





**user manual**

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### **Notice**

HEXEL electronics s.r.l. reserves the right to change the specifications of the hardware and software described in this manual at any time and without prior notifications.

The PC program runs only on Windows10 and upper.



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### 1) General Description

The SMDVISIO is a robotic microscope for inspection of the correct assembly of SMD or PTH components on printed circuit boards.

The machine allows the simplification of the operations related to the inspection of circuit boards by simultaneously providing a magnified image of each mounted component, its data (code, value, mounting position & orientation) and a reference picture of its correct installation on the board.

By comparing these information with the actual mounted component an operator can easily verify the correctness of the assembly.

SMDVISIO is an excellent support for quality certification as the control is carried out directly by a qualified operator and thus avoiding the uncertainties associated with automatic control subject to imponderable variables.

### 2) Work Environment

2.1) The SMDVISIO is meant for indoor usage where a proper power source is provided. The SMDVISIO should be stored in a clean and dry place if not in use.

2.2) Do not expose the SMDVISIO to rain or other humidity.

2.3) Place the SMDVISIO on a solid, hard, dry, stable surface. Leave proper clearance around the SMDVISIO (min. 10 cm). Do not place the SMDVISIO on a damaged or fragile surface.

### 3) Features

Net weight: 18 kg approx.

Gross weight: 20 kg including the shipping box

Dimensions: 600×500×200 mm

Maximum dimensions of the PCB in inspection: 400 mm x 270mm

Maximum PCB size that can be inspected: 380 mm x 250mm

Position precision: 0,2mm

Overall dimensions: 670×580×280 mm

Power input: 12VDC, 24W (wall wart adaptor supplied separately)



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#### 4) Declaration of compliance - CE

Producer: HEXEL S.R.L. - TRISSINO (VI) ITALY  
Product Description: semiautomatic system for optical  
inspection of electronic boards  
Power supply: 12VDC, 24W  
Type: SMDVISIO



This SMDVISIO complies with the following directives and standards.

Directives:

2014/35/EU Low Voltage Directive (LVD)  
2004/108/EC EMC Directive  
2011/65/EU EU RoHS Directive

Standards:

IEC/EN 61010-1:2010

Safety requirements for electrical equipment for measurement, control, and laboratory use  
IEC/EN 61326-1:2013

Electrical equipment for measurement, control and laboratory use. EMC requirements.  
General requirements

#### 5) Identification Plate

**MODEL: SMDVISIO**  
**Input Power: 12V / 2A**  
**Producer: HEXEL s.r.l. - ITALY**  
**S/N: 00001/2018**  
**Made in ITALY**



This symbol indicates you should not throw away the used SMDVISIO with household waste, and should be disposed to authorized entities, following the directions of the local authority. Alternatively it can be returned manufacturer.



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### 6) Safety precautions

Please read the following safety precautions before using SMDVISIO.

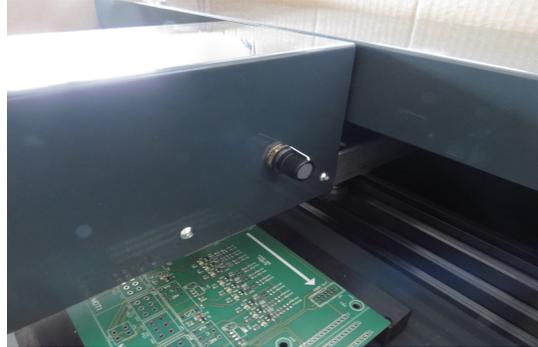
- 6.1) The manufacturer shall not be liable for any equipment damage or personal injury caused by incorrect installation or usage, other than that covered in this manual.
- 6.2) The SMDVISIO should only be used by trained personnel.
- 6.3) Only install on a horizontal stable surface, never on a slanted surface.
- 6.4) Do not modify any accessories and never use broken parts.
- 6.5) Before operating the SMDVISIO, always make sure that the power cable is not worn out or damaged.
- 6.6) DO NOT attempt to modify or repair the SMDVISIO by yourself. In case of damage, please contact us at [info@hexel.it](mailto:info@hexel.it).
- 6.7) This SMDVISIO is not a toy. Keep it away from children or pets.
- 6.8) Maximal ambient temperature: +40°C (104°F).
- 6.9) Minimal ambient temperature: +15°C (41°F).
- 6.10) The PCB pins are small. Keep them out of reach of children.
- 6.11) The motors have magnets. Do not put items that are sensitive to magnetic fields around the SMDVISIO (credit cards, hard disks, compasses, etc.)

**NOTE: If you have a pacemaker, consult your doctor before using the SMDVISIO.**

## 7) Parts of the SMDVISIO

### Y Axis Right side

#### 1. Adjust camera luminosity



It adjusts the light intensity of the LED light .

### Back Panel

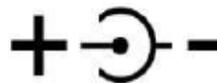


#### 1. USB connector Type B (camera port)

It connects the SMDVISIO camera to the PC.

#### 2. DC supply connector

Use the recommended 12VDC 2A power supply, delivered with the SMDVISIO. Connector type: 5.5mm/2.1mm



#### 3. USB connector Type A (service port)

It connects the SMDVISIO to the PC for communication functions.



