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ProberBench™ 7

# Hardware Reference

## ProberBench™ Electronics II

SUSS MicroTec Test Systems

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# ProberBench™ Electronics II

The ProberBench Electronics II is the second generation of an industrial control system on a compact PCI platform with a special SUSS rear I/O bus in the P2 connector area, designed to manage the main functions of a Semiautomatic Probe System.

It consists of the drive and control circuitry for powering a fully equipped probe system. This includes the chuck stage (controller) X, Y, Z and Theta, the microscope (controller) X, Y and focus and four ProbeHead (controllers) X, Y and Z.

Also accommodated are a GPIB card, two contact sense inputs, control outputs for inker, the test beacon interface and auxiliary input/output ports.

The ProberBench Electronics II is suitable for working in stand-alone operation in conjunction with the Expert Control Panel, as well as in remote control operation with a PC, by using the ProberBench™ firmware where the COM1 or the ETH1 are used to communicate with the ProberBench PC.

In combination with an automated measurement system, the ProberBench Electronics II is also suitable for working on an IEEE 488 (GPIB) bus.




**ProberBench Electronics II**




**ProberBench Electronics II Rear Side (S-Interface)**




**ProberBench Electronics II Rear Side (R-Interface)**

# Safety

## Warnings and Safety Hazards



This section contains information that the user must know and understand to minimize the risk of injuries.

SUSS equipment is designed to protect the user against all possible hazards. After review by qualified safety personnel, the user should generate specific safety procedures with regard to the particular application of the equipment and local codes, and make certain that operators are familiar with the procedures.

### *General Precautions*



Read and understand these precautions and the safety information before using the system.

### *Electrical Precautions*



The ProberBench Electronics II contains electrical circuits with lethal voltage and current levels.

**Do not open or remove covers !**

**Service of the electrical system should be performed only by SUSS qualified personnel.**

#### Open Connections

In order to make safe connections, the device must not be connected to the mains.



**NOTE:** Switching of sub-assemblies or circuit cards is not allowed for safety reasons, it can be done only by SUSS qualified personnel.

Switching of sub-assemblies under voltage is not allowed for it can destroy the assembly.

## Test Procedures

### *Electrical Tests*

Acceptable results according to IEC / EN 61010-1:2001, SEMI S22-1103 and EN 60950:1997.

### *Sound Pressure Level Test*

Acceptable results according to IEC / EN 61010-1:2001 and SEMI S2-0703.

Sound pressure level not greater than 45 dB(A).

## Emergency Machine Off (EMO) of the Probe System

To run the semiautomatic probe system with the ProberBench Electronics II the user must know and understand the function of the prober EMO system, please refer to the prober user manual.

Generally a semiautomatic probe system, including the PA300 and PA200, are equipped with an EMO system. When it is activated, the EMO system immediately stops all machine movement and removes all voltages except the low voltage EMO power supply. The EMO buttons are for emergency use only to prevent injury, or damage to equipment or the device under test.

# Controls and Connections

## Power Supply

### *Power Switch*



**The Power Switch "POWER" connects / disconnects the ProberBench™ Electronics II to / from the mains.** Power is applied to the entire system by pressing the ON button.

The ProberBench Electronics II has a built-in **S**hut **D**own **M**anagement (SDM). If the ProberBench Electronics II has been switched off using the Power Switch, a power fail signal will be generated and the shut down routine will be started. The SDM energizes the control system with 24 V DC for the shut down period. This will take approximately 20 seconds. After the shut down routine the ProberBench Electronics II is de-energized.

### *ON Button*



**The ON button starts the ProberBench™ Electronics II and activates the EMO safety circuit** if the Power Switch is on. The built-in embedded PC (CPU module) boots and starts the communication to the Expert Control Panel. The ProberBench Electronics II is ready to use. This takes approximately 20 seconds.

The ON button is also used to reactivate the EMO safety circuit after the EMO button at the prober has been hit.

### *Main Power Supply*

The ProberBench Electronics II has a wide range of input voltages from 100 to 240V AC nominal (88...264V AC total) for 50/60Hz supply frequency, single phase. The power consumption is max. 600 VA. Note that the switch-on current may get up to 50 A at 230 V for a short moment. The power factor (100...240V AC) is larger than 95%.



**Please note that the user is responsible for supplying a 10 A fuse for the mains cable.**

**The user is also responsible for switching defective mains cable.**

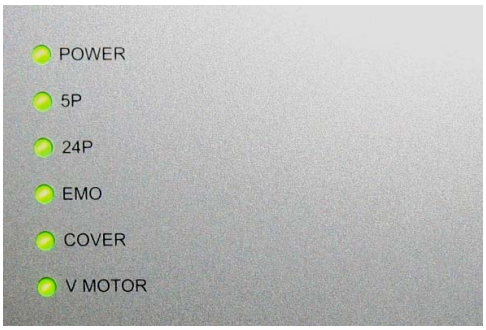
### *Power Supply line*

**The mains plug fulfills the main disconnecting function.**

Supply line: 3 x 0.75 $mm^2$, length 2 m, with either

- Plug according DIN 49441 (IEC) or
- Plug NEMA 5-15 (UL / SEMI)

## System LED’s




**POWER**

The Power LED is illuminated when the Power Switch is on and the line voltage is present.

**5P**

The 5V LED  is illuminated when the ProberBench Electronics II supplies the prober with a voltage of 5V.

**24P**

The 24V LED  is illuminated when the ProberBench Electronics II supplies the prober with a voltage of 24V.

**EMO**

The EMO LED indicates a properly operating EMO safety circuit. That means that the EMO button(s) of the probe system is (are) released. The prober is ready to work.

**COVER**

The Cover LED indicates a properly operating COVER safety circuit. That means that the prober cover switch is closed. The prober is ready to work.

**V MOTOR**

The V Motor LED  is illuminated if the electronics power supply provides the motion controller stages with energy.

## Fuses

**F1 and F2 fuses**

F1 and F2 are the main fuses for the ProberBench Electronics II.

The Power LED  indicates that the fuses are working correctly. The Power LED is illuminated when the line voltage is present, the POWER switch is on and the fuses are working.

**Type:**

2 x T 6.3 A (sluggish), 250 V, high breaking capacity (HBC) corresponding to IEC 60127-2

and

10000 ampere interruption capacity (AIC) at 125 V corresponding to UL 198G. Size 5 x 20 mm, (e.g. WICKMANN type 181).

## Motion Controller LED's




For the motorized stages of chuck, microscope and up to four ProbeHeads ( slot 2, 3 and 8 .. 11 of the fully equipped ProberBench Electronics II ) DC drives with status LED's are integrated.

The upper LED $V_m$ of each DC drive indicates the motor voltage status.

- If this LED is **illuminated** the presence of the 28 V motor voltage is indicated.
- The LED will be **switched off** if the motor voltage is < 26 V.  **NOTE:** If the EMO button of the probe system is hit or if the cover switch (interlock of the loading lid) has been actuated the motor power is also interrupted.

