

ViaSampler

Instruction Manual



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ViaSampler
Instruction Manual

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this product not expressly approved by Struers A/S could cause harmful radio interference and void the user's authority to operate the equipment.

Always state *Serial No* and *Voltage/frequency* if you have technical questions or when ordering spare parts. You will find the Serial No. and Voltage on the type plate of the machine itself. We may also need the *Date* and *Article No* of the manual. This information is found on the front cover.

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations:

Instruction Manuals: Struers Instruction Manuals may only be used in connection with Struers equipment covered by the Instruction Manual.

Service Manuals: Struers Service Manuals may only be used by a trained technician authorised by Struers. The Service Manual may only be used in connection with Struers equipment covered by the Service Manual.

Struers assumes no responsibility for errors in the manual text/illustrations. The information in this manual is subject to change without notice. The manual may mention accessories or parts not included in the present version of the equipment.

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ViaSampler Safety Precaution Sheet

To be read carefully before use

1. The operator(s) should be fully instructed in the use of the machine, any connected equipment and accessories and the applied consumables according to the relevant Instruction Manuals.
2. The machine must be placed on a stable, level work surface with a load-bearing capacity of at least 150 kg / 331 lbs, at a suitable working height. All functions on the machine and any connected equipment must be in working order.
3. Clearances around the routing table must conform to the minimum working clearances specified. Do not place any item or any part of your body within the clearance area while the ViaSampler is operating.
4. Operators should ensure that the actual supply voltage corresponds to the voltage specified on the back of the machine. The machine must be earthed. Follow the local regulations. Always turn the power off and disconnect from the a.c. mains supply before any disassembly operations, including drive belt change operations.
5. Only Struers-trained personnel may service the machine.
6. Ensure that an appropriate fume/dust extraction system is attached as described in this manual and functioning correctly before starting a routing or cleaning cycle.
7. Make sure that the router tool is correctly mounted and that the printed circuit board is clamped in position before starting the machine.
8. Routing may only be done on unmounted printed circuit boards – do not route coupons from circuit boards with mounted components.
9. If you observe malfunctions or damaged parts, especially in the area of the safety screen, or hear unusual noises - stop the machine and call technical service. Do not use the machine until an authorised technician has carried out repairs or declared the machine safe for use.

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- 10.** The transparent part of the safety screen must NOT be cleaned with alcohol-based cleaning products or other organic solvents.
- 11.** Use only with Struers consumables and accessories.
- 12.** Struers recommends operators wear safety goggles and hearing protection devices when using ViaSampler.


The equipment should only be used for its intended purpose and as detailed in the Instruction Manual.

The equipment is designed for use with consumables supplied by Struers. If subjected to misuse, improper installation, alteration, neglect, accident or improper repair, Struers will accept no responsibility for damage(s) to the user or the equipment.

Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).



Disposal

Equipment marked with a WEEE symbol  contain electrical and electronic components and must not be disposed of as general waste.

Please contact your local authorities for information on the correct method of disposal in accordance with national legislation.

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1. Getting Started with ViaSampler

Unpacking ViaSampler

Detach ViaSampler from the bottom of the packing case by removing the four screws from below. Remove ViaSampler from the packing case.

Checking the Contents of the Packing Boxes

In the packing boxes you should find the following items:

- 1 ViaSampler
- 3 Router tools
(1 x 1.96 mm, 1 x 1.97 mm, 1x 1.98 mm)
- 1 17 mm open ended spanner
- 1 13 mm open ended spanner
- 1 Mains lead with Schuko plug
- 1 Mains lead with NEMA plug
- 1 IEC-female C5 to IEC-male C14 cable
for touch screen power supply
- 1 ViaSampler W32 cable
- 1 SVGA cable
- 1 USB cable
- 1 bnc-bnc coaxial cable
- 1 Touch screen display
- 1 Industrial PC
- 1 Power supply for industrial PC
- 1 Mains lead for power supply (Schuko plug)
- 1 Mains lead for power supply (NEMA plug)
- 4 Screws M4 for attaching touch screen to VESA bracket on
support arm
- 1 Instruction Manual Set
- 1 Cable for connection of contactor to ViaSampler
- 1 Contactor for control of external exhaust system

Placing ViaSampler

Place ViaSampler on a rigid, stable table or worktop, designed to bear the weight of the ViaSampler, and at an adequate working height. The machine must be close to a source of mains power, and coupled to a fume/dust exhaust system. There must be a clear space to the left and right sides of ViaSampler. Recommended clearances are as follows:

Left side: 350 mm (13.8")

Right side: 350 mm (13.8")

Important!

Failure to observe the minimum clearances can result in improper operation and/or damage to the equipment and operator injury.

The minimum clearances (viewed from the front) are:

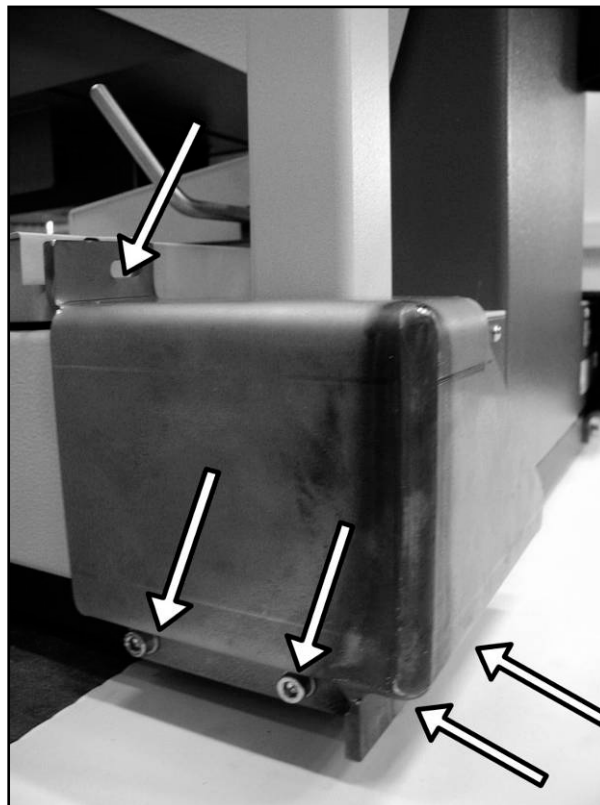
Left side: 150 mm (5.9")

Right side: 300 mm (11.8")

Removing the Transport Brackets

The routing table is secured for transport by two brackets. The brackets must be removed before ViaSampler can be used.

- Unscrew the 5 red M6 screws from the right-side bracket and remove the bracket.
- Unscrew the 6 red M6 screws from the left side bracket and remove the bracket.
- Place the brackets and the screws in a storage container. The brackets and screws will be needed if the ViaSampler is moved.



Note: prototype transport bracket illustrated.

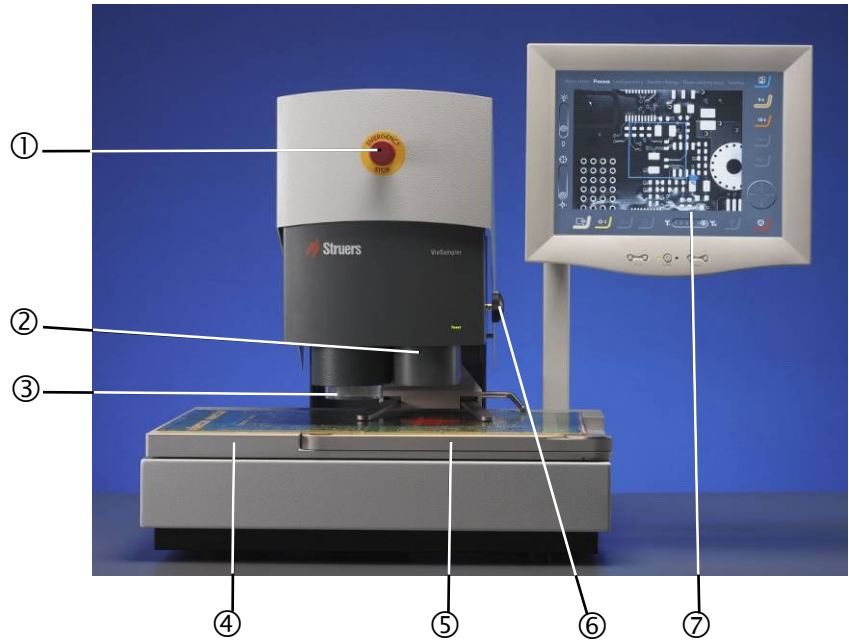
Important!

Never move ViaSampler from one location to another unless the storage brackets are mounted. Mounting of the storage brackets may not be done unless the routing table has been placed in the correct position from the Transport screen in the Service menu.

**Getting acquainted
with ViaSampler**

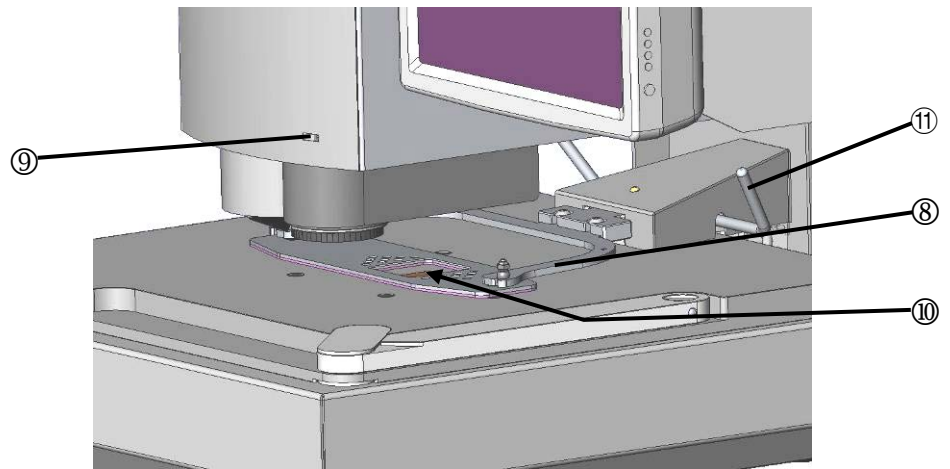
Front of ViaSampler

Take a moment to familiarise yourself with the location and names of the ViaSampler components:

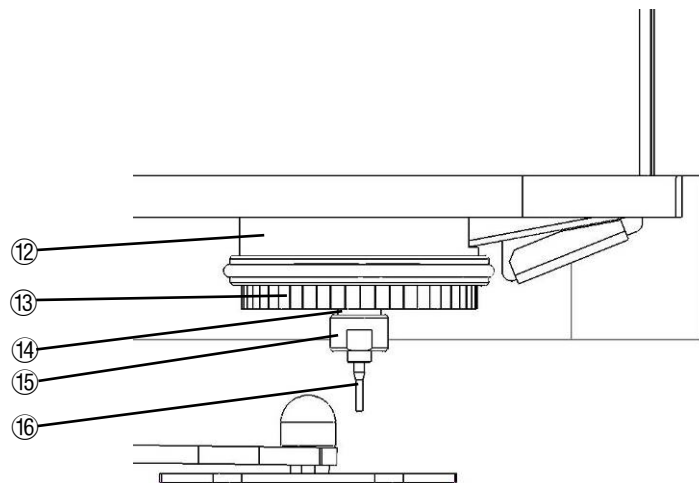


- ① Emergency Stop button
- ② Camera housing
- ③ Router housing
- ④ Router table
- ⑤ Support arm for large boards
- ⑥ Focus adjustment
- ⑦ Touch Screen display

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- ⑧ Clamp arms
- ⑨ Power indicator
- ⑩ Routing well (routing area)
- ⑪ Clamp locking lever



- ⑫ Safety screen (shown retracted)
- ⑬ Rubber skirt
- ⑭ Drive shaft
- ⑮ Collet
- ⑯ Router tool

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Rear of ViaSampler



- ① Video output connector
- ② Control cable connector for W32 (RS232 serial communication)
- ③ Switched 24V supply for contactor control of exhaust system



- ④ Switched mains output connector for screen power supply
- ⑤ Fuse
- ⑥ Power switch
- ⑦ Mains input connector



- ⑧ Exhaust output fitting

Supplying Power

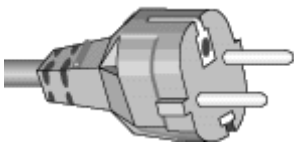
Always remember to switch the power off when installing electrical equipment.

IMPORTANT

Check that the mains voltage corresponds to the voltage stated on the type plate on the back of the machine.

ViaSampler is shipped with 2 types of Mains cables:

Single-phase Supply

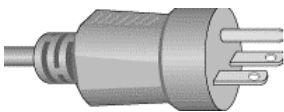


The 2-pin (European Schuko) plug is for use on single-phase connections.

If the plug supplied on this cable is not approved in your country, then the plug must be replaced with an approved plug. The leads must be connected as follows:

- Yellow/green: earth
- Brown: line (live)
- Blue: neutral

2-phase Supply



The 3-pin (North American NEMA) plug is for use on 2-phase power connections.

If the plug supplied on this cable is not approved in your country, then the plug must be replaced with an approved plug. The leads must be connected as follows:

- Green: earth
- Black: line (live)
- White: line (live)

Connection to the Machine



Both cable types are fitted with an IEC 320 connector, which fits in the female socket on the rear of the ViaSampler.

WARNING!

The output voltage from this cable is 200 – 240V and not 110V. DO NOT use this cable to connect equipment that use a 110V power supply. Failure to adhere to this may result in material damage.

The **female** IEC 320 connector at the rear of the ViaSampler is used to supply power to the touch screen (via the touch screen power supply cable).

Mounting the Display

The touch screen display is affixed to the ViaSampler support arm with 4 M4 screws through the VESA bracket at the end of the arm.

- Holding the display correctly oriented so that the mounting holes are aligned with the holes in the VESA bracket, affix with the 4 M4 screws supplied, using a 2.5 mm screwdriver.



Connecting ViaSampler

The computer must be connected before ViaSampler can be used. The external fume/dust extraction device is controlled by a 24V contactor relay-switching voltage supplied by ViaSampler. A suitable 24V control contactor relay must be installed and connected to the dust/fume extraction device and its power source by a qualified electrician before the ViaSampler can be used.

Electrical Connections

- Connect the W32 cable between the D-9 connector on the ViaSampler and the D-44 port on the PC.

Important!

Ensure that the mains cable is not yet connected to the PC when connecting the W32 cable. Failure to observe this point can result in damage to the ports on ViaSampler or on the PC.

- Connect the SVGA and USB cable from the display to the D-15 and USB connector on the PC.
- Connect the touch screen power supply cable to the display and the switched mains output connector (female IEC) at the rear of ViaSampler.
- Connect the BNC coaxial cable between the ViaSampler video output connector and the BNC connector on the PC.
- Connect the ViaSampler mains cable to the mains supply.
- Connect the Industrial PC power supply connector to the PC.
- Connect the Industrial PC power supply to the mains supply.
- Connect the control cable from the contactor to the control output (24V) connector on ViaSampler.

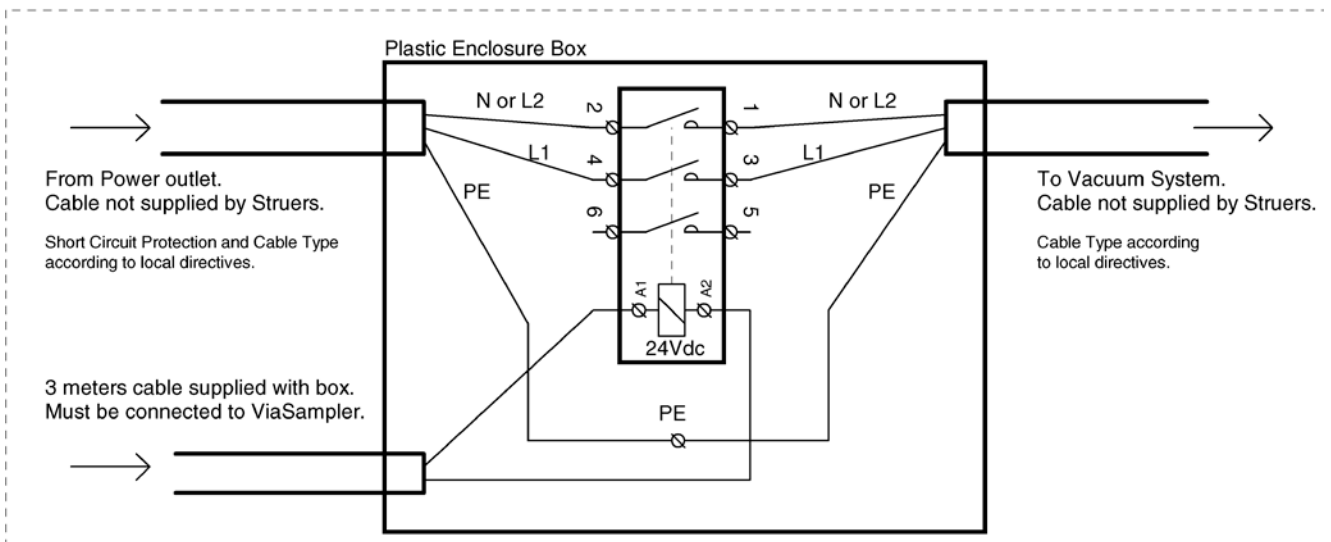


Connecting the Contactor

A contactor is supplied with ViaSampler. This is used to control an external fume/dust extraction (exhaust) system. Connections from the contactor to the mains supply and to the exhaust system must be made by a qualified electrician. A wiring diagram is supplied with the contactor. This is reproduced below in two separate diagrams, for single-phase and 3-phase supply.