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### 8) Use of the PC software

#### System Requirements

Operating system: WINDOWS 10

Document reader: reader for .pdf file

Processor: 1 GHz or faster or SoC

RAM: 1 GB (32-bit) or 2 GB (64-bit)

Recommended Hard Disk Type: SSD minimum 120GB

Free hard disk space: 16 GB (32-bit) or 20 GB (64-bit)

Graphics card: high speed card, 16 million colors, min. 4 GB DDR3

Display: 1024×768 minimum

Com Port: at least two USB A ports available

Internet connection required

### 9) Installing the software SMDVISIO 1.0

#### 9.1) Initial operations.

Insert the disk/pen memory provided with the machine, then open the folder <publish>, finally double click on SETUP.

Wait until the installation finishes.

Connect the two USB cables from SMDVISIO to the PC.

Launch the SMDVISIO program. The software will automatically detects the links with the machine.

#### 9.2) Service port.

If a "Port not found" message appears then check for the correct connection of the USB cable.

If the cable seems to be ok check the driver installation and remove the USB connector of the SERVICE PORT, then try to reinstall the driver.

To reach the Device Manager in Windows go to the Start menu and into the search box type "device manager", then hit enter.

Into the installation disk/pen memory go to the folder <CP210x\_VCP\_Windows> and start the driver's installation program, when required connect the SERVICE PORT USB cable.



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### 9.2) Camera port.

If the machine is correctly detected go to Setup > Preferences > Camera selection and select <USB2.0 UVC PC Camera> (machine's microscope camera).

If you cannot find <USB2.0 UVC PC Camera> in the list then go to the Windows Device Manager to see if the driver <USB2.0 UVC PC Camera> has been installed properly (no exclamation point marker should appear).

To reach the Device Manager in Windows go to the Start menu and into the search box type "device manager", then hit enter.

If the driver was not installed properly then try to reinstall it: first remove the driver (if it was improperly installed) and remove the USB connector of the microscope coming from SMDVISIO machine, into the installation disk/pen memory go to the folder <CAMERA\Driver> and start the driver's installation program, when required connect the microscope's USB cable.



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### 10) Running the software SMDVISIO 1.0

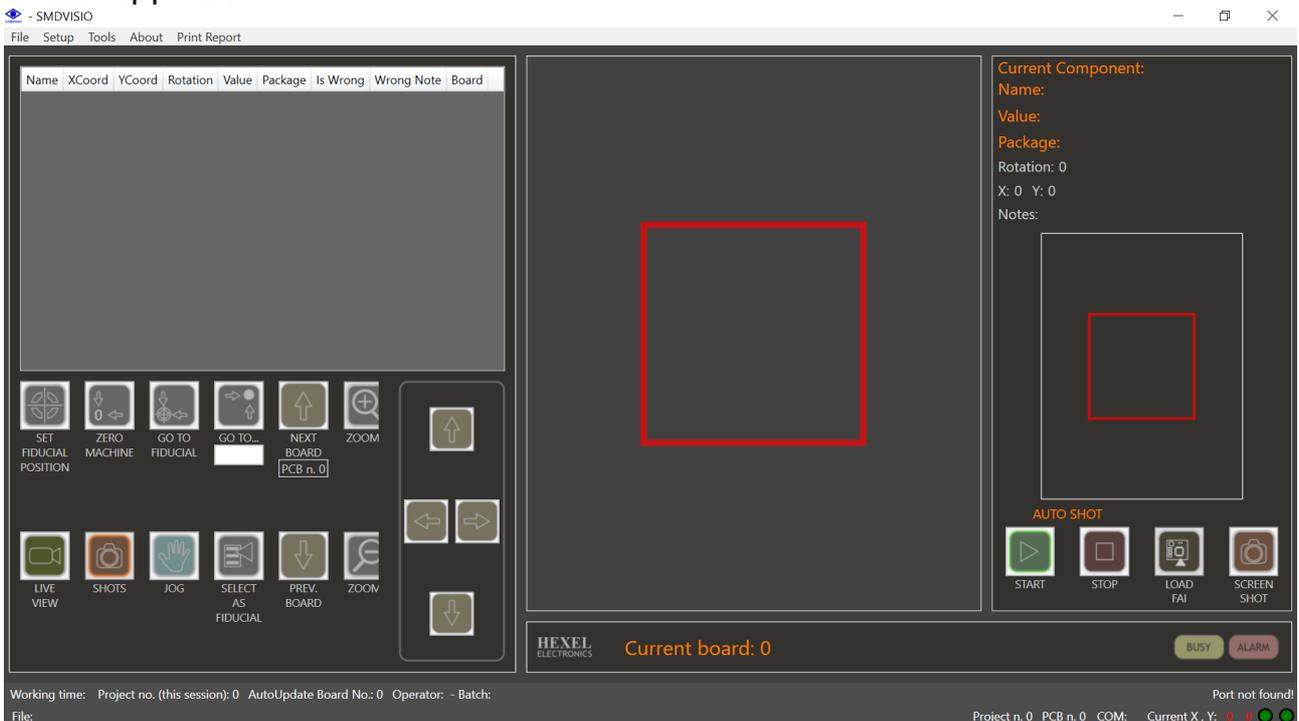
10.1) Connect the power supply to powerline .

10.2) Connect the USB connector Type A (service port).  
Verify the correct drive installation.

10.3) Connect the camera via USB connector Type B (camera port).  
Verify the correct drive installation.

10.4) Start the software by double clicking on SMDVISIO icon  (smdvisio.exe).

