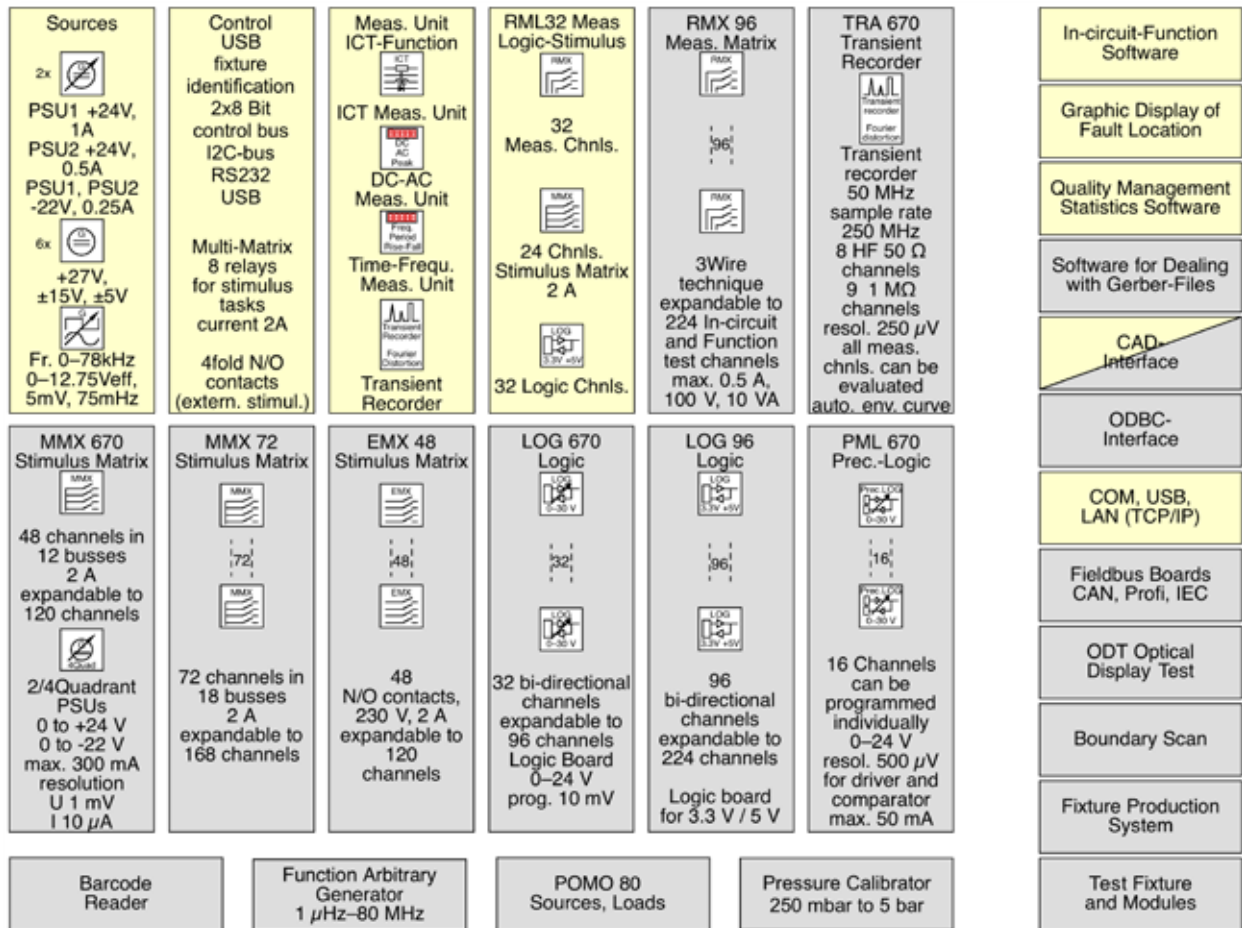# REINHARDT
System- und Messelectronic GmbH

More than 2,700 REINHARDT-Test Systems Installed
ATS-UKMFT 616 In-circuit- and Function Test System for Loaded PCBs

ATS-UKMFT 616

The fast REINHARDT-test systems excel due to very short programming times for function test and In-circuit test and very low fixturing cost. Quick and competent service and support are first hand. More than 2,700 REINHARDT-test systems provide high test speed, profound test depth, higher throughput and higher product quality. The test systems are operated stand-alone as well as in-line .

