

## Our Complete Solution incl. Fixturing

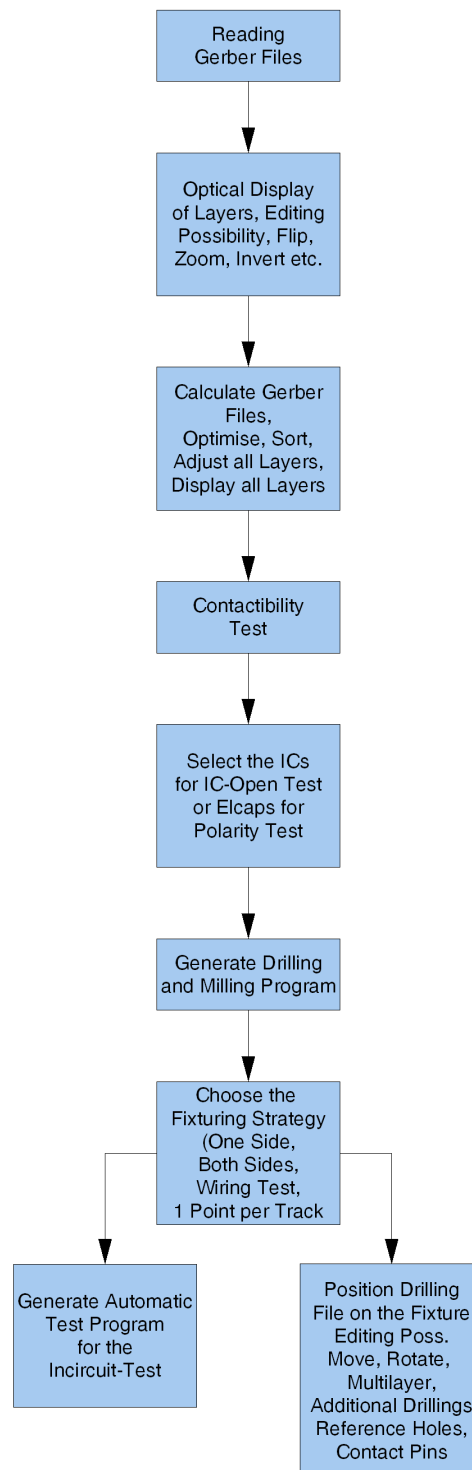
A test system, whether for In-circuit or for Function test, can only be used in a reasonable way, if the item under test, PCB, hybrid, module or SMT-PCB, can be connected as well as possible for a most comprehensive test. We have always tried to produce cost-effective test systems with an extremely user-friendly software. Our solutions for fixturing are extraordinary: We have developed various systems for fixturing which are unusual in costs, user-friendliness and space needed for them. Testing has become economical even with small units. Our semi-automatic system for building fixtures can be used together with our fixtures. In less than one day you can thus create a solution for many hundred pins at your own site.

### Various solutions for building test fixtures semi-automatically by using Gerber files

In Germany and Western Europe it has become pretty expensive to produce and test PCBs because of the wages and the costs around them. Many companies have therefore shifted their large scale production to the Far East in order to produce more economically there. This brings about that there are only middle and small-lot productions on the German and the European markets. This is why things had to be thought over in testing and especially in building fixtures. Years ago, production runs with 100,000 and more pieces per type were absolutely common. In the meantime, the numbers of pieces have diminished pretty much. Nowadays, one can hardly plan in this way. In the past the costs for fixturing could easily be allotted to the number of pieces – testing nevertheless remained economical. In the meantime, the structure of the market has changed in that a big part of the electronics is produced by mechanical engineering industries as well as by their sub-contractors. There is an enormous variety of types in this field therefore, with limited numbers of pieces at that. Today, there are production lots between 200 and 400 pieces. In creating fixtures for such lots, especially in the in-circuit test field, the costs very often run up to sums in between 4,000 and 10,000 Euro for both preparation and creation. You also have to pay the capacity/non-capacity of the service industries. These costs can in no way be apportioned to the numbers of pieces given above. Therefore it has become necessary to think about new ways for such lots.