It Will appear:





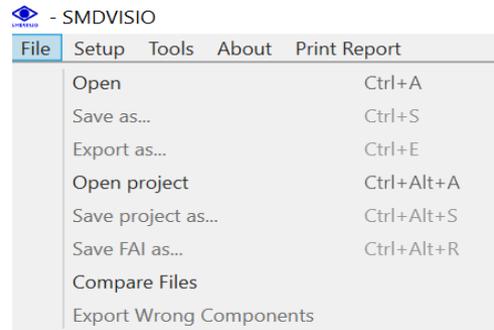
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### 11) Interface Description

#### 11.1) Upper Bar Choice-File

File Setup Tools About

- Open :** open and import cad files
- Save as :** save the file as a data file (extension .rpt)  
Only the file including the fiducial and its location is saved
- Export as :** export the file in CSV format usable for traceability for industry 4.0
- Open project :** open project files (extension .vspj). Data, photos and fiducials are uploaded
- Save project as:** save project files (extension .vspj). Data, photos and fiducials are saved.  
The project requires the name of the operator and the lot number.
- Save FAI as :** save the file as F.A.I. for the golden card (extension .rpt)  
Save the file as a golden card to compare and it is loaded with the button **Load FAI button**



- Compare Files :** compare the old file with the new file and generate a table with the differences:
- REMOVED COMPONENTS ->  
ROW COLORE BROWN LIGHT
  - ADDED COMPONENTS ->  
ROW COLOR GREEN LIGHT
  - MODIFIED COMPONENTS->  
ROW COLOR YELLOW
- Need the reference fiducial

- Export Wrong Components:** export the components list checked in WRONG column



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11.2) File -> Open: opening file cad ( extension .mnt or .txt or .vis )

Open file – Loading File Parameters

### File type :

File type to be imported

### Invert X Axis :

Invert the axis X coordinate

### Invert Y Axis :

Invert the axis Y coordinate

### Value Separators :

The files provided by the CAD program can have up to three types of separators:

space or tab or other( i.e. , ; : ) .

### File Headers :

The files provided by the CAD program can have up to 6 fields. You can select the order of the headings by acting on the selection N X Y R V P, to skip a field use J.

### Measurement Unit :

The unit of measurement of the file can be in mm or mils.

### Multiple Electronic Boards :

It is also possible to check multiple circuits by setting the selection to Yes and indicating in "Number of boards" the number of circuits in X and the number of circuits in Y.

### Create FAI from Image/PDF :

It is possible to create the FAI file from a topography in image / PDF format.

It is necessary to give the dimensions of the card in mm to correctly scale the image / PDF file.

Loading File Parameters

File type:

All files  Create FAI from Image/PDF

.rpt

Invert Axis

Invert X Axis Board Width (mm)

Invert Y Axis Board Height (mm)

Value Separators

Space

Tab

Other

File Headers:

N,X,Y,R,V,P

Put the characters in the corresponding order.  
Name = N, X Coord = X, Y Coord = Y, Rotation = R, Value = V, Package = P  
If the column is not needed put J (Jump)

Measurement Unit

mm

mils

Multiple Electronic Boards?

Yes  No

Number of boards (x,y):



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### 11.3) Setup -> Preferences

**Select Marker:** select for Marker dimension

**Select Camera:** select for Camera

**Select Com:** select com port

**Insert Multiplier X :**  
ratio of x axis

**Insert Multiplier Y:**  
ratio of y axis

**Max jog value X:** maximum X quote value

**Max jog value Y:** maximum Y quote value

**Jog movement value:** minimum step(mm)

**Offset Zero X :** X offset zero position

**Offset Zero Y :** Y offset zero position

**Delay Autoshot :** delay between photos during autoshot.

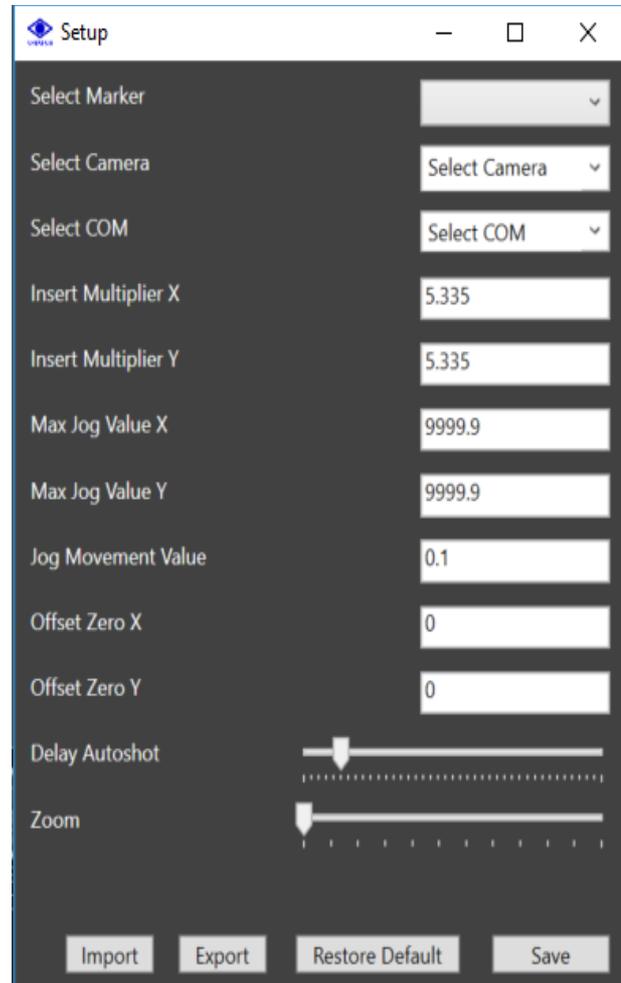
**Zoom :** camera zoom.