- In-circuit- and function test up to 224 measuring channels
- Function test analog, digital, pulse, microprocessor test, power electronics, evaluation of optical displays
- In-circuit test: pin contact, solder defects, components test, short-circuit and break test
- Boundary Scan with graphical fault display

- GPIB, IEEE, RS232-, I^2C, CAN, K, DeviceNet, LIN, Profibus, EIB, TCP/IP,… partly optional
- Menu-driven software with automatic program generation and autolearn for analog, digital and in-circuit test
- Graphical display of fault location
- Integration of external programs
- CAD-interface
- ODBC-interface (Open Database Connectivity)
- Transient recorder with Fourier analysis and distortion factor
- All stimulus and measuring modules for high test speeds are our own developments
- On-board programming
- Statistics and fault evaluation, quality management, Traceability, MES
- System diagnose for system calibration

Sources
2x [⊘]
PSU1 +24V, 1A
PSU2 +24V, 0.5A
PSU1, PSU2 -22V, 0.25A
6x [⊙] +27V, ±15V, ±5V
Fr. 0–78kHz 0–12.75Veff, 5mV, 75mHz

Control USB
fixture identification
2x8 Bit control bus
I2C-bus
RS232
USB
Multi-Matrix 8 relays for stimulus tasks current 2A
4fold N/O contacts (extern. stimul.)

Meas. Unit ICT-Function
ICT Meas. Unit
DC-AC Meas. Unit
Time-Frequ. Meas. Unit
Transient Recorder

RML32 Meas Logic-Stimulus
32 Meas. Chnls.
24 Chnls. Stimulus Matrix 2 A
32 Logic Chnls.

RMX 96 Meas. Matrix
3Wire technique expandable to 224 In-circuit and Function test channels max. 0.5 A, 100 V, 10 VA

TRA 670 Transient Recorder
Transient recorder 50 MHz sample rate 250 MHz 8 HF 50 Ω channels 9 1 MΩ channels resol. 250 µV all meas. chnls. can be evaluated auto. env. curve

In-circuit-Function Software
Graphic Display of Fault Location
Quality Management Statistics Software
Software for Dealing with Gerber-Files
CAD-Interface

MMX 670 Stimulus Matrix
48 channels in 12 busses 2 A expandable to 120 channels
2/4Quadrant PSUs 0 to +24 V 0 to -22 V max. 300 mA resolution U 1 mV I 10 µA

MMX 72 Stimulus Matrix
72 channels in 18 busses 2 A expandable to 168 channels

EMX 48 Stimulus Matrix
48 N/O contacts, 230 V, 2 A expandable to 120 channels

LOG 670 Logic
32 bi-directional channels expandable to 96 channels Logic Board 0–24 V prog. 10 mV

LOG 96 Logic
96 bi-directional channels expandable to 224 channels Logic board for 3.3 V / 5 V

PML 670 Prec.-Logic
16 Channels can be programmed individually 0–24 V resol. 500 µV for driver and comparator max. 50 mA

ODBC-Interface
COM, USB, LAN (TCP/IP)
Fieldbus Boards CAN, Profi, IEC
ODT Optical Display Test
Boundary Scan
Fixture Production System
Test Fixture and Modules

Barcode Reader
Function Arbitrary Generator 1 µHz–80 MHz
POMO 80 Sources, Loads
Pressure Calibrator 250 mbar to 5 bar

ATS-UKMFT 616 is a combined In-circuit-Function tester. Options are grey.

REINHARDT test systems are based on experience which was gained over 4 decades out of recurring procedures and which was transformed into modules. 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 REINHARDT supply qualified service by the developer.

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. The stable and ergonomic fixtures are options. These test fixtures can be used in both In-circuit and Function test and are also ready for contacting on both sides. When you retrofit for another type of PCB, only the bed-of-nails are changed and the universal retention system is adjusted, which takes typically 1–2 minutes. Fixturing is very low-cost between €350 and €800.

ATS-UKMFT 616 Basic Version

1 combined In-circuit Function measuring unit
32 In-circuit-Function measuring channels
1 Sine-square wave generator
2 programmable complementary PSUs
32 Stimulus matrix channels
32 bi-directional logic channels
2 free positions
comprehensive menu-driven software

The remaining 2 board positions, maximum 224 measuring channels can be allocated individually, see block diagram.
A customary computer controls the test system via USB-interface.

Programming REINHARDT-Test Systems

The menu forms reduce your entries to a minimum. Compiling or assembling with syntax tests is unnecessary. On-line-editing is a special feature: 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 measured values are sent to the measuring system (real time) and evaluated.

