FlyingProbe Test System

Operating Instructions

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	Contents	Page
1	**Safety**	**1-1**
1.1	Classification of hints	1-2
1.2	Safety regulations and hints	1-3
1.3	Safety installations	1-4
1.3.1	*Status lights*	*1-4*
1.3.2	*Housing of the test chamber*	*1-5*
1.3.3	*Doors to the test chamber*	*1-5*
1.3.4	*Safety switches*	*1-5*
1.3.5	*Emergency-Stop buttons*	*1-6*
1.3.6	*Doors to the machine control*	*1-6*
1.4	Safety area	1-6
1.5	Emergency-Stop	1-6
1.6	Safety measures by the operating personell	1-7
2	**Introduction**	**2-1**
2.1	Basic concepts	2-2
2.2	Copyright	2-3
2.3	Range of validity	2-3
2.4	Limitation of liability	2-3
2.5	Use as agreed	2-4
2.6	Obligations to the customer	2-5
2.7	Requirements to the operating personnel	2-5
2.8	Authorized personnel	2-6
3	**Description of the machine**	**3-1**
3.1	Major parts of the machine	3-2
3.2	Test chamber	3-2
3.2.1	*Test probes*	*3-3*
3.2.2	*PCB mounting frame*	*3-4*
3.3	Controls and indicators	3-5
3.3.1	*Status lights*	*3-5*
3.3.2	*OCU*	*3-5*
3.3.3	*Emergency-Stop button*	*3-5*
3.3.4	*Mouse*	*3-6*
3.3.5	*Button „Power on"*	*3-6*
3.3.6	*Button „Lights"*	*3-6*
3.4	Machine control	3-6

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4	**Installation**	**4-1**
4.1	Delivery	4-2
4.2	Site selection	4-2
4.3	Installation	4-2
4.3.1	*Technical data*	*4-2*
4.3.2	*Positions of supply elements*	*4-4*
4.3.3	*Installation*	*4-4*
4.4	Putting into operation	4-5
4.5	Transportation of the machine	4-6
5.1	Switch on/off and reset	5-2
5.1.1	*Switch the machine on*	*5-2*
5.1.2	*Switch the machine off*	*5-2*
5.1.3	*Reset the machine*	*5-3*
5.2	Prepare testing	5-3
5.2.1	*Create a new job directory*	*5-3*
5.2.2	*Activate a directory*	*5-4*
5.2.3	*Import required files*	*5-4*
5.2.4	*Execute data preparation*	*5-5*
5.2.5	*EDIAPV data preparation*	*5-5*
5.2.6	*GcPowerTestFPMania data preparation*	*5-10*
5.2.7	*Test file convention*	*5-11*
5.2.8	*Place fiducials*	*5-13*
5.2.9	*Define CAD zero point*	*5-17*
5.2.10	*View and edit job options*	*5-18*
5.2.11	*Mount a board into the frame*	*5-20*
5.3	Start testing	5-22
5.3.1	*Check fiducials*	*5-22*
5.3.2	*Test first board*	*5-23*
5.3.3	*Test subsequent boards*	*5-24*
5.4	Errors on the board	5-24
5.4.1	*Error reports*	*5-24*
5.4.2	*Stop on error*	*5-25*
5.4.3	*View errors*	*5-26*
5.5	Test repaired board	5-27
5.6	Test floor integration	5-28
5.6.1	*TFI compatibilities*	*5-28*
5.6.2	*Preparation of the directory structure*	*5-29*
5.6.3	*Preparation of the EDIAPV*	*5-29*
5.6.4	*Display errors in EDIAPV*	*5-30*
5.6.5	*Use BarCode option for TFI*	*5-30*
5.6.6	*TFI retest*	*5-31*

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6	**Maintenance and Cleaning**	**6-1**
6.1	Terms for maintenance duties	6-2
6.2	Switch the machine off	6-2
6.3	Daily inspection and maintenance	6-2
6.3.1	*Check probes*	*6-3*
6.3.2	*Change probes*	*6-3*
6.4	Monthly inspection and maintenance	6-3
6.4.1	*Check Z guiding*	*6-3*
6.4.2	*Check z springs*	*6-4*
6.4.3	*Check deflection*	*6-4*
6.5	Inspection and maintenance every six months	6-5
6.5.1	*Check the z home sensors*	*6-5*
6.5.2	*Check the X and Y sensors*	*6-5*
6.5.3	*Spray motor pulleys*	*6-6*
6.5.4	*Grease bearings and bottom x-guiding*	*6-6*
6.6	Cleaning	6-6
7	**Operation software**	**7-1**
7.1	Pegasus software icon	7-2
7.2	Main window	7-2
7.2.1	*Menus of the main window*	*7-2*
7.2.2	*Buttons of the main window*	*7-5*
7.3	Job directory	7-6
7.4	Job options	7-7
7.5	Test menu	7-9
7.5.1	*Test dialog*	*7-10*
7.5.2	*Test repaired boards*	*7-11*
7.5.3	*Test external ticket*	*7-12*
7.5.4	*Scale function*	*7-14*
7.5.5	*Point on fiducials*	*7-14*
7.5.6	*Display results*	*7-16*
7.5.7	*View errors*	*7-17*
7.5.8	*Display log file*	*7-18*
7.6	Load function	7-19
7.7	Data preparation	7-19
7.7.1	*Set fiducials*	*7-20*
7.7.2	*HLS input*	*7-22*
7.7.3	*Duplicate image*	*7-22*
7.7.4	*Job merge*	*7-24*
7.7.5	*View *.lst file*	*7-25*
7.7.6	*Compress files*	*7-26*
7.7.7	*Editor for job data*	*7-26*
7.7.8	*Alternative editor*	*7-26*
7.8	Directory maintenance	7-26

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7.9	Technical submenu	7-27
7.10	Parameters	7-27
7.10.1	*Parameters 1*	*7-27*
7.10.2	*Parameters 2*	*7-30*
8	**Administrator software**	**8-1**
8.1	Start adminpgs	8-2
8.2	Login	8-2
8.3	*Main menu*	*8-2*
8.4	User management	8-3
8.4.1	*Define a new user*	*8-3*
8.4.2	*Define user profile*	*8-3*
8.4.3	*Define new profile*	*8-4*
8.4.4	*Copy profile*	*8-6*
8.4.5	*Modify a user*	*8-6*
8.5	Machine management	8-6
8.5.1	*Create new machine profile*	*8-6*
8.5.2	*Update existing machine profile*	*8-7*

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1 Safety

This chapter focusses on the safety aspect only. We show you all safety installations and give you important hints for the safe operation of the machine.

Warning

Possible injuries due to non-compliance with safety regulations!

Read this chapter completely before you start working at or with the machine! Otherwise you could not get notice of important information regarding working safety.

Contents ***Page***

1	**Safety**	**1-1**
1.1	Classification of hints	1-2
1.2	Safety regulations and hints	1-3
1.3	Safety installations	1-4
1.3.1	*Status lights*	*1-4*
1.3.2	*Housing of the test chamber*	*1-5*
1.3.3	*Doors to the test chamber*	*1-5*
1.3.4	*Safety switches*	*1-5*
1.3.5	*Emergency-Stop buttons*	*1-6*
1.3.6	*Doors to the machine control*	*1-6*
1.4	Safety area	1-6
1.5	Emergency-Stop	1-6
1.6	Safety measures by the operating personell	1-7

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1.1 Classification of hints

The safety and warning hints in this manual are structured in accordance with ANSI Z535.4. Five different types of hints can be distinguished, indicated by different icons and Status words:

Danger

Indicates a menacingly immanent danger. If you do not avoid this danger, death or severe injuries will be the direct consequence.

Warning

Indicates a possibly dangerous situation. If you do not avoid it, death or severe injuries could be the consequence.

Caution

Indicates a possibly dangerous situation. If you do not avoid it, slight or minor injuries could be the consequence.

Notice

Indicates a possibly damaging situation. If you do not avoid it, the machine or something in its environment could be damaged.

Important

Shows hints which are useful for the daily operation of the machine. At some positions within this manual, special operational possibilities will be shown.

The used icons correspond with the German regulations regarding accident prevention. Please obtain all rules and regulations.

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1.2 Safety regulations and hints

Warning

Dangerous electrical voltage is used inside the machine!

To avoid severe injury, mains should be unplugged before opening the housing.

Caution

Severe damage to the machine!

This machine will be severly damaged if connected to unsuitable power supply conditions. Before connecting the power supply, please check, whether the available and the required mains voltage are identical.

Notice

Possible damage to the machine!

Repair and maintenance duties may only be carried out by experienced staff (MANIA TAC-certified operator, see section 2.8). Operation of this machine may only be carried out by an instructed person, who had read and understood this manual completely.

Important

Read manual first!

Read this manual completely, before you put the machine into operation. Obtain all rules and regulations.

Important

Qualified personnel only!

Maintenance and repair duties may only be carried out by the service staff of MANIA, or authorized firms, or technicians having the MANIA TAC certificate (see section 2.8). In any other case, producer's warranty will be spoiled.

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Important

No unauthorized modifications!

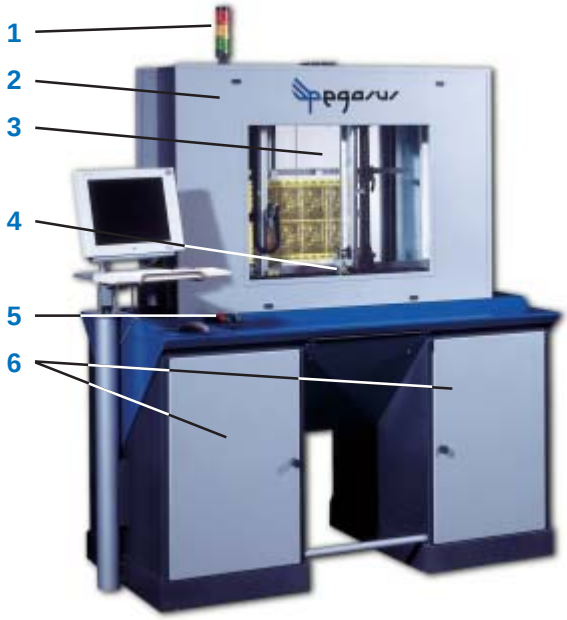
The customer is responsible for any modifications to the machine. In this case, producer's warranty will be spoiled.

Important

Do not loose rights!

Please do a careful unpacking and check all parts for completeness and possible transportation damage. We only accept warranty, if such damage is claimed before the appliance is put into operation.

1.3 Safety installations



The machine is equipped with the following safety installations:

1 Status lights
2 Housing of the test chamber
3 Doors to the test chambers
4 Safety switches at the doors
5 Emergency-Stop button
6 Doors to the machine control

1.3.1 Status lights

The current machine status is indicated by the Status lights:

Red	fault occurred, machine stopped
Yellow	machine is waiting for operation
Green	machine is testing

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1.3.2 Housing of the test chamber

The test chamber is housed completely to prevent the operator from grasping between the moving parts of the machine. The machine may only be operated, if the complete housing of the test chamber is mounted:

- Front plate with the front door
- Rear plate with the rear door
- Side plates on the right and left side
- Roof plate

The machine may only be operated with closed doors. The only exception is the execution of some maintenance duties as described in chapter 6. Then, special safety measures must be applied.

If you find parts of the housing missing or not fixed correctly, you have to switch of the machine immediately. Disconnect the power supply to assure that the machine cannot be switched on unintentedly. The housing must be completed before the machine may be switched on again.

1.3.3 Doors to the test chamber

During machine operation, the doors to the test chamber must be kept closed at all time. This shall prevent the operator from grasping into the moving parts of the machine and get injured.

During normal machine operation, the doors to the test chamber may only be opened in the following cases:

- to mount boards to be tested into the PCB frame
- to dismount tested boards from the PCB frame
- to execute the cleaning and maintenance duties described in chapter 6 of this manual

1.3.4 Safety switches

The closed state of the doors to the test chamber is supervised by safety switches.

When a door is opened while tests or calibrations or other machine movements are in progress, an Emergency-Stop will be triggered by the safety switches. All movements of machine parts will be stopped immediately.

Please see section 1.5 for information on how to react on an Emergency-Stop.

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1.3.5 Emergency-Stop buttons

The machine is equipped with two Emergency-Stop buttons, located to the left of the test chamber on the front and rear operation panel.

In case of an emergency, or in any doubtful situation, press an Emergency-Stop button. All movements of machine parts will be stopped immediately.

Please see section 1.5 for information on how to react on an Emergency-Stop.

1.3.6 Doors to the machine control

The access to the machine control is inhibited by doors. These doors should be kept closed at any time during machine operation.

The left door to the operation PC should only be opened, if data cartridges shall be inserted into or taken out from the PC.

1.4 Safety area

The machine can be operated from the front or rear side. During operation, only one person may stay inside one of the operation areas (O). The other operation area must be free.

The swinging range of the monitor arm is a safety area (S). This area must be free of anything at any time. Nobody may enter this area during machine operation.

The operation and safety areas are illustrated in the drawing.

1.5 Emergency-Stop

An Emergency-Stop is an interruption of the machine operation. It can be triggered by two causes:

- an Emergency-Stop button has been pressed
- one door to the test chamber has been opened during machine operation

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Warning

Possible injuries due to unclear machine situations!

Clear and cure the cause of the Emergency-Stop before you reset it. Otherwise the machine could be in an unclear status what could lead to injuries of the operating personell or severe damage to the machine or its environment.

Follow this procedure to reset an Emergency-Stop:

1. Clear the cause of the Emergency-Stop without any doubt.
2. Cure the cause of the Emergency-Stop completely.
3. If an Emergency-Stop button has been pressed: turn this button to the left to release it.
4. If a door to the test chamber has been opened: close this door.
5. Press the button „Power on“.
6. If a test has been interrupted, it will be continued automatically. If the machine was waiting, you can continue to operate now.

1.6 Safety measures by the operating personell

The safety installations of the machine work passively that means that they can only react on certain incidents. To achieve an optimized working safety, active measures of the operating personell are required.

Please obtain the following regulations for the operation of the machine:

1. Always work concentrated and avoid any actions that bear a risk.
2. Do not try to bridge safety installations or put them out of order in any other way.
3. Check all safety installations for fault-free functioning when starting work at the machine.
4. Interrupt the power supply mechanically and assure that it cannot be connected unintentedly, before you open the housing.
5. Switch off the machine using the main switch, before you start with cleaning or maintenance works.

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2 Introduction

This chapter contains an introduction to the Operating Instructions Manual on hand. You will find safety regulations and hints that will be helpful in the daily use of the test system. Additionally we give you all required information on the topics 'Copyright', 'Warranty regulations' and 'Use as agreed'.

Important

Read manual first!

Read the Operating Instructions completely, before you put the test system into operation. Otherwise you'll take the risk, that producer's warranty may be voided.

Notice

Do not install other software!

The operation software may be incompatible with other software. We do not guarantee a fault-free functioning, if other software is installed on the operation PC of the test system.

Contents ***Page***

2	**Introduction**	**2-1**
2.1	Basic concepts	2-2
2.2	Copyright	2-3
2.3	Range of validity	2-3
2.4	Limitation of liability	2-3
2.5	Use as agreed	2-4
2.6	Obligations to the customer	2-5
2.7	Requirements to the operating personnel	2-5
2.8	Authorized personnel	2-6

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2.1 Basic concepts

A circuit board is a device that allows electronic components to be mounted and connected together on a flat surface to perform specific functions. Some circuit boards contain many discrete components such as transistors, resistors, and capacitors, while others may be heavily populated with integrated circuits. One thing that each of these components have in common, however, is that they must be connected to their fellows in a specific manner so that the final assembly can perform it's specified functions.

These electronic components are joined together by „traces" (lines of copper) embedded in the circuit board. If traces are incorrectly routed, broken (open), or shorted to adjoining traces, then the board will not operate correctly when the electronic components are added. In some cases, the whole production run may have to be scrapped. In modern designs, the electronic components are worth much more than the original circuit board material, but they cannot be removed easily after assembly. Its very important, therefore, to verify that each circuit board is good prior to mounting components on the board.

You will be using your MANIA FlyingProbe Test System to do just that, that is, to verify that each of the traces on the circuit boards you are testing are routed to their correct locations. This is done while the circuit board is still free of electronic components. In this condition, the circuit board is referred to as a „bare board".

Tests are made by mounting the board to the test **Frame** of the MANIA Test System. Then movable **Probes** will be moved to each position to be tested. Cute probe tips are lowered onto the PCB, contacting the test points of each network on the board. MANIA FlyingProbe Test Systems are equipped with four probes, two on the front and rear of the board.

The MANIA test system verifies the proper trace routing by performing **Continuity** and **Isolation** testing of the bare board. These tests are performed according to a **Test Program** loaded into the system. This program represents the pattern according to which all the test points are supposed to be interconnected. The system is also able to „self learn" test programs from a circuit board known to be good. Programs may also be downloaded from CAD design data for the board and test fixture.

Continuity Test verifies that each point on the board is well contacted with any other point(s) to which it is supposed to be connect. Each group of such interconnected points is called a **Network**. A special type of network is the **Single Point Network**, which contains only a single point connected only to itself. A typical board may have a large number of such networks. Each network may contain from one or two points, up to hundreds of test points. When continuity test fails, the system reports the failed network as being an **Open Error**.

Isolation Test verifies that the networks are not improperly short circuited to each other. Isolation Test also verifies that the electrical insulation between networks is sufficiently high to prevent unwan-

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ted interaction between these points when the components are added. When isolation test fails, the system reports either **Short Errors** or **Isolation Errors** according to how severely the offending networks are connected.

Once you load a test program and calibrate the test system, testing is as simple as:

1. Mount a board into the frame.
2. Click on the „Start Test“ button in the operating software.
3. Wait for the test to conclude.
4. Check the display and the printer for PASS/FAIL results.
5. Remove the board.
6. Sort the board onto the PASS or FAIL stack with it’s accompanying printout.

2.2 Copyright

The machine and this operation manual are protected on copyright. Manufacture without license will be prosecuted by law. All rights reserved on this manual, even the reproduction and/or duplication in any thinkable form, e.g. by photocopying, printing, on any data recording media or translated. Reproduction of this manual is only permitted with a written approval of MANIA.

The technical standard by the time of delivery of machine and manual is decisive, if no other information is given. Technical changes without special announcements are reserved. Earlier operation manuals loose validity.

The general conditions of sale and delivery of MANIA are valid.

2.3 Range of validity

This operation manual is valid for FlyingProbe Test Systems named „Pegasus“ MPP 6504. It adresses to the operator of this machine, that means the person that works at and with the machine. The manual is not a Technical or Service Manual. Please contact our service staff for questions that exceed the contents of this manual.

2.4 Limitation of liability

We guarantee the faultless functioning of our product in accordance with our advertising, the product information edited by MANIA and this manual. Further product features are not guaranteed. We take no liability for the economy and faultless function if the product is used for a different purpose than that, described in the chapter „Use as agreed“.

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Compensation claims are generally impossible, except if intention or culpable negligence by MANIA is proved, or if assured product features are not provided. If this appliance is used in environments, for which it is not suited or which do not represent the technical standard, we are not responsible for the consequences.

We don't accept responsibility for damages at installations and systems in the surroundings of this appliance, which are caused by a fault of the product or an error in this manual.

We are not responsible for the violation of patents and/or other rights of third persons outside the European Community.

We are not liable for damages, which result from improper operations according to this manual. We are not liable for missed profit and for consecuting damages due to non regardance of security advices and warning hints. We don't accept liability for damages which result from the use of accessoires which are not delivered and/or approved by MANIA.

The products of MANIA are designed for a long life. They represent the standard of technique and science and were checked on all functions individually before delivery. The electrical construction corresponds to the current norms and regulations, particularly DIN 5713 / VDE 0113. MANIA is doing product and market research for the further development and permanent improvement of their products. In the case of faults and/or technical trouble please contact the MANIA service staff. We assure that suitable measures will be taken immediately.

The MANIA guarantee regulations are valid, which we will send to you on demand.

2.5 Use as agreed

The Electrical FlyingProbe Test System „Pegasus MPP 6504" is used for the double sided testing of bare Printed Circuit Boards (PCB).

The PCB is mounted into the test frame within the test chamber. After closing the doors of the test chamber and clicking the „Start Test" button, the four probes will be moved to each point on the PCB to be tested. When contacting at least two testpoints, the desired electrical tests will be executed.

After termination of the electrical test, the result will be displayed on the screen of the operation PC. Additionally, the test result may be printed by the optional printer of the test system. At the operation PC, the operator can load test programs, modify the settings of the machine, and even work on the test data by using the operation software of the test system.

Important

The customer is responsible, if the machine is used for a different purpose than that described above. See chapter 'Limitation of Liability' for further details.

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If you want to use this machine for a different purpose, please contact our service staff.

2.6 Obligations to the customer

The operating authority of this machine has to assure, that only persons who

- are common with the regulations on working safety and accident prevention
- have been instructed in the operation of this appliance
- have read and understood the safety instructions in this manual

can operate this appliance. Persons who work with this appliance are obligated to

- obey all rules and regulations on working safety and accident prevention
- read and obey this operating manual completely, especially the safety instructions in this chapter.

2.7 Requirements to the operating personnel

Important

Authorized personnel only!

All actions at or with the machine may only be executed by authorized personnell, which have previously read and understood this manual completely.

This regulation is especially valid for the following actions:

- Operation including setup, troubleshooting during production, removal of production waste, care, cleaning
- Maintenance (inspection, maintenance, repair)
- Transportation (deinstallation, packing, transportation, installation)

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2.8 Authorized personnel

Persons are regarded as authorized, who have a professional education, technical experience, knowledge of the important norms and regulations and who are able to estimate their duties and recognize possible danger at an early time.

Operator of the machine

Persons are regarded as authorized, who were trained in the operation of the machine and have read and understood the manual on hand completely.

Personell for installation, setup and maintenance

Persons are regarded as authorized, who were trained in all aspects of the machine and have read and understood the manual on hand completely. The successful training and instruction is documented by the „MANIA Technical Approval Certificate“ (TAC).

Please contact our service department for further details.

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3 Description of the machine

In this chapter we introduce the FlyingProbe test system Pegasus to you. Beginning with an overview over the major parts and assemblies, we show you all controls and indicators and the technical installations.

Contents ***Page***

3	**Description of the machine**	**3-1**
3.1	Major parts of the machine	3-2
3.2	Test chamber	3-2
3.2.1	*Test probes*	*3-3*
3.2.2	*PCB mounting frame*	*3-4*
3.3	Controls and indicators	3-5
3.3.1	*Status lights*	*3-5*
3.3.2	*OCU*	*3-5*
3.3.3	*Emergency-Stop Button*	*3-5*
3.3.4	*Mouse*	*3-6*
3.3.5	*Button „Power on"*	*3-6*
3.3.6	*Button „Lights"*	*3-6*
3.4	Machine control	3-6

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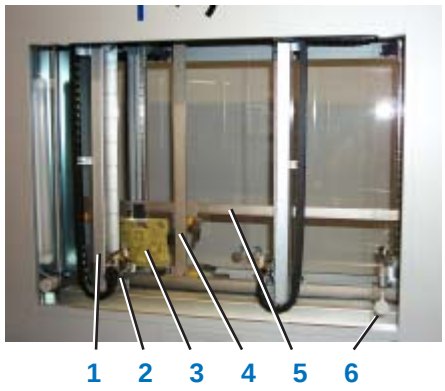
3.1 Major parts of the machine

1. OCU (operator control unit)
2. Mouse and control buttons
3. Emergency-Stop button
4. Left cabinet (computer)
5. Status lights
6. Access doors (front and rear) to the test chamber
7. Right cabinet (motor control)
8. Test chamber housing

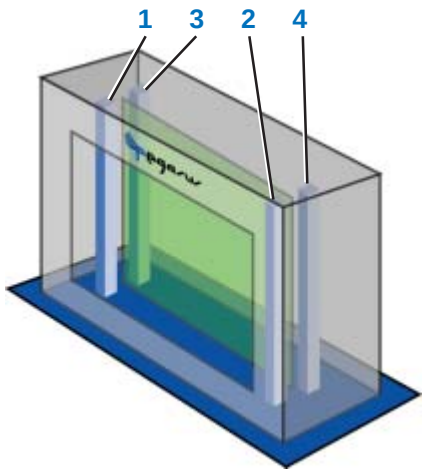
3.2 Test chamber



1. Probe arm (PA1, PA2, PA3 and PA4)
2. Vertical PCB clamping arm
3. Horizontal PCB clamping arm
4. Mounted PCB
5. Probe unit (1 of 4)
6. Grip of test chamber access door (1 of 4)

In the test chamber, all assemblies required for the testing of PCBs are contained. It is very important that the access doors to the test chamber are closed at any time, testing or calibration is in progress. Also when the machine is idling or switched off, these doors should be closed to keep the interior free of dust.

Probe arms:



Warning

Danger of crushing!