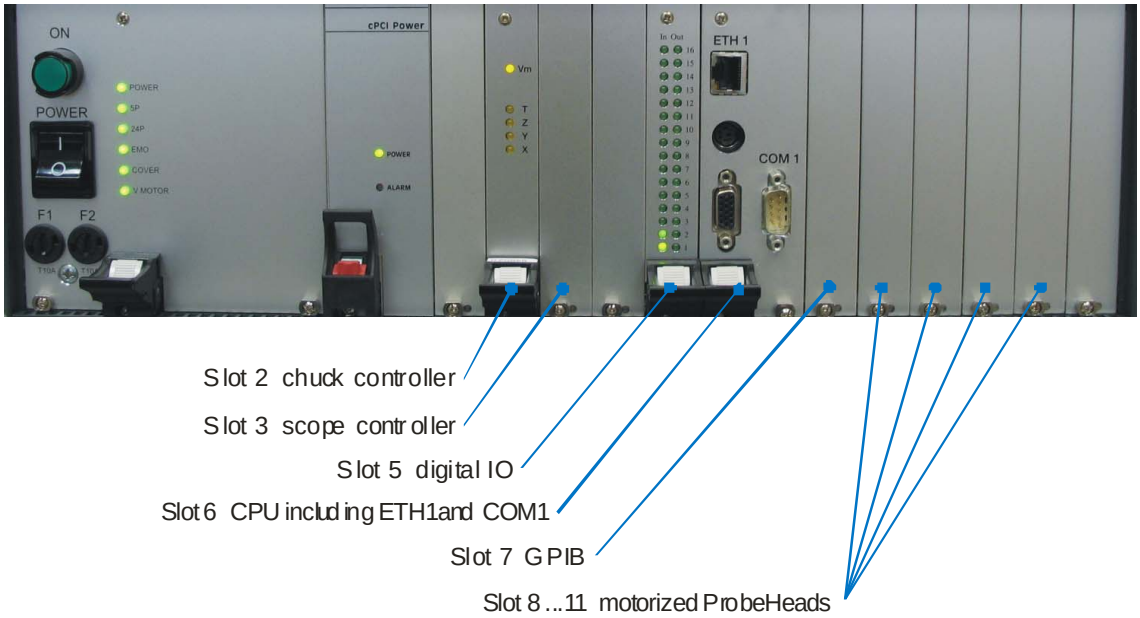
For each axis there is one LED which shows the status of the axis: X, Y, Z and Theta for the chuck.

Status of LED's:

- **illuminated**: The axis is active and ready for operation.
- **switched off**: The axis is not active, e.g. if the probe system is set to QuietMode™ status.
- **flashing**: The axis has run into the mechanical limit (behind the software fence).

# Interface Connections

## *Front Side*




**Front Side of ProberBench Electronics II (standard)**

## *ETH1*

ETH1 is a 10/100 MBit/s Ethernet interface of the ProberBench Electronics II with the ETH interface number 1.

The interface is an alternative connection to COM2 between the ProberBench Electronics II and the ProberBench PC. For connecting a cross-over patch cable Cat.5 2xRJ45 (cross link) is used. The network card Intel PRO/100 is recommended for the PC interface.

## *COM1*

COM1 is a RS232 interface of the ProberBench Electronics II.

It is used for communication between the ProberBench Electronics II and the ProberBench PC. **Note:** Commands of ProberBench release > 6.57 (June 2008) are no longer supported.

A zero modem cable 2x9 pin sub D (2 x female) is used for this connection.

## *GPIB*

GPIB is the ProberBench Electronics II high-performance IEEE 488 interface with complete IEEE 488.2 compatibility.

The interface is used to involve the ProberBench Electronics II in automated measurement systems.

### *PROBEHEAD (optional)*

PROBEHEAD is the ProberBench Electronics II interface to the motorized ProbeHeads.

Classification:

Slot 11 Motorized ProbeHead No. 1

Slot 10 Motorized ProbeHead No. 2

Slot 9 Motorized ProbeHead No. 3

Slot 8 Motorized ProbeHead No. 4

Interface signals:

- Motor control
- Encoder signals
- End limits
- LED control

### *Rear Side*




**Rear Side of ProberBench Electronics II (S-Interface)**

### *COM2*

The COM2 RS232 interface of the ProberBench Electronics II is used to control the thermal chuck if the probe system is equipped so.

## *EXPERT CONTROL PANEL CONNECTOR (Control Box)*

Expert Control Panel connector is the ProberBench Electronics II interface to the Expert Control Panel.

The communication between the ProberBench Electronics II and the Expert Control Panel is via an Ethernet 10/100 MBit/s connection. At the same time the power supply for the Expert Control Panel is realized via the Expert Control Panel connector.

## *J23 to J27*

J23 ... J27 is the machine interface for the prober (prober connections).

| | |
|---|---|
| Signal classification J23: | Limits for chuck stage and microscope |
| | Diverse machine control signals |
| Signal classification J24: | Encoder for chuck stage and microscope |
| Signal classification J25: | Motor control for chuck stage and microscope |
| | EMO wiring (machine internal) |
| Signal classification J26: | Digital outputs for channels 6 to 16. |
| | (The channels 1 to 5 are wired internally via J23) |
| Signal classification J27: | Digital inputs for channels 4 to 16. |
| | (The channels 1 to 3 are wired internally via J23) |




**Rear Side of ProberBench Electronics II (R-Interface)**

### *J1 ... J4, J22, BEACON*

| | |
|---|---|
| Signal classification J1: | Motor control, limits and encoder for microscope |
| Signal classification J2: | Motor control for chuck stage |
| Signal classification J3: | Limits and encoder for chuck stage |
| Signal classification J4: | EMO, cover, edge wiring. Spare wiring. |
| Signal classification J22: | Digital inputs and outputs for channels 1 to 16. |
| BEACON: | Digital outputs for beacon status lights (red, yellow, green) |

### *Remote Control (optional)*

J30 to J32 are the interfaces for integrating the ProberBench Electronics II in a superior automatic system.

Signal classification J30:

Button connection for "start manual / reactivating EMO safety circuit".
Connection for remote display "POWER / ON".

Signal classification J31:

"Interlock-Interface".
Here, the integration of the "motion stop safety circuit" (in line with the cover switch) and the "EMO safety circuit" (in line with the internal machine EMO-switch) of the ProberBench Electronics II as the receiver *(like a „slave“)* in a superior automatic system is possible.
Also for the integration into a superior automatic system, as a sender *(like a „master“)*, the „cover switch“ signal will be made available by the ProberBench Electronics II.

Signal classification J32:

Power supply to external users.

On J32 there are 3 individually secured power connectors (each 1 A) for external users with an available total load of 2 A.