**Import :** load The setup values previously saved.

**Export :** export current setup values.

**Restore Default :** restores factory values.

**Save :** save current selections.





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### 11.4) Tools -> Gymn

Mechanical test, put the start quote (i.e. 0-0), end quote (i.e. 100-100) then click on Gymn icon to start, another click to stop.

### Tools -> Clear error

If there is an alarm  Click on Clear error to clear the card error.

### Tools -> Duplicate Component

Duplicate the current line  
(Right mouse button -> Duplicate or CTRL + C).

### Tools -> Erase Component

Delete the current line  
(Right mouse button -> Erase or DEL).

### Tools -> Assign Current Position

Update the quota of the component of the current row to the current dimension to view details of the component otherwise out of sight  
(Right mouse button -> Assign Current Position).

### 11.5) Info ->

**Board info:** information about the control card

**Firmware info:** information about firmware

**Website:** [smdvisio.it](http://smdvisio.it)

**Manual:** link to guide on line

**About Us:** HEXEL srl information



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### 12) Button description

Set Fiducial Position:



It confirms the fiducial on pcb centered by camera.

Zero Machine:



It moves the camera to zero machine.

Go To Fiducial:



It moves the camera to fiducial on pcb.

Go To Components:



It confirms the NAME choice for a component in data table.

Live View:



It views components by Live camera.

Shots:



It views components by picture updated before.

Jog :



It moves the camera by arrows.

Select as Fiducial:



It confirms the choice for fiducial reference in data table.

Move:



Arrows for camera movement. It's possible to use the keyboard arrow in same way.

To move with step of 0.1mm press arrow.

To move with step of 2mm press shift and arrow.

To move with step of 6mm press Ctrl and arrow.



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Next Board:



It moves to the next board (if there are panelized boards).

Prev. Board:



It moves to the previous board (if there are panelized boards).

Zoom+ :



Zoom + increase the camera zoom.

Zoom- :



Zoom - decrease the camera zoom.

### AUTO SHOT area



Start (Pause):



It alternatively starts/pauses automatic shots.

Stop:



It stops automatic shots.

Load Report:



It loads sample image file .rpt.

Screen Shot:



Immediate photo of the component being inspected. The photos are saved in the SMDVISIO\_Pictures folder on the desktop.



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## 13) Icon description

Busy:



Busy at the moment, don't use the program

Alarm:



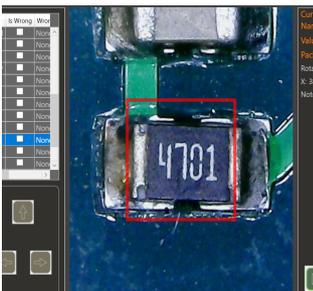
Alarm from hardware (see name of alarm in the lower bar )

Data Table:

Name	XCoord	YCoord	Rotation	Value	Package	Is Wrong	Wired
C3	57.2	8.6	180	7805	TC252-1		None
C4	37.2	19.2	270	ATMEGA8L-8AA	TC1FF32		None
LD1	83.3	23.5	0	CHP-LED0805	None		None
Q1	31.5	31.4	180	8MHz	HC49LUP		None
R4	27.3	23.1	270	1K	R0805		None
R9	26.7	17.8	180	10	R0805		None
R10	45.6	23.6	90	NM	R0805		None
R11	28.2	19.9	180	0	R0805		None
R14	26.7	12.7	180	1K	R0805		None
R15	38.1	2.5	180	4K7	R0805		None
R18	50.2	23.5	90	1K	R0805		None
R19	36.8	12.7	180	4K7	R0805		None

Data table

Picture:



Display the image of the component being inspected in two ways:

immediate LIVE VIEW



from camera

Photo - SHOTS



from the photos saved in the project

Report Picture:



Image of the component imported from the gallery of reference photos with the button

LOAD REPORT ( file.rpt )



Components Data:

**Name: R31**  
**Value: 5k6**  
**Package:**  
 X: 44.22 Y: 21.00  
 Rotation: 90°  
 Remarks:

Data value of the component under inspection



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### 14) Bottom Bar Description

#### Status bar :

Working time: Project no. (this session): 0 AutoUpdate Board No.: 0

File:

Project n. 0 PCB n. 0 COM: Current X, Y: 0 0

Working Time : time spent during photo acquisition session

Project no: project number

Autoupdate board No. : number of board for this work session

Operator : operator name

Batch : batch number

File : name of the loaded project file

COM : number of control port communication

Current X,Y : actual position for axis X and Y

When the program is running you will see:

2018102212122\_HEX075 - SMDVISIO

File Setup Tools About Print Report

Name	XCoord	YCoord	Rotation	Value	Package	Is Wrong	Wrong
Q1	31.5	31.4	180	8Mhz	HC49UP		Non
R4	27.3	23.1	270	1K	R0805		Non
R9	26.7	17.8	180	10	R0805		Non
R10	45.6	23.6	90	NM	R0805		Non
R11	28.2	19.9	180	0	R0805		Non
R14	26.7	12.7	180	1K	R0805		Non
R15	38.1	2.5	180	4K7	R0805		Non
R18	50.2	23.5	90	1K	R0805		Non
R19	36.8	12.7	180	4K7	R0805		Non
R20	45.7	14	90	4K7	R0805		Non
R21	19.6	9.6	180	1K	R0805		Non
R22	7.1	10	0	10K	R0805		Non

SET FIDUCIAL POSITION ZERO MACHINE GO TO FIDUCIAL GO TO... NEXT BOARD ZOOM PCB n. 0

LIVE VIEW SHOTS JOG SELECT AS FIDUCIAL PREV. BOARD ZOOM

Current Component:  
Name: R21  
Value: 1K  
Package: R0805  
Rotation: 180  
X: 19.6 Y: 9.6  
Notes: None

AUTO SHOT  
START STOP LOAD FAI SCREEN SHOT

HEXEL ELECTRONICS Current board: 0

Working time: Project no. (this session): 0 AutoUpdate Board No.: 0 Operator: Paolo - Batch: 1

File: C:\VISIO\Progetti salvati\2018102212122\_HEX075\2018102212122\_HEX075.vis

Project n. 0 PCB n. 0 COM: Current X, Y: 0 0

Now viewing pictures.



