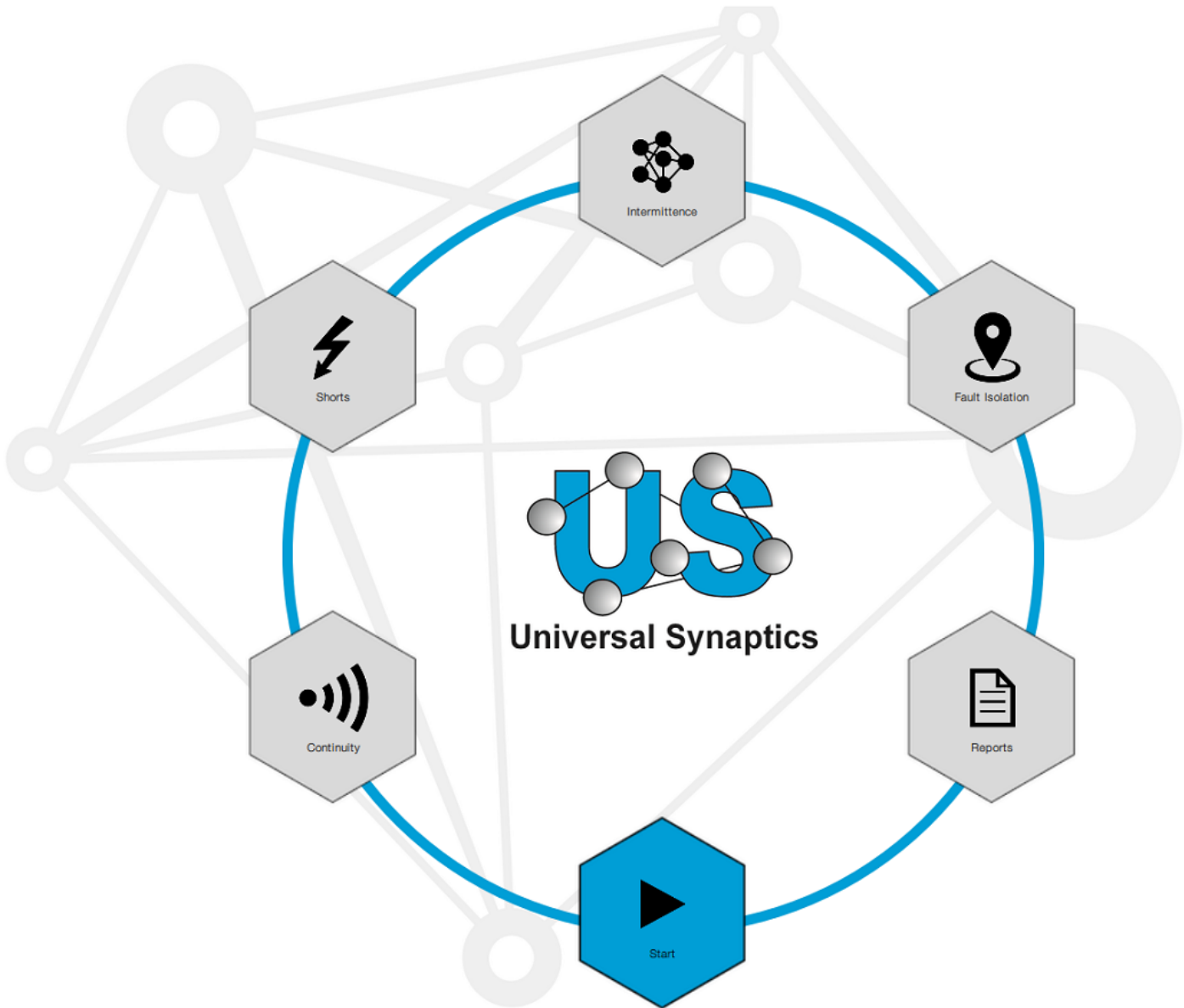


Intermittent Fault Detector™ (IFD™)

User Guide

Revision 1.0 : April 2020



This guide helps you get started using Intermittent Fault Detector™ (IFD™) test equipment and facilitates the discovery of all the amazing things it can do.