# Additional Data and Requirements

### *Dimensions:*

| | |
|---|---|
| **Electronics** | 450 mm x 400 mm x 230 mm (with connectors installed) |
| **Expert Control Panel** | 280 mm x 250 mm x 140 mm (with connector installed) |

### *Weight:*

| | |
|---|---|
| **Electronics** | 13 kg |

## Normal Use of the Device

If the device is not used in accordance with the instruction manual the intended safety may be impaired.

The side ventilators and air expellers must be kept clear for air circulation at all times.

### *Electrical Data*

| | |
|---|---|
| **Protection class** | I |
| **Transient overvoltage** | Overvoltage category II according to IEC 60364-4-443 |

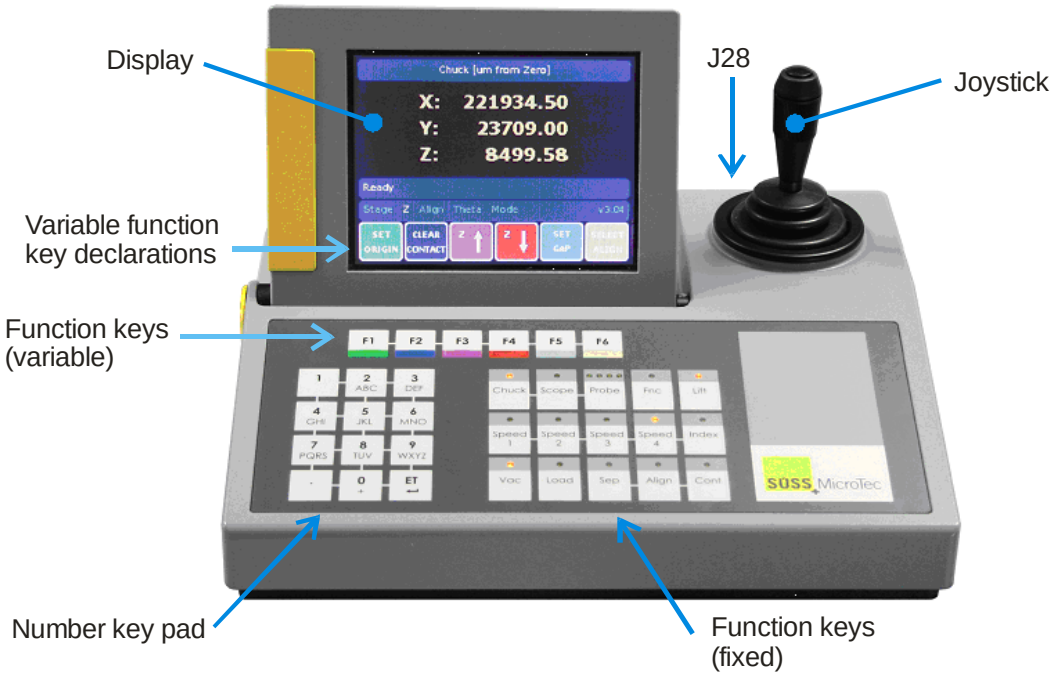
### *Environmental Requirements*

This equipment is designed to be used indoors only and up to a height of 2000 m above see level.

| | |
|---|---|
| **Ambient Temperature** | 5°C – 40°C |
| **Ambient Humidity** | 25% – 60% r.H., 80% for temperatures up to 31°C |
| **Pollution Degree** | Grade 1 as per IEC 60664-1 |

# Expert Control Panel

The Expert Control Panel is the operator interface of the ProberBench™ Electronics II in stand-alone operation of the prober. If the ProberBench PC is being used as the operator interface, a connected Expert Control Panel is functional as the operator interface of the ProberBench Electronics II in a similar way (*additional*).




### *Display*

5.7" graphics display for showing positional and functional information.

### *Joystick*

Operational element for control of X, Y and Z movement of chuck, microscope and ProbeHeads.

### *Keyboard*

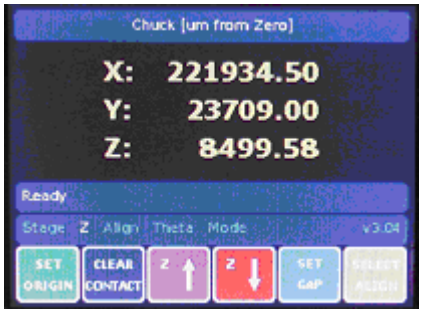
The keyboard consists of:

- Keys with variable functional classification via display (F1 ... F6) *(softkey)*
- Keys with fixed functional classifications and LED display status
- A number key pad

### *J28*

J28 is the interface to the ProberBench Electronics II. The power supply to the Expert Control Panel and the communication (ETH2) with the ProberBench Electronics II is ensured out via J28.

## Display




The Expert Control Panel display contains the selected stage with its position data in the (stage) coordinate system, more status information as well as the current chosen (with **F6**) variable function keys declaration.

Actuate the function at the bottom of the display with the corresponding **F1 ... F6** key of the variable function keys group.

Press 

to toggle the menu layers.

## Joystick



Use the joystick to move the selected stage: chuck, microscope or ProbeHeads.

Actuate the movement in X and Y direction by deflecting the joystick in the desired direction. A bigger deflection generates a higher stage velocity, also in Z.

To get control of the Z movement, push the top button and deflect the joystick forward to get a movement of the selected stage in positive Z direction (chuck up, microscope and ProbeHeads down) or backward to move the stage in negative Z direction.

## Keyboard

### *Variable Function Keys*

The variable functional classification F1 ... F6 for the chuck as selected stage is:

| F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|
| Set Origin | Set Home | Go Home | Set Index | Go Center | **Select Z** |
| Set Origin | Set Contact | Z up | Z down | Set GAP | **Select Align** |
| | Cancel | Mark 1 | Mark 2 | | **Select Theta** |
| Set Origin | Theta ccw | Theta Center | Theta cw | | **Select Mode** |
| | Remote | Quiet | Dark | Set Unit | **Select Stage** |

F6 is a ring counter, always showing the function group next to come.

The function information corresponding to F1 ... F6 can be seen at the bottom of the display, above the variable function keys group.

The function groups that can be selected with F6 are:
- Stage: Stage options (XY movement)
- Z: Chuck height options
- Align: Alignment procedure (adjustment of rotational error)
- Theta: Theta options (chuck rotation)
- Mode: Special probe system modes

For the microscope the variable functional classification F1 ... F6 is:

| F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|
| | Remote | Quiet | Dark | Set Unit | **Select Stage** |
| Set Origin | Set Home | Go Home | Set Index | Go Center | **Select Z** |
| Set Origin | Set Focus | Z up | Z down | Set GAP | **Select Align** |
| | | Mark 1 | Mark 2 | | **Select Mode** |

Another function set is provided for the ProbeHeads as selected stages.

**Stage Functions**




**SET ORIGIN** defines the 0-0-0 origin of the stage X-Y-Z coordinate system from Zero (of the glass scales), from Home or from Center.

