcodes	EAN-8, EAN-13, EAN-128, Code 2 of 5 interleaved, Code 39, Code 128 A, B, C, Codablock F
2D-Codes	Datamatrix, QR-Code, PDF 417
Rotation	0 °, 90 °, 180 °, 270 ° for fonts, Barcodes and monochrome logos

Environmental conditions

For the control unit:

• Temperature	• 5 ... 35 °C
• Air humidity	• 10 ... 80 % Non condensing

Information!

For detailed information about the interface configuration see chapter 8.

For detailed information about the operation of the control unit refer to chapter 9.

Further detailed information concerning the control commands and printer functions can be found in the Programming Manual – topex 7100.

2.4.2 Options

- Network connection via TCP/IP interface
- PLC board to control handling device
- Control of maximum 3 stepping motors, for electrical handling devices,
- Memory expansion
- Font generator changing any True Type Fonts in print format
- Label end pre-warning device
- Conversion of the following formats in print sequences, according to customer requirement: Zebra ZPL, CAB.

Optional PC-Programs

- TopTerm: Terminal program supporting the data exchange between PC and control unit.
- TopTerm - RemoteControl: Graphical user interface to create PLC programs for handling devices.
- toplabel: Graphical user interface to design label layouts for printing.

3 Transport and installation

3.1 Safety notes

Caution!

The labelling machine might fall, slip or tilt from the transport device.

Possible risk of crushing extremity.

⇒ **Use only appropriate transport devices.**

⇒ **Follow the relevant regulations.**

⇒ **Do not drive on a ramp or downhill.**

Information!

The assembly and installation of the machine should only be made

- By authorized persons by topex or
- By topex service technicians

according to the safety regulations.

3.2 Transport

- The transport is made by a forwarding agent from the topex plant to the customer.
- Only fork lift and hand lift trucks are allowed for in-plant transport.

3.2.1 Packaging

- In order to avoid machine damage or seriously bodily injury during the transport of the machine, this machine is delivered on a pallet.
- The machine is covered with a foil to protect it against weather influences.
- Single machines are mounted on a topex transport rack if required.
- The machine is solidly mounted on the pallet bottom or on a crate.
- The control unit as well as attachments, cables pneumatic elements are packed separately in a carton and secured to the pallet.
- The handling device is additionally secured with a rope or a cable binder.

3.2.2 Dimension and weight

Length x width x height:	280 x 350 x 240 mm
Different packaging:	See supplement
Weight	According to machine and accessories

3.2.3 Acceptance and transport at customer

- Check the machine and the accessories for any possible transport damage and completeness, based on the delivery note.
- Transport the pallett carefully.
- When moving the system with a fork-lift truck, make sure that the center of gravity is not in the middle of the pallet as there is then the danger of tilting.
- Be extremely careful when moving and placing down the machine!

3.3 Installation

3.3.1 Ambient conditions on installation site

Temperature and humidity, Power supply and compressed air connection	See chapter. 2.4, „Technical Data“
Mounting Space	See general drawing in documentation folder

Information!

The cycle time of the handling device can be increased if the pneumatic pressure is lower than the adjusted limit.

3.3.2 Installation notes

- Normally the labelling machine is delivered in a completely assembled condition.
- Remove the transport securing devices respectively the transport rack on the installation site.
- The machine should be built into position in such a way as to ensure the most uncomplicated and safe access for changing the consumption materials as well as for performing servicing work.

3.3.3 Disposal of packaging material

Euro pallet	Return to forwarding agent
Transport rack	Return to topex
Foil, label material, crate, other materials	Disposal according to the local disposal regulations

Notizen

4 Commissioning and operation

4.1 Safety notes

Information!

The initial commissioning and the setup of the machine can only be made

- By trained persons from topex or
- By topex service technicians

according to the safety regulations.

- The machine may only be used according to regulations.
- Regard the safety regulations in chapter 1.
- Before switching on the system inform yourself about the correct behaviour in case of a failure.
- Before switching on the system carry out the control functions:
  - on all safety devices,
  - on the emergency stop switch of the superior system.

4.2 Notes for the installation of the control unit

Information!

For further information about the interface configuration refer to chapter 8.

For further information about the operation of the control unit refer to chapter 9.

Detailed information about the control commands and printer function can be found in the programming manual – control unit topex 7100.

- Make sure that the maximum allowed supply voltage is not exceeded.
- Check the fuses on the rubber connector.
- Check the settings of the serial print data interface COM2 (RS232). Standard setting see chapter 8.5.2.
- Provide sufficient airflow around the control unit. A ventilator on the rear side supports the airflow.
- Provide sufficient cable cross section in order to avoid leakage and overheating of cables.
- Switch off the control unit before mounting or demounting the connection cable of the labelling machine.
- Mount the connecting cable, see block diagram figure 5 and chapter 8.
- Check if the connector is locked so that the control unit cannot be destroyed by bad contact.
- Check the connections of motor, inputs and outputs.

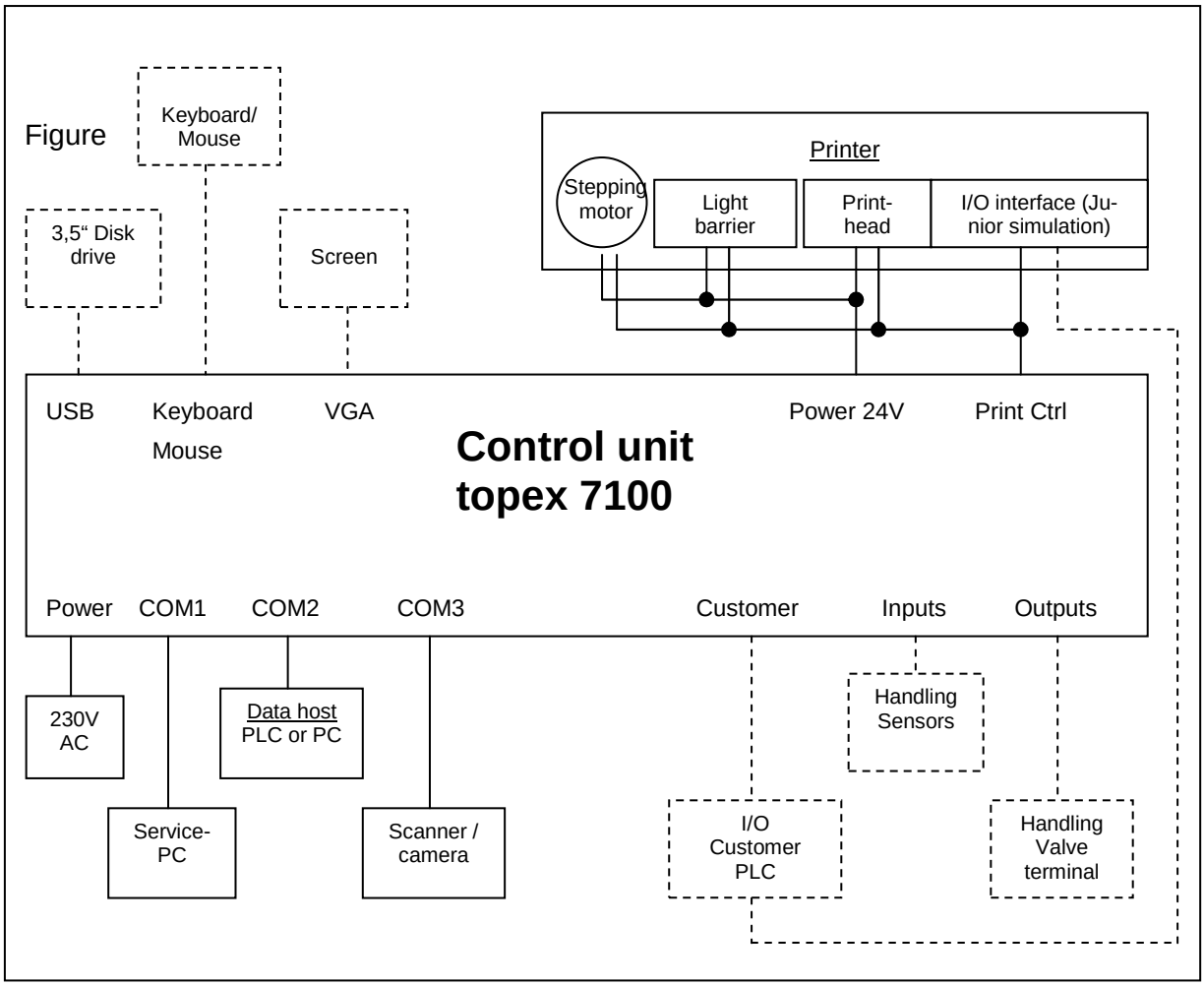


Figure 5 Block diagram

Optional devices are shown in dashed lines.

4.3 Switching on

4.3.1 Checks before switching on

1. Ensure that all safety devices are correctly mounted. If not remount them.
2. Check if the setup of the machine is correct and corresponding with the application.
3. Expel unauthorized persons from the labelling machine.

4.3.2 Processing

- Turn on the compressed air.
- Switch on the power supply, e.g. on main switch.
- Switch on the control unit.
- Adjust controlling if necessary.
- Start automatic operation.
- Check if the labelling functions correctly and if the positioning works accurately.

4.4 Switching off

There are various possibilities to switch off the machine depending on the period of switching off.

4.4.1 Switching off for a longer period

- Switch off the control unit.
- Switch off the superior system.
- Switch of the compressed air.
- Switch off the main switch of the superior system or pull the power supply plug of the control unit.

4.4.2 Switching off in an emergency situation

If the control unit is integrated in superior system with emergency stop cycle then the unit can be switched off by pressing the emergency stop switch in dangerous situations.

Before operating the labelling machine normally again you have to

- resolve the failure,
- relock the emergency stop switch,
- reset the error message and reinitialize the firmware.

5 Troubleshooting

5.1 Safety notes

Caution!

By resolving failures dangerous situations can occur.

⇒ **Follow the safety regulations in chapter** Fehler! Verweisquelle konnte nicht gefunden werden.**.**

- Block the access wide-ranging for unauthorized persons to the working area of the machine.
- Firstly secure all operating media, e.g. as compressed air, against unintentional commissioning.
- Switch off the control unit zero-potentially.
- Secure the control unit against accidental restart. If necessary lock the main switch of the superior system and remove the key.

5.2 Errors and corrections

Categories:

- Machine in general,
- Error messages on system level, displayed in clear text on touch panel,
- Error messages in PLC program, only if a PLC program is activated on the control unit topex 7100.

5.2.1 Machine in general

Error	Reason	Correction
Machine shows no reaction when switching on the control unit	• Power supply cable of control unit not plugged in or • Main switch of control unit is switched off • Superior main switch is switched off	• Plug in power supply switch or • Switch on main switch of control unit • Switch on main switch
	Connection between machine and control unit not correct	Check connections and cables and remount them if necessary
	Defective fuses on control unit	Check fuses and exchange them if necessary
Control unit does not react to PC commands	Interfaces of control unit and PC do not correspond with each other	• Check adjustment of interfaces. • Readjust interfaces if necessary, see chapter 8 and chapter 9
	Data line faulty	• Check data line • Change sending and receiving line, if necessary (Pin 2+3)
	Controlling faulty	Correct positioning and control sequences of PC software on the basis of Programming Manual topex 7100

5.2.2 Error messages on system level

Shown as clear text on the touch panel.

Error	Reason	Correction
Label does not exist/ WARNING 016	A label that was not stored in the printer was loaded.	Store the required label in printer
Font does not exist/ WARNING 060	A font configured for a text field does not exist in printer	• Store desired font in printer • Change font type of text field
False barcode type/ WARNIG 061	False control sequence for barcode to be printed.	Change syntax of barcode type
False barcode data/ WARNING 069	The parameter of the barcode to be printed does not correspond with the specification.	Look for the correct barcode parameter in Programming Manual
Character error/ WARNING 001	A character that does not correspond with the specification was received via serial interface.	• Check interface parameter • Check control sequences
Error Download/ ERROR 087	At download of files an error occurred. • Cable is not connected to COM1 • Connection cable is defective • The interface parameter of sending PC is wrong	• Check COM interface • Check connection to printer (cable, interface parameter)
Timeout Download/ ERROR 088	At download of files the set time period has been extended. Reason see Error Download	see Error Download
Compiler error/ ERROR 091	The PLC interpreter is programmed incorrectly. This error can only occur by changing the PLC interpreter and is recognized at commissioning.	Check programming of PLC Interpreter.

Error	Reason	Correction
Runtime error/ ERROR 092	see Compiler error	see Compiler error
I/O Card Error/ ERROR 200	The I/O card that realises the printer functions is defective (Connection „Print Ctrl“ on control unit).	Change I/O card.
Transfer ribbon/ ERROR 201	The sensor of transfer ribbon sends no feedback. Reasons: • Transfer ribbon is torn (possibly too high heating temperature). • Sensor of transfer ribbon control is defective.	• Change transfer ribbon sensor • Reload transfer ribbon • Check heating time
Paper jam/ ERROR 203	The label transport is not working. Reasons: • The light barrier for recognizing the label gap is adjusted incorrectly. • The stepping motor is defective.	• Readjust light barrier • Change stepping motor
No labels/ ERROR 204	No label synchronization because light barrier sends no signal.	• Readjust light barrier • Then make a calibration run
COM Error/ ERROR 210	Hardware defect of one in 4 serial interfaces	Change complete control unit

5.2.3 Error messages in PLC program

Only valid if the PLC program is activated on the control unit topex 7100.

Error	Reason	Correction
Timeout Cyl. WP	The respective cylinder has not reached its working position. Reasons: • Compressed air too low • Limit switch defective or adjusted incorrectly	• Check compressed air (6 bar) • Adjust/change limit switch
Timeout Cyl. HP	The respective cylinder has not reached its home position, see Timeout Cyl. WP	see Timeout Cyl. WP
No label loaded	A label was printed although there was no label loaded.	Integrate the object „Data?“ in front of the command „Print” in the PLC sequence. This object waits until a new label has been loaded.
Timeout TopCam Timeout Datalogic Timeout Sick	The barcode/Datamatrix could not be read with a scanner. Reasons: • No printout • Poor print quality • Scanner/camera outside reading field	• Check mechanical adjustment of printhead • Change the parameter heating time • Readjust mechanically scanner/camera
False barcode data	The barcode/ Datamatrix read by scanner do not correspond with the current print data. Reasons: • The configuration of scanner is not compatible to the quantity of barcodes printed on label.	Check scanner configuration. Generally all barcodes on label are compared with the reading of scanner. The quantity of barcodes to be read must correspond with the quantity of barcodes printed on the label.

