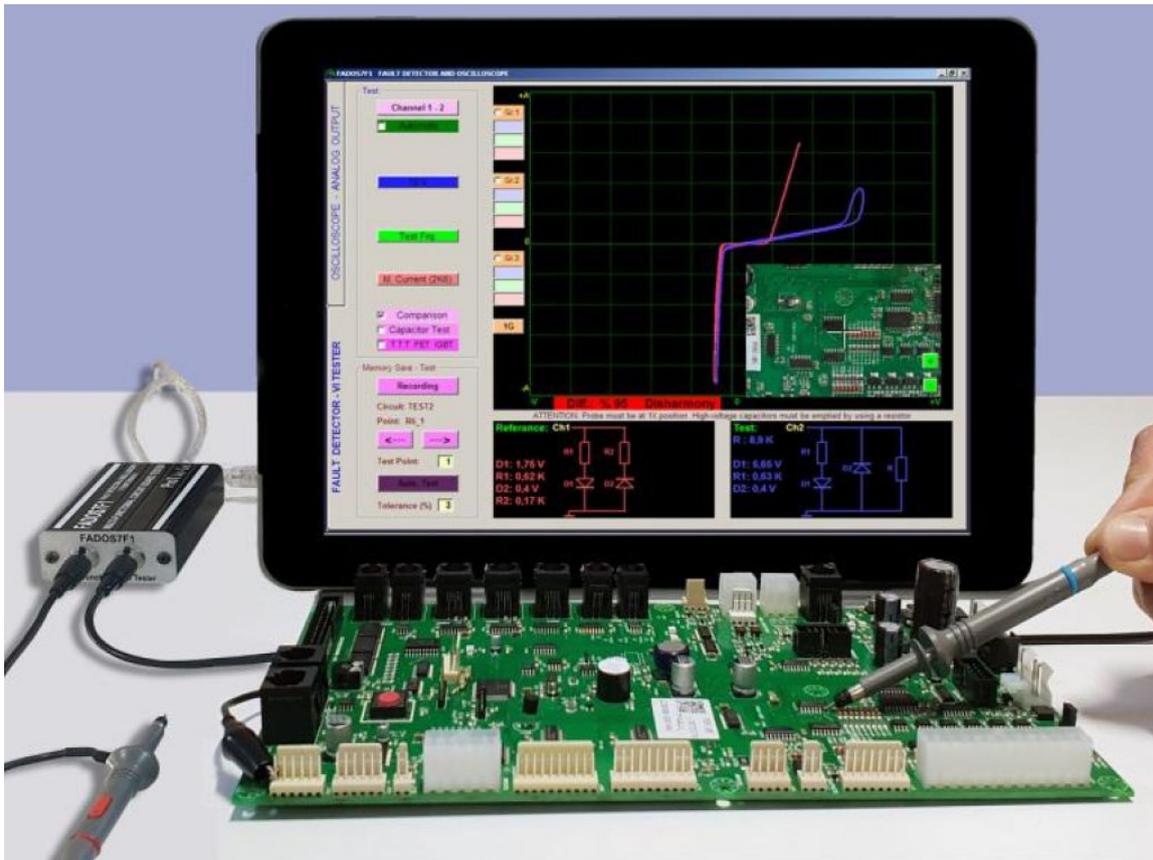


FADOS7F1

FAULT DETECTOR & OSCILLOSCOPE

7 FEATURES IN 1



7 FUNCTIONS:

1. Dual channel fault detection by V-I tester

Fault detection by direct comparison of the current-voltage characteristics (signatures) of a working and a faulty circuit board without applying power to the unit under test.

2. Equivalent Circuit Diagram ***

Display of an equivalent circuit that corresponds to the characteristic on the touched point.

3. Display Values of Resistor, Capacitor and Diode Threshold ***

Display the calculated values of resistance, capacitors and diode threshold voltages corresponding to the conditions at the contacted node.

