BA66 USB

Cashier Display

Product Manual

Contents

Manufacturer's Declaration and Approval

$C\!\epsilon$ This device fulfills the requirements of the EEC directives 89/336/EEC "Electromagnetic Compatibility" and 73/23/EEC "Low Voltage Directive".

Therefore, you will find the CE mark on the back of the device or packaging.

FCC-Class A Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful inter-ference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications not authorized by the manufacturer may void users authority to operate this device. This class A digital apparatus complies with Canadian ICES-003.

Cet appareil numerique de la classe A est conforme à la norme NMB-003 du Canada.

Wincor Nixdorf International GmbH (WN) accepts no responsibility for radio and television reception interference resulting from unauthorized modifications to the equipment. Furthermore, neither cables nor devices which have not been approved for use by WN may be connected. The user shall be held responsible for interference caused in this manner.

Device repairs must be carried out by authorized personnel. All guarantee and liability claims are automatically excluded if repairs have been carried out by unauthorized personnel.

Tested Safety

The BA66 USB display has been provided with the GS-symbol for "Tested Safety".

In addition, the device has received the UL symbol and cUL symbol.

Notes on Care

Wipe the cashier display with a damp cloth as required. Solvents must not be used under any circumstances as they may damage the plastic.

Warranty

Wincor Nixdorf guarantees a limited warranty engagement for 12 months beginning with the date of delivery. This warranty engagement covers all those damages which occur despite a normal use of the product.

Damages because of

- Improper or insufficient maintenance,
- Improper use of the product or unauthorized modifications of the product,
- Inadequate location or surroundings

will not be covered by the warranty. For details please consult your contract documents.

Recycling the BA66
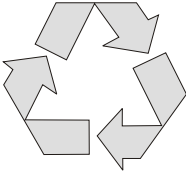
Environmental protection does not begin when it comes time to dispose of the BA66; it begins with the manufacturer. This product was designed according to our internal norm "Environmental conscious product design and development".

The BA66 is manufactured without the use of CFCs und CCHS and is produced mainly from reusable components and materials.

The processed plastics can, for the most part, be recycled. Even the precious metals can be recovered, thus saving energy and costly raw materials.

Please do not stick labels onto plastic case parts. This would help us to re-use components and material.

At this time, there are still some parts that are not reusable. Wincor Nixdorf guarantees the environmentally safe disposal of these parts in a Recycling Center, which is certified pursuant to ISO 9001.

So don't simply throw your BA66 on the scrap heap when it has served its time, but take advantage of the environmentally smart, up-to-date recycling methods!

Please contact your competent branch office for information on how to return and re-use devices and disposable materials.

General Notes

The BA66 cashier display is mainly used in POS installations which are designed in modular form. It is either securely screwed to the POS keyboard or installed near it so that it is ideally positioned in the cashier's field of vision.

The display is a vacuum florescent display (VFD) with four lines, each with 20 alphanumeric characters. The standard character set and corresponding country code are implemented. Implementation of VFD technology ensures that the cashier display is ergonomically designed to achieve a high degree of readability, irrespective of the cashier's angle of vision.
The display is connected to the point of sale system via a Standard USB interface. The voltage (5 V DC) is also supplied via this interface. The BA66 works with operating systems that support USB.

The following two BA66 cashier displays are available to meet individual installation requirements:
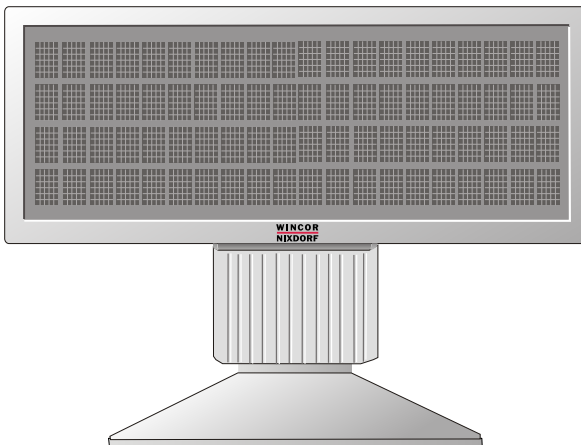
BA66 cashier display with base/ rotating plate