Error	Reason	Correction
Timeout Special input	The special input can be programmed with Timeout i.e., if the object in the sequence is active, this input must lead the signal HIGH in an adjustable time.	Check the requirement that is controlled by the special input.
Vacuum error	By dispensing the vacuum was not reached in the set time. Reasons: • The label is not dispensed correctly onto stamp • Vacuum valve is defective • Vacuum switch is adjusted incorrectly • Vacuum stamp is leaky	• Check adjustment of printer to peel off bar • Adjust auxiliary air if necessary • Change vacuum valve • Adjust vacuum switch • Check vacuum stamp for leaky parts
Label on stamp	By backward movement of application cylinder label was still on stamp	Check application position on work piece / product
No home position	Automatic operation was started although there was no home position	Get machine in home position: • In the menu Service / home position run or • With Reset input
Label lost	During application process the label has been removed from stamp.	Check vacuum
Emergency stop NIO	The emergency stop cycle was interrupted.	Close emergency stop cycle and acknowledge fault
I1 orO1 defective	By the automatic check of I/O card for PLC function a defective input / output was recognized.	Change I/O card

Error	Reason	Correction
Overload outputs	By automatic check of I/O card amongst others all outputs are set simultaneously. One or more inputs had not connected through.	Change I/O card

6 Maintenance and servicing

6.1 Safety notes

Danger!

Missing safety devices or safety devices without function can endanger your life.

⇒ **Operate the machine only with properly working safety devices!**

⇒ **Shut the machine immediately down if a faulty or ineffective safety device is recognized.**

As operator you are responsible!

Danger of life!

Electric shock by touching live parts.

⇒ **Never work at live parts.**

⇒ **Works on the electrical equipment of the machine shall only be carried out by qualified electrical personnel.**

⇒ **Switch off the mains plug before performing works on the machine and secure against startup by mistake.**

Warning!

Risk of infeeding or crushing at the rollers of the drive unit.

⇒ **Switch off the mains plug before performing works on the machine and secure against startup by mistake.**

- Block the access wide-ranging for unauthorized persons to the working area of the machine.
- Firstly secure all operating media, e.g. as compressed air, against unintentional commissioning.
- Switch off the control unit zero-potentially.
- Secure the control unit machine against accidental restart. If necessary lock the main switch of the superior system and remove the key.

Information!

- Use only the specified operating material.
- Use only original spare parts that are indicated in the topex spare part list.
- Do not use thinner, acids or bases even not in thin concentration as cleaning agents.
- Do not use thinner, acids or bases as cleaning agents even not in thin concentration.
- Do not use compressed air or a high-pressure washer for cleaning.
- Do not clean the printhead with hard objects as e.g. knives or screwdrivers.
- Check that no hard objects get onto the dot line as e.g. swarfs.

6.2 Requirements for the performing personnel

- The operating personnel can do simple checks and maintenance works after attending a specific training.
- Trained and skilled electricians may only execute works at the electrical equipment.
- Repairs may only be carried out by trained and authorized personnel. Therefore our service technicians are at your disposal. You will find the address under „Service and Support“ on the inside of the title page of this user manual.

6.3 Notes for further maintenance works

- Follow the safety regulations in chapter 6.1, especially at works on the drive unit side by removed housing rear panel.
- Follow the requirements for performing personnel, see chapter 6.2.
- Use solely original spare parts that are indicated in the topex spare parts list.
- Regard the provided information in the documentation folder.
- Remount after end of maintenance works disassembled protection devices and safety devices and check their function.

Notes

7 Shutting down

7.1 Safety notes

- Regard the safety notes in chapter 1, „Safety Devices“.
- Block the access wide-ranging for unauthorized persons to the working area of the machine.
- At disposal pay attention to environmental safety, risks to health, disposal requirements and the local possibilities of disposal according to the regulations.

Information!

- Do not use thinner, acids or bases even not in thin concentration as cleaning agents.
- Do not use compressed air or a high-pressure washer for cleaning.

7.2 Temporary shutdown

- Respectively wait until the system is in home position.
- Secure all operating media as e.g. compressed air against accidental restart.
- Switch off the control unit.
- Secure the control unit against unintentional restart. Lock respectively the main switch of the superior system and remove the key.
- Clean the entire machine with a fluff-free cloth moistened with cleaning milk.
- Protect all metallically bright parts with a light film of oil against corrosion.
- Lift the lever of the printhead unit to release platen roller.

7.3 Final shutdown / disposal

- Respectively wait until the system is in home position.
- Secure all operating media as e.g. compressed air against accidental restart.
- Switch off the control unit.
- Secure the control unit against unintentional restart. Lock respectively the main switch of the superior system and remove the key.

Dismantle the machine in the following assembly units:

Electronic waste	Dismantle in groups (transformations, boards, cables...) and dispose them according to the local regulations
Metals, non-metals, composite and auxiliary materials	Separate in species and dispose them according to the environmental regulations
Batteries	Dispose them according to the environmental regulations

8 Control unit topex 7100

8.1 Introduction of control unit topex 7100

The control unit topex7100 consists of a full-fledged industrial PC. As operating system MS-DOS for standard applications or Windows XP for complicated customer applications is used.

By using a file system the up- and download of the entire settings, fonts, labels, firmware and PLC programs is possible.

Adjacent to the regular COM1 two additional serial interfaces are available that enable the connection of a data host and further connections as service notebooks, scanners or cameras.

Furthermore a PCI-I/O card is integrated that controls the whole functions of the labelling machine (printhead, stepping motor, I/O-Interface).

An internal touch panel provides easy handling.

The control unit can be optionally extended by 12 digital 24V-In- and -Outputs to control the pneumatic handling device or by 2 stepping motors to control a stepping motor driven handling device.

The programming of the PLC is made with the program RemoteControl that enables an easy design and alteration of PLC programs.

The controlling components are mounted in a Schroff housing that meets industrial needs.

The entire print system (control unit, hardware of labelling machine) is certified according to EN 60950-1.

8.2 Control unit topex7100 – front view

Figure 6 Control unit topex7100 – Front view

8.3 Control unit topex7100 – Rear view

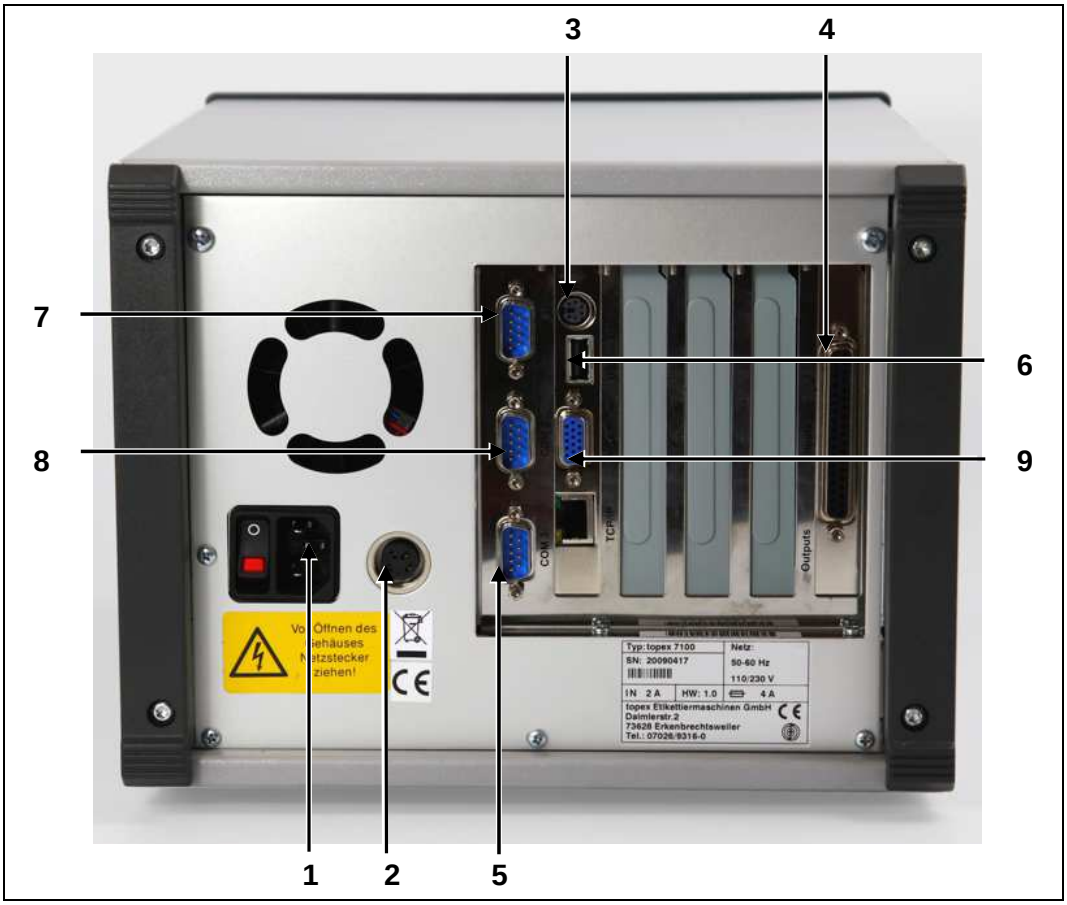


Figure 7 Control unit topex7100 – Rear view

Item	Description	Item	Description
1	230V-power supply/ power supply switch	6	USB for a disk drive
2	24V-power supply labelling machine	7	COM1 (RS232), service interface
3	Keyboard and mouse via Y-cable	8	COM2 (RS232/RS422/RS485), Data interface
4	Data cable labelling machine	9	VGA-interface
5	COM3 (RS232), peripheral interface		

8.4 Control unit topex7100 – Rear view with optional assembly units

Figure 8 Control unit topex7100 – Rear view with optional assembly groups

Item	Description	Item	Description
1	TCP/IP → RS232 Print server	2	PLC board

- The **TCP/IP → RS232 Print server** can be freely configured (IP-Address, Port number, interface parameter for RS232). The serial bushing of Print server is connected with the COM2 data interface of the control unit.
- The **PLC-Board** contains 12 digital inputs / 12 digital outputs 24V DC potential free. The following 10-pole bushings are available: The following SUB-D connectors are available:
-

- **Customer**: 4 inputs / 4 outputs for signal exchange with the control unit provided by the customer, 24V-power supply
  SUB-D 15-pole male connector.
- **Inputs**: 8 inputs for the connection of a Lumberg adapter
  SUB-D 15-pole female connector.
- **Outputs**: 8 outputs for the connection of a valve terminal
  SUB-D 9-pole female connector.

8.5 Overview of interfaces

8.5.1 Serial Service interface COM1

The COM1 interface is designed for the service. Via this interface labels, logos, sequence programs as well as firmware files are transmitted from the PC to the control unit or from the control unit to the PC.

The standard setting of the interface is as follows:

- 57600 baud
- 8 data bit
- 1 stop bit
- no parity

Pin assignment of Service interface COM1

Description of connector: „COM1“

Connector type: D-Sub-9-pole male connector

Manufacturer: any

Pin	Signal	Sender	Function
2	**RxD**	Computer	Receiving data. Receives data transmitted by the computer.
3	**TxD**	Printer	Transmit data. Available if XON/XOFF-protocol was selected. Additionally, the status can be requested via this data cable.
4	DTR	Printer	HIGH → Printer is read LOW → Printer isBUSY
5	**GND**		Signal grounding
6	DSR	Computer	Computer ready for receiving data
7	RTS	Printer	Request for transmitting always HIGH

- Signal description is shown in bolt letters: Signal is compulsory necessary, standard
- Signal description is not shown in bolt letters: Signal optional

8.5.2 Serial data interface COM2

The COM 2 interface is the general print data interface V24 (RS232), i.e. the data host of customer is here connected (PLC or PC). Two different types of hand-shake-protocols are available. The interface works with adjustable transmitting speeds. Via internal jumper the interface can be used also as RS422 or RS485.

Feedback:

- load label (<ESC>y6;..;<CR>):
  - „+“ if loading was successful,
  - „-“ if loading was impossible.
- Print label (<ESC>#1<CR>):
  - „+“ after printing
  - „-„ if no data record for printing was loaded

The standard setting of the interface is as follows:

- 19200 baud
- 8 data bit
- 1 Stop bit
- no parity

Pin assignment of serial interface COM2 (RS232, RS422, RS485)

Description of connector: „COM2“

Connector type: D-Sub-9-pole male connector

- Signal description is shown in bolt letters: Signal is compulsory necessary, standard
- Signal description is not shown in bolt letters: Signal optional

8.5.2.1 Pin assignment RS232

Pin	Signal	Sender	Function
1	DCD		Hardware handshake
2	**RxD**	Computer	Receiving data. Receives data transmitted by the computer.
3	**TxD**	Printer	Transmitting data. Available if XON/XOFF- Protocol is selected. Additionally the status can be requested via this data cable.
4	DTR		Hardware handshake
5	**GND**		Signal grounding
6	DSR		Hardware handshake
7	RTS		Hardware handshake
8	CTS		Hardware handshake
9	Voltage		Power supply optional 5V / 12V DC

8.5.2.2 Pin assignment RS422

Pin	Signal	Sender	Function
1	**TxD-**	Printer	Transmit data „–“ Potential
2	**TxD+**	Printer	Transmit data „+“ Potential
3	**RxD+**	Computer	Receive data „+“ Potential
4	**RxD-**	Computer	Receive data „–“ Potential
5	GND		Signal grounding
6	NC		Not connected
7	NC		Not connected
8	NC		Not connected
9	Voltage		Power supply optional 5V / 12V DC

8.5.3 Pin assignment RS485

Pin	Signal	Sender	Function
1	**RTX-**		Transmit / receive data „–“ Potential
2	**RTX+**		Transmit / receive data „+“ Potential
3	NC		Not connected
4	NC		Not connected
5	**GND**		Signal grounding
6	NC		Not connected
7	NC		Not connected
8	NC		Not connected
9	Voltage		Power supply optional 5V / 12V DC

8.5.4 Serial peripheral interface COM3

The COM3 interface (RS232) is designed for the connection of a barcode scanner or a camera.