We have made fundamental changes in the preparations for a fixture as well as in the final mounting of the fixture with the corresponding systems. We deliver the *semi-automatic system* (software and CNC drilling machine), which calculates the positions of the test pins, drills the fixture and places the pins. *It helps you to create a fixture on your own – in your own house in less than one day. Please ask for a detailed quotation.*

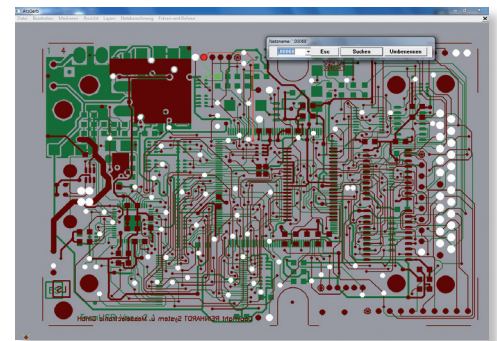
The following diagram shows the structure of the tasks:



## Elaborating Gerber Files

Without exceptions, all CAD systems offer Gerber data, the only common standard of CAD systems. That is why we use these data which are made up of single vectors. With them we calculate complete conductor tracks with the component drillings and the through-connections. The single layers (up to 255) can be graphically displayed on screen, either one after the other or all at the same time, or they can be edited if needed. Various D-Codes can be extracted of the displayed layers and single layers can be reflected. When all the layers are congruent, the software starts recalculating all tracks. This process is worked out within a few minutes, even for double-Eurocards in multi-layer technique. In a menu, you finally select if either all terminating points of the tracks or only one drilling per track is used for creating a fixture; of course this is displayed graphically. This software also checks the minimum distances between the monitoring points: It displays a message if you can no longer use 100 mil-contact pins (cost-effective, robust), because they are too close or that you have to use a 75 mil-contact pin (blue frame) for this monitoring point. Two monitoring points marked in a red frame mean you can only use 50 mil or even smaller contact pins here (if possible you should avoid this, as they are expensive and not robust.). The user should try to avoid such narrowings and use a suitable other test pad, even if this causes a re-design of the PCB. Tracks which are not contacted are flashing, i. e. they are not contacted, e. g. if IC-pins were connected with a track below the IC or if fixturing is from one side only and the track is on the side of the PCB which cannot be contacted from this side. As soon as everything is corrected or accepted, you place the reference pins or items which support you in inserting the boards. Finally the drilling diagram is positioned on the usable area of the fixture. This is done by centering it or by rotating. The usable area of the fixture can be used by some drilling programs so that two or more devices under test can be set on one fixture box if the test items are small.

The whole process for editing, displaying the PCB, creating the tracks and the drilling data takes about 10 minutes. These processes take about 2 to 3 weeks less than they used to when done in the manual technique used until now.

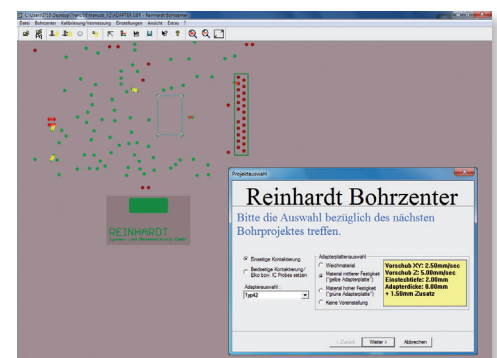


## Building Fixtures

The CNC drilling machine we offer is a package which contains hard- and software, box for 630 receptacles with spring contacts and sub-cabinet, but neither computer nor monitor. This three-dimensional CNC-drilling machine has got a slide travel of 395 mm (X axis), of 300 mm (Y axis) and 140 mm (Z axis). Accuracy is 20–30 $\mu$ , repeat accuracy is 10 $\mu$ . The unit requires compressed air, not lubricated, 6 bar pressure at a quantity of 50 l/minute.