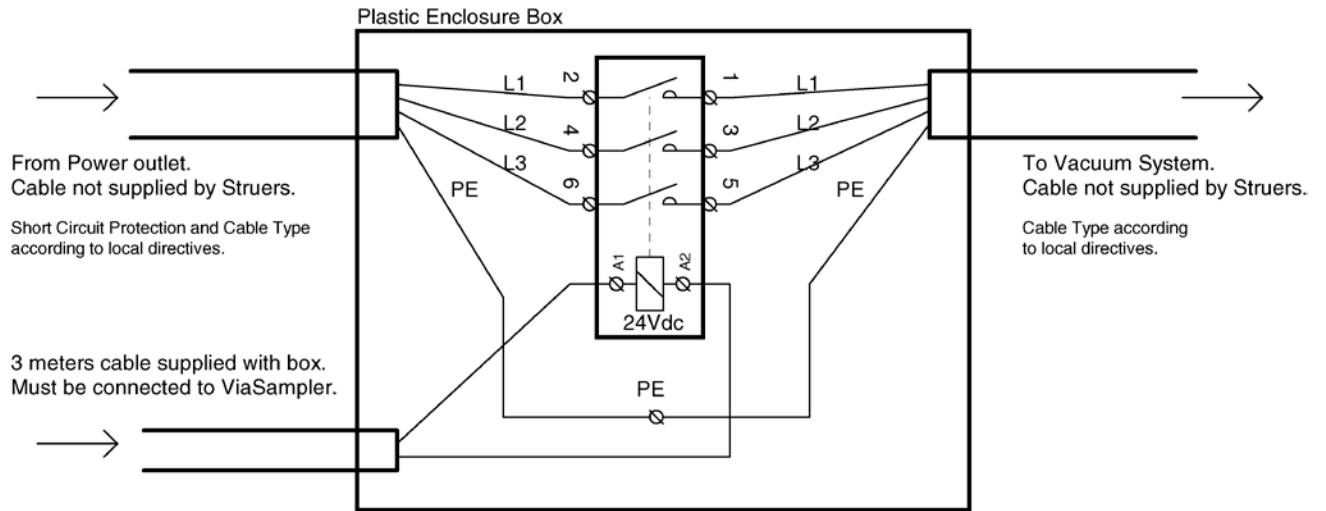


1-Phase or 2-Phase Connection



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3-Phase Connection



Important!
Do not attempt to connect the contactor box to the mains supply unless you are a qualified electrician. Incorrect connection can cause a shock hazard and / or damage to ViaSampler

Dust/Fume Exhaust Connection

Connection to the external fume/dust extraction system is via the $\varnothing 32$ mm connector on the rear of the ViaSampler.

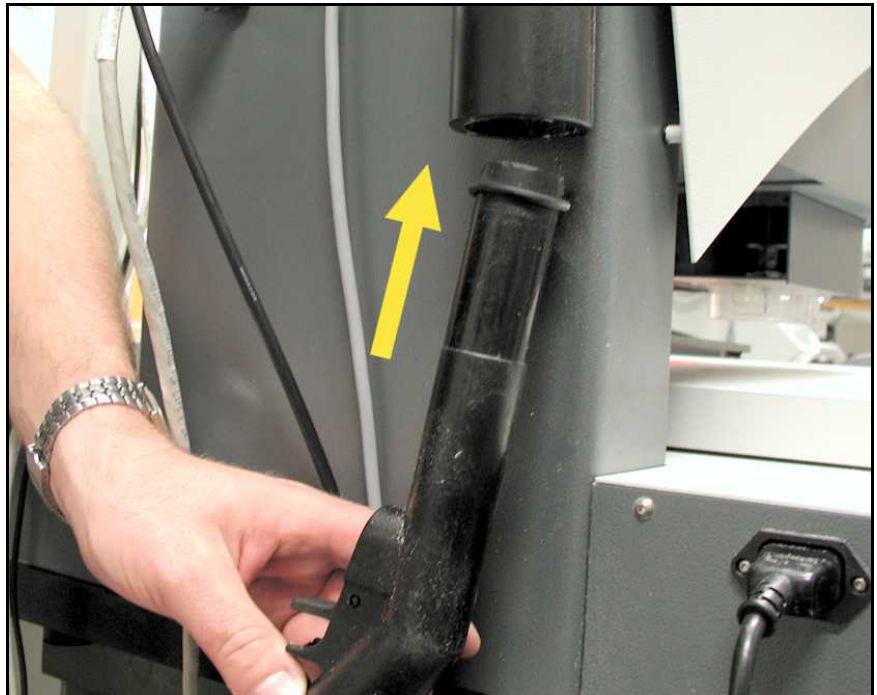
Important!

Glass-fibre and epoxy resin dusts are harmful irritants. Always use fume/dust extraction. Local Health, Occupational Safety and Environmental Protection regulations may apply here.

Placing the O-ring



- Slide the O-ring onto the fume/dust extraction system pipe ($\varnothing 32$). The O-ring should sit approximately 1 cm from the end of the nozzle.
- Insert the nozzle into the bottom of the exhaust outlet at the rear of the ViaSampler. The nozzle is retained by the pressure exerted by the O-ring on the tapered internal wall of the exhaust outlet.



PC and Operating System

The ViaSampler software is pre-installed on the PC.
(Note, if another PC is to be used, a Struers Service Technician will be required to fix compatibility issues).

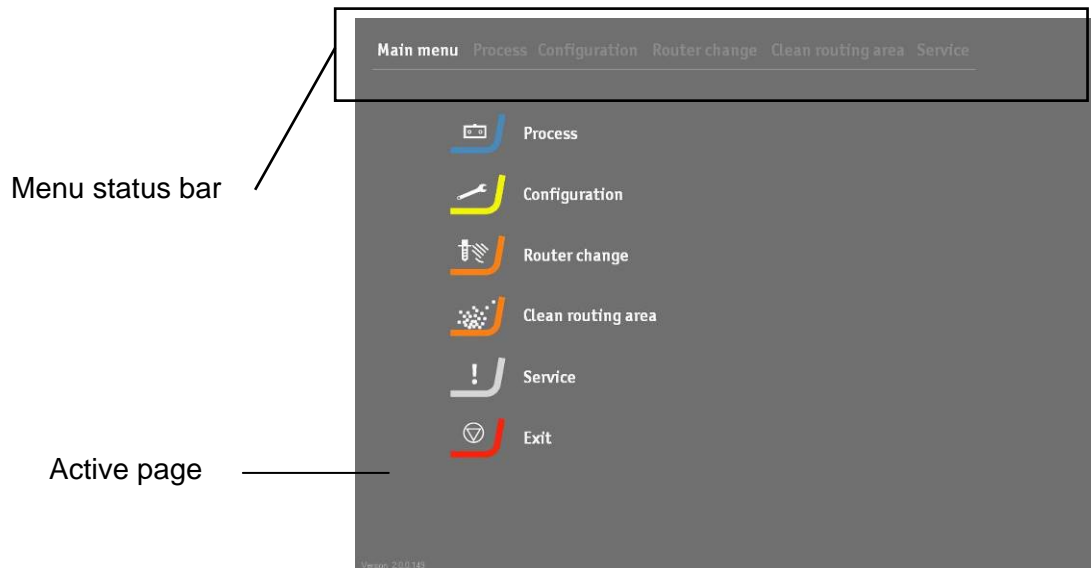
User Interface

ViaSampler is controlled via a touch screen display. The display has two operating modes: touch screen mode and mouse mode. The default mode is mouse mode.

In touch screen mode, the cursor is disabled for maximum screen visibility, so it is not possible to use the mouse. In mouse mode, both the mouse and the touch screen can be used. However, the cursor can sometimes obscure details on the screen. Screen options are accessed in the *Configuration* menu.

Screen Layout and Main Menu

The *Main menu* page is shown in the illustration below:



The touch screen is divided into two areas: the menu status bar at the top, and the active page area, which covers the rest of the screen. The active menu/page is displayed white in the menu status bar, while the other menu items are greyed out.

The menu status bar is display-only: the text items at the top part of the screen are not control buttons. However, in sub-menus and function screens, an icon at the right side of the menu status bar is a functional control.

The icons in the active page area are functional buttons: touching or clicking a button activates that particular menu or function, if the function is a valid operation at the particular step in the process. If the function is not a valid operation at the particular step, the icon is greyed out. If the function is already activated or in progress, the icon is “illuminated” with a white halo.

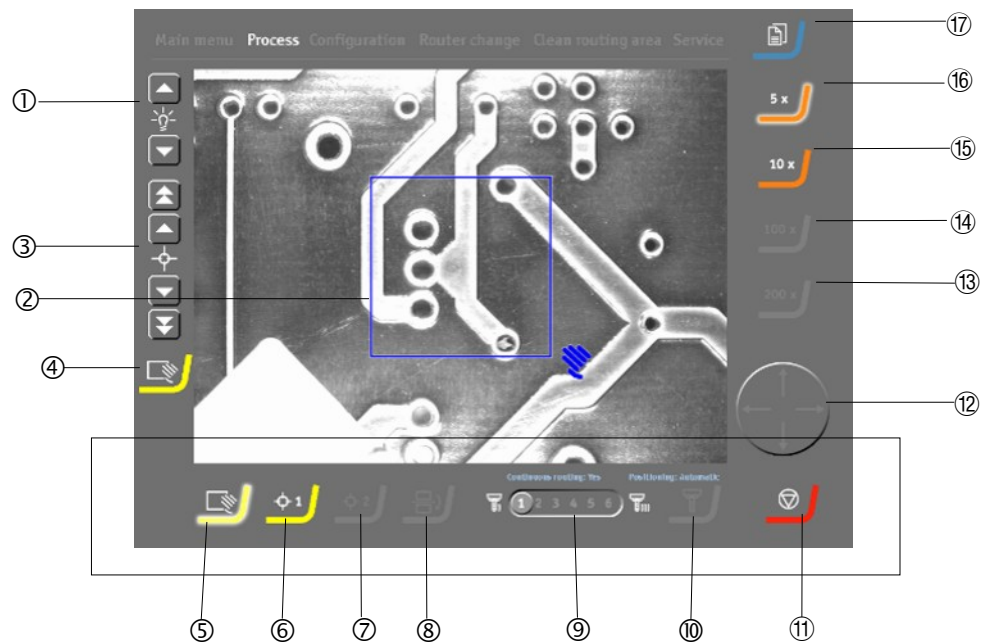
Navigation in the Menu



From the *Main menu* page, press or click on an icon to enter a *Process* or function page. To go to another *Process* or function page from within a *Process* or function page, it is necessary to first exit the process or function by pressing the **Return to Main menu** icon, pictured here. This brings up the *Main menu* page, from which the new *Process* or function page can be selected.

Process Layout

This screen shot shows the *Process* page during the manual positioning step.
















- ① Light intensity
- ② 11 x 11mm field – the first target via must be within this field
- ③ Target via alignment circle diameter
- ④ Process Line and controls
- ⑤ Manual/Automatic positioning mode
- ⑥ First target via step
- ⑦ Second target via step
- ⑧ Show coupon/Flip coupon
- ⑨ Router speed
- ⑩ Router start
- ⑪ Exit process and return to start of process
- ⑫ Positioning control
- ⑬ 200x magnification
(digital zoom in high-magnification camera image)
- ⑭ 100x magnification (high-magnification camera)
- ⑮ 10x magnification (digital zoom in low-magnification image)
- ⑯ 5x magnification (low-magnification camera)
- ⑰ Return to Main menu button

Process Line

In the Process Line at the bottom of the Process page, the highlighted button indicates the present step in the process. The sequence of steps in the Process Line is from left to right. The process line also contains a menu bar with information about coupon type, size (if it is not a standard type), holes, whether continuous routing has been selected, and whether automatic or manual positioning mode has been selected.

Display Icons

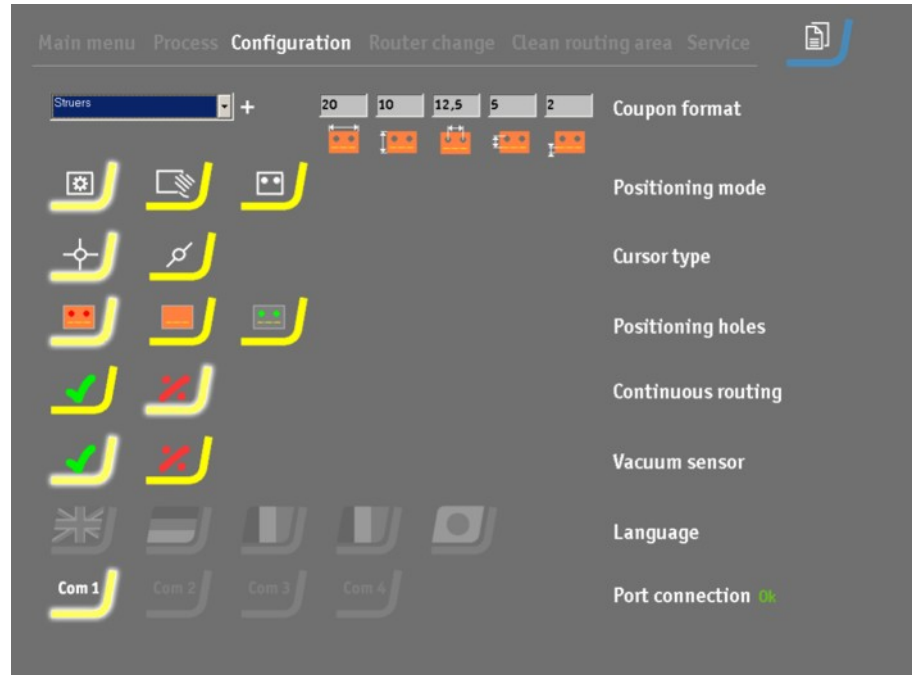
Icon	Function	Icon	Function
	Process menu.		Manual positioning function
	Configuration menu.		First target via selection.
	Router change function.		Second target via selection.
	Clean routing area function.		Show coupon / flip coupon
	Service menu. Only some of the items on the service menu are accessible by the machine operator.		Start routing
	Exit. Press this button to shut down the ViaSampler program or stop the current process (context dependent).		Return to main menu.
			Proceed to Next step.

Adjusting the Display

The contrast, brightness and screen geometry can be adjusted using the controls on the front of the display. See the display manual for details.

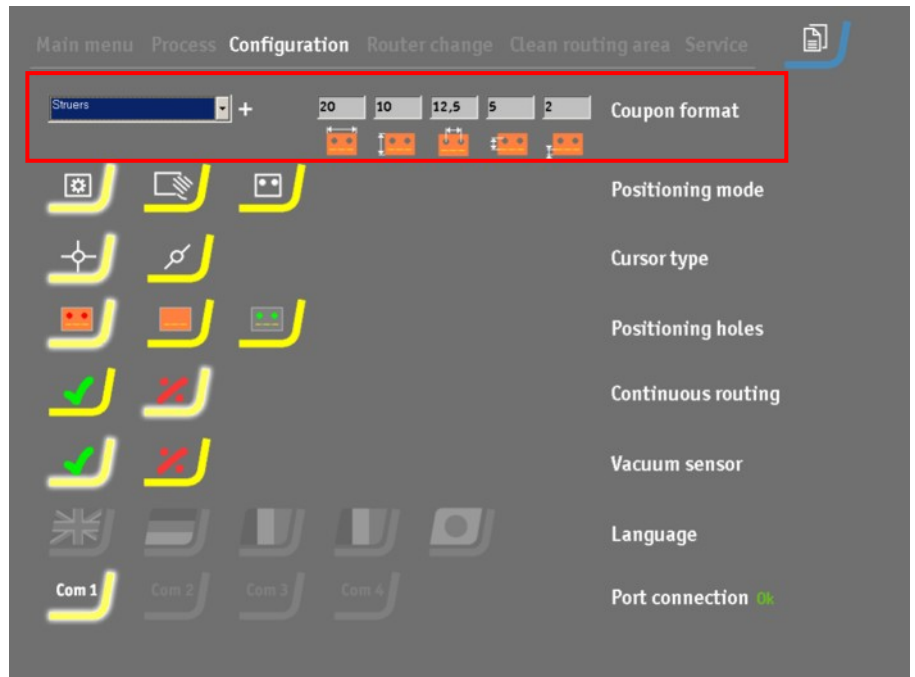
Configuration Page

From the *Configuration* page, press or click on an icon to select the desired function.