The standard setting of the interface is as follows:

- 19200 baud
- 8 data bit
- 1 Stop bit
- no parity

Pin assignment of serial interface COM3

Description of connector: „COM3“

Connector type: D-Sub- 9-pole male connector

Manufacturer: any

Pin	Signal	Sender	Function
2	**RxD**	Computer	Receiving data. Receives data transmitted by the computer.
3	**TxD**	Printer	Transmitting data. Available if XON/XOFF- Protocol is selected. Additionally the status can be requested via this data cable.
4	DTR	Printer	• HIGH → Printer ready • LOW → Printer BUSY
5	**GND**		Signal grounding
6	DSR	Computer	Computer ready for receiving data
7	RTS	Printer	Request for transmitting always HIGH

- Signal description is shown in bolt letters: Signal is compulsory necessary, standard
- Signal description is not shown in bolt letters: Signal optional

8.5.5 Power supply

A rubber connector that is plugged to the line filter serves as power supply of the control unit. The line filter consists of the main switch and the protection switch for two T4-Ampere fuses type 5x20mm.

8.5.6 TCP/IP-Print Server (Optional)

A TCP/IP → RS232- converter is available on demand that is connected to a 10 Mbit RJ45 network cable provided by the customer. The serial side of the converter is connected to the COM2 – interface of the control unit.

8.5.7 PLC-IO-board (Optional)

The optional provided PLC board contains 12 digital in-and outputs, which are supplied by 24V. For the circuit diagram refer to the separate documentation folder of the labelling machine.

With the program „RemoteControl“ up to 3 pneumatic cylinders, as well as auxiliary air and vacuum can be programmed freely (see chapter 11, „PLC programing with TopTermControl RemoteControl“).

8.5.7.1 Assignment of customer interface of PLC board

Description of connector: „Customer“

Connector type: SUB-D 15-pole male

Customer has to provide a cable with a diameter of 0.5mm² at maximum and an open cable end for connection to printer unit.

Pin	Description	
1	24 V from customer	24 V potential for all inputs and outputs (optional in groups of 4).
2	Start Printing	Label is printed and dispensed under the vacuum stamp. The step sequence must contain the object „E_Start?“ (topTermControl)
3	Start Applying	Label is applied onto the product. Step sequence must contain the object „E_Applying?“ (topTermControl)
4	External acknowledging	Error can be acknowledged at topex panel or externally.
5	Emergency Stop IO	Emergency Stop cycle closed
6	24 V from customer	24 V emergency stop potential for all inputs and outputs (optional in groups of 4).
11	0 V from customer	0 V-potential for I/O board
12	Labeller ready	Labeller signals ready (Signal High), if printer is turned on und there is no error.
13	Labeller in home position	Labeller signals home position, depending on programmed home position in step sequence (topTermControl)
14	Label end pre-warning	Labeller reports label end pre-warning if the label counter is at end. (Signal LOW). The machine is still ready for operation (see chapter 9.3.2.10)
15	End of label cycle	Signal „label cycle“ is during the labelling cycle LOW. After switching on the machine, after acknowledging an error or after a successful label cycle the signal turns to HIGH

8.5.8 Interfaces of the labelling machine

The interface board is mounted on the labelling machine (see Figure 9). The signals that are received from the control unit are distributed to the printer hardware (printhead, stepping motor, light barrier) and the I/O-Interface.

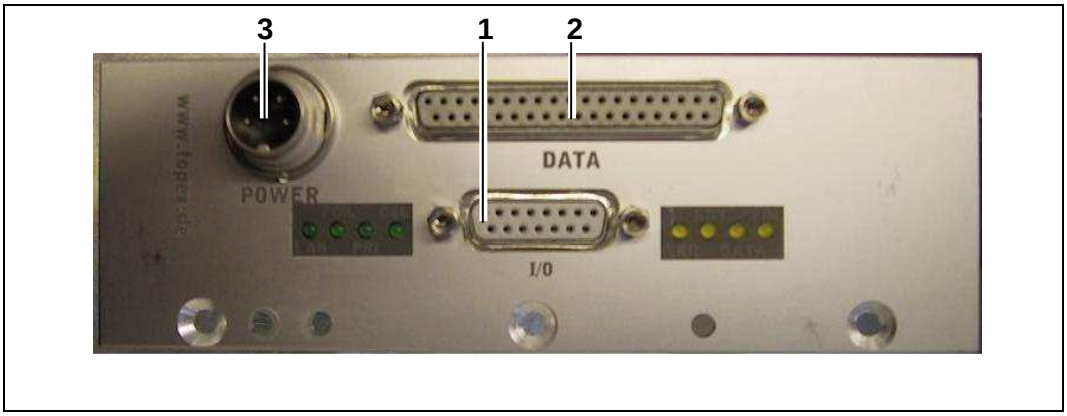


Figure 9 Interfaces of the labelling machine

Item	Description	Item	Description
1	I/O-interface **I/O** **Only in use, if no PLC board is mounted into the printer control unit**	7	LED **FIN**, yellow To I/O-interface Pin 9
2	Data cable **DATA** (see chapter 5.5.4.2)	8	LED **DEL**, green To I/O-interface Pin 7
3	Power supply **POWER**	9	LED **PRI**, green To I/O-interface Pin 6
4	LED **RDY**, yellow To I/O-interface Pin 11	10	LED **FOIL**, green To light barrier of transfer ribbon
5	LED **DATA**, yellow to I/O-interface Pin 10	11	LED **LAB**, green To light barrier of label synchronisation
6	LED **ERR**, yellow To I/O-interface Pin 13		

8.5.8.1 I/O-interface (Junior-Simulation)

Description of female connector on interface board of labelling machine: I/O

Connector type: 15-pole SUB-D header

The I/O-interface is designed in 24V DC. The power supply is provided by the customer via a cable type 9x0,5 mm².

Besides the female connector there are status-LEDs for in-/ and outputs on the interface board.

Pin	Description	
9	Label cycle ready (Output)	Signal Label cycle is during a labelling cycle LOW. After switching on the system, after acknowledging an error or after a successful labelling cycle the signal turns to HIGH.
10	Data record loaded (Output)	Labeller reports „Data record loaded“ if a data record exists in RAM memory
11	Ready for operation (Output)	Labeller reports ready (Signal High), if printer is switched on
13	Error (Output)	HIGH signal, turns LOW when error occurs
6	Start Printing (Input)	A label will be print if a data record was loaded
7	Delete data record (Input)	Deletes data record from RAM. A new label has to be loaded to RAM before starting the next label cycle.
1 - 5	24 V from customer	Power supply provided by customer.
14 - 15	0 V from customer	Power supply provided by customer.

8.5.8.2 Data cable labelling machine

Description of bushing on control unit:	Prn Control
Description of bushing on interface board on the labelling machine:	DATA

The controlling of printer is made via TTL- signals, which are provided by the I/O board that is mounted in the printer control unit. Therefore the board is connected to the Interface board of the printer via a 37- pin 1:1- cable.

The following components are controlled by this interface:

- stepping motor for label transport
- printhead
- I/O- Interface (Junior simulation)

8.5.8.3 Power supply of labelling machine

Description of bushing on control unit:	POWER
Description of bushing on interface board on the labelling machine:	POWER

The labelling machine is connected to the mains via a 4- pin cable.

Notes

9 Operation of touch panel

9.1 Menu setting of labelling machine (printer menu)

Figure 10 Menu setting of labelling machine

Description	Function
FEED	Feed of a blank label.
Print	Feed of a printed label. If no data record has been yet transmitted or selected a test label is printed otherwise the last printed data record is used (if „Delete after print“ is OFF).
Calibr	With the **CALIB**-key a test run is started. About 8 labels are dispensed and calibrated.
Setup	With the **SETUP**-key you get to the menu.
Reset	With the **Reset**-key upcoming firmware errors are deleted. By pressing this key twice the firmware is reinitialized.

9.2 Operation of touch panel

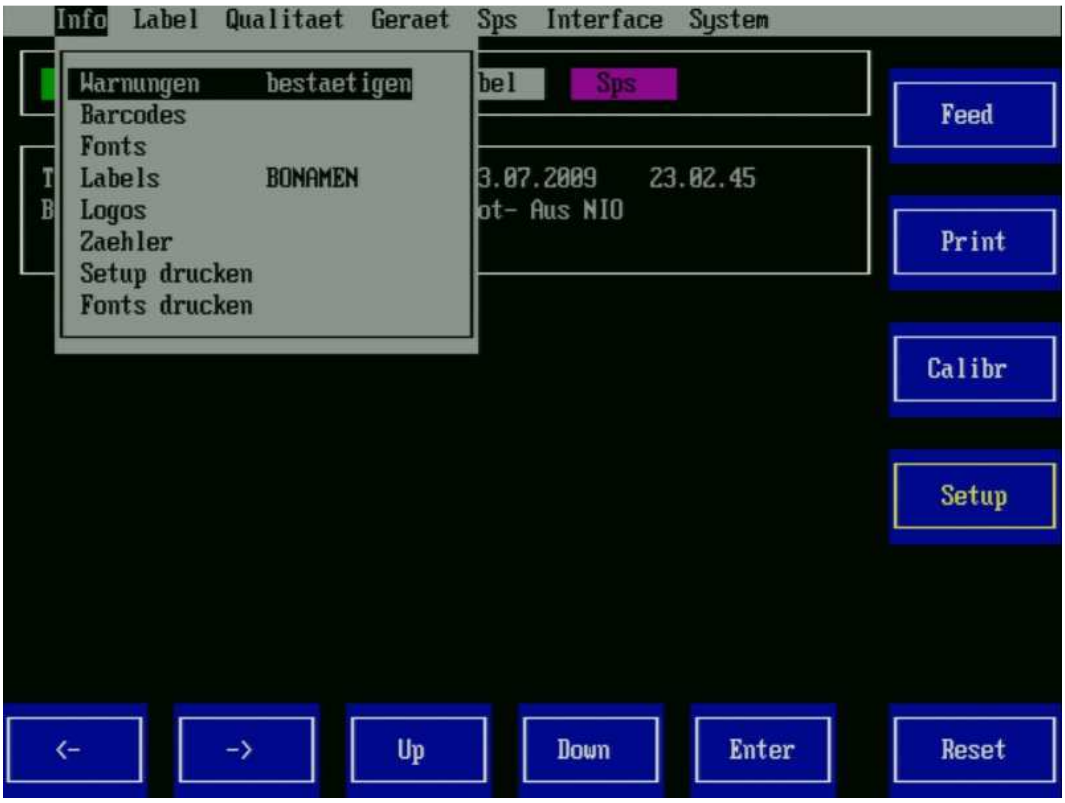


Figure 11 Operation of touch panel

- By pressing the **Setup**-key you can jump to the firmware menu and back.
- By pressing the **arrow**-keys you scroll through the menu levels.
- By pressing the **Up**- and **Down**- key you select the values in the menu levels and by pressing the Enter- key you get to the dialogue where the values can be selected or set.

Description	Function
<–	Moves cursor in the submenu to the left.
–>	Moves cursor in the submenu to the right.
UP	With the **Up**-key you scroll up in the submenu.
DOWN	With the **Down**-key you scroll down.
Enter	With the **Enter**-key the dialogue to select or set values is activated.

Figure 12 Operation of touch panel

If a parameter value has been changed then this value after having been acknowledged is stored permanently with the **OK**-key.

Figure 13 shows the dialogue for inserting a numeric value.

9.3 Menu tree of printer menu

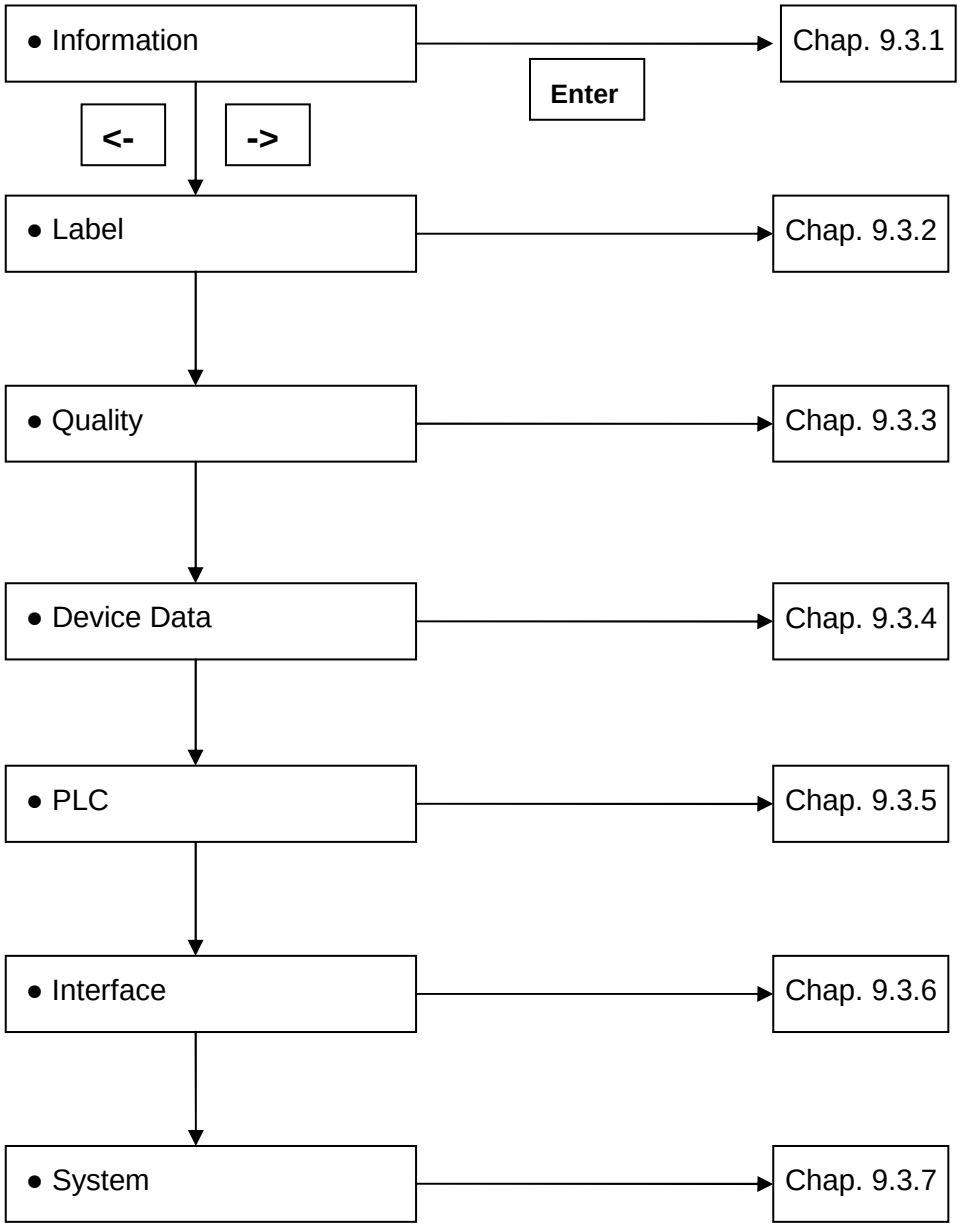


Figure 14 Menu tree of printer menu

9.3.1 Printer menu item „Information“

9.3.1.1 Warnings

In this menu you can set whether warnings (Attention: No ERROR!) should be confirmed (ESC), only be displayed or be ignored (no display).

