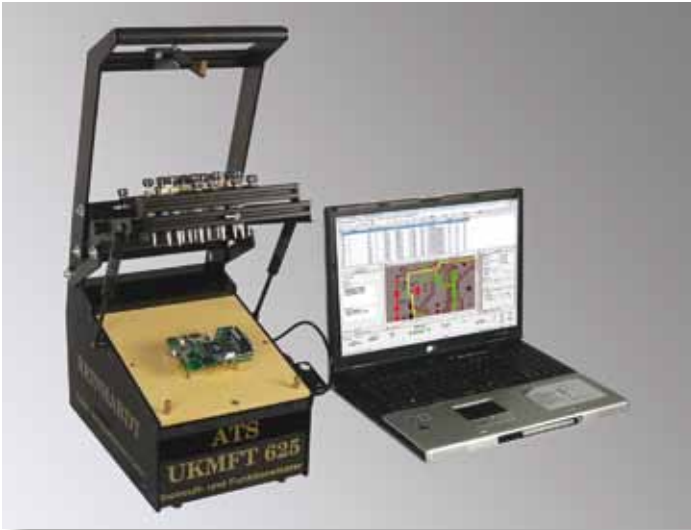


# ATS-UKMFT 625 / ATS-UKMFT 645

## Compact Multi-Function Test System for Testing Electronic PCBs



ATS-UKMFT 625 with integrated test fixture and with optional laptop

- In-circuit- and Function test up to 224/512 channels
- Function test analog, digital, pulse, microprocessor test, power electronics
- Pin contact, solder defects, components test, short-circuit and break test
- Boundary Scan, GPIB, IEEE/IEC-, RS232-, I<sup>2</sup>C-interface, CAN-Bus, K-Bus, DeviceNet, LIN-Bus, Profibus, VISA-Bus, Lon-Bus, EIB-Bus, TCP/IP, ...
- Menu-driven software with automatic program generation and autolearn for analog, digital and in-circuit test
- Graphic display of fault location for pin contact test, short-circuits between tracks, components defects, SMT-solder defects (Fine Pitch, BGA), polarity test
- Integration of external programs
- CAD-interface for CAD-data transfer (Fabmaster-Siemens), including Eagle
- Transient recorder with Fourier analysis
- Logic analyser
- All stimulus- and measuring modules for high test speeds are our own developments
- Flash-RAM programming, microprocessor test
- Statistics and fault evaluation
- ODT Optical Display Test
- Quality management
- Offline programming station and repair station
- System diagnose for system calibration
- Semi-automatic building of fixtures within 2 to 3 hours
- Only 1 day of training; in most cases the system is used in production in the first week after installation
- Competent, fast service by the developers

### How to Test Even a Few Pieces Economically

Investment test system	18.000,00 €
Depreciation period	5 years
Number of pieces p.a.	4.000 pcs
Investment depreciation	1,13 €/pc
Types of PCBs	12 pcs
Fixturing apiece	470,00 €
Test program apiece	320,00 €
Fixturing and test cost	0,47 €/pc

**Test cost per PCB 1,60 €/pc**

The calculation above is based on electronic PCBs with 80–100 contact pins or nets and an In-circuit-Function test. In single-shift operation the test system works to only 10 % capacity. These figures clearly prove that even with smaller numbers of pieces and greater variety of types testing can be very cost-effective and fast. At 50.000 pieces per annum the test cost are cut to only 0,13 €.