Supported IFD™ Models

- Intermittent Fault Detection & Isolation System™ (IFDIS™)
- Intermittent Fault Detection & Isolation System 2.0™ (IFDIS 2.0™)
- Intermittent Fault Detector™ (IFD™) portable



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General

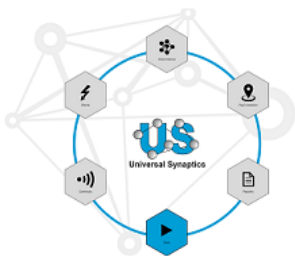
Introduction

Universal Synaptics is the industry leader in detecting and isolating elusive intermittent faults in accordance with the Department of Defense MIL-PRF 32516. The massive digital testing void that exists today with conventional scanning test equipment, led to the development of the patented portable Intermittent Fault Detector™ (IFD™), the Intermittent Fault Detection & Isolation System™ (IFDIS™) and the Intermittent Fault Detection & Isolation System 2.0™ (IFDIS 2.0™) family of Intermittent Fault Detectors. Our primary mission is to provide test solutions to the Department of Defense (DoD), commercial aircraft operators, Maintenance Repair and Overhaul (MRO) facilities and electronics manufacturing organizations to solve their intermittent failure problems to drive Customer Solutions across existing and new platforms.

Each IFD utilizes Synapse™ application as the user interface for testing and operation. The remainder of this guide will navigate you through the application's functions and the steps needed to successfully test for and isolate intermittent faults.

Operation

Testing



From the "Home" screen - Press Start.

If a Map has not yet been selected, the top drawer will advise that a selection is required. Select a Map Group and a Map.

Enter the Serial Number of the Unit Under Test (UUT).

Once a Map is selected, press Start.

All tests will automatically run unless a fault is discovered during the testing process. If any of the tests fail, an operator action will be required to continue testing.

All IFD™ models perform the following tests automatically:

- **Continuity**
- **Shorts**
- **Intermittence**
- **Fault Isolation***
- **Reports**

*Fault Isolation will be skipped if no intermittences are detected.

Meter

During testing, a meter pop-out icon will be available in Continuity, Shorts, and Fault Isolation. The meter can be used to monitor an intermittent connection or series of connections for fault isolation.

Sensitivity

Intermittence detection sensitivity can be adjusted only while Intermittence testing. At the start of Intermittence, sensitivity should be adjusted until no noise is detected by the intermittence hardware. This can be done by using the pareto chart while adjusting sensitivity until there are no new intermittence events.



As shown above, the bottom of the meter will display the test point numbers and the corresponding nomenclatures. As the meter value changes, the meter range will be displayed on the top left. The meter value will be displayed in red when the read value is out of the defined tolerance for that test point.

Icon & Drawer Glossary

Home Screen - Icons



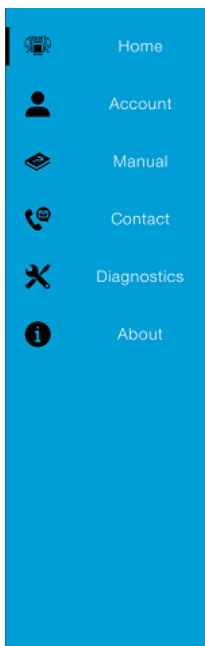
Home Screen - Icon Indicators

Continuity, Shorts, and Intermittence are pass/fail tests. These Icons will be outlined depending on the current state of the test. A green outline indicates a test that has passed (example shown below). A red outline indicates a test that has failed. Fault Isolation and Reports are outlined in green by default.



Left Drawer

The Left Drawer can be used to navigate between the "Home" screen and other information screens.



Top Drawer - Left


Test Settings located in the Top Drawer is separated into two sections: Map Selection and Sensitivity.

Map Selection is used to select the Map Group and Map for testing. The Serial Number input block is used by Synapse in the Reports for documentation.

