

PowerProbe - Logic and Protocol Analyzer

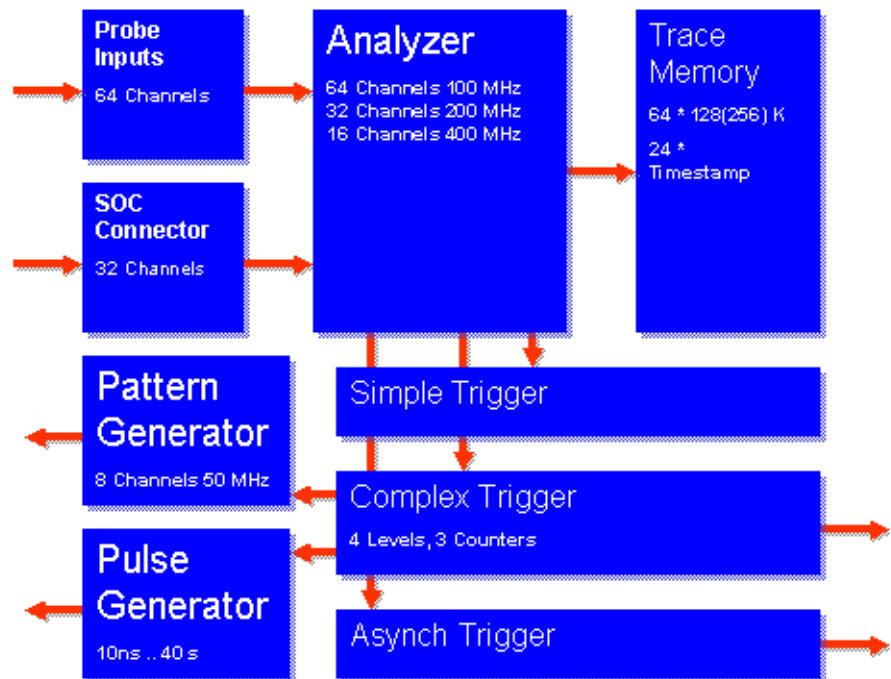
- Timing Analyzer up to 400 MHz
- State Analyzer up to 100 MHz
- 64 Input Channels
- Transient Recording
- Time Correlation with RISC Trace
- Clock Qualifier for State Clock
- Mixed State and Timing Mode
- 4 State Clock Inputs
- Optional FPGA Onchip Trace
- Optional Pattern Generator
- Protocol Support for CAN, USB, etc.

The Timing/State Analyzer Module is special designed for microprocessor applications. It can work separately or in conjunction with all ICD modules. The high-speed transient recording allows very long record time when tracing peripheral lines in a microcontroller application.