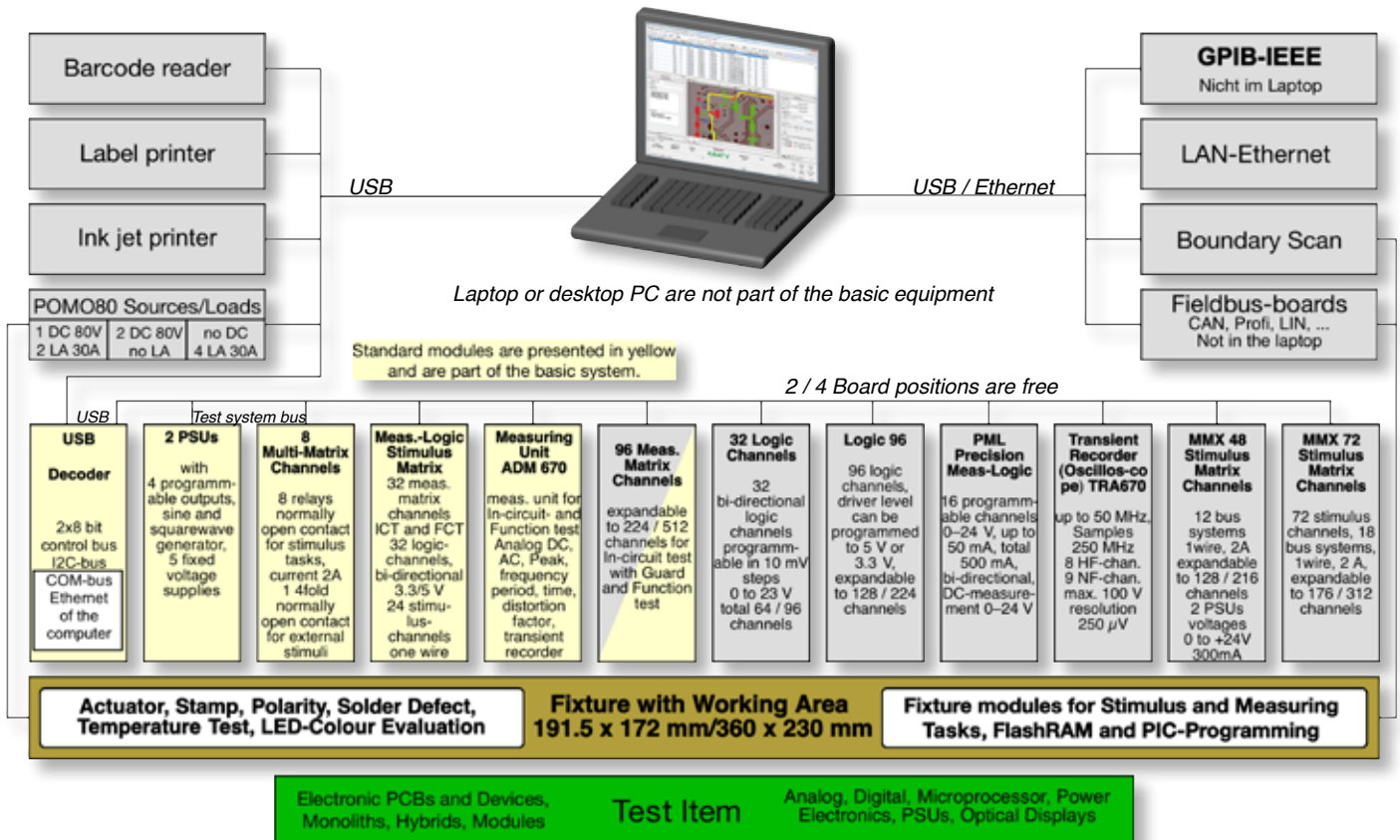
ATS-UKMFT 645 with integrated test fixture and with optional laptop

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# ATS-UKMFT 625-4 and ATS-UKMFT 645-4



ATS-UKMFT 625-4 and ATS-UKMFT 645-4 are combined in-circuit and function test systems. Options are displayed in grey.

In 1979 we started to develop, produce and sell computer controlled test systems. Independent institutes have shown that we have been the leading producer in Germany since 1994. Our company was founded in 1976 and we have always used our own money.