Supply: 230 V

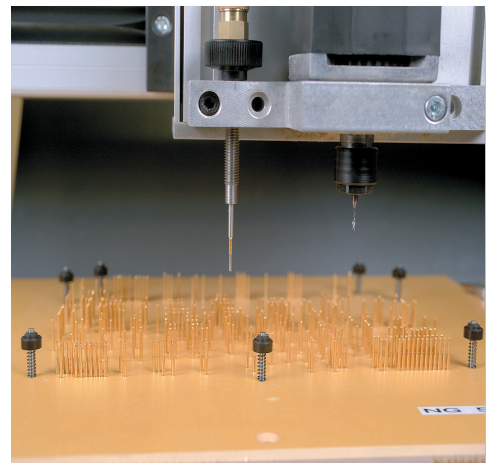
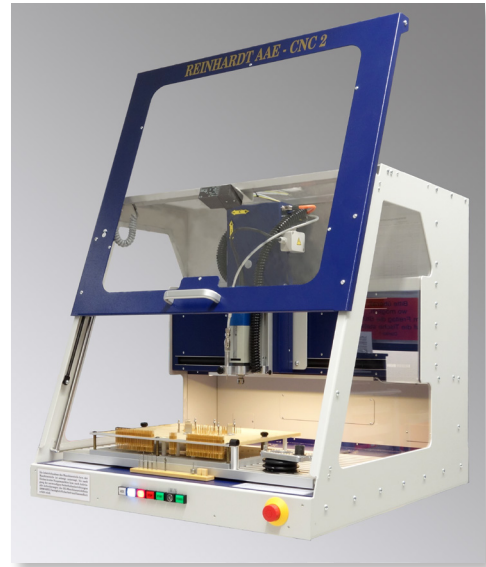
Dimensions: 80 cm high, 80 cm wide, 100 cm deep, weight about 110 kg.



Using the data which have been gained and selected out of Gerber files, the laminated paper plate is drilled for the contact pins, the reference pins, guidings and perhaps the IC-Open probes and polarity probes. You neither have to take care of offsets or other special inputs when you want to use the fixture drilling center as the dimensions of the plates are known and there are fixed holders for them. All holes can be drilled into the laminated paper plate true to gauge in less than one hour. A special press-in device, which is also controlled by the CNC-machine, supports this procedure. The spring contacts with receptacles are pressed in automatically with high accuracy. Using the D-codes, the system selects contact pins with different heads from the bi-partite magazine. You have to use different heads if you have chosen different contacting points. The contact pin of a wired component e. g. would be contacted with a crown, an open feed-through or a test pad would be contacted with a tip. On the whole, this process takes less than two hours. Wiring with wire-wrap cables follows. We have prepared cables with connectors on both ends. With them, the connector which contacts the test system is wired to the spring contacts. Wiring about 300 connections approximately takes you two hours. A test fixture incl. the calculation times of the Gerber files can be finished completely in about 4 to 6 hours.