Parameter field: confirm, display, ignore

9.3.1.2 Barcodes

The barcodes that are implemented in the printer firmware are displayed.

Parameter field: no parameter values, display only.

9.3.1.3 Fonts

The fonts that are stored in the printer are displayed.

Parameter field: no parameter values, display only.

9.3.1.4 Labels

With this menu item the label layouts saved in the controlling can be displayed and can be loaded by pressing the CR key.

Parameter field: no parameter values, display only.

9.3.1.5 Logos

With this menu item logos saved in the controlling can be displayed.

Parameter field: no parameter values, display only.

9.3.1.6 Counter

This option displays a counter showing the quantity of labels, which have been printed since commissioning of system.

Parameter field: no parameter values, display only.

9.3.1.7 Printing Setup

The setup configuration of the control unit is printed onto the labels.

Parameter field: no parameter values, display only.

9.3.1.8 Printing Fonts

This menu item prints the font files that are saved in the control unit.

Parameter field: no parameter values, display only.

9.3.2 Printer menu „Label“

9.3.2.1 XOffset

Displaces label layout that has to be printed on dot line in X direction.
This function enables to position the printout independent of transmitted label layout subsequently to the left or right (global parameter).

This item corresponds with the parameter X alignment that defines where the zero point in X- direction is. (left, right, centered).

Parameter field: -999/+ 999 Dot

9.3.2.2 YOffset

Displaces label layout that has to be printed in Y-direction. This function enables to position the printout independent of transmitted label layout subsequently to the bottom or to the top (global parameter).

This item corresponds with the parameter Y alignment that defines where the zero point in Y-direction is. (top, bottom, centered).

Parameter field: -999/+ 999 Dot

9.3.2.3 Label width

This value defines the label width in Dot.

12 Dots = 1 mm

Parameter field: 0000/+9999 Dot

9.3.2.4 Label length

This value defines the label length in Dot. However, this item is only necessary if using continuous label material.

12 Dots = 1 mm

Parameter field: 0000/+9999 Dot

9.3.2.5 X-alignment

This function enables to position the label layout that has to be printed either to the left margin, centered or to the right margin.

Parameter field: left/right/centered

9.3.2.6 Y-alignment

This function positions the label layout to the top margin, to the bottom margin or centered on the label.

Parameter field: top, bottom, centered

9.3.2.7 Rotate Label

The printout can be rotated about 180°.

Parameter field: ON/OFF

9.3.2.8 Inverse print

This parameter inverts the entire printout.

Parameter field: ON/OFF

9.3.2.9 Labels/Roll

This item sets the label quantity per roll. This function is relevant for the label-end pre-warning (see chapter 9.3.2.10). If this value is turned to 0 then the signals of the outputs are permanently HIGH.

Parameter field: 00000/+99999

9.3.2.10 min. Labels

This item shows the remaining quantity of labels per roll that sets off the label-end pre-warning.

Example: Label/Roll = 5000, min.Labels = 100.

After 4900 labels the output „label-end pre-warning“ is reset on both I/O interfaces of print system. The printer operates normally as there is no error but only a warning.

Parameter field: 000/+999

9.3.2.11 Reset Label Warning

By pressing the Enter-key the output „label end pre-warning“(see chapter 9.3.2.10; chapter 8.5.7.1; chapter 8.5.8.1) is set on the I/O-interfaces again.

9.3.3 Printer menu „Print quality“

9.3.3.1 Print speed

This item defines the speed in mm/s (value between 20 and 200).

Parameter field: +005/+200 mm/s

9.3.3.2 Heating value

The heating value defines the power supply of the printhead.

Parameter field: +001/+200

9.3.4 Printer menu „Device data“

9.3.4.1 Print with Print key

This item sets the print-start performance. Entering „On“ starts the print only when the print data is complete and the print-key or the input print-start is set.

Entering „Off“ starts the print as soon as the data record is complete.

Parameter field: ON/OFF

9.3.4.2 PLC enable

A saved PLC program is activated by the parameter ON. Then there is a second menu level available (see chapter6.4.1).

Parameter field: ON/OFF

9.3.4.3 Print enable

If this parameter is set to ON then the print function can be used in a PLC program without sending label data for each cycle from a host system.

The following additional requirement must be fulfilled:

- A label must be stored in the labelling system and via the menu item Information → Labels be loaded. (Chapter 9.3.1.4)

Parameter field: ON/OFF

9.3.4.4 PowerOnFeed

This item activates the function that after turning on the control unit an automatic calibration test is carried out.

Parameter field: ON/OFF

9.3.4.5 Delete after print

If this option is activated the transmitted label layout to the control unit is immediately deleted from the main memory after printout. It cannot be printed a second time. (if “Print enable“ = OFF).

By “Print enable“ = ON the variable data is updated (e.g. serial numbers, date, time) and the label remains in the memory.

Parameter field: ON/OFF

9.3.4.6 Continuous Material

With the parameter value „On“ the light barrier is set inactive. Then the synchronization is made via the defined label length as described in chapter 9.3.2.4.

Parameter field: ON/OFF

9.3.4.7 Medium transparent (password protected)

With the parameter value „On“ the logic of the label synchronization is inverted. This function is necessary if using transparent label material.

Parameter field: ON/OFF

9.3.4.8 Stop Adjust

The value Stop Adjust sets how many dots the label should be fed after print stop.

Parameter field: 000/+999 Dot

9.3.4.9 Thermal direct

If this option is turned to „ON“ the transfer ribbon end control is inactive.

Parameter field: ON/OFF

9.3.4.10 System date

With this item the date is set.

Parameter format: TT:MM:JJJJ

9.3.4.11 System time

With this item the time is set.

Parameter format: HH:MM:SS

9.3.5 Printer menu „PLC“

9.3.5.1 Autostart

If this item is set to “On“ the PLC program is loaded and started automatically after booting of firmware.

9.3.5.2 Pressure time in ms

This value defines the time period of the vacuum stamp on the product before returning to home position (value in milliseconds)

9.3.5.3 Waiting time 1 in ms

This item defines the waiting time in the PLC-program (value in milliseconds)

9.3.5.4 Waiting time 2 in ms

This item defines the waiting time in the PLC-program (value in milliseconds).

9.3.5.5 Delay Aux. Air Dot

This value defines the start of the auxiliary air depending on the printout (value in dot).

9.3.5.6 Delay Vacuum Dot

This value defines the start of the vacuum depending on the printout (value in dot).

9.3.5.7 Timeout Vacuum in ms

This item defines the time period of creating a vacuum until a timeout error is set off (value in milliseconds).

9.3.5.8 Timeout Cyl. in ms

This item defines the time period of reaching the end position of cylinder until a timeout error is set off (value in milliseconds).

9.3.5.9 Timeout Scan. in ms

This item defines the time period of waiting for the scan results until a timeout error is set off (value in milliseconds).

9.3.5.10 Timeout Special in ms

This item defines the time period of waiting for the signal of the special input until a timeout error is set off (value in milliseconds).

9.3.5.11 Delay Special in ms

With this parameter you define the time delay of the step “E_Special?”, E_Special_Low? and E_Special_or?“ of the sequence chain (value in milliseconds).

9.3.5.12 Scanner type (password protected)

In this menu item the connected scanner is selected.

9.3.5.13 Repeat Reading

This item sets how often the scanner carries out a repeat reading if a timeout error has been set off.

9.3.5.14 Repeat Reading not okay

This item defines how often the entire print and apply cycle is made if a scanner timeout error has been set off.

9.3.5.15 Repeat Vacuum not okay

This item defines how often the entire print and apply cycle is made if a vacuum timeout error has been set off.

9.3.5.16 Sequence program

With this parameter you can select different PLC programs that have been designed with Remote Control in TopTerm.

9.3.6 Printer menu „Interface“

9.3.6.1 Aux-Port (password protected)

Definition of the interface parameters of COM1. COM1 is the service-interface for updating and downloading the firmware and PLC-programs.

Parameter format: COMx:baudrate, parity, data bit, stop bit

9.3.6.2 Data-Port (password protected)

Definition of the interface parameters of COM2. COM2 is the general data interface for receiving labels, layout files, logos and print sequences.

Parameter format: COMx:baud rate, parity, data bit, stop bit

9.3.6.3 Scanner-Port (password protected)

Definition of interface parameters of COM3. COM3 is the peripheral interface to connect external devices as scanners, cameras, etc.

Parameter format: COMx: baud rate, parity, data bit, stop bit

9.3.7 Printer menu „System“

9.3.7.1 Display type (password protected)

With this item the display to be connected to the control unit is selected e.g. EAKIT120.

Parameter field: EAKIT120

9.3.7.2 Display key (password protected)

This item changes the display.

Parameter field:

Touch key / Touch + Keyboard / Touch+Hardkey / Keyboard / Hardkey

9.3.7.3 Display saver

Delay time until the screen saver is activated.

The value “+000“ disables the screen saver.

Parameter field: 0-999

9.3.7.4 Language

Selecting the language of the display.

Parameter field: all available languages in clear text

9.3.7.5 Device (password protected)

This function defines the data processing of the control unit. If the option „topex“ is chosen the topex printer syntax is processed. If the option „Zebra“ is activated the Zebra syntax is processed.

Parameter field: Topex / Zebra / Junior / Dispenser

9.3.7.6 Printhead width (password protected)

Printheads of 4 different widths (54, 104, 108 und 160 mm) are used in the topex7100- series. In the menu the entries are in dots.
Conversion from mm in dots:

- 54 mm → 640 Dot (12 Dot)
- 108 mm → 1280 Dot (12 Dot)
- 160 mm → 1920 Dot (12 Dot)
- 104 mm → 832 Dot (8 Dot HYC)
- 108 mm → 896 Dot (8 Dot)

Parameter field: 640/12; 1280/12; 1920/12; 832/8 HYC; 896/8

9.3.7.7 Distance LB (password protected)

This function sets the distance between light barrier and printhead and is decisive for the label synchronisation.

The models topex7100 and topex7100 ECO have different distances due to their construction.

Parameter field: ECO/T7000

9.3.7.8 Paper feed

This parameter sets the dispensing mode of the system.

In mode „Normal“ the beginning of the label is positioned directly under the dot line after the calibration run. In mode „Applicator“ the label feed is made depending on the label gap and the set StopAdjust. So an adaptation of different label sizes can be realised.

Parameter field: Normal/Applicator

9.3.7.9 PLC- program

If Standard.SBS is selected the PLC program is interpreted by the firmware (quicker processing) if Auto.SBS is chosen the PLC program is interpreted by the formula compiler, which can be expanded by topex at any time. Also special programs can be executed.

Parameter field: Auto.SBS / Standard.SBS / *.SBS

9.3.7.10 Rotating direction (password protected)

This function sets the rotating direction of the motor.

Minus = right construction

Plus = left construction

Parameter field: Plus/Minus

9.3.7.11 Micro step (password protected)

This function sets the step width of stepping motor per tact signal. This value is adjusted to 4 steps as standard.

9.3.7.12 Backup (password protected)

With this function all files of the printer control will be copied into the folder c:\backup.

9.3.7.13 Restore (password protected)

The files they are saved in the folder c:\backup will be copied back to the root-directory.

9.3.7.14 Save

This parameter is used for internal purposes.

9.4 Setting of menu labelling machine (Dispenser menu)

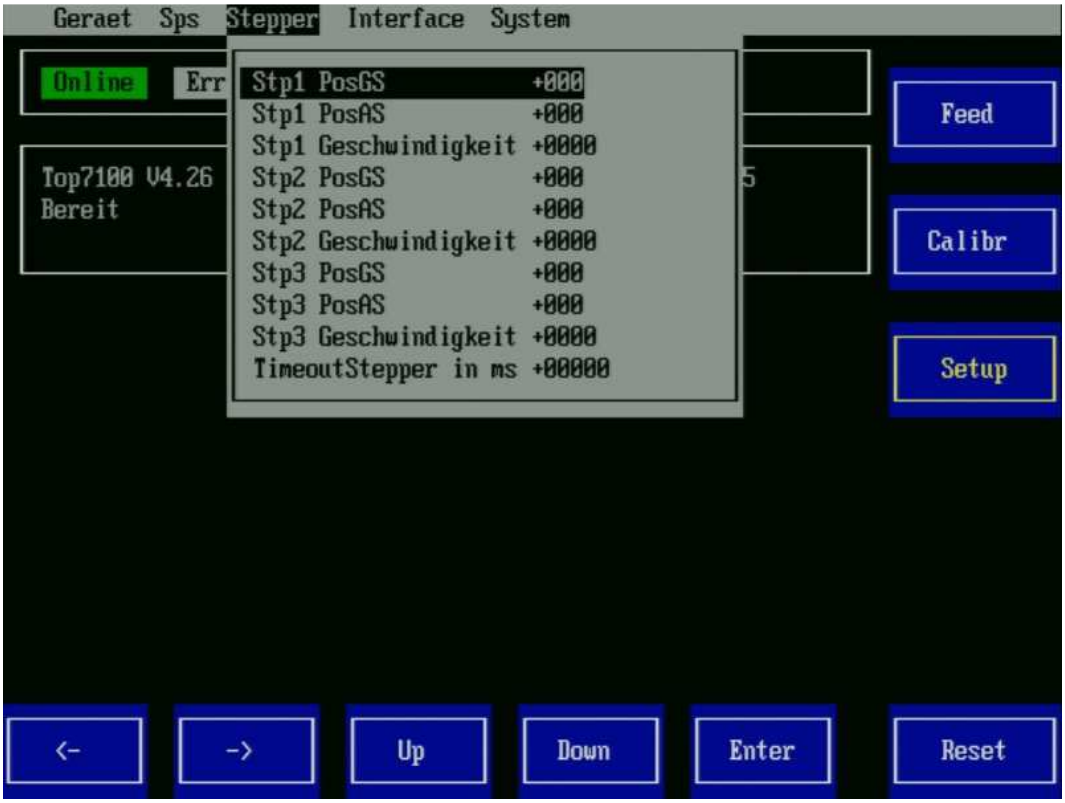


Figure 15 Menu of labelling machine (dispenser)

Description	**Function**
Feed	Feed of a label.
Calibr	With the **CALIB**-key a test run is started. About 4 labels are dispensed and calibrated.
Setup	With the **SETUP**-key you get to the menu.
Reset	With the **Reset**-key upcoming firmware failures are deleted. By pressing the key twice the firmware is reinitialized.