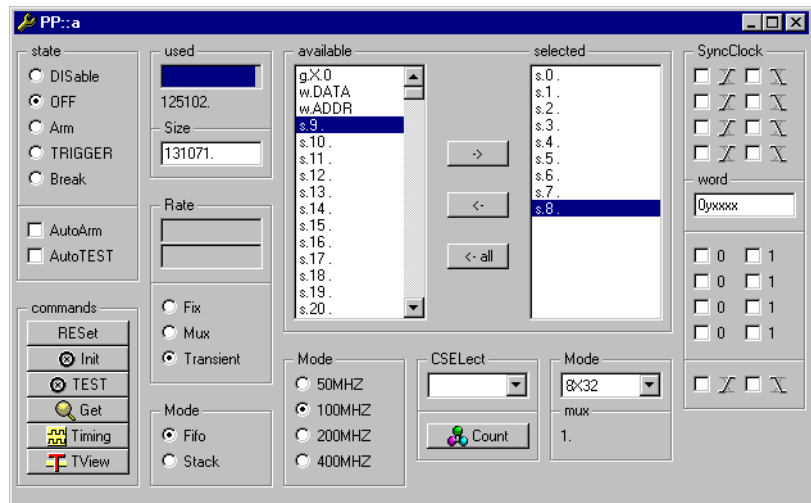
Functional Units

Schematics

PowerProbe



System Features

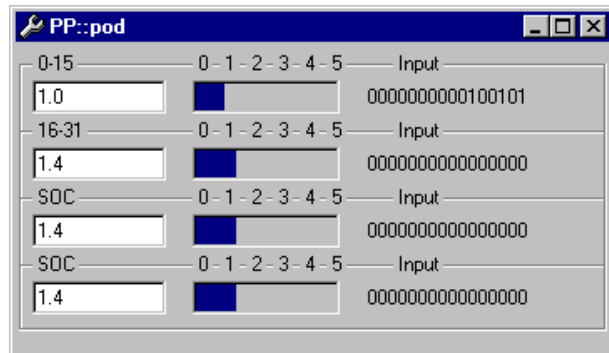


- Timing Analyzer with
 - Trace up to 400 MHz
 - Transient recording
 - Simple trigger function
 - Complex trigger function
- Pattern Generator, which can supply 9 channels with a resolution of 20ns
- SOC Connector
- Pulse Generator
- Universal Counter

Trace

Inputs

- 64 Inputs
- 100 KOhm 7 pF 100 Ohm ser.
- 0..+7.0 V
- 1.0 or 1.4 V threshold level separately definable per group
- 4 groups with 16 lines each
- Probe compensation



Logical names for input Lines

| pin | name | pol | configuration |
|-------|--------|-----|--------------------------------|
| word | w.DATA | | s.0 s.1 s.2 s.3 s.4 s.5 s.6 s. |
| word | w.ADDR | | s.8 s.9 s.10 s.11 s.12 s.13 s. |
| group | g.INT | | x.INT0 x.INT1 x.INT2 x.NMI |
| x.0 | x.INT0 | - | Transient |
| x.1 | x.INT1 | - | Transient |
| x.2 | x.INT2 | - | Transient |
| x.3 | x.NMI | - | Transient |
| x.4 | x.4 | + | Transient |
| x.5 | x.5 | + | Transient |
| x.6 | x.6 | + | Transient |
| x.7 | x.7 | + | Transient |
| x.8 | x.8 | + | Transient |
| x.9 | x.9 | + | Transient |
| x.10 | x.10 | + | Transient |
| x.11 | x.11 | + | Transient |
| x.12 | x.12 | + | Transient |
| x.13 | x.13 | + | Transient |

- Polarity
- Sample Mode
- Groups
- Words

Max. 64 Channels

5 operating modes:

- 64 channels asynchronous 100 MHz
- 32 channels asynchronous 200 MHz
- 16 channels asynchronous 400 MHz
- Up to 32 channels synchronous, 4 clock inputs
- Transient mode

Transient Recording over Required Time

Transient sensitivity can be activated independently for each group. That means, the sampling of the input lines is stored to the trace buffer by the change of the input level only.

The total record time depends on the occurrence of changes on the input signals. The minimum time for high speed signals is 1.2 ms. The max. trace length can be 6.5 h.

Trace Buffer

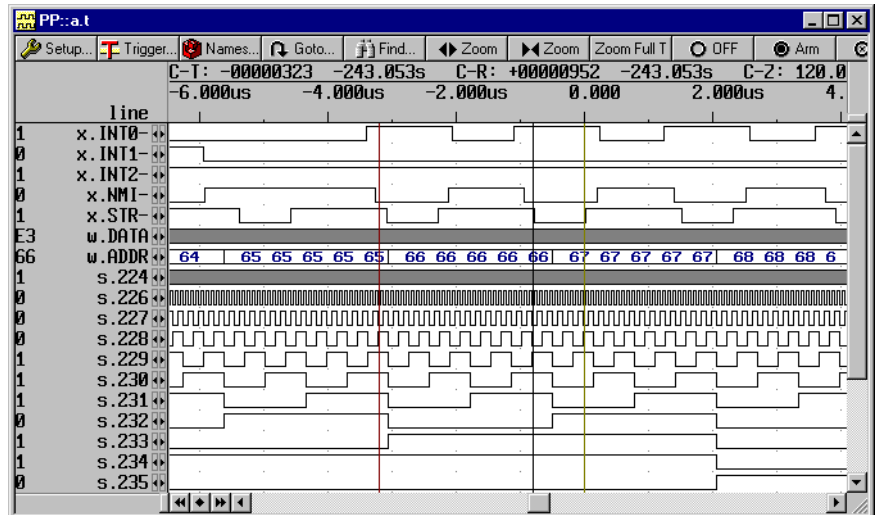
The depth of the trace buffer is 128K or 256K frames.
Each input probe can be used for synchronous or asynchronous events (mixed mode timing/state).