### Test Fixtures

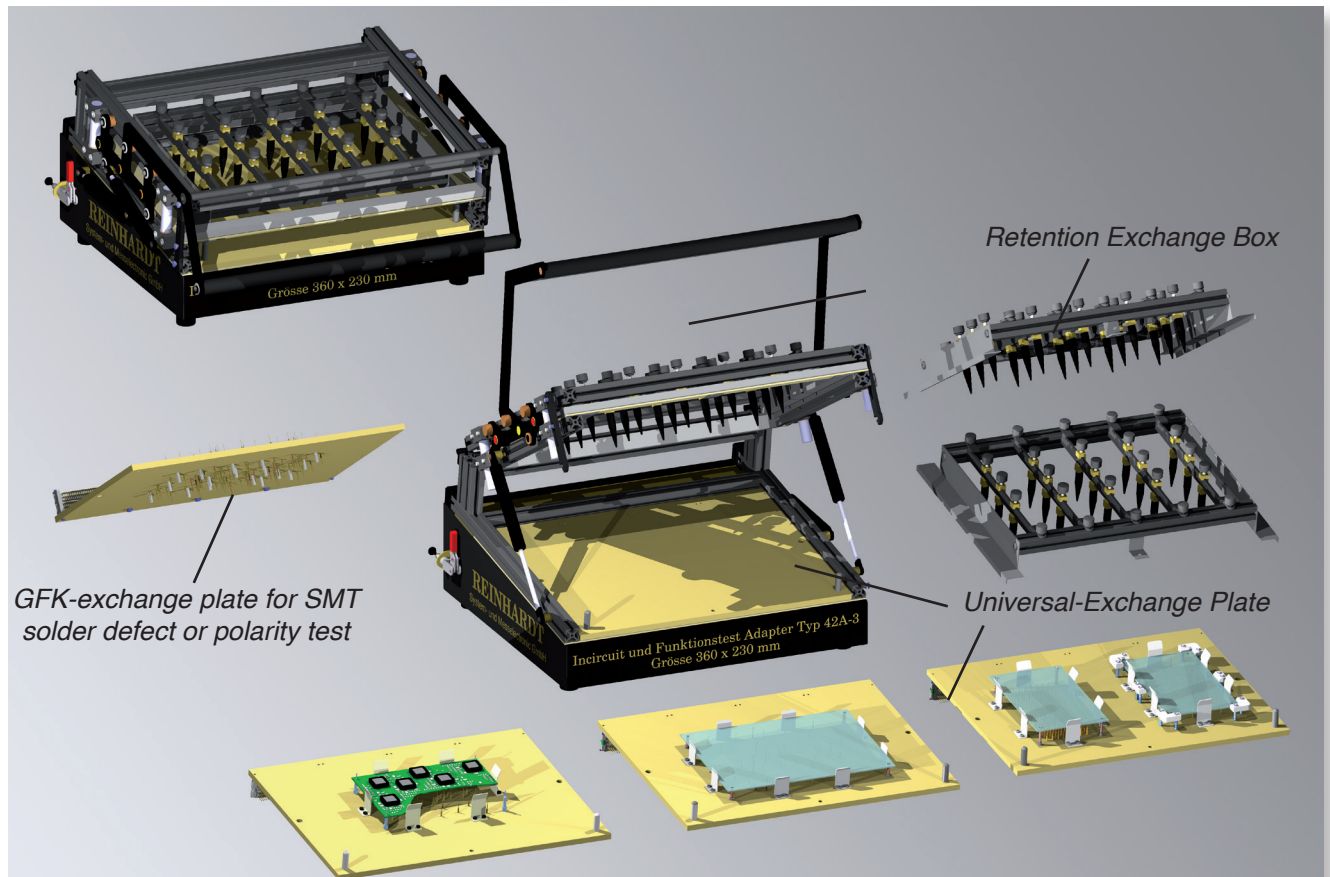
We grant that, from the very first thought until it is finished, a fixture can be made in less than one day. You therefore need a great deal less know-how and less efforts. This further reduces cost and time so that building a fixture today takes about 300 to 800 Euro. We have calculated that this fixturing system is profitable after only three fixtures. The costs for any further fixture will only be a fraction of the usual costs. Normally, you will only have 1/5 or 1/8 of the usual costs. What cannot be given in a sum of money is the spontaneity that results from the fact that you are able to build fixtures all on your own – within hours at your own site and without contacting suppliers.



## Our Fixturing System

As Germany's leading manufacturer of In-circuit- and Functional test systems, we have been producing test fixtures for testing electronic PCBs since 1990. Meanwhile, there are more than 86,000 fixturings are used with REINHARDT-fixtures. As we keep close contact with our customers, we know their difficulties in building

In both In-circuit- and Function test you have to measure into the test item, i.e. for location of defect each component has to be contacted or in function test the respective monitoring points or clusters have to be contacted. Spring contact pins are put onto the GRP-plate and make contact with the test item. For that, the test pads are contacted as are solder joints which are used in through-hole technique. For contacting every joint, quite a number of those spring contact pins is



fixtures for in-circuit and functional test. Our long-time experience becomes part of our fixturing systems which are continuously adapted to the requested needs. At the same time, we keep our fixtures practice-oriented and cost-effective.

In the field these systems turned out to stand many millions of contactings of test items. This is granted by a well dimensioned mechanics. Precision deep groove ball bearings are used at the heavily loaded pivot points so that our fixtures are almost maintenance-free.

Ergonomic operation is most important for us. This is why the lids of our test fixtures open wide. In this way, the device under test can be placed and removed quickly and comfortably. Therefore, handling times are short and the operator gets less tired.

put onto the hardboard or GRP-plate. The test item is placed on them and adjusted with collector pins. With retention pins which should be evenly distributed over the PCB, it is pressed to the contacting areas.

### Bed of nails

Our beds of nails (exchange plate) are drawers. Needless to say, the lower GRP-exchange plate (drawer) is compatible to former fixture types. The basic fixture is connected by plugging a number of 64/96way multi-way connectors (only once!). This is why the times for changing component types are very short (typically 1 minute). For technical details, please see the survey of fixture types.