9.4.1 Dispenser menu „Stepper“

In this menu the movement position and the movement speed as well as the Timeout for the control end position of the PLC program are set. (For all other menu items see chapter 9.3.2.4).

9.5 Menu tree of PLC menu

The PLC menu is started in the printer menu by pressing the **Menu**-key. Therefore a PLC program has to be stored and to be activated in the control unit.

The step back to the printer menu is made with the **Menu**-key as well.

With the **Start-/ Stop**-keys the operation mode „Automatic“ is activated/deactivated. After activation of Automatic the automatic sequence programmed in RemoteControl is started.

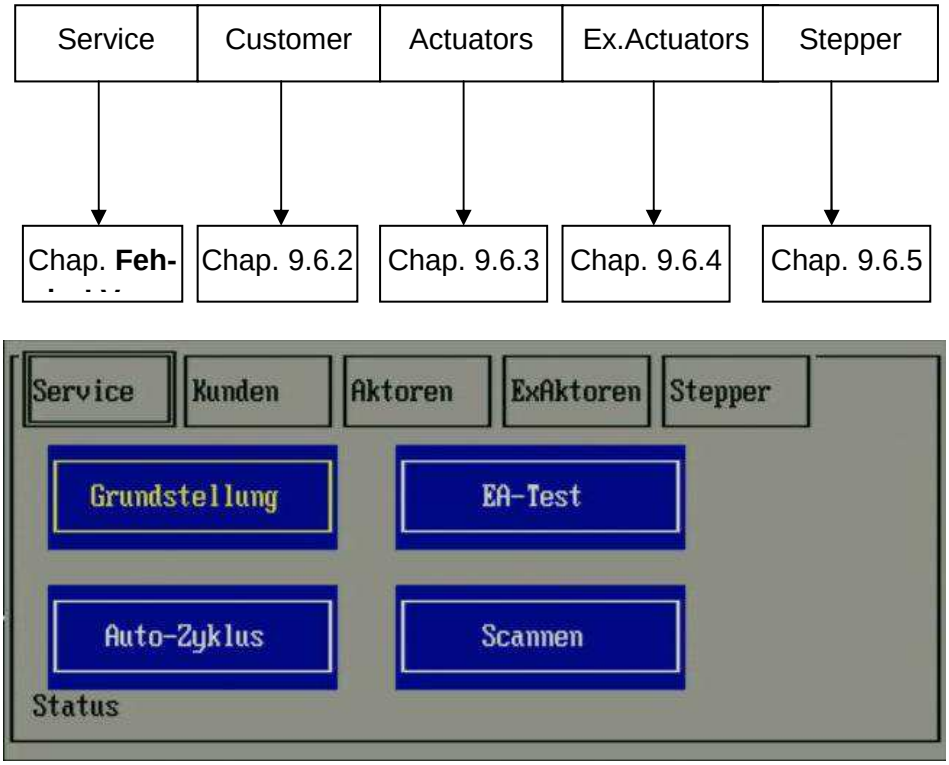


Figure 16 Menu tree of PLC menu

9.6 Menu item of PLC menu

Generally all actuators are set with the **ON**-Button and reset with the **OFF**-Button. All actions are started directly with the corresponding button e.g. **home position**-Button or **IO-Test**-Button.

9.6.1 PLC menu „Service“

9.6.1.1 Home position

This item starts the sequence chain of the home position movement. The sequence has to be programmed with RemoteControl and stored in the printer.

9.6.1.2 Automatic cycle

This item starts the sequence chain of the automatic operation. The sequence has to be programmed with RemoteControl and stored in the printer.

9.6.1.3 IO-Test (password protected)

Warning!

Before start of I/O- Test a topex check adapter has to be connected to the I/O-board. The I/O- Test must not be carried out if a pneumatic driven handling device is connected.

After starting the test all outputs are switched on and off one after the other and the corresponding inputs are checked.

The test lasts about 15 sec.

If the test has been successful the text „I/O- board okay“ is displayed otherwise an error message with the corresponding I/O pair is shown.

9.6.1.4 Scan

A control reading with the currently connected scanner (camera) is made. If the code is read its content is shown on the display otherwise the message „Timeout“ is displayed.

9.6.2 PLC menu „Customer“

Here the 4 Inputs and Outputs of the customer interface can be tested. The actuators are set with the **ON**-button and reset with the **OFF**-button. The status of the inputs is shown on the right side of the display. At signal status HIGH the font background turns to green.

9.6.3 PLC menu „Actuators“

This menu is used to test the pneumatic cylinders of the handling device as well as the vacuum and auxiliary air unit. This item operates in the same way as the menu customer interface.

At end position HP the background of the actuator inscription gets green, at WP blue.

Caution!

All outputs of cylinders are not interlocked in manual mode. In case of wrong handling, there is danger of physical injury and danger of damage or destruction by collision!

⇒ **Ensure at each activity that no person or**
Objects interrupt the motion sequence.

9.6.4 PLC menu „ExActuators“

This menu controls the pneumatic cylinders 3-6 of the handling device and also an expanded control unit with 24 inputs and outputs. The operation is the same as the menu item „Actuators“

9.6.5 PLC menu „Stepper“

This menu controls the optional expandable stepping motors. The reference point, the home position and the working position that have been predefined in the menu can be set for up to 3 motors.

9.7 Settings of PLC menu

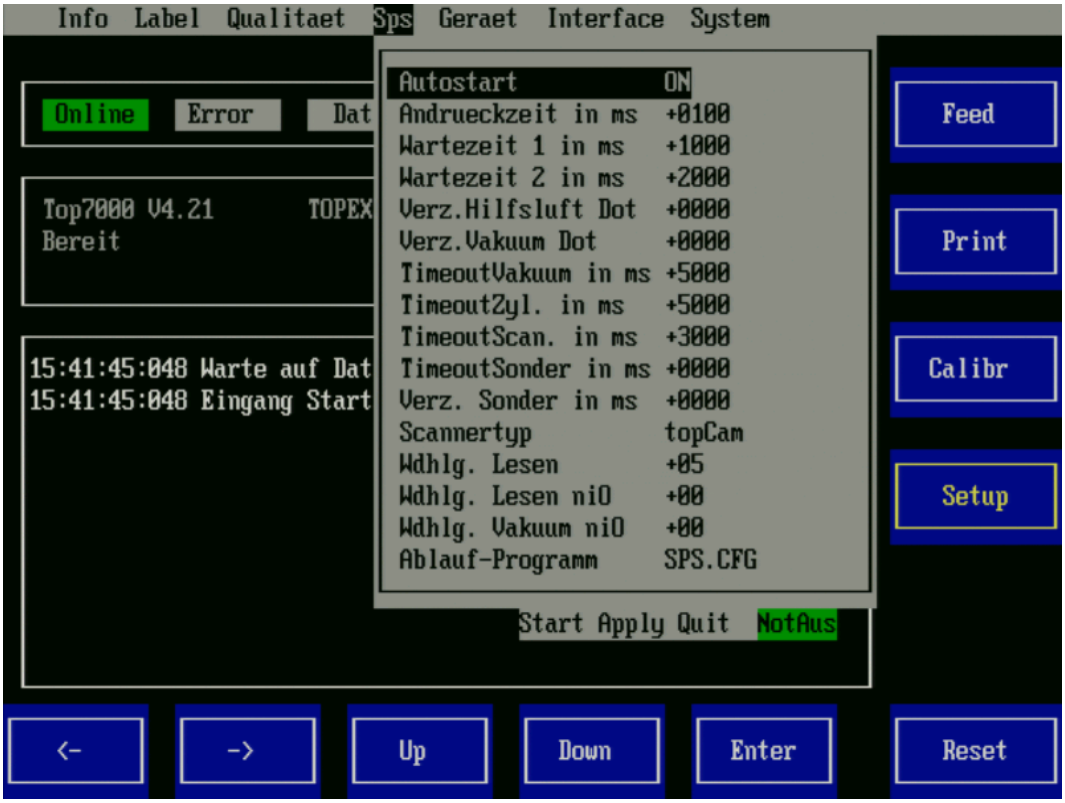


Figure 17 Settings of PLC parameters

9.7.1 PLC menu „Settings“

This menu adjusts all time values with a resolution of 1 ms. Furthermore it sets the scanner configuration.

A PLC program designed with RemoteControl is required for all these adjustments; it is also possible to edit all parameters with the program Remote-Control. Therefore the PC with RemoteControl installed has to be connected to the service interface COM1.

9.7.1.1 Auto start

If this item is set to “On“ the automatic mode is started after starting the control unit.

9.7.1.2 Pressure time in ms

This value defines the time period of the vacuum stamp on the product after applying the label.

9.7.1.3 Waiting time1

This item defines the free-programmable waiting time in the PLC sequencer.

9.7.1.4 Waiting time 2

This item defines the free-programmable waiting time in the PLC sequencer.

9.7.1.5 Delay Auxiliary Air

Start delay of auxiliary air. Instead of a time the feed in dots is set after this set value the auxiliary air is activated.

9.7.1.6 Delay of vacuum

Start delay of vacuum. Instead of a time the feed in dots is set after this set value the vacuum is switched on.

9.7.1.7 Timeout vacuum

Monitoring time of vacuum switch. If the vacuum is activated and the vacuum switch sets no signal during the monitoring time a timeout error is set off.

9.7.1.8 Timeout Cyl.

Monitoring time of pneumatic cylinder. Has a cylinder been moved in one of its end positions and the respective end position switch sends no signal during the monitoring time a timeout error is set off.

9.7.1.9 Timeout Scan.

Monitoring time of scanner/camera. If the scanner does not send a okay-read an error is set off.

9.7.1.10 Timeout Special

Monitoring time of the special input. If the input is LOW after the end of the set time an error is set off.

9.7.1.11 Delay Special

If the special input has the signal HIGH the delay time is started. The sequencer will be continued if the time is run down.

9.7.1.12 Scanner type

Here you can choose the connected scanner. The PLC program sends then automatically the respective control sequences to the scanner or camera and analyses the feedbacks received.

9.7.1.13 Repeat Reading

This item sets how often the scanner carries out a repeat reading if a timeout error has been set off.

9.7.1.14 Repeat Reading not okay

This menu item requires the object niO (not okay) scan →of the automatic sequencer.

With this counter the quantity of repetitions of the step sequence from this object is configured.

A repeat reading is only started if the scanner/camera sends non-reading signal. After end of counter an error is set off.

9.7.1.15 Repeat vacuum not okay

This menu item requires the object „niO (not okay) vacuum →“ of the automatic sequencer.

With this counter the quantity of repetitions of the step sequence from this object is configured.

A repetition is only made if a vacuum error occurs.

After end of counter an error is set off.

9.7.1.16 Sequence program

With this parameter you can select different sequence programs that have been designed with RemoteControl and are stored in the control unit.

10 Datenhandling mit TopTerm

Warning!

Exclusively authorized stuff, trained by topex GmbH and with the required qualifications, may carry out the data processing with TopTerm.

Improperly made changes on the control unit might result in faults or damages to the labelling system and in injuries for the operator.

The program TopTerm has been extended by the menu item „Topex7200“.
Here you find submenus for the file transfer, change of setup, firmware download as well as PLC programming.

Information!

For this function the service interface LAN2 or the serial interface COM1 of the control unit is used. The baud rate in TopTerm must be set to 57600.

10.1 Setting of port

In order to use the TopTerm program for downloading files you have to use the COM1- interface of the control unit with the adjustments 57600 Baud, 8 Data bits, No Parity, 1 Stop bit and No Protocol

It might be necessary to reselect under „file“the function „SR-Terminal“.