In synchronous mode each recorded frame is marked by a time stamp with a resolution of 10ns.

Display

| record | int0 | int1 | int2 | .nmi | .str | ta | dr | ti | ref |
|-----------|------|------|------|------|------|----|----|----------|-----|
| +00051743 | . | . | . | . | . | BB | 99 | -0.013us | |
| +00051744 | . | . | . | . | . | BB | 99 | -0.010us | |
| +00051745 | . | . | . | . | . | BB | 99 | -0.000us | |
| +00051746 | . | . | . | . | . | BB | 99 | -0.005us | |
| +00051747 | . | . | . | . | . | BB | 99 | -0.003us | |
| +00051748 | . | . | . | . | . | BB | 99 | 0.000 | |
| +00051749 | . | . | . | . | . | BB | 99 | 0.003us | |
| +00051750 | . | . | . | . | . | BB | 99 | 0.005us | |
| +00051751 | . | . | . | . | . | BB | 99 | 0.008us | |
| +00051752 | . | . | . | . | . | BB | 99 | 0.010us | |
| +00051753 | . | . | . | . | . | BC | 99 | 0.013us | |
| +00051754 | . | . | . | . | . | BC | 99 | 0.015us | |
| +00051755 | . | . | . | . | . | BC | 99 | 0.018us | |
| +00051756 | . | . | . | . | . | BC | 99 | 0.020us | |
| +00051757 | . | . | . | . | . | BF | 99 | 0.023us | |
| +00051758 | . | . | . | . | . | BF | 99 | 0.025us | |
| +00051759 | . | . | . | . | . | BF | 99 | 0.028us | |
| +00051760 | . | . | . | . | . | BF | 99 | 0.030us | |
| +00051761 | . | . | . | . | . | BC | 99 | 0.033us | |
| +00051762 | . | . | . | . | . | BC | 99 | 0.035us | |

State Display

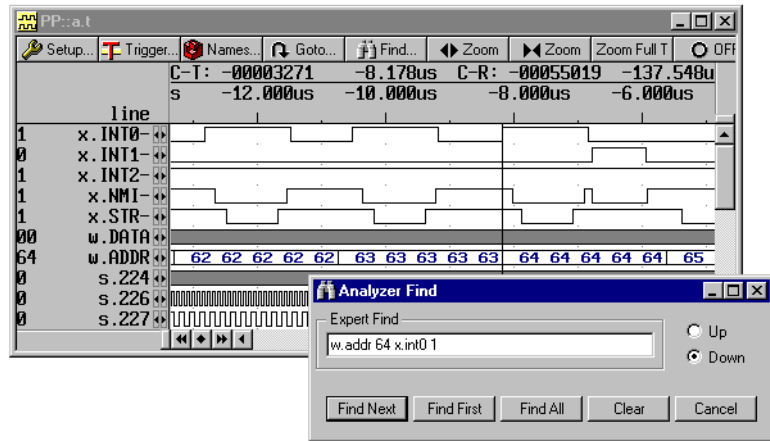


Timing Display

The contents of the trace buffer can be displayed in a tabular form or as a timing

diagram.

Signal Analysis



- LOAD and SAVE
- COMPARE
- FIND
- Tracking

Master-Slave Operation

- The timing analyzer can trigger the other TRACE32 analyzers (high speed state analyzer or port analyzer)
- The timing analyzer can be triggered by the other TRACE32 analyzers.