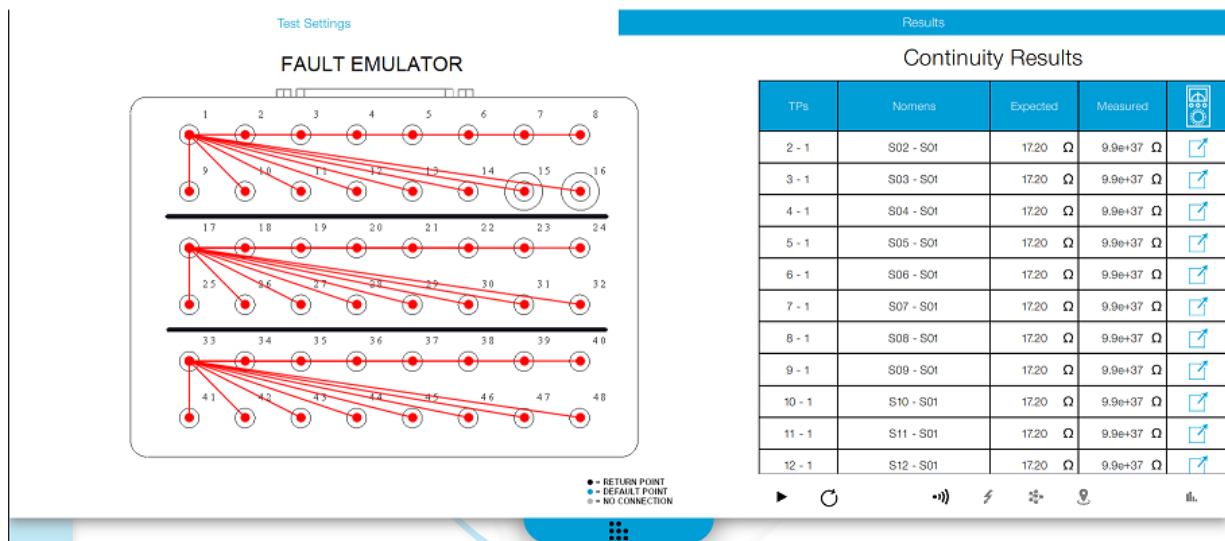
NOTE: Sensitivity is only active during Intermittence Testing and is used to adjust the sensitivity of the hardware to intermittent events. Adjusting sensitivity can be done by dragging the dial or pressing the plus/minus icons.







Top Drawer - Right

The Results portion of the Top Drawer includes the selected Map Graphic as well as a table containing the failed results, if any, of the selected test. Test results are available at the completion of Continuity and Shorts and live during Intermittence testing. The Fault Isolation table is a duplicate of the Intermittence Results with the addition of a meter pop-out icon . The meter pop-out icon is also available in the Continuity and Shorts results table.

Results can be accessed only after a test is started/run. The respective test icon will be inactive until results are available. Additional icons displayed on the Results panel include Start/Continue and Rerun.



During Intermittence, two additional icons will become available/active: stop  and Pareto . Stop must be used to end Intermittence testing and the Pareto icon will display a Pareto chart representing the live intermittence results. The Pareto can be used in addition to the results table.

In addition to the above, Continue  and Rerun  icons are available to continue on to the next test or rerun the current test.

Tests Explained

Continuity



A continuity test verifies that current will flow in an intended electrical circuit. The test is performed by placing a small voltage between 2 or more endpoints of the circuit. Continuity testing is performed utilizing a digital multimeter to measure the resistance between the endpoint. In continuity testing the resistance between two points is measured. Low resistance means that the circuit is closed and there is electrical continuity. High resistance means that the circuit is open and continuity is lacking.

Shorts



A short circuit is any electrical flow that strays outside its intended circuit with little or no resistance to that flow. The usual cause is bare wires touching one another or wire connections that have come loose. The immediate impact is that a large amount of current suddenly begins to flow. This condition is known as a "short" circuit because the current is bypassing the full circuit wiring and flowing back immediately to the source by a shorter pathway.

Intermittence



Intermittent faults occur randomly in time, place, amplitude and duration. The very nature of the failure mode suggests that the ability to detect and further isolate the intermittence root cause is based on detection sensitivity and probability rather than conventional methods concentrating on ohmic measurement accuracy. You can't detect an intermittent fault until it occurs, and you must be on the specific intermittent circuit when it does in order to detect and isolate the intermittent fault.

The Intermittent Fault Detector (IFD) family of testers utilize a proprietary, patented hardware neural network to continuously and simultaneously monitor every electrical path in the Unit Under Test (UUT).

Fault Isolation



Fault Isolation is the method used to identify the root cause for a failure that has been detected by the IFD during Intermittence Testing.

Reports



Reports automatically save after each test run whether the test passes or fails. At the conclusion of the testing sequence, a Full Report of the last set of testing results is saved automatically. Each report includes the Map Group and Map name, Serial Number of UUT, and the date of the test. All reports are saved as text files in a Synapse Reports folder located on the systems desktop.

Please Contact Universal Synaptics Technical Support Team

<https://www.usynaptics.com/technical-support>

801.731.8509

Diagnostics

If required or under the direction of Technical Support, click "Diagnostics" from the left drawer.

From the Diagnostics screen, click the "Start" icon.

Results

Once Diagnostics is complete, the user will receive either a Diagnostic Code or a Pass notification. The diagnostic code should be provided to Technical Support for use with the secret decoder ring.

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Advanced Technician

AutoMap

To access AutoMap functionality, select "Account" from the Left Drawer.

