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Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

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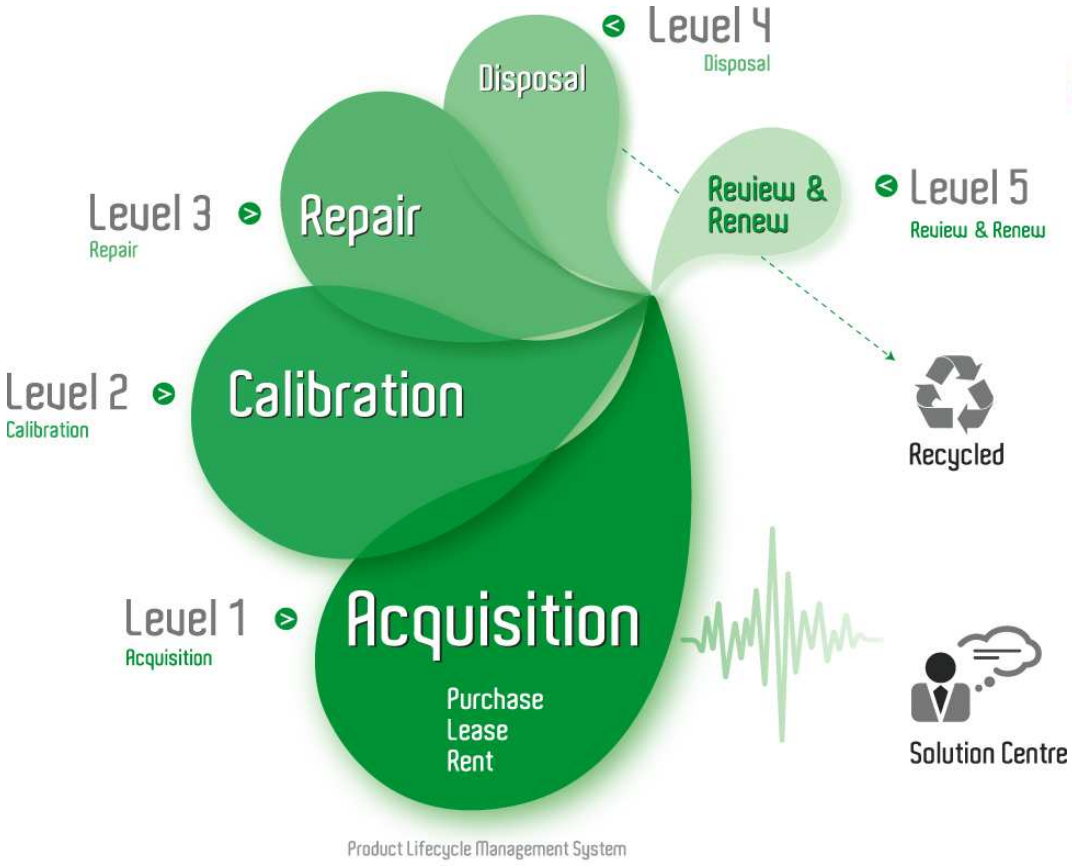

CRESCENT HEART SOFTWARE

TF-GBE

GIGABIT ETHERNET COMPLIANCE TEST FIXTURE

FOR USE WITH

TEKTRONIX TDSET3

ETHERNET COMPLIANCE TEST SOFTWARE

QUICK REFERENCE GUIDE

Version 1.3.2

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Please communicate suggestions for product and documentation improvements to the technical support e-mail address above.

Table Of Contents

List of Tables

1. General Information

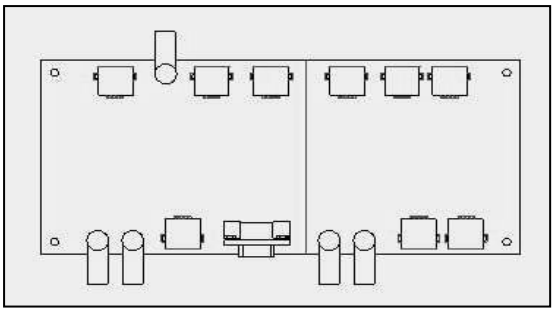
This document provides a quick reference to the test fixture and its usage along with the Tektronix TDSET3 Ethernet Compliance Test Software. For further details about selecting tests and making connections, refer to the TDSET3 User Manual or Online Help that is shipped along with the TDSET3 Software.