Flexible Coupon Format

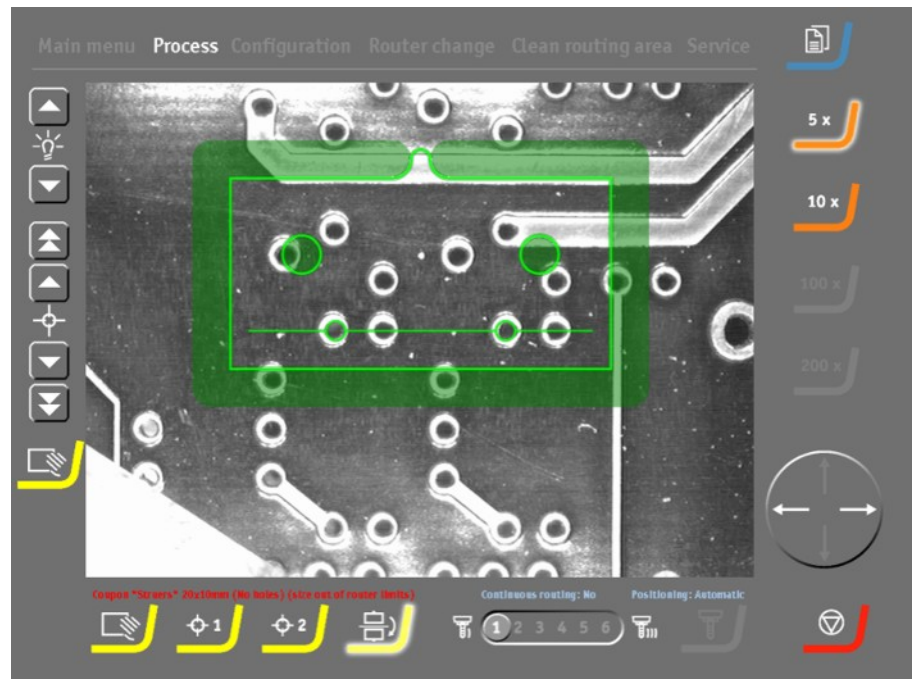
Using the Struers standard coupon format (10x20 mm) means that multiple coupons can be prepared automatically using ViaKit. User defined coupon formats can be selected, though this will usually mean that coupons have to be prepared manually (unless the dimensions are very similar to the Struers standard format).



The possible coupon size largest is approximately 45 x 45 mm or 5 x 50 mm, depending on the angle of the coupon in relation to the routing well, which sets the physical limits.

Important

If a sample is out of bounds or if the custom coupon format exceeds the limitations defined by the routing well, a note appears in red warning text informing of the issue. The routing button is dimmed and routing cannot start until the measurements have been changed.



If a large coupon is tilted at an angle that will result in a conflict with the edges of the routing well, then the routing process cannot be started.

An unlimited number of custom coupon sizes can be named and the settings saved.

Positioning Holes



Important

Coupons that are not the standard size are not compatible with ViaKit (ViaInserter, ViaMount, and ViaHolder), which are designed specifically for the default Struers format.

Positioning pin holes are not necessary for coupons that are to be prepared manually; positioning holes can be de-selected.



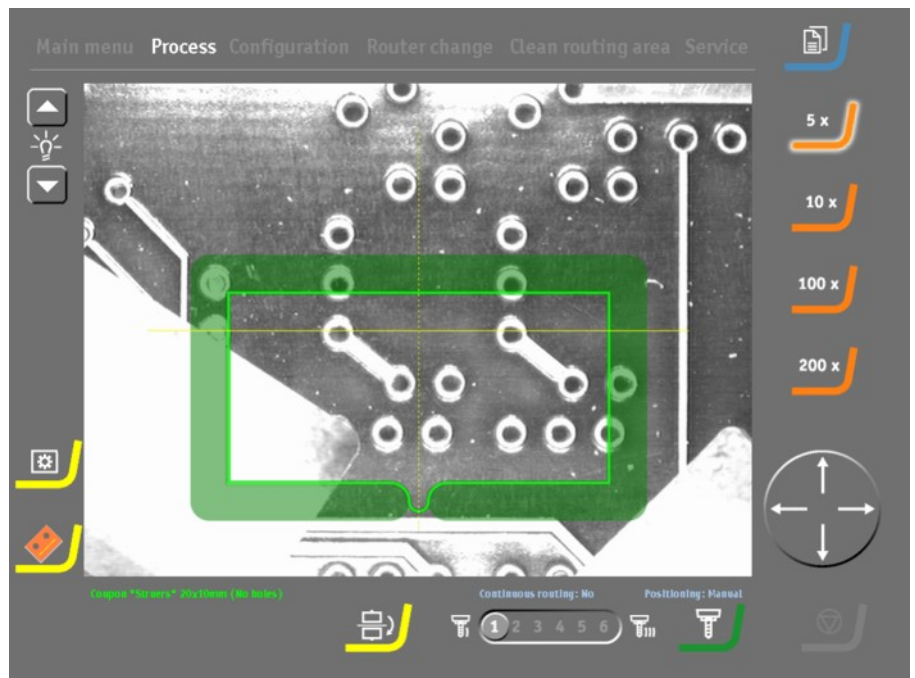
Coupon will be routed with positioning holes



Coupon will be routed without positioning holes



Positioning holes only



Emergency Stop Button

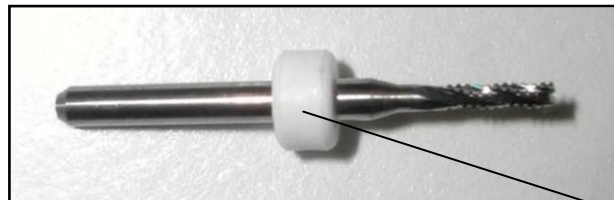


The emergency stop button is a latching switch, which causes the motors in ViaSampler to stop when the button is pushed. It also causes several pop-up warnings to appear on the ViaSampler screen. Select OK to acknowledge the pop-ups until the ViaSampler program on the PC shuts down. To return ViaSampler to normal operation, pull out the button to the normal position, and restart the ViaSampler program on the PC.

Mounting the Router-cutter



- Loosen the collet using the two spanners provided with ViaSampler
- Insert the router-cutter into the collet, press upwards and hold, and tighten the collet. Ensure that the collar on the router-cutter is in firm contact with the collet.

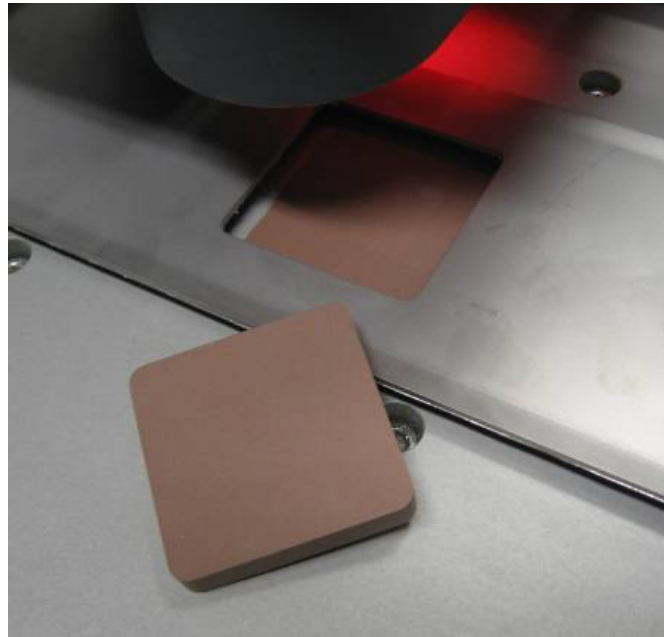


Collar

Support blocks

When flexible boards are routed frequently, the use of support blocks in the routing well is recommended.

- Insert the support blocks into the routing well.
- When the blocks no longer provide the intended support, remove the block and flip to use the rear of the block for support or replace with a new support block.



2. Operating ViaSampler

Switching on ViaSampler

- Power on the ViaSampler using the power switch at the rear of the machine.
- Now power on the Industrial PC using the power button on the front of the PC.
- Wait for both systems to power up.

Switching off ViaSampler

To avoid data loss on the PC, it is important that the PC is switched off using the power button on the front, before switching off ViaSampler.

- When the PC has shut down completely, switch off ViaSampler at the switch at the rear of the machine.

ViaSampler produces one specimen coupon in each process cycle. The process involves selection of two target vias in a row of holes or vias, followed by routing of a coupon containing the target vias, and the drilling of two positioning holes (plane parallel to the target vias) for mounting the coupon. The complete process involves the following steps:

- Manual positioning of the PCB on the router table using the low-magnification video camera
- Locking the PCB in position
- Identifying the first target via using the low-magnification video camera
- Fine positioning of the first target via using the high-magnification video camera and marking the position
- Positioning of the second target via using the low-magnification video camera
- Fine positioning of the second target via using the high-magnification video camera and marking the position
- Marking the coupon position
- Routing the specimen coupon
- Unlocking the PCB
- Removing the routed coupon from the PCB

Note

The points of interest on the board are not necessarily via holes, although this is usually the case. In this manual, the words “via” and “target via” are interchangeable with “point of interest”. For example, it is possible to select two points along a conductive path, in order to do a metallographic examination of a cross-section of the path.

Clamping in General

ViaSampler is supplied with a built-in clamping plate, and friction pads on the router table. This ensures reliable clamping of both small and large boards.

- Place the PCB on the router table, with the area of interest on top of the router area (the recessed square on the table).
- Place the Clamping Plate on top of the PCB, aligning the guides on the top of the Clamping Plate with the ends of the clamp arms.
- Pull down the clamp locking lever.
- Proceed from the [Marking the First Target Via](#) step on page 31.

Starting the Process



- Switch on ViaSampler and the industrial PC (press the power button).
The ViaSampler program will now start automatically.
- From the ViaSampler main menu, press or click the **Process** icon to enter the Process page. See [Process Layout](#) on page 16 to identify the controls and their functions.

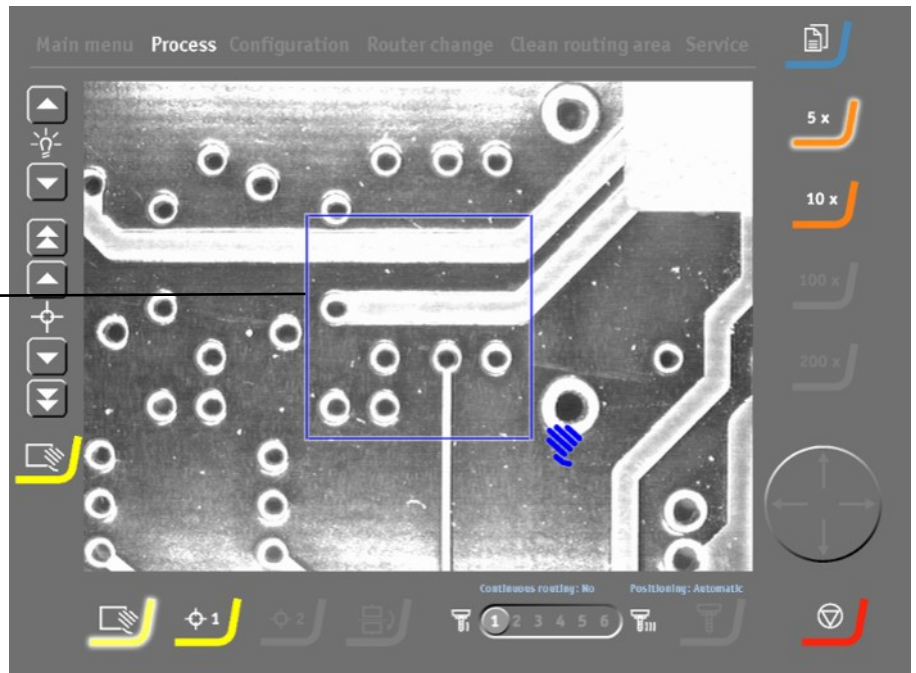
Manually Positioning the PCB on the Table

In the first part of the process, it is necessary to identify the area of the PCB from which the specimen coupon will be routed. Bear in mind that routing is a process that destroys a 2 mm band around the sample coupon. If specimens from adjacent areas on the PCB are also required, it may be necessary to carefully orient the coupon routing area to minimise routing damage to the adjacent areas of interest.

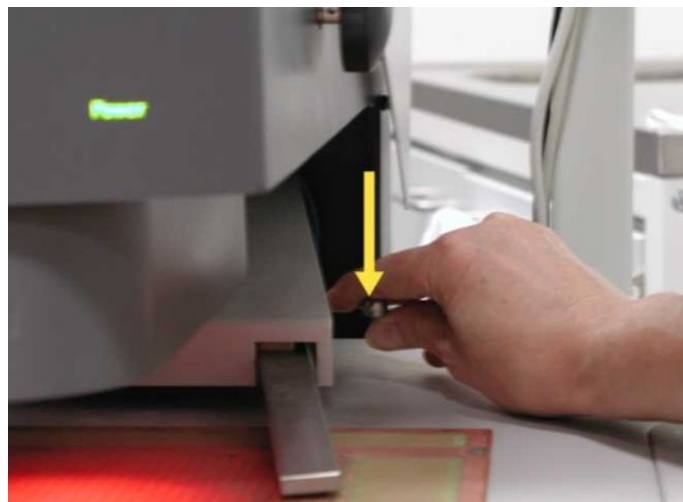
- Place the PCB on the table. If the PCB extends over the edge of the routing table, unfold the support arm to provide support and minimise stress on the PCB.
- On the Process page, select 5x magnification. If necessary, adjust the focus with the focus knob.

- Position the PCB manually so that the first target via is inside the 11.7 x 11.7 mm blue reference box. Adjust the lighting level if necessary with the light intensity buttons.

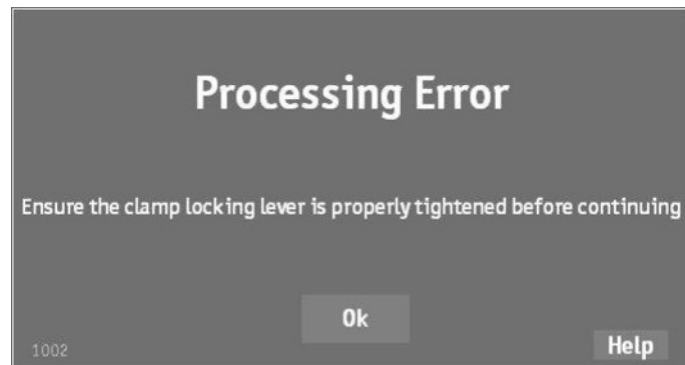
The first target via must be inside the blue box



- Lock the PCB in position on the table by pulling down the clamp locking lever.

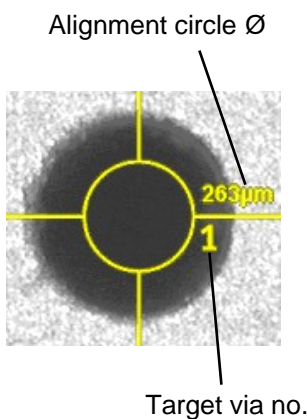


If the PCB is not locked in position, an error dialog box will be displayed when the **First target via** icon is pressed or clicked on:

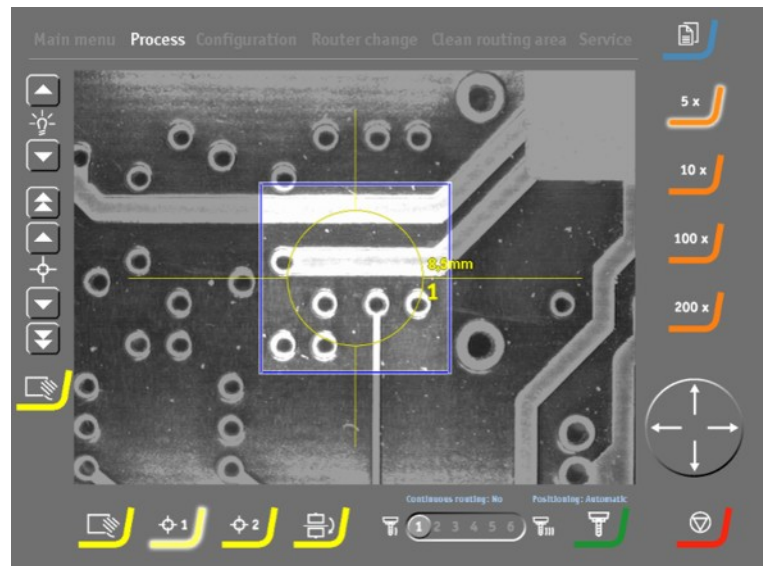


- Pull down the clamp locking lever and press or click on the OK button.