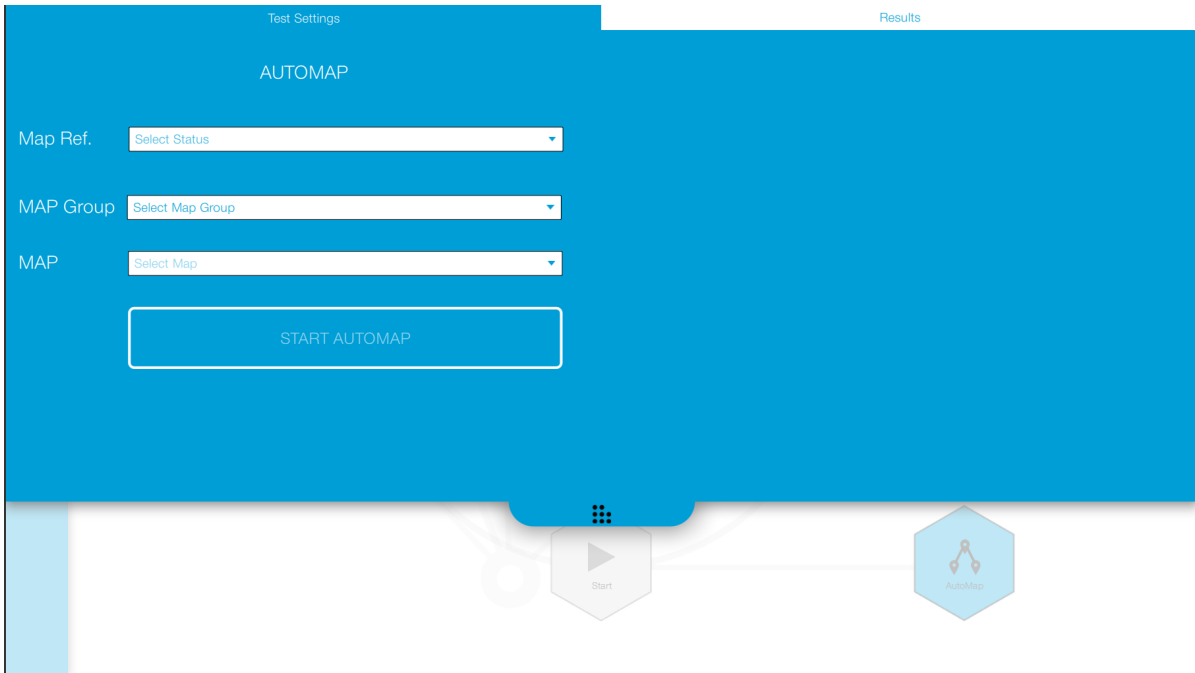
Log in using an Advanced Technician account type.

Once in Advanced Technician, use the Top Drawer to select the reference map status (Archived vs Released).

Select an existing Map Group or enter a new Map Group Name.

Select an existing reference Map or enter a new Map Name.

Press "START AUTOMAP".



When Complete, click on the Results tab of the Top Drawer to see the AutoMap Results.

A new map will be available for use based on the new user-specified Map Group and Map Name. If a Reference Map such as "Demo" was used as the reference map, a revision number will be used to identify the latest revision of the new map.

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Admin

User Management



Synapse™ has three different user accounts types; *Technician*, *Advanced Technician*, and *Admin*. By default, the application starts up in *Technician* to facilitate access to all IFD test functionality and reports.

An *Admin* account type is required to manage accounts. To add or remove users, or modify user account settings, click the Account icon located on the left pane. Follow the on-screen prompts to log in and access User Management.

Account Types

- **Technician** -Technician account types can access all IFD test functionality and reports.
- **Advanced Technician** -Advanced Technician account types can access AutoMap functionality.
- **Admin** -Admin accounts can access User Management.

Adding a User



Click the +User icon and complete the provided form. Log out from User Management when complete.

Edit/Delete Profile or Reset Password



From the table, select a user profile then click the Actions icon. From the drop down, select the action to take on the user profile. Log out from User Management when complete.