**SET HOME** defines the X-Y home position at the current position and zeros the X-Y coordinates.

**GO HOME** moves the selected stage to the X-Y home position as defined with Set Home.

**SET INDEX** defines the keys as **X AXIS** and **Y AXIS**. The index values may be changed using the Number key pad and confirm with Enter for each X and Y.

**GO CENTER** moves the selected stage to center position defined by the coordinate system of the chosen stage.

**Z Functions**




**SET ORIGIN** defines the X-Y-Z origin of the stage from Zero, from Home or from Center.

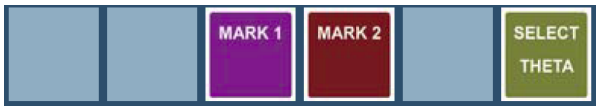
**SET CONTACT** defines the upper limit of chuck travel, set to provide adequate contact without device or probe tip damaging excessive overtravel. When set, the function changes to **CLEAR CONTACT** to clear the contact position. The contact position must be set each time the system is powered-up. The Z axis controls of Contact, Align and Separate cannot be used until contact has been set. When choosing the microscope movement, **SET FOCUS** is displayed – this saves the focus height. With **CONTACT** it is then moved into its stored position.

**Z UP** moves the chosen stage upward at the selected speed.

**Z DOWN** moves the chosen stage downward at the selected speed.

**Set GAP** opens a dialog to define the contact gaps (Z heights) for **Separation** and **Alignment**. The **Overtravel** can be activated and defined.

**Align Functions**




**ALIGN** defines the keys as **CANCEL**(not visible above), **MARK 1** and **MARK 2**, and starts the 2-point alignment process.

1. Position the wafer stage near one edge of the wafer so that a horizontal street or feature is aligned with a crosshair or probe tip reference point and press **MARK 1**.
2. Move to the opposite edge of the wafer and align with the same street or feature and press **MARK 2**. The chuck Theta will then rotate to correct the rotational error. Increased magnification and careful alignment increases accuracy.

The same procedure can be used for Theta alignment of the microscope and ProbeHeads. Although the chuck is physically rotated, the microscope and ProbeHeads are corrected with software. This allows the ProbeHead rotational correction to track the microscope, so that aligning a microscope will automatically align the ProbeHeads. Packaged parts are easier to align with the microscope rather than with the chuck.

**Theta Functions**




**SET ORIGIN** defines the X-Y-Z origin of the stage from Zero, from Home or from Center.

**THETA** defines the keys as **CW**, **CENTER** and **CCW** and controls the chuck Theta in clockwise, go to center and counterclockwise.

**Mode Functions**




**REMOTE** sets a flag to signal a tester the prober is ready, redefines the key as **LOCAL** and disables all controls except this button. Pressing **LOCAL** resets the ready flag and enables local controls.

**QUIET** switches on the quiet mode. Once the control position has been reached, electricity is taken away from all motors to reduce electrical noise interference to the device under test.

Use **DARK** to switch off all sources of light to get a test environment without disturbances, typically used in a ShieldEnclosure™.

**SET UNIT** switches the coordinate system units between µm (microns), mils and index.

## *Fixed Function Keys*

Upper array:
**Chuck, Scope, Probe**: Defines the stage to be controlled by the joystick and which stage the functional keys relate to.
**Fnc**: (detailed description see below)
**Lift**: The selected stage (chuck, microscope or ProbeHead) is moved in a maximum distance away from the center. The chuck will be moved down, the microscope is raised to change objective lenses or facilitate setup. Afterwards the LED is lit.

Center array:
**Speed**: Sets the speed at which the stages move in response to the joystick. Speed 1: jogs or moves at the smallest stepping increment. Speed 2-4: each cover a speed range (4 = 100%)

**Index**: moves at a user-defined index value in X or Y direction. - Safety function: If Index speed is selected, **Theta** and **Z** can not be moved, the corresponding variable function keys are greyed out.

Lower array:
**Vacuum** controls the vacuum to the chuck stage for securing the wafer or DUT.
**Load** lowers the chuck to the lowest or load position, centers it in the X axis and forwards it towards the user.
**Separation, Align, Contact**: Moves the selected stage or ProbeHead to the defined contact, align and separate positions. Contact must be set by the user before these keys can be used.

Detailed **Fnc** key description (of upper key array):

Using the **Fnc** key allows
- getting user information and running a self test of the Expert Control Panel
- running the probe system initialization (access only for service engineers)

Press the **Fnc** key.
F6 is a ring counter to select the next function group, the function information corresponding to F1 ...
F6 can be seen at the bottom of the display, above the variable function keys group.

| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** |
|---|---|---|---|---|---|
| About | PMD | | | | **Select Test** |
| | LCD | LED | Keyboard | Joystick | **Select Service** |
| | Login | | | | **Select Info** |
| | Logout | | | | *) **Select Init** |

*) access to **Select Initialization** options after Login for service engineers only.
At the end press any stage key to get out of the **Fnc** key functionality.

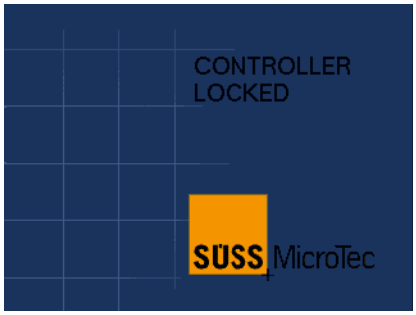
The **Fnc** key user functions include getting some user information and running self test options.
Press the F6 key to get the **Select Info** function group.
Pressing F1 the **About** information appears:
- CBox version
- PA Kernel version
- Serial number
- Operating time (uptime)

Press F2 to get the **PMD** information:
Motion controller version numbers of chuck, scope and ProbeHeads 1 to 4.

Press the F6 key to get the **Select Test** function group.
- **F2, LCD:** tests the LCD display with regard to physical damages, the test runs automatically for about 10 seconds. Viewing the diverse colors the LCD display can be checked. If a frozen test screen appears at the end use any key to leave the test.
- **F3, LED:** Switches all LED's on and off automatically, possible not illuminated LED's are defect.
- **F4, keyboard:** displays the key codes on the screen, the key is o.k. then. Fixed function keys array: additionally the corresponding LED is illuminated for test, and possible defective electrical bridges can be detected. Quit with F6.
- **F5, Joystick:** functional test of the joystick, check of the zero point and the X Y value feedback, the maximum X and Y excursion is depending on the joystick type. Quit with F6.
  **Note:** The joystick test results are used for calibration, **access for service engineers only**.

## Stage Locking Option

To protect against accidental stage movements a stage locking option may be used for chuck, microscope, Expert Control Panel or ProbeHeads. This can be used if e.g. only the WaferMap may have access to the chuck for a test sequence.