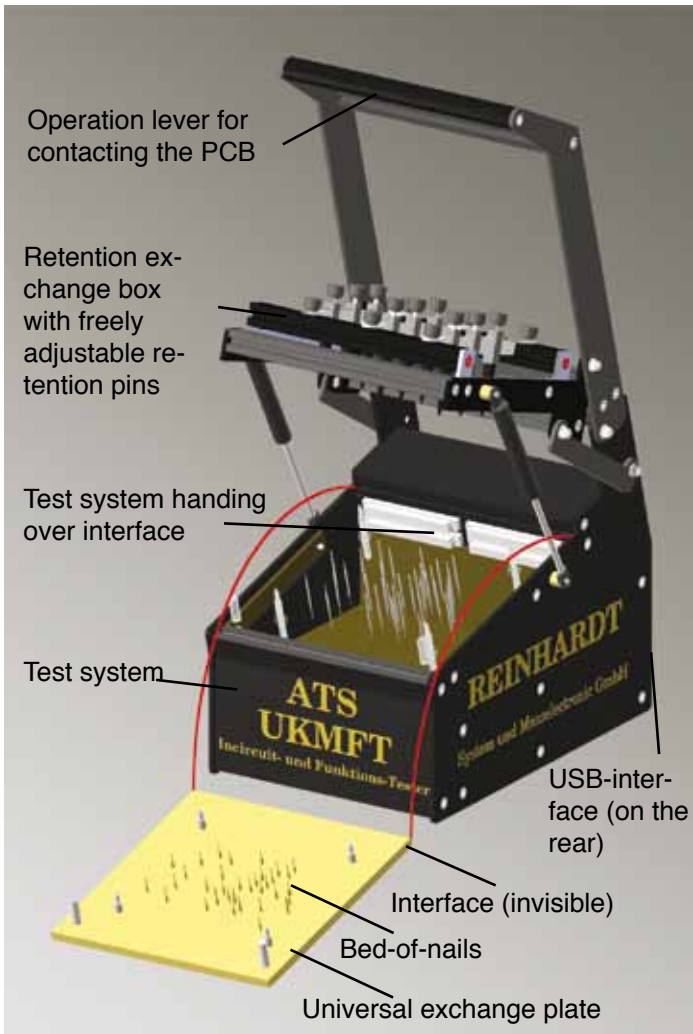
REINHARDT-test systems are based on experience which was gained over 4 decades out of recurring procedures. We transformed this experience into modules and that is why they differ so much from test systems which are made up of a number of IEC-boxes or which are made up of PC-/PXI-boards and varied software. Test systems that are made up of different boards of different producers are hard to program and the boards often do not comply. There is no system responsibility and almost no proper service whereas we supply qualified service by the developer.

By our very close contact to our customers and to people who are interested in our products and by analysing the market, we have found that there is a rising market for small in-circuit and function test systems, but these clients do not want to invest 35,000 to 50,000 Euro. ATS-UKMFT 625-4 and ATS-UKMFT 645-4 were therefore developed with less requirements for a possible expansion, but with the professional surroundings such as software, operation, speed, robustness and system responsibility. Many of the modules are identical with that of the successful ATS-KMFT 670. The software of ATS-UKMFT 625-4 and ATS-UKMFT 645-4 is compatible with that of ATS-KMFT 670.

ATS-UKMFT 625 and ATS-UKMFT 645 was developed for testing electronic PCBs. Target customers are the automotive industry, manufacturers of white goods, controls and sensors

## Structure of ATS-UKMFT 625-4 and ATS-UKMFT 645-4

The basic versions of ATS-UKMFT 625-4 and ATS-UKMFT 645-4 comprise a combined in-circuit and function measuring unit, 5 fixed voltages, 2 twin PSUs with 4 output voltages, a sine and square wave generator, 8 stimulus channels, a combined measuring-logic-stimulus matrix with 24 stimulus channels, 32 bi-directional logic channels and 32 measuring channels and Guard channels. The basic version of ATS-UKMFT 645 also holds a measuring matrix with 96 channels. ATS-UKMFT 625 is ready for expansion to up to max. 224 channels or 2 additional modules, ATS-UKMFT 645 is ready for expansion to max. 512 channels or 4 additional modules. The remaining board positions can be used as needed, see block diagram. A customary computer controls the test system via USB2-interface. The upper part of the test system is a test fixture for PCBs. This fixturing unit was developed for high stableness and ergonomic operation. All fulcrums are equipped with maintenance-free precision ball-bearings. This test fixture can be used for in-circuit and function test and is ready for contacting from above and below. It is retrofitted for different PCBs by changing the exchange plates and adjusting the universal retention system. This takes typically 1-2 minutes. The very inexpensive fixture costs are between €250 and €700.



Its low price, its comfortable menu-driven software based on WINDOWS®, its low follow-up cost in fixturing, in programming and maintenance are out of competition and enable you to create economical test solutions for smallest series (5 to 500 units) as well as for high-volume series. Thus PCBs can be tested economically and competitively.