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### 15) Use of the software - file processing

#### 15.1) CAD file import

File -> Open -> the menu opens Loading File Parameters

File Type : file cad type options

All files for generic file cad

.rpt SMDVISIO generated file cad with the golden card. This file allows you to import the changes made to the original CAD file during the inspection of the golden card and to replicate them in the multiple circuit.

Invert Axis : options for the Cartesian origin of the cad file:

if the origin is at the bottom left, do not flag anything

if the origin is in the upper right hand flagging Invert X Axis and Invert Y Axis

if the origin is in the lower right hand flag only Invert X Axis

if the origin is at the top left, flag only Invert Y Axis

Value Separators : options for file cad separators

File Headers : options for file cad header

example of cad file line

R49 93.98 59.05 270 22K FEEDER19 R0805

R49 component name -> N

93.98 X quote value -> X

59.05 Y quote value -> Y

270 component rotation -> R

22K component value -> V

FEEDER19 not used column -> J (jump)

R0805 component package -> P

The File Headers will be : N,X,Y,R,V,J,P

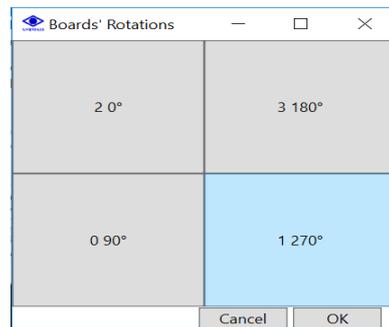
Use J to jump the unused column

Measurement Unit : option for mm o mils unit measurement

Multiple Electronics Boards : Multiple Electronics Boards option

Choose no for single pcb or golden card.

Multiple Electronics Boards : Multiple Electronics Boards option  
Choose Yes if the circuit is multiple. The multiple circuit must be in consecutive sequence, the circuit must be rotated. Set the number of circuits present in X and Y considering the square as a table, if there are circuits with different rotations select the rotation card by card with the right mouse button in the table  
Boards' Rotation.



PCB 2 (rotaz. 0°)	PCB 3 (rotaz. 180°)
PCB 0 (rotaz. 90°)	PCB 1 (rotaz. 270°)

Once the configuration has been completed, confirm with the OK button at the bottom. If the configuration is correct, the program populates the data table with the values of the cad file and the machine positions itself on zero.

The program asks you to choose the line with the  $\Theta$  fid.ref (can also be a component) and confirm with the button  
Select As Fiducial



then it asks to position itself in JOG  on the fiducial of the card in the lower left corner ( $\Theta$  fid.ref. PCB n.0),

confirm with the Set Fiducial Position button



and then top right ( $\Theta$  fid.ref. PCB n.3) and confirm again with  
Set Fiducial Position



All the card fiducials are presented and require the confirmation of the correct position for each fiducial. If the multiple circuit has not been selected, only the acquisition of the first fid.ref will be performed. ( $\Theta$  fid.ref. PCB n.0).

### Create FAI from Image/PDF

To inspect the first card, not having available photo files can be used topography in image / PDF format.

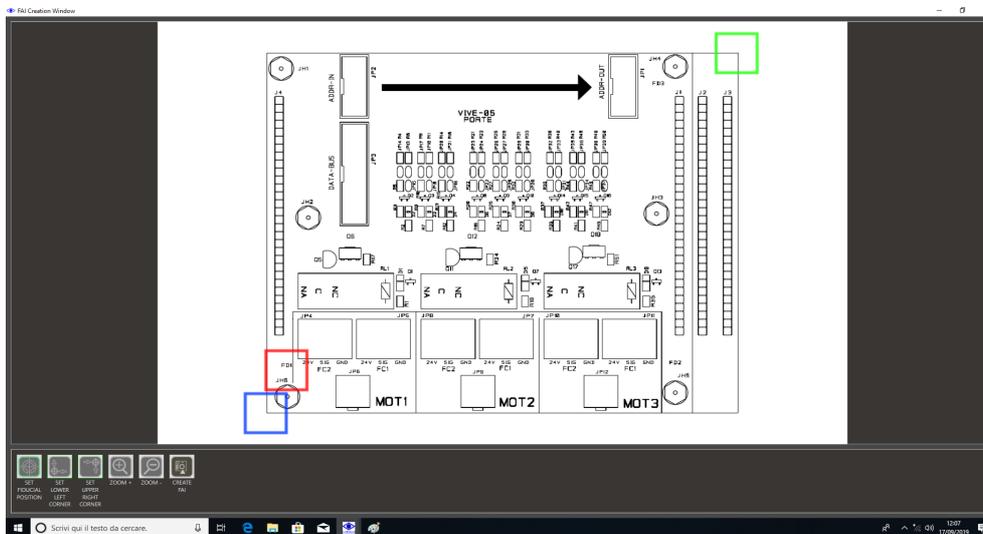
Check the box

Create FAI from Image / PDF

Click Load File (pdf or bmp, jpg, jpeg, png)