With the **SetStageLock** remote command the stage lock functionality can be enabled or disabled. If the Expert Control Panel is locked, the display and the keys are deactivated and no input can be done. On the display “Controller locked” is noted, except for the activated Dark-Mode.

The “not locked” status is standard, thus after rebooting the Expert Control Panel is not locked.

# Operation

## System Power-up

System power-up prepares the semiautomatic probe system for use from the Expert Control Panel and the user interface.

1. Push the ProberBench Electronics II Main Power Switch to the ON position. The power LED will light up indicating power to the electronics. Press the green ON button, the other LED's light up, the EMO System is activated. Ensure that the latching EMO button on the mechanic is in the released position.

   **Note**: The boot up sequence of the User Interface, running on the PC, includes establishing communications with the ProberBench Electronics II. Therefore, the electronics must be switched on before starting the User Interface to prevent a communications error.

If an error occurs, turn on the electronics and click OK in the error message box.

2. Turn on power to the PC, monitor and all ancillary equipment, such as the microscope illuminator, laser cutter and camera.
3. The system is now ready for use with the Expert Control Panel or from Microsoft Windows®.

## Getting Started

This procedure guides the user through a typical set-up of a SUSS semiautomatic probe system, from powering up the system to aligning Theta, setting contact and home, and entering an index.

1. Turn the power to all components on.
2. On the Expert Control Panel select the stage to be used: chuck, microscope or ProbeHead. For this example, the chuck is selected.
3. Select the control speed, typically **Speed 4** at a low magnification to locate the probe tips and target.
4. Press **F6** to get the Z axis controls. If the chuck is not in the loading position (front middle), press the **Load** key. Load the wafer and switch the vacuum on (**VAC** key).
5. Ensure that the platen (if movable) is in the contact position and raise the chuck, using **Z UP** and **Z DOWN** keys, **F3** and **F4**, so that the wafer or DUT is about 1-2 mm away from the platen or probe card. This allows the use of short probe tips and places the wafer within the working range of ProbeHeads. Press **SET CONTACT**, **F2**, to set contact at this point.
6. Since the chuck will not move while in contact, press **Align** (fixed function keys array) to lower the chuck.
7. Use the joystick and microscope focus to get the wafer and probe tips in view. If equipped with motorized focus Z axis controls, operate the focus when the microscope is selected.
8. Switch to **Align Select** with **F6** for Align. For a two-point alignment position the wafer stage near the left (right) edge of the wafer. A horizontal street or feature is aligned with a crosshair or probe tip reference point. Press **MARK 1**, **F3**. Move to the right (left) edge of the wafer and align with the same street or feature and press **MARK 2**, **F4**. The chuck Theta then rotates to correct the rotational error. Increased magnification and careful alignment increase accuracy. For probing packaged parts, use the microscope software Theta compensation.
9. Use the joystick to move the wafer chuck to the first test point or a reference die. Align the first pad to the first probe tip. If necessary, adjust single probe tips. Press **SET HOME**, **F2**, after having switched to **Stage Select** with **F6**.
10. Use the joystick to slowly move the chuck in Z until the probe tips are in contact. Press **SET CONTACT** to raise the chuck to contact position. Use **F6** to change to the Z menu. If the contact position has already been set, press the **Clear Contact** button. Using the **Contact**, **Align** and

**Separation** buttons allows you to move among the preset heights, which can be defined by pressing **Set Gap** on the Expert Control Panel

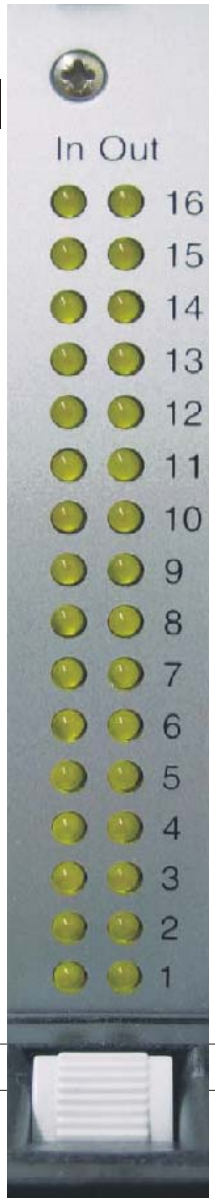
11. The joystick and Z axis controls can now be used to move to more test points. An index can be set with **F4** in the Stage Functions menu. The index value is displayed on the screen. Change the index using the Number key pad and press **Enter** for X and Y.
12. Unloading: press the **Load** key, the chuck moves to the loading/unloading position. Switch the vacuum off and remove the wafer.