Keep the access doors to the test chambers closed at any time, when movements are executed by the probes or probe arms. Otherwise your fingers might be caught when you grasp inside the test chamber.

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3.2.1 Test probes

This machine is equipped with the total of four test probes, two in front, and two behind the mounted PCB.

3.2.1.1 Probe tip

At this machine, new pyramid-shaped probe tips (1) are used, achieving an even more reliable, but also careful contact with the pad on the PCB. One probe Tip is mounted at each probe unit and can be moved in Z-direction (onto the PCB and back) directly driven by a micro-stepper motor.

1

Probe Tips must always be clean and straight. Whenever they are dusty or other dirt adheres at them, they must be cleaned to maintain a safe contact with the pad. Bended probe tips must be replaced. Please see chapter 6 for information on how to clean or replace probe tips.

Notice

Unreliable test results possible!

Keep the probe tips clean at any time. Replace bended or damaged probe tips immediately. Otherwise a sure contact with the pad on the PCB is not guaranteed, what can lead to wrong test results.

3.2.1.2 Probe movement

The movement and exact positioning of the test probes is very important for good and reliable test results:

Y-direction	the complete probe unit is mounted at a vertical probe arm and can be moved up and down this arm, driven by a linear motor via a high-precision cogged belt
X-direction	the probe arm is mounted between a horizontal pilot bearing (bottom) and a guide bar (top), and is driven by a linear motor via a high-precision cogged belt
Z-direction	the probe tip is driven directly by a micro-stepper motor, which is part of the Probe Unit

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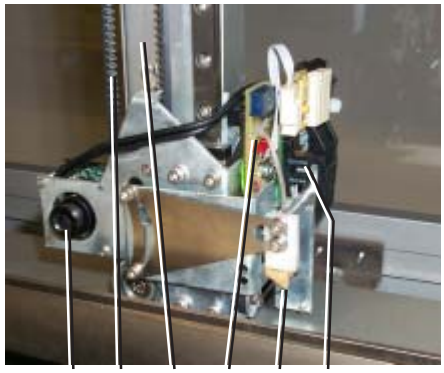
3.2.1.3 *Probe unit*



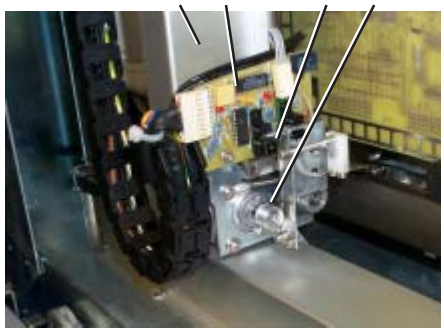
Each probe unit combines the required parts and assemblies for the movement and control of the probe tip, for the control of the electrical test, and for the registration of the test results.

All probe units are basically identic, but there are two exceptions:

- the left and right probe units are made mirror-inflected
- the front left and rear right probe unit are equipped with a camera, used to ease the electronic registration of the mounted PCB at the beginning of a test

The major parts of a probe unit are:

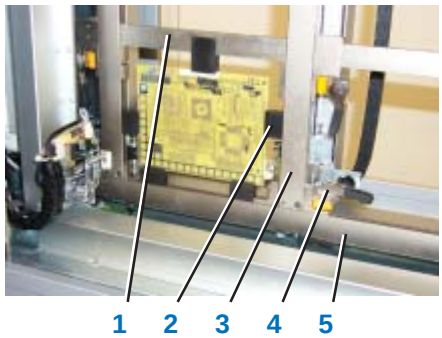
1 Cogged belt for movement in Y-direction
2 Vertical probe arm
3 Probe electronics
4 Micro-stepper motor
5 Camera
6 Probe tip
7 Mechanism for probe tip movement



3.2.2 PCB mounting frame

A PCB that shall be tested by the FlyingProbe test system Pegasus must be mounted into the mounting frame within the test chamber. The mounted PCB must be clamped firmly to achieve a reliable registration. During testing, it may not become loose, since then the probe tips would not contact the desired pads.

The mounting frame is constructed with five elements:



1 Movable horizontal bar
2 Magnetic holder
3 Movable vertical bar
4 Clamp
5 Fixed bottom bar

The vertical and horizontal bars can be moved to adjust them to the size of the PCB to be tested. The magnetic holders must be attached to the frame and the bars. Dependant on the size of the PCB, a different number of magnetic holders is required.

Please see chapter 5 for instructions on how to mount a PCB into the mounting frame.

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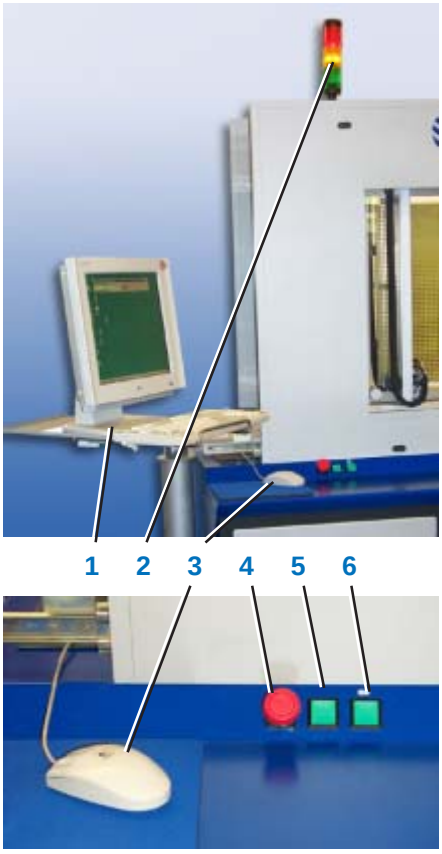
3.3 Controls and indicators



1. OCU (operator control unit)
2. Status lights
3. Mouse
4. Emergency-Stop button
5. Button „Power on“
6. Button „Lights“

Important

Buttons available on front and rear side.

The „Emergency-Stop“ button is available at the front and rear side of the machine. Their functionality is identic.

3.3.1 Status lights

The status lights (1) are mounted on the roof of the test chamber and indicate three different operational states:

Red light	an error occured, the machine is stopped
Yellow light	the machine is waiting for operation
Green light	the machine is testing

3.3.2 OCU

The OCU contains a monitor and a keyboard. Both devices are placed on an arm, which can be moved in a way that the OCU is in the ideal position for the operator. You can also swing around the arm completely to operate the Pegasus from the rear side.

On the monitor, the screens and dialogs of the operation software are displayed. The keyboard is used to enter literal and numerical information during the operation of the test system.

3.3.3 Emergency-Stop button

The Emergency-Stop button is used to stop the machine immediately, when a critical situation occurs. Simply hit the button to press it and all movements of the machine will be stopped instantly.

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Warning

Possible injuries through unclear machine status!

Check the cause of an Emergency-Stop without any doubt and remove it, before you reset the Emergency-Stop. Otherwise the machine could be in an unclear status what may lead to injuries to the operating personell and/or severe damage to the test system.

Please see chapter 5 for information on how to reset an Emergency-Stop.

3.3.4 Mouse

The mouse is used to operate the operation software of the test system.

3.3.5 Button „Power on"

Press this button to switch on the machine. Please see chapter 5 for information on how to switch the machine on and off.

3.3.6 Button „Lights"

Press this button to turn the lights in the test chamber on or off.

3.4 Machine control

The machine control is contained in two cabinets in the machine table:

- the left cabinet contains the operation PC of the test system (1)
- the motor control units are contained in the right cabinet (2)

During normal machine operation, the operator does not need to access the machine control. The only exception is, if data shall be imported from a floppy disk or a CD ROM and the medium must be inserted into the appropriate drive of the computer.

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4 Installation

In this chapter we give you all required information on the delivery, transportation, technical data, installation and putting into operation of the machine.

Contents ***Page***

4	**Installation**	**4-1**
4.1	Delivery	4-2
4.2	Site selection	4-2
4.3	Installation	4-2
4.3.1	*Technical data*	*4-2*
4.3.2	*Positions of supply elements*	*4-4*
4.3.3	*Installation*	*4-4*
4.4	Putting into operation	4-5
4.5	Transportation of the machine	4-6

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4.1 Delivery

The Flying Probe Test System Pegasus is delivered by MANIA and installed at the location desired by the customer. The following will be delivered:

- the machine according to the order;
- possible accessoires according to the order;
- the manual on hand.

Check the range of delivery in accordance to your order. You have to sign for the completeness of delivery in the hand-over protocol. Later claims on imcomplete delivery are not possible.

4.2 Site selection

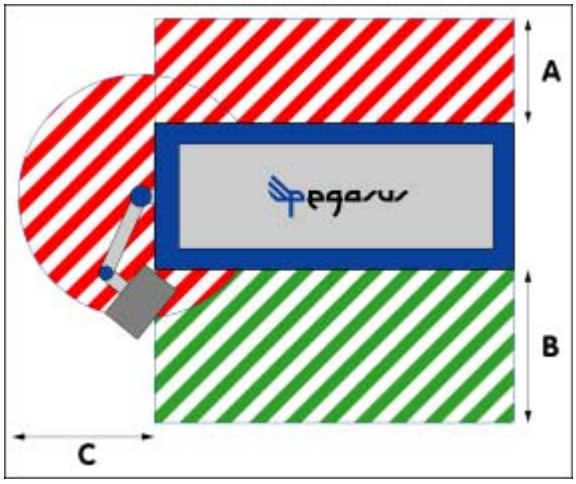
The installation location of the MANIA FlyingProbe Test System Pegasus has to meet the following requirements:

- see chapter „Technical Data“ for environmental limitations;
- solid and horizontal grouding;
- enough free space around the system according to the drawing:

A 80 cm behind the machine (Maintenance Area)

B 120 cm in front of the machine (Operator Area)

C 80 cm to the left of the machine (swinging range of monitor arm)



4.3 Installation

The test system Pegasus will be installed by the MANIA service staff. This is part of the MANIA customer service.

4.3.1 Technical data

Test qualities

Max. test area	26.8“ x 21.3“ – 680 x 540 mm (W x D)
Board thickness	0.03“ – 0.2“ (0.8 – 5.5 mm) with magnetic holder and using fixed frame, others available on request

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Isolation threshold	5 – 300 MΩ
Continuity threshold	1 – 250 Ω
Test voltage	25 – 250 V, 500 V as an option
Test current	30 – 200 mA
Short test	resistance or HiRAM™
Open test	resistance

Accuracy

Pad size	0.008“ 8 mil	150 µm	
Pitch	0.008“ 8 mil	150 µm	
Pitch with staggering	> 8 mil		
X/Y axis resolution	0.0012“	1.2 mil	30 µm
Repeatability (dynamic)	0.0008“	0.8 mil	20 µm

Alignment

Board registration X/Y	automatic
Board rotation compensation	automatic
Board step&repeat tuning	automatic
Needle registration maintenance	automatic, self-learning
Calibration time	30 min.
Alignment	electrical, 2 CCD cameras to support electrical alignment

Test system

Number of probes	4 (2 on each side)
Probe type	standard, special pyramidal probes as an option
Probe tip size	80 x 150 µm (X x Y)
Probe load	40 grams
Probe drive X/Y	by precision belts
Probe drive Z	directly by micro-stepper motor
Z-axis frequency	5 – 10 Hz (4 needles)

Computer

Model	standard PC with grabber card, network card as an option
Operating system	Windows™ 98
Drives	3.5“ HD floppy, CD-ROM
RAM	128 MB
Monitor	15“ flat-screen

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Physical characteristics

Dimensions	68“ x 38“ x 78“ – 1,710 x 950 x 2,000 mm (W x D x H)
Width with monitor arm	99“ – 2,500 mm
Weight	250 kg
Power supply	115/230 V, 50/60 Hz, 1,000 W
Fuse	10 A

4.3.2 Positions of supply elements

The Pegasus must only be connected to electrical power. Please see the section „Technical data“ for the electrical power requirements.

The electrical power connector is located at the right side of the machine, in the lower right corner of the machine.

1 Connector for power cord

4.3.3 Installation

Notice

Possible damage to the machine due to improper environmental conditions!

Check before starting the installation, whether the desired location corresponds with the requirements (see section „Technical data“).

Notice

Qualified staff only!

All works at the electrical components of the machine may only be carried out by qualified staff (electrical qualified personell in accordance to IEC 364 and DIN EN 60204-1).

Warning

Hazardous electrical shock possible!

Electrical installations inside the machine with dangerous electrical power. Disconnect power supply before opening the housing. Obtain safety regulations given in chapter 4 of this manual.

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Notice

Damage to the machine by connecting to inadequate power supply!

Check the available power supply before installation whether the requirements are met (see section „Technical data“).

1. Use the electrical power cord delivered with the machine and plug it into the connector at the test system.
2. Plug the electrical power cord into a suitable wall plug.
3. Lay the electrical power cable in a way that stumbling is avoided.

Warning

Hazardous electrical shock due to insufficient grounding!

Ground the machine in accordance to DIN EN 60204.

Warning

Danger of stumbling!

Lay the electrical power cord in a way that the danger of stumbling is avoided. If this is impossible, you have to put up signs indicating this danger.

4.4 Putting into operation

The first putting into operation is executed by the MANIA technicians. The test system will be balanced and adjusted perfectly, additional work by the user of the machine is not required.

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4.5 Transportation of the machine

Warning

Severe injuries due to transportation accidents!

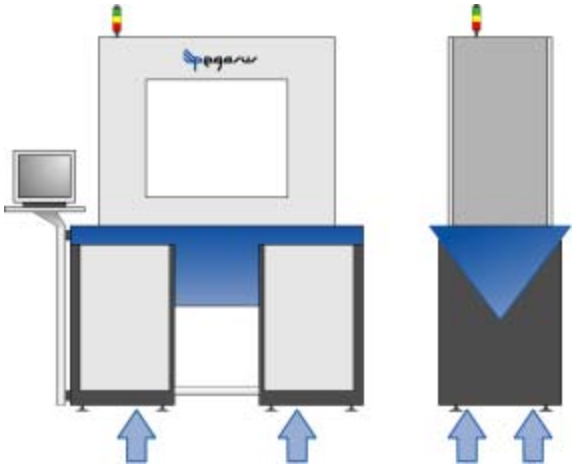
Be aware of the machine's weight during transportation. Be especially careful during transportation on sloping ways.

Before transportation, the following procedures must be executed:

1. Switch off the machine according to the procedure described in chapter 5.
2. Unplug the electrical power cable.
3. Remove the cover of the transportation feet by unscrewing the holding screws.

Now you may transport the machine, using a suitable transportation device that is strong enough for the machine's weight:

1. Undertake the complete table frame as shown in the drawings.
2. Assure that the machine is balanced evenly on the transportation device.
3. Move the machine to the new location carefully. Please see section 4.2 for requirements to the installation location of the machine.
4. We recommend to balance the machine using a spirit level. Balance the x-direction on the front and rear side, the y-direction on the right and left side of the machine.
5. Turn in/out the adjustable machine feet to level the machine.
6. Install the machine in accordance to the information in section 4.3.3.



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5 Operation of the machine

This chapter contains all information required for the safe operation of the machine. We show you how to prepare the reference data for the use on the machine, how to create or load a job, how to mount a PCB into the machine and how to execute electrical tests.

Important

Not all functions of the software are described in this manual. Please see the online help for additional information.

Contents ***Page***

5	**Operation of the machine**	**5-1**
5.1	Switch on/off and reset	5-2
5.1.1	*Switch the machine on*	*5-2*
5.1.2	*Switch the machine off*	*5-2*
5.1.3	*Reset the machine*	*5-3*
5.2	Prepare testing	5-3
5.2.1	*Create a new job directory*	*5-3*
5.2.2	*Activate a directory*	*5-4*
5.2.3	*Import required files*	*5-4*
5.2.4	*Execute data preparation*	*5-5*
5.2.5	*EDIAPV data preparation*	*5-5*
5.2.6	*GcPowerTestFPMania data preparation*	*5-10*
5.2.7	*Test file convention*	*5-11*
5.2.8	*Place fiducials*	*5-13*
5.2.9	*Define CAD zero point*	*5-17*
5.2.10	*View and edit job options*	*5-18*
5.2.11	*Mount a board into the frame*	*5-20*
5.3	Start testing	5-22
5.3.1	*Check fiducials*	*5-22*
5.3.2	*Test first board*	*5-23*
5.3.3	*Test subsequent boards*	*5-24*
5.4	Errors on the board	5-24
5.4.1	*Error reports*	*5-24*
5.4.2	*Stop on error*	*5-25*
5.4.3	*View errors*	*5-26*
5.5	Test repaired board	5-27
5.6	Test floor integration	5-28
5.6.1	*TFI compatibilities*	*5-28*
5.6.2	*Preparation of the directory structure*	*5-29*
5.6.3	*Preparation of the EDIAPV*	*5-29*
5.6.4	*Display errors in EDIAPV*	*5-30*
5.6.5	*Use BarCode option for TFI*	*5-30*
5.6.6	*TFI retest*	*5-31*

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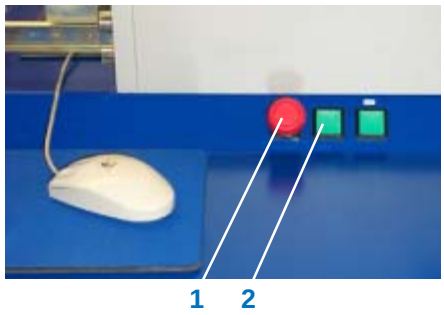
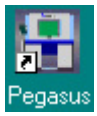
5.1 Switch on/off and reset

5.1.1 Switch the machine on

Before the machine can be switched on, the electrical power must be connected.

1. Press the green button „Power on“ (1).
2. Watch the signalling lights on the roof of the machine. After some seconds, the lights red/yellow/green must light up for a second each. This indicates that the machine control has been initialized successfully.
3. Switch on the monitor and the operation PC.
4. Wait until the operation software has booted completely. Then you will possibly have to log into the network, if the optional network connection is installed.
5. Start the Pegasus software by double-clicking the respective icon.





5.1.2 Switch the machine off

Wait until the last board has been tested completely, before you switch the machine off. Otherwise the test data will get lost.

1. Terminate the Pegasus software.
2. Drive down the operation PC.
3. When the message „It is now safe to turn off the computer“ is displayed, press the green button „Power on“(1) to switch the machine off.

Warning

Hazardous electrical shock possible!

There is still electrical power at some parts of the interior machine after switching the machine off. Unplug the electrical power supply before you work at the electrical installations or the machine control.

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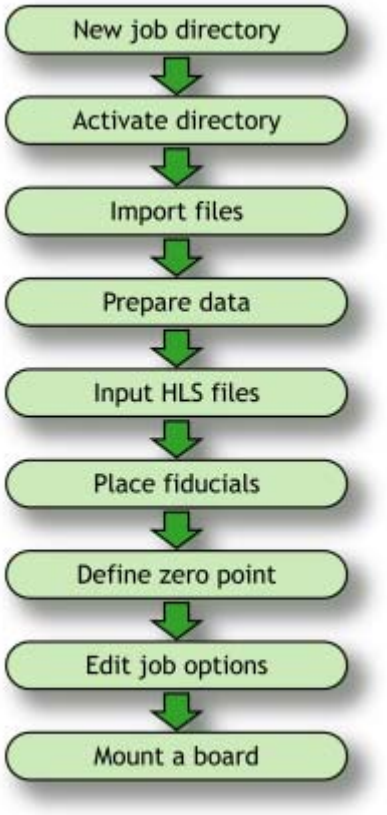
5.1.3 Reset the machine

When the machine is in an Emergency-Stop situation, a reset of the machine is necessary to be able to continue working.

1. If an Emergency-Stop button (2) has been pressed, you have to turn this to the left to release it.
2. If the access doors to the test chambers were opened, you have to close them to release the safety switches.
3. Press the green button „Power on“ (1).



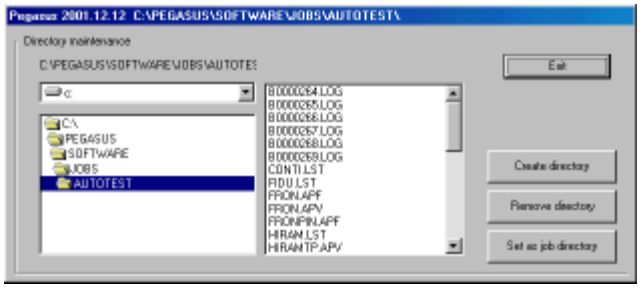
5.2 Prepare testing

The preparation of the machine for the testing of PCBs contains several easy steps:

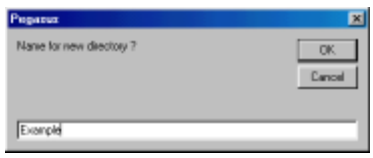
1. Create a new job directory
2. Activate a directory
3. Import required files
4. Execute data preparation
5. HLS input
6. Place fiducials
7. Define CAD zero point
8. View and edit job options
9. Mount a board into the frame

5.2.1 Create a new job directory

This step is only required, if you want to test new PCBs and import new job data into the machine. Otherwise you can continue with section 5.2.2.



1. Click the button [Dir Maint] (directory maintenance).
2. Open the directory, under which you want to create a new subdirectory.
3. Click the button [Create directory].
4. Enter the name for the new subdirectory.
5. Click the button [OK]. The new directory will be displayed as a subdirectory of the current directory.
6. Click the button [Exit] to terminate the procedure.



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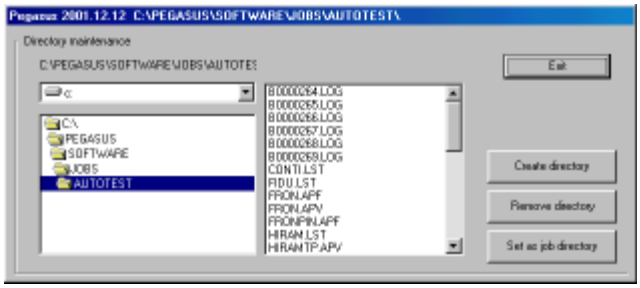
5.2.2 Activate a directory



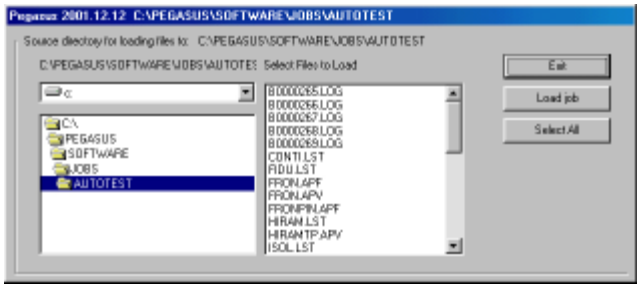
To be able to work with job data (e.g. import files, execute data preparation, start testing), the job directory must be activated. The active directory is displayed in the title bar of the Pegasus software window.

1. Click the button [Dir Maint].
2. Double-click the directory you want to activate.
3. Click on the button [Set as job directory].
4. Click on the button [Exit].

5.2.3 Import required files

Dependant on the CAD software you use to design your PCBs, different file types are available to be imported to the Pegasus. MANIA recommends to use either GCPowerTestFPMania or EDIAPV, both by Mania, to prepare the CAD data for the FlyingProbe test system. Please see section „Data preparation“ for further information on proceedable file types.

The easiest file import is via network, your Pegasus is ready for the optional equipment with a network connection. But it is also possible to import files from floppy disks or a CD.



1. Click the button [Load].
2. Insert the floppy or CD, where the files to be imported are contained (not required when loading files via network).
3. Select the drive and directory, where the desired files are contained.
4. Select the files to be imported; you can click the button [Select all] to mark all files contained in the current directory.
5. Click on the button [Load job]. The selected files will be copied into the active directory.

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5.2.4 Execute data preparation

Important

Job must be activated!

To be able to execute the data preparation, the job directory containing the data to be processed must be the active directory. Please see section 5.2.2 for information on how to activate a directory.

It is possible to process data of different origins within the Pegasus. During the processing, the netlist will be calculated.

We recommend to use one of two sophisticated software products for the preparation of CAD data for the use on the Pegasus:

- EDIAPV by MANIA
- GCPowerTestFPMania by Mania

In this manual, we show you the preparation of data for both inputs. If you use other software with an output differing from that explained here, please contact the MANIA service department for information on how to prepare these data for the Pegasus.

Steps of data preparation

1. Preprocess image files (by using the EDIAPV) or make HLS input (GCPowerTestFPMania) to get the required test information files (*.lst).
2. Set fiducials.
3. Measure CAD zero position.
4. View and edit job options.

5.2.5 EDIAPV data preparation

EDIAPV needs some file input for the analysis of netlist and net adjacencies of the PCBs and for the generation of the test program:

- Image information
- Position information
- Set of fiducials (optionally)

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5.2.5.1 Image information

Final images of every copper layer, externals (and internals in case of multilayer boards) in a format suitable for photoplotting, representing either the positive or negative image of the copper.