Connector cables are available in different lengths. The cables have to be ordered and will be delivered separately.
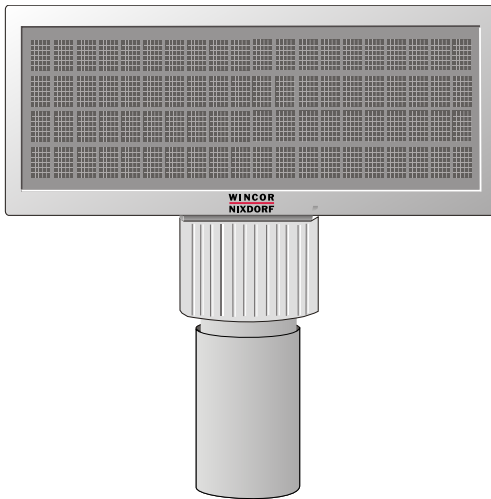
Cashier display with adapter for tube-based installation
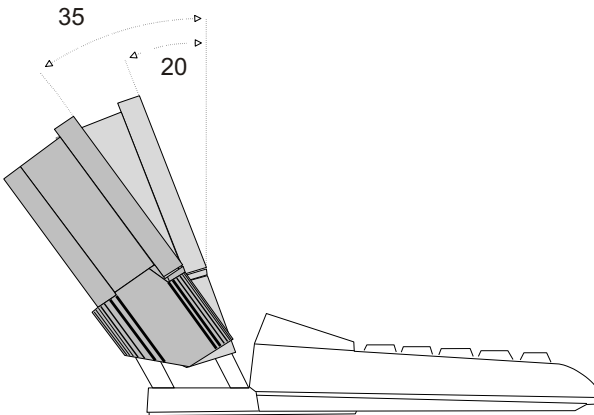
Cashier display to TA61, TA64, TA58, TA85

The tube diameter is 40 mm (+0.3 mm/ -0.1 mm). The tube is not included in the delivery.

Installation of BA66 to TA6I/TA64/TA58/TA85 keyboard

Attach the cashier display to a keyboard as follows:
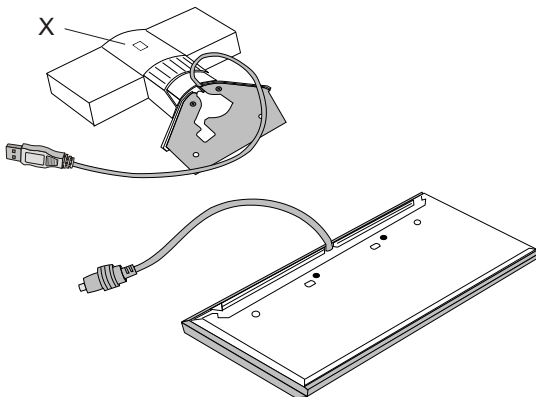
Turn both devices upsi-de-down (remove key from the keyboard!).

Important! The cashier display must not be disconnected from the base by means of the release button (X) as the internal plug connection may otherwise become disconnected!
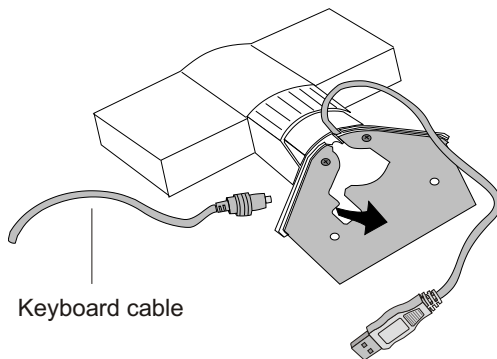
Pull the keyboard cable out through the metal opening (see arrow).
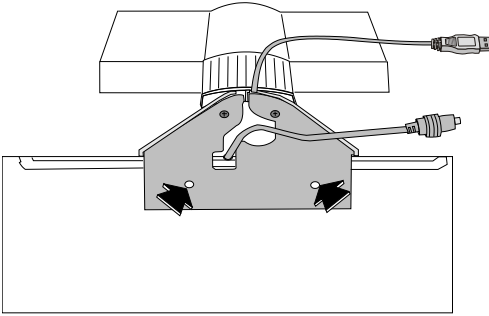
Keyboard cable