Marking the First Target Via



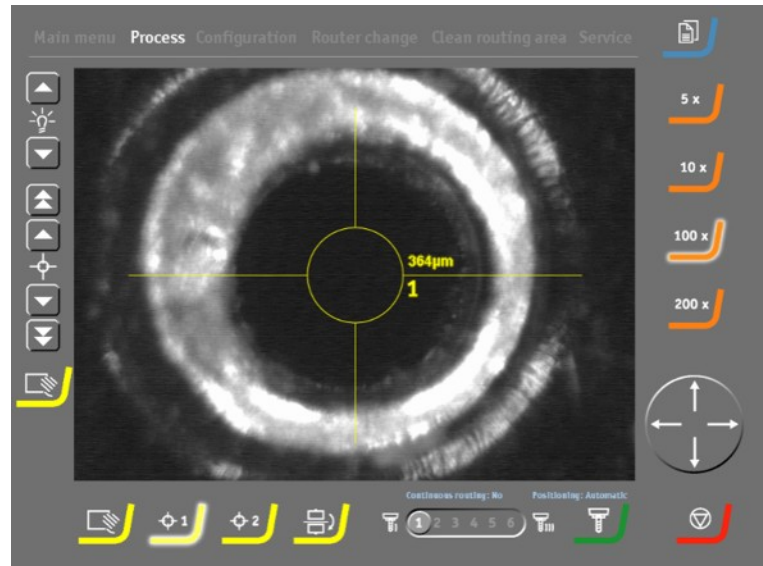
- The **First target via** icon is automatically highlighted when you have clamped the panel.
- A yellow target via alignment circle is shown at the centre of the 11.7 x 11.7 mm field, adjacent to two numeric figures. The upper figure is the diameter of the target via alignment circle in microns. The alignment circle can be used to measure the diameter of the actual hole or via on the PCB – see [Fine Positioning the First Target Via](#). The lower figure shows which target via (1 or 2) is being marked, number 1 in this case.
- Align the first target via with the centre of the yellow alignment circle, by touching the screen in the centre of the target via or by using the table positioning control. This initial alignment is normally done using the 5x camera.



Fine positioning the First Target Via

100 x

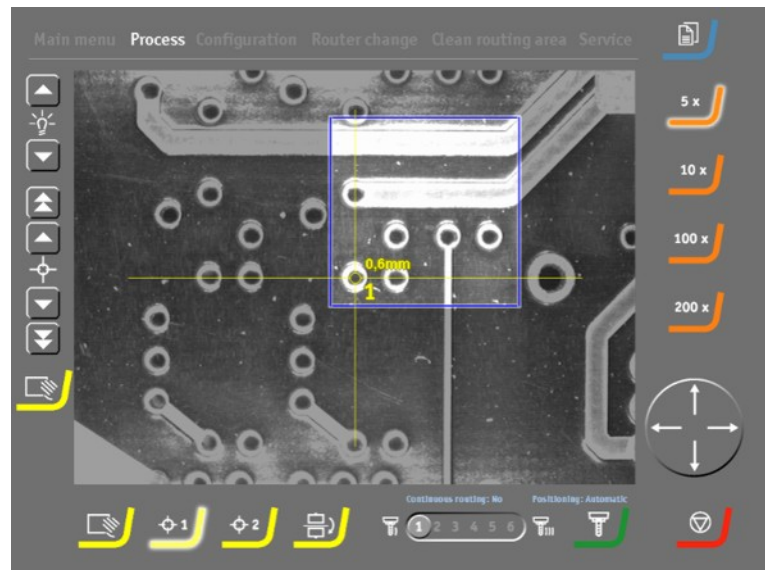
- Change to the high-magnification camera by pressing or clicking the **100x** icon. The table will move to position the active area under the high-magnification camera. If necessary, adjust the lighting level and focus.



- Fine position the first target via by touching the screen at the centre of the target via or by using the table positioning control. An optional adjustment of the diameter of the alignment circle can be done to match the diameter of the target via with the alignment circle diameter slider. This makes it easier to align the target via exactly with the alignment circle.

Note:

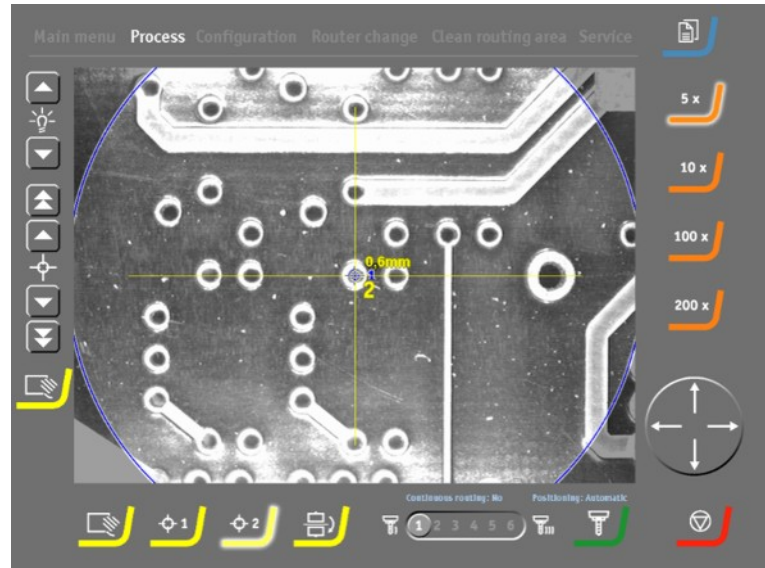
To achieve the greatest possible precision, larger targets should also be identified at high magnification (100x or 200x).



- Press the **Second target via** icon to complete identification of the First target and to move to the Next step. The Second target button is now highlighted, and the low-magnification camera is automatically selected. The table will move to position the new target area under the low-magnification camera.

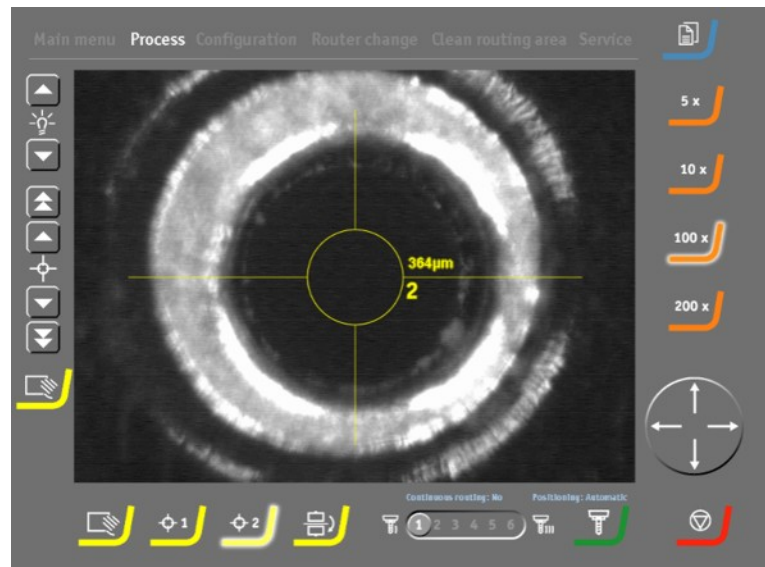
Marking the Second Target Via

- The area in which it is possible to mark the second target via is shown by a blue 14 mm diameter circle, centred on the first target via.

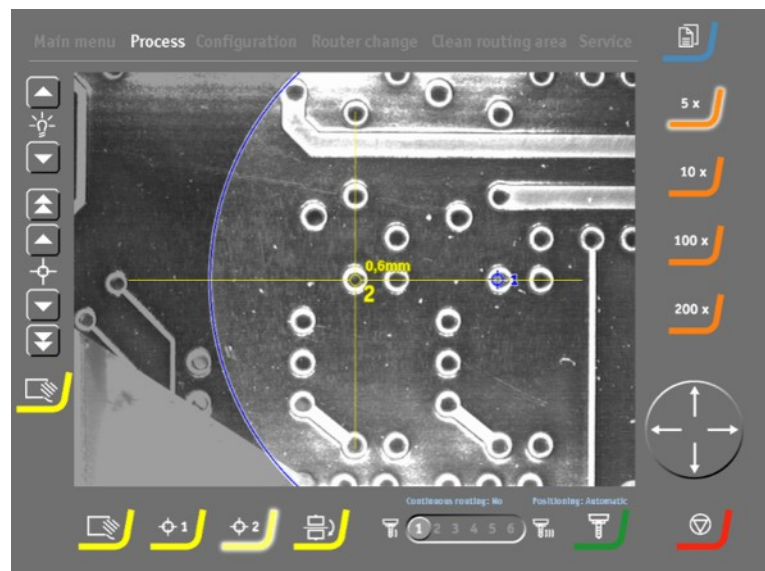


- Adjust the lighting level if necessary with the light intensity buttons.
- Align the second target via with the yellow alignment circle by touching the screen at the second target via or by using the table positioning control.
- Change to the high-magnification camera by pressing or clicking the **100x** icon. The table will move to position the active area under the high-magnification camera. Adjust the lighting level if necessary with the light intensity buttons.

100 x

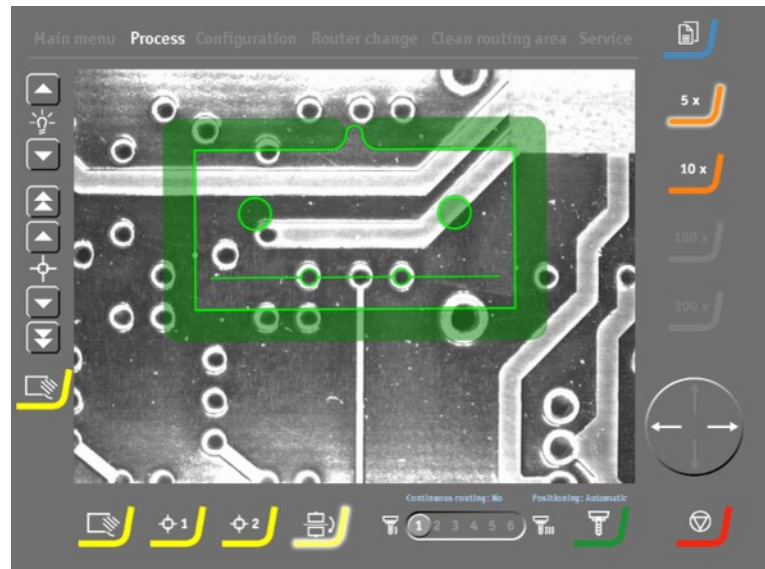


- Fine position the second target via under the yellow alignment circle by touching the screen at the centre of the target via or by using the table positioning control. An optional adjustment of the diameter of the alignment circle can be done to match the diameter of the target via with the alignment circle diameter buttons.



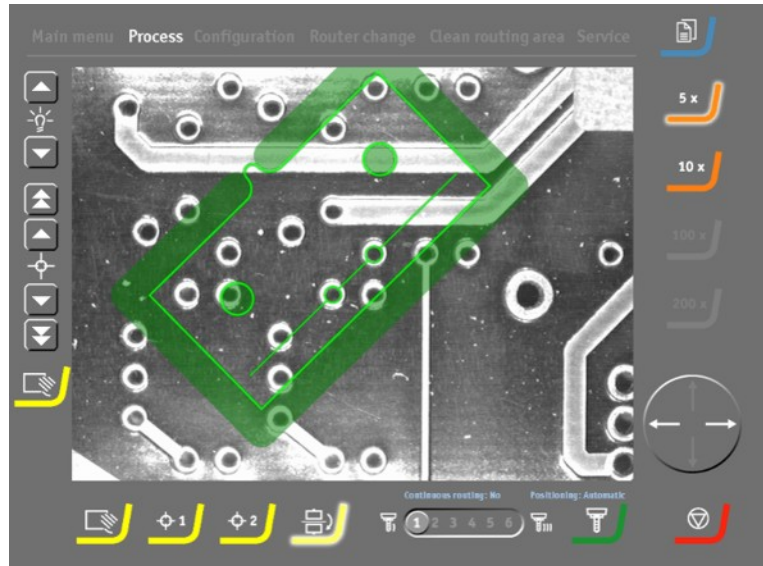


- Press the **Show coupon / flip coupon** icon to complete identification of the Second target and to move to the Next step. This button is now highlighted and the router table moves to position the coupon under the low-magnification camera.



Checking the Coupon Position

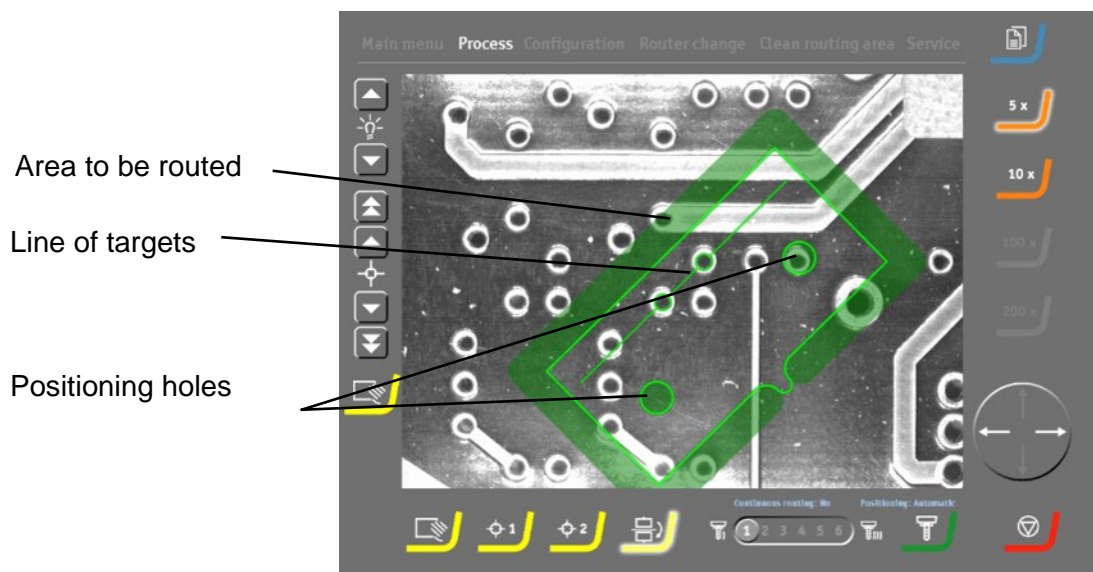
- Before routing, confirm that the coupon has full edges (shown as a solid green line) and that the coupon fully overlaps existing holes on the PCB.



If there are conflicts, use the positioning control to move the area to be routed until there is no conflict. Alternatively, use the flip coupon function to avoid the conflict.

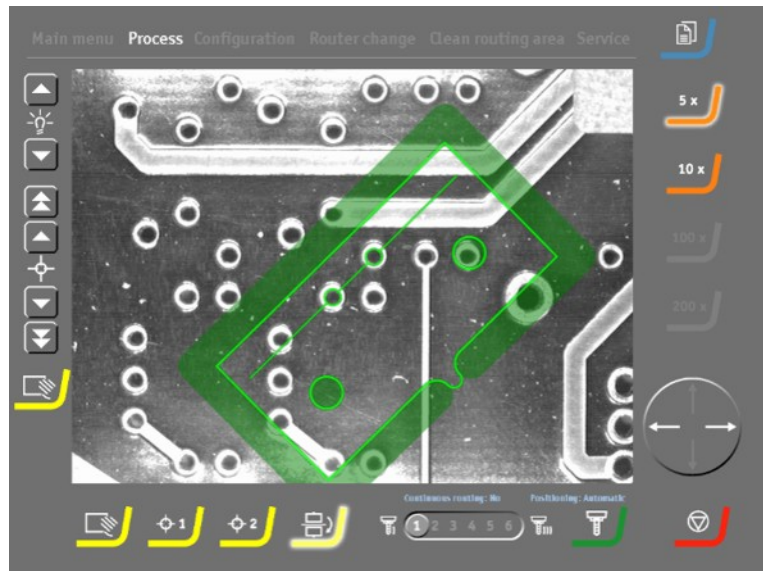
Important!

The positioning holes are drilled by ViaSampler and used to ensure precise alignment of the coupon in the sample holder. Irregularities in the shape of the positioning holes can make precise alignment impossible.