The files can be in the formats

- Gerber
- extended Gerber
- Barco dpf
- most drilling program formats (for MEHOLE)

Text, logos and other copper features that are electrically irrellevant (or unaccesible) can be removed, but is it not mandatory to eliminate them.

5.2.5.2 Position information

The list of the centers of the metalized holes (drilling program). The mechanical holes (non metalized), should be removed, or be identificable to be able to remove them using the EDIAPV editor.

Input formats can be:

- Gerber
- extended Gerber
- Barco dpf
- most drilling program formats.

Remark 1

Observe that by concept, image data that define tracks are neither usable for the declaration, nor for the automatic recognition of a test point. If the PCB must be tested at a point that has only a track (or tracks) on the original design, you will have to add a „hidden“ pad of similar thickness on the copper image. A typical case is, if the SMD's pads are drawn with tracks. In that case a „Drawn to Flash“ conversion must be done, before or after entering the EDIAPV editor.

Remark 2

Because test points are deducted automatically from the pads, care should be taken to identify and eliminate any pads used to create copper at strange places that are not required as test points.

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5.2.5.3 Fiducial information

Optionally, a set of fiducial marks (position references), should be provided, if possible on both sides of the PCB. They should be copper pads of adequate size and shape.

If they are not (or can not) be added on the PCB design, a set of existing, adequate, square or rectangular pads (or circular pads, if no other available) must be selected and declared as fiducials to be used for board registration by the test system. Board registration is not necessary when the smallest test pads are bigger than the board position uncertainty in the board mounting frame.

5.2.5.4 Data transfer

Two cases must be distinguished for the transfer of data to EDIAPV and the subsequent netlist calculation:

Automatic if the images of all layers exist as single individual files (1 file = 1 Image), containing pads, tracks and possibly contours (the contour concept is the same as on Barco Ucam stations).

Semi-automatic if at least one of the images involves sophisticated techniques of sequential logic (additive / substractive chain of image generation), available as separate files, only. In this case, the image must either be processed to become a single image file, (in dpf, Gerber RS-274X or apv), or be contourized. The conversion can be done on the EDIAPV editor or on the CAM system of the user.

5.2.5.5 Directories and file names

The EDIAPV philosophy involves the use of a separate directory for each type of PCB to be tested.

The names of the copper layers can be the original customer names, declared in a „Name pack“. The internal layers that are negative (1 pad = 1 hole in a copper plane) must be marked as negative in the „Layer List Screen“, before net annotation and/or programming.

The solder masks and buried via layers must always be converted to APV files exclusively using the standard names.

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The list of standard file names (in APV format) is:

FRON	front (usually component) layer: pads + tracks; eventually it may contain contours. It could even contain the completely contourized image of the copper, but the test points must be present as pads; drawn SMD pads must be converted to flashes.
REAR	rear layer (solder?): pads + tracks; eventually it may contain contours; drawn SMD pads must be conveted to flashes.
ILY02	internal image, in positive, of the layer next to the front layer; pads + tracks and eventually contours.
ILY02NEG	internal layer, but automatically recognized as negative.
ILY03	see above
ILY03NEG	see above
ILY04	see above
ILY04NEG	see above
ILY05	see above
ILY05NEG	see above
MEHOLE	image of the metallized holes drilling program, with correct diameters; it is important that no mechanical holes (non metallized) are mixed there; aperture for vias can be flexible. If vias are all in the same aperture, and aperture is set to 1, nothing has to be declared (default situation); if the via aperture is different, or if there are several via apertures, the list (max. 16 values) of aperture numbers must be declared, when asked by EDIAPV, and stored in a file named „viapertu.lst“.
VIAPERTU.LST	optional text file, containing a single line of text, with the list of via aperture numbers, separated by commas; if the vias are all of the same aperture, and this is aperture 1, „viapertu.lst“ doesn't need to be created; vias will never be test points, neither in continuity nor in isolation test (buried vias also, irrespective of aperture).

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Important

In the MEHOLE file, pads under aperture 1001 are reserved for „Front access only“ metal holes. Similarly, aperture 1002 means „Rear access only“ metal holes. They will be counted separately and listed in the file „report.lst“. If the pads of FRON/REAR have a corresponding pad center in MEHOLE, within a X/Y distance of 5 mil or less, they are not treated as SMDs, but as metal holes (bi-lateral), and if the hole is a via, they will be considered unaccessible. To make them accesible as SMDs, they must have a distance of 5 or more mils from the via center in any direction.

MET##-## optional image of buried via drilling program(s), affecting a range of two or more adjacent layers, as indicated by the pair of two digit numbers in the name; additional to MEHOLE, there can be a maximum of 8 buried via drilling programs.

Example: on a board with ten layers, two drilling programs for buried vias could be: MET01-04 and MET07-10; all pads inside MET##-## files will be considered as vias, irrespective of its aperture.

The non-via pads in MEHOLE represent the bi-lateral test point list (exception: apertures 1001 and 1002, used to declare unilateral front and rear access, respectively); if any MEHOLE is to be declared unaccesible, it must have an aperture included in the „viapertu.lst“ file.

FRONMASK optional image of the front solder mask, when it is delivered in positive form (unusual, needs a lot of hatching with tracks).

FRONMNEG same, but delivered in the most frequent form, as a negative image, containing pads, so called:

„Anti-pads“, representing unconnected metal holes, passing through an „opening“ in the copper of the layer

„Thermals“ or „Butterflies“ in connected holes, piercing that layer; the openings of the „Thermal“ reduce the cooling effect when soldering.

REARMASK

REARMNEG optional: same, for the rear layer.

This set of files is the starting point for the artwork net-annotation, and autonomous test program generation, by EDIAPV.

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The test program generation produces the REPORT.LST file with job test data, and a copy of the reporting screen content in the file: TESTPROG.LST.

Important

At the moment of triggering the net-annotation or the test program generation, the only files that need to be loaded in EDIAPV layers, are the copper layers (FRON, REAR and all internals) and the MEHOLE layer. The eventual solder masks and buried vias need and must not be loaded. They will work just by being present in the job directory. They will be searched and sequentially loaded by EDIAPV into an internal layer, invisible to the user.

5.2.6 GcPowerTestFPMania data preparation

Two cases can be distinguished:

Input by EDIAPV of externally generated IPC-D356A format files:

Net-annotated images, test points, masking and adjacency are imported from an external CAM system, ready for final test program generation and powerful error viewing.

Probot format (HLS) file input (by Pegasus console):

Net numbers, test points and adjacency received in the Probot files, but images must be received separately; separate image transfer can be using:

- **Barco dpf files;** the images will arrive with net number annotation, if the dpf files have been created including this extra feature (sometimes non standard, only an option); external layers only, or all layers, at users discretion.
- **Gerber files**; in this case, no net number information will arrive; the error viewing by EDIAPV will still work, except net high-lighting; but if the complete set of artwork can be obtained (including all metal holes and internal layers, solder mask not needed), a net annotation by EDIAPV is possible: you can make it before or after Probot format input, and the fact that the net numbers are not coincident with the ones inside Probot files, does not matter at all: net highlighting will work, as long as the images are complete, and board geometries are coincident.

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The execution of the HLS input must be executed for the preparation of GC CAM data, only. If you have „Speedy output“ from PowerFixture, you can skip this step.

1. Click the button [Data prep] (Data preparation).
2. Click the button [HLS input]. The files for HLS input in the active directory are displayed.
3. Click the button [Compile] to start the automatic import procedure.
4. You can interrupt the procedure by clicking on the button [Stop]. Then you can click on [Continue] to continue the procedure.
5. Click the button [Exit] to close the window after the HLS input has been completed.
6. On the declared directory the test files have been created.

5.2.7 Test file convention

After data preparation, a number of different files has been created for each job. The different file types are explained in this section.

5.2.7.1 Conti.lst

„Conti.lst“ is an ASCII file, used for continuity testing.

Each line specifies a machine cycle with the movements of a set of probes (min. two, max. four) to individual test positions. They are followed by the descent of the probes to touch the board, execute a continuity test and the inmediate retract of the probes.

The test system will respond when reading the „Conti.lst“ file, by directing the probes to the respective coordinates and perform the continuity checks, by analizing the coincidences between the net numbers of the probes.

Example 1

114c 6618y 4298 114c11253y 4298 114s 6593y 3853 114s11228y 3853

checks continuity between all four probes (because all four net numbers are the same)

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Example 2

128c 6618y 4298 75c11253y 4298 128s 6593y 3853 75s11228y 3853

checks continuity between probe 1 and probe 3 (both on net 128), and between probe 2 and probe 4 (both on net 75)

Example 3

34c 9323y 3320 34c10022y 2507 0v 0y 0 34s11228y 7640

checks continuity between probes 1, 2 and 4; probe 3 will not touch the board; probe 3 will be moved automatically, if it's position hampers the movement of probe 4.

Example 4

279c 9323y 3320 0v 0y 0 0v 0y 0 279s 3456y10345

checks continuity between probe 1 and probe 4 (net 279); probes 2 and 3 will be moved automatically, if their positions hamper the movements of the other probes.

5.2.7.2 Pair.lst & Isol.lst

These files are needed for the ohmic isolation testing.

„Pair.lst" is an ASCII file containing a series of lines. Each line contains a pair of decimal numbers, separated by a period (,). Both are the numbers of two nets that have mutual visibility at, at least, one place in a layer, at a distance below or equal to a certain dimensional value (typically in the range of 1 to 6 mm). This file, together with „Net.lst" (see further below), is the basis for the construction of „Isol.lst":

„Isol.lst" is an ASCII file with a physical format identical to „Conti.lst". The lines contains different net numbers in the four probe fields. Net number „Null" is an exception: it means that the probe is idling (doing nothing) in this cycle.

At each cycle, the test system will execute an isolation test between all probes with net numbers differing from „Null". Probe fields with „Null" net numbers will happen more often in boards with very differently populated faces (front versus rear).

„Null" net probe carriages will also shift automatically away (in X) when needed.

The sequence of ISOL machine cycles that form the isolation test program are supposed to be based on an isolation test strategy, using the criteria of „adjacency" or mutual visibility between nets. Under such a strategy, a list of mutually visible „Pairs-of-nets" is to be compiled, considering the accumulated visibility of all nets over all layers.

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5.2.7.3 *Hiram.lst*

This file is needed for the accelerated isolation test.

The „Hiram.lst“ file contains the program of the sequential visit to all nets in the board. Up to three probes per cycle are used to touch nets, while one probe is touching a ground net.

Additionally, the file contains space to store:

- the area readings
- multiple access points
- readings of a reference net

for the compensation of inter-probe and board-to-board variations.

Example:

136c 2269y 2165 52c 2785y 2431 6g 1999y 8075 65s 4069y 1698

In this example, probe 1 accesses net 136, on a front-only test point, at X=22.69 mm and Y=21.65mm; probe 2 accesses net 52; probe 3 accesses ground (net 6); probe 4 accesses net 65.

The test system responds when reading the „Hiram.lst“ file, by directing the probes to the respective coordinates of the four fields, and performing the necessary checks.

5.2.8 Place fiducials

The placing of the fiducials is one of the most important steps in the data preparation. Through the fiducials, the registration of the board within the frame is achieved by the machine.

Before we show you how to place the fiducials, you'll get some information on the consideration „behind“ the fiducials.

5.2.8.1 *Philosophy of the fiducials*

Principles of operation

When a circuit board is placed in the machine, it is positioned by its edges. The probes that will test the board will be moved according to programs generated automatically, obtained from the original CAD data.

The board can be placed in different positions in CAD address space when the test program is extracted and the board itself can be tested as a finished, individual unit, milled to final size or tested inside an extra frame of board material. All this variables must be controlled in order to get the probes find their way to the expected nominal places.

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But with current tiny test point sizes, many circumstances add substantial amounts of additional positioning uncertainty: the board thickness, because the guides are V-shaped, the boards milling precision, the frame tooling precision, the pressure applied by the horizontal separator bar and right clamp, etc. When the size of the smallest features to be tested is not sufficiently bigger than the worst case positioning error, a board registration process (fine adjustment) must be executed by the system to succeed in the positioning of the probes at the centre of tiny features in the board.

For coarse positioning control, the following two answers must be obtained:

Where are the CAD data located?

To answer this, a declaration of the left/bottom board corner coordinates in CAD address space is needed: OrigX and OrigY values in mm, inside ORIG.LST file, editable from 'Job options' menu. If the data board corner is arranged to be at X = 10 mm and Y = 10 mm, it doesn't need to be declared, because the default values will be assumed and the error ticket coordinates will be easier to interpret for manual measurements on a particular board (by placing a ruler with the 10 mm mark over the board edges).

Where is the physical equivalent of the board corner in CAD located in the physical board holding frame?

The answer is that the MargX and MargY values (in mm) are stored in the ORIG.LST file, too. If the board is tested in finished condition without any framing margins, the margins are unexisting and does not need to be declared (assumed to be zero). If the equivalent of the CAD board corner is surrounded by extra material (a very common situation in SMD boards, delivered in panels with margins and scoring lines), the sizes of the left and bottom margins shall be declared in the 'Job options' menu.

All further X/Y position fine tuning (manual and/or automatic) will be stored by adjusting the MargX and MargY values accordingly.

For position fine tuning (an operator's choice in 'Job options' menu), Pegasus evaluates the board position using measured deviations from their nominal positions of a set of copper features (fiducial marks) declared in the programming process, or declared by the operator before testing a set of boards. The goal is that every probe shall independantly measure the board X and Y offsets (with respect to its own axis zeros) and optionally evaluate globally a board rotation angle.

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Best results will be obtained if the fiducial marks are added specially for the purpose when the board is designed (or prepared for production, normally outside of the customer area, in the framing margin around it). If not (which is a very common situation), a suitable set of fiducials chosen from existing set of unlacquered copper features, must be selected. The availability of adequate pads and the clever choice made by the operator will be fundamental for the successful registration of the boards.

If no sufficiently big or adequate pads are available, or if the choice is made without understanding the principles and without a minimum of practice, depending on the actual board size, technology, offset and rotation dispersions, the tast of successful testing can range from difficult to impossible.

Fiducial mark declaration

They are rectangular or square pads, not covered by lacquer and partially free from tracks that will be checked for the position deviation of their track-free edges. A rectangular or square pad having track-free vertical edges will be considered a candidate as 'vertical fiducial' and for 'horizontal fiducial' it will need track-free horizontal edges. As unconnected sufficiently big square or rectangle can be ideal for simultaneous use as horizontal and vertical fiducial.

The complete set is composed of: a vertical and horizontal fiducial on each of the front and rear face. If possible, the 2, 3, or 4 fiducials should be relatively close together. An additional fiducial, used for rotation compensation should be far away from all others, and about at the same height or similar X position as the group of the others.

For square/rectangular/oblong pads: recommended minimum size is 1.5 x 1.5 mm (absolute minimum is about 1.2 x 1.2 mm). The pads can have a metalized hole (the smaller the better). On limit cases they can be round, 1.7 minimum diameter or more, preferably without hole or hole diameter at least 1 mm less than the pad.

5.2.8.2 Required fiducials

The machine needs the total of six fiducials to be defined:

- two vertical fiducials (to detect the vertical orientation)
- two horizontal fiducials (to detect the horizontal orientation)
- one rotation point (to detect possible rotation of the mounted board)
- one scale factor point (to detect possible enlargements or shrinkings)

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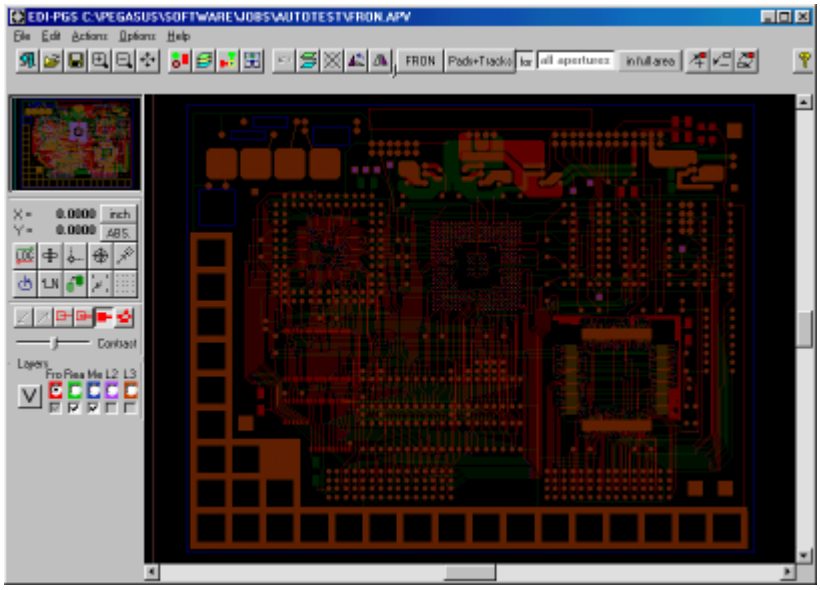
The fiducials to be set should meet the following requirements:

- all vertical fiducials should be pads with no tracks on their right or left side
- all horizontal fiducials should be pads with no tracks on their upper and lower side
- the rotation point should be on a pad without tracks on its upper and lower side
- best are rectangular pads with at least 0.4 mm of distance to the next pad
- it is possible to choose round pads or holes as fiducials, but you may not obtain optimized results
- it is recommended to set all fiducials in the same corner of the board and the rotation point as far away from them as possible

5.2.8.3 How to place fiducials



1. Click the button [Data prep].
2. Click the button [EDI-PGS] to open the testpoint editor.
3. Open the menu „File“ and select the function „Load Fron&Rear only“.
4. Select the front and rear files and click on [Open]. The files will be loaded and the pads and tracks of the board will be displayed.
5. Click on the button to choose the fiducial tool.
6. Check the fiducial that you want to place first.
7. Press the <Ctrl> key and click the left mouse button to zoom into the image. Repeat zooming in until you have a good look at the area, where you want to place the fiducial (you should be able to distinguish pads and flashes).

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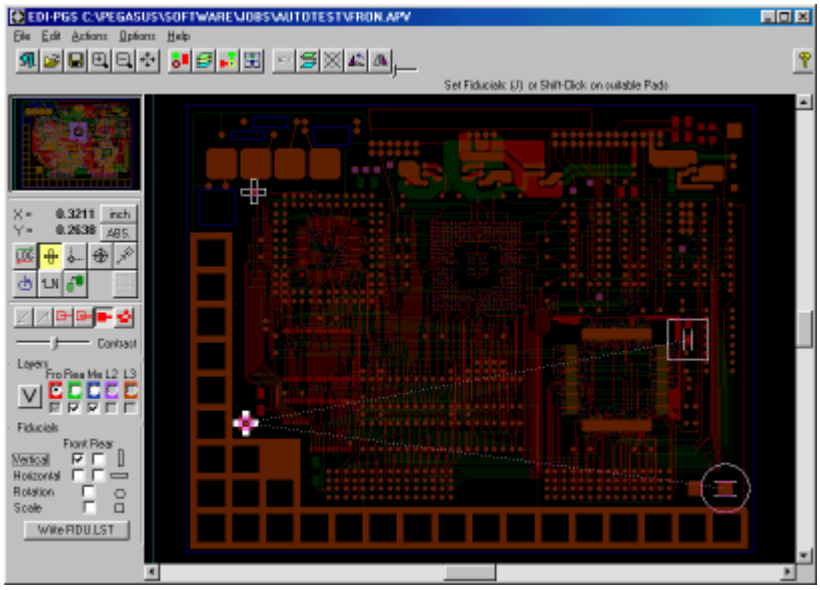
8. Position the mouse pointer above a pad, press and hold the <Shift> key and click the left mouse button. The icon of the fiducial will be placed on that pad:



- vertical front/rear fiducials are indicated by a vertical rectangle with/without white filling
- horizontal front/rear fiducials are indicated by a horizontal rectangle with/without white filling
- the rotation point is indicated by a circle
- the scale factor point is indicated by a square

9. Repeat steps 6. to 8. for all fiducials to be set.
10. Click the button [Write FIDULST] to save the fiducials within the job data.

5.2.9 Define CAD zero point

The definition of the CAD zero point is required since there may be a margin around the PCB image. The definition is done in a view easy steps:

1. Click the button [Data prep].
2. Click the button [EDI-PGS] to open the testpoint editor.
3. Open the menu „File“ and select the function „Load Fron&Rear only“.
4. Select the front and rear files and click on [Open]. The files will be loaded and the pads and tracks of the board will be displayed.
5. Click on the button to choose the zero point definiton tool.
6. Enlarge the left lower corner of the PCB image by positioning the mouse pointer there, pressing the <Ctrl> key and clicking the right mouse button (repeatedly).

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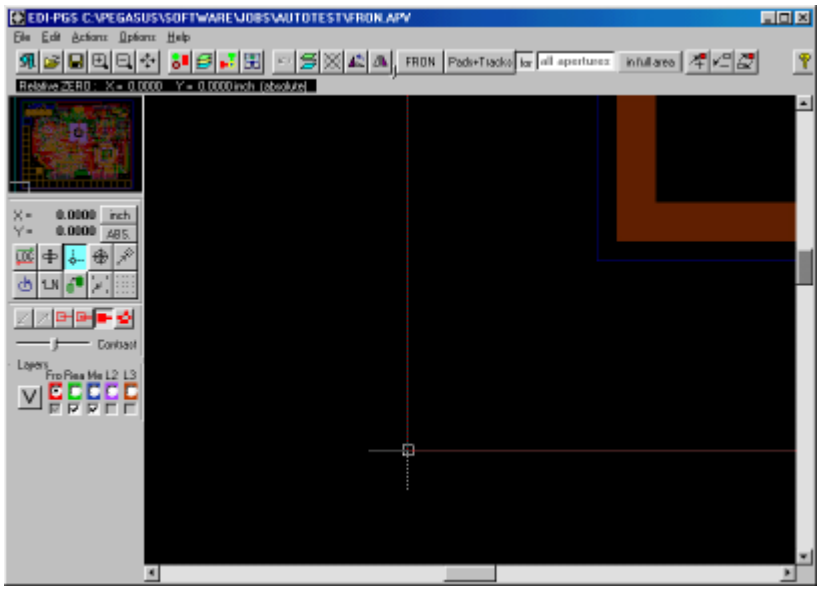
7. Click and hold the left mouse button, two dotted lines and a small square will be displayed. Move the lines until they are below and left of all PCB design elements and then release the mouse button.
8. If required, you can repeat step 7. until the CAD zero position fits.
9. Note the determined coordinates. You will have to enter them when viewing and editing the job options (see section 5.2.10).



Important

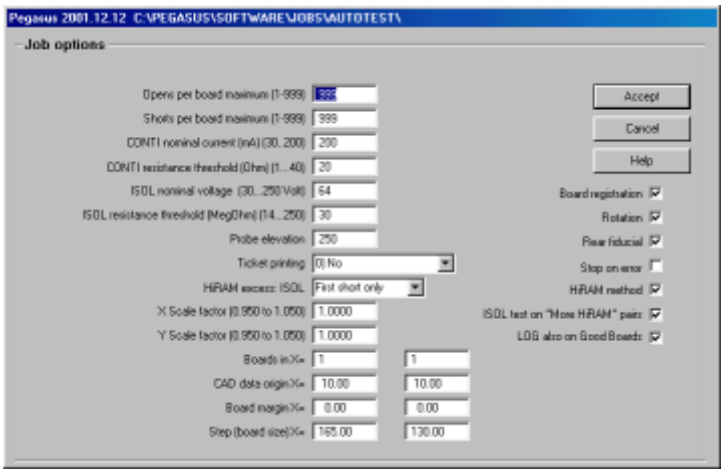
Check correctness of zero position.

After positioning the CAD zero, you should move the displayed image along the x- and y-axis to check, whether all design elements of the PCB are above or to the right of the dotted lines.

5.2.10 View and edit job options

After preparing the job data for testing, you should view and check the job options. Here you can do job-specific settings of a number of options.

1. Click the button [Job options].
2. Press the <Tab> key to step through all options displayed in the window.
3. Enter the modified values or settings.
4. Click on [Accept].
5. Click on [Back] to close the window.