Screw the assembly plate of the cashier display to the rear side of the keyboard with the selftapping, recessed-head screws provided.
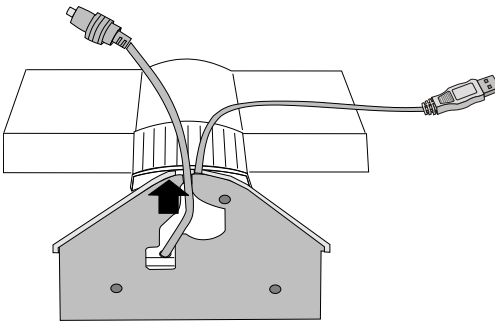
Then press the keyboard cable downwards and draw it through the metal opening into the cable run of the plastic base.

Installation of the Connector

Tube-based
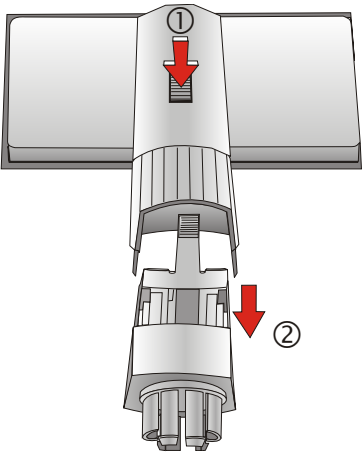
Press the release knob marked with the arrow in the drawing (1) and disconnect the hinge from the customer display (2).
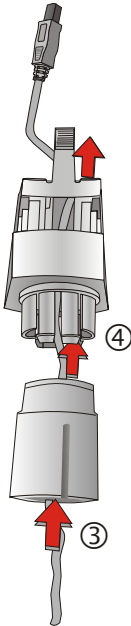
Thread the cable through the adapter (3) and then through the hinge (4).
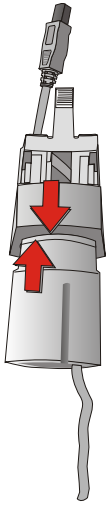
Connect the hinge and adapter.
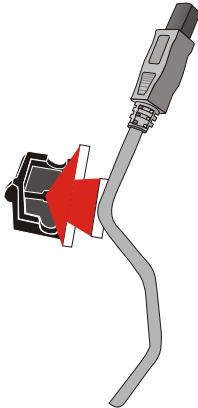
Secure the connector cable in the strain relief.
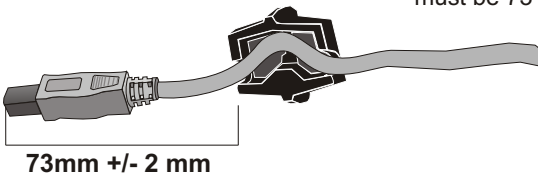
The distance between the strain relief and the tip of the connector must be 73 mm (2 mm).

73mm +/- 2 mm
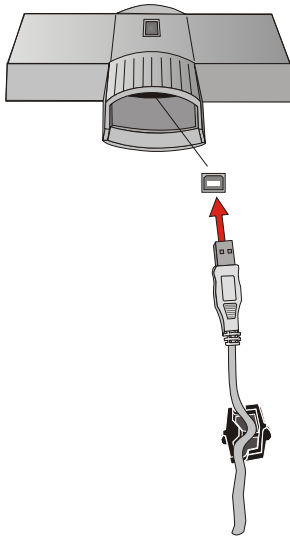
Plug the cable connector into the appropriate socket of the customer display and plug the adapter/hinge into the customer display again until it locks into place.