# Appendix

## Pin Assignment I/O-Card

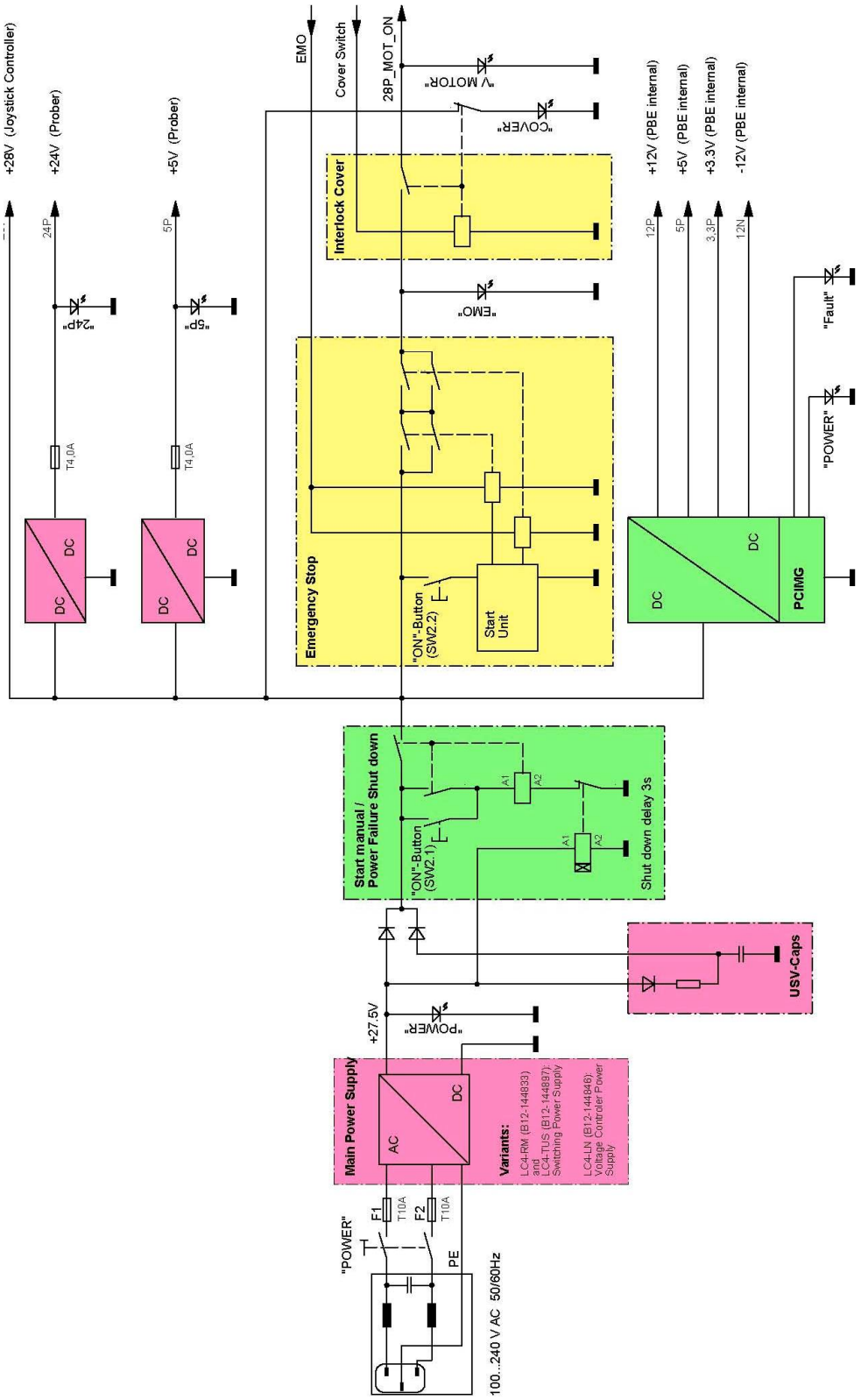
output current: 0,5A per channel

| J22 pin | description | name | name | description | J22 pin |
|---|---|---|---|---|---|
| *27* | *EPIN_DOWN* | *IN_CH16* | *OUT_CH16* | | *37* |
| *8* | *DARKMODE* | *IN_CH15* | *OUT_CH15* | | *18* |
| *26* | | *IN_CH14* | *OUT_CH14* | | *36* |
| *7* | | *IN_CH13* | *OUT_CH13* | *BEACON_GN* | *17* |
| *25* | | *IN_CH12* | *OUT_CH12* | *BEACON_YE* | *35* |
| *6* | | *IN_CH11* | *OUT_CH11* | *BEACON_RD* | *16* |
| *24* | *SVAC_WAFER* | *IN_CH10* | *OUT_CH10* | *SCOPE_LIGHT* | *34* |
| *5* | *VACUUM_IN* | *IN_CH09* | *OUT_CH09* | *VALVE_SCOPE* | *15* |
| *23* | *PRESSURE_IN* | *IN_CH08* | *OUT_CH08* | | *33* |
| *4* | *SCOPE_DN* | *IN_CH07* | *OUT_CH07* | | *14* |
| *22* | *SCOPE_UP* | *IN_CH06* | *OUT_CH06* | *LED_QUIET* | *32* |
| *3* | *LOCK_CHUCK* | *IN_CH05* | *OUT_CH05* | | *13* |
| *21* | *LOCK_SCOPE* | *IN_CH04* | *OUT_CH04* | | *31* |
| *2* | | *IN_CH03* | *OUT_CH03* | *INK_2* | *12* |
| *20* | *EMO* | *IN_CH02* | *OUT_CH02* | *INK_1* | *30* |
| *1* | *28P_MOT_ON* | *IN_CH01* | *OUT_CH01* | *WAFER_VAC* | *11* |
| *9, 28* | | *24P* | *GND* | | *10, 29* |

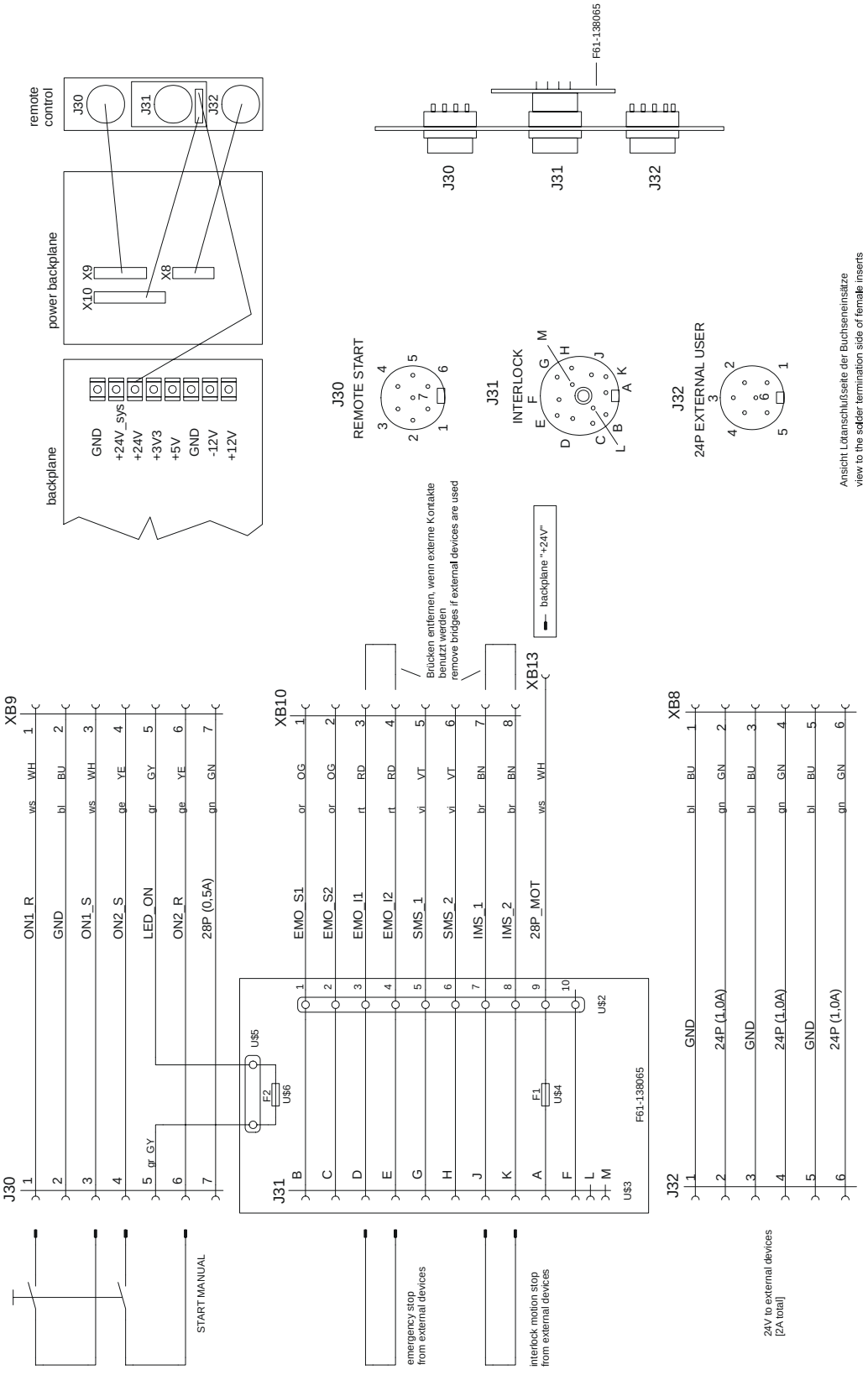



Not all inputs and outputs are used in each prober. Please compare with circuit diagram of the prober.
Inputs and outputs without description are prober defined.