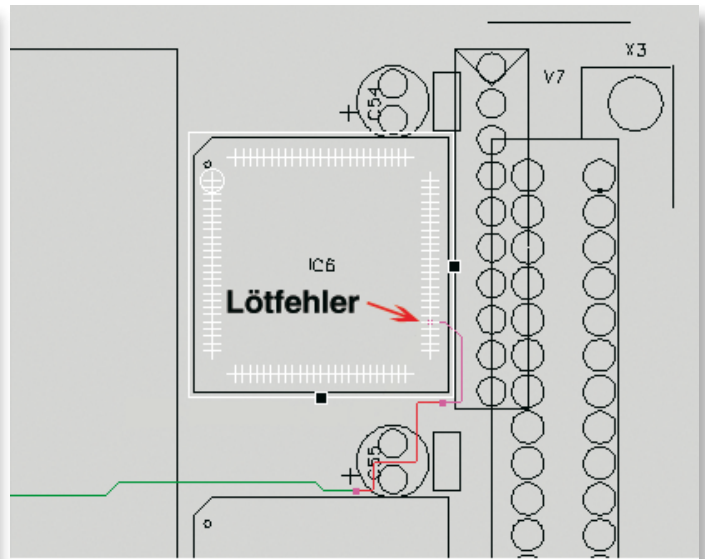
### Programming

REINHARDT--test systems have menu forms for programming which reduce your entries to a minimum. Compiling or assembling with syntax tests is unnecessary. On-line-editing is one of their special features: single test steps are created in both in-circuit and function test and are simultaneously tested with the test item. Further test steps are based on this knowledge. All input data are presented in a logic and user-friendly way. The device under test is connected via an interface (a number of multi-way connectors) which contacts the item via fixture or wiring. The measured values are sent to the measuring system and evaluated.

Programming is in forms so that programs are created rapidly and can be expanded, modified, corrected or optimised, even by trainees. You need only 1 day of training; 90% of our customers use the test system for production in the first week after installation.

### Analysing the Testability of a Test Item

Before a project is started, you can use a software-tool and the CAD- and Gerber files of the PCB for analysing its design



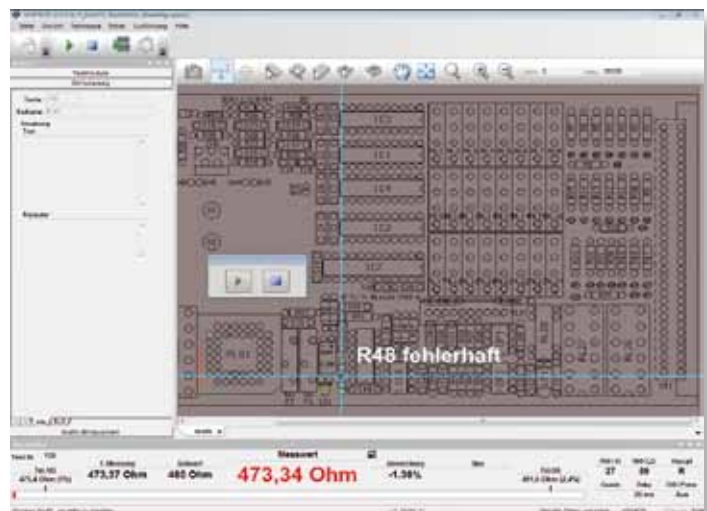
Pin-exact graphical display of fault location

for testability. The drilling data for creating your fixture can also be generated with this tool.

In programming the REINHARDT-In-circuit test, the bed-of-nails fixture must not be wired selectively according to a wiring list. You can wire 1 : 1 as you like and use a probe for assigning a spring-suspended contact pin to a test system channel.

### Incircuit-Test

The in-circuit test recognises solder defects which end in either short-circuits or breaks (cold joint) or open pins if SMT components are used. With very small programming efforts, a special measuring method finds even SMT-solder defects of fine pitch ICs and of BGAs. Components such as IC-insertion and resistors, capacitors, diodes, Zener diodes, FETs, operational amplifiers etc. are tested for values and polarity. A special autoguarding method and automatic finding of delay times reduce the programming time to a minimum. Programming data can be taken from CAD-data, e.g. the data of the bill of materials can be processed with the Excel®-software so that they can be imported directly into the test system software. As there is an automatic program generator, the test program is generated in typically 2 minutes per 100 components.