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The following job options can be set:

Opens per board maximum	enter a number of open errors; if this number is reached during a test, the machine stops and reports an „Open error overflow“
Shorts per board maximum	enter a number of short errors; if this number is reached during a test, the machine stops and reports an „Short error overflow“
CONTI nominal current	enter the current for the continuity test
CONTI resistance threshold	enter a resistance value; if this value is exceeded in a network, an open error is reported for this network
ISOL nominal voltage	enter the voltage for the isolation test
ISOL resistance threshold	enter a resistance value; if this value cannot be reached for a network, a short error is reported for this and an adjacent network
Probe elevation	enter the distance the probe shall be lifted away from the PCB; the smaller the value, the faster the testing, but the higher the risk that the probe scratches the surface of the PCB
Ticket printing	decide, whether an error report shall be printed for every board tested BAD; you can choose, whether a short, or a full, or a full with the board ID shall be printed; the full report contains all error information with coordinates
HiRAM excess: ISOL	here you decide what shall happen, if HiRAM values are exceeded during a board test: if you select „First short only“, the defective networks will be tested with isolation test, only; if you select „ISOL full scan“, the defective and all adjacent networks will be tested with the isolation test
X scale factor	if the board differs in its size from the original CAD data, you can enter a scale factor for the x-direction
Y scale factor	if the board differs in its size from the original CAD data, you can enter a scale factor for the y-direction
Boards in X/Y	if you mount several boards into the frame, you should enter the number of boards in x- or y-direction
CAD data origin	enter the coordinates of the CAD zero position that you have determined in section 5.2.9
Board margin	if there's a margin between the CAD zero position and the image, you should enter the x- and y-values of this margin here
Step	if you test a panel with multiple images, you should enter the number of images in x- and y-direction here
Board registration	this box should be checked to have all boards registrated
Rotation	check this box if a possible board rotation shall be measured
Rear fiducial	this box is always checked when double-sided PCBs are tested

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Stop on error	if this box is checked, the machine will stop if an error is detected; the probes will point on the endpoints of the defective network
HiRAM method	check thisnbox to test the boards using the HiRAM method; this safes at least 50% of test time
ISOL test on „Mode HiRAM“ pairs	check this box, if HiRAM errors shall be retested using the isolation test

Important

Value range is indicated.

Beside some of the items, you see the unit and/or the minimum/maximum values in brackets. If you enter a value that is outside the indicated range, the nearest possible value will be entered.

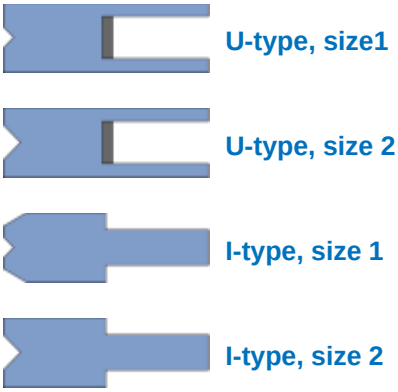
5.2.11 Mount a board into the frame

In the Pegasus, a frame is used, where you can mount PCBs of different sizes and thicknesses very fast, easy and comfortable. With some optional mounting devices it becomes possible, to mount several boards into the frame.

5.2.11.1 Parts of the frame

The frame of the Pegasus contains:

- a vertical movable bar
- a horizontal movable bar
- a fixed vertical bar
- a fixed horizontal bar
- I-type blocks in two sizes for both fixed and the movable vertical bar
- U-type blocks in two sizes for the movable horizontal bar



The blocks are pushed in/on the bars and can be moved to stabilize the mounted PCB over its complete length/width. They are available in two sizes, one for PCB thicknesses between x and x mm, the other for thicknesses between x and x mm.

The movable bars are equipped with locking levers. By closing the lever you clamp the movable bar to fix it tightly.

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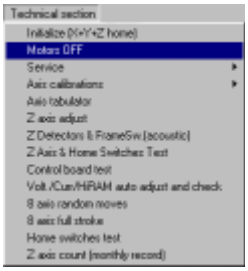
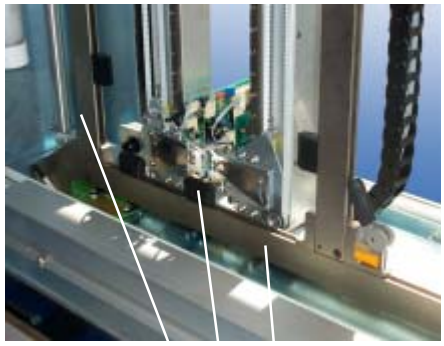
5.2.11.2 Mounting procedure



1. Open the menu "Technical section".
2. Select the command "Motors off".
3. Open the access doors to the test chamber.
4. Push aside the vertical probe arms.
5. Hold the PCB to be mounted into the frame to measure its size roughly.
6. Insert I-type blocks (2) into the fixed bars (horizontal (1) and vertical (3)) and distribute them evenly over the length/width of the PCB.
7. Do this for the movable vertical bar, too.
8. Push U-type blocks onto the movable horizontal bar and distribute them evenly over the length of the PCB.



9. Open the locking levers of both movable bars and push them away to make space for the PCB to be mounted.
10. Place the PCB on the blocks of the fixed bars.

11. Move the horizontal bar (5) down until the blocks touch the PCB.
12. Close the left locking lever (4) of the horizontal bar.

13. Push the vertical bar (6) to the left, until the blocks touch the PCB.
14. Close both locking levers (7) at the vertical bar.
15. Shake the PCB (8) to check whether it sits firmly. Otherwise open the levers and press the movable bars against the PCB.
16. Close the access door to the test chamber.
17. Click the button [OK] in the "Board motion" window to switch the motors on.

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5.3 Start testing

The sophisiticated HiRAM test method if used for the testing of bare printed circuit boards on the Pegasus. Through this test method, test times are reduced drastically.

The first board will be tested in „normal“ mode with continuity and isolation tests. During this test, the capacities of all networks are measured and saved in a special file (hiram.lst). All the other boards of the same job will only be tested in a reduced way. The capacity is measured what makes isolation tests against adjacent networks superfluous.

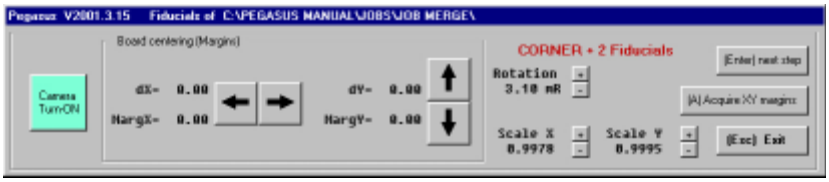
As a consequence, the board tested first must be a good board. If faults are contained here, the hiram.lst saves wrong values and the next boards will be tested against these wrong values.

The testing of a batch of PCBs should contain these steps:

- check fiducials
- test of first board was OK
- test subsequent boards

5.3.1 Check fiducials

1. Mount the first board into the frame (see section 5.2.11).
2. Activate the directory containing the job data (see section 5.2.2).
3. Click on the button [Test Menu].
4. Click on the button [Point Fidu]. The machine positions the left front probe above the first fiducial (Front Vertical).



5. Click on the button [Camera turn on] to display the fiducial pad in the window.

Important

Note the two different sections in the „Check fiducial“ window. During the button ”Camera Turn-On“ is disabled, the arrow keys belong to the fiducial registration. If the camera is enabled, a second window will be displayed with a second set of arrow keys. These are used to adjust the camera-probe offset. **Do not manipulate the camera offset when adjusting fiducials.**

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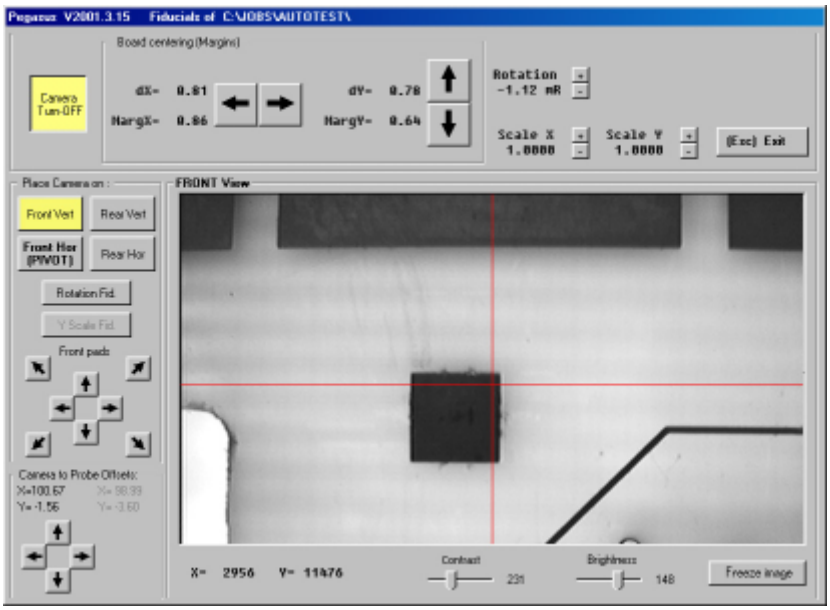
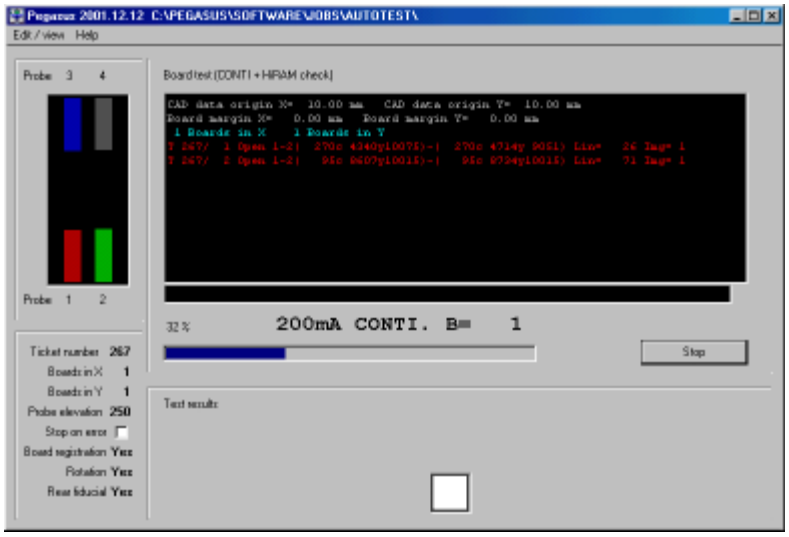
6. Use the arrow keys to move the cross-wires into the center of the pad.
7. Click on the button [Front Hor] to display the next fiducial.
8. Repeat steps 5. and 6. for all fiducials, represented by buttons on the left side of the window.
9. Click the button [Exit] to close the window. The corrections will be saved automatically.



5.3.2 Test first board

1. Mount the first board into the frame (see section 5.2.9).
2. Activate the directory containing the job data (see section 5.2.2).
3. Click on the button [Test menu]. The opened window gives you the opportunity to modify some job settings (see section 5.2.8 for detailed description). Six indicators show the readiness of the job data for testing (all squares, except LOG must be green).
4. Click on the button [First board proc]. The mounted board will be tested completely, errors will be reported in accordance to the settings in the job options (see further below).



During the testing of the first board, the HiRAM values for all networks are determined. Since this is of decisive importance for the testing of the rest of the PCBs, an error-free board should be used.

If the system detects errors on the first board, you should mount another board and repeat the testing [First board proc].

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5.3.3 Test subsequent boards

After the HiRAM values have been determined successfully (no error during first board test), you can use the HiRAM method for the testing of all other boards of the same job.

1. Mount a board into the frame (see section 5.2.9).
2. Click on the button [Test menu]. The opened window gives you the opportunity to modify some job settings (see section 5.2.8 for detailed description). Six indicators show the readiness of the job data for testing (all squares must be green).
3. Click on the button [Full test]. The mounted board will be tested completely, errors will be reported on screen and printed out.

5.4 Errors on the board

The Pegasus offers you a great variety of possibilities to report detected errors on the tested PCB:

- different error reports can be printed
- the machine can stop when an error is detected and let the probes point on the testpoints between them the error is located
- errors can be viewed with the EDI software module

This gives you the possibility to verify and possibly repair errors. After repair, you can retest the defective board very fast by loading the error list and testing the defective networks, only.

Additionally you can use the TFI option (see section 5.6) for the easy verification and retest of PCB errors that had been detected by electrical grid test systems.

5.4.1 Error reports

Within the job options, you can choose one of four options for the printing of tickets for defective boards:

Full	gives the complete error information, e.g. type of error, affected network numbers, testpoint coordinates, HiRAM values, a.s.o.
Short	prints the most important information, only (type of error, testpoint coordinates)
ID + Full	prints the complete error report together with the identification number of the defective board
No	prints no error report

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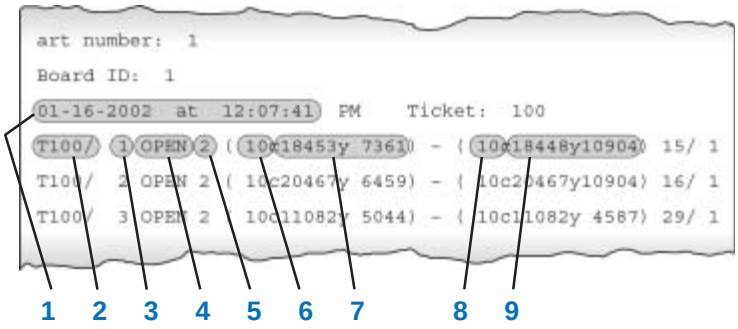
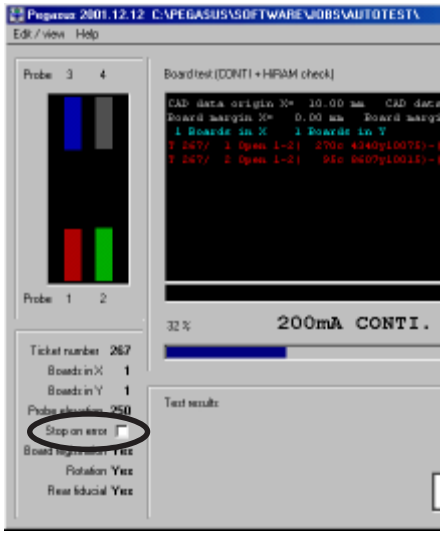
Dependant on you requirements regarding the repair of defective boards, you should choose either the full or the short error report. We recommend to attach the ticket to the PCB using Scotch™ tape or similar.

Example of an error report

1. Date and time of the test
2. Test number
3. Error number
4. Error type
5. Probe detecting the error
6. Net number
7. First x-y-coordinates
8. Net number
9. Second x-y-coordinates



5.4.2 Stop on error



If this option is enabled within the job options, the machine stops testing when an error is detected. The error information is displayed on the screen (possibly an error report will be printed in accordance to the settings in the job options) and the probes point on the endpoints of the defective network.

This gives you the possibility to verify the error instantly. If the fault can be repaired, you can continue testing, if not, testing can be aborted without wasting time on the defective PCB.

This function can be en- or disabled during the test by checking/unchecking the respective option.

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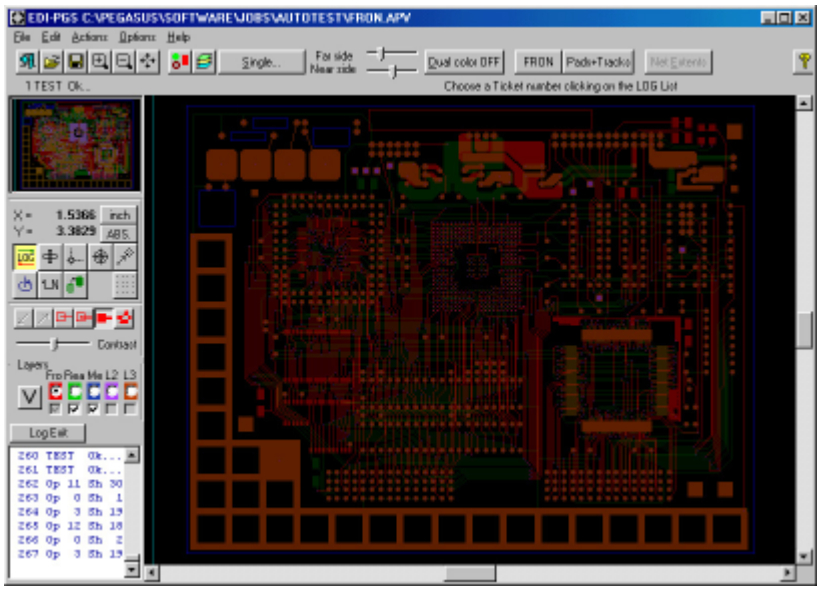
5.4.3 View errors

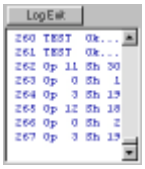
The EDIAPV software offers you a comfortable possibility to view the errors detected on a board.

5.4.3.1 Display a board with errors



1. Click the button [Job Dir].
2. Select the directory, where the job data of the desired board are stored.
3. Click on [Open] to select this directory.
4. Click the button [Test menu].
5. Click on the button [Vw errors].

   The EDI software will be started and the PCB image will be displayed.
6. If you have created the test files using EDIAPV editor, click "Load Name-Pack"; all outer and inner layers will be loaded so all interconnections between them will be available; if the data preparation was carried out using „HLS input", click on the command „Load fron & rear only". The front and rear layer will be loaded and you can see all pads and flashes in the EDI window.
7. Check whether the button on the left center edge of the window is clicked. If not, click it.



You can see a list window in the lower left corner of the EDIAPV software. This is a list of all PCBs of the current job that had been tested. Each board has a unique ticket number in the left column.

The words „Test", „Conti", or „HiRAM" in the center column show the type of executed test. Wherever „OK..." is displayed in the right column, the correspondant board has been tested free of errors.

If errors had been detected during a board test, the list shows the number of opens (Op) and shorts (Sh) on the correspondant board. Click on a line of the list to display the errors of the board.

If you click on a „Sh" error, the button [Net Blink] will be displayed above the list. By clicking on this button, you can display the network to which the first network is shorted (toggle function).

Use the zoom in/out functions to have a better look on the defective networks.

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5.4.3.2 *Useful hints for easy verification*

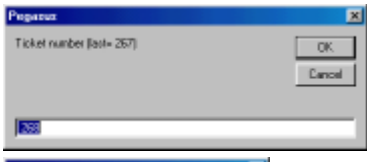
The following shortcuts and buttons help you to verify the errors fast and easy (LM = left mouse button, RM = right mouse button, <E> = key on the keyboard):

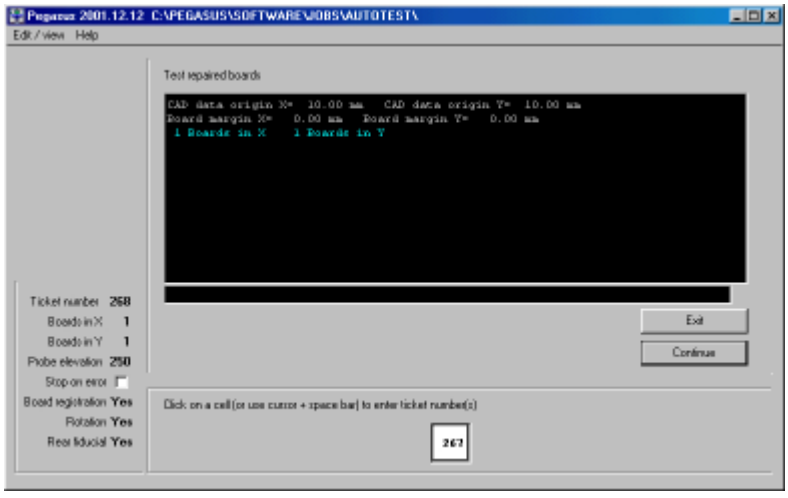
Click RM	zooms out
Drag RM	zooms in
<V>	makes an error toggle between both endpoints of an error
	toggles between the front and rear side view
<C>	brings the cursor to the center of the image
<+>	zooms in
<->	zooms out
Drag LM	scrolls the image (with redraw function)
<Arrow down>	displays the next error of the same ticket
<Arrow up>	displays the previous error of the same ticket

5.5 Test repaired board

After repairing the errors of a board, you can retest it to check, whether the repair was successful.

1. Mount the board to be tested into the frame.
2. Activate the directory containing the job data.
3. Click on the button [Test menu].
4. Click on the button [Repaired].
5. Enter the ticket number of the defective board. You find the ticket number on the error report.
6. Click on [OK].
7. Decide, whether the latest registration data shall be used (see further below). Click on [Yes] or [No].
8. Click on the button [Continue] to start the test. After testing is terminated you can read from the window, whether the errors have been removed or not.
9. Click on [Exit] to close the window.





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When can I use the latest registration?

When you have to decide this question within the procedure shown above, you can click on ...

Yes if you have left the board in the machine after it has been tested; the repair has been done within the machine, without removing the board from the frame

No if the board has been removed after the first test and has now been mounted for the retest again

If you are not sure what to do, you should click on [No] anyway. Then the registration process is executed.

5.6 Test floor integration

This option allows you to retest boards on the Pegasus that had been tested on a MANIA electrical grid test system. Beside that, you can use the EDIAPV software delivered with the Pegasus to view the defects in the CAD image of the board.

In this section we show you:

- the compatibilities of the TFI option
- the preparation within the EDIAPV software
- the way to display errors in EDIAPV
- the execution of a retest

Information on the preparation of your electrical grid test system is contained in the manual of this machine or can be gathered from the MANIA service department.

5.6.1 TFI compatibilities

TFI contains two major functions:

- errors can be displayed with the EDIAPV software, e.g. to ease the verification
- repaired boards can be retested to verify whether the errors are solved now

To be able to execute the functions, the software needs input files of these formats:

Display	Speedy/Pegasus log format, MANIA log format, MANIA Precise log format
Retest	Speedy/Pegasus log format, MANIA log format

All file formats can be read from local or network drives (if network option is present). The MANIA log format can be read with a Bar-Code reader, too.

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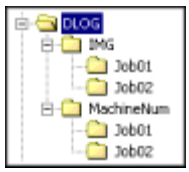
5.6.2 Preparation of the directory structure

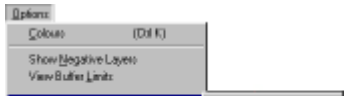
For the verification and retesting of boards, the machine needs three different file types. These must be available in a certain directory structure.

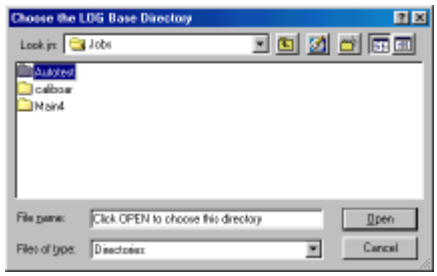


1. Create a directory named „DLOG“; here you can also use a different name, but in DLOG will be used in all descriptions following.
2. Create a subdirectory „DLOG/MachineNum“ for all error log files (e.g. B000###.log).
3. Create a subdirectory „DLOG/IMG“ for all board images (*.apv) and test programs (*.lst).
4. For each job, a subdirectory „*/JobName“ must be created under each of the two subdirectories.
5. Save the error log files in the path „.../DLOG/MachineNum/JobName/“.
6. Save the board images and the test programs in the path „.../DLOG/IMG/JobName/“.

5.6.3 Preparation of the EDIAPV

1. Start the EDIAPV software by double-clicking the respective icon.
2. Open the submenu „Options – LOG Format“ to display the available log file formats.
3. Click on the log file format of the error log you want to display.
4. If you want to use the BarCode option, open the „Options“ menu and click on the command „LOG Base Directory“.
5. Select the directory („.../DLOG/MachineNum/JobName/“), where the needed *.log files are contained.
6. Click on the button [Open] to confirm the selection.





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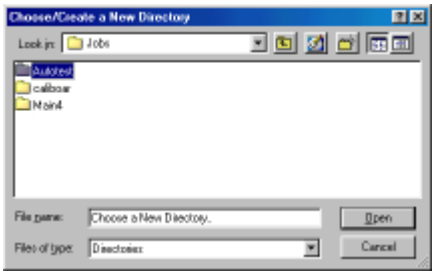
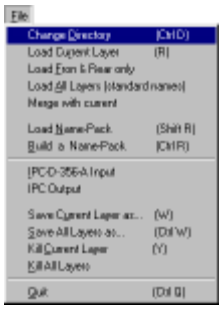
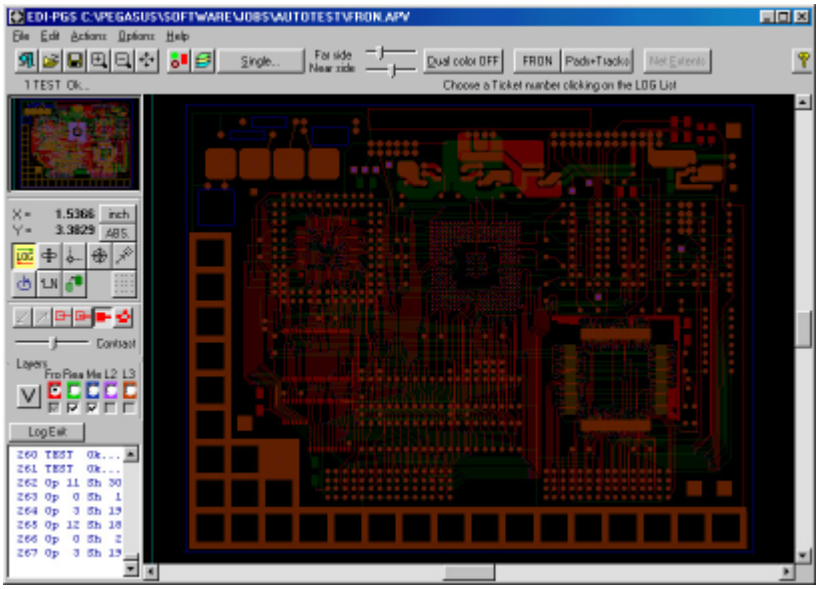
5.6.4 Display errors in EDIAPV

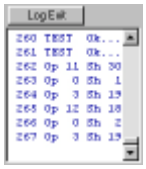


1. Open the menu „File“ and select the command „Change Directory“.
2. Select and open the directory, where the log files (B000***.log) are contained.
3. Click on the button [Open] to confirm the selection.