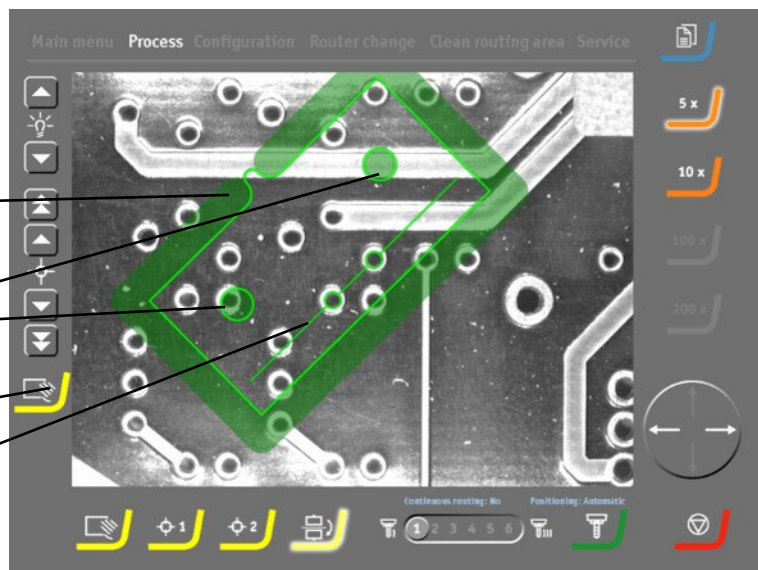
- Check also that the area to be routed, as displayed on the screen, does not interfere with a planned specimen coupon from an adjacent area. To avoid conflicts with other areas of interest or customer panels, the coupon area can be flipped around the target line axis by pressing the **Show coupon / flip coupon** icon.



In the screen capture above, a via will interfere with the drilling of the left side positioning hole, so the area to be routed should be flipped around the line of targets to avoid this, as illustrated in the next screen shot:

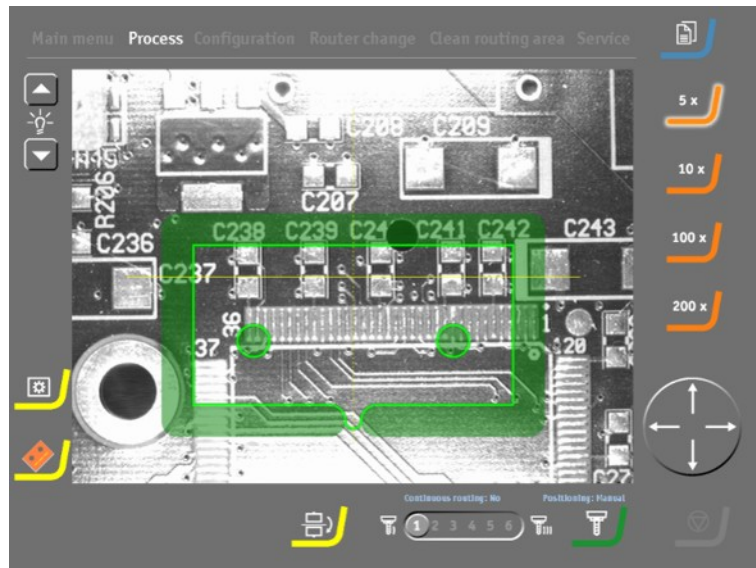
Flipped coupon

- Area to be routed
- Positioning holes
- Positioning mode
- Line of targets



Manually Positioning the Coupon

For larger vias where the precision of the alignment of the holes is less critical, use the manual positioning feature.



- Using the simple horizontal cross hair, manually align a row of targets.
- To check the position of the board, change the magnification to 100x or 200x. The coupon outline can be flipped, moved up/down or sideways, but not rotated.
- When the coupon outline is in the correct position, clamp and then start routing.

Important!

Manual positioning is recommended for large vias only.
For best results with the highest precision, always select Automatic positioning for microvias.

Rotating the Coupon

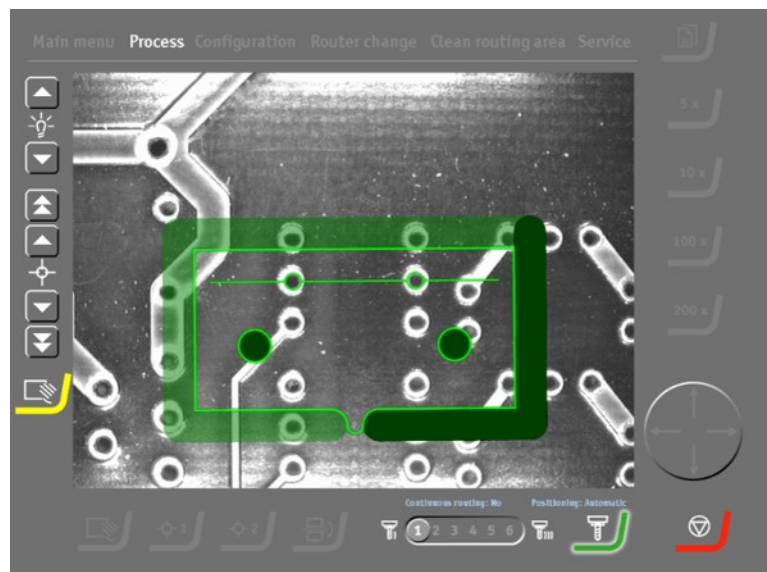
In some cases, typically for larger boards, it may be necessary to rotate the coupon, for example, in manual mode where clamping is restricted.

Two angles can be pre-selected: 45 and 90 degrees. Choose between 45 degrees rotation in Automatic mode and 90 degrees in Manual mode.

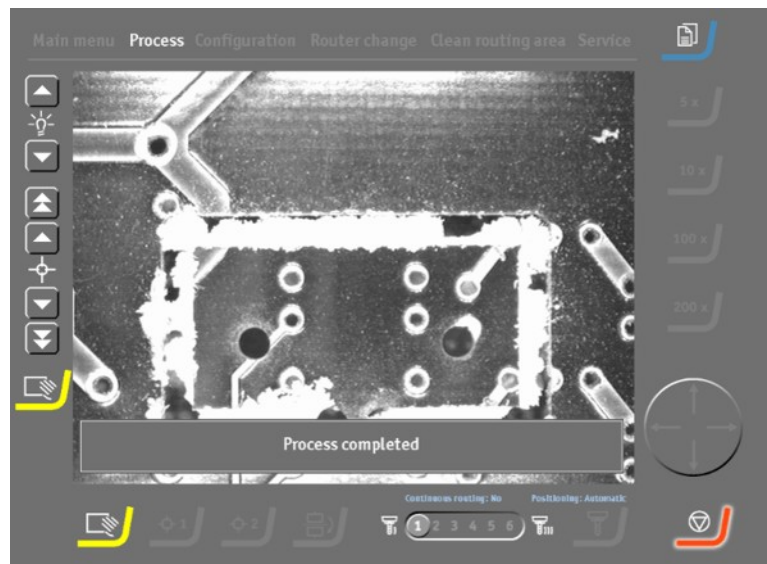
Routing



- Select the routing speed most suitable for the type and thickness of the PCB by moving the routing speed slider. The rule of thumb is to reduce the routing speed with increased board thickness. For flexible boards it is also recommended to reduce the routing speed.
- Press the **Start routing** icon to start the routing operation.
 - While the routing is in progress, the camera image is frozen, and the routing progress is superimposed on the frozen image, the routed area being shown in a darker shade of green.



- When routing is complete, the display reverts to a live camera view of the board. It is now possible to begin the coupon production process again, to route additional coupons from the board.



- When all the coupons required have been routed from the board, lift the clamp locking lever to release the PCB.
- Remove the PCB and twist out the coupon(s).

Note

At the start of the routing process, the width of the knock-out tab holding the coupon on the board is automatically set according to the board gauge/thickness.

Continuous Routing

Continuous routing can be selected in the *Configuration menu* when several coupons are to be extracted from the same board, thus allowing for maximum productivity in terms of coupons per hour.

With Continuous routing selected, the table moves sideways to the camera position immediately after a coupon has been routed. The safety hood remains lowered and the router cutter continues to rotate whilst the vias for the next coupon are selected.



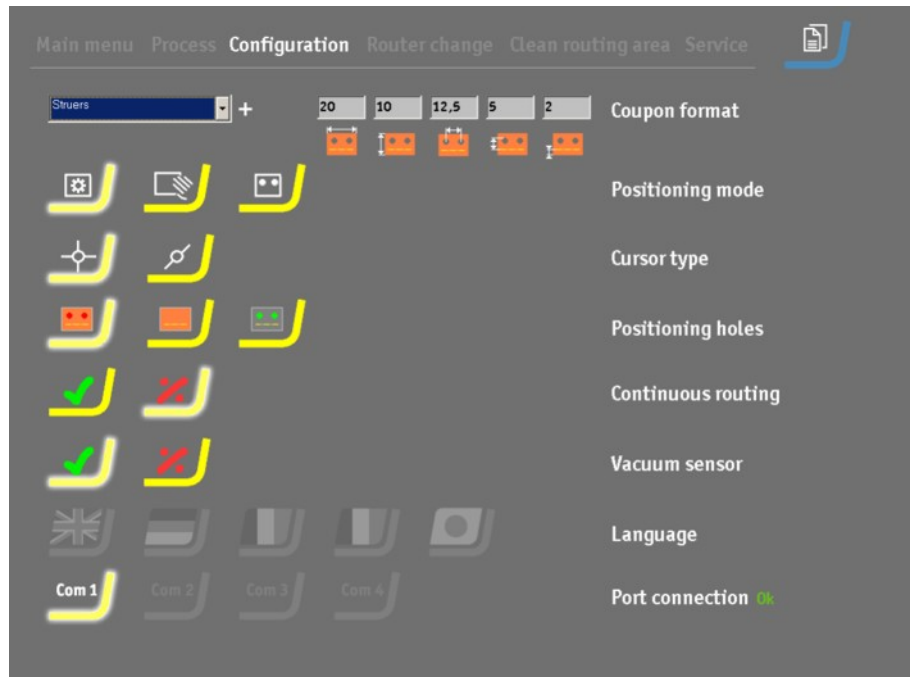
This process continues until there is no more clamping space available or the **Exit** icon is pressed to stop the routing procedure.

Split process

In some cases it may be useful to split the routing process into two stages: first drilling the positioning holes and then extracting the coupon at a later stage.

Drilling positioning holes

In the Configuration menu:



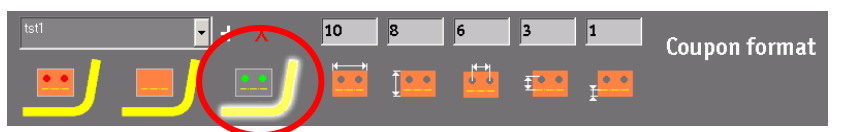
- Select either Automatic Positioning mode



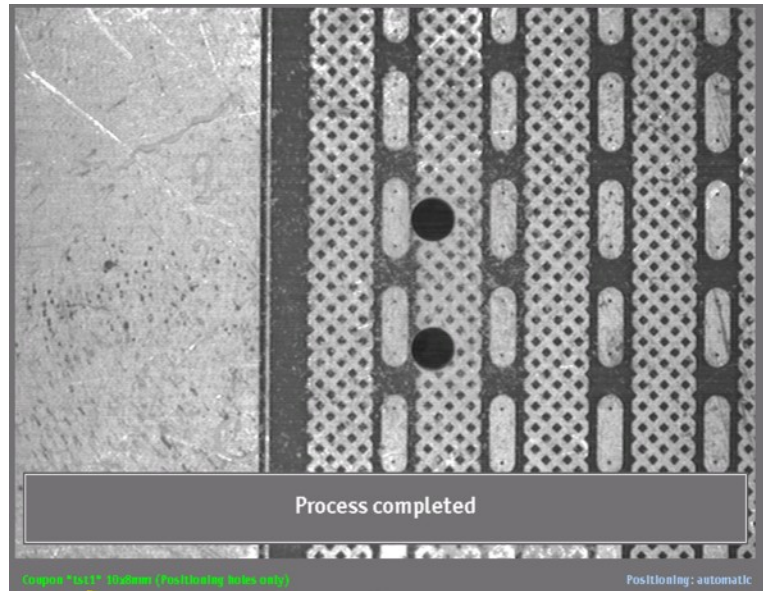
or Manual Positioning mode.



- Select the option for drilling holes only.



- In the Process screen, follow the usual procedure for routing. The holes will be drilled but the coupon won't be extracted.

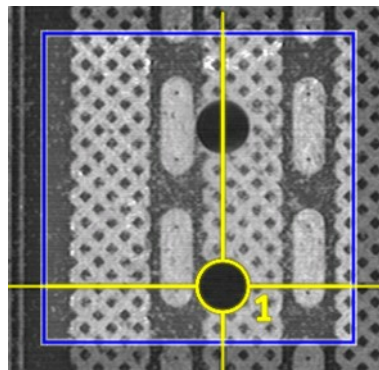


Extracting the Coupon

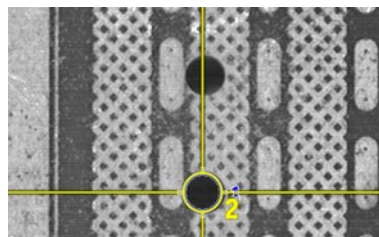
- In the *Configuration menu*, select Special Positioning Mode.
- Go to *Process*.



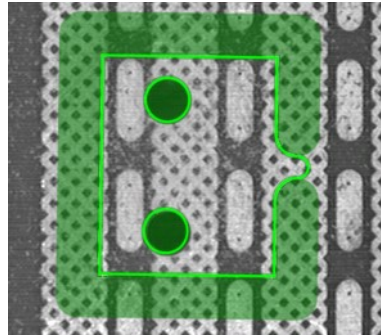
- Select the position for the first hole.



- Click the second target button to proceed with the second hole.



- Select the position for the second hole. The coupon boundary is displayed:



- Adjust the position. Use higher magnification if necessary.
- Click the router button to extract the coupon.

Routing Large Boards

The maximum board size that can be handled by ViaSampler is 635 x 635 mm. The maximum thickness is 7mm. It is important that the board is adequately supported, to avoid deformation in the routing process. Boards that extend over the edge of the routing table should be supported by the support arm.

- Extend the arm as shown, to support a board in front of the routing table. The arm can be also swivelled out to support a large PCB extending over the right edge of the routing table.



Routing Small Boards

Very small boards (less than ca 80 x 80 mm) can be glued using super glue to larger boards. The composite board can then be routed in the normal way.

Routing Flexible Boards

Nominally, the minimum board thickness that can be handled by ViaSampler is 0.5 mm. However, thinner boards and flexible boards can be stiffened for the purpose of routing by laminating a standard PCB to the underside of the flexible board with super glue, or by using the Clamping Plate.

When flexible boards are routed frequently, the use of support blocks in the routing well is recommended.

Routers

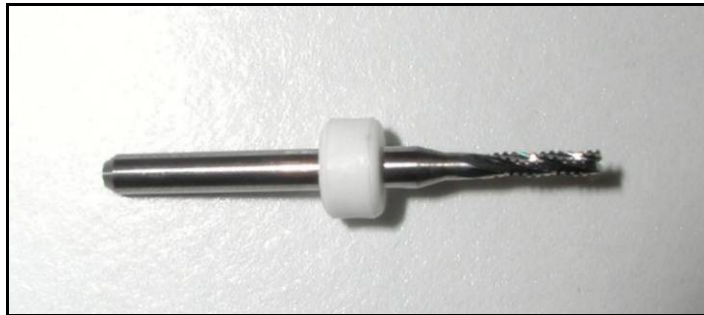
ViaSampler is supplied with three router tools, nominal diameter, $\varnothing 2$ mm (actually 1 x 1.96 mm, 1 x 1.97 mm, 1x 1.98 mm). For reliable operation, use only routers supplied by Struers.

Important!

The PCB routers used in ViaSampler must have a collar to ensure correct positioning.

Failure to comply with this requirement will result in damage to the equipment and cause incorrect operation

Router Tool



Selecting the Correct Router Tool

The router tool diameter to be used will depend on the type of board that is to be routed; the thicker the board, the larger the diameter that should be used.

3 sizes of router tools are available.

Typically:

1.96 mm are used for boards of 2-3 mm

1.97 mm are used for "standard" boards of 3-5 mm

1.98 mm are used for boards thicker than 5 mm

Make a test coupon of the material to be routed with each of the router tools and check in which of the drilled positioning holes the positioning pins (from ViaKit or ViaKit Basic) fit tightly:

- Use ViaSampler to make coupons from a scrap piece of board using each of the router tools in turn.
- Press a positioning pin through a drilled positioning hole in the coupon, and hold the coupon by the edges so that the coupon is horizontal.
- Select the router tool diameter that routs a positioning hole where the pin is retained quite tightly.

Lifetime

The lifetime of the router tool depends on the type of board used and coupon size. For thicker boards and boards with high copper content, the lifetime of the router tool will be reduced.

Boards with ceramic layers will significantly reduce the lifetime of the router tool.

Replace the router tool if the fit between the drilled hole and positioning tool becomes too loose.