## Retention box

An exchangeable box with retention pins comes with the basic version of a fixture. The retention pins can be adjusted as required by the resp. item to be tested. You therefore only buy the box once – this reduces your testing cost.

For SMT-solder defect test or polarity test you can change the box for an optional upper GRP-exchange plate.

## Working method of an exchange plate fixture

Procedure from placing the test item to contacting it:

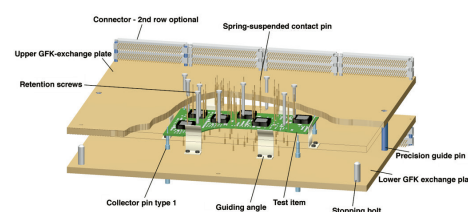
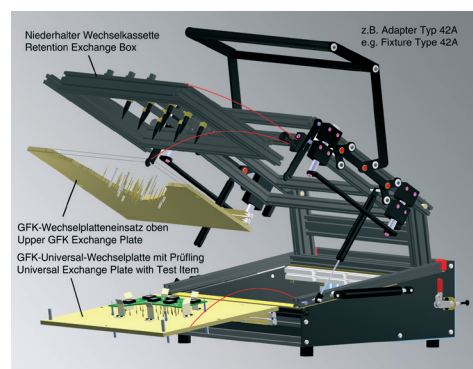
1. After opening the upper lid with its integrated retention pins, the test item can be placed comfortably as it is guided precisely by the collector pins.

2. The lower bed of nails is fixed with these types of fixtures. After the upper part with the retention box is turned down, the retention box clicks into place and is then lowered from above – absolutely in parallel with a few hundredth millimeters accuracy at each of the four sides and without any tilting (There are four linear guidings with bronze bushes which do not require maintenance). With its retention pins, the retention box holds down the test item and presses it to the bed of nails with the spring-suspended contact pins. As the front lever is wide and ergonomic, both left-handers and right-handers can use the fixture without difficulties. Operation forces have been distributed so that over 90% of the operational distance, you only apply less than 1 kg force. Only for a peak of a few percent of the total operational distance, the force rises to 6 kg with the maximum number of pins (e. ge. >800).

## Contacting from top and bottom

For contacting from top and bottom, an upper SMT-GRP exchange plate with the pins, polarity test probes and receptacles of spring-suspended reference pins can be used instead of the retention box. Contacting the electronic PCBs from both sides (above and below) is only possible, because REINHARDT-fixtures press down the test item exactly in parallel.

REINHARDT-fixtures offer another big advantage for preparatory measurements for new test programs: Since you always have to measure signals at the single pins, the fixture types 40, 42 and 82C, be it pneumatic or manual, can be opened although the upper part is closed for contacting the test item (see picture below) and you can reach the pin connection for measurement tasks.



Type 42 with open lower part

## Our Fixtures

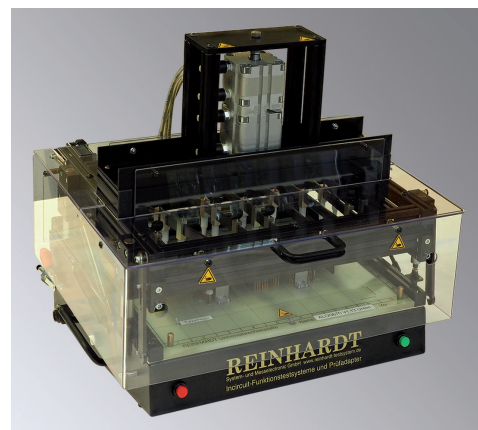
### Type 40 Pneumatic Fixture makes contact from both sides

Fixture Type 40 is closed manually, but two pneumatic cylinders press it down. Dual-stage is available so that very precise testing of components is possible. After the test, the pneumatic cylinder returns to its home position and the fixture opens automatically.