Base/ Rotating Plate
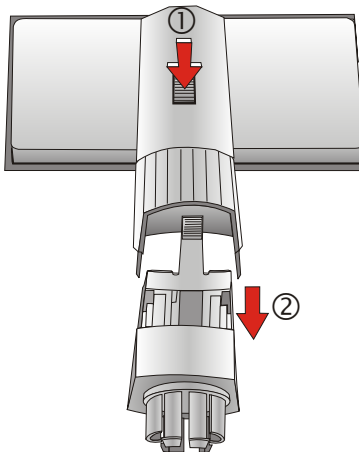
Press the release knob marked with the arrow in the drawing (1) and disconnect the hinge from the customer display (2).
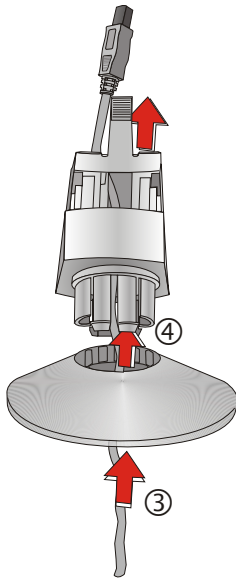
Thread the cable through the base (3) and then through the hinge (4).
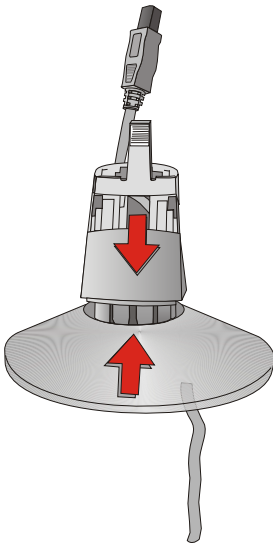
Connect the base and the hinge.
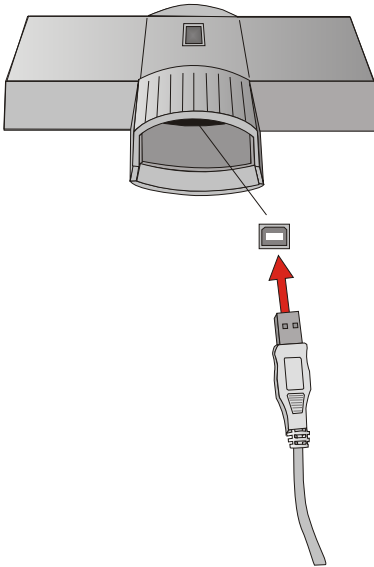
Plug the cable connector into the appropriate socket of the customer display and plug the base/hinge into the customer display again until it locks into place.
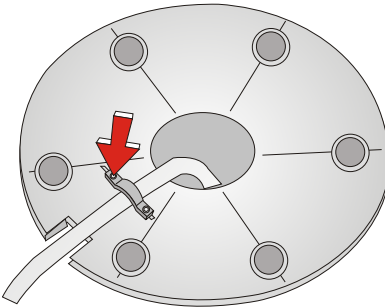
A metal bracket of the strain relief is situated on the bottom side of the base. Loosen one of the screws (see arrow), push the bracket aside and guide the connector cable from inward to outward under the bracket through the recess. Tighten the screw.

Customer Display Control

The customer display is controlled via software. The commands are entered with the appropriate ESC sequences. The following functions are available:

- The cursor can be moved to the desired position;

- Characters resp. areas can be deleted;

- Country-specific character sets can be selected;

- special test functions or communication commands can be performed via POS commands.

Control Sequences

The cashier display operates in VT100 mode, i.e. it emulates a subset of the VT100 ESC sequences and control bytes. These are illustrated in the following:

Backspace (without deleting)	BS
Line feed	LF
Carriage return	CR
Delete display	ESC [2J
Position cursor	ESC [Py;PxH
Delete to end of line	ESC [0K
Set country code	ESC Rn

Backspace (without deleting)

The BS command (hexadecimal 08) moves the cursor one space to the left. If there is a character in the position to which the cursor moves, it is not deleted. This command is ignored if the cursor is already at the very start of the line.