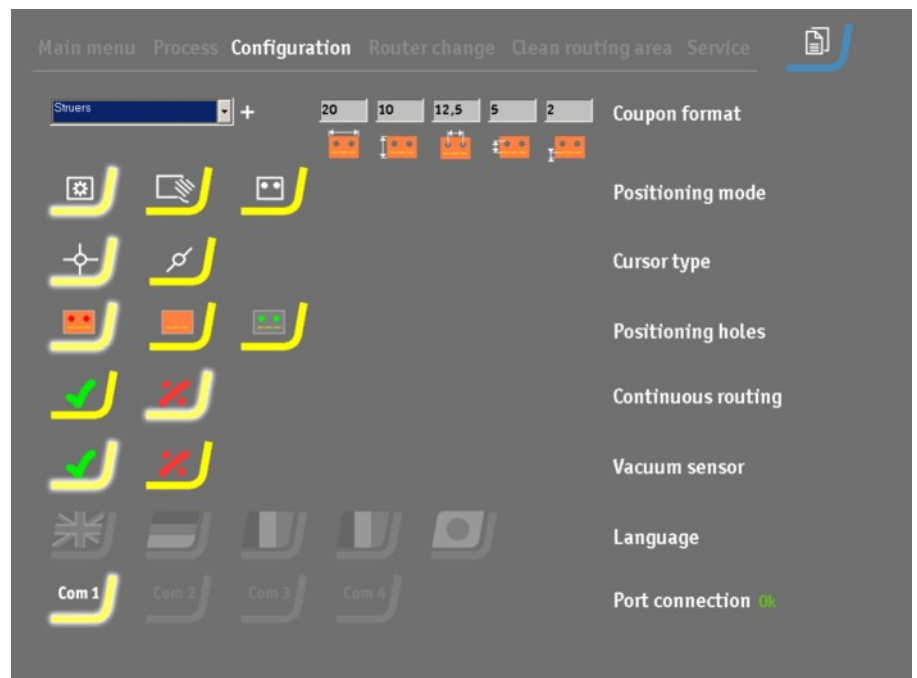
3. Configuring ViaSampler

ViaSampler can be tailored to the user-specific environment via the *Configuration* menu, accessed from the main menu.



- From the *Main menu*, press or click the **Configuration** icon:

Configuration Menu



Positioning Mode



Automatic positioning mode



Manual positioning mode



Special positioning mode

Used when positioning holes have been drilled previously and need to be aligned with the positioning holes and the coupon boundary shown on the screen.

Language

- Press or click the flag icon to select your preferred language. Language options that are unavailable will be greyed out.

Vacuum Sensor

For practical and health and safety reasons, it is important that routing waste material is removed effectively from the working area. This is done by the external extraction device or system, connected to the exhaust outlet on the back of ViaSampler. The external device or system must be capable of maintaining a flow of at least 130 m³ / hour (4597 ft³ / hour).

ViaSampler can be configured to give an alert if the minimum extraction flow rate is not maintained.

Enabling the Alert Function

- From the *Configuration* menu, press or click the ✓ symbol.

Disabling the Alert Function

- From the *Configuration* menu, press or click the % symbol.

Cursor Type
(Automatic Positioning mode)

Buttons or functions can be selected by a left click on the mouse or by touching the button/ area on the touch screen. In *Automatic Positioning mode* a 90° or a 45° angle cross hair cursor can be selected.



90° angle cross hair cursor



45° angle cross hair cursor

Coupon Rotation
(Manual Positioning Mode)

The coupon can be rotated at a 90° or a 45° angle.

4. Cleaning and Maintenance

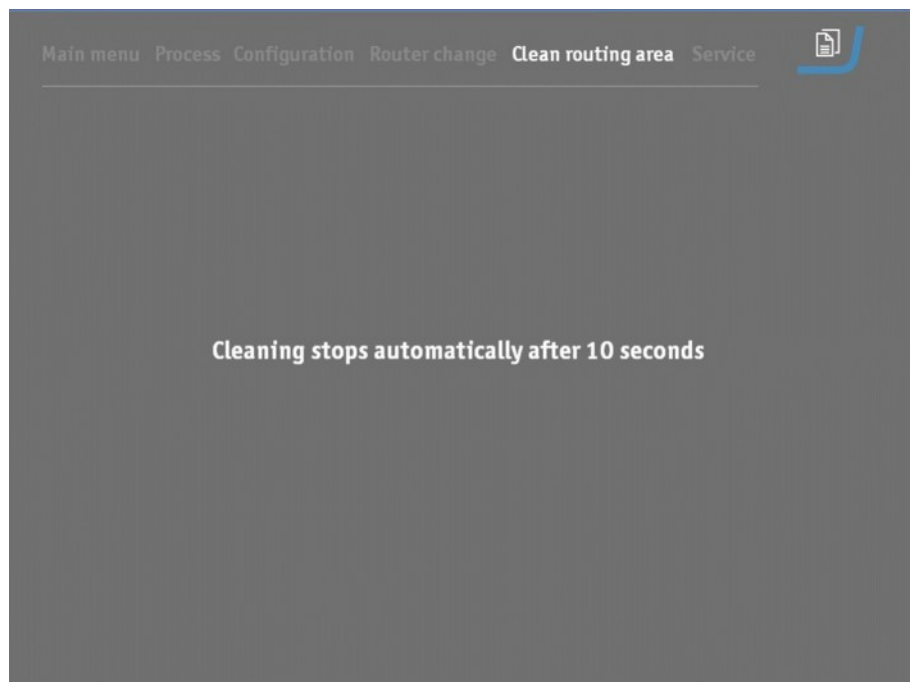
Cleaning

The routing area needs to be cleaned regularly. This is done using the automatic Clean routing area function, and by manually cleaning the surfaces of ViaSampler.

Cleaning the Routing Area



- Ensure that the dust/fume extraction device or system is connected and functional.
- Ensure that there is no PCB on the router table.
- From the *Main menu* page, press or click the **Clean routing area** icon. The cleaning cycle starts and ViaSampler switches the external contactor relay to start the external dust/fume extraction device or system. The cleaning cycle lasts 10 seconds, and while cleaning is in progress the following text is displayed:



When the cleaning cycle is finished, the display returns automatically to the *Main menu* page.

Manual Cleaning

It is not necessary to disassemble the machine for normal cleaning.

- Using a soft moist cloth, gently wipe the surfaces of the ViaSampler enclosure and router table.
- Using a soft moist cloth, gently wipe the external surface of the routing area safety screen.

Warning!

Do not use excess water or solvents to clean ViaSampler. Cleaning with solvents or excess water can cause damage and create a safety hazard.

Warning!

Do not use alcohol-based cleaning products on the transparent part of the safety screen.

Checking Router Wear

Wear on the router can be checked using a positioning pin (from ViaKit or ViaKit Basic):

- Use ViaSampler to make a coupon from a scrap piece of board.
- Press a positioning pin through a drilled positioning hole in the coupon, and hold the coupon by the edges in a horizontal orientation. The pin must be retained quite tightly. If the pin falls out, the router is worn and must be changed.

Changing the Router Tool

The router tool must be changed at regular intervals. The interval between changes depends on the following factors:

- Material and quality of the router tool
- PCB material
- PCB thickness
- Duration of usage
- Router operating speed

Router tool lifetime depends on the board type and the coupon size. Thicker boards with higher copper content result in a shorter router cutter lifetime. Some boards have thin ceramic layers, and this means that the lifetime of a router cutter is significantly lowered.

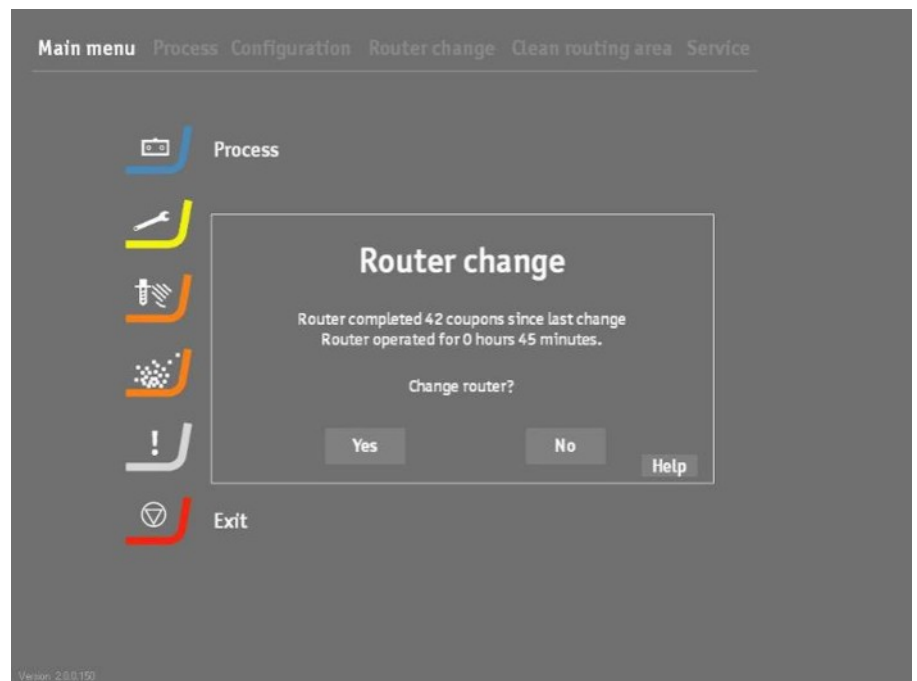
You can keep track of the number of coupons routed since the last counter reset. See [Statistics](#) on page 56.

Warning!

Handle router tools with care: The tip can be sharp.
The router can be hot if changed shortly after a routing operation.

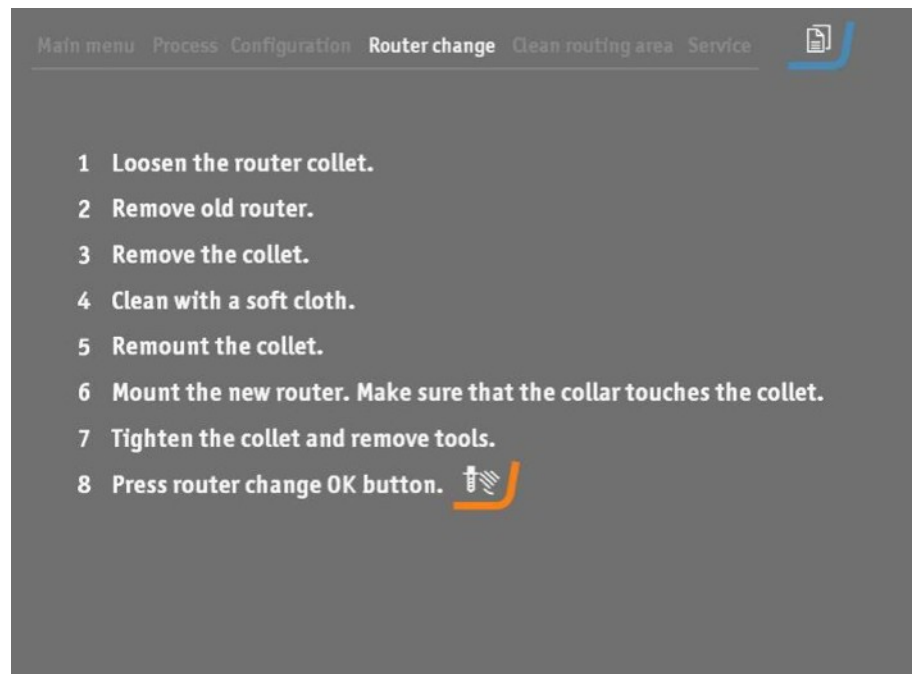


- From the *Main menu* page, press or click the **Router change** icon.
- A dialog box appears, showing the number of coupons routed since the last coupon counter reset (normally done when changing the router), and the operating time of the router in the same period. To confirm, select **Yes**. To cancel the change operation (e.g. the router has already been changed recently), select **No**.



- If router change has been confirmed, the safety screen retracts to allow access and the router change instructions are displayed:

Router Change Screen



Loosening the Collet

- Loosen the router collet using the 13mm and 17mm open spanners.



- Remove the old router tool.
- Remove the collet completely.
- Clean the collet with compressed air or a soft cloth.
- Remount the collet.
- Mount the new router tool. Make sure the router is fully inserted in the collet, i.e. the collar is touching the collet
- Tighten the collet with the 13 mm and 17 mm open spanners, and remove the tools.
- Press or click the **Router change** icon to leave the router change screen. The safety screen returns to the normal position, and the Coupon Completed counter (can be viewed from Statistics in the *Service* menu) is reset to zero.



Note

If you do not wish to reset the Coupon Completed counter, do not press the **Router change** icon after changing the router tool. Instead, press the **Return to Main menu** icon.

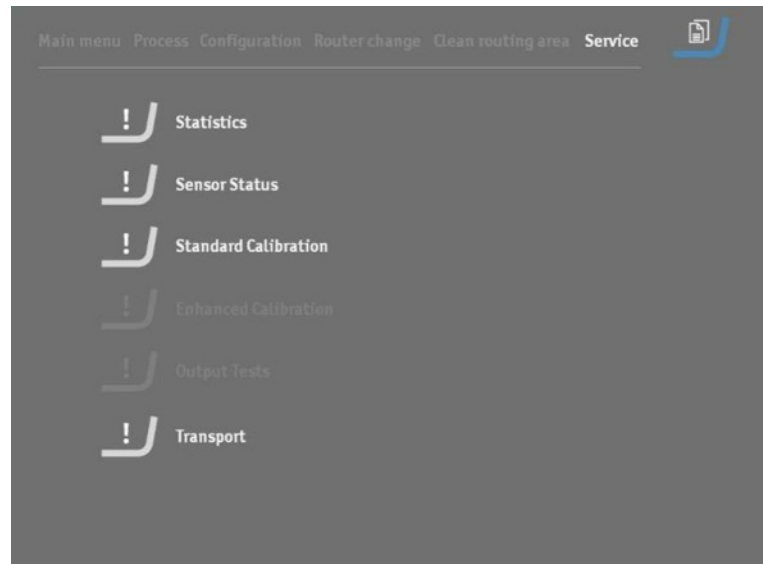
Replacing the ViaHolder Coupling

The coupling on the ViaHolders can become loose with wear. Replace the coupling ball once a year. Please see ViaHolder Repair Kit in the section on Consumables and Accessories.

Service Menu



- The *Service* menu is accessed from the *Main menu* by pressing or clicking the **Service** icon.
- To return to the *Main menu* from the *Service* menu, press or click the **Return to Main menu** icon.



Some of the functions under the *Service* menu can only be accessed by authorised service engineers. These functions are greyed out.

Statistics

The Statistics page gives you an overview of the operational history of your ViaSampler, including the total running time, a count of the number of times the router tool has been changed, and a count of the number of coupons completed since the last reset. The software and hardware versions are also shown.



- From the *Service* menu, press or click the **Statistics** icon to view the statistics.

Item	Duration		Counts	
	Since last reset	Total	Since last reset	Total
	[Hours:Minutes]	[Hours:Minutes]		
ViaSampler power on	151:10	151:10	30	30
X direction motor on	0:50	0:50		
Y direction motor on	0:03	0:56		
Shield motor on	0:20	0:20	93	93
Router level motor on	0:19	0:19		
Router motor on	0:02	0:43	4	89
Router tool on	0:02	0:43	1	2
Vacuum activated			31	117
Coupon completed			2	8
Service Trigger			14001	



- Press the **Return to Main menu** icon to return to the *Service* menu.

Sensor Status



The *Sensor Status* page shows the present state of all the sensors in the ViaSampler. This can be used as a diagnostic aid.

- From the *Service* menu, press or click **Sensor status** icon to view the *Sensor Status* page.

The screenshot shows the 'Sensor Status' page with the following data:

Emergency stop	
Status:	OFF

Clamp locking lever	
Status:	RELEASED
Navur:	500 ADC

Vacuum	
Status:	OFF
Pressure:	7 ADC

PCB Temperature	
Temperature:	30 °C

Focus / Light	
Focus:	540 ADC

Safety screen	
Position status:	At middle
Motor position:	2744 counts
Top Navur:	OFF 522 ADC
Safety Switch:	ON 2 ADC

Router	
Router motor:	OFF 0 rpm
Position status:	At top
Motor position:	0 counts
Top Navur:	ON 133 ADC
Bottom Navur:	OFF 598 ADC

Camera	
Camera:	Wide

Routing table	
Movement status:	Idle
Reference status:	Complete
X Navur:	OFF 544 ADC
X:	34654 µm
Y Navur:	OFF 540 ADC
Y:	28807 µm

The bottom right of the screenshot shows a camera view of a PCB with a red dot and a white square indicating the current position and target area.



- Press the **Return to Main** menu icon to return to the *Service* menu.

Standard Calibration

For correct operation of ViaSampler, it is essential that the distance between the cameras and the router be precisely calibrated. To ensure that the results are uniform, a new specific diameter router and a specific board must be used for standard calibration.

