

TTP Disturbance Node

The Disturbance Injection Device for TTP



TTP Disturbance Node is a powerful test equipment for systematic verification of the application and the system as a whole. It saves significantly time during software and system testing due to its flexibility to define deterministic fault injection campaigns for the TTP network. **TTP** Disturbance Node provides all the necessary means to inject realistic disturbances like sender faults, transmission loss, wire faults. The faults can be sporadic, repeated, or random.

Simulate Rough Environments

Controlled fault injection is a powerful and inexpensive way to test and validate a system. It may uncover more problems than simply running an “instrumented system”. The node can be used in a running system or with a test setup in the laboratory. **TTP** Disturbance Node is used to study the effects of faults on system behavior, and to test fault tolerance properties of the complete system. When creating fault scenarios for distributed systems, the user needs a powerful tool to set up fault injection campaigns in a fully reproducible and programmable manner. **TTP** Disturbance Node satisfies this requirement. It can be used to inject classes of faults thus allowing analyzing the behavior at the physical, logical, and application layer. Even the most severe classes of faults, namely Byzantine SOS faults, can be injected.

KEY FEATURES/BENEFITS

- Systematic application verification and validation
- Deterministic fault creation/injection
- Fully transparent to TTP network and application
- XML configuration for fault campaigns
- Emulation of different faults; e.g. transmission loss, short-circuit of wires
- Supports system verification testing

Fault Tolerance for Safety-Critical Applications

The TTP is designed to meet the requirements of safety-critical applications. It provides services for the construction of fault-tolerant, distributed and hard real-time systems. System requirements demand continued operation in the presence of faults. **TTP** Disturbance Node test scenarios can cover exceptional situations which are not covered by test scenarios during normal operation. By injecting faults, **TTP** Disturbance Node enables the construction of exceptional test scenarios and the exposure of weaknesses in the fault tolerance and safety of the system.

Disturbances created with TTP Disturbance Node

Emulated Faults	direct access logic to differential signal lines	mismatched termination	TTP synchronous disturbance	periodic disturbance	sporadic disturbance	split whole network into two	trigger external devices at defined times	trigger external device at arbitrary times
Transmission loss - external transient				✓	✓		✓	✓
Faulty sender - outgoing link			✓				✓	
Cable broken	✓							
Short high and low	✓							
Short high/low to supply/gnd	✓							
Termination fault		✓						
Supply or electromagnetic interference							✓	✓
Babbling idiot occurrence			✓	✓	✓			
SOS failures						✓		

Features

Examination of the application behavior in the presence of disturbances

- TTP Disturbance Node is invisible to the network unless activated
- Physical layer tests: mismatched termination, short-circuit, open-circuit
- XML environment for reproducible fault campaigns
- User-configured disturbances:
 - single
 - multiple
 - periodic
 - intermittent
 - permanent
- Selectable disturbance triggers:
 - synchronized to TTP
 - external trigger input
 - pseudo-random (reproducible)
 - asynchronous/strictly periodic
- Disturbance of one or both TTP channels
- Triggers for external hardware to disturb arbitrary or specific transmissions with custom signal/burst
- Tests for clique detection
- Separate a bus into two groups (“Bus break”)

Interfaces

- TTP interface based on austriamicrosystems AS8202NF TTP controller
 - RS485 physical layer
 - Ethernet based MII on request
- RS232 interface for download of configuration data and disturbance setup
- Sub-D socket for trigger input and trigger output and power supply

Specifications

- Dimensions: 172 x 172 x 55 (in mm)
- Weight: 924 g
- Operating temperature: 0 °C to +70 °C
- Storage temperature: -40 °C to +85 °C
- Robust housing
- Power requirements: input voltage 9 to 60 V DC at max. 15 W and max. 2 A

Order Number

- H23.00.0

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