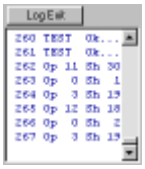
4. The job data will be displayed in the EDIAPV. ((n004))
5. Click on the button to display the list box in the lower left corner of the window. ((n005))
6. Select the desired board by clicking on the respective ticket number in the list box.



7. The errors of the selected board will be listed instead of the ticket list.
8. Click on an error to display it in the board image.

The verification of errors using the EDIAPV will be explained in detail in section 5.4.3.

5.6.5 Use BarCode option for TFI



1. Click on the LOG button to enable the log mode.
2. Use the BarCode scanner to read the BarCode on the desired PCB.

   The software checks, whether all required directories and files are available and will report any problems. Then the board image will be displayed together with the error list.
3. Click on an error to display it in the board image.

The verification of errors using the EDIAPV will be explained in detail in section 5.4.3.

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5.6.6 TFI retest

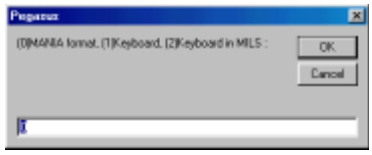
After repairing defective boards, you can use the TFI option to re-test the repaired errors, only.

5.6.6.1 Without BarCode reader

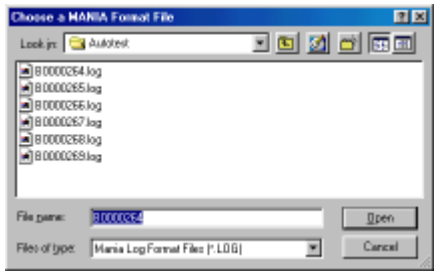
1. Click the button [Job Dir].
2. Select the desired directory, where the *.log files are contained.
3. Click the button [Open] to confirm the selection.
4. Click on the button [Test Menu].

5. Click on the button [Ext. Tick.].
6. Enter the ticket number you want to retest.
7. Click the [OK] button.

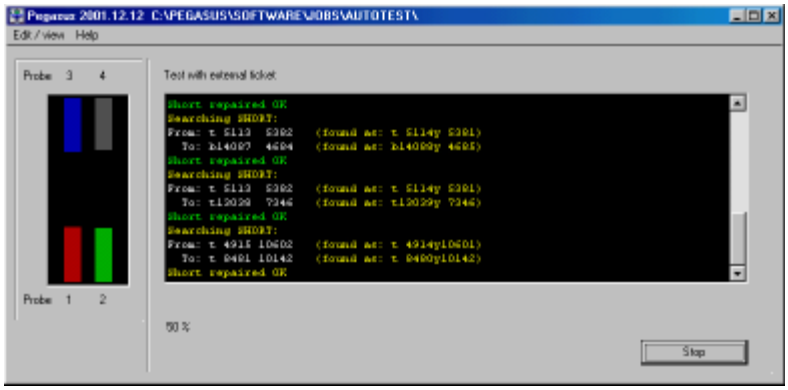
8. Enter the code number for the log file format, e.g. „0“ for MANIA format.
9. Click the button [OK].



10. Select the log file you want to retest.
11. Click on the button [Open].



12. The errors of the selected ticket will be retested, the result is displayed.



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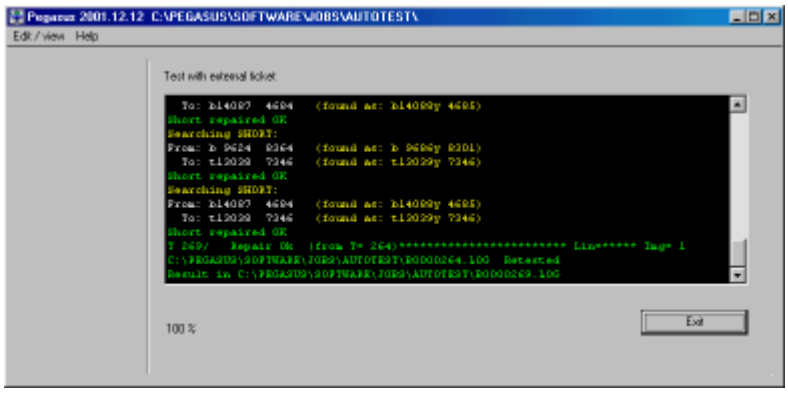
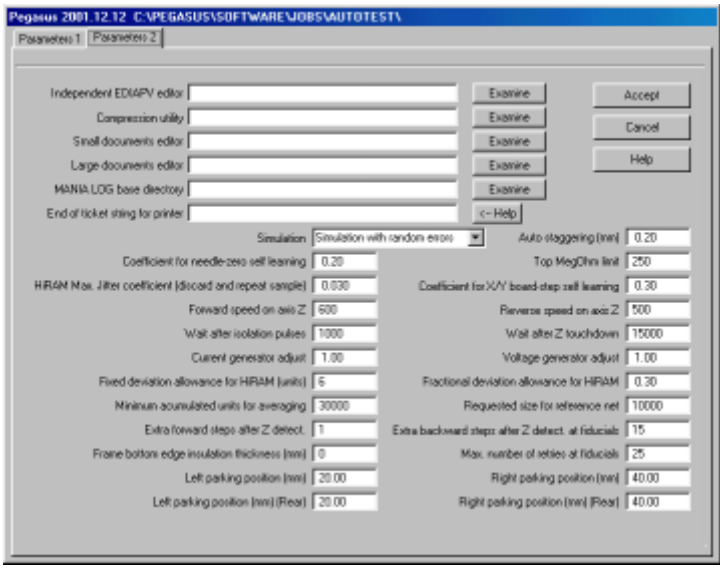
13. Click on the button [Exit] to leave the retest.
14. The window to enter the ticket number will be displayed again (see step 6.). Either enter another ticket number and click on [OK], or click on [Cancel] to terminate the retest function.

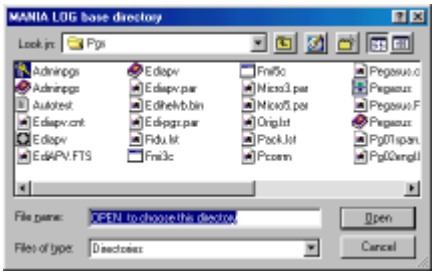


5.6.6.2 With BarCode reader

Before you can use the BarCode option, the MANIA log base directory must be specified in the „Parameters“ dialog:



1. Click the button [Parameters].
2. Click the tab [Parameters 2] to display the second parameters dialog.
3. Click the button [Examine] to the right of the entry box „MANIA LOG base directory“.
4. Select the directory, where the log files are contained „.../DLOG/MachineNum/JobName/“.



5. Click the button [Open] to confirm the selection.
6. Click the button [Accept] to save the modification and close the parameters dialog.
7. Click on the button [Test Menu] to enter the test menu.
8. Use the BarCode scanner to read the BarCode on the board to be retested.

   The system checks, whether all required directories and files are available. Then a window with the message „Ready for re-testing“ will be displayed.
9. Click on button [Ext. Tick.] to start the retest.
10. If this is the first external ticket test on this job, you will be requested to enter the job shift in x- and y-direction. If there is any shifting (e.g. if the fixturing software has shifted the images), enter the values in mm and click on [OK].
11. The errors of the selected ticket will be retested, the result is displayed.
12. Click on the button [Exit] to leave the retest.

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6 Maintenance and Cleaning

Warning

Risk of hazardous electrical shock!

Most of the maintenance duties described in this chapter may only be executed, after the machine has been switched off and cut off the power supply. Follow the rules and regulations mentioned below and in the corresponding items.

Hint

Since the machine works with a very high accuracy, it is important that the following maintenance duties are executed regularly. Otherwise, malfunctions or improper testing results could be the consequences.

Contents ***Page***

6	**Maintenance and Cleaning**	**6-1**
6.1	Terms for maintenance duties	6-2
6.2	Switch the machine off	6-2
6.3	Daily inspection and maintenance	6-2
6.3.1	*Check probes*	*6-3*
6.3.2	*Change probes*	*6-3*
6.4	Monthly inspection and maintenance	6-3
6.4.1	*Check Z guiding*	*6-3*
6.4.2	*Check z springs*	*6-4*
6.4.3	*Check deflection*	*6-4*
6.5	Inspection and maintenance every six months	6-5
6.5.1	*Check the z home sensors*	*6-5*
6.5.2	*Check the X and Y sensors*	*6-5*
6.5.3	*Spray motor pulleys*	*6-6*
6.5.4	*Grease bearings and bottom x-guiding*	*6-6*
6.6	Cleaning	6-6

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6.1 Terms for maintenance duties

The required maintenance duties should be executed according to the following terms:

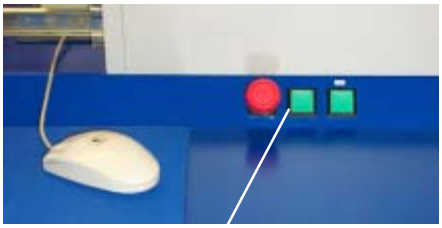
Check probes	at the beginning of each working shift
Change probes	if required
Check Z guide	monthly
Check Z springs	monthly
Check deflection	monthly
Check Z home sensor	every six months
Check X sensors	every six months
Spray motor pulleys	every six months
Grease rollers	every six months

6.2 Switch the machine off

For the execution of most of the measures described in this chapter, the Pegasus should be switched off.

Wait until the last board has been tested completely, before you switch the machine off. Otherwise the test data will get lost.

1. Terminate the Pegasus software.
2. Drive down the operation PC.
3. When the message „It is now safe to turn off the computer“ is displayed, press the green button „Power on“(1) to switch the machine off.



1

Warning

Hazardous electrical shock possible!

There is still electrical power at some parts of the interior machine after switching the machine off. Unplug the electrical power supply before you work at the electrical installations or the machine control.

6.3 Daily inspection and maintenance

Execute the measures described below at the beginning of each working shift.

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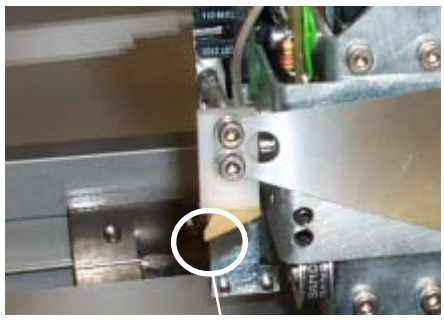
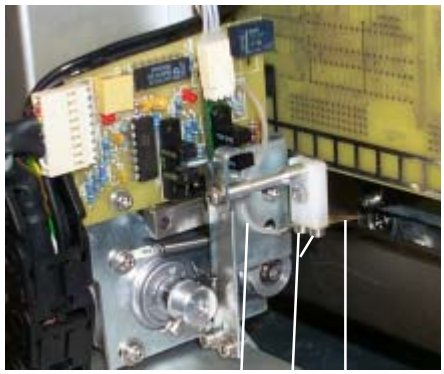
6.3.1 Check probes



During the testing, the probes are lowered onto the board to be tested. Since the probes are very pointed, it might happen that the point of a probe (2) gets bended. A bended probe cannot get an appropriate contact with the testpoint and bad testing result would be the consequence.

Check all four probes daily (e.g. before starting to work with the machine or during the insertion of a board) for the top to be staright and not bended.

6.3.2 Change probes



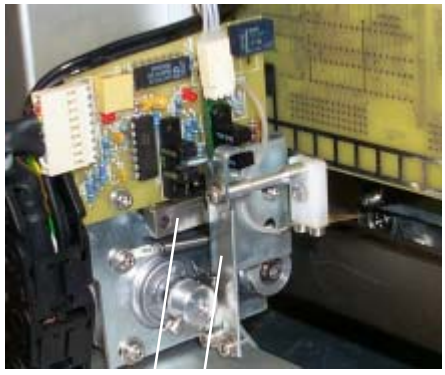
If a probe is bended, it has to be changed. This is done by loosening the two allen screws wich are accesible from below:

1. Take an allen key and screw off both fixing screws (4).
2. Take out the old probe (5) and insert a new one.
3. Screw in both fixing screws (4) and be sure, that the ground wire (3) is fixed together with one of the screws.
4. Tighten both fixing screws (4).
5. Mount the autotest board.
6. Execute the function „Zero X/Y“ in the software (see chapter 7) to write the zero point to the new probe setup.

6.4 Monthly inspection and maintenance

Execute the measures described below once a month. It is recommended to run a maintenance book, where you confirm the execution of the inspection and maintenance measures.

6.4.1 Check Z guiding



The test probe is mounted on a metal plate, which is moved in z-direction. It rests on a special guiding, which must be checked for perfect functionality monthly.

1. Move the probe unit (2) manually in z-direction and check, whether the movement is easy-going, evenly, and without any disturbances.
2. If required, clean the guiding (1) and repeat the manual moving.
3. If the movement is disturbed after cleaning, the guiding and the carriage must be replaced. Please contact the MANIA service staff.

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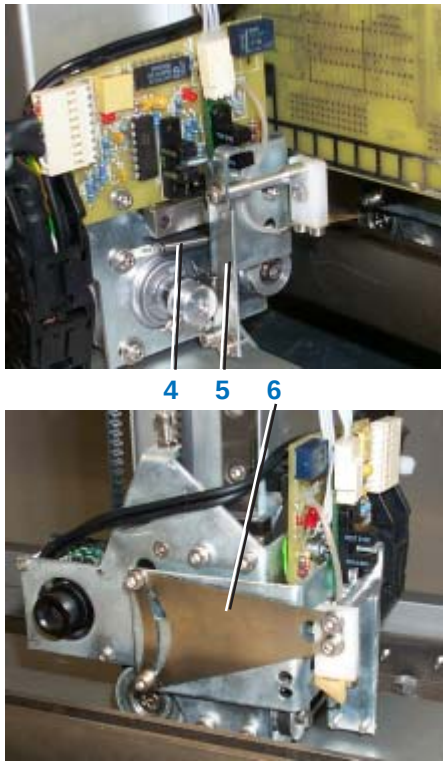
6.4.2 Check z springs



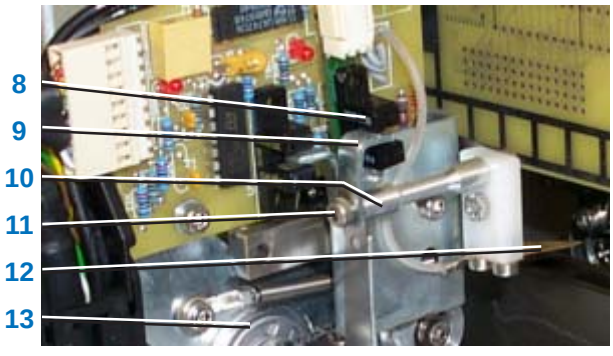
There are two springs mounted at each probe unit. A normal spring (4) supports the return movement of the probe from the board, the other one (6) is a metal retainer supporting the forward movement.

1. Position a finger at the vertical metal plate (5) of a probe unit.
2. Press gently towards the mounting frame (forward) but assure that the probe tip does not touch anything.
3. Release the metal plate and watch, whether it comes back immediately and with an even movement.
4. If the movement is not OK, the spring (4) must be replaced.
5. Repeat steps 1. to 4. for all probe units.
6. Use a spring balance (capacity min. 50 g) and attach it to the metal plate (5).
7. Pull the spring balance horizontally and with a right angle away from the mounting frame (outward).
8. Check whether a spring power of 40 g is present.
9. If the spring power is too high or low, the metal retainer (6) must be replaced.

6.4.3 Check deflection

The information, whether the probe tip has contact with the board is achieved by a photo cell sensor. The photo cell is switched by a metal plate that is moved between the detectors.

The deflection is the distance of the front edge of the metal plate to the switching position of the sensor, when the probe tip gets contact with the board. The deflection must be checked and possibly corrected once a month.



1. Mount the autotest board.
2. Turn the z-drive belt (13) manually, until the probe tip (12) gets contact with the board.
3. Hold the z-drive belt (13) in this position and check the distance between the front edge of the metal plate (9) and the switching point in the middle of the sensor (8). This distance must be between 0.7 and 1.3 mm.
4. Execute "Z Axis Ajust" from technical section menu and check whether the Z Axis deflection has been properly done.

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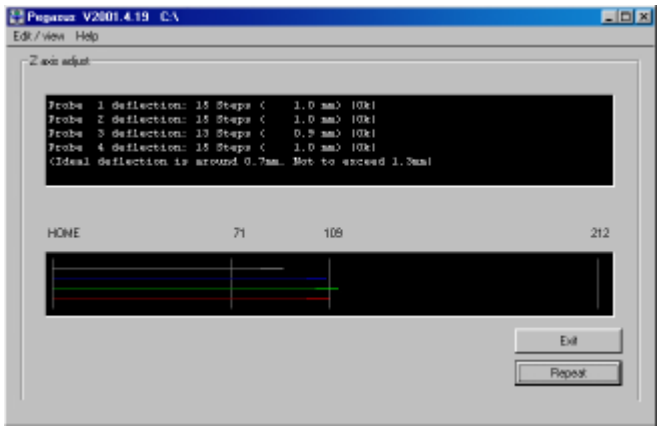
The z axis adjustment is shown with four lines (one for each probe) each line has a section which is displayed thicker than the rest of the line. This section of the line must be inside the reference values 71 & 109.



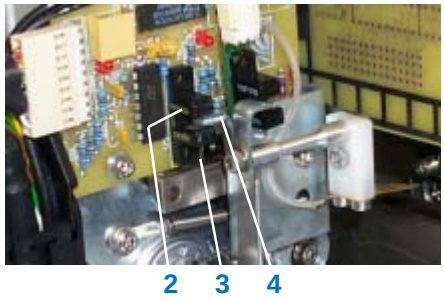
5. If required, loosen the holding screw (11) and turn the adjustment screw (10) to adjust the distance.
6. Tighten the holding screw (11) and check the deflection again.
7. Repeat this procedure for all four probes.

6.5 Inspection and maintenance every six months

Execute the measures described below every six months. It is recommended to run a maintenance book, where you confirm the execution of the inspection and maintenance measures.

6.5.1 Check the z home sensors

The home position of the probe units is supervised by magnetic sensors. Each sensor contains a magnetic part (3) and a detector part (2). The sensor is switched by a metal plate (4) moved between the magnetic and detector part.



To achieve good detection results, the metal plate (4) should be nearer to the magnetic (3) than to the detector part (2) when moved into the sensor. When the machine is switched off, the probe unit is in home position and the front edge of the metal plate should be positioned in the middle of the sensor.

You can check the position quality by executing the „Z check“ function (see chapter 7) for at least 30 minutes. After this time, no errors should be displayed in the window.

6.5.2 Check the X and Y sensors

Execute the function „Home switch test“ in the technical section of the Pegasus software (see chapter 7) to check the functionality of the x and y sensors.

If the test reports errors, you should contact the MANIA service staff.

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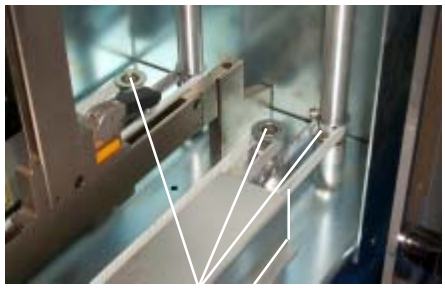
6.5.3 Spray motor pulleys



The probes are driven by high-precision belts (6), which are driven by pulleys (5). Belts and pulleys must be cleaned thoroughly every six months, using a slightly dampened, clean and lint-free cloth.

After cleaning you should use liquid silicone to lubricate both belts and pulleys.

You find pulleys and belts at the following positions within the test chamber:

- at the bottom; pulleys at the right and left side
- at the top; pulleys at the right and left side
- at the backside of each probe arm; pulleys at the top and bottom

6.5.4 Grease bearings and bottom x-guiding

The probe arms are moved along horizontal guidings (7). They are hidden behind the drive belts and under a cover at the bottom of the test chamber.

The probe units are moved over vertical guidings (8) at the probe arms.

These guidings must be cleaned completely every six months. Dampen a clean and lint-free cloth with cleaning gasoline and wipe off all lubrication and dirt from the guidings.

After cleaning you must apply grease to the guidings.

6.6 Cleaning

Since the Pegasus FlyingProbe test system is a high-precision appliance, it has to be kept clean at any time to maintain perfect functionality and long-termed reliability.

You should inspect the machine at the beginning of your working shift for dirt and waste materials. It should be a natural process for you to keep the machine clean.

The following cleaning measures should be executed whenever required:

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Clean test chamber

Use an industrial vacuum cleaner and clean the test chamber from dust and dirt.

Notice

Probes can be damaged!

Pay attention not to hit the probe units when cleaning the test chamber. The electronics can be damaged and the probe tips can be bended. Be careful when using the vacuum cleaner.

Notice

Drives of probe arms and probes can be damaged!

Do not use compressed air to blow out dust and dirt from the test chamber. You could blow the dirt into the motion parts which could disturb the precise drive of probe arms and probes.

Clean machine housing

Use a dampened (not saturated) clean and lint-free cloth to wipe the housing of the machine. In case of intractable dirt, you can use a mild household detergent to clean the housing.

Notice

Paint can be damaged!

Do not use aggressive detergents or solvents to clean the machine housing. This could damage the paint of the machine.

Clean monitor, plexi glass, keyboard and mouse

Use a soft, dry and lint-free cloth to wipe dust of monitor, plexi glass, keyboard and mouse.

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7 Operation software

This chapter contains a chronological description of the Pegasus operation software with all functions. You can find the information contained here in the online help within the software, too.

Contents ***Page***

7	**Operation software**	**7-1**
7.1	Pegasus software icon	7-2
7.2	Main window	7-2
7.2.1	*Menus of the main window*	*7-2*
7.2.2	*Buttons of the main window*	*7-5*
7.3	Job directory	7-6
7.4	Job options	7-7
7.5	Test menu	7-9
7.5.1	*Test dialog*	*7-10*
7.5.2	*Test repaired boards*	*7-11*
7.5.3	*Test external ticket*	*7-12*
7.5.4	*Scale function*	*7-14*
7.5.5	*Point on fiducials*	*7-14*
7.5.6	*Display results*	*7-16*
7.5.7	*View errors*	*7-17*
7.5.8	*Display log file*	*7-18*
7.6	Load function	7-19
7.7	Data preparation	7-19
7.7.1	*Set fiducials*	*7-20*
7.7.2	*HLS input*	*7-22*
7.7.3	*Duplicate image*	*7-22*
7.7.4	*Job merge*	*7-24*
7.7.5	*View *.lst file*	*7-25*
7.7.6	*Compress files*	*7-26*
7.7.7	*Editor for job data*	*7-26*
7.7.8	*Alternative editor*	*7-26*
7.8	Directory maintenance	7-26
7.9	Technical submenu	7-27
7.10	Parameters	7-27
7.10.1	*Parameters 1*	*7-27*
7.10.2	*Parameters 2*	*7-30*

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7.1 Pegasus software icon

The Pegasus software is installed in the Windows™ environment with an icon displayed on the desktop. You can double-click this icon to start the Pegasus operation software.

When ending the operation software, a window will be displayed where you have to confirm your decision.

7.2 Main window

After starting the Pegasus operation software, the main window will be displayed. Here, four important sections can be distinguished:

Title bar — the blue section on top of the window, containing the name of the software, the name of the activated job, and three buttons to minimize, maximize and close the window

Menu bar — the section below the title bar, showing the operation menus (see further below)

Button bar — the section below the menu bar, showing the available buttons (see further below)

Status bar — the section at the lower edge of the window, containing topical information on selected items, functions or commands; on the right side, the name of the current menu is displayed

7.2.1 Menus of the main window

There are three menus in the main window:

Edit/view — here you can start the internal or external editing tool and the compression utility

Technical section — here you find several commands and functions, which are for service/maintenance purposes, only

Help — here you get access to the online help system; additionally, you can view the software release and system information

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7.2.1.1 Edit/view menu

Click on the item „EDIT/view“ in the menu bar of the main window to display the available commands:

Edi-Pgs (slave) starts the editor software integrated in the Pegasus operation software

EdiAPV (independant) starts an external editor software which can be installed on the operation PC; the path of the program file must be entered in the „Parameters“ dialog (see further below)

Compression utility starts an external compression utility for the archiving of job data; the path of the program file must be entered in the „Parameters“ dialog (see further below)

7.2.1.2 Technical section

Notice

Damage and inadequate test results possible!