Clear fault location with current measuring value

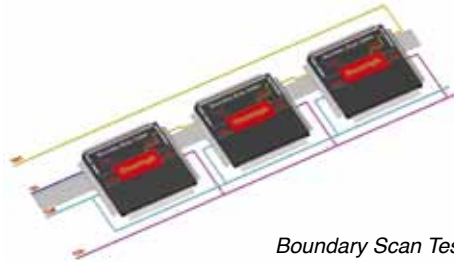
In both in-circuit and function test, you just move the mouse-cursor in the graphic display and click on the resp. component pin. Then the test system measuring channel is displayed and you adopt it e. g. in creation. You just determine if it is the High- or the Low-channel. Then you decide if you execute an analog measurement such as e. g. UDC, UAC, UPk, distortion factor or a digital one, with a time and frequency measuring unit which measures e. g. rise time or with an analog transient recorder which records the signal curve forms.

### CAD-Interface (Fabmaster/Siemens)

REINHARDT have developed their own interface for importing ASCII-data of test systems. An Eagle-interface is also available. Siemens-Fabmaster offers a converter for 65 of the most common CAD-systems.

### RBS 100 REINHARDT Boundary Scan

The Boundary Scan test and editing module for REINHARDT-test systems is fully integrated in the convenient test system menu. With the standard logic channels, it can test components which are not accessible via Boundary Scan cells, e. g. interface pins. Convenient programming via Boundary Scan



Boundary Scan Test

e. g. of Analog-to-Digital-converters is also possible. When you create the test program, you need the Gerber files and the BSDL-data of the ICs. They are required for the graphical display of fault location and the connections of the ICs.

### Function Test

In function test, there are analog, digital, pulse, micro-processor, power electronics and power supply tests. Our modules are developed and produced in the latest technologies. We produce our modules in the best way for high speed testing and reliability in three shifts.



Editing form with online display and input field

### Programmable Voltage Sources

In the basic version, there are 2 programmable complementary voltage sources 0 to +24 V and 0 to -22 V with 10 mV resolution. There are also 5 fixed voltage sources. PSU1+ delivers max. +1 A, PSU2+ max. 0.5 A and PSU1- or PSU2- max. 0.25 A.



Programming PSUs in the function test form

### Function Generator

The quartz-precise DDS-function generator can be programmed in 0.075 Hz-steps up to 78 kHz and generates sine and square wave signals with 16 bit resolution at 0.25 A maximum current. Maximum amplitude (sine) is  $7V_{eff}$  (5 mV resolution) and  $10V_{pp}$  (square, 10 mV resolution).

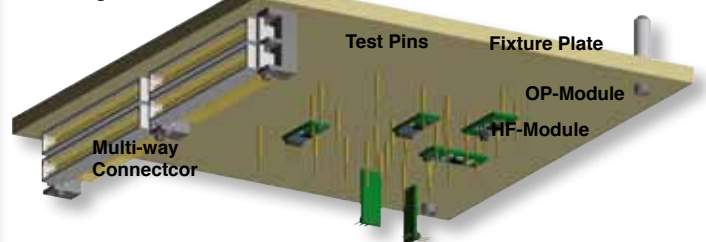
### Function and Arbitrary Generators

The optional function and arbitrary generators for frequencies up to 20/80 MHz offer sine, square wave, triangle, sawtooth, noise, pulse signals and ramps. Arbitrary functions are for generating any curve forms. Frequency ranges from 1  $\mu$ Hz to 20/80 MHz, resolution 1  $\mu$ Hz. Amplitudes can be programmed between 20 mV<sub>pp</sub> and 20 V<sub>pp</sub>.