ViaSampler must be re-calibrated if:

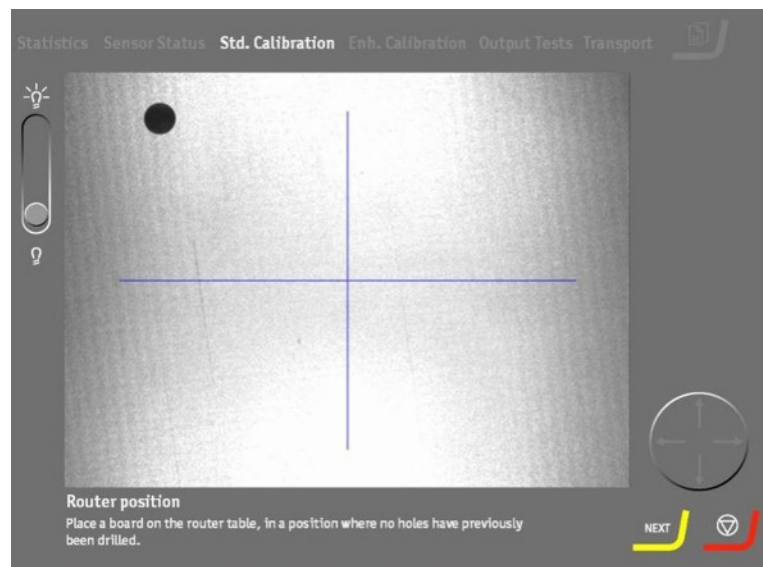
- the router cutter tool has been replaced
- ViaSampler has been moved
- ambient temperature has changed by more than $\pm 3^{\circ}\text{C}$ ($\pm 5.4^{\circ}\text{F}$) since the last calibration

The cursor is automatically enabled in calibration mode.

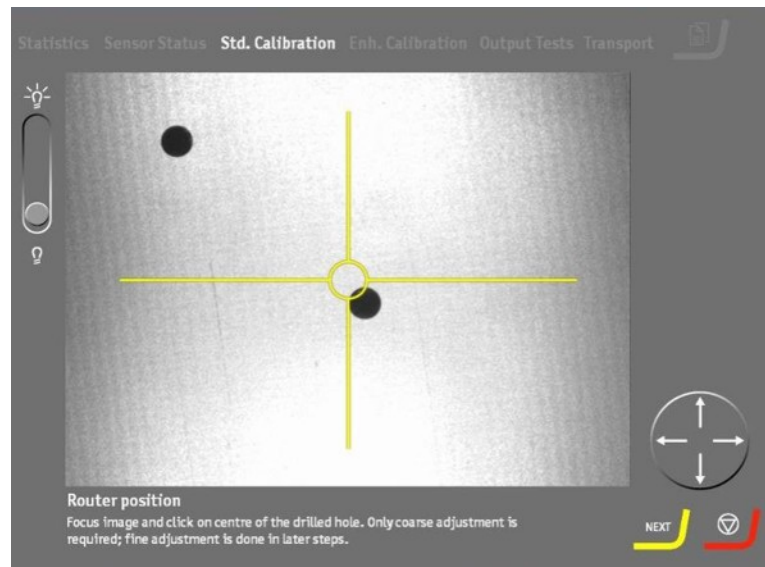
To calibrate ViaSampler:



- From the *Service* menu, press or click the **Standard calibration** icon to start the calibration process.
- Place a suitable board on the router table and move it so that the blue crosshairs meet over an area of the board with an unbroken copper surface.
- Lock the board in place by pulling down the clamp locking lever.

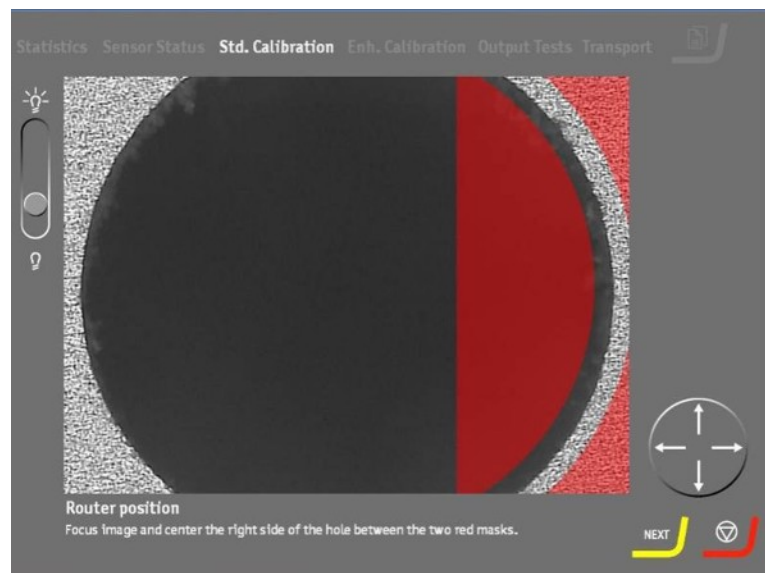


- Press the **Next** icon. A hole is drilled in the board.
- Adjust the lighting slider and the focus knob for the clearest view of the edge of the hole that has just been drilled.



NEXT

- At this stage, it is necessary to make a coarse correction of the camera alignment. Click at the centre of the drilled hole, so that the hole moves to the centre of the yellow circle.
- Click the **Next** icon. The high magnification camera view is now shown.

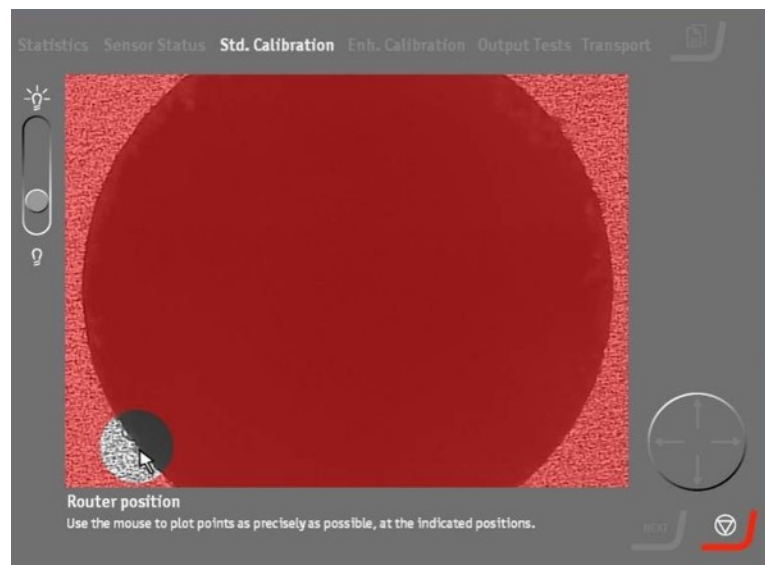


NEXT

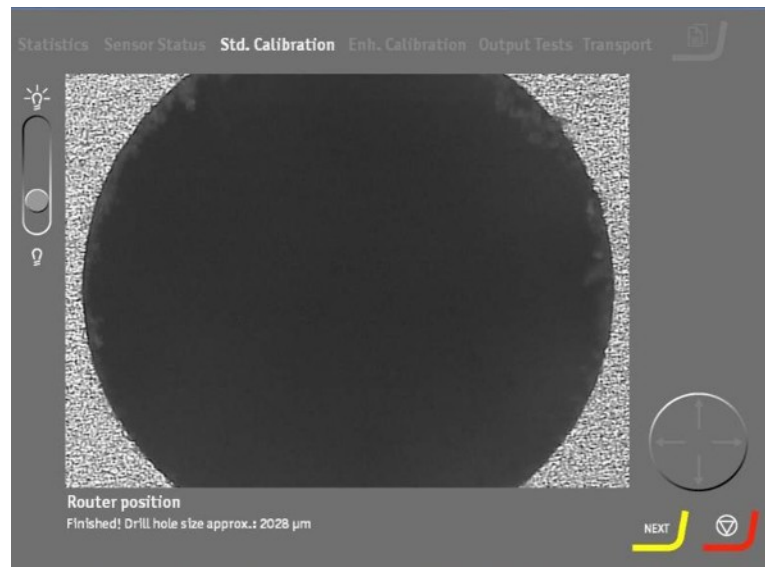
- Focus the image and centre the right side of the hole between the two red masks.
- Press the **Next** icon.



- Using the mouse, left-click as precisely as possible at one point on the edge of the hole inside the area highlighted in black and white. A new area is highlighted.



- Left-click as precisely as possible at one point on the edge of the hole inside the new highlighted area.
- Repeat in each of the highlighted areas around the hole. When all the alignment points have been clicked on, the red overlay disappears.



- Press or click the **Next** icon to accept the new calibration. To leave the calibration procedure without updating the calibration, press the **Exit** icon to leave the calibration screen.
- Press the **Exit** icon to return to the *Service* menu.

Oversized Hole

After completion of the standard calibration routine, the software should confirm that the hole is not oversized.

If the hole is oversized, it may be due to tilting of the router tool. Reinstall the router tool, and repeat the calibration.

If this does not help, the router tool may be worn and should be replaced.

Enhanced Calibration

Use of this function is restricted to authorised service technicians only.

Output Tests

Use of this function is restricted to authorised service technicians only.

Transporting ViaSampler

ViaSampler is a precision tool and instrument. As such, it can be damaged by excessive vibration or movement of the router table under transport. To minimise the risk of transport damage, Transport Brackets are supplied with ViaSampler. The router table must be set to a special transport position before the brackets are mounted.

- Turn the PC off using the power button – this will shutdown both application and PC.
- Switch off ViaSampler and disconnect both the mains power cable from ViaSampler and the cable to the touch screen power supply.
- Feed the cables through the holes in the left side bracket and reconnect the two power cables. **Do not mount the brackets yet.**



Note: prototype bracket illustrated


Important!



Do not mount or affix the brackets to ViaSampler until ViaSampler has been switched on again and has re-initialised. Premature mounting of the brackets can damage ViaSampler when the table moves at re-initialisation.

- Switch on ViaSampler.
- Switch on the PC.
Press yes when the initialize dialog appears. The machine re-initialises, and the routing table then moves to the centre position.
From the *Service* menu, press or *click the Transport* icon.

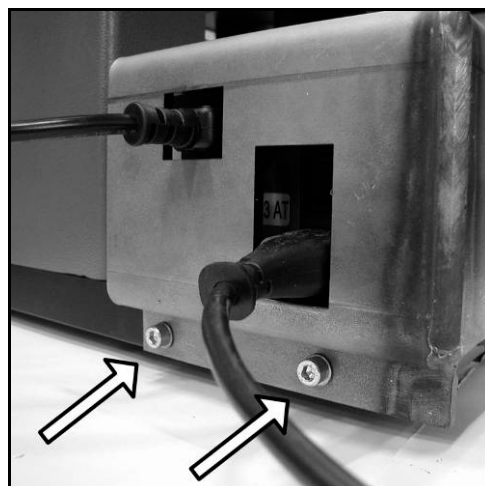
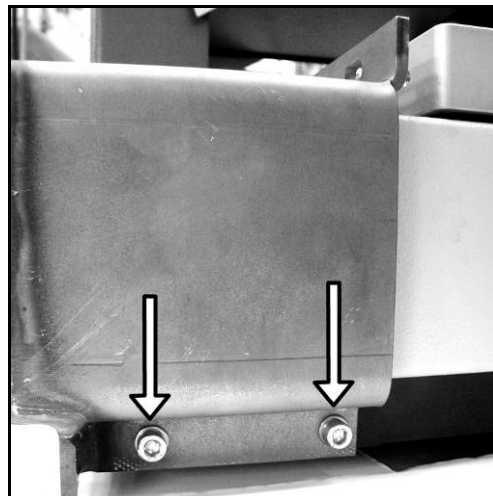


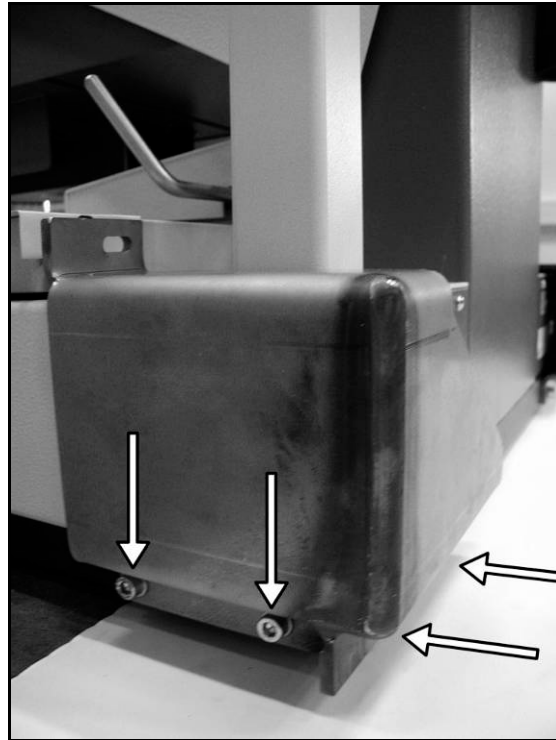
ViaSampler Instruction Manual

Statistics Sensor Status Std. Calibration Enh. Calibration Output Tests **Transport** 

- 1 Switch ViaSampler off and unplug the power cables for ViaSampler and monitor.
- 2 **Important: DO NOT mount the brackets yet!**
Pass the cables through the holes in the left side transportation bracket and switch ViaSampler on.
- 3 **After ViaSampler initialization, re-enter the TRANSPORT menu.**
- 4 Mount the two brackets to the black base plate using the red M6 screws supplied.
- 5 Press Next to move routing table to transport position: 
- 6 Mount M6 screws through the brackets into the routing table.
- 7 Exit this program and switch ViaSampler off before transport: 

- **Mount the two brackets** to the black base plate using the red M6 screws supplied.





Note: Prototype transport brackets illustrated

NEXT

- Press or click the **NEXT** icon to move the routing table to the transport position.
- Affix the brackets to the routing table with M6 screws.





- Turn off the PC using the power button. Switch off ViaSampler.
- Replace ViaSampler in the original packing case and secure.
- After transport to the new location, remember to remove the transport brackets before attempting to use ViaSampler!

Remote Service

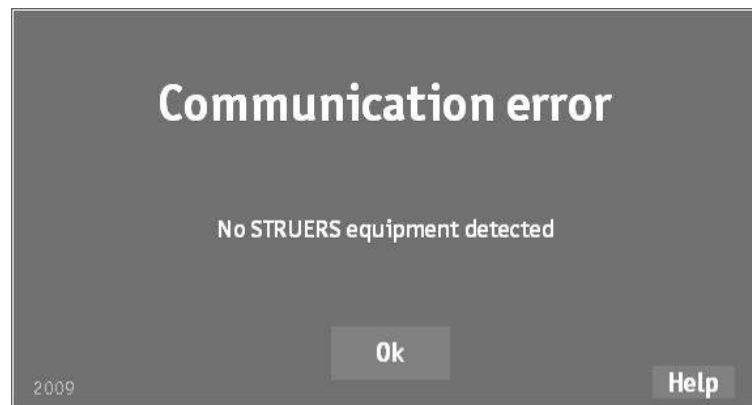
Customers with a Remote Service contract
Your local Struers Service Technician will be in touch to help set up
the Remote Service connection.

Remote Service is part of the ViaSampler Preventative Maintenance
Plan (PMP), a valuable aid to ensuring equipment performance and
reducing costly down time.
For more information on this valuable tool, please refer to the Struers
website: [Remote Service](#)

5. Trouble-shooting

Error at Program Start

If the serial cable is not connected correctly between the PC and ViaSampler, a popup error message will appear when the ViaSampler program is started:



- Check that the serial cable is connected between a serial port on the PC and the ViaSampler.
- Check that the ViaSampler is connected to a 230V source and switched on.

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Problem	Explanation	Action
ViaSampler		
Incorrect calibration	The distance from the top of the positioning pin to the centre of the via (the one identified on the monitor and not another one in the same row) MUST be 5 mm +/- 10 µm.	Re-calibrate ViaSampler. If this does not help, contact a Struers service technician to service the ViaSampler.
Incorrect identification of points of interest	The physical identification of the two points of interest on ViaSampler are critical, and easily overlooked.	For microvias, always use maximum magnification (200x) and the measuring ring used for the best possible alignment. Stand directly in front of the monitor and take care whilst centering the crosshair over the via. Resize the circle of the crosshair to the via size.
Worn/incorrectly mounted router tool	There must be a tight fit between positioning hole and the positioning pin at all times.	Drill a hole and push the pin inside. It should be necessary to use force to move the pin. If not, re-mount the router tool. If this does not help, replace the router tool.
Routing tool has not cut through the board	The standard length of a router-cutter from the tip of the router-cutter, to the edge of the coloured collar must be 16.5 mm.	Check that the length from the tip of the router-cutter, to the edge of the coloured collar is 16.5 mm.
Panels bend during routing		Glue thin panels onto a piece of rigid board to prevent the panels from bending downwards during routing.
Loud, grating metallic noise during routing	There may be ceramic components on the PCB (populated boards).	Stop the routing process immediately. Ceramic components cannot be cut with the router-cutter. Select a different location for the coupon that avoids these ceramic components.
	Router-cutter may be damaged or not suitable for use with ViaSampler.	Stop the routing process immediately. Check that the length from the tip of the router-cutter, to the edge of the coloured collar is 16.5 mm. If the cause cannot be found, contact a Struers service technician to service the ViaSampler.