## Power Management



# Remote Control (Optional)



# ProberBench™ Electronics II LC4

| Name | Article-No. | Equipment | Basic Device |
|---|---|---|---|
| EMO POWER-ON | B62-144837 | | X |
| POWER SUPPLY 5V/4A | K10-70818 | | X |
| POWER SUPPLY 24V/5A | K10-70817 | | X |
| POWER SUPPLY CPCI-DC-3U | K10-70819 | | X |
| | | | |
| DC-DRV-2 CHUCK | B62-141475 | | X |
| DC-DRV SCOPE NPN | B62-131651 | X | |
| | | | |
| I/O 16 NPN | B62-138029 | | X |
| 3U-BASE ETX-PM | B62-144386 | | X |
| GPIB-CPCI - LC3 | B60-139610 | X | |
| DC-DRV PROBEHEAD NPN | B62-131655 | X [2)] | |
| DC-DRV PROBEHEAD NPN | B62-131655 | X [2)] | |
| DC-DRV PROBEHEAD NPN | B62-131655 | X [2)] | |
| DC-DRV PROBEHEAD NPN | B62-131655 | X [2)] | |
| I/O 16 NPN | B62-138029 | X [2)] | |
| ENCLOSURE TABLETOP [2) 3)]<br>ENCLOSURE RACKMOUNT [1)] | K00-51632<br>K00-70820 | | X |
| REAR I/O 16CH | B62-134184 | X [2)] | |
| REAR I/O MOT | B62-130447 | X [2)] | |
| REAR I/O MOT | B62-130447 | X [2)] | |
| REAR I/O MOT | B62-130447 | X [2)] | |
| REAR I/O MOT | B62-130447 | X [2)] | |
| COVER-SWITCH-DELAY NPN | B60-130449 | X | |
| REAR I/O 3U | B62-129624 | | X |
| MACHINE INTERFACE LC3 [2)]<br>MACHINE INTERFACE II - R [1) 3)] | B62-138033<br>B62-134190 | | X |
| REMOTE CONTROL - LC3 | B60-138059 | X | |
| POWER IN | B62-138025 | | X |




[2)] to each DC-DRV PROBEHEAD belongs on the rear side a REAR I/O MOT (the complete component number is B12-131654)

[3)] second I/O-card together with REAR I/O 16CH

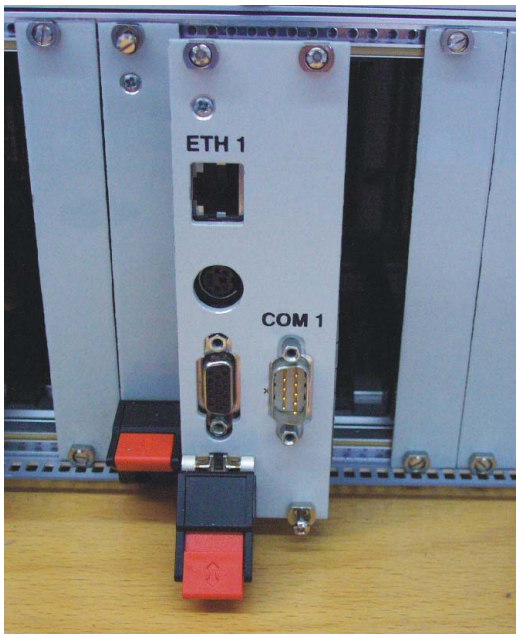
Version 4.0

# Switch the Flash Memories

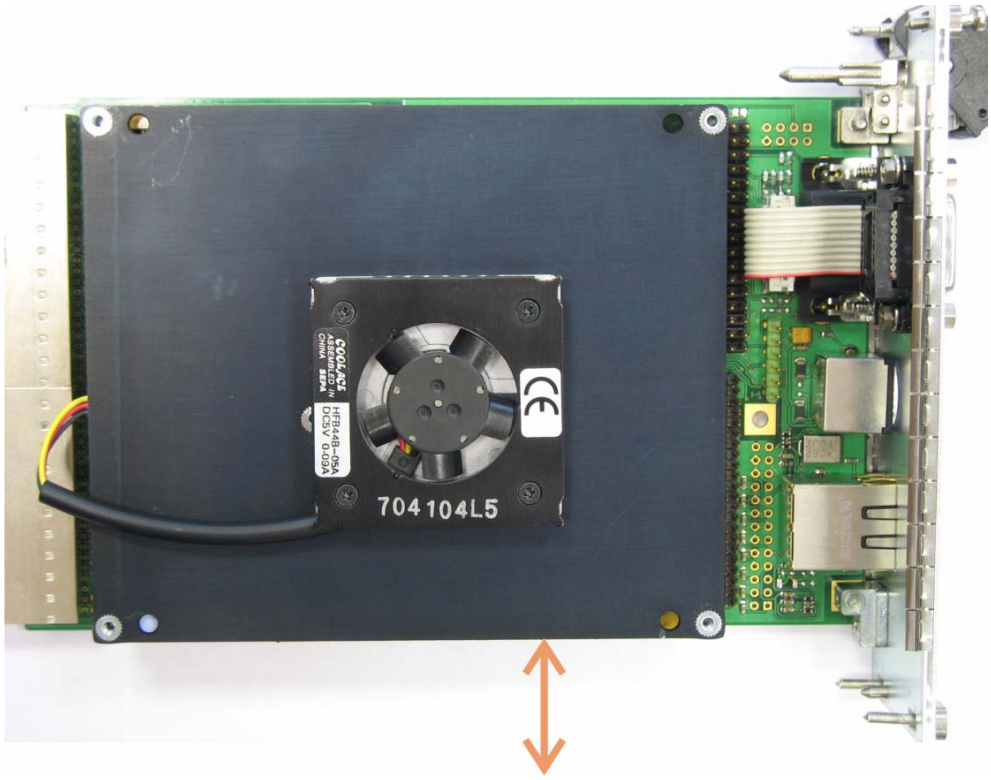
**Switch the devices off and disconnect them from the mains before starting to work!**

## ProberBench Electronics II

Remove the card out of CPU slot of the ProberBench Electronics II by pressing on the key at the bottom and pull out the card.



Switch the flash memory as indicated with arrows in the pictures below. There are 2 possible types: type i shown above, and type d below.