The execution of most of the commands and functions within the „Technical section“ is reserved to the service personnell of MANIA or other, very experienced technical staff. By executing these functions without the required knowledge, damage to the machine or unreliable test results may be the consequence.

Click on the item „Technical section“ in the menu bar of the main window to display the available commands. Some of the commands are accessible in the submenu [Technical]. The correspondant button is shown in the list.

Initialize (x, y, z home) initializes the test system; all axis will be driven into home (starting) position

Motors off switches the motors of the probe arm off; then the probe arms may be moved manually (e.g. when mounting a board into the frame); **MOVE PROBE ARMS CAREFULLY**

Service this submenu contains four functions; these functions are for services purposes only and may not be executed by the operator

Axis calibration [Axis calib] this submenu contains function for the calibration of the three axis; for service purposes only; see section 7.2.1.3

Axis tabulator [Axis tab] gives you the possibility to move all axis in pre-defined steps; for service purposes only

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Z axis adjust	[Z-adjust] measures the adjustment of the Z-axis; before you execute this function, the calibration board must be mounted; for service purposes only
Z detectors & frame sw. (acoustic)	[Acoustic] assigns an acoustic signal to the switches; for service purposes only
Z axis & home switches test	[Z-check] executes a text of the switches at the Z-axis; before you execute this function, the self-check PCB must be installed; for service purposes only
Control board test	[Ctrl boar] executes a test of the control board; for service purposes only
Volt./curr./HiRAM auto-adjust ...	[AutoChek] checks and possibly auto-adjust the test voltage, current and HiRAM values by contacting the self test resistors; before you execute this function, the self-check PCB must be installed; for service purposes only
8 axis random moves	[Axis rnd] performs random moves of all axis; for service purposes only
8 axis full stroke	[Axis full] performs full strokes of all axis; for service purposes only
Home switches test	[Home sw] executes a test of the home switches located at all axis
Z axis count (monthly record)	[Z-count] displays the moves of the Z-axis; gives you information on when to replace the probe tips

7.2.1.3 *Submenu axis calibration*

The submenu „Axis calibration“ contains some commands and functions regarding the calibration of the x-, y- and z-axis.

You can access them by opening the menu „Technical section“ and clicking on „Axis calibration“. You can also access them by clicking on the button [Technical] in the main window and then on the button [Axis calib]. The buttons contained there are contained in the list.

Draw corr x	[Vw corr x] shows the correction values of the x-axis graphically; use the keys 1 ... 4 to display a single probe (front left, front right, rear left, rear right) and 5 to display all probes; press the vertical keys to change the scale factor of the graphs; this function is for service purposes only
Draw corr y	[Vw corr y] shows the correction values of the y-axis graphically; use the keys 1 ... 4 to display a single probe (front left, front right, rear left, rear right) and 5 to display all probes; press the vertical keys to change the scale factor of the graphs; this function is for service purposes only
Probe XY zero adjust	[Zero] execute a zero point adjustment for both x- and y-axis; before executing this function, the calibration or the self-check board must be mounted
Refine x axis calibration	[Refine x] executes a calibration of the x-axis only; before executing this function, the calibration board must be mounted

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Refine y axis calibration	[Refine y] executes a calibration of the y-axis only; before executing this function, the calibration board must be mounted
Refine x+y axis calibration	[Refine xy] executes a calibration of the x- and y-axis; before executing this function, the calibration board must be mounted
Complete primary calibration	[Calibrate] executes a complete calibration of the machine; this is required after installing the machine at a new site; before executing this function, the calibration board must be mounted

Important

Possible loss of important data!

The execution of the function „Complete primary calibration“ deletes all correction files and individual adjustments. Possible customer-specific settings must be re-programmed after execution.

7.2.1.4 Help menu

Here the access to the online help system is provided. By clicking on the item „About“ you can display information on the software version of your Pegasus.

7.2.2 Buttons of the main window

By clicking on the buttons of the main window, you can access the available submenus and trigger some functions:

Exit	leaves the Pegasus operation software; after clicking, a window will be displayed where you have to confirm the exit command
Job dir	opens the job directory, where you can search, activate, create and delete job directories
Job option	displays the job options dialog, where you can view and edit some options for the activated job
Test menu	enters the test menu, where all functions for the testing of PCBs are contained
Load	opens a window where you can select job files (from floppy, network, or other drives) to be loaded into the activated job directory

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Data prep	enters the data preparation submenu, where all functions and commands for the preparation of data for the testing on the Pegasus are contained
Dir maint	opens a window where you can create, activate and delete job directories
Technical	opens a submenu, where the most important technical functions and commands are contained
Parameters	displays a dialog, where you can view and edit the basic settings of the machine

7.3 Job directory

Click on the button [Job dir] in the main window to display the job directory dialog.

Activate a directory

1. Click on button (repeatedly), until the desired directory is displayed.
2. Double-click on the directory to open it.
3. Click on the button [Open] to activate the opened directory and close the window.

Create a job directory

1. Open the directory, where you want to create a subdirectory.
2. Click on the button .
3. Enter the name of the new directory.
4. Press the <Enter> key to create the directory.

Delete a directory

1. Click on the desired directory to mark it (do not open it).
2. Press the <Del> key to delete the directory.
3. Confirm the deletion.

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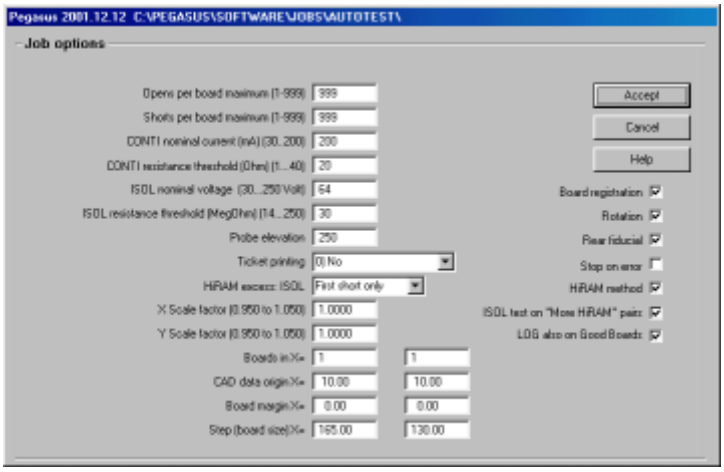
7.4 Job options



Important

Job options contain job-specific settings!

The settings executed within the „Job options“ dialog are job-specific and affect the activated job only. If you want to do general modifications for all jobs, you will have to do this in the „Parameters“ dialog.

Click on the button [Job options] to open the dialog containing this items:

Opens per board maximum — enter the number of open errors that shall be detected, before the machine reports an „Open error overflow“ and aborts the test; you can enter a number between 1 and 999

Shorts per board maximum — enter the number of short errors that shall be detected, before the machine reports an „Short error overflow“ and aborts the test; you can enter a number between 1 and 999

Conti nominal current — enter the current, with which the continuity test shall be executed; you can enter a value in mA between 30 and 200

Conti resistance threshold — enter a resistance value; if this value is exceeded, the machine will report an open error; you can enter a value between 1 and 40 Ohms

Isol nominal voltage — enter the voltage, with which the isolation test shall be executed; you can enter a value between 40 and 250 V

Isol resistance threshold — enter a resistance value; if this value is not reached during isolation test, a short error will be reported; you can enter a value between 10 and 250 MegaOhms

Probe elevation — during testing, the probe will be lifted from the PCB for the distance entered here; you can enter a value between 120 and 350, the unit is 0.01 mm; the probe elevation can be reduced, if you have a very flat board; in case of curved boards, the value should be increased to avoid the danger of making scratches with the probe tips

Ticket printing — here you can decide, whether tickets with an error report shall be printed for each defective PCB; you can choose between „Full“ (complete error information), „Short“ (most important error information only), „Full + ID“ (board ID together with full report) and „No“

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HiRAM excesses isol	here you decide what shall happen, if HiRAM values are exceeded during a board test: if you select „First short only“, the defective networks will be tested with isolation test, only; if you select „ISOL full scan“, the defective and all adjacent networks will be tested with the isolation test
X scale factor	if the board differs in its size from the original CAD data, you can enter a scale factor for the x-direction here
Y scale factor	if the board differs in its size from the original CAD data, you can enter a scale factor for the y-direction here
Boards in X / Y	if you mount several boards into the frame (optional frame equipment required), you should enter the number of boards in x- or y-direction
CAD data origin	enter the coordinates of the CAD zero position that you have determined during the preparation of the job data (see section 5.2.7)
Board margin	if there's a margin between the CAD zero position and the image, you should enter the x- and y-values of this margin here
Step	if you test a panel with multiple images, you should enter the distances between identic points of the images in x- and y-direction here
Board registration	this box should be checked to have all boards registrated
Rotation	check this box if a possible board rotation shall be measured; this needs some seconds but assures that mounting errors or distortions are compensated if possible
Rear fiducial	check this box, if the registration of fiducials on the rearside of the board is required (e.g. in case of layer offsets)
Stop on error	if this box is checked, the machine will stop if an error is detected; the probes will point on the endpoints of the defective network
HiRAM method	check this box to test the boards using the HiRAM method; this safes at least 50% of test time
ISOL test on „Mode HiRAM“ pairs	check this box, if HiRAM errors shall be retested using the isolation test

The job options are saved in a special file and stored together with the other data in the job directory.

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7.5 Test menu

The test menu contains all functions and commands required for the testing of PCBs. After clicking the button [Test menu] in the main window, the occupation of the button bar changes:

Back	click this button to close the test menu and return to the main window
Job dir	opens the job directory, where you can search, activate, create and delete job directories
Job option	displays the job options dialog, where you can view and edit some options for the activated job
Test	opens the test dialog, where you can do some additional settings and start the testing
Repaired	with this function you can verify errors detected on a board; clicking this button opens a dialog where you can enter the ticket number of a board and retest this board
Ext. ticket	this function allows to verify errors on a board that had been tested on a different test system (e.g. grid tester); see information on TFI in section 5.6
HiPOT	enables the HiPOT option; please contact our service staff for further details
HiRAM reset	deletes all values from the file „Hiram.lst“; you have to confirm the command in another window
Scale	function to measure the scale factor of the board; a scale pad must be declared (can be done during the fiducial definition in the EDI tool)
Point fidu	lets the probes point on the fiducials (front and rear); this allows you to check, whether the probes hit the pads exactly; possible inexactness can be corrected
Results	displays the results of the last PCB test
Vw errors	opens the EDI tool to display the detected errors visually
Log	displays the log file

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7.5.1 Test dialog

Click the button [Test] in the test menu to display the test dialog. Here you can set some test-specific options and start the testing of the mounted PCB.

Ticket number the ticket number that would be generated for the next board is displayed here; you can overwrite the number, the subsequent boards would be counted up starting with the entered number; the ticket number of the previous board is displayed in brackets

Boards in x enter the number of boards mounted in x-direction (for the mounting of more than one board, additional mounting equipment is available as an option)

Boards in y enter the number of boards mounted in y-direction (for the mounting of more than one board, additional mounting equipment is available as an option)

Probe elevation during testing, the probe will be lifted from the PCB for the distance entered here; you can enter a value between 120 and 350, the unit is 0.01 mm; the probe elevation can be reduced, if you have a very flat board; in case of curved boards, the value should be increased to avoid the danger of making scratches with the probe tips

Stop on error if this box is checked, the machine will stop if an error is detected; the probes will point on the endpoints of the defective network

Board registration this box should be checked to have all boards registrated

Rotation check this box if a possible board rotation shall be measured; this needs some seconds but assures that mounting errors or distortions are compensated if possible

Rear fiducial check this box, if the registration of fiducials on the rearside of the board is required (e.g. in case of shifted layers)

CONTI/ISOL/HIRAM/NETL/LOG/FIDU all status „indicators“ must be green to allow testing; the indicator „LOG“ is red during the testing of the first board

[Full test] executes the full test of the mounted board; if the HiRAM test method shall be used, the first board should not be tested with „Full test“, but using the „First board procedure“

[Exit] closes the test dialog and returns to the test menu

[Conti only] applies the continuity test only to the mounted board

[HiRAM check] checks the saved HiRAM values

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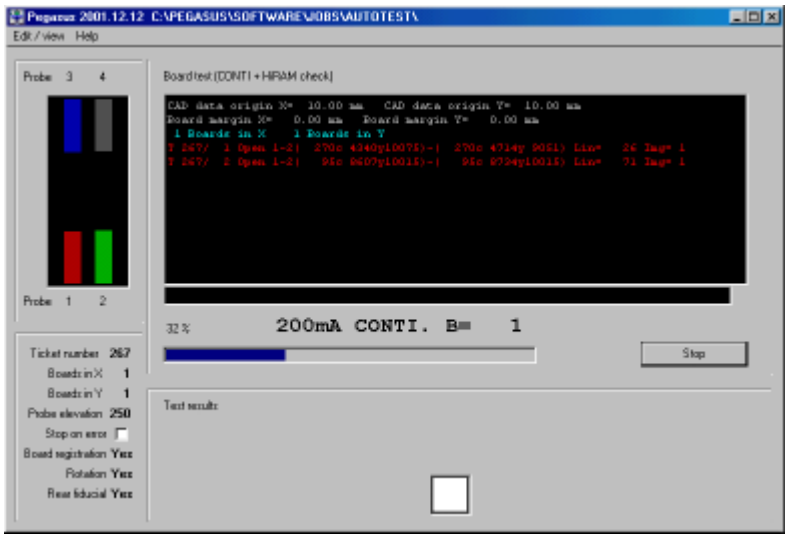
[First board proc]

applies the „First board procedure“ to the mounted board; this is a full isolation and continuity test, during that the HiRAM values of all networks are measured and saved; these values will be used with the other boards of the same job to increase test speed significantly; a fault-free board is required for the „First board procedure“

After setting the options and starting the test by clicking on one of the available buttons, the test window will be displayed.



In the upper left corner, the probe movement is indicated by colored squares. The test log is displayed in the large section to the right. In the lower left corner, the settings of the most important test options are displayed. To the right, messages concerning the procedure in execution and test results can be displayed.

You can click on the button [Stop] to interrupt the test. End the testing by clicking on the button [Exit].

7.5.2 Test repaired boards

If errors were detected on a board, you can retest the board instantly to verify the errors. Or you can repair the errors and then retest the repaired board to check, whether the repair was successful. Both is done with the function „Repaired“.

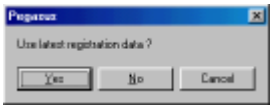
Mount the board to be retested into the frame. Then click on the button [Repaired] in the test menu.

Enter ticket number

Here you are requested to enter the ticket number of the mounted board. The previous board number is displayed as default. With this information, the machine can assign the correct error information to the board. Click on [OK] to confirm the entry.

Decide about board registration

Decide whether the board registration shall be executed, or not. If you do an instant retest, without removing the previously tested board, no registration has to be executed. If you have mounted the board, a registration must be executed. In case of doubt, the registration should be executed.



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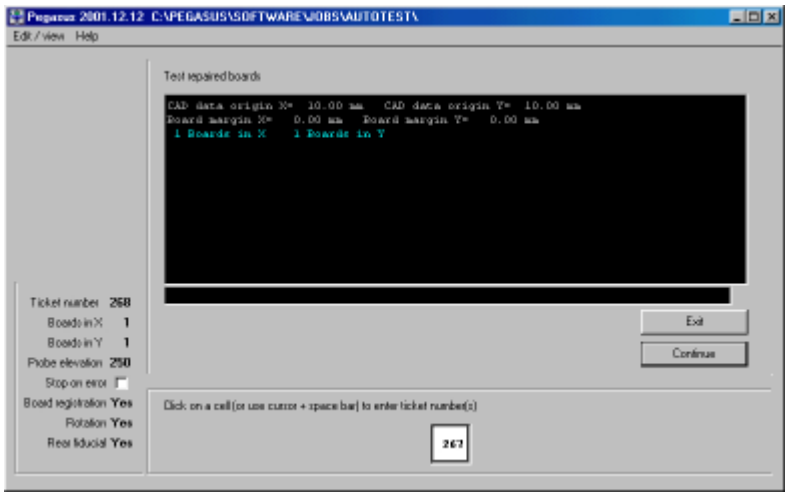
Execute retest

Click on the button [Continue] to start the retest. All errors will be retested and the test result will be reported as defined in the job options.



7.5.3 Test external ticket

With this function you can test a board on the Pegasus, which had been tested before on another machine. To be able to do this, the job directory containing job data and error list must be activated before.

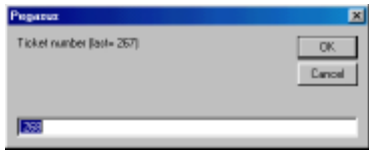
In general, two cases must be distinguished regarding the availability of log file information.

7.5.3.1 MANIA log file available

Error information are stored in log files. If such files are present, the testing of an external ticket is very easy. Click on the button [Ext. ticket] in the test menu to initiate this function.

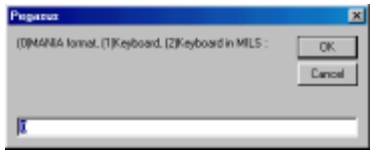
Enter ticket number

Enter a ticket number for the test you want to start. This is required to assign the test result to the mounted board. The last ticket number +1 is displayed as default. Click on [OK] to confirm the entry.



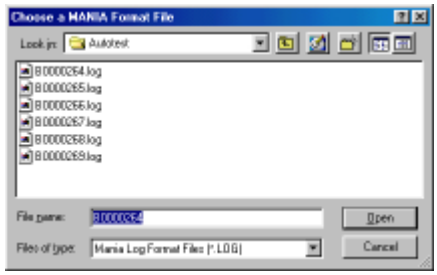
Enter format

Here you have to enter the data format. Enter „0“, because a MANIA log file is available. Click on [OK] to confirm your entry.



Select log file

A window will be displayed, where you can select the log file for the test. Click on the appropriate file in the list and then on [Open].



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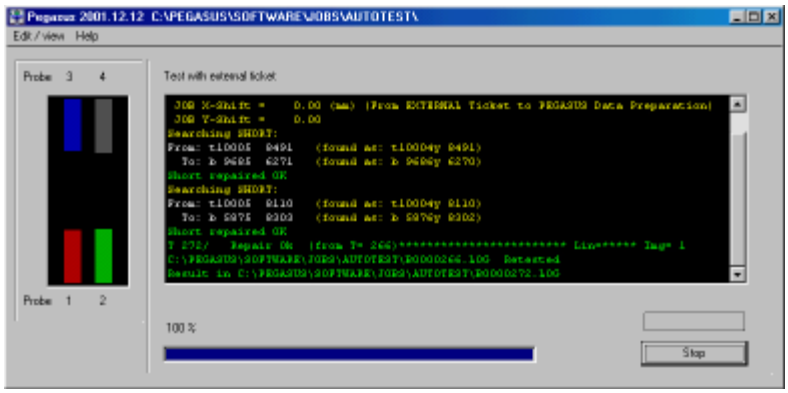
Test execution

The test starts, the development is displayed in the window. After the test is terminated, click on [Exit].

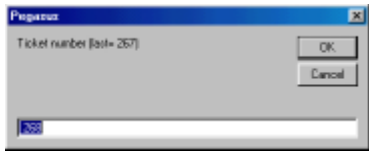


7.5.3.2 No log file available

If no log files are available, you'll have to enter the error information manually using the keyboard. Click on the button [Ext. ticket] in the test menu to initiate this function.

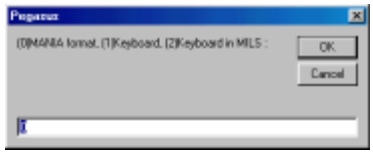
Enter ticket number

Enter a ticket number for the test you want to start. This is required to assign the test result to the mounted board. The last ticket number +1 is displayed as default. Click on [OK] to confirm the entry.



Enter format

Here you have to enter the data format. Enter „1“, if you want to enter the error coordinates in mm units. Enter „2“, if you want to enter the error coordinates in mil units. Click on [OK] to confirm your entry.



Select error type

Enter the letter indicating the type of error to be retested. Enter „o“ for open and „s“ for short error. Click on [OK] to confirm your entry.

Enter coordinates

Enter the coordinates of the first test point. Separate the x and y coordinates with a slash „/“. If desired, you can enter an optional TOP code in front of the coordinates, separated with a „;“. Click on [OK] to confirm your entry.

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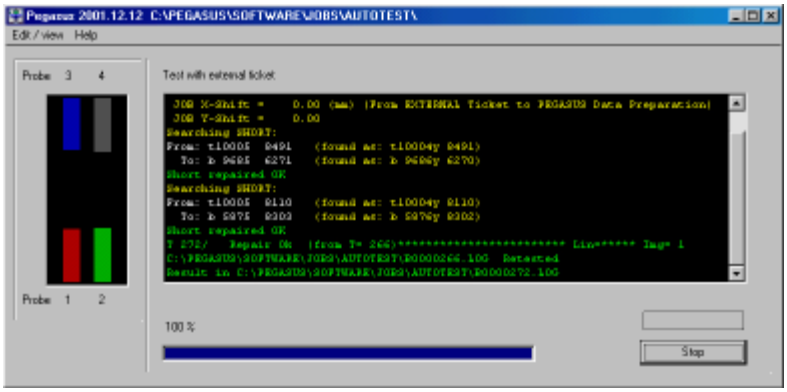
Test execution

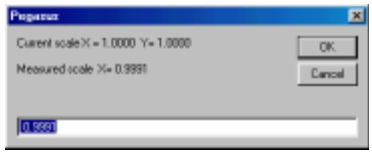
The probes will be moved to the entered coordinates and the selected test starts. The result is displayed in the window. Then you can enter further coordinates and error types, until you leave the test function clicking on [Exit].



7.5.4 Scale function

With this function, you can measure the board size and compare it to the original size. To be able to do so, a scale pad must be defined and saved together with the fiducials.

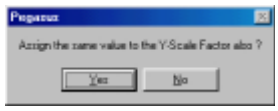
Click on the button [Scale] in the test menu. The result of the scale factor measurement in x-direction will be displayed. Click on [OK] to accept the scale factor.



Confirm for y-direction

After accepting the scale factor for the x-direction you will be asked, whether the same factor shall be applied for the y-direction. If you say [Yes], the scale factor will be applied for the y-direction, too (recommended).

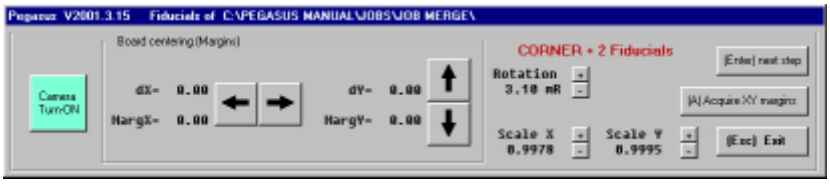
If you say [No], the scale factor will be applied to the x-direction, only.



7.5.5 Point on fiducials

This functions allows you to check, whether the probe tips hit the pads correctly. After giving the command, the probes are moved to the fiducial pads and a window with several control functions is displayed.