Security switch by two-handed operation

Shift: In-circuit test: 20 mm, Function test 13 mm

Compressed air, unoiled, 6 bar, 5 Micron



*Type 40B Pneumatic Fixture with Protective Cover*

### Type 42 Manual Fixture allows double-sided contacting

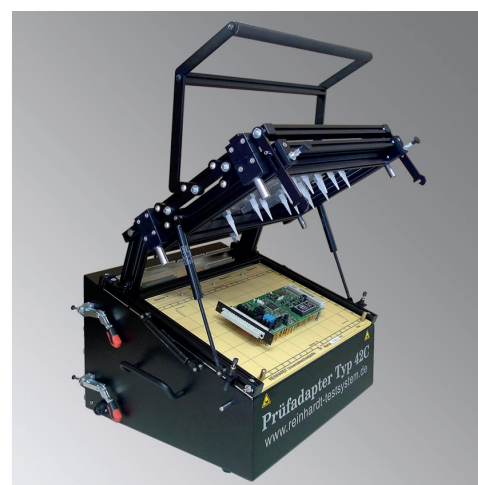
Manual fixture Type 42 is our best-selling fixture. It comes as a desk-version with sloping working area and a lower exchange plate and a retention box. Working area: 360x230 mm, max. 1,000 contact pins



*Type 42A*

### Type 42C Manual Fixture

Fixture Type 42C comes with a sloping working area and is designed for use with an ATS-KMFT 670/ATS-MFT 770 with expansion rack. The fixture has 4 linear guidings. It comes with a lower exchange plate and a retention box and 1 (max. 36) 64- and 7 96-way interchangeable connectors. Working area: 360x230 mm, max. 1,000 contact pins



*Type 42C*

### Type 82C Manual Fixture

This manual test fixture has a working area of 480 x 320 mm and was designed for a basic system with expansion rack.



*Type 82C Manual Fixture*

### Type 82B Manual Fixture

This manual test fixture has got 480x320mm working area. A lot of space is available inside. This fixture comes with one SR18VG-interface.



*Type 82B*

### Type 127 Manual Fixture

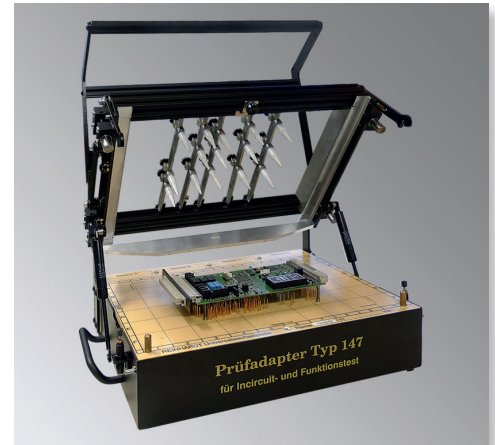
Type 127 was designed for medium-sized PCBs and max. 500 spring contact pins. It is particularly suitable for use with an ATS-UKMFT 627. Fixture Type 127 is delivered with a retention box and retention pins.



*Type 127 Manual Fixture*

### Type 147 Manual Fixture

Fixture Type 147 has the same usable area as types 42 and 40 although its pressure force is for max. 800 spring contact pins. It is also particularly suitable for use with an ATS-UKMFT 627. Type 147 comes with a retention exchange box. With knurled head screws, the 5 longitudinal arms with the retention pins are individually adjusted for the various test items.



Type 147 Manual Fixture

### Type UJ20 Universally Adjustable Test Fixture

With the universally adjustable test fixture Type UJ 20 single electronic PCBs or smallest series in the development of electronic PCBs can be contacted in a cost-effective way in testing prototypes, in function test of batches or in flashing.

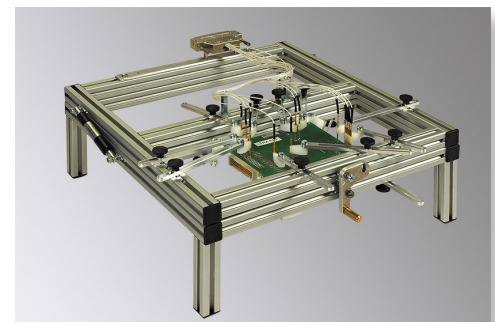
Test fixture Type UJ 20 is equipped with adjustable guiding edges, guiding brinks and guiding pins so that the device under test is repeatedly and exactly positioned. The spring contact pins are positioned so that with the upper hatch they press down on the electronic PCB with its contacting points. The spring contact pins are mounted to jibs which can be aligned in every horizontal position and which are fixed in place with a knurled screw. Via cables, the spring contact pins are connected to an interface connector which itself is connected to the test equipment.

Basic version: 10 contacting jibs 120mm, 1 guiding edge –firmly mounted, 3 guiding edges, 2 guiding brinks, 4 guiding pins.