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Problem	Explanation	Action
Positioning pins loose.	Router-cutter used is too large or is worn.	Change the router-cutter or use a smaller diameter.
	Router-cutter incorrectly mounted or is worn.	Remove the collet, clean thoroughly, and re-mount router-cutter. Make sure the router-cutter is as straight as possible.

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Other Error Messages

Code:

0 Special application start-up/closing down messages
 0001-0999 User information, not noted in error log
 1001-1999 User errors, not noted in error log
 2001-2999 Minor errors, application still running, noted in error log
 3001-3999 Major errors, application stopped, noted in error log

Code	Error message	Explanation	Action required
3	ViaSampler is not initialized. Begin initialization?	This message is shown at power-on when ViaSampler needs to do a reference search.	Select YES; initialization is required before it is possible to operate the ViaSampler. Note that the router table and safety screen might move during initialization.
4	Exit ViaSampler?	This message is shown to verify the closing of the ViaSampler program.	Select YES to close program. Select NO to return to program.
5	Router change. Router completed %0:s coupons since last change Router operated for %1:s hours %2:s minutes. Change router?	This message may be shown when Router Change menu is selected.	Select YES to replace the router, else NO.
6	Router change. Change router?	This message may be shown when Router Change menu is selected.	Select YES to replace the router, else NO.
22	Processing stopped. Clamp locking lever not properly tightened? State is %0:s Warning! PCB might move if clamp locking lever is released during Process	This message is shown when the clamp locking lever has been released during the process.	Select OK and the program will return to the manual positioning step.
24	Initializing. Please wait...		
30	Time to service. %0:s coupons made since last service. Additional %1:s coupons can be made before recommended service	A coupon has been made and the number of coupons since last service passes a specific point, activating notification of time to service.	Evaluate the approximate time to service; e.g. if service is required after an additional 10000 coupons have been made and you create 1000 each week, then a service visit should be scheduled in 10000/1000 = 10 weeks.

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Code	Error message	Explanation	Action required
1001	Processing Error. Cannot show Main menu while routing	Operator has selected the Return to Main menu button in Process view, ViaSampler was routing.	Select OK to return to Process menu; routing will continue.
1002	Processing Error. Ensure the clamp locking lever is properly tightened before continuing	Clamp locking lever has been released or hardware error.	Close the clamp locking lever and select OK. Contact a Struers Service Technician if this message is shown even though the clamp locking lever is already closed.
1003	Processing Error. This function is not valid at the current level of processing		
1004	Processing Error. Safety screen is blocked, remove obstacles. Processing is stopped	Safety screen cannot move, or safety screen did not move to a defined destination within expected time, or hardware error.	Remove safety screen obstacles. Power ViaSampler off and on. Contact a Struers Service Technician if this message continues to appear.
1005	Processing error. Router is blocked, remove obstacles. Processing is stopped	Router table cannot move, or router table did not move to a defined destination within expected time, or hardware error.	Remove obstacles. Power ViaSampler off and on. Contact a Struers Service Technician if this message continues to appear.
1006	Video input error. Video processing stopped. The Frame Grabber is most likely not set to 50Hz and cannot acquire video. Retry acquire video? (NO will result in program exit)	Frame Grabber has not been setup correctly.	To change the setup: If the Frame Grabber is a Data Translation DT3120: Go into Windows "Start" -> "Control Panel" -> "DT Imagine Control" -> "Advanced" and select "50Hz". Contact a Struers Service Technician if this message continues to appear.
1007	Video acquire problem. Video processing stopped. Error: %0:s Retry acquire video? (NO will result in program exit)	Video cable connection between ViaSampler and computer is most likely not correct.	Verify that the round video cable is connected to the ViaSampler. Verify the cable is connected to the Frame Grabber card in the back of the computer. If the Frame Grabber is a Data Translation DT3120: Connect cable to the round connector in the centre of the card. Contact a Struers Service Technician if this message continues to appear.

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Code	Error message	Explanation	Action required
2001	Process error. Processing failed Error: %0:s	An unexpected situation occurred within a specific process execution.	Report error to Struers Service department.
2003	ViaSampler is not operative. Router table home search timeout. Report error to Struers Service department.		
2004	ViaSampler is not operative. Encoder error. Report error to Struers Service department.		
2005	ViaSampler is not operative. Processing error. Report error to Struers Service department.		
2006	ViaSampler is not operative. Unknown error. Report error to Struers Service department.		
2007	Error. ViaSampler is not ready	Software error.	Report error to Struers Service department.
2008	Communication error. Cannot use COM%0:s serial port	This message is shown at power-on if there is no response from the COM port or the COM port number used is unknown (COM0).	On "COM0" message: Select OK and select a COM port button when the configuration menu opens. Else: Check that the serial cable is connected correctly between the ViaSampler and the computer. Check if there is another program using the COM port. Close this program and re-start ViaSampler program. Try to use another COM port for data communication between the PC and ViaSampler.
2009	Communication error. No STRUERS equipment detected	This message is shown if the communication cable is missing, not properly connected or because the COM port is used by something other than a ViaSampler.	ViaSampler must be powered ON. Check that the serial cable is connected correctly between the ViaSampler and the computer. Verify the COM port selected in the "Configure" menu.

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Code	Error message	Explanation	Action required
2010	Communication error. No ViaSampler detected	This message is shown if Struers equipment other than a ViaSampler is found.	The communication cable must be connected to a ViaSampler; the ViaSampler program on the computer only supports communication with ViaSampler equipment.
2011	ViaSampler equipment error. Failed operation name: %0:s Issue: %1:s	Hardware or software error. This message is used in many situations related to communication with the ViaSampler equipment. Note: This error can most likely be provoked in service mode in the Output Test menu.	Write down the text after "Issue:". Select OK; but inform Struers Service department if this message continues to appear.
2012	Transmission error. Received telegram %0:s has not the expected length; not enough data bytes	Problem most likely due to communication problems between the ViaSampler equipment and the ViaSampler Program on the computer. May be due to incompatible software versions.	Select OK. Re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service department if this does not fix the problem.
2013	Transmission error. No answer from ViaSampler	A fault has occurred in the ViaSampler.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2014	Transmission error. Cannot send telegram to ViaSampler	ViaSampler Program has tried to send data to the ViaSampler equipment, but failed in the process.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.

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Code	Error message	Explanation	Action required
2020	Router error. Timeout waiting for router to start spinning	A process is underway and the message is shown that the router is started but is not rotating.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.
2021	Router error. Timeout waiting for router to stop spinning	A process is underway and the message is shown that the router will not stop spinning.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.
2022	Router error. Timeout waiting for router to move down	A process is underway and the message is shown that the router cannot position correctly at BOTTOM position.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.
2023	Router error. Timeout waiting for router to move feed	A process is underway and the message is shown that the router cannot position correctly at FEED position.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.
2024	Router error. Timeout waiting for router to move up	A process is underway and the message is shown that the router cannot position correctly at TOP position.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.
2025	Router error. Timeout waiting for safety screen to move to bottom position	A process is underway and the message is shown that the safety screen cannot position correctly at BOTTOM position.	Stop the current Process then restart the Process. If the process restart did not help; turn ViaSampler power off, wait 5 seconds, and turn power back on for the ViaSampler. Contact a Struers Service Technician if the error reoccurs.

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Code	Error message	Explanation	Action required
2026	Router error. Timeout waiting for safety screen to move to middle position	A process is underway and the message is shown that the safety screen cannot position correctly at STANDBY position.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2027	Router error. Timeout waiting for safety screen to move to top position	A process is underway and the message is shown that safety screen cannot position correctly at TOOL CHANGE position.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2028	Process error. Failed to enter ViaSampler process idle mode Issue: %0:s	Software or hardware error. ViaSampler enters idle mode in certain situations. E.g. on Process menu exit.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2029	Process error. Cannot select placement mode; the mode where the PCB is to be placed on the router table. Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2030	Process error. Failed to enter via1 mode; the mode where via1 is to be pointed out by operator Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2031	Process error. Failed to re-enter via1 mode; the mode where via1 is to be pointed out by operator Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.

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Code	Error message	Explanation	Action required
2032	Process error. Failed to enter via2 mode; the mode where via2 is to be pointed out by operator Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on.. Contact a Struers Service Technician if the error still occurs.
2033	Process error. Failed to re-enter via2 mode; the mode where via2 is to be pointed out by operator Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2034	Process error. Failed to enter coupon placement mode; the mode where the placement of the coupon is to be defined by operator Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2035	Process error. Failed to flip the coupon; failed to enter coupon flipped mode Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2036	Process error. Failed to complete routing. Issue: %0:s	Software or hardware error.	Write down the text after "Issue:". Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, turn off the PC, wait for it to shutdown and turn it back on. Contact a Struers Service Technician if the error still occurs.
2038	Communication error. Serial error on COM%0:s Name of routine that failed: %1:s. Error message details (if any): %2:s	This message is shown at power-on if there is no data communication between ViaSampler and the PC, or because the received data is not in the expected format (E.g. because it is not a ViaSampler connected to the COM line).	Try another COM port or re-connect the communication cable to the serial connection port and re-start PC program.

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Code	Error message	Explanation	Action required
2039	ViaSampler hardware error. Self test has detected problems with: %0:s Continue using ViaSampler?	This message is shown at power-on if there is a self-test error detected.	Select NO; ViaSampler will exit (recommended).
2040	Emergency stop. Emergency stop has been activated. Select OK to stop ViaSampler program	This message is shown if the emergency button has been activated. Selecting OK will close the program.	De-activate the emergency button before the PC program is re-started.
2043	Equipment error. Wrong firmware version number in ViaSampler, version %0:s found, version %1:s or later required. IMPORTANT: ViaSampler Firmware must be updated.	Incompatible PC program software and firmware versions.	Press OK twice. Press Service (in the top menu) and at the same time press once on "u" on the keyboard. Now release the Service key and a new menu will open. Select Update and wait for the update process to complete. Contact Struers Service department if the firmware update fails.
2044	Equipment error. Wrong hardware version number in ViaSampler, version %0:s found. Version %1:s or earlier required. IMPORTANT: ViaSampler software or hardware must be updated	Hardware is incompatible with Firmware and/or PC Program versions.	Report error to Struers Service department.
2045	Connection error. Serial communication TEST connector on the back of the ViaSampler should not be used for communication	This message is shown if the communication cable is mounted incorrectly at the rear of the ViaSampler. The ViaSampler has two serial input connectors at the rear side. The TEST connector is used during software update and service on the ViaSampler. It must not be used when the ViaSampler Program on the PC is in use.	Use the PC serial communication connector on the back instead of the TEST connector.
2046	Connection lost. No connection to ViaSampler Select OK to stop ViaSampler program - or - Restore connection	Power to ViaSampler lost, software in ViaSampler has stopped working, or serial communication cable has been disconnected.	Check the power and cables on the ViaSampler equipment. Power ViaSampler off, wait 5 seconds, and power it on again.
2047	Connection restored. Connection was lost to ViaSampler, but ViaSampler is replying again Select YES to reset ViaSampler, - or - NO to stop ViaSampler program	This message is shown if the communication cable or connection is restored.	Select YES to start initialization. Select NO to close the PC program.

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Code	Error message	Explanation	Action required
2050	ViaSampler is not operative. Namur sensor error Report error to Struers Service department	Initialization error. This message is shown if the power-on initialization error has occurred. One of the Namur sensors is not responding correctly.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2051	ViaSampler is not operative. Emergency Stop button active	Initialization error. This message is shown if the power-on initialization error has occurred. The emergency button is activated.	Re-position the emergency button, by de-activate the emergency button. Close the PC program and re-start the PC program. Contact a Struers Service Technician if the error reoccurs.
2052	ViaSampler is not operative. Router at Illegal position	Initialization error. This message is shown if the power-on initialization error has occurred. The router is not at a legal position.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2053	ViaSampler is not operative. Safety screen at Illegal position. Report error to Struers Service department.	Initialization error. This message is shown if the power-on initialization error has occurred. The safety screen cannot deactivate an internal safety switch.	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2054	ViaSampler is not operative. Safety screen failed to position correctly. Report error to Struers Service department.	Initialization error. This message is shown if the power-on initialization error has occurred. The safety screen cannot find its top position (Namur sensor not activated).	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2055	ViaSampler is not operative. Router failed to position correctly. Report error to Struers Service department.	Initialization error. This message is shown if the power-on initialization error has occurred. The router cannot find its top position. (Namur sensor not activated).	Select OK. Turn ViaSampler power off, wait 5 seconds, and turn power back on. If this did not help, close and then re-open the ViaSampler PC Program. Contact a Struers Service Technician if the error still occurs.
2056	Camera light problem. Warning: Retrieval of camera light status failed!		Report error to Struers Service department.

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Code	Error message	Explanation	Action required
3001	Fatal error. Dialog with message ID %0:s requested by program. This ID is not in the message list	Installed ViaSampler PC software has been damaged or bug in software.	Note message information. Press OK. Then re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service Department if this does not fix the problem.
3002	Fatal error. Internal application error. Exception: %0:s	A severe error occurred, which made it impossible for the ViaSampler PC software to continue.	Note exception. Select OK. Then re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service department if this does not fix the problem.
3003	Fatal error. Invalid Argument; software element aComms" is not defined."	Software or hardware error.	Select OK. Re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service department if this does not fix the problem.
3004	Missing log file directory. ViaSampler installation is invalid	PC Program installation has been corrupted or previous installation of the PC Program failed.	Select OK. Re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service department if this does not fix the problem.
3005	Fatal error. External problem resulted in fatal error. . %0:s	A severe error occurred, which made it impossible for the ViaSampler PC software to continue.	Note message information. Press OK. Then re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service Department if this does not fix the problem.
3006	Fatal error. The following %0:s are missing: %1:s Program will exit	ViaSampler Installation is not ok; the missing items have been deleted or have not been installed in the first place.	Select OK. Re-install / repair the ViaSampler PC Software using the Program CD-ROM. Report error to Struers Service department if this does not fix the problem.

6. ViaSystem Accessories and Consumables

Please refer to the [ViaSampling system brochure](#) for details of the range available.

7. Spare Parts List

0,75x3 MAINS CABLE EN-MALE+FEM.....	2WC04668
0.9²x 3 Mains Cable w. Nema 6-15P	2WC09003
Coax cable BNC-BNC 75ohm 1.50m	2WC17150
Serial cable	15713532
Mains cable IEC320.C5-C14	2WC00571
(Touch-screen to ViaSampler)	
Mains cable IEC320.C5 – Schuko	2WC00572
(PC mains power supply)	
Mains cable IEC320.C5 - NEMA	2WC00573
(PC mains power supply)	
Touch monitor	2HD15601
Contact box.....	15710080
ULS screw M4 x 10	2TR80410
Fork spanner NV 13	2GR00213
Fork spanner NV 17	2GR00217
O-ring 29.50 – 3.00	2IO30030
VIARO Router drill 1.96 Blue	40300078
VIARO Router drill 1.97 Yellow	40300079
VIARO Router drill 1.98 Red	40300077

8. Technical Data

Please refer to the [ViaSampling system brochure](#) for details.

Subject		Specifications
ViaSampler		
Table clearance (recommended)	Left side	350 mm / 13.8"
	Right side	350 mm / 13.8"
Table clearance (minimum) (facing the front)	Left side	150 mm / 5.9"
	Right side	300 mm / 11.8"
Board dimensions	Min. gauge without support / reinforcement	0.5mm / 20 mil
Safety Standards		Please refer to the Declaration of Conformity

English

Declaration of Conformity

Manufacturer

Struers ApS
 Pederstrupvej 84
 DK-2750 Ballerup, Denmark
 Telephone +45 44 600 800

Herewith declares that

<i>Name:</i>	ViaSampler
<i>Cat. No.:</i>	05716128
<i>Function:</i>	PCB Sampler
<i>Type No.:</i>	571

fulfils all the relevant provisions of the:
**Machinery Directive
 2006/42/EC**

according to the following standard(s):
 EN ISO 12100:2010, EN ISO 13849-1:2015,
 EN ISO 13850:2008, EN 60204-1:2006/AC:2010.

and is in conformity with the:
**EMC Directive
 2014/30/EU**

according to the following standard(s):
 EN 61000-3-2:2014, EN 61000-3-3:2013, EN 61326-1:2013.

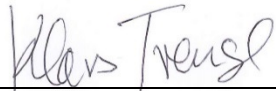
**RoHS Directive
 2011/65/EU**

according to the following standard(s):
 EN 50581:2012.

Supplementary Information

The equipment complies with the following standards:
 NFPA70:2014, NFPA79:2012, FCC 47 CFR Part 15, AS/NZS 2064. 1/2.

The above has been declared according to the global approach, module A.

Authorized to compile the Technical File:


Klavs Tvenge
 Director of Business Development
 Struers ApS
 Pederstrupvej 84
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Date of Issue: 2017.11.01



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