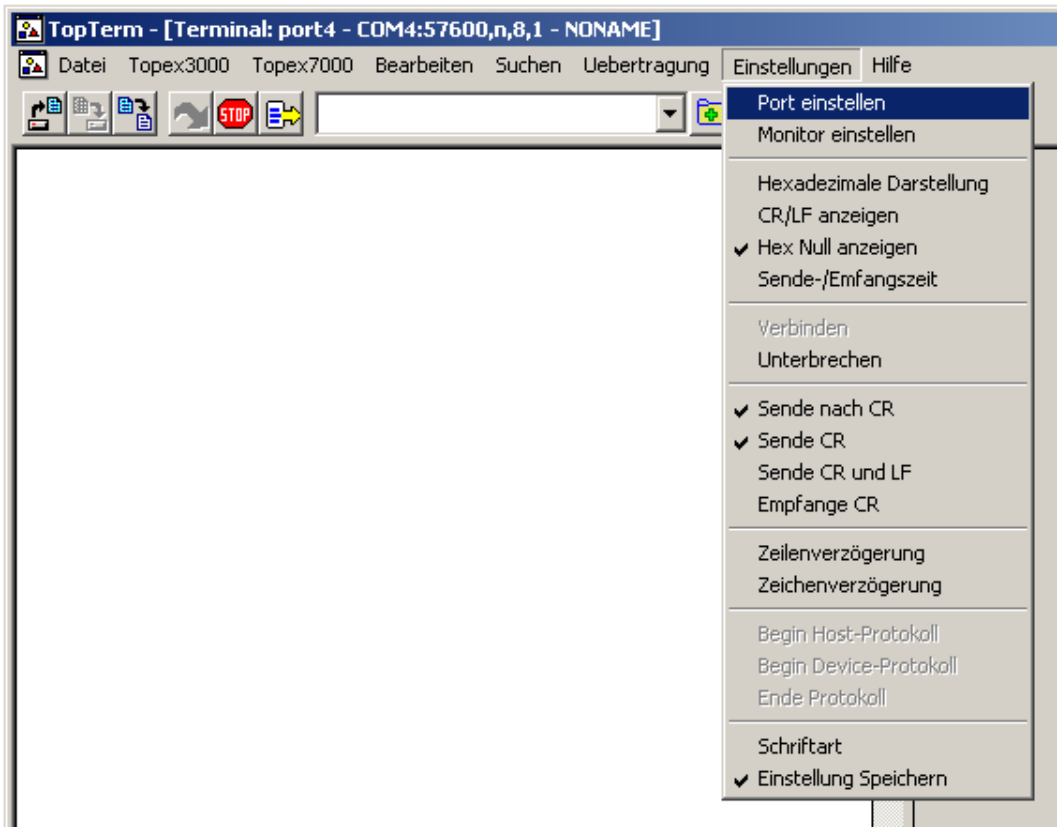


Figure 18 „Setting port“

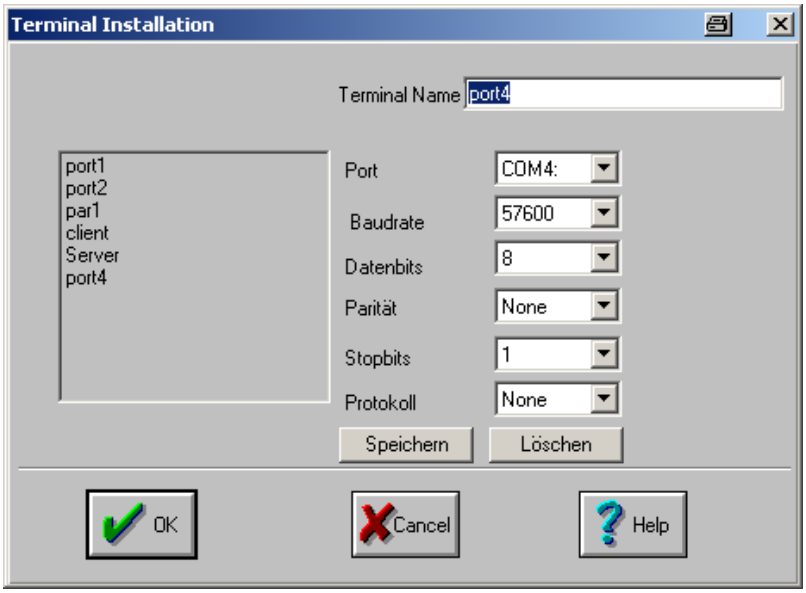


Figure 19 „Setting port“

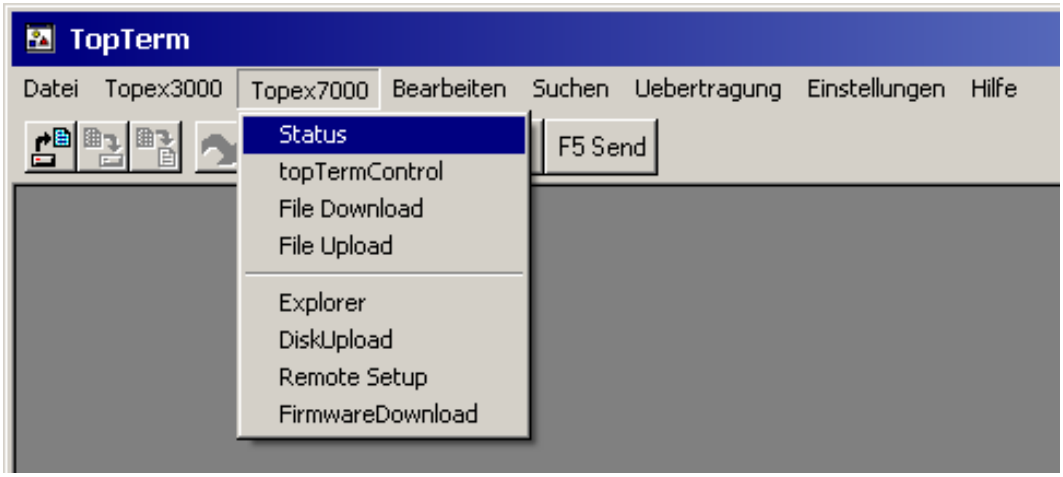


Figure 20 Status request

10.2 File Download

Any files can be transmitted from the hard disk of the service PC to the control unit.

- Menu topex7000/File Download
- Select the file to be transmitted in „Datei senden/Send file“- dialogue
- Click the button „Öffnen/open“

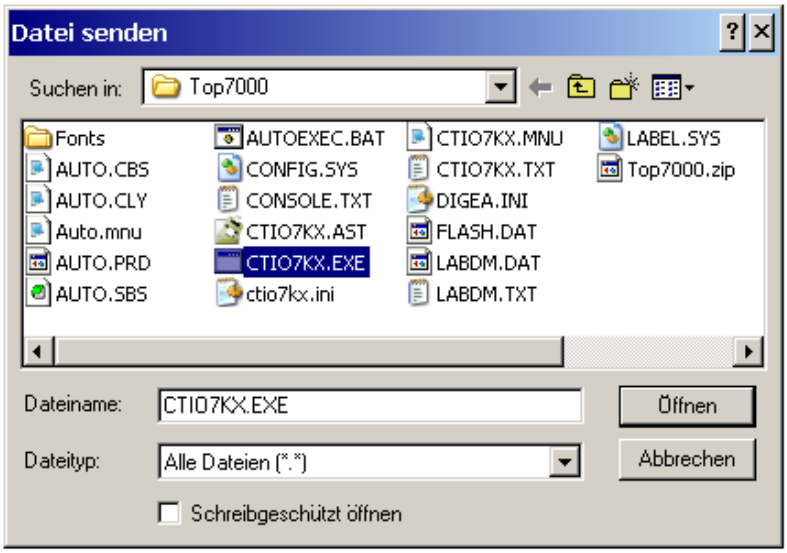


Figure 21 „Sending file“

10.3 File Upload

Any files can be transmitted from the hard disk of the service PC to the control unit.

- Menu topex7000/File Upload
- Select the file to be transmitted in „Directory“- dialogue.
- Click the button „Ok“ → File transfer is displayed as bar graph
- Select the target directory in „Datei speichern unter/save file as“- dialogue
- Click the button „Speichern/Save“

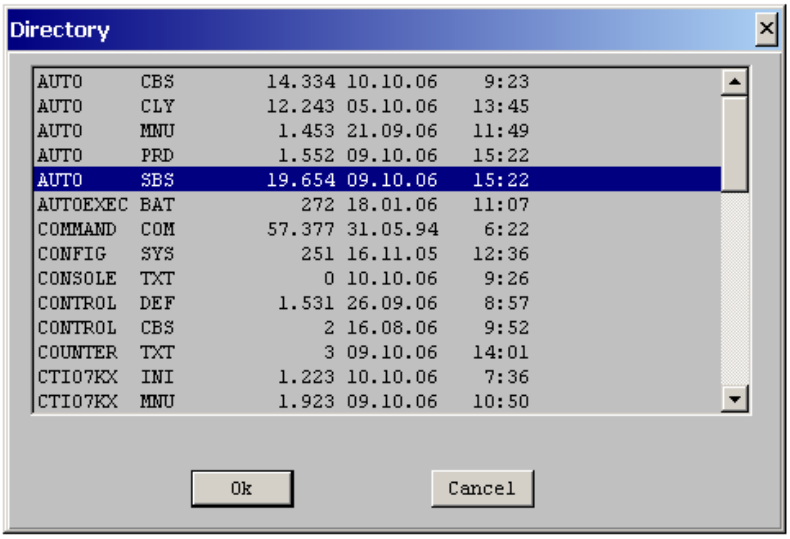


Figure 22 „Directory“

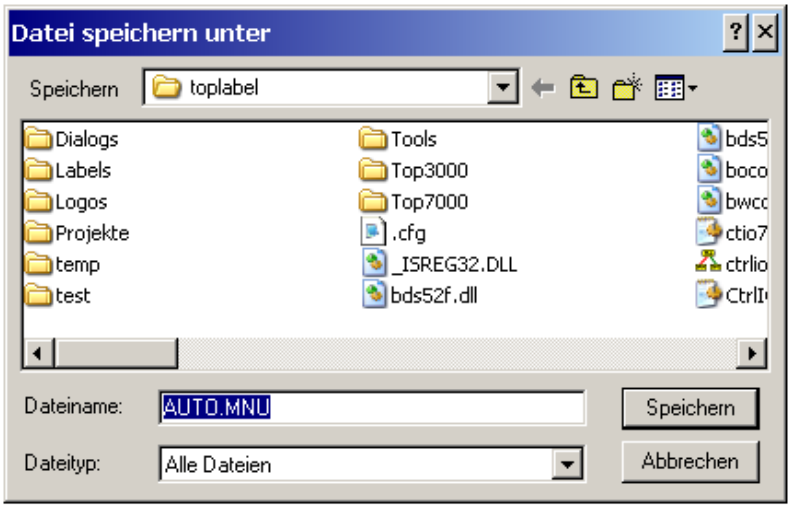


Figure 23 „Save file as“

10.4 DiskUpload / DiskDownload

This function saves all important files and directories of the control unit on the Service PC respectively are transmitted from the PC to the control unit.

DiskUpload:

- Menu Topex7000/Explorer
- Menu Topex7000/DiskUpload
- Select the target directory „Speichern unter/Save as“- dialogue
- Start process by pressing the button „Speichern/Save“. The total transmission takes about 5 – 10 min.
- Please note that no **.exe**- files are transmitted.

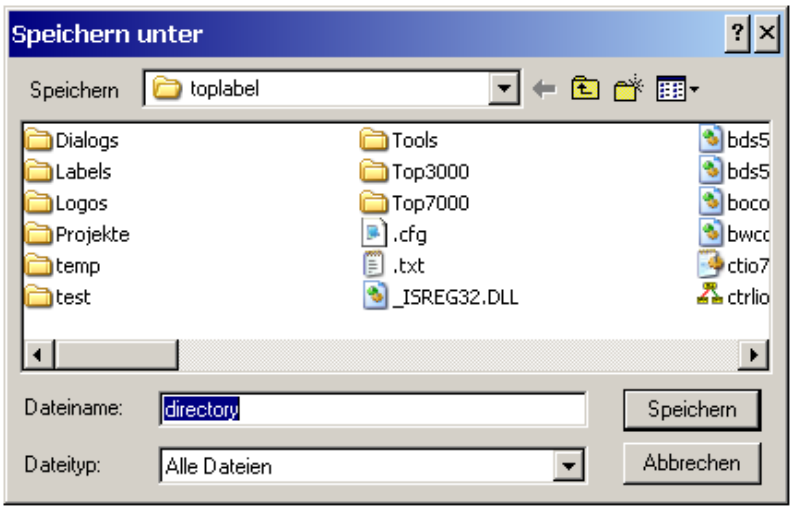


Figure 24 „Save as“

DiskDownload:

- Menu Topex7000/Explorer
- Menu Topex7000/DiskDownload
- Select source directory
- Start the process by pressing the button „Speichern/Save“. The total transmission takes about 5 – 10 min.

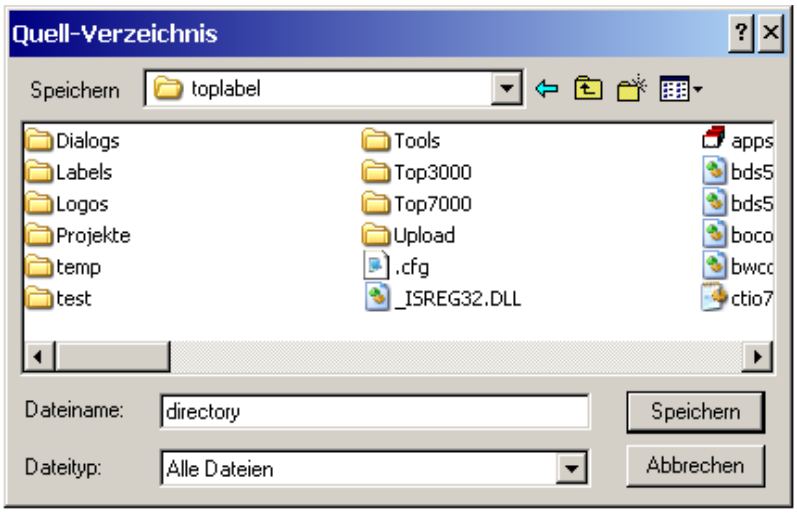


Figure 25 Selection of source directory

10.5 Remote Setup

All settings of the printer menu (see chapter 9.3) can also be changed with the item Remote Setup.

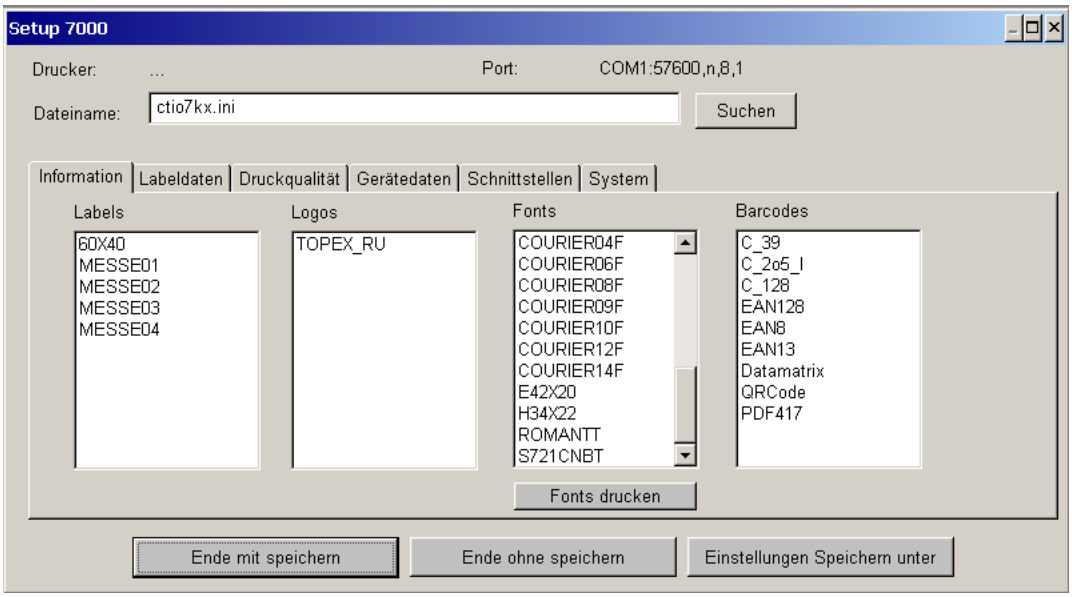


Figure 26 Remote Setup

10.6 Explorer

With this tool all files in the control unit can be edited, copied, deleted, up- and downloaded.

