54754A-07A

Information Only Service Note

Supersedes:
54754A-07

54754A Differential and Single-ended TDR/TDT

Serial Numbers: ALL

Reduce ESD/EOS damage on TDR modules using proper ESD protection techniques and Keysight N9355CK01 DC Coupled Limiters.

Parts Required:

P/N	Description	Qty.
Keysight N9355CK01	DC Coupled Limiter	2
54753-60001	Discharge Mechanism Assembly (ESD Gate)	2
54754-25701	Knurled Attachment Nut	2

ADMINISTRATIVE INFORMATION

[[]] Calibration Required
[X]Calibration NOT Required Calibration NOT Required

PRODUCT LINE: PL8F
AUTHOR: djs

ADDITIONAL INFORMATION: This document should be shared with customers in repair cases with damaged electrical samplers.

KEYSIGHT TECHNOLOGIES

Situation:
High speed instrument inputs are susceptible to damage by electrostatic discharge (ESD) or electrical over stress (EOS). Voltages in excess of ±2V can destroy high-performance samplers used high speed instruments. It is possible for ESD voltages too small to be felt as a shock to damage sensitive input components resulting in eventual failure

Solution/Action:
Protection against ESD is essential while removing or connecting cables to the TDR module. Using adequate ESD and EOS techniques can reduce costly failures and system down time.

Static electricity can build up on cables or your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- Always have a grounded, conductive table mat in front of your test equipment.
- Always wear a grounded wrist strap, connected to a grounded conductive table mat, having a 1 MΩ resistor in series with it, when making test setup connections.
- Always wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- Always ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- Always ground the center conductor of a test cable before making a connection to the TDR by shorting the center conductor of the cable to the ESD gate as shown below.


Figure 1. ESD gate.


Figure 2. Shorting test cable.


Figure 3. Cable connection.

- Incorporate additional ESD/EOS protective devices such as the Keysight N9355CK01 DC Coupled Limiter to help prevent damage to the sampler. Contact Keysight Technologies for availability of the N9355CK01

Keysight N9355CK01 DC Coupled Diode Limiter

The N9355CK01 is a DC Coupled diode limiter to protect sensitive oscilloscope channels and trigger inputs from damage due to ESD or EOS. The limiter dramatically reduces the likelihood that such voltages will reach the sensitive part of the instrument.

Instruments with dual electrical channels, such as the 54754A, will need two N9355CK01s for differential measurements. Step generators within the TDR modules use ≤ 0.2 V which is far less than the diode threshold of the N9355CK01 limiter.

The N9355CK01 can also be used to protect the electrical channel of the 86105x and similar modules, as long as the signal does not exceed –0.5 V to +0.5 V.

N9355C is an AC coupled version of the limiter and can be used to protect sensitive inputs of non-TDR modules, or the trigger input of the 86100D mainframe where an AC coupled solution is desired.

Revision History:

Date	Service Note Revision	Author	Reason for Change
21 Jul 2010	01	Don Stanisich	As Published
16 Dec 2016	02	Don Stanisich	Updated with Keysight branding. Removed reference to obsolete technical note