select the file, enter the dimensions

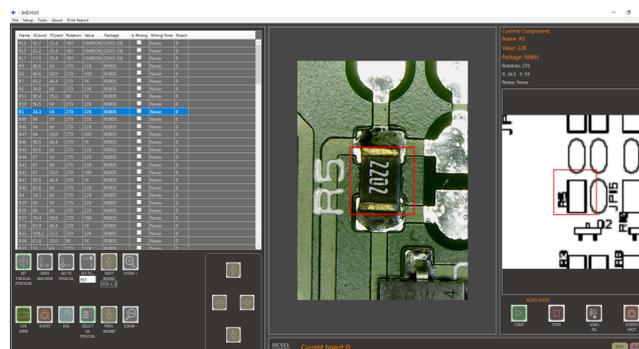
printed circuit board in mm and press OK, select the file cad of the card and the following screen is displayed:



Proceed by clicking on the Set Fiducial Position e button place the mouse on the reference fiducial, give Enter and comes highlighted the fiducial with a red square, repeat the operation for the buttons Set Lower Left Corner (blue square) and Set Upper Right Corner (green square). Proceed with the Create FAI button which will present the file save menu.

If everything is correct, the image of the topology will be presented on the control panel on the right than in the center.

In normal use, loading as FAI the one generated with the Create FAI from Image / PDF you will have the following screen





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### 15.2) Saving the golden card report file

File -> Save as: save the file as a report file (.rpt) including the fiducial, its position and all the changes made to the original cad file.

### 15.3) Saving the report file in CSV format

File -> Export as: export the data file in CSV format usable for traceability of the lots usable in the "Industry 4.0"

### 15.4) Opening of project files

File -> Open project: open project files (extension .vspj). The data, photos and fiducials of a project (or lot) previously processed are loaded.

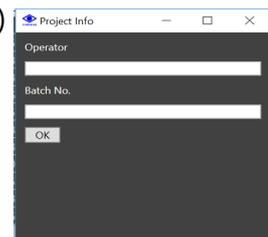
This function allows you to set up the machine for processing subsequent projects (or lots) without having to repeat the import operation of the cad files

### 15.5) Saving the project file (or lot)

File -> Save project: save project files (extension .vspj). Data, photos, fiducials and any changes made to the project (or lot) are saved.

To process the project (or lot) it is necessary to import the CAD file the first time original, execute the fiducial learning sequence, verify the correct positioning and launching the AUTOSHOT 

sequence for the acquisition of all the photos. Once the sequence of photos is finished it is possible to save The project that requires the operator's name (Operator) and the batch number (Batch). At the end press the button OK to execute the save.



ATTENTION : when saving (green bar at the bottom) do not perform other operations that could compromise the saving of the file itself!

### 15.6) Saving the FAI file (golden card or First Inspection Article)

File -> Save FAI as: save the file as FAI for the golden card (extension .rpt) Save the FAI file (golden card) to be used as a comparison and loaded with the button Load FAI button.



To process the FAI file (golden card) it is necessary the first time to



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import the original CAD file, execute the learning sequence of the fiducial (single card), verify its correct positioning and launch the AUTOSHOT sequence for capturing all the photos. Once the photo sequence has been completed, perform a careful verification of the correspondence of the components and save the FAI (golden card). To use the FAI file upload with the button  Load FAI button.

ATTENTION : when saving (green bar at the bottom) do not perform other operations that could compromise the saving of the file itself!

### 15.7) Compare the old file with the new file

File -> Compare Files : Compare the old file with the new file and generate a table with the differences:

REMOVED COMPONENTS -> ROW COLORE BROWN LIGHT

ADDED COMPONENTS -> ROW COLOR GREEN LIGHT

MODIFIED COMPONENTS-> ROW COLOR YELLOW

Need the reference fiducial

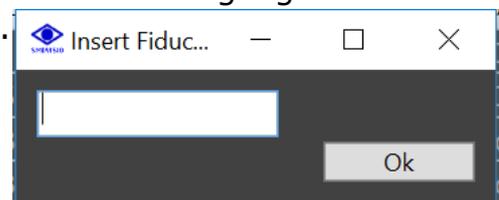
This function allows the comparison between two files (old and new) relating to the same project that may have undergone minor changes and that requires to be generated a third file given with the difference between the two files to be able to perform the check only on modified components.

To execute the function it is necessary to import the cad files (follow the procedure for importing cad files) at the end of which the program requests to open the old file (Load Old File) and then the new file (Load New File).

Need the reference fiducial

The data table is populated with the differences highlighted with the respective colors and the fiducial.

Perform the learning of the fiducial and perform component verification.



### 15.8) Exporting the table of incorrect components

File -> Export Wrong Components: exports the list of components checked in WRONG column.



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### 15.9) Special Keys

When the cad file is imported into the data table, selecting a row of the data table (the line turns blue) it is possible to make changes

Right mouse button -> Duplicate or CTRL + C duplicates the line

Right mouse button -> Erase or DEL delete the selected line

Right mouse button -> Assign Current Position

Update the quota of the component of the current row to the current dimension to view details of the component otherwise out of sight.

To use this function it is necessary to position yourself on the line of the component you want to modify, go to JOG

and move the camera to desired point, select the line

-> right button -> Duplicate.