Control window with cameras turned off



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Here you can use these functions:

Cameras turn on — switches the cameras on, the window will be enlarged

Board centering (margin) — the values of the axis drift (dX, dY) and the board margin (MargX, MargY) are displayed; click on the arrow buttons to modify the values

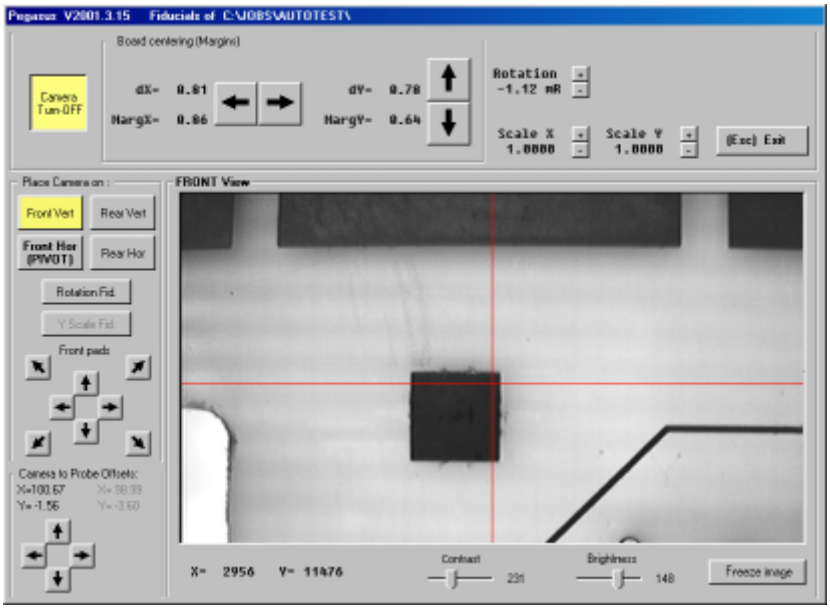
Rotation — the measured rotation value is displayed; click on the buttons [+] and [-] to modify this value

Scale — the measured scale values in x- and y-direction are displayed; click on the buttons [+] and [-] to modify this value

[(Enter) next step] — either press the <Enter> key or click this button to switch between the functions „Corner + 2 fiducials“ (for board centering only), „All x/y fiducials“ (for board centering and scale) and „Rotation fiducial + pivot“ (for determination of board rotation)

[(A) Acquire x/y margins] — either press the <A> key or click on this button to execute a new measurement of the margins in x- and y-direction

[(Esc) Exit] — either press the <Esc> key or click on this button to close the window



Control window with cameras turned on

The cameras mounted at each of the probe units can be switched on to ease the alignment of the fiducial pads. After switching them on, the control window will be enlarged. A large video window and some functions are contained in the expanded section:

Place cameras on — click on one of the buttons [Front vert], [Rear vert], [Front hor (Pivot)], [Rear hor], [Rotation fid], or [V scale fid] to display the desired fiducial in the video window

Arrow buttons — the eight arrow buttons can be clicked to move the active camera into the desired direction; use them to navigate through all testpoints

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Cameras to probe offsets — due to technical requirements, the cameras are mounted with a certain offset to the probe tips; this offset is measured and adjusted perfectly during the installation of the machine and should only be modified, after probe tips have been changed; click on the arrow buttons to modify the offset

Important

Malfunctions possible!

The camera to probe offset should only be adjusted by MANIA service technicians or specially trained personnell. Otherwise you could get problems in using the camera adequately.

Contrast — move the „slide control“ to modify the contrast of the video picture; dependant on the material of the PCB, different settings can bring best result

Brightness — move the „slide control“ to modify the brightness of the video picture; dependant on the material of the PCB, different settings can bring best result

Freeze picture — click this button to freeze the picture; clicking this button again undoes the freezing

7.5.6 Display results

This function allows you to display the result screen of any board of the current job.

Click on this button to display the result screen of the previously tested board. If you want to display the results of a different board, click on the white square and enter the desired ticket number.

Click on the button [Exit] to close the window.

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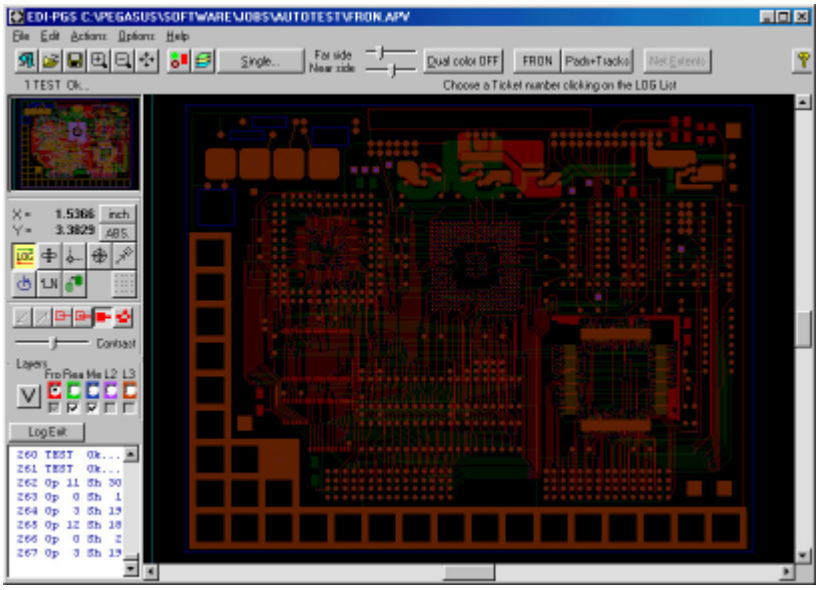
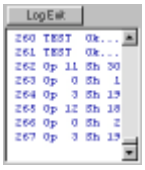
7.5.7 View errors

This function gives you the possibility to view the errors of any board of the current job with EDIAPV. Click on the button [Vw errors] to open EDIAPV. The image of the current board is loaded and displayed automatically.

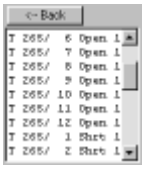


Select ticket



In the lower left corner of the EDIAPV window you can see the list of all bad tested board of the current job. Click on the desired ticket number to open the error list of this board. The first error will be displayed.

Select error



Click on an error displayed in the list. The affected network with the assigned testpoints will be highlighted. If desired, you can move the „slide control“ beside the word „Contrast“ to increase/reduce the contrast between the highlighted network and the rest of the board.

Blink networks

If you have selected a short error, the button [Net blink] is displayed above the error list. Click on this button to display the network with which the first network is shortened. By clicking this button repeatedly, you alter between the display of the first and second network.

Select zoom level

Position the mouse pointer on the board, click and hold the right mouse button and draw a rectangle around the board section that shall be enlarged. Release the mouse button and the selected board section will be displayed.

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Reverse image

Click on the button to flip the displayed board. You can use this function to view errors located on the rearside of the board.

End function

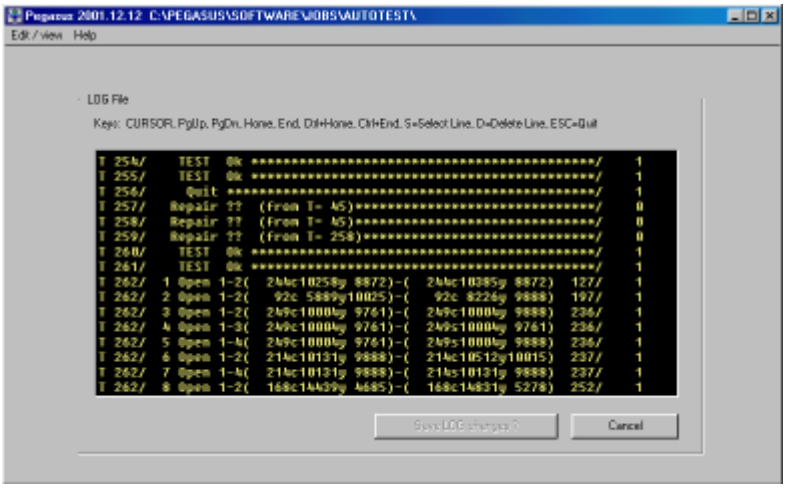
Click on the button [Back] above the error list to return to the list of boards. Here you can select another ticket to view the errors of this board.

Open the „File“ menu and select the command „Quit“ to close the EDI tool.

7.5.8 Display log file

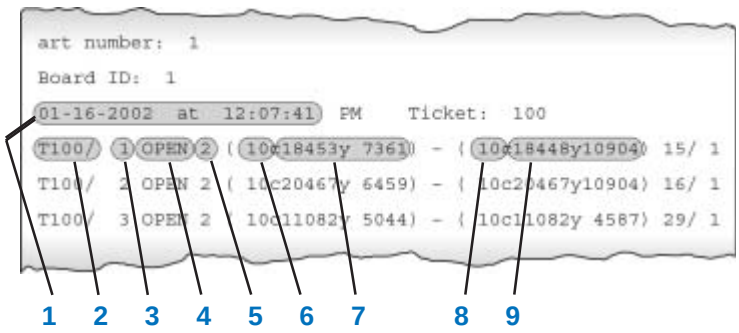
Click on the button [Log] in the test menu to display the test log of the last board. You can view and edit the log.

Click on the button [Cancel] to close the log window.



Explanation of error report and log file

1. Date and time of the test
2. Test number
3. Error number
4. Error type
5. Probe detecting the error
6. Net number
7. First x-y-coordinates
8. Net number
9. Second x-y-coordinates



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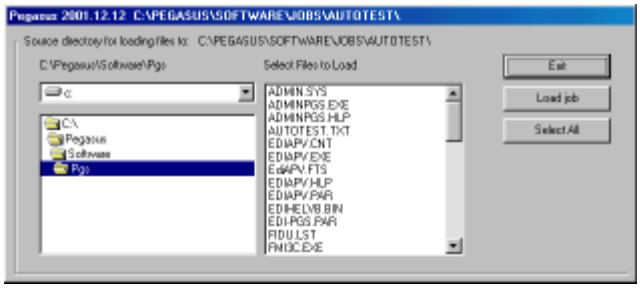
7.6 Load function



With this function you can load job data from any source into the current job directory. Before doing so, you should create and activate a new directory for the new job.

Select the desired drive from the selection list. Select the source directory on the selected drive. Either click on each file to be loaded to mark it, or click the button [Select all] to mark all files in the selected directory.

Click on the button [Load job] to copy the selected files into the current job directory. Then click on the button [Exit] to close the window.

7.7 Data preparation

The Pegasus operation software brings you all the tools and function for the preparation of several input data formats for testing. Click on the button [Data prep] in the main window to open the data preparation submenu. The following functions are contained here:

Back	click here to return to the main menu
Job dir	opens the job directory, where you can search, activate, create and delete job directories
Fiducials	opens the EDI tool with the current job data; here you can place the required fiducials
HLS input	executes the automatic HLS input procedure, required for the treatment of input data available in the Probot™ data format
Dupl. img	with this function you can create duplications of the board data within the *.lst files
Job merge	use this function to merge the data of two jobs; this allows you to mount boards of different jobs into the frame (additional mounting equipment required as an option) and test them in one procedure
View lst	enables you to view a *.lst file with an editor
Compress	starts the optional compression tool to start the compression of job data; the path to the compression tool must be entered in the „Parameters“ dialog
EDI pgs	starts the EDI software

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Alter EDI	starts an optional external job data editor software; the path to the external editor must be entered in the „Parameters“ dialog

7.7.1 Set fiducials

The placing of the fiducials is one of the most important steps in the data preparation. Through the fiducials, the registration of the board within the frame is achieved by the machine.

Please see section 5.2.6.1 for detailed information on the background of fiducials and the way to use them.

7.7.1.1 Required fiducials

The machine needs the total of six fiducials to be defined:

- two vertical fiducials (to detect the vertical orientation)
- two horizontal fiducials (to detect the horizontal orientation)
- one rotation point (to detect possible rotation of the mounted board)
- one scale factor point (to detect possible enlargements or shrinkings)

The fiducials to be set should meet the following requirements:

- all vertical fiducials should be pads with no tracks on their right or left side
- all horizontal fiducials should be pads with no tracks on their upper and lower side
- the rotation point should be on a pad without tracks on its upper and lower side
- best are rectangular pads with at least 0.4 mm of distance to the next pad
- it is possible to choose round pads or holes as fiducials, but you may not obtain optimized results
- it is recommended to set all fiducials in the same corner of the board and the rotation point as far away from them as possible

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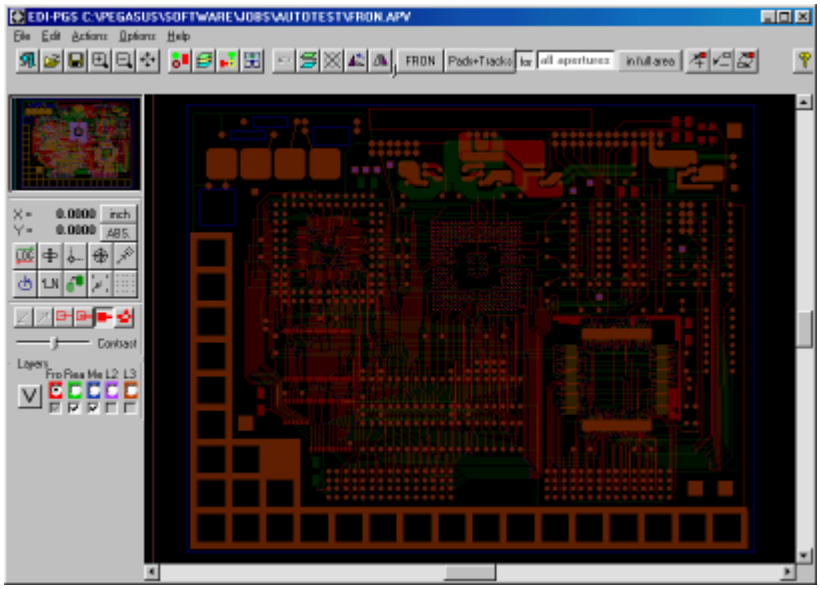
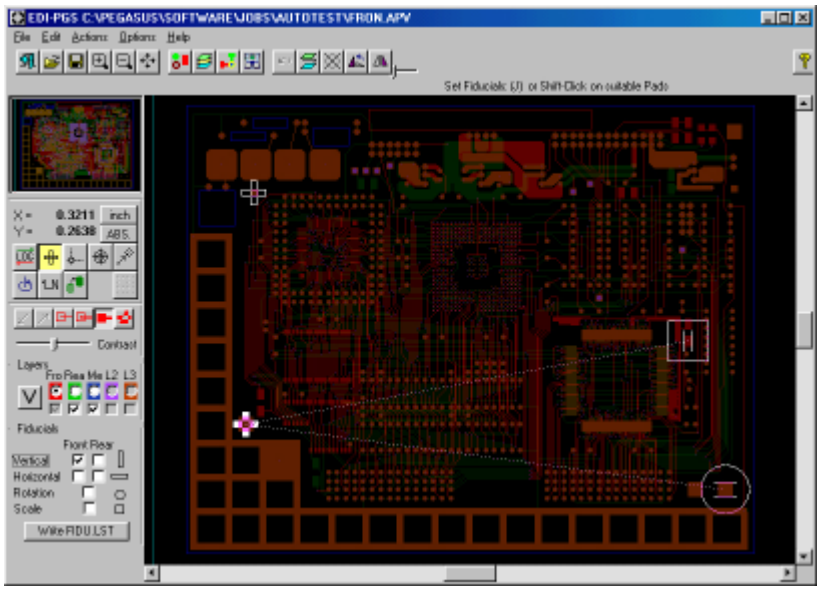
7.7.1.2 How to place fiducials

1. Click the button [Data prep].
2. Click the button [EDI-PGS] to open the testpoint editor.
3. Open the menu „File“ and select the function „Load Fron&Rear only“.
4. Select the front and rear files and click on [Open]. The files will be loaded and the pads and tracks of the board will be displayed.



5. Click on the button to choose the fiducial tool.
6. Check the fiducial that you want to place first.

7. Press the <Ctrl> key and click the left mouse button to zoom into the image. Repeat zooming in until you have a good look at the area, where you want to place the fiducial (you should be able to distinguish pads and flashes).
8. Position the mouse pointer above a pad, press and hold the <Shift> key and click the left mouse button. The icon of the fiducial will be placed on that pad:



- vertical front/rear fiducials are indicated by a vertical rectangle with/without white filling
- horizontal front/rear fiducials are indicated by a horizontal rectangle with/without white filling
- the rotation point is indicated by a circle
- the scale factor point is indicated by a square

9. Repeat steps 6. to 8. for all fiducials to be set.
10. Click the button [Write FIDULST] to save the fiducials within the job data.

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7.7.2 HLS input

The execution of the HLS input must be executed for the preparation of data in the „GC CAM™“ format, only. If you have „Speedy™ output“ from PowerFixture™, or if you have done the data preparation using the EDIAPV, you can skip this step.

1. Click the button [Data prep] in the main window.
2. Click the button [HLS input]. The files for HLS input in the active directory are displayed.
3. Click the button [Compile] to start the automatic import procedure.
4. You can interrupt the procedure by clicking on the button [Stop]. Then you can click on [Continue] to continue the procedure.

5. Click the button [Exit] to close the window after the HLS input has been completed.

7.7.3 Duplicate image

This functions allows you to duplicate the board image within the job data. This is helpful when you plan to mount several boards of the same job into the frame (additional mounting equipment required as an option) and test them in one process.

Select duplication method

The first window after selecting this function requires the selection of the duplication method. You can enter

0 to create duplications freely by entering the required data into a number of windows (step & repeat duplication)

1 to create an automatic duplication by rotating for 180° around the rotation point (rotation duplication)

7.7.3.1 Step & repeat duplication

After entering „0“ when selecting the duplication method and confirming with a click on [OK], the first of four windows will be displayed, where you have to enter the required duplication information.

Boards in x: enter the number of boards you have mounted in x-direction (horizontally); click on [OK] to confirm your entry and display the next window

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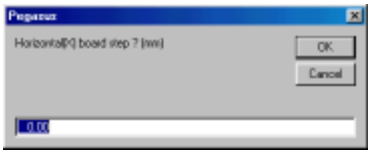
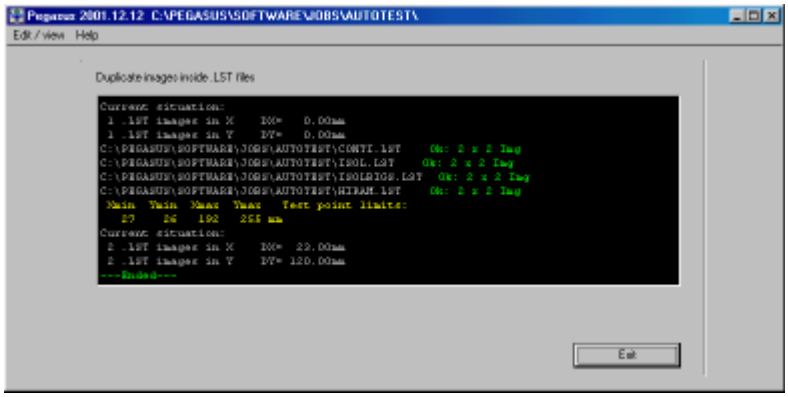
Boards in y: enter the number of boards you have mounted in y-direction (vertically); click on [OK] to confirm your entry and display the next window

Horizontal board step: enter the distance between two identic points of the mounted boards in x-direction; this distance can be measured manually inside the test chamber, or on the CAD image using EDIAPV; click on [OK] to confirm your entry and display the next window



Vertical board step: enter the distance between two identic points of the mounted boards in y-direction; this distance can be measured manually inside the test chamber, or on the CAD image using EDIAPV

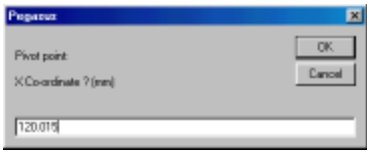
After clicking on [OK] in the fourth window, the duplication of the board will be executed automatically.



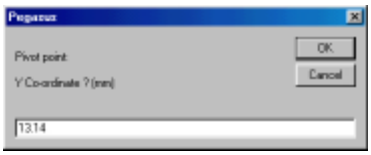
7.7.3.2 *Rotation duplication*

After entering „1“ when selecting the duplication method and confirming with a click on [OK], the first of two windows will be displayed, where you have to enter the require duplication information:

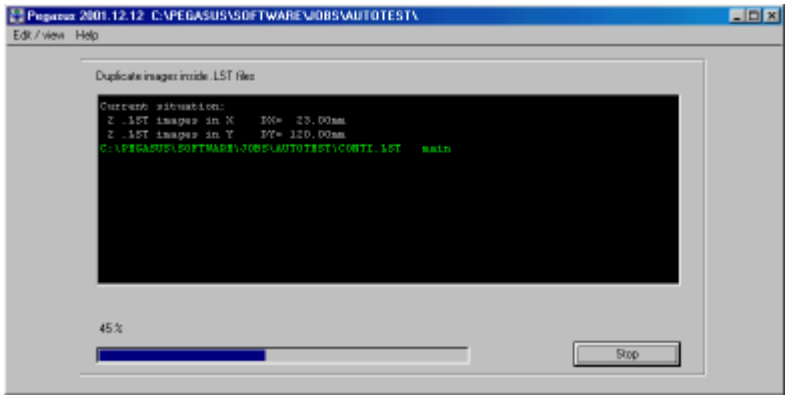
Pivot point: x-coordinate: enter the x-coordinate of the pivot point (rotation point); if required, you can start EDIAPV and select the pivot point to view its coordinates; click on [OK] to confirm your entry and display the next window



Pivot point: y-coordinate: enter the y-coordinate of the pivot point (rotation point); if required, you can start EDIAPV and select the pivot point to view its coordinates



After clicking on [OK] in the second window, the duplication of the board will be executed automatically.



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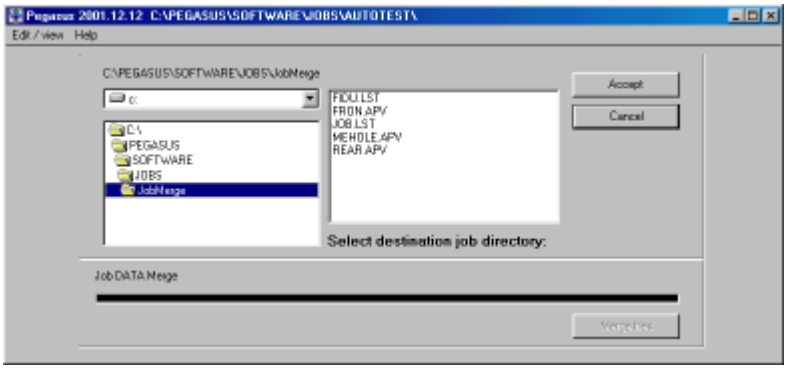
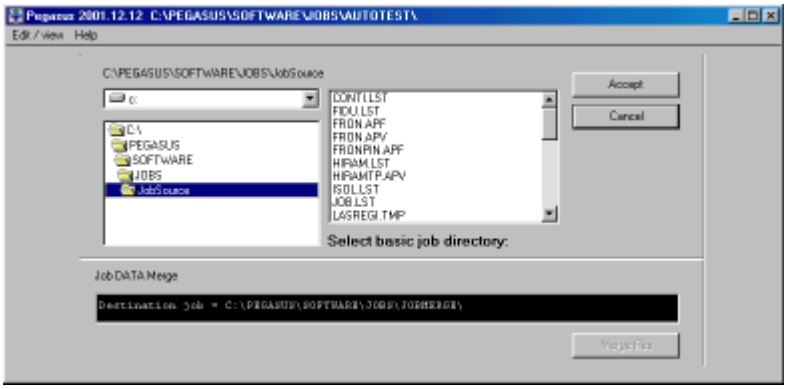
7.7.4 Job merge

If you want to mount several boards of different jobs together in the frame (additional mounting equipment required as an option) or test a panel composed of different PCBs, and want to test them in one process, you have to use the function „Job merge“ to combine the job data.

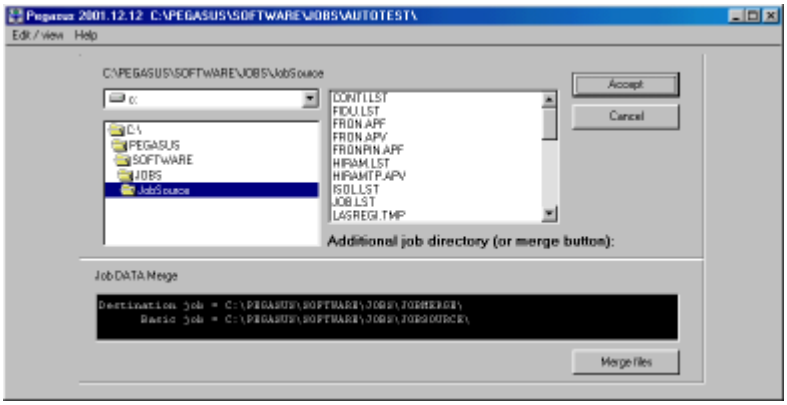
1. Create and activate a new directory for the merged job data.
2. Copy the files from one of the jobs to be merged into the new directory.
3. Click on the button [Job merge] in the data preparation menu.
4. Select the directory for the merged job data that you have created in step 1.
5. Click on [Accept].



5. Select the directory with the job data which you want to merge with the first job.
6. Click on [Accept].



7. Select the job directory with the data of the next board (additional job).
8. Repeat steps 6. and 7. for all job directories, which data shall be merged.