Programming is in forms so that programs are created rapidly and can be expanded, modified, corrected or optimised, even by trainees.

Editing form with online display and input field

Analysing the Testability of a Test Item

With a software-tool and the CAD- and Gerber files of the PCB you can analyse its design 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 need not be wired selectively according to a wiring list. You can wire 1:1 as you like and use a graphically guided probe for assigning a spring contact pin to a test system channel.

With only 1 day training 90% of our customers use the test system for production in the first week after installation!

In-circuit-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. A special measuring method finds even SMT-solder defects of fine pitch ICs, of BGAs. Components such as IC-insertion and resistors, capacitors, diodes, Zener diodes, FETs, operational amplifiers etc. are tested for values and polarity. The autoguarding method and automatic finding of delay times reduce the programming time to a minimum. Programming data can be taken from CAD-data IIn both in-circuit and function test, you just move the mouse-cursor in the graphic display and click on the resp. component pin to display the measuring channel of the test system.

Pin-exact graphical display of fault location

RBS 100 REINHARDT Boundary Scan

The REINHARDT Boundary Scan Test finds shorts and interrupts between Boundary Scan-capable components. The Boundary Scan test and editing module for REINHARDT-test systems is 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 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.

Boundary Scan Test

Function Test

In function test, there are analog, digital, pulse, microprocessor, 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.

Programmable Voltage Sources

In the basic version, there are 2 programmable complementary voltage sources 0 to +24 V / 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.
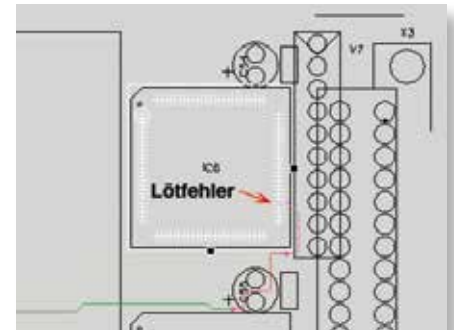

Function test editor

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 at 0.25 A maximum current. Maximum amplitude sine is 7 Veff (5 mV resolution) and square wave 10 Vpp (10 mV resolution).
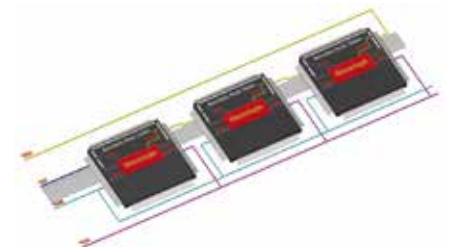
Function and Arbitrary Generators

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 μHz to 20/80 MHz with 1 μHz resolution. Amplitudes can be programmed between 20 mV$_{pp}$ and 20 V$_{pp}$.

Supporting Modules – Built Into The Test Fixture

Pulse Generator Module, max. 1 MHz, 0.2 μs pulse. High Frequency Generator Module max. frequency 30 MHz TTL. High Frequency Divider up to 1 GHz division rate 64 or 128. Impedance Transformer input impedance: 8 TΩ at 8 pF. Module for Measuring Peak Voltages up to 100 MHz. FARBMod and 16FARBMod evaluate and test colours (e. g. of keys) and LEDs incl. colour and intensity 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 500 V or 2 A, and 32 digital logic channels. The driver levels can be set to 5 V or 3.3 V.

MMX Stimulus Matrix

The optional stimulus matrix **MMX670** offers 48 channels in 12 bus systems, the optional **MMX72** offers 72 channels in 18 bus systems in one-wire technique for 2 A max. current or 500 V. Two 16 bit 4quadrant precision PSUs (only MMX670 with PSUs), 0 V to +24 V, max. 300 mA can be programmed in 1 mV-steps. Current is programmed in 10 μA-steps from 30–300 mA.

Measuring Matrix

The measuring matrix has 96 measuring channels for both in-circuit and function test incl. time measurements. Expansion is in groups of 96 to up to 224 channels. For guarding in the in-circuit test, the measuring matrix is made up in three bus technique.

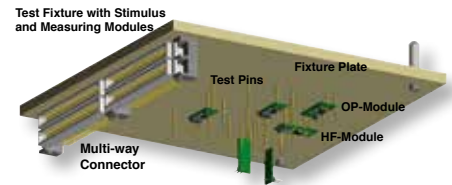## Measuring System for In-circuit and Functional Test

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, transient recorder, sample rate 100 kHz, distortion factor and Fourier analysis.