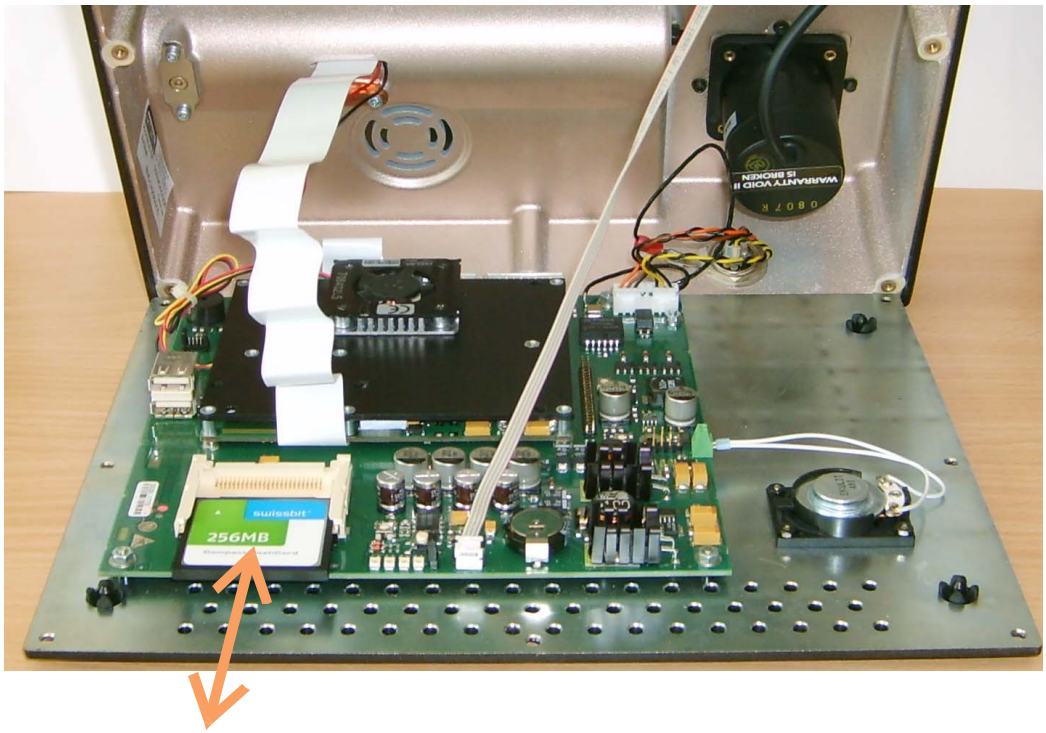




Re-install the card in the ProberBench Electronics II.

## Expert Control Panel

Unscrew the 8 screws at the bottomside of the Expert Control Panel and replace the old memory flash by the new. **Be careful with the cables !**



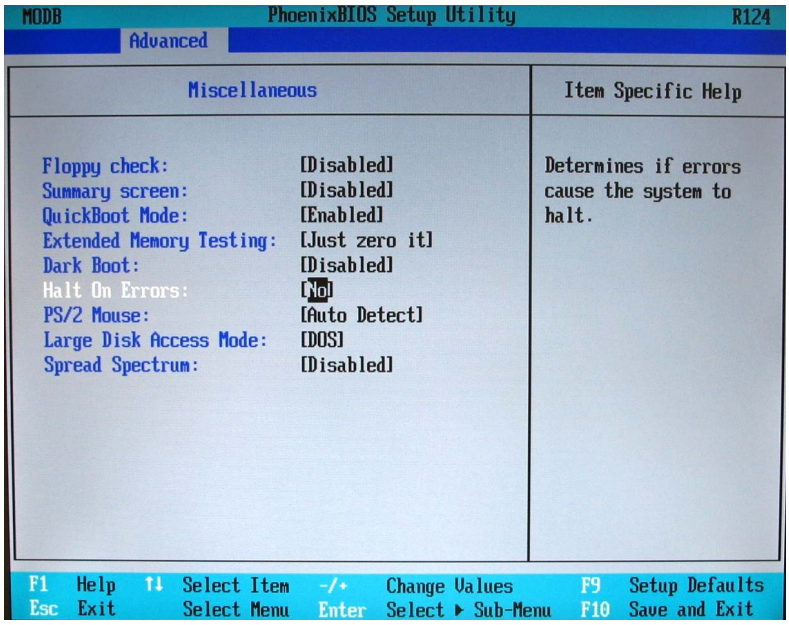

Re-assemble the Expert Control Panel, fix the 8 screws on the bottomside.

# BIOS Settings

## BIOS Settings of the ProberBench Electronics II

These are the settings of the Main Board BIOS, to compare the settings do the following steps:

- connect an English keyboard and monitor directly on the 3U-Base board
- Press F2 during the boot process
- Load Setup Defaults
- Adjustment: Halt ON Errors = No




## BIOS Settings of the Expert Control Panel

These are the settings of the Main Board BIOS, to compare the settings do the following steps:

- connect an English keyboard and monitor directly on the Base board
- Press F2 during the boot process
- Load Setup Defaults
- Adjustment: Dark Boot = Enabled
  Halt ON Errors = No

# FAQs

## Do I have to keep the slots for inserting the boards into the ProberBench Electronics II ?

Yes. The type of the insert boards is stored in the software. The hardware only recognizes the configuration (board is inserted or not) of the slots. Using this information the software includes the configuration and displays it to the user.

## What must be done after activating the EMO button ?

After the use, latching buttons should be released by pulling the button. The system can then be switched on again by pressing the green ON button on the ProberBench Electronics II. The system LED's should be illuminated then.

## What happens after power failure ?

The power failure will be bridged by the system. After 5 seconds the UPS (Uninterruptible Power Supply) initiates a defined shut down.

## What happens after a PC system crash ?

When re-starting the control computer the software recognizes the crash and the error message "Init lost" is prompted. The software does not know if the chuck position has been saved (correctly). Running the prober initialization procedure is necessary.

## Are the insert boards of different production years / design compatible?

Yes.

## Can the ProberBench Electronics II be exchanged between different probe systems ?

Yes, only the flash memory (compact flash) with firmware and prober specific data must remain with the prober.

## Can the Expert Control Panel be exchanged between different probe systems?

Yes, even under applied voltage. But it is necessary that the firmware version must fit.

## Why does the shut down procedure take so much time ?

Shutting down first requires to save the positions and data. The ProberBench Electronics II has a built-in **S**hut **D**own **M**anagement (SDM). If the ProberBench Electronics II has been switched off using the Power Switch the shut down routine will be started. The SDM energizes the control system with 24 V DC for the shut down period. This will take approximately 20 seconds.

## Which beeps do I hear when booting the ProberBench Electronics II ?

You can hear 2 beeps of 2 different sources. The first beep is generated by the microcontroller of the ProberBench Electronics II, the second beep comes from microcontroller of the Expert Control Panel.

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