4. Fault Detection by Comparison with Stored Signatures

Signatures of a functioning board can be saved and used at a later time as a reference for troubleshooting a faulty board. The point to touch can be indicated by a cross hair mark at an image of the board.

5. Dual-Channel Digital PC Oscilloscope

As occasion may require, device can be used as oscilloscope.

6. 0.2... 25KHz Square Wave Output

Channel 2 is used as a square wave generator. Channel 1 can be used as an oscilloscope

7. Analog Voltage Output

Channel 2 is used as Analog DC output. Channel 1 can be used as an oscilloscope.

*** These features are unique.

FADOS7F1 10V PC Screen

Function 1: Double Channel V-I Tester

Function 2: Equivalent circuit diagram

Function 3: Multicomponent measurement

Function 4: Recording data and comparing with recorded data

Function 5: Double Channel Oscilloscope

By using functions 2 and 3, components' values can be measured without dismantling the components from card easily.

Reference: Ch1
R : 8,0 K
D1: 0,6 V
R1: 2,98 K
D2: 0,55 V
R2: 1,21 K

Test: Ch2
R : 998
C : 10 µF

Fault Detector - VI Tester (Analog Signature Analysis) Screen

Function 6: Square wave Generator

Function 7: Analogue Voltage Output

1. Channel
Probe X1
Top Value : 3,21 V
Low Value : 0,00 V
Point :
Frequen. : 0,8 KHz

2. Channel
Probe X1
Top Value : 0,00 V
Low Value : 0,00 V
Point :
Frequen. :

Analog Output (Channel 2)
Active
Signal
Frequency : 800
Voltage mV: 3200

Oscilloscope – Analog Output Screen

FADOS7F1 Fault Detector & Oscilloscope 7 Functions in 1 has been especially developed to determine and troubleshooting faults at all type electronic circuit boards by **Prot Ar-Ge Industrial Project Design R&D Ltd. Co.** FADOS7F1 is basically computer-based **VI Tester Voltage-Current (Signature Analysis)** equipment. It connects to PC via USB port and works 5V by taking power from USB port. Signature Analysis is a power-off test method that is used to troubleshoot circuit boards. FADOS7F1 works by applying a current-limited sine wave through a serial resistor point of touched on circuit and Voltage-Current (Signature) graph is displayed on the computer screen. In addition to this feature, computer software by analyzing signature graph to displays Equivalent Circuit Diagram and Values of Electronic Components and these features used for convenience to user in giving information for finding faults easily.

By using Feature of Dual Channel VI test; signature of known good circuit boards and faulty or suspect boards comparable with touch of same points at the same time and using this method, faulty points out of tolerance can be quickly detected. All signature graphs are composed at 2,5 mV sensitivity and by taking 720 different measurement of signature. For this reason, FADOS7F1 is very sensitive.

By the help of Memory Feature; it is possible to save the features (values and signature) of good circuit board to memory for reference and then, to compare easily with faulty or suspects circuit boards sensitively. By using feature of recording reference values, signatures to memory and comparing data from memory, it can test circuit boards easily. It is possible to record data with circuit board's picture. As a result; while comparing data from memory, it is possible to see data on the picture which saved before.

In order to lower the loss of time during test procedure, **it sounds different at compatible and incompatible points.** By this way, users make the comparison quickly without any need to look at screen or circuit boards steadily and the sound feature can save you time when compared circuit boards. Users can compare the circuit boards with 3 different steps at the same time. (Selected Current-Voltage-Frequency steps)

In addition to the basic features, FADOS7F1 VI Tester can also be used **Dual-Channel Oscilloscope, Square-Wave Generator and Analogue Voltage Output.** By using **Square-Wave Signal Output,** signal is applied to circuit boards; then, it is possible to see the other channel and output signals at oscilloscope screen.