- Menu topex7000/Explorer
- Select file with left mouse click
- Open context menu by right mouse click
- Choose desired function

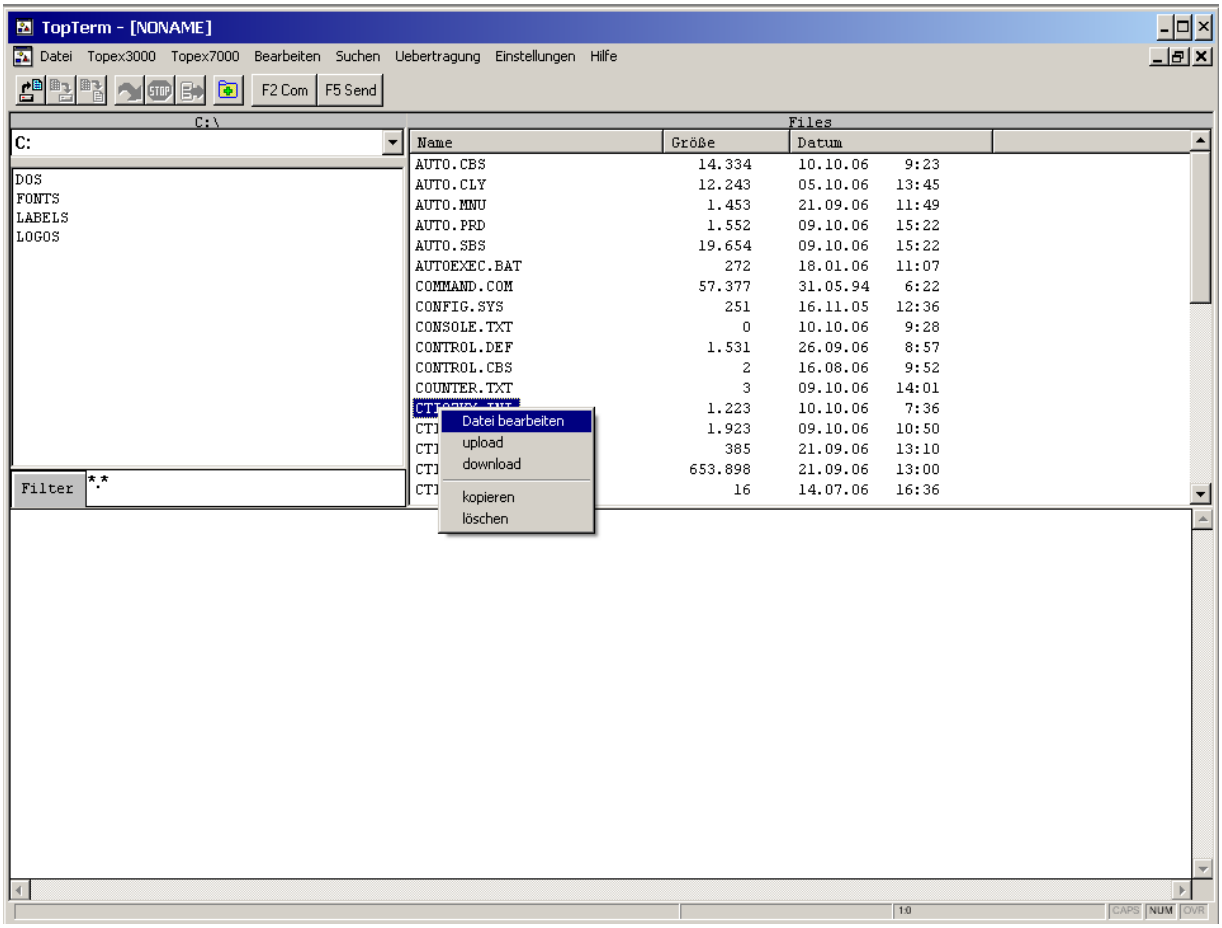


Figure 27 Explorer

10.6.1 Edit file

Files can also be changed directly in the control unit:

- Menu topex7000/Explorer
- Select file with left mouse click
- Open context menu with right mouse click
- Select „Datei bearbeiten/edit file“, file is displayed in bottom window of explorer
- Make the changes
- Select „Datei/Speichern/Save file“ or „Datei/Speichern unter/Save file as“

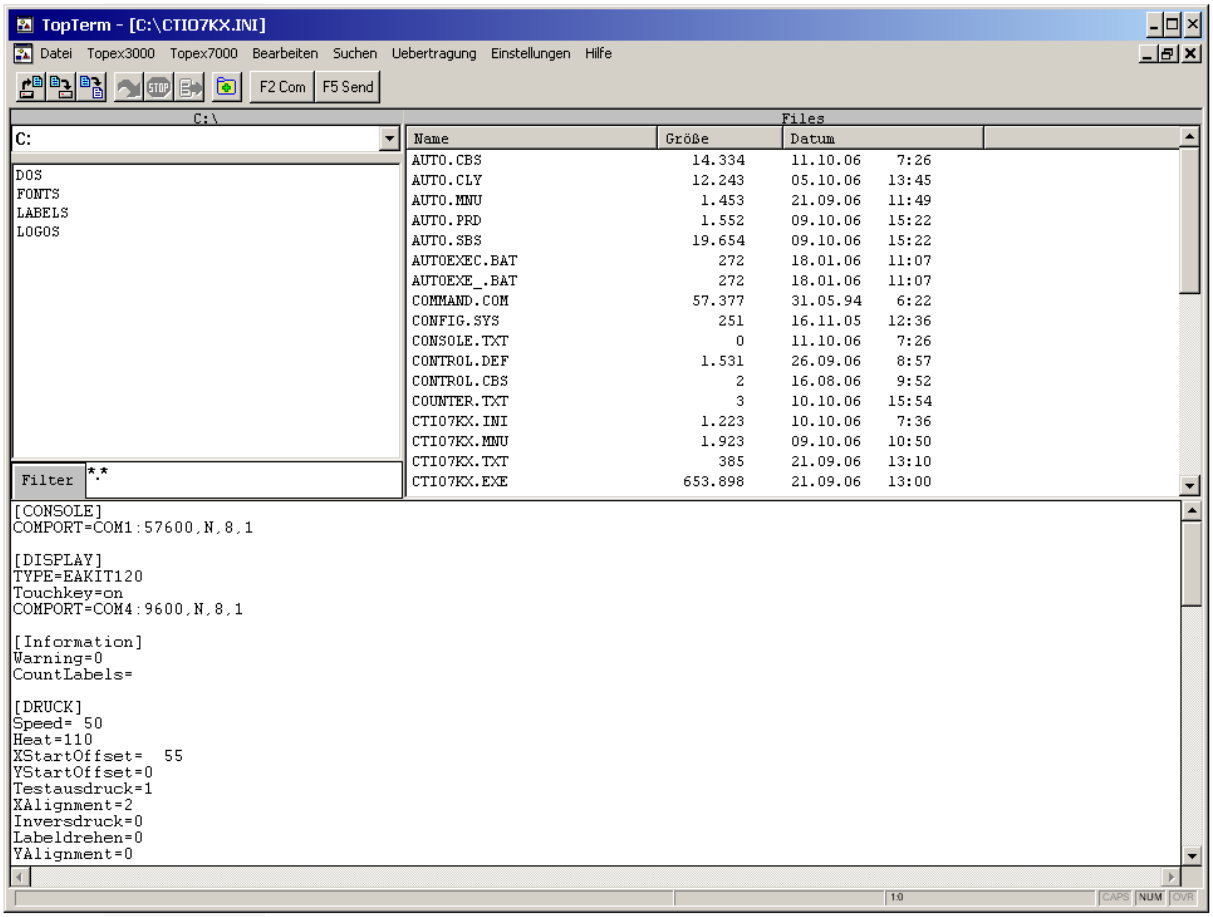


Figure 28 Explorer – Edit file

10.7 Files of the control unit

The following describes the file structure of the control unit.

10.7.1 System files

c:\wctio7kx.exe	Firmware
c:\ctio7kx.ini	Setup parameters
c:\ctio7kx.mnu	Configuration of main menu in printer mode
c:\digea.ini	Configuration of main menu in dispenser (not active)
c:\ctio7kx.txt	PLC menu configuration
c:\labdm.exe	Messages
c:\labqr.exe	Designs Datamatrix
c:\pdfenc.exe	Designs QR-Code
c:\rtm.exe	Designs PDFENC-Code
c:\dpmi16bi.ovl	Borland-file for memory management
c:\counter.txt	Borland-file for memory management
c:\flash.dat	Is set by firmware: Counter for labels
c:\logfile.csv	Is set by firmware: Measured values during test run
c:\config.sys	Is set if INI-file [INFORMATION] LogFile=ON
c:\autoexec.bat	Start file

10.7.2 User files

c:\fonts*.dat	Font files (only relevant in printer mode)
c:\logo*.bmp	Logos
c:\labels*.dru	Labels for the interpretation by the firmware
c:\labels*.etk	Source files of labels
c:\dialogs*.dlg	Dialogue files of display

10.7.3 TopTermControl-Interpreter, Menu configuration and PLC sequence program

c:\standard.prd	Project file
c:\standard.sbs	Global functions
c:\standard.cly	Object macros
c:\control.def	Definition of inputs, outputs, flags and variables
c:\standard.mnu	Menu configuration of PLC menu
c:*.cfg	PLC sequence program (designed by RemoteControl)

11 PLC programing with TopTermControl

Warning!

Exclusively authorized stuff, trained by topex GmbH and with the required qualifications, may carry out the PLC programming with TopTerm RemoteControl.

Improperly made changes on the control unit might result in faults or damages to the machine and in injuries for the operator

11.1 Brief description

With the program „TopTerm RemoteControl“ PLC programs with cylinder movements or requests of In- and Outputs can be designed. These programs can be loaded from printer/hard disk and saved on printer/hard disk.

The sequence programs are organized as lists in which the different control objects can be positioned linearly. Furthermore delay and monitoring time can be set and scanner/camera can be configured.

A command interpreter in the control unit is required that the PLC programs designed with topTermControl work. This is displayed after restart of the control unit in the 2nd line of the operating panel with the index „topTermControl V3.x“.

11.2 Selection

The programming tool is started via „TopTerm“ by the menu item Topex7000/topTermControl.

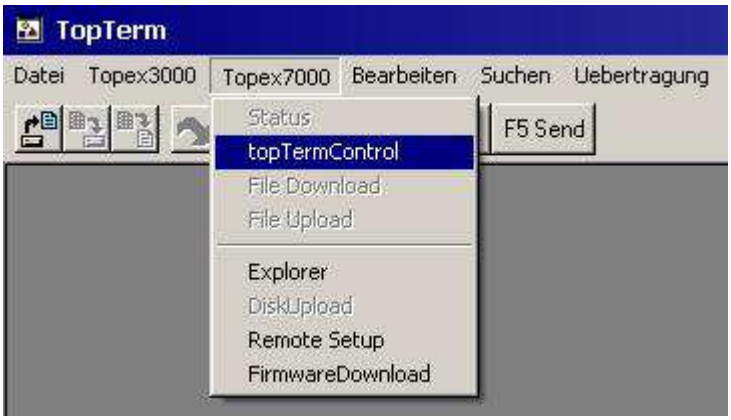


Figure 29 Starting topTermControl

11.3 Operation

The user interface is divided in 6 sections:

- Commands:
  List of all available control objects
- Parameter:
  Configuration of time values and scanners as well as repetitions of printing and reading procedure. When the option „Autostart“ is selected the operation mode Automatic is immediately started after restart of control unit.
- Automatic:
  Sequence chain for automatic operation
- Home position:
  Sequence chain for home position run
- topex7000:
  load/save PLC program from/to labelling machine
- Hard disk:
  load/save PLC from/to hard disk

For each section of automatic and home position sequence chain are 4 buttons and 1 input field with the following functions available:

- Schritt einfügen (Insert step):
  Inserts the current marked control object from the command section in front of the marked object of each list.
- Schritt anhängen (Add step):
  Adds the current marked control object from the command section to the end of each list
- Schritt löschen (Delete step):
  deletes the marked object of the respective list
- Liste löschen (Delete list):
  deletes the respective list
- Zylinder Nr.(Cylinder no.):
  Here the number of the cylinder that has to be programmed is entered, cylinder 1 - 10 is possible.

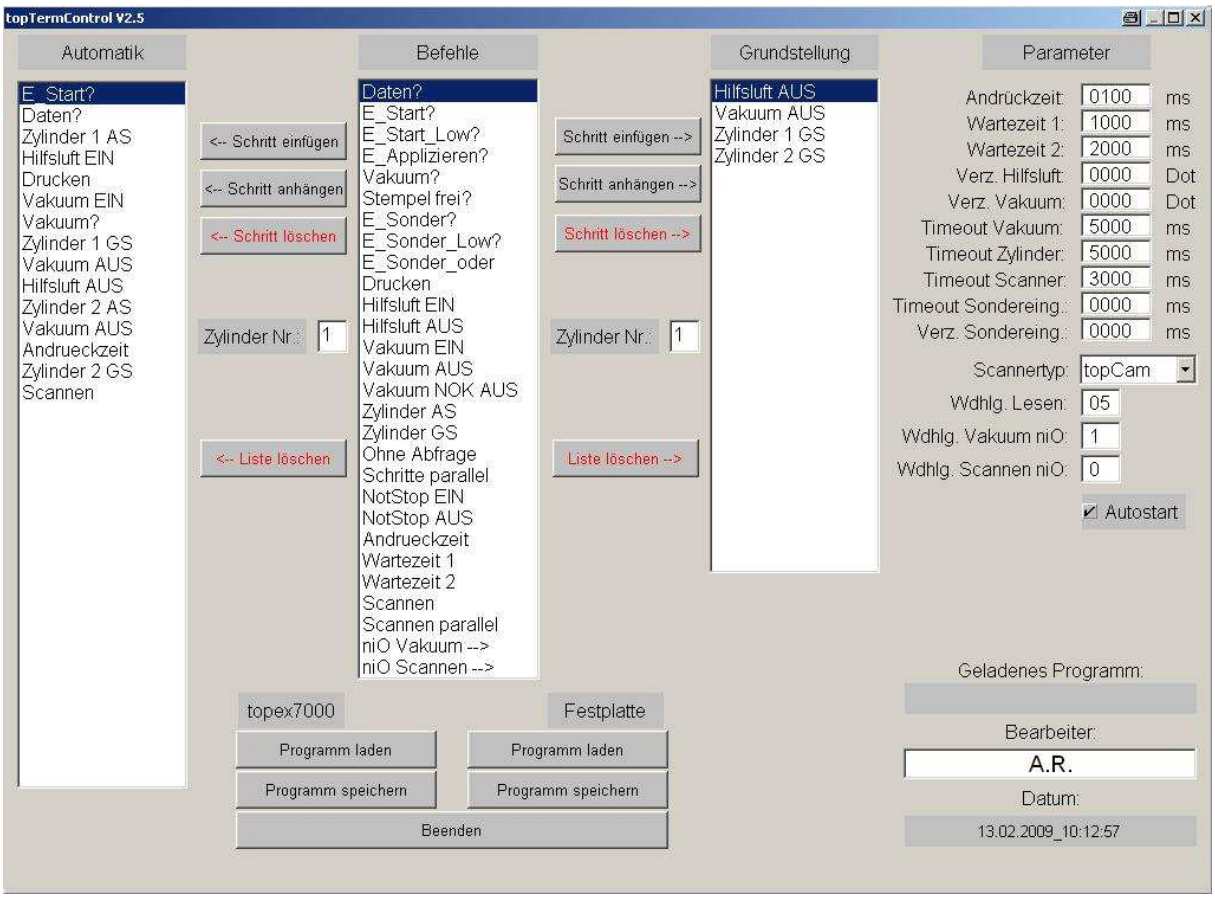


Figure 30 Operation of topTermControl

11.4 Description of control objects

All available control objects are displayed in the command section of the user interface. Each object displays while a sequence chain is active a text in the 2. line of the operation panel so that the processing of the sequence chain can be watched.