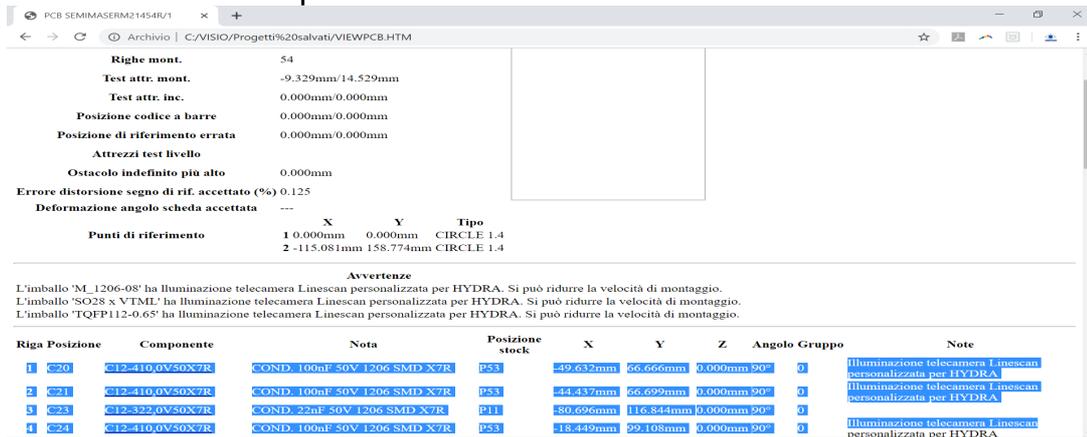
The quota of the line will be updated to the desired one.



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## 16) File conversion from pick & place

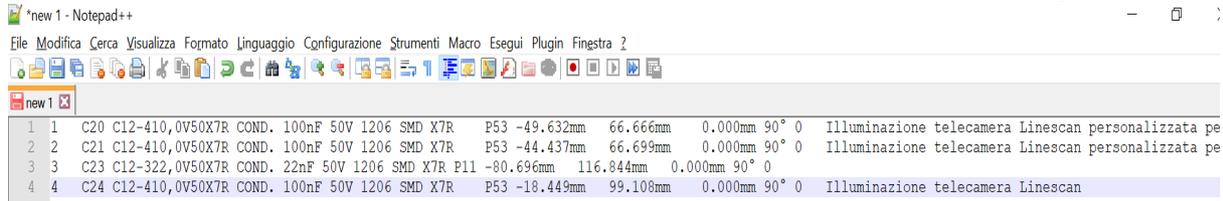
16.1) File conversion from Mydata: save the assembly file as an HTML file using a standard browser (for example Chrome). Open the file and select component rows with values and dimensions



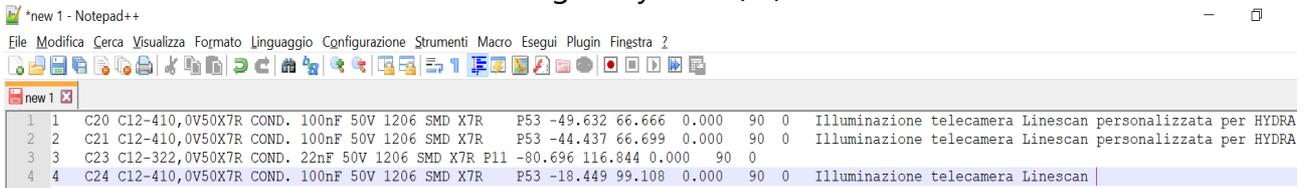
In the example:

1	C20	C12-410,0V50X7R	COND. 100nF 50V 1206 SMD X7R	P53	-49.632mm	66.666mm	0.000mm	90°	0	Illuminazione telecamera Linescan personalizzata per HYDRA
2	C21	C12-410,0V50X7R	COND. 100nF 50V 1206 SMD X7R	P53	-44.437mm	66.699mm	0.000mm	90°	0	Illuminazione telecamera Linescan personalizzata per HYDRA
3	C23	C12-322,0V50X7R	COND. 22nF 50V 1206 SMD X7R	P11	-80.696mm	116.844mm	0.000mm	90°	0	Illuminazione telecamera Linescan personalizzata per HYDRA
4	C24	C12-410,0V50X7R	COND. 100nF 50V 1206 SMD X7R	P53	-18.449mm	99.108mm	0.000mm	90°	0	Illuminazione telecamera Linescan personalizzata per HYDRA

Edit the values with an editor (for example notepad ++) by removing the mm text



after the dimensions and the degree symbol ( ° ).