Interface connector: D-Sub 25 pin unwired

Overall dimensions: W/D/H: about 360 mm/380 mm/200 mm

Board dimensions: max. 270 x 120 mm



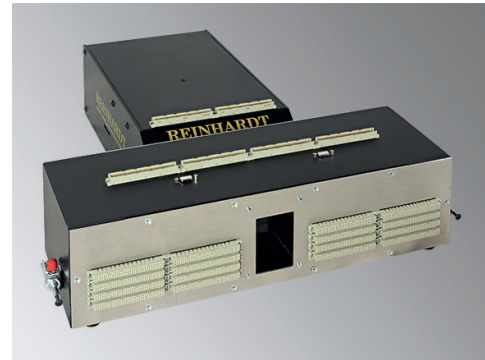
Type UJ 20



### Tandem Module

Tandem module 627/127 is a twin fixture box for contacting 2 fixtures Type 127 on one REINHARDT-test system. The module is designed for mutual contacting for higher throughput. A connection kit for two fixtures Type 127 is included.

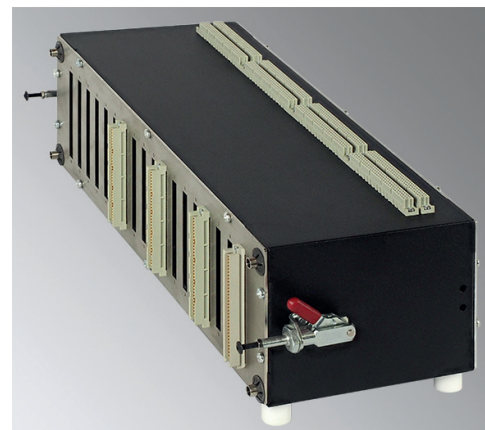
Depth about 165 mm, width about 600 mm



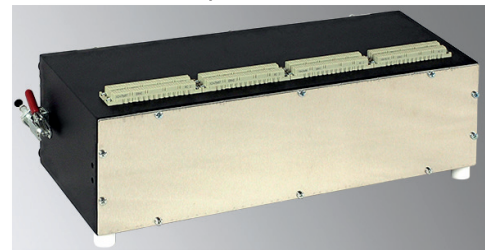
*Tandem Module 627/127*

### Universal Interface Box 165

This box was developed especially for REINHARDT-test systems and allows the easy contacting of function test components with e.g. cable endings and connectors for final functional test. On the one side, there is the SR18VG REINHARDT-interface and on the opposite side there is an aluminium plate, where you can mount connections specifically for the test item. Inside the box (around 10 cm or 16.5 cm deep) the ranging from test system connectors to test item connectors are wired. This avoids a confusing jumble of cables and connectors and resulting operating errors. This interface box also allows to convert the interfaces of other test system producers to REINHARDT-test systems.

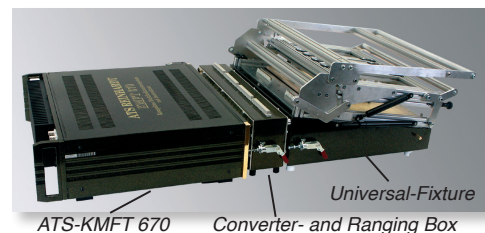


*Universal interface box 165 – similar to picture*



### Converter- and Ranging Box








The Converter- and Ranging Box enables you to connect former REINHARDT-fixture systems to the present 770/670-series. It is plugged between test system and fixture.



### In-line-System

REINHARDT-test systems are designed for both in-line systems and isolated use. Many control options are standard, others are options, such as e.g. the [SteuerMod-Inline USB](#) control module. Via ASCII- or ODBC-interface it can communicate with MES- or process control systems.



More spare parts and accessories for our fixtures are described in a special brochure. Please ask for "Accessories and Spare Parts for REINHARDT-Test Fixtures" or see our homepage on the internet under [http://www.reinhardt-testsystem.de/english/test\\_fixtures/fixture\\_accessories.php](http://www.reinhardt-testsystem.de/english/test_fixtures/fixture_accessories.php).