### Supporting Modules – Built Into The Test Fixture

**Pulse Generator-Module** max. 1 MHz repetition frequency, 2  $\mu$ s pulse. **High Frequency Generator Module** max. frequency 30 MHz TTL. **High Frequency Divider** up to 1 GHz, factors 64 or 128. **Impedance Transformer**, input impedance: 8 T $\Omega$  at 8 pF. **Module for Measuring Peak Voltages** up to 10 MHz. **FARBMod** and **16FARBMod** evaluate and test colours (e. g. of keys) and LEDs incl. colour and intensity

### Test Fixtures with Stimulus and Measuring Modules



from 300 to 700 nm. **Activator-Module** activates keys and switches. **Start Stop Steuerung USB-Module**

### RML 32 Combined Measuring-Logic-Stimulus Matrix

The standard combined measuring-logic-stimulus matrix is made up of 32 measuring channels in three-wire technique for in-circuit- and function test with an open Guard channel. The High- and Low-channels can be switched individually 10 VA, 200 V or 500 mA, 24 stimulus matrix channels in one-wire technique and 32 digital logic channels. The driver levels can be set to 5 V or 3.3 V.

### Stimulus Matrix MMX

The optional **MMX670** stimulus matrix offers 48 channels and 12 bus systems, the optional **MMX72** offers 72 channels and 18 bus systems in one-wire technique for 2 A max. current. Two 16 bit precision PSUs, 0 V to +24 V, max. 300 mA can be programmed in 1 mV-steps. Current is programmed in 10  $\mu$ A-steps from 30–300 mA.

### Measuring Matrix

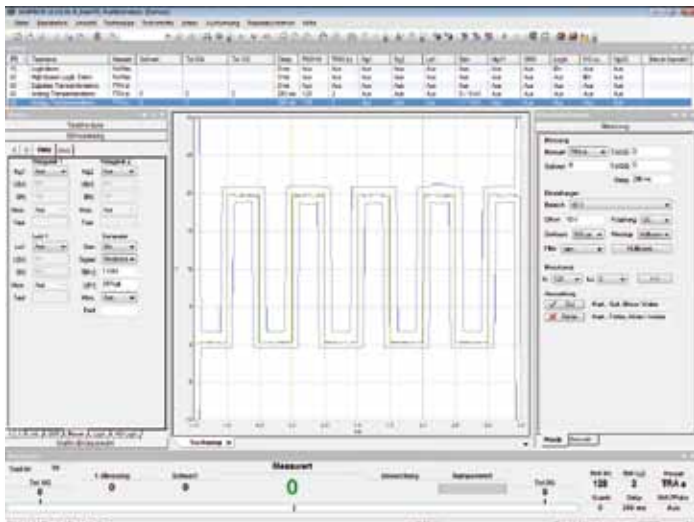
For measurements in In-circuit- or function test incl. time measurements there are measuring channels in relay technique. They can be expanded in groups of 96 to max. 224/512 channels. For guarding in the in-circuit test, the measuring matrix is made up in three bus technique.

### Measuring System for In-circuit- and Function Test

The 16 bit measuring system measures DC, AC, True RMS up to 100 kHz, peak voltage, current, AC current, resistance, resistance four-terminal, frequencies, periods, pulse widths, rise and fall times, phases, pulse duty factor, events, intervals between two channels, distortion factor and Fourier analysis.

### Transient Recorder TRA670 (Oscilloscope)

The 64k deep REINHARDT-transient recorder with 12 bit resolution offers 50 MHz bandwidth with max. 250 MHz sample rate. Max. input voltage is 100 V at min. 250  $\mu$ V resolution. Out of the curve forms it measures parameters such as frequency, period, rise time, fall time, pulse widths, peak voltage, distortion factor, Fourier analysis etc. Envelopes are for automatic evaluation of curve forms. 8 HF-input channels



Analog transient recorder with envelope curve (blue lines)

and 9 NF-input channels are available, but the transient recorder can also be used on the standard measuring bus provided by the test system. A test system can hold several of these modules so that e.g. 4 signals can be measured and evaluated in parallel. An external trigger input is also available.

### Power Electronics

If you need operating voltages and currents above those provided by the standard version of ATS-UKMFT 625/645, we offer a number of sources for DC-voltage (up to 300 VDC) and AC-voltage (up to 40 ADC) and electronic loads (up to 40 A).

### POMO80 Power Module

The linear controlled DC-module can be programmed in current (4 mA step) and voltage (25 mV) and works in the three ranges 0–30 V, 14 A, 30–65 V, 7 A, 65–80 V, 4 A. The load module can be programmed in two current ranges: 0–30 A with 10 mA incr. or 1 mA and 0–40 A with 10 mA or 1 mA resolution. Max. input voltage is 100 V, max. loading of each module 400 V/A.