Technicians, engineers and hobbyists have found VI graph to be an effective and efficient method for troubleshooting printed circuit boards. The signature comparison method is easy to use and allows for immediate feedback that will assist you in locating faulty component. As you gain some experience with VI graph you will realize that FADOS7F1 is an indispensable troubleshooting tool. Usage is very easy and users will find the faults just by looking at graphs without comparison.

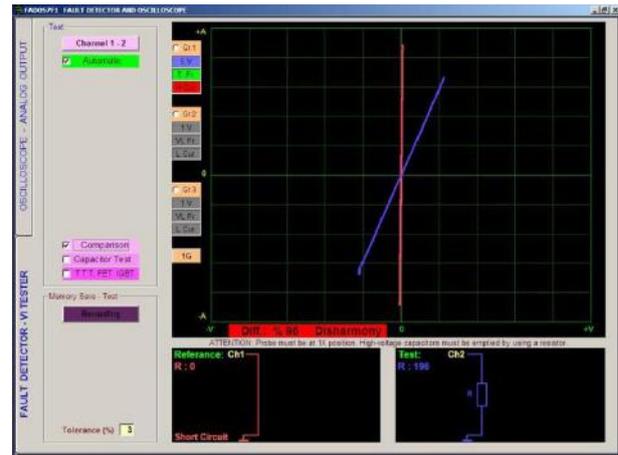
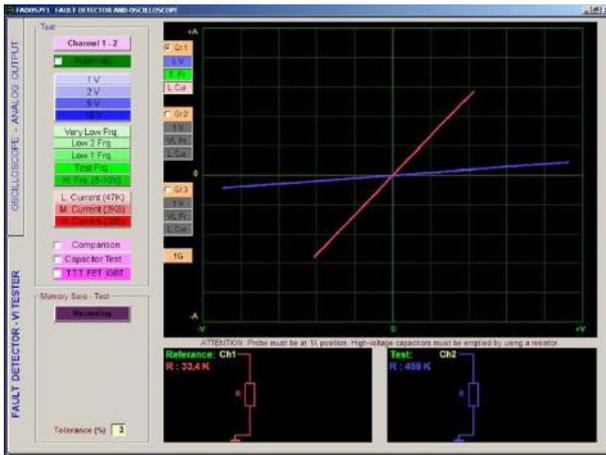
When test or troubleshooting Printed Circuit Assembly (PCA), the FADOS7F1 is very useful and reliable tool. The benefit of the test method is the fact troubleshooting is done without applying power to the Under Unit Test components and there is no risk for consequential damages due to any existing shorts, defective components or low-impedance connections on the faulty board. **When test PCA with FADOS7F1, do not apply power to PCA. PCA and the devices must be made high-voltage capacitor discharges.**

FADOS7F1 is easy to carry since it's small. It can be carried in a laptop briefcase. Including many more features, it is like a Swiss knife of users dealing with electronics.

Electronic Components Test: Resistors, Capacitors, Inductors, Diodes (General purpose, Zener, High Voltage etc.) Transistors (NPN, PNP, JFET, MOSFET etc.), SCRs, TRIACs, Optocouplers, Integrated Circuits (Digital, Analog) etc.

Resistor V/I Graph

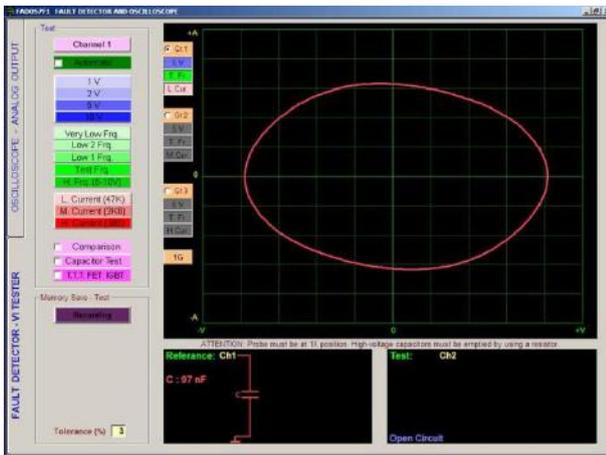
Resistor signatures appear with a specific angle to horizon; resistor symbol and value are seen at the bottom of the graph.