1.1 TF-GBE Product Features

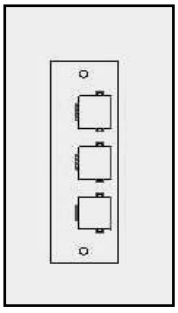
The TF-GBE offers following capabilities:

- Support for 1000/100/10BaseT technologies enables comprehensive testing
- Support for wide spectrum of tests saves time
- On-board test points for accurate removal of disturbing signals ensures reliable results
- Special Return Loss Calibration Board shrinks time taken for testing
- Test Channel for 1000BaseT Jitter tests ensures tests as per standard
- Cross-connect circuits simplify connection to traffic generators and link partners
- Twisted-Pair-Model and Loads (as per IEEE802.3) enables complete transmitter testing of 10BaseT Physical Layer

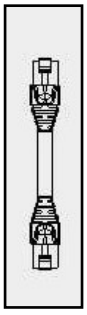
1.2 Supplied Components



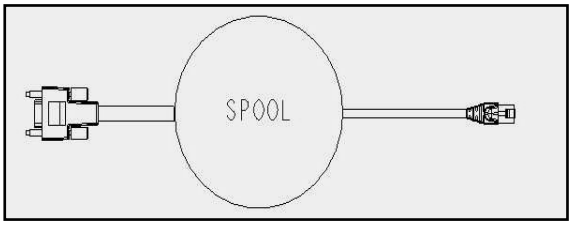
Main PCB



Return Loss Calibration PCB



Short RJ45 Interconnect Cable



Jitter Test Channel Cable (available as TF-GBE-JTC or standard on TF-GBE-ATP)

1.3 TF-GBE Specifications

1.3.1 1000Base-T Tests Supported

- Templates - all pairs
- Peak Voltage - all pairs
- Level Accuracies - all pairs
- Jitter – Test Channel; D-conn to RJ45 interface
- Distortion – all pairs
- Common Mode Output Voltage – all pairs
- Return Loss – all pairs; Calibration Circuits included

1.3.2 100BaseTX Tests Supported

- Template
- Amplitude Domain – Output Voltage, Amplitude Symmetry, Overshoot
- Time Domain – Rise time, Fall Time, Rise/Fall Symmetry
- Jitter Domain – Total Jitter, Duty-Cycle-Distortion
- Common Mode Output Voltage
- Return Loss – Tx, Rx; Calibration Circuits included

1.3.3 10BaseT Tests Supported

- Link Pulse Template – w/TPM and w/0 TPM, Loads 1, 2 and 100Ω
- TP_IDL Template - w/TPM and w/0 TPM, Loads 1, 2 and 100Ω
- MAU Template – with TPM (Twisted Pair Model)
- Output Voltage Amplitude
- Harmonic of Ones or Zeros
- Jitter
- Common Mode Output Voltage
- Return Loss – Tx, Rx; Calibration Circuits included

1.4 Oscilloscope Requirements

The TF-GBE Test Fixture is designed for use with TDSET3 Ethernet Compliance Test Software running on following oscilloscopes from Tektronix:

- DPO7000 series
- DPO/DSA70000 series

For more details on ordering and configurations, contact Tektronix sales or visit **www.tektronix.com**.