In modulation to over 50 kHz you can modulate from 0 to 100 %, but as well program a basic current or a current curve. The professional device can be operated under current mode, R-mode, P-mode and U-mode. The true value of the potentialfree modules can be re-read at any time via RS232. The unit is available in various expansions as well as 4 quadrant versions.

### ZDC 100 Zener Diode Measuring Board

The ZDC 100 expands the Zener diode measurement in the In-circuit test default 28 V to up to 100 V. The measuring current can be programmed in 1, 5 or 10 mA-steps, voltage limitation can be programmed in steps 50, 75 and 100 V. This plug-in board is also used for capacitor discharge.

### Logic Test

The Logic board (32 channels, max. 2 boards) stimulates and measures logic conditions. Logic is tested with the bi-directional drivers between 0 and 23 V. With several logic boards, you can apply and evaluate several different logic families such as 1.5 V, 3 V, 5 V-logic up to 24 V-logic at a time. The programming form grants a full view of the program depth. There is a number of tools, e.g. programming components



Logic programming

with serial interfaces with comfortable inputs such as LSB and MSB. Transducers or converters can be stimulated and/or read out. You create bus systems with automatic program generators. Autolearn also helps in creating programs.

### **LOG96 Logic Board**

The 96 logic channels of this optional logic board are for stimulating and measuring logic channels in the 3.3V and 5V-technologies.

### **PML670 – HighSpeed Measuring Unit, Precision DC-Voltage Source and Logic**

The PML670-module combines a parallel DC-voltage measuring unit (16 channels 0–24V, resolution 0.5mV) with a 16fold DC-source (max. 50mA) and it is also used for stimulating and measuring logic conditions. Each of the 16 channels can be programmed individually from step to step in the driver level and the comparator level and each channel can be programmed in different levels.

### **Offline Programming Station**

Our optional software can be used on any standard PC for offline program generation.

### **Offline Repair Station RDR**

With the optional offline repair station, defective loaded PCBs can be repaired independent of the test system.

### **Statistics / Quality Management**

All test results needed for quality management are recorded as is the good or bad status of the test item. For assessing histograms of test steps, you can check all measured values. With the optional **Reference Test** the function of the test system and the fixture is checked and documented after a specified number of test runs or after a specified time interval. This reference test complements the System Diagnose.

### **ODBC-Interface**

The optional ODBC-interface helps to integrate the REINHARDT-test system in an existing quality management or in production procedures with data base management (Open Database Connectivity.)

### **ODT Optical Display Test**

The ODT-software is used for a fast and completely automatic test of LCD, LED, dot matrix, mask display, seven-segment displays etc. The software evaluates fields, symbols, special characters, signs, decimal points, units and seven-segment displays for intensity, contrast and function. Different video sources can be used.

### **Listing with the "Komfortprotokoll"**

This optional software helps you to design a listing, depending on your own or your customer's wishes, from the collected statistics data. You only need the Word software from version Word2003® and the "Komfortprotokoll" tool.

## **Building Fixtures and Creating Graphs of Fault Location**

Our software for creating fixtures re-calculates the Gerber data to layouts. The graphical data are taken for fault location and used for calculating the positions of the test pins automatically. A drilling file is created out of those points. This file drills the fixture for test pins and reference pins. The CNC-drilling machine has a clamping device for our fixtures and uses the data for drilling. The contact pins with receptacles or the receptacles without pins are automatically placed into the drilled positions. Accuracy in drilling and placing is better than 10–20 $\mu$ . A magazine can hold two different types of heads. They are placed according to the developed drilling file. Test fixtures with about 600 test pins are drilled in typically 3 to 5 hours. Pins are placed and wired with wire-wrap or via plug-in cables. Fixtures are built in an extremely cost-effective way, just-in-time and at your



**Fixture-Drilling Center**

own site. With two to three fixtures a year, the investment will be repaid within one year.

For more details please see our homepage on the Internet under <http://www.reinhardt-testsystem.de> or contact us for the more detailed salient features.

Some of the listed positions are options and do not come with the basic equipment.

All prices are net prices and nonbinding – change in price subject to change. E & OE – Specifications subject to change without prior notice.  
3/2012