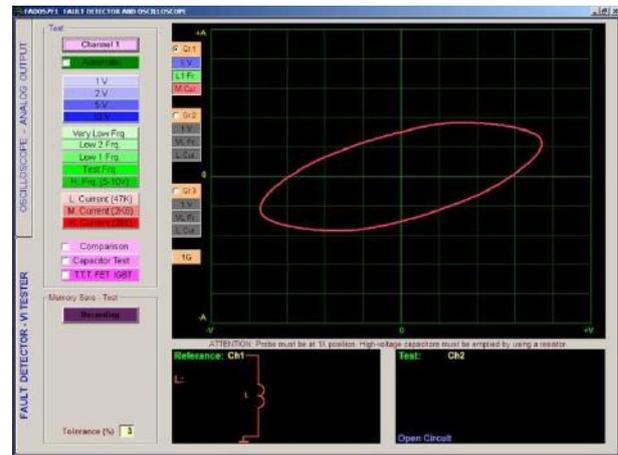
Resistor

Capacitor and Inductor V/I Graph

Capacitors typically have an elliptical signature; first picture shows capacitor signature; symbol and value are seen at the bottom of the graph.



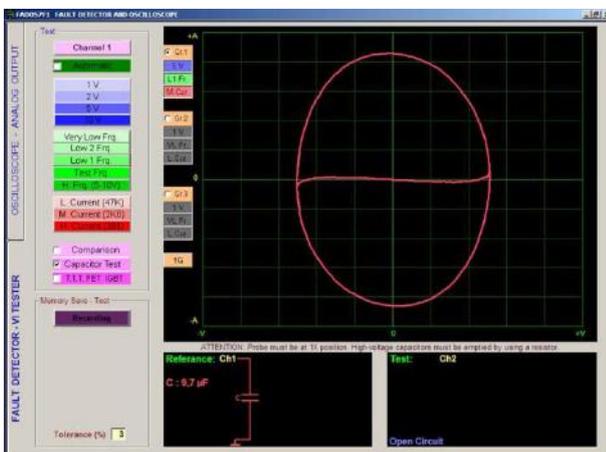
Capacitor



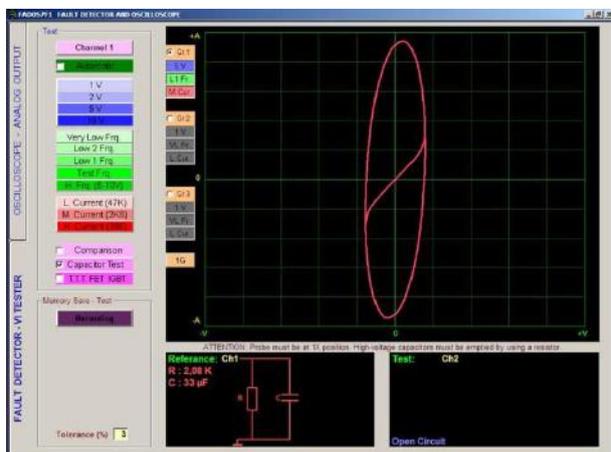
Inductor

Capacitor Quality Test

When "Capacitor Test" is selected, an additional curve displaying the quality of capacitor appears. If this curve is at horizontal axis or close to it, quality is high; and quality is low as much as the angle degree is high. High quality capacitor generates a horizontal line.