Line feed

The LF command (hexadecimal 0A) moves the invisible cursor down a line if it is positioned in one of the first three lines of the display. The column position remains unchanged.

The position of the cursor remains unchanged if it is already in the last line. The contents of the last line are copied to the first line and the last line is deleted.

Carriage return

The cursor is moved to the start of the line in which it is currently positioned when the CR command (hexadecimal 0D) is entered. The command is ignored if the cursor is already at the start of the line.

Delete display

The display can be deleted with this ESC sequence. The cursor position remains unchanged. The ESC sequence is as follows:

Code	Hexadezimal
ESC '[' '2' 'J'	1B 5B 32 4A

Position cursor

The cursor position can be defined with this ESC sequence. The cursor is not visible on the display whilst this is being carried out. The following ESC sequence (for example) can be implemented:

Code	Hexadezimal
ESC '[' 'Py' ; 'Px' 'H'	1B 5B 31 3B 31 48

The parameters are transferred as ASCII characters and have the following meaning:

Parameter	Meaning
Py	This parameter defines the line.
Px	This parameter defines the column.

Example
Replace the parameters with the following values if you wish to position the cursor at the very start of the first line:

> ESC '[' '1'; '1' 'H'

If you select 0 for the parameter value, this is interpreted as 1 by the display. If, on the other hand, you select a value which is greater than the maximum line and column value, the display will interpret this value as the maximum value permissible.

The cursor is positioned in the first column of the first line if no parameter values are entered.

Delete to end of line

This command deletes the characters from the cursor, cursor position included, to the end of the line. The position of the cursor remains unchanged.

The ESC sequence is as follows:

Code	Hexadezimal
ESC '[' '0' 'K'	1B 5B 30 4B

Set country code

The following ESC sequence is implemented in order to select a country-specific character set:

Code	Hexadezimal
ESC 'R' 'n'	1B 52 02

The hexadecimal value n corresponds to the country code and defines the country-specific character set. The German character set corresponds to the default setting.

Country code	Character set
00	USA
01	France
02	Germany
03	Great Britain
04	Denmark 1
05	Sweden
06	Italy
07	Spain 1
08	Japan
09	Norway
0A	Denmark 2
0B	Spain 2
0C	Latin-America

Furthermore PC code pages which contain additional country-specific display codes can be selected by ESC R n with the following codes:

Country code	Code page	Character set	Country
30	437	Standard	Latin-America
31	850	Latin 1	International, Scandinavia, Latin-America
32	852	Latin 2	Hungary, Poland, Czechia, Slowakia

33	857	Latin 5/Turkey	Turkey
34	858	Latin 1+€ char.	International, Scandinavia, Latin-America
35 and 29	866	Latin/Cyrillic	Russia
37	862	Latin/Hebrew	Israel
36	737	Latin/Greek 2	Greece
38	IBM813	Latin/Greek 2	Greece
63	Katakana	Katakana	Japan
73	Space Page	definable	universal

In the appendix there are shown all character set tables for BA66 in 5 x 7 matrix display.

POS Commands

Write Data Command

Data can be Escape sequences, control characters or data to be issued. Escape sequences can be "hacked up" (1st part in frame n, 2nd part in frame n+1).
Command: 02H, 00H, Data Count, Data Bytes

Length max. 32. That is the size of the report. Maximum of reference data to be transferred: 32-3 = 29 bytes, i.e. when configuring an Escape sequence "economically" for positioning, a line can be displayed with a Write Data Command.

Read Config Request

Display identification
Command: 21H, 00H, 00H, .., 00H

Test Request

A self test is performed. This command causes no new enumeration.

Command: 00H, 10H, 00H, .., 00H

Status Request

Status is requested.

Command: 00H, 20H, 00H, .., 00H

Reset Request

A reset causes a new login and thus enumeration of the device with all sub-devices. Therefore, there is no corresponding response to the Reset Request.