Transient Recorder TRA670 (Oscilloscope)

The 64 k 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 μV 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 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. An external trigger input is also available.
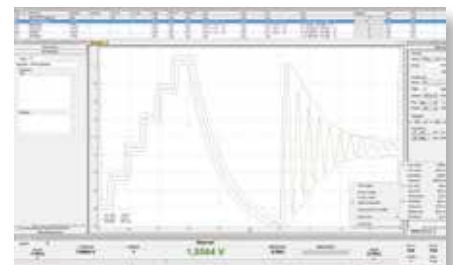

Arbitrary Editor

Test Fixture with Stimulus and Measuring Modules
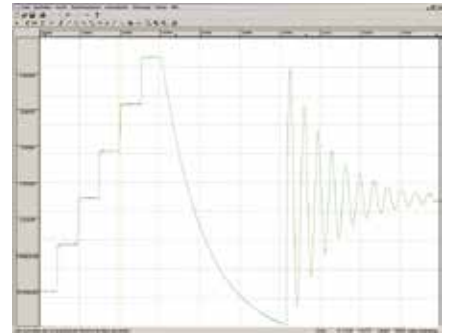
Fixture Plate
Test Pins
OP-Module
HF-Module
Multi-way Connector

MMX670 with PSUs

Fastest In-circuit test measuring unit (measuring speed and measuring accuracy)

Analog Transienten Recorder with Envelope Curve (blue lines)

Power Electronics

If you need operating voltages and currents above those provided by the standard version of the ATS-UKMFT-family, 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).

Power electronics up to 12 KVA

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 resolutions. 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 program a basic current or a current curve (arbitrary) as well.

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 4quadrant versions.

POMO80 Power Module

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 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 stimulate and measure logic signals in the 3.3 V and 5 V-technologies.

Form for Logic Programming

PML670 – HighSpeed-Measuring Unit, Precision-DC-Source, Measuring Unit 16 Channels and Logic

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

Offline Programming Station

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

PML 670-Module

## RDR Offline Repair Station

With the optional offline repair station, defective loaded PCBs can be repaired independent of the test system. The test system remains free from repair so higher throughput is possible.

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 **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.
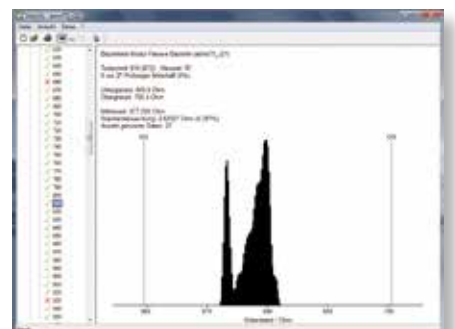
Statistics – Histogram

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 fast and fully automatic testing of LCD, LED, dot matrix, mask display, seven segment displays etc. The software evaluates fields, symbols, special characters, algebraic signs, decimal points, unit positions and seven segment displays for intensity, contrast and function. Various camera systems can be used.

Optical Display Test

Universal-Data-Converter and Eagle-Data-Converter

For the widely used cost-effective Eagle CAD-system for developing and designing PCBs REINHARDT has developed a comfortable interface. The software generates a bill of materials and Gerber data which can be displayed. This information is used for generating the graphical data for the display of fault location and the finished framework for the In-circuit test program. After the converted data are imported into the test system software only the automated autolearn tools must be activated.

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 Word2003® or Word2007® software and the "Komfortprotokoll" tool.

Data-Converter

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, 75 mil and 100 mil, with receptacles or the receptacles without pins are automatically placed into the drilled positions. Accuracy in drilling and placing is better than $10–20\,\mu$. The magazines 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 own site. With two to three fixtures a year, the investment will be repaid within one year.
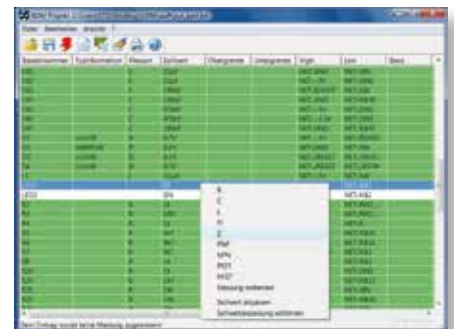
For more details please see our homepage on the Internet under http://www.reinhardt-testsystem.de or contact us for the more detailed salient features.

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.   *10/2014*

Fixture Production System

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