Fixture-Type	Type 40A	Type 42A	Type 42C	Type 82C	Type 82B	Type 127	Type 147
							
for Function Test for In-circuit Test	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
Contacting from Above and Below	✓	✓	✓	✓	✓	✓	✓
Work. Area in mm Width – Depth	360x230	360x230	360x230	480x320	480x320	191.5x172	360x230
Exchange Plates Dimensions in mm	380x297	380x297	380x297	500x400	500x400	217.6x230	380x297
Contact Pins Number	1000	1000	1000	1000**	1000**	500 pcs.	800 pcs.
Operation Force manual Ø in kg	0 kg	2.0 kg	2.0 kg	2.0 kg	2.0 kg	1.9 kg	1.9 kg
Interface Basic Allocation	4x64 total 256	4x64 total 256	1x64, 7x96 total 736	2x64, 3x96 total 416	2x64, 3x96 total 416	2x64 total 128	4x96 pcs. total 384
Interface max. Contacts	SR18VG 1152 (1728*)	SR18VG 1152 (1728*)	SR18VG 1152 (3456*)	SR18VG 1152 (3456*)	SR18VG 1152 (3456*)	SR08VG 512 (768*)	SR08VG 512 (768*)
Exchange Plate Interface Basic Allocation	4x64 total 256	4x64 total 256	4x64 total 256	4x64 total 256	4x64 total 256	2x96 pcs. total 192	4x96 pcs. total 384
Exchange Plate Interface max. Contacts	16x64/96 total 1536	16x64/96 total 1536	16x64/96 total 1536	16x64/96 total 1536	16x64/96 total 1536	8x64/96 total 768	8x64/96 pcs. total 768
Opening and Access when Contacted	✓	✓	✓	✓	✓	–	–
SMT Solder Defect + Polarity Probe	✓/ both sides	✓/ both sides	✓/ both sides	✓/ both sides	✓/ both sides	✓/ both sides	✓/ both sides
Retention Pins/ Arms	15 5	15 5	15 5	18 6	18 6	12 pcs. 4 pcs.	15 pcs. 5 pcs.
Retention Exchange Box	✓	✓	✓	✓	✓	✓	✓
2Level Fixturing Pneu- matic	✓ 6bar	Option manual	Option manual	–	–	–	–
Manual Operation	left/right	left/right	left/right	left/right	left/right	left/right	left/right
max. Com.Height *** contact one side contact both sides	45 mm 15 mm	45 mm 15 mm	45 mm 15 mm	45 mm 15 mm	45 mm 15 mm	no pocket 15 mm	no pocket 15 mm
Total Dimensions width, depth, height	50x47.5x46 cm	51x51x29 cm	51x54x29 cm	65x64x44 cm	65x64x32 cm	28x33x 23 cm	44x42x23 cm
Weight ca.	21 kg	16kg	20kg	25kg	25kg	9kg	12kg

\* SR8VG and SR18VG are test system-interfaces for REINHARDT-test systems  
if 96-way connectors are used

\*\* with "Fixture/exchange plate brace 453".

\*\*\* can be increased by milling grooves

Fixture–Type	Type 127	Type 147
		
for Function Test for In–circuit Test	✓ ✓	✓ ✓
Contacting from Above and Below	✓	✓
Work. Area in mm Width – Depth	191.5x172	360x230
Exchange Plates Dimensions in mm	217.6x230	380x297
Contact Pins Number	500 pcs.	800 pcs.
Operation Force manual Ø in kg	1.9kg	1.9kg
Interface Basic Allocation	2x64 total 128	4x96 pcs. total 384
Interface max. Contacts	SR08VG 512 (768*)	SR08VG 512 (768*)
Exchange Plate Interface Basic Allocation	2x96 pcs. total 192	4x96 pcs. total 384
Exchange Plate Interface max. Contacts	8x64/96 total 768	8x64/96 pcs. total 768
Opening and Access when Contacted	–	–
SMT Solder Defect + Polarity Probe	✓/ both sides	✓/ both sides
Retention Pins/ Profile Arms	12 pcs. 4 pcs.	15 pcs. 5 pcs.
Retention Exchange Box	✓	✓
2Level Fixturing Pneu- matic	–	–
Manual Operation	left/right	left/right
max. Comp. Height** contact one side contact both sides	no pocket 15mm	no pocket 15mm
Total Dimensions width, depth, height	28x33x 23 cm	44x42x23 cm
Weight ca.	9 kg	12 kg