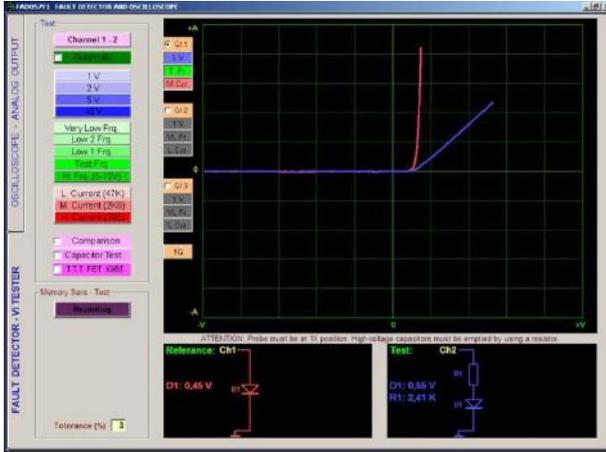
High Quality Capacitor



Low Quality Capacitor

Diode V/I Graph

Diodes start to transmit current after high transmission voltage. For this reason, diodes are seen horizontally at one part of the graph, and are seen vertically at the other part. A zener diode exhibits the same signature as a conventional diode for voltages below the Zener voltage. When the reverse bias exceeds the Zener voltage, a low resistance signature is displayed. If diode and resistor are serial on circuit, after transmission graph makes an angle to horizon. Diode (Ch1-red), serial diode-resistor (Ch2-blue) and Zener diode symbol, value and forward drop voltage are seen at the bottom of graph.