Command: 00H, 40H, 00H, .., 00H

Read Config Response

Response: Length Byte, Status Byte 0, Status Byte 1,
                     Status Byte2 (s. Status Response)
                     "Pn1;Pn2;Pn3;Pn4;Pn5;Pn6;Pn7"

                     Pn1: type of display (1 digit ASCII, e.g. "2")

                     Pn2: actual code page (4 digits ASCII, e.g. "0852")

                     Pn3: country code (2 digits ASCII, e.g. "02")

                     Pn4: number of lines (1 digit ASCII, e.g. "4")

                     Pn5: columns/line (2 digits ASCII, e.g. "20")

                     Pn6: code page loaded in Space-Page (4 digits ASCII, e.g. "0850")

                     Pn7: serial number (10 chars ASCII, e.g. "N000000001")

Note: Pn6 rsp. Pn7 may be omitted in case the Space Page is empty or no serial number burnt into the device.

Parameters are not compatible to the response to the Escape sequence
ESC [0 c of the displays BA63 and BA66 with RS232 interface. The
firmware version is not specified here but in the corresponding descriptor.

Test Response

Response: 04H, Status Byte 0, Status Byte 1, Status Byte 2
Status Bytes: s. Status Response

Status Response

Response: 04H, Status Byte 0, Status Byte 1, Status Byte 2

Status Byte 0:

Bit 0..4	ignore
Bit 5	Hardware Error
Bit 6	ignore
Bit 7	Device not ready to receive commands

Status Byte 1:

Bit 0..6	ignore
Bit 7	Undefined command received (command reject)

Status Byte 2:

Bit 0..7	ignore

Updating the Firmware

The firmware as well as the character set can be programmed via the USB interface. Thus, updates, customer specific character sets or firmware can be newly arranged. During an updating operation the device will not work as display.

Updating the firmware (including the standard character sets) or the space page can be done by using the **WNUpdHID.exe** file. There is no need for additional hardware (see also next page).

The utility WNUpdHID.exe can be used to perform a firmware update or a character table update. In the following the reference is to firmware update, as this is is more critical than just performing a character table update. WNUpdHID.exe requires the WNHidHlp.dll to run. It is recommendable to have the DLL and the executable file in the same directory. In the dialog of the firmware update utility you specify the type of device, for which a firmware update should be done. For the BA66 USB a selection

- BA66

- Nonspecific (virgin device)

is relevant.

Roughly the BA66 USB software can be divided into a loader and a firmware. The selection "BA66" is for a case, where the BA66 USB already has a firmware and therefore knows "which type of device it is". If there is no firmware at all, i.e. just the loader, only "Nonspecific" can be used. "Nonspecific" also may be used in case something went wrong during the update, i.e. it serves as a fallback. Note, if "Nonspecific" is chosen, there must not be any other firmware updatable HID devices! There is a file browsing facility to select the firmware file for update. It should have a .DAT extension. After both the device type and the firmware file are selected, the download can be started. It takes some time until the update actually starts, as the device does a reenumeration. Please wait for the enumeration to finish! When the update starts, you will see a progress bar. If the update was successful, you will get a message and you will see the BA66 performing a reset and showing the actual versions of the loader and firmware. If something went wrong, you may get messages like

- "Command reject"

- "Operation in error"

- "Device not found"

- "Command reject" may occur, if the firmware update file is not for this type of device.

- "Operation in error" may occur in case of a hardware failure, e.g. no successful flashing, therfeore, a retry is performed in this case.

- "Device not found" may have the reason that the BA66 is not connected to the system. In this case check the cable. Another reason may be that something went wrong during flashing and from the system point of view the device no longer looks like a BA66. In such a case you may try the selection "Nonspecific (virgin device)" rather than BA66 for another update. Note, that the BA66 normally offers two interfaces to the system:

- 'line display' interface   --> corresponds to BA66

- 'firmware update' interface --> corresponds to Nonspecific (virgin device)

When a firmware update is started, the BA66 clears the firmware and reenumerates to just having a 'firmware update' interface. Then the firmware update is performed and when finished, the BA66 again performs a reset and reenumerates to having a 'line display' and 'firmware update' interface, if the update was OK. If something went wrong, still only the 'firmware update' interface is presented. Therefore, the selection "Nonspecific (virgin device)" serves as a fallback, if anything got wrong during an update performed before. The **About button** may be used to get the software version.