Control objects	Display text	Description
Daten?	Waiting for Data	The object waits until a valid data record was transmitted or a saved label was selected on printer
E_Start?	Input Start?	The object waits until the input „Start“ was set on the customer interface. The input must be reset by customer (edge interpretation), otherwise „Eing. Start aktiv!/ input start active!“ is displayed at next cycle
E_Applizieren?	Input Applying?	The object waits until the input „Start“ was set at the customer interface.
E_Sonder?	Special input? Delay Special input	The object waits until the input 6 is set at the Lumberg adapter. Moreover a Timeout and delay time of special input are provided in the parameter section. Timeout can be disabled by entering 0.
Vakuum?	Check Vacuum	The vacuum switch is checked. If the vacuum is not reached after end of period Timeout Vacuum (see parameter section) an error is displayed. If the vacuum is reached the vacuum control is activated.
Stempel frei?	Stamp free?	Switches on the vacuum and checks if the vacuum switch is set to LOW. If the vacuum switch signal is HIGH an error is displayed.
Drucken	Print Label	The loaded label is printed
Hilfsluft EIN	Auxiliary Air ON	Switches on the auxiliary air
Hilfsluft AUS	Auxiliary Air OFF	Switches on the auxiliary air
Vakuum EIN	Vacuum ON	Switches on the vacuum
Vakuum AUS	Vacuum OFF	Switches off the vacuum and shuts down the vacuum control.
Vakuum NOK AUS	No display	Switches of the vacuum control.

Control objects	Display text	Description
Zylinder AS	Cylinder [1-10] WP	The respective valves of cylinder work position (WP) are set and the corresponding inputs are checked. The number of the cylinders to be programmed is entered in the respective input field of the sequence chain. If the end position is not reached after end of period „Timeout cylinder“ (see parameter section) an error is displayed.
Zylinder GS	Cylinder [1-10] HP	The respective valves of cylinder home position (HP) are set and the corresponding inputs are checked. The number of the cylinders to be programmed is entered in the respective input field of the sequence chain. If the end position is not reached after end of period „Timeout cylinder“ (see parameter section) an error is displayed.
Andrueckzeit	Applying Time	Waits until the set applying time in the parameter section is terminated.
Wartezeit 1	Waiting Time 1	Waits until the set waiting time 1 in the parameter section is terminated.
Wartezeit 2	Waiting Time 2	Waits until the set waiting time 2 in the parameter section is terminated.
Scannen	Reading with [Scanner type]	A scanner or camera reading with the set scanner type in the parameter section is serially triggered. The object is active as long as no scan result is available. The step is set forward if either a scan result with the respective Barcode/ Datamatrix is provided or if the set repetitions of scanning (see parameter section) are terminated without a result. In the latter case an error is displayed.
Scannen parallel	Reading with [Scanner type]	Functions are the same as the object „Scan“, however by contrast the sequence chain is set forward immediately that a reading can be done simultaneously to a cylinder movement.

Control objects	Display text	Description
niO Vakuum →	No display	This object sets a jump label in front of the step as from there the sequence chain should be repeated after a vacuum- Timeout. The repetitions are configured with the parameter „Wdhlg. Vakuum niO/repetition vacuum not okay “ in the parameter section.
niO Scannen →	No display	This object sets a jump label in front of the step as from there the sequence chain after a good reading of scanner/camera should be repeated. The repetitions are configured with the parameter „Wdhlg. Scannen niO/repetitions scanning not okay“ in the parameter section.
E_Sonder_oder	No display	The object that follows this object into the step- chain, will only be executed when the special input is “high”, otherwise this object will be skipped.
Schritte parallel	No display	Both steps that follow this object will be started in parallel.
NotStop EIN	No display	After „NotStop EIN“/ „NotStop ON“ has been carried out in the sequence chain the LOW-signal of the special input sets all cylinder immediately to home position and displays the error „Not Stop“. Afterwards the control unit has to be acknowledged.
NotStop AUS	No display	The object „NotStop AUS“/„NotStop OFF“ neutralises this function so that the special input can be used again in the sequence program.
E_Start_Low?	Input Start active!	The object is waiting without Timeout until the start input is set to LOW.
E_Sonder_Low?	Special input active!	The object is waiting without Timeout until the special input is set to LOW
Ohne Abfrage	No display	The following object will be executed without input request

11.5 Interpreter of PLC programs in the control unit

The file SPS.cfg designed with topTermControl and saved in the control unit is interpreted with the formula project standard.prd.

This program includes the complete logic of the PLC sequence control system. The following files belong to the formula project:

- standard.prd
- standard.sbs
- standard.cbs
- standard.cly
- control.def

That the interpreter is activated is shown after restart of the control unit in the 2nd line of the operating panel with the index „TopTermControl V2.x“.

12 Data of controlling at acceptance test

The acceptance report contains the software versions:

- Firmware version of control unit
- Version of TopTermControl

Both versions are displayed after restart of the control unit.

The following files must be saved to the folder \Elektro\t7000 on the CAD-Server:

- ctio7kx.ini all settings of printer
- sps.cfg PLC sequence program (if existent)
- standard.prd Interpreter file of TopTermControl
- standard.sbs Interpreter file of TopTermControl
- standard.cbs Interpreter file of TopTermControl
- standard.cly Interpreter file of TopTermControl
- control.def Interpreter file of TopTermControl
- \labels*.* Labels
- \logos*.* Bitmaps

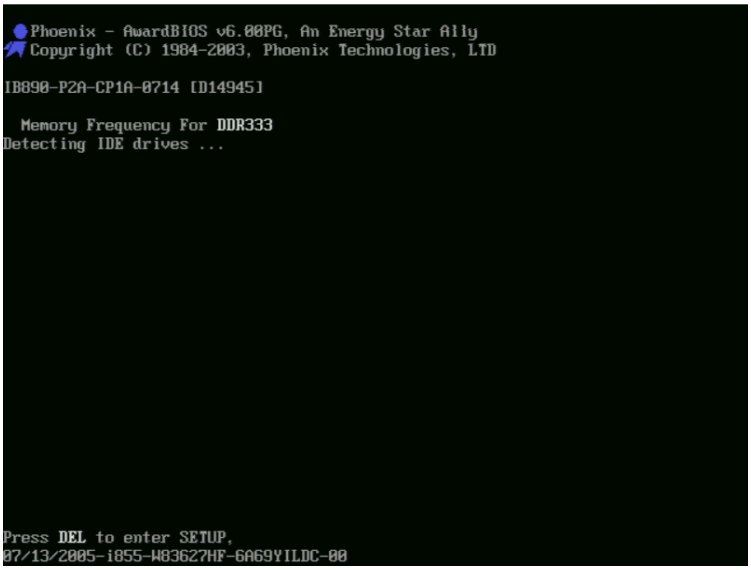
To save the files the function DiskUpload (see chapter 10.4) is used.

13 BIOS-Parameter

To check or adjust the BIOS parameters you will need a PS2-Keyboard with a PS2 Y-Adapter or a USB- Keyboard, which will only be recognized in the BIOS

To enter the BIOS you have press the „delete“ Button on the connected Keyboard after the controller is powered on.

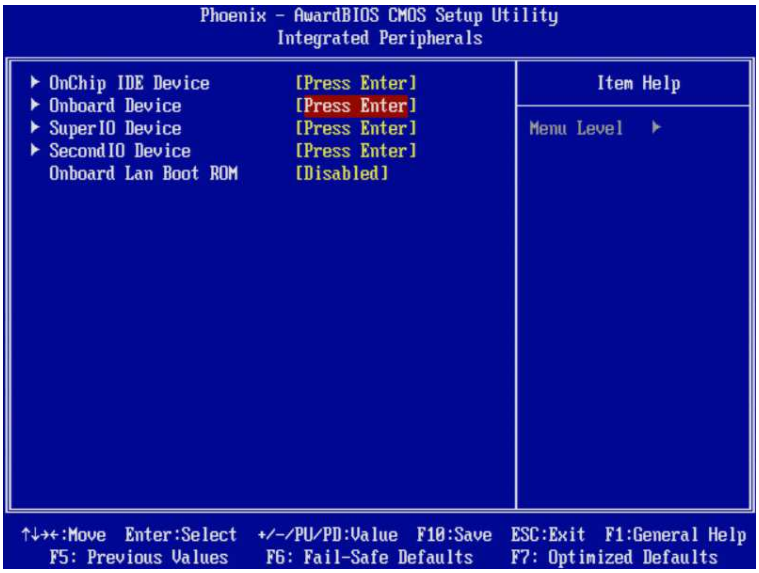
Boot Screen



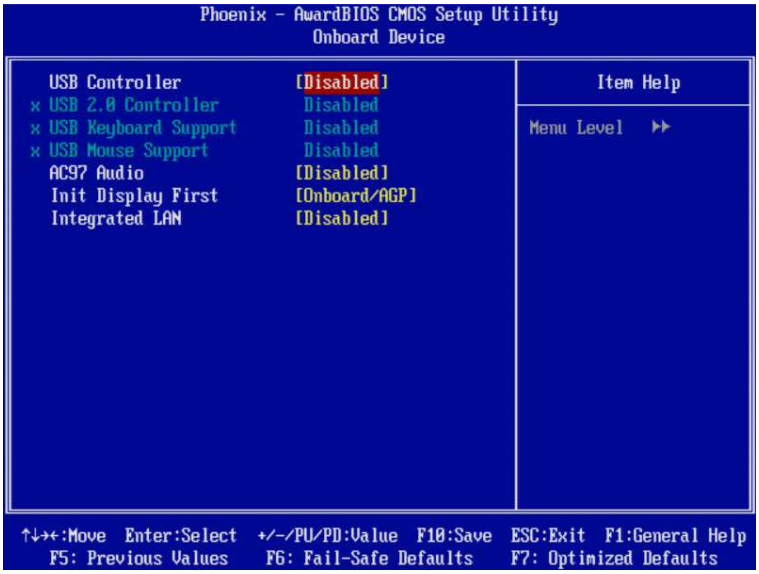
When you are having communication problems while using the serial interface, you will have to check the following BIOS settings.

Under the menu item „Integrated Peripherals“

and „Onboard Device“

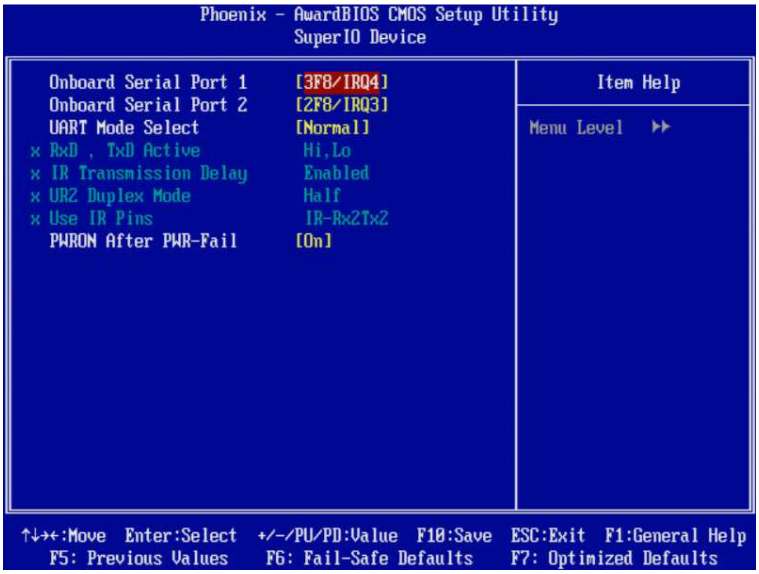


you will find the settings for the USB controller

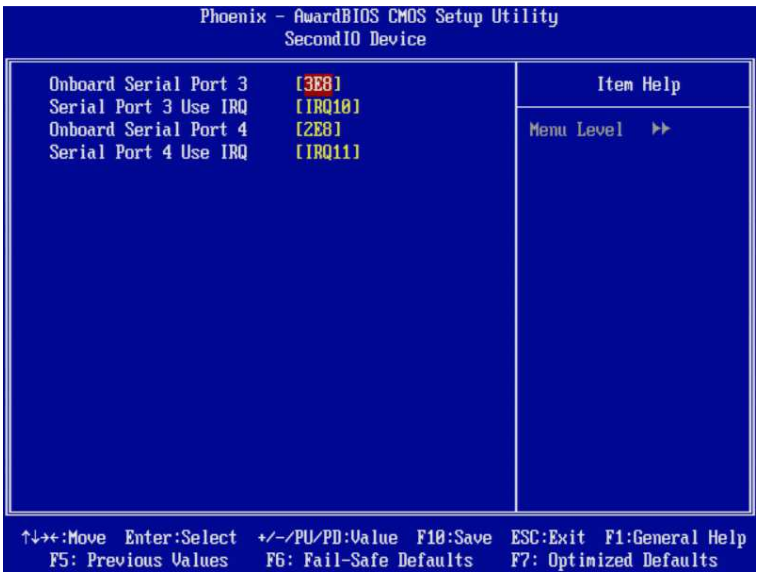


And under the menu item "SuperIO Device" and
" SuperIO Device " you will find the settings
for the serial interfaces.

„SuperIO Device



SecondIODevice



Please make sure that all the parameters are set as described or adjust them accordingly.