Handling, Safety and Technical Information

Technical Specifications & Compliance

USC-IFD-00512¹

Integral Computer	<ul style="list-style-type: none">• Intel Atom 1.9 GHz processor• 8GB DDR3L DIMM• 1x Internal 256 GB MSATA solid state drive• 1x USB 2.0
Test Software	<ul style="list-style-type: none">• Synapse software - Intermittence, Continuity, Shorts, Fault Isolation, AutoMap, Test Reports
Integrated Multimeter	<ul style="list-style-type: none">• 6.5 Digit fully integrated digital multimeter• Calibration not required
Test Interface	<ul style="list-style-type: none">• 12x 50 Point D-Sub
Carry Case	<ul style="list-style-type: none">• Strong HPX(R) High Performance Resin• Airtight and Watertight when closed• Press & Pull Latches• Double-layered, soft-grip handle

Electrical Service	<ul style="list-style-type: none"> • Input Power – 100 - 240 VAC, 2 A • Frequency – 50/60Hz
Size and Weight	<ul style="list-style-type: none"> • Exterior Dimensions – 19” x 14” x 7” • System Weight – <42 lbs • Custom Packaging available (PN: USC-CarryCase-00001)
Operating Environment	<ul style="list-style-type: none"> • Indoor or Outdoor use • Operating Temperature – 2 to 50 degrees Celsius • Storage Temperature – 0 to 60 degrees Celsius • Humidity – 5 to 90% non-condensing • Operating Altitude – 5000 m • Voltage Fluctuations – +/- 10% of input rating
Regulatory	<ul style="list-style-type: none"> • MIL-PRF-32516, MIL-STD-461, MIL-STD-1472, CSA
Warranty	<ul style="list-style-type: none"> • 12 Months
Related Part Numbers	<ul style="list-style-type: none"> • USC-IFD-00128, USC-IFD-00256

USC-IFD-05120²

Integral Computer	<ul style="list-style-type: none"> • 4U rugged compact 19” rackmount chassis, Black E-4000, 19”x7”x18” • Intel Quad Core i7 3.4GHz processor • 4GB DDR3 DIMM • Video system supports two 4K HDMI displays • 1x Internal 512 GB solid state drive 2.5” • Optical drive 5.25 24X SATA DVDRW • 1x Front USB 2.0 • 1x Cooling fan 120mm + removable and washable filter
Test Software	<ul style="list-style-type: none"> • Synapse software - Intermittence, Continuity, Shorts, Fault Isolation, AutoMap, Test Reports
Integrated Multimeter	<ul style="list-style-type: none"> • 6.5 Digit fully integrated digital multimeter • Calibration not required
Test Interface (Pod)	<ul style="list-style-type: none"> • 1,280 G10 Virginia Panel Quick Disconnect interface connector
Cabinet	<ul style="list-style-type: none"> • Cooling – 300 CFM Blower with automatic temperature control • Aluminum extrusion and steel • Swivel caster and leveling feet • Rear access door with lock • Front storage drawer
Electrical Service	<ul style="list-style-type: none"> • AC Input Voltage – 100V-120V, 30A, Single Phase • Frequency – 50 / 60Hz, • L5-30P twist lock plug • Sequenced Power Distribution – 15A, 16 Outlet • Uninterrupted Power Supply – 3000 VA
Size and Weight	<ul style="list-style-type: none"> • Exterior Dimensions – 84” x 22” x 38” • System Weight – <1000 lbs. • Custom Packaging and Pallet Ramp
Operating Environment	<ul style="list-style-type: none"> • Temperature – 0 to +40 degrees Celsius • Storage – -15 to +50 degrees Celsius • Relative Humidity – 0 to 80%, Non-condensing • Operating Elevation – 0-3000 m • Acoustic Noise – 50DbA at 1m front side
Regulatory	<ul style="list-style-type: none"> • MIL-PRF-32516
Warranty	<ul style="list-style-type: none"> • 12 Months
Related Part Numbers	<ul style="list-style-type: none"> • USC-IFD-01280, USC-IFD-02560, USC-IFD-03840, USC-IFD-06400, USC-IFD-07680, USC-IFD-08960, USC-IFD-10240

Handling, Safety and Technical Information

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Revision 1 : October 2019

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- (d) "Intermittent Fault Detection" means detection of faults in equipment in accordance with (i) ECIA EIA-364-46, Microsecond Discontinuity Test Procedures for Electrical Connectors, Contacts and Sockets; (ii) ECIA EIA-364-87, Nanosecond Discontinuity Test Procedure for Electrical Connectors, Contacts and Sockets; and/or (iii) MIL-PRF 32516, Electronic Test Equipment, Intermittent Fault Detection and Isolation for Chassis and Backplane Conductive Paths.
- (e) "Object Code" means a series of instructions in machine executable form, which cause a computer to perform its functions or to perform specific tasks in a pre-assigned order.
- (f) "Hardware" means each and every hardware component and assembly pre-installed on, and/or provided with or as part of, an IFDIS 2.0™ unit or portable IFD™ unit, and any associated media and Documentation.
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