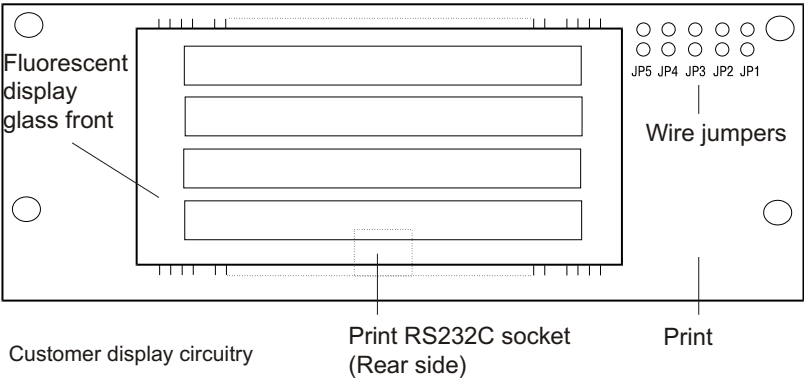Please finish the update utility by pressing the **Exit button**.

System Connection

The system is connected via a USB 1.1 interface. Changes of operating mode or rate of transmission are not possible. A connection to a USB 2.0 port is possible. In this case a cable released by Wincor Nixdorf must be used.

On the front of the module the following jumpers can be accessed:

Jumper	ON/OFF	Function	Default
JP0	ON	Self test	OFF
JP1	ON	Font test	OFF
JP2	ON	Manual Upgrade	OFF

The illustration below shows the position of the jumpers. The screen can be removed by pressing the two clips of the housing, underneath the screen. Thus the jumpers are accessible. Jumpers can be set by using pointed tweezers or paper-clips. Even a crosswise setting of the jumpers will not lead to damage of the display circuitry. If one of the jumpers is set to ON the BA66 can not be operated in display mode.

Fluorescent display glass front

JP5 JP4 JP3 JP2 JP1

Wire jumpers

Customer display circuitry

Print RS232C socket (Rear side)

Print

Cable Connection

The customer display cable is a standard cable according to the USB specifications.

Please use only cables delivered by Wincor Nixdorf.

Test Functions

The internal RAM of the processor and the EPROM are tested during the start-up phase. If no errors are detected during the test and the BA66 was initialized and attached as a USB device by the operating system, a start-up message will be displayed for approx. 1.5 seconds. The display remains blank if an error is detected.

Test by short-circuiting J0

Same self test in series as entering the ESC sequence ESC [0c and ESC [?2;nn;2;2;20c. As long as the jumper J0 is set to ON the test will be performed as closed loop. See also page 21.

Test by short-circuiting JI

All presentable characters of all character sets will be output nearly every second. As long as the jumper J1 is set to ON the test will be performed as closed loop. See also page 21.

Short-circuiting J2

The display is forced to start in upgrade mode, which otherwise is only possible by commands via USB interface or when the selftest program detects a faulty firmware. See also page 23.

Technical Data

The technical data of the BA66 cashier display is detailed in the following table:

Display technology	Vacuum Fluoreszenz Display (VFD)
Character display	4 lines each with 20 alphanumeric characters Matrix: 5 x 7 pixel Height: 5 mm Width: 3.2 mm Color: green
Self-test function	possible via software control using ESC sequences and wire jumper
Interface	USB 2.0 (Full Speed)
Operating Systems	Windows 2000, Windows XP and Linux (MS-DOS is not supported)
Transmission modes	12 Mbits/s gross data rate
Voltage supply	+5V (Vusb), basical 360 mA, max. 380 mA
System connection	USB
Dimensions	Height (with base): 165 mm Width: 206 mm Depth: 46 mm
Weight	0.5 kg