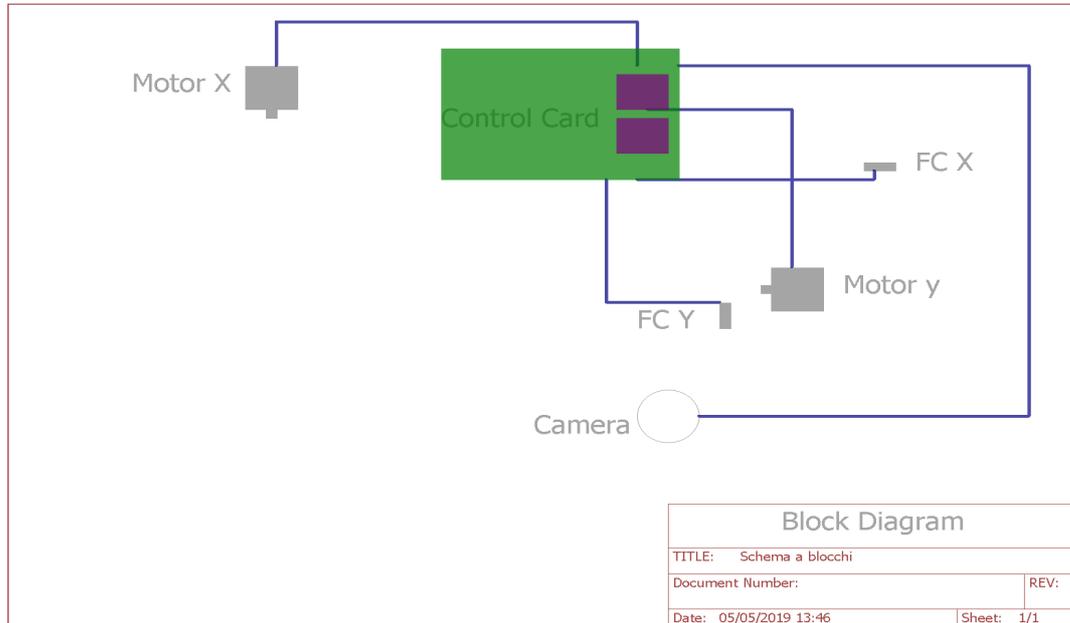


Save the file with the .txt extension and proceed with importing the file with Value Separators -Tab- and the following File Header sequence: J, N, J, V, J, X, Y, J, R, J, J

Result :

Name	XCoord	YCoord	Rotation	Value	Package
C20	-49.6	66.7	90	COND. 100nF 50V 1206 SMD X7R	None
C21	-44.4	66.7	90	COND. 100nF 50V 1206 SMD X7R	None
C23	-80.7	116.8	90	COND. 22nF 50V 1206 SMD X7R	None
C24	-18.4	99.1	90	COND. 100nF 50V 1206 SMD X7R	None

## 17) Electric block diagram



## 18) Appendix

### Power supply:

Productor: EDACPOWER

Model: EA1018G-1E

AC input: 100 – 240V~, 50/60Hz, 1A max

DC output: 12Vdc, 2A

Environment temperature: 5°C - 40° C (41°F - 104° F)

Power supply: 24W

For indoor use only

- CEC Compliance
- RoHS Compliance
- Plug USA, EU, SAA, UK Type
- Over Voltage Protective Installation
- Protection Type: Auto-Recovery
- MTBF: >30,000 hours





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### 19) Legal Guarantee

#### **LEGAL PRODUCT WARRANTY**

1) HEXEL srl guarantees manufacturing defects relating to the products supplied for a period of one (1) year from the invoice date. Therefore the total legal guarantee period and will be 1 year from the invoice date.

2) The warranty is valid for standard products, products made to the customer's specific request are excluded from the extension.

3) The Warranty is applicable only when:

3.1 the installation and / or assembly of the Product are carried out in compliance with the instructions attached to the Product and by specialized technical personnel;

3.2 Product maintenance is performed by specialized technical personnel, without making changes or repairs to the Products without written authorization from HEXEL srl or not covered in the relative technical specifications;

3.3 the limit values of temperatures and voltages are not exceeded and the Product is not exposed to mechanical loads not conforming to its destination;

3.4 the reported defect affects the functionality of the product;

3.5 in case of alleged defect, the product conditions must be kept unchanged for the execution of the appropriate checks;

3.6 the defective product must also be made available to HEXEL srl for technical analysis and for all the time necessary for their execution;

3.7 the defect, duly specified and proven in its nature and extent, must be reported in writing to HEXEL srl no later than thirty (30) days from the date of receipt of the products (in case of apparent defects) or from the discovery of the defect ( in case of hidden defects);

3.8 the Customer presents the invoice proving the purchase and that he has regularly paid the Product according to the terms and conditions of sale.

4) This warranty does not include:

4.1 Damage to the product due to negligence, transport, unforeseen and / or unforeseeable events, such as unforeseeable circumstances and / or force majeure (including current pulses, lightning), which exclude the traceability of these defects to the



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Product manufacturing process ( vandalism, unauthorized alterations and anomalous atmospheric phenomena);

4.2 all additional costs deriving from the repair of the defect: for example labor costs for assembly and disassembly, transport of defective and new / repaired products, disposal, reimbursement of expenses, transfers, elevators or scaffolding will be charged to the customer;

4.3 The components subject to wear which can be assimilated to consumables (such as light sources, mechanical parts ..) 4.4 this warranty does not apply if the appliance is not used for the purpose for which it was made;

4.5 this does not guarantee the integrity of the paint when the product is used in a saline environment or in the presence of corrosive agents.

5) In the event that the defect is covered by this warranty, HEXEL srl will choose, at its discretion, between the repair of the defective product and / or its replacement with an identical or equivalent item, compatibly with the technical evolution of the products and their components.

6) The one (1) year warranty is also valid for products that use an LED light source

7) The liability of HEXEL Srl for a product defect will in any case be limited to the sum paid for that defective product.

8) This warranty applies to the domestic and foreign markets.

9) In the event of a technical dispute, the parties will submit the product in dispute to an expert appraisal by a third party - appointed by mutual agreement or, in the absence of agreement, by the President of the Court of Vicenza. The expert's assessment will be binding on both parties. The costs will be borne by the parties at a rate of 50% each.

10) For matters not covered by these conditions, Italian law applies. The court of Vicenza – Italy - is exclusively competent for any dispute.



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