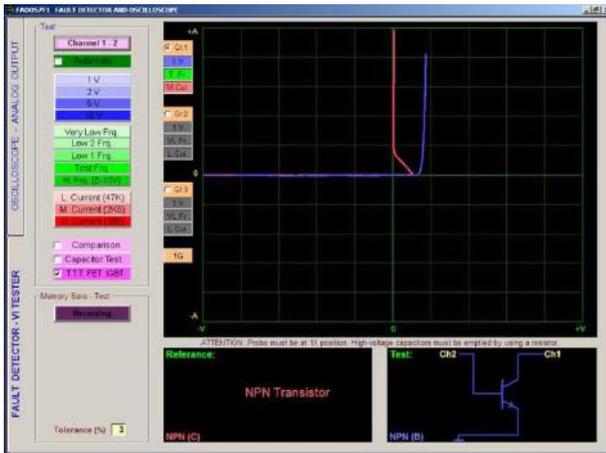


Diode and Serial Diode – Resistor

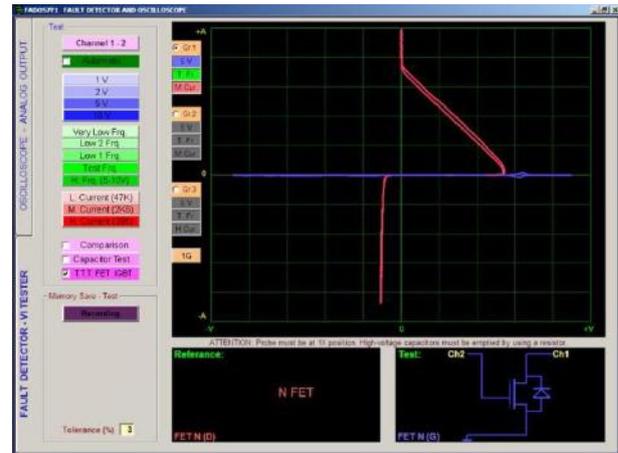


Zener Diode

Transistor V/I Graph



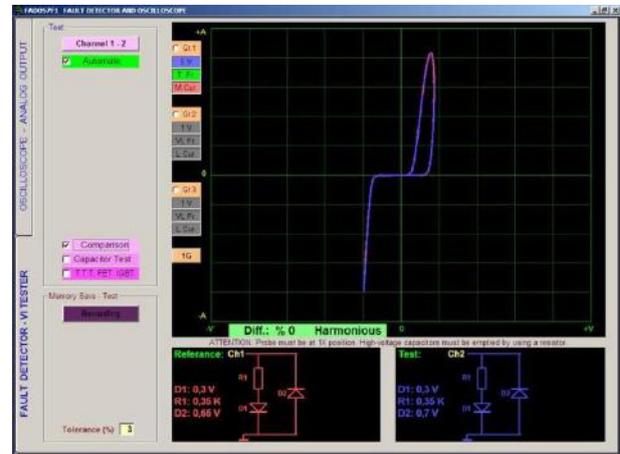
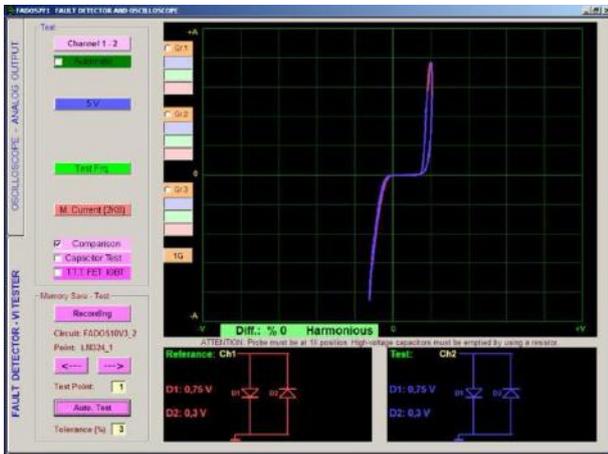
NPN Transistor



N-FET

Integrated Circuits (ICs) V/I Graph

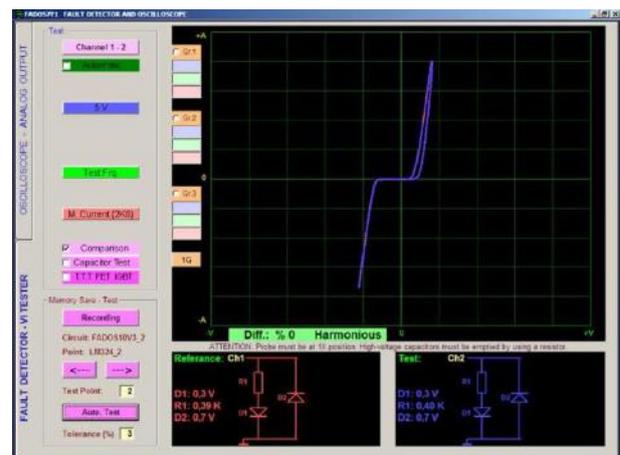
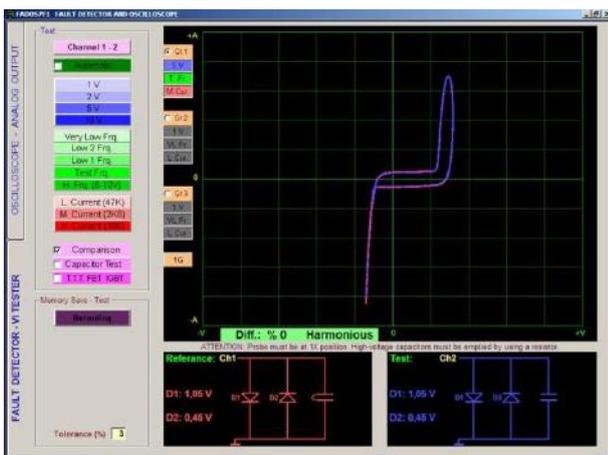
Digital components (ICs) contain components and connections which are susceptible to damage from electrical stress and static discharge at levels far lower than those which would damage normal components. For this reason, many ICs incorporate protection diodes on their signal input and output pins. When testing integrates signals display similar to the double-inverse diode, zener diode and diodes. And digital components have many similar pins that allow for identifying signature patterns.