2 About TDSET3 Ethernet Compliance Test Software

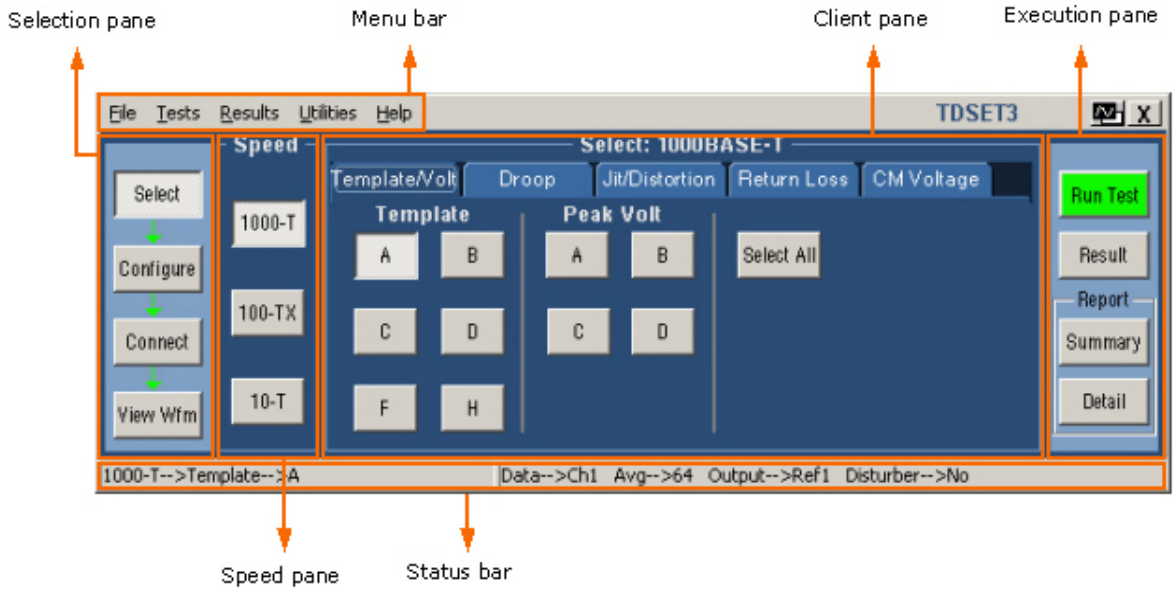
2.1 General Capabilities

The TDSET3 Ethernet Compliance Test Software from Tektronix, coupled with TDS/CSA7000 and TDS6000 Series oscilloscopes, enhances efficiency with faster validation cycles and much higher reliability. Key features of TDSET3 software are:

- Wide range of tests for 10/100/1000BaseT enables complete validation to standards
- Accurate normalization and Disturber removal ensure reliable results
- Return Loss tests for 85, 100, 115 ohm impedances for thorough validation along with efficient utilization of resources
- Automatic "one-button" testing ensure faster testing with much higher reliability
- Elaborate test fixture, available from Crescent Heart Software, completes the compliance solution
- Ingenious "Select All" feature ensures faster testing with much reliability
- Automatic Pass/Fail notification delivers quick results
- Mask Auto-fit and Locate Hits features minimize time for testing
- Automated Jitter measurements eliminate human intervention for faster and reliable measurements
- Sophisticated report generator saves time
- One-button summary and report save time

2.2 TDSET3 user interface (version 1.1.0 and above)

The TDSET3 is laid out in distinct panes as described below:



2.3 Setups for reliable results

Remember that the margins specified in Ethernet standards are very tight. While testing, it is important to pay special attention to many aspects of test setup. The key contributors to unreliable measurements are:

1. Non-linearities in the acquisition path: The test margins are very narrow and any non-linearity can affect the measurement adversely. The following steps would ensure reliable measurements:
   - Signal Path Compensation (SPC) on the oscilloscope. Refer oscilloscope user manual for details on how to perform SPC.
   - Probe calibration is highly recommended prior to performing the tests. Refer oscilloscope user manual for details.
   - JigMatch ensures that the disturber and fixture non-linearities are compensated while testing. Refer TDSET3 User Manual for procedures.
2. Noise: By far, noise is the biggest contributor for erroneous or doubtful results. The following precautions minimize noise:
   - Keep interconnects as small as possible. The TF-GBE-SIC ensures short interconnects.
   - Ensure that the probe stays away from power supply of the DUT.
   - Un-terminated interconnects in circuits can act as excellent transmitters. Either remove them or terminate such interconnects.
   - In the configure menu for each test, check for the numbers of averages:
     - For 1000BaseT Template/Amplitude/Droop tests, set averages to 64 or more
     - For 100BaseTX, set averages to 16 or more for all tests (except for template and Jitter tests, where it is not applicable)
     - For 10BaseT, set averages to 16 or more for Link Pulse Test

NOTE. *For 100BaseTX template test and MAU-Template test for 10BaseT, define the number of samples to at least 50,000. You can do this by selecting the Configure button in Control pane and then selecting the Mask Configuration button.*

2.4 Pattern and TPM (Twisted Pair Model) requirements for 10BaseT Tests

The following chart describes the patterns and TPM requirements for various 10BaseT tests:

Table 2.1: Pattern and TPM requirements for 10BaseT tests

Test	Pattern required from DUT	With TPM	Without TPM
Link Pulse	Link Pulse	✔	✔
MAU Template	Pseudorandom	✔	✘
TP_IDL	Pseudorandom	✔	✔
Jitter	Pseudorandom	✔	✔
Differential Voltage	Pseudorandom	✘	✔
Harmonic	All 1s or 0s	✘	✔

2.5 Test-to-Fixture Matrix

The following chart provides a cross-matrix of tests and test-circuits on the fixture.

Table 2.2: Test-to-Fixture Matrix

	Compliance Test	TC1	TC2	TC3	TC4	TC5	TC6	TC7	RLCF[1]	JTC[2]
1000	Templates, Voltage, Droop		✔ [3]			✔				
	Distortion		✔ [3]			✔				
	Jitter Master/Slave Unfiltered			✔						✔
	Jitter Master/Slave Filtered		✔	✔						✔
	Return Loss	✔							✔	
	Common Mode Output Voltage				✔					
100	Template		✔				✔ [4]			
	O/p Voltage, Overshoot, Symmetry		✔				✔ [4]			
	Rise/Fall Time, Rise/Fall Symmetry		✔				✔ [4]			
	Jitter, Duty Cycle Distortion		✔				✔ [4]			
	Return Loss	✔							✔	
10	MAU Template							✔		
	TP_IDL Template						✔	✔		
	Link Pulse Template						✔	✔		
	Jitter						✔	✔		
	Voltage						✔			
	Harmonic Content						✔			
	Return Loss	✔							✔	
	Common Mode Output Voltage				✔					

Note 1: RLCF implies Return Loss Calibration Fixture

Note 2: JTC implies Jitter Test Cable

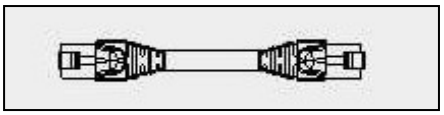
Note 3: TC2 used for testing without Disturbing Signal Generator

Note 4: TC6 used when connecting a Link Partner to obtain scrambled idle signals

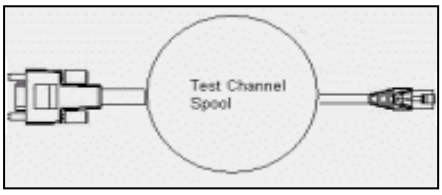
3 Accessories and Ordering Information

3.1 Test Fixture Accessories

Short Interconnect Cable: TF-GBE-SIC



Jitter Test Channel: TF-GBE-JTC



3.2 Test Fixture

Basic Test Package: TF-GBE-BTP

Advanced Test Package: TF-GBE-ATP

3.3 Oscilloscope Accessories (contact Tektronix for more details)

Differential Probes: P6247, P6248, P6330, P7330 and P7350

Active Probes: Any Tektronix Active Probe with bandwidth greater than 1GHz.