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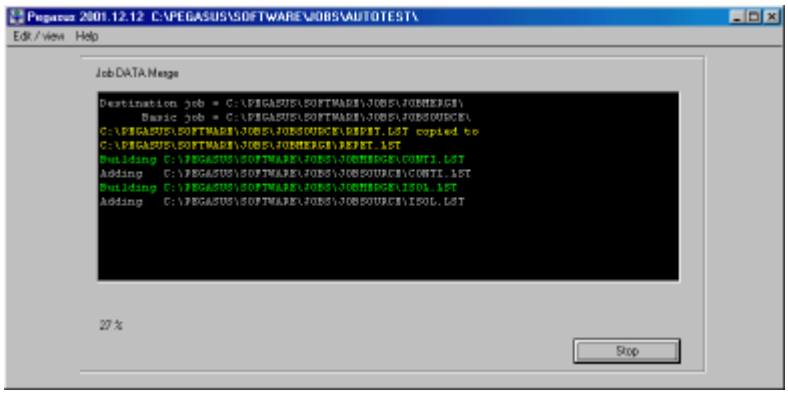
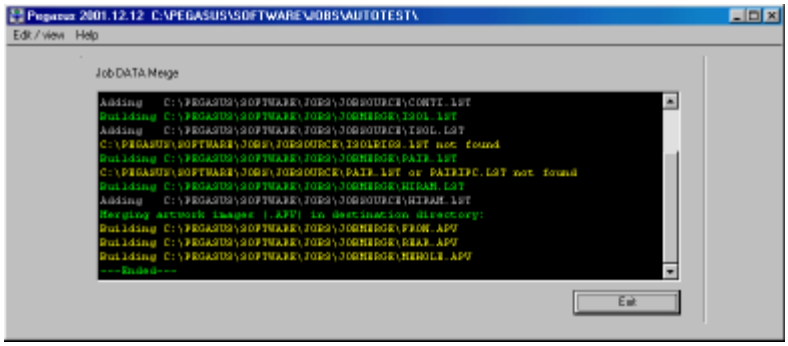
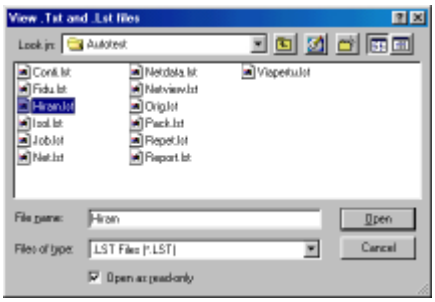
9. Click on the button [Merge files] after selecting the last job directory.



The job merge procedure is executed automatically. When finished, click on the button [Exit] to close the window.

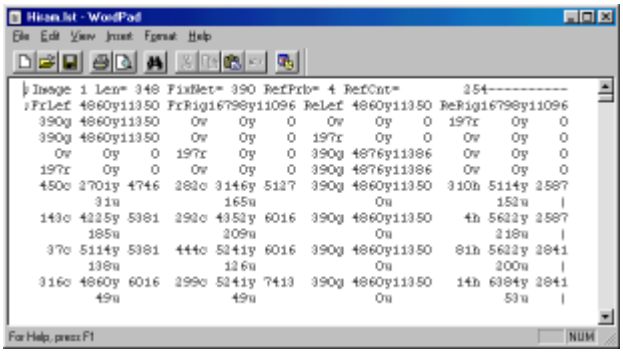


7.7.5 View *.lst file



During the data preparation and testing, several *.lst files are created automatically. The data preparation menu contains a comfortable way to view these files.

Click on the button [View lst] in the data preparation menu. A window will be opened, where you can select drive, directory and *.lst file to be displayed. The path to the editor tool must be entered in the „Parameters“ dialog.



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7.7.6 Compress files

To save space on the hard disk of the Pegasus, you can compress job data which are not required at the moment.

Click on the button [Compress] in the data preparation menu and the desired compression tool will be started. The path to this tool must be entered in the „Parameters“ dialog.

7.7.7 Editor for job data

The EDI software is part of the operation software of the Pegasus electrical test system. You can use it, among others, to

- convert data of different input formats
- generate test data for the Pegasus
- place fiducials for the board registration
- view errors detected during the electrical testing

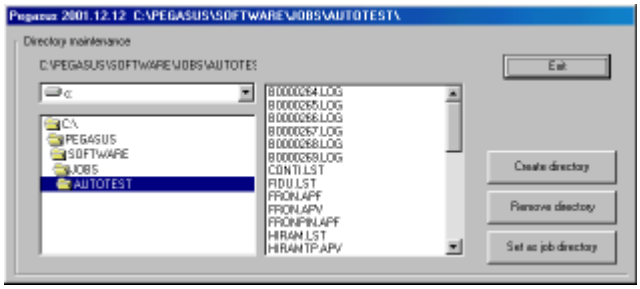
The EDI software is described in its own chapter.

7.7.8 Alternative editor

You can use your own editor for working with the input and error data. You can start it by clicking on the button [Alter EDI] in the data preparation menu. The path to the tool must be entered in the „Parameters“ dialog.

7.8 Directory maintenance

The main window offers a tool for the comfortable working with directories. You can create, delete and activate directories very easy. Click on the button [Dir maint] in the main menu to display the window.



You can select the desired drive and directory. Create a new directory under the opened directory by clicking on the button [Create directory], entering a name and clicking on [OK]. Remove a directory by marking it (do not open it) and clicking on the button [Remove directory]. You can activate a directory by opening it with a double-click and clicking on the button [Set as job directory].

Close the window by clicking on the button [Exit].

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7.9 Technical submenu

Some of the commands and functions contained in the menu „Technical section“ can be accessed by opening the submenu „Technical“ and clicking on one of the buttons contained there.

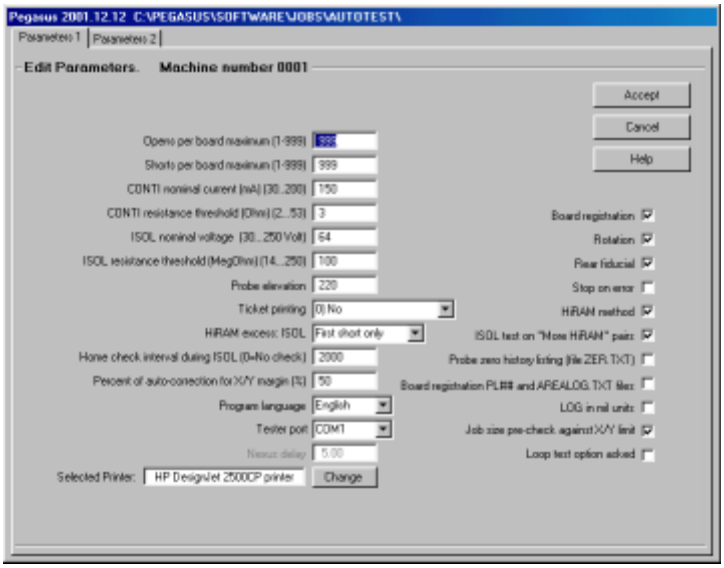
They are explained in the section about the menu „Technical section“ (see section 7.2.1.2).

7.10 Parameters

The job-specific settings of several options are contained in the „Job options“ dialog. They are valid only for the job that has been active during the modification of the job options.

The general settings for the complete machine (valid for every job) can be viewed and modified in the dialog „Parameters“. This can be accessed by clicking on the button [Parameters] in the main window.

The dialog is separated into two pages. You can switch between them by clicking on the correspondant tab on the upper edge of the window.



7.10.1 Parameters 1

Opens per board maximum — enter the number of open errors that shall be detected, before the machine reports an „Open error overflow“ and aborts the test; you can enter a number between 1 and 999

Shorts per board maximum — enter the number of short errors that shall be detected, before the machine reports an „Short error overflow“ and aborts the test; you can enter a number between 1 and 999

Conti nominal current — enter the current, with which the continuity test shall be executed; you can enter a value in mA between 30 and 200

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Conti resistance threshold	enter a resistance value; if this value is exceeded, the machine will report an open error; you can enter a value between 1 and 40 Ohms
Isol nominal voltage	enter the voltage, with which the isolation test shall be executed; you can enter a value between 40 and 250 V
Isol resistance threshold	enter a resistance value; if this value is not reached during isolation test, a short error will be reported; you can enter a value between 10 and 250 MegaOhms
Probe elevation	during testing, the probe will be lifted from the PCB for the distance entered here; you can enter a value between 120 and 350, the unit is 0.01 mm; the probe elevation can be reduced, if you have a very flat board; in case of curved boards, the value should be increased to avoid the danger of making scratches with the probe tips
Ticket printing	here you can decide, whether tickets with an error report shall be printed for each defective PCB; you can choose between „Full“ (complete error information), „Short“ (most important error information only), „Full + ID“ (board ID together with full report) and „No“
HiRAM excess isol	here you decide what shall happen, if HiRAM values are exceeded during a board test: if you select „First short only“, the defective networks will be tested with isolation test, only; if you select „ISOL full scan“, the defective and all adjacent networks will be tested with the isolation test
Home check interval during isol	number of machine cycles between periodic x/y axis position checks, to reassure the integrity of the isolation test; the check is executed at the end of the test program; in case of failure, the message "Recovering from axis error..." is displayed and the execution resumes at the last safe point; units = machine cycle counts; range: 500 to unlimited
Percent of auto-correction for x/y margin	coefficient (0 to 1) for the self-learning of the board margin; e.g. if you set 0.3, the board margin values will be updated by 30% of the average discrepancy of all four probes
Program language	choose the desired operation language from the list
Tester port	select the port where the data connection to the test system is connected
Nexus delay	available for automated FlyingProbe test systems, only
Printer configuration	click on the button [View] to display the printer driver; here you can do some modifications
Board registration	this box should be checked to have all boards registrated
Rotation	check this box if a possible board rotation shall be measured; this needs some seconds but assures that mounting errors or distortions are compensated if possible

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Rear fiducial check this box if the fiducials on the rearside of the board shall be used for registration (e.g. in the case of shifted layers)

Stop on error if this box is checked, the machine will stop if an error is detected; the probes will point on the endpoints of the defective network

HiRAM method check this box to test the boards using the HiRAM method; this safes at least 50% of test time

ISOL test on „Mode HiRAM“ pairs check this box, if HiRAM errors shall be retested using the isolation test

Probe zero history listing if enabled, the probe zero evolution will be saved in the current directory in the file „zero.txt“; this allows a later analysis of the AXIZERO auto-update, controlled by the PROLEARN factor

Board registration PL## and arealog.txt files if enabled, listing will be saved for the board registration in the current directory as files named PL1, PL2, PL3... (one for each board in the frame); this is useful for reliability diagnostics, after loop testing of a frame loaded with boards (to correlate eventual false opens with bad registrations and/or rotations)

Log in mil untis if enabled, all log file information will be saved in mil units (if unchecked, they will be saved in mm)

Job size pre-check against x/y limit if enabled, a new job will be checked instantly whether the job data fit into the size limitations of the machine

Loop test option asked if enabled, you will be asked at the beginning of the testing, whether the board shall be tested once or in loop mode

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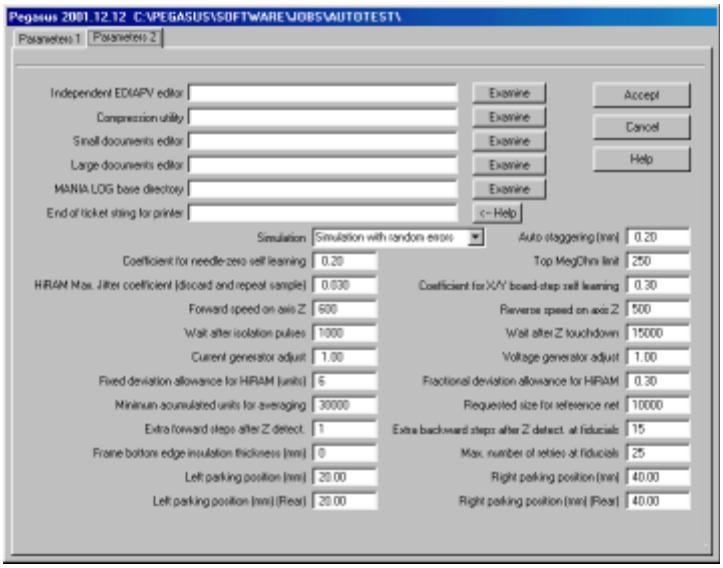

7.10.2 Parameters 2

The second page with parameters can be opened by clicking on the tab „Parameters 2“. Here, basic settings and adjustments of the machine are contained.

Important

Unreliable test results due to unadequate settings!

Most of the settings on page „Parameters 2“ are basic adjustments of the machine which do not need to be modified. They are set during the installation by the MANIA personell during installation and service. We strongly recommend to contact the MANIA service staff before executing any changes. The items explained here are excepted from this regulation.

The following settings may be modified by the user:

Independant EDI APV editor — enter the path to the data editor, which you want to use instead of or together with the standard editor; click on [Examine] and then select the drive and directory

Compression utility — enter the path to the compression utility, which you want to use to compress data; click on [Examine] and then select the drive and directory

Small documents editor — enter the path to the text editor, which you want to use to display and edit text files with small size; click on [Examine] and then select the drive and directory

Large documents editor — enter the path to the text editor, which you want to use to display and edit text files with large size; click on [Examine] and then select the drive and directory

Optional net path for LOG — enter the drive and directory, where you want to save all log files produced by the machine; this option requires the optional network connection

End of ticket string for printer — here you can enter a string (e.g. text) that shall be printed at the end of error reports (both short and full reports)

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8 Administrator software

In this chapter, we describe the functions and operations of the administrator software „adminpgs“, delivered with each Pegasus test system. You will learn how to create new, modify or delete existing users and manage the machine profiles.

Important

Insufficient operation safety possible!

In this chapter we tell you the default administrator password. This is needed to define new users. We strongly recommend to create an individual administrator password as soon as possible to maintain the required operation safety.

Contents ***Page***

8	**Administrator software**	**8-1**
8.1	Start adminpgs	8-2
8.2	Login	8-2
8.3	*Main menu*	*8-2*
8.4	User management	8-3
8.4.1	*Define a new user*	*8-3*
8.4.2	*Define user profile*	*8-3*
8.4.3	*Define new profile*	*8-4*
8.4.4	*Copy profile*	*8-6*
8.4.5	*Modify a user*	*8-6*
8.5	Machine management	8-6
8.5.1	*Create new machine profile*	*8-6*
8.5.2	*Update existing machine profile*	*8-7*

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8.1 Start adminpgs

The file „adminpgs.exe“ is contained in the folder /pgs of the Pegasus software installation. Doubleclick this file to start adminpgs. If a link is installed to the desktop, the adminpgs icon can be doubleclicked, too.

8.2 Login

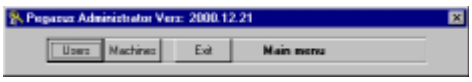
Before you are able to use the software, you'll have to log in by entering a valid user name and password.

1. Enter your user name.
2. Press the <Tab> key.
3. Enter your password.
4. Click on the button [Accept].

Important

The default administrator user name is „admin“ and the password is „master“. Delete this factory-set user as soon as possible after you have defined an individual administrator.

8.3 Main menu



After a successful log-in, the main menu is displayed. Here you can click on one of three buttons:

Users	opens the user management submenu
Machines	opens the machine management submenu
Exit	closes adminpgs

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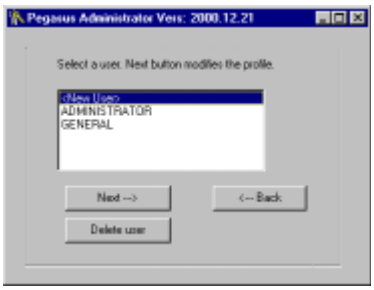


8.4 User management

After entering the user management submenu, a window will be displayed, where all defined users are listed. Here you have four possibilities:

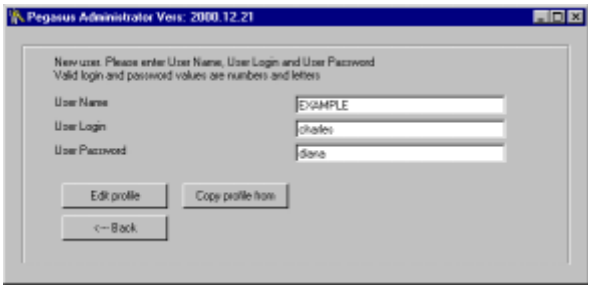
Define a new user	click on the list entry „<New User>“ and then on the button [Next –>]
Modify existing user	click on the desired user in the list and then on the button [Next –>]
Delete a user	click on the desired user in the list and then on the button [Delete user]
Close user management	click on the button [<– Back]

8.4.1 Define a new user

The definition of a new user requires two steps:

- the definition of name, login and password
- the definition of the user profile

After initiating the definition of a new user, a window for the name definition will be displayed.



1. Enter a name for the new user.
2. Press the <Tab> key.
3. Enter a user login.
4. Press the <Tab> key.
5. Enter a password.

Then you should define the user profile.

8.4.2 Define user profile

Here you have two possibilites:

- define a completely new profile by clicking on the button [Edit profile]
- copy the profile from another user to the new user (and possibly modify it then) by clicking on the button [Copy profile from]

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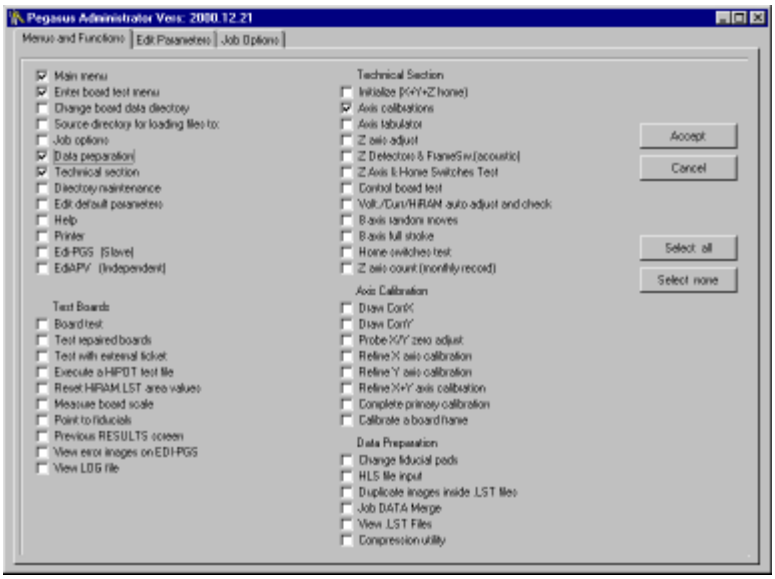
8.4.3 Define new profile

After defining user name, login and password and clicking on the button [Edit profile], the first of three windows for the profile definition will be displayed.



8.4.3.1 Profile: menus and functions

Here you can assign all menus and functions of the Pegasus console software to the new user. Each checked menu/function can be opened/executed by the defined user.

Please see chapters 5 and 7 for information on the different menus/functions. Some submenus/functions can only be checked, after main menus have been checked.

Example:

The functions within the submenu „Axis calibration“ can only be checked, if these menus are checked:

- Main menu
- Technical section (within main menu)
- Axis calibration (within technical section)

The buttons on the right edge of the window have the following meanings:

Accept	saves the user profile and closes the window
Cancel	closes the window without saving possible changes to the user profile
Select all	checks all boxes within the user profile (on the pages „Edit parameters“ and „Job options“, too)
Select none	unchecks all boxes within the user profile (on the pages „Edit parameters“ and „Job options“, too)

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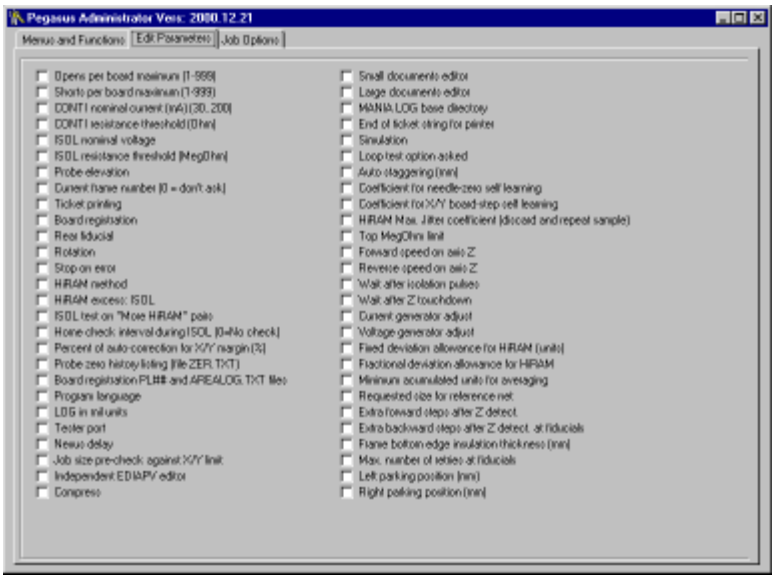
8.4.3.2 Profile: edit parameters



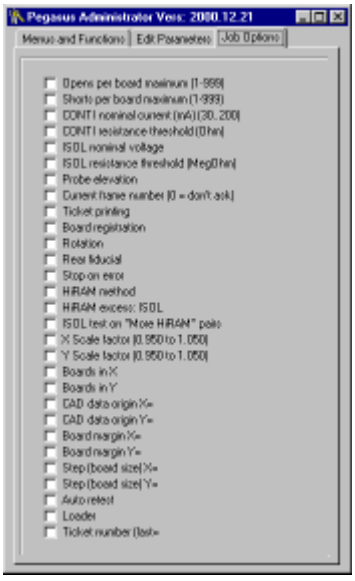
After checking all desired menus and functions, you should click on the tab „Edit parameters“ to open the second page of the user profile.

Important

The functions on this page can only be checked, if the function „Edit default parameters“ within the section „Main menu“ on the page „Menus and functions“ is checked.

Here you can select all default parameters that shall be editable for the new user. Please see chapters 5 and 7 for information on the functions.

8.4.3.3 Profile: job options



After assigning all desired default parameters, you should click on the tab „Job options“ to open the third page of the user profile.

Important

The functions on this page can only be checked, if the function „Job options“ within the section „Main menu“ on the page „Menus and functions“ is checked.

Here you can select all job specific options that shall be editable for the new user. Please see chapters 5 and 7 for information on the job options.

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8.4.4 Copy profile

When defining a new user, it might be helpful to import the user profile from an existing user and possibly modify it then. This can be done after entering name, login and password by clicking on the button [Copy profile from].

This opens a window, where you can select the user from whom you want to copy the profile.

1. Click on the desired user.
2. Click on the button [Copy profile from].
3. Click on the button [OK] to confirm the copying.

8.4.5 Modify a user

If you want to modify an existing user, you have to click on him in the user management submenu and then click on the button [Next –>].

On the first window you can modify login and password of the selected user. After clicking on [Edit profile], you can do the desired changes to the user profile.

8.5 Machine management

After clicking on the button [Machines] in the main menu, the machine management submenu will be displayed. This submenu helps you to manage the access rights to several flying probe test systems.

Here you can use three functions:

Create machine profile	click here to create a new machine profile
Update existing machine profile	click here to select a machine profile for modification
<– Back	closes the submenu and returns to the main menu

8.5.1 Create new machine profile

The definition of a machine profile contains two steps:

- users are assigned to the machine
- the hardware profile is defined

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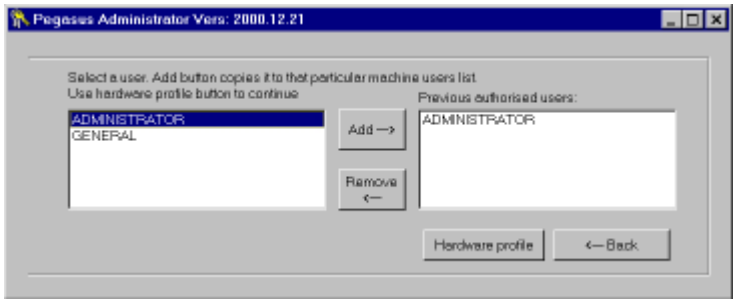
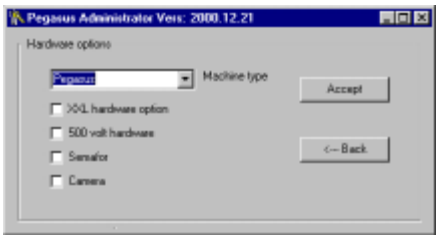
8.5.1.1 *User assignment*



After starting to create a new machine profile, a window with two list boxes will be displayed. The left list shows all users defined within adminpgs. The right list shows all users assigned to the current machine profile.

Click on a user in a list and then on one of the buttons [Add –>] or [<– Remove] to move the selected user from one list into the other. Then click on the button [Hardware profile] to continue.

8.5.1.2 *Define hardware profile*

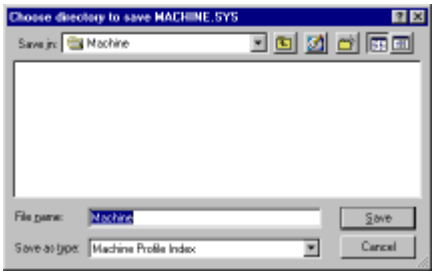


After clicking on the button [Hardware profile], you can select several optional equipments.

First you should select, whether the machine is a Pegasus or a Speedy flying probe test system. Then you should check all hardware options with which the particular machine is equipped.

Terminate the machine profile definition by clicking on [Accept].

8.5.2 Update existing machine profile



This function allows you to edit a machine profile. Click on the button [Update existing machine profile] in the machine management window. A window will be opened, where you can select the machine profile you want to edit.

After selecting a file, the modifications can be executed according

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