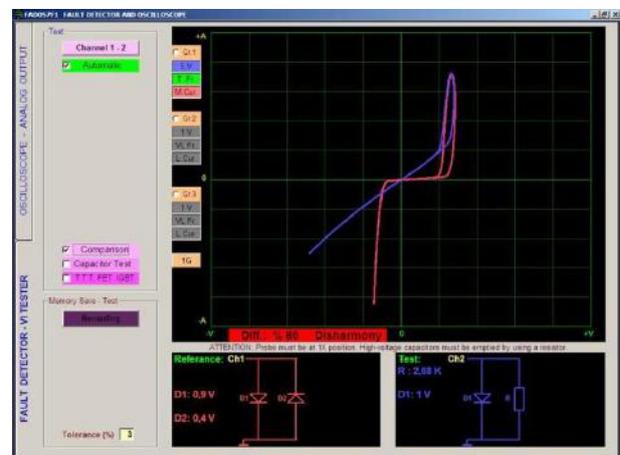
ICs Signatures – Compare 2 ICs Integrated Pins

Comparison Testing Component of Circuit Boards

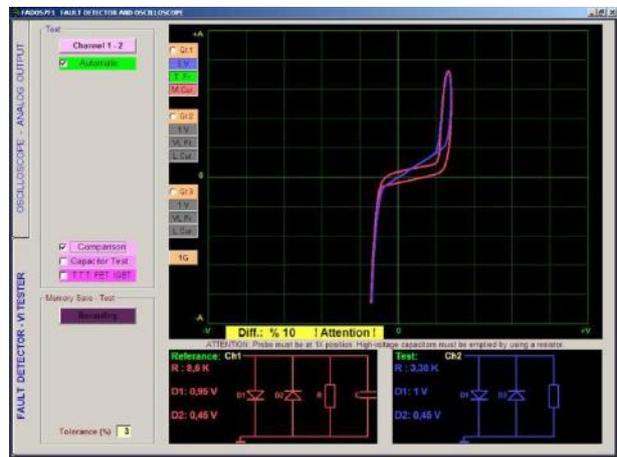
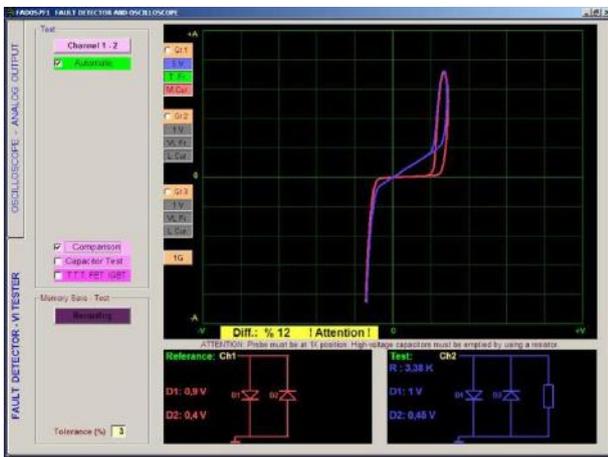
Comparisons between Channel 1 (red signature) and Channel 2 (blue signature) can take place manually or automatically allowing you to identify signature differences quickly. When a component is tested in a circuit, generates a complicated signal other due to parallelism other components in the circuit. FADOS7F1 makes the comparison by removing the component values of the equivalent circuit and measuring signals. Connect good circuit board to Channel 1, connect faulty or suspects boards to Channel 2 and touch same points with probes at the same time. If signature is same as, it is written **"Harmonious"** at screen. If it is out of tolerance values, it is written **"Disharmony"**, percentage value is seen and wrong voice is heard.