Output Formats

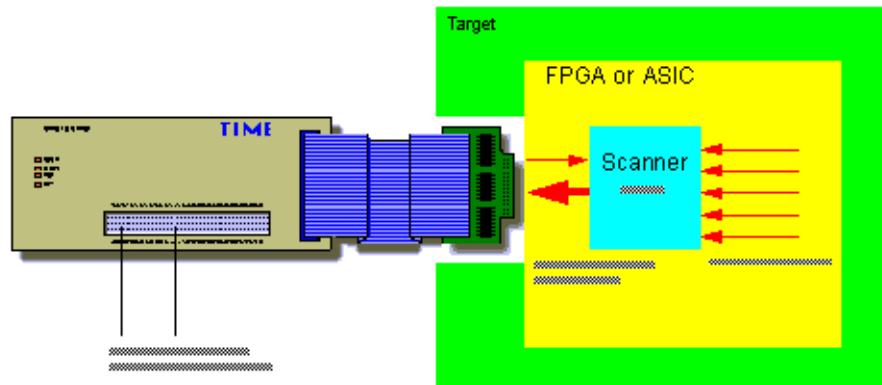
- Binary
- ASCII
- VHDL
- Verilog

Option SOC Adapter

Function

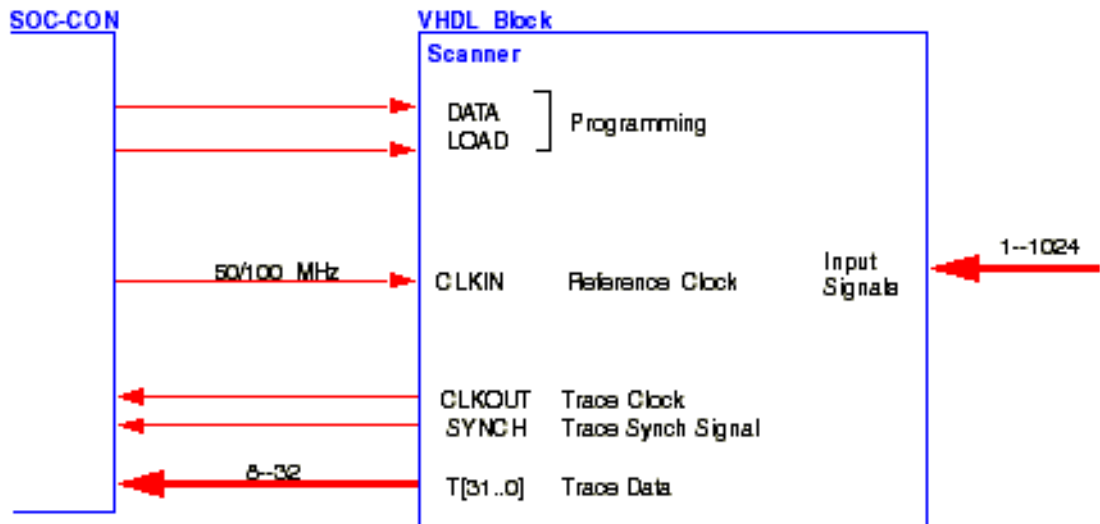
The SOC adaption is a simple way of analyzing internal nodes in FPGAs or ASICs. By integration of a scanner module up to 1024 channels can be

traced inside a silicon system. The SOC adaption is scalable up to 32 multiplexed signals.



Scanner Module

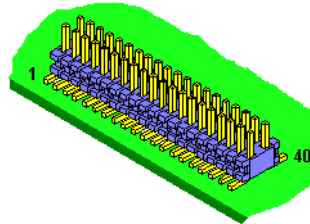
The scanner module is available in VHDL, Verilog or AHDL.



SAMTEC FTE-120-xxxx

Connector

Connector type is



Signals Connector Version A 32 Bit

| Signal | Pin | Pin | Signal |
|--------|-----|-----|--------|
| GND | 1 | 2 | LOAD |
| DATA | 3 | 4 | CLKIN |
| CLKOUT | 5 | 6 | SYNCH |
| T00 | 7 | 8 | T01 |
| T02 | 9 | 10 | T03 |
| T04 | 11 | 12 | T05 |
| T06 | 13 | 14 | T07 |
| GND | 15 | 16 | VCC |
| T08 | 17 | 18 | T09 |
| T10 | 19 | 20 | T11 |
| T12 | 21 | 22 | T13 |
| T14 | 23 | 24 | T15 |
| T16 | 25 | 26 | T17 |
| T18 | 27 | 28 | T19 |
| T20 | 29 | 30 | T21 |
| T22 | 31 | 32 | T23 |
| T24 | 33 | 34 | T25 |
| T26 | 35 | 36 | T27 |
| T28 | 37 | 38 | T29 |
| T30 | 39 | 40 | T31 |