Match the Signatures

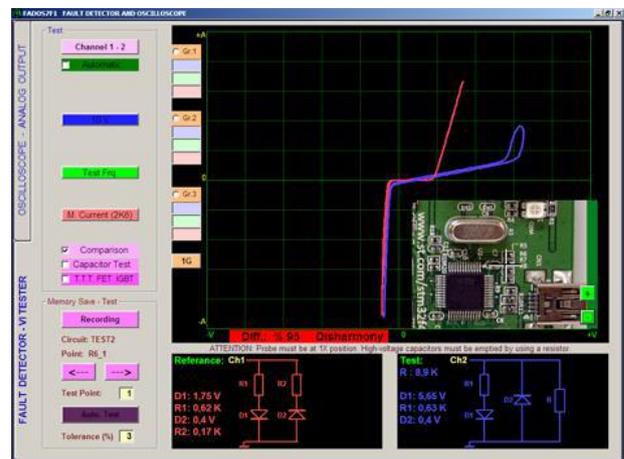
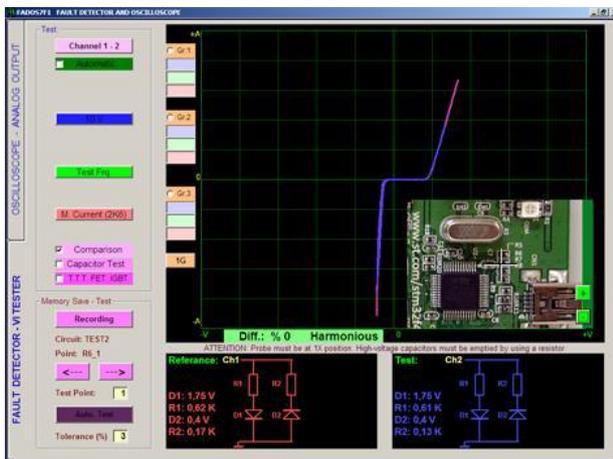


Examples of different signatures that indicate a high fault



Different signatures with relatively small percentage faults

Comparison Testing Component of Circuit Boards with Picture from Memory



Circuit node is displayed in the display with crosshairs cursor

Product Overview and Content

- 1 FADOS7F1 Product
- 1 Software CD
- 2 Oscilloscope Probe
- 1 Com Probe (Crocodile)
- 1 USB Cable
- 1 Handbag



FADOS7F1

A- FAULT DETECTION SPECIFICATIONS :

- Test Voltages** : ±1V, ±2V, ±5V, ±10V
- Test Resistance** : Current Level: Low 47 KΩ, Medium 2,6 KΩ, High 385 Ω
- Test Frequencies** : Very Low Frequency, Low2 Frequency, Low1 Frequency, Test Frequency, High Frequency
- Number of Channels** : 2 (Channel 1 and Channel 2)
- Scan Mode** : Manual or Automatic. Automatic selection steps of voltage, current, frequency.
- Other Feature** :
 - 1:** Equivalent circuit diagram.
 - 2:** Resistor, capacitors, diodes etc measurement.
 - 3:** Recording data and comparing with recorded data.
 - 4:** 3 graphs at different adjustments can be screened simultaneously.

B- PC OSCILLOSCOPE FEATURES :

- Sampling Rate** : 400 K/S
- Input Voltage** : Probe 1X: ±5 V Probe10X: ±50 V
- Channel / ADC** : 2 Channel / 12 Bit
- Sensitivity** : 2.5 mV
- Image Rate** : 0.02 mS/div....100 mS/div
- Instant Memory** : 64 Kbyte

C- DIGITAL AND ANALOG OUTPUT :

- Output** : Channel 2
- Output Voltage** : -5V....+5V (Adjustable)
- Frequency (Digital)** : From 0.2KHz to 25KHz
- Connections** : Probes can be connected each socket. Yellow ring probe is always Channel 1; Blue ring probe is always Channel 2. Crocodile probe is always COM. USB cable for using communications between PC and FADOS7F1.
- Dimensions** : 105mm L x 54mm W x 24mm H
- Weight** : 450 gram with all accessories
- Warranty** : 1 year

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