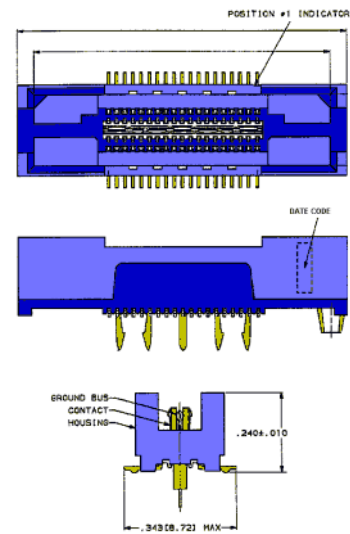
Signals Connector Version A 16 Bit

| Signal | Pin | Pin | Signal |
|--------|-----|-----|--------|
| GND | 1 | 2 | LOAD |
| DATA | 3 | 4 | CLKIN |
| CLKOUT | 5 | 6 | SYNCH |
| T00 | 7 | 8 | T01 |
| T02 | 9 | 10 | T03 |
| T04 | 11 | 12 | T05 |
| T06 | 13 | 14 | T07 |
| GND | 15 | 16 | VCC |
| T08 | 17 | 18 | T09 |
| T10 | 19 | 20 | T11 |
| T12 | 21 | 22 | T13 |
| T14 | 23 | 24 | T15 |

Signals Connector Version A 8 Bit

| Signal | Pin | Pin | Signal |
|--------|-----|-----|--------|
| GND | 1 | 2 | LOAD |
| DATA | 3 | 4 | CLKIN |
| CLKOUT | 5 | 6 | SYNCH |
| T00 | 7 | 8 | T01 |
| T02 | 9 | 10 | T03 |
| T04 | 11 | 12 | T05 |
| T06 | 13 | 14 | T07 |
| GND | 15 | 16 | VCC |

Connector MICTOR



Signal Connector Version B (MICTOR)

| Signal | Pin | Pin | Signal |
|--------|-----|-----|--------|
| VCC | 1 | 2 | LOAD- |
| CLKIN | 3 | 4 | DATA |
| CLKOUT | 5 | 6 | SYNCH |
| T15 | 7 | 8 | T31 |
| T14 | 9 | 10 | T30 |
| T13 | 11 | 12 | T29 |
| T12 | 13 | 14 | T28 |
| T11 | 15 | 16 | T27 |
| T10 | 17 | 18 | T26 |
| T09 | 19 | 20 | T25 |
| T08 | 21 | 22 | T24 |
| T07 | 23 | 24 | T23 |
| T06 | 25 | 26 | T22 |
| T05 | 27 | 28 | T21 |
| T04 | 29 | 30 | T20 |
| T03 | 31 | 32 | T19 |
| T02 | 33 | 34 | T18 |
| T01 | 35 | 36 | T17 |
| T00 | 37 | 38 | T16 |

Complex Trigger System (optional)

Trigger

- Trigger Conditions
 - HIGH, LOW or DONTCARE for each input
 - Range trigger definitions for each group
- 8 Trigger Events
 - 8 global event, no death time
- Trigger Filter

Freely programmable Trigger Sequencer

```

a.p
Save Save As... Save+Close Quit+Close Save+Comp Compile
DATA chipselect_1 a:011111110! b:34
DATA chipselect_2 datstr b:34
EVENT delay 1000.

COUNT delay if datstr:a:chipselect_1
GOTO trigg if delay

trigg:
BREAK if chipselect_2
GOTO CONTINUE Sample. OUT. Count. other previous
  
```

Input variables

- Trigger events from input
- Bus trigger lines A
- Event counter actions/operations
- Acquisition ON/OFF
- Trigger
- Bus trigger lines A
- Counter enable
- Counter restart
- Sequential triggering through 4 levels

- Triggering through bus trigger lines
- Programmable trigger delay 0 to 100% of records
- Triggering of other system units

Pretrigger Delay

The pretrigger delay prevents from immediate triggering which generates an nearly empty trace storage. The value can be defined between 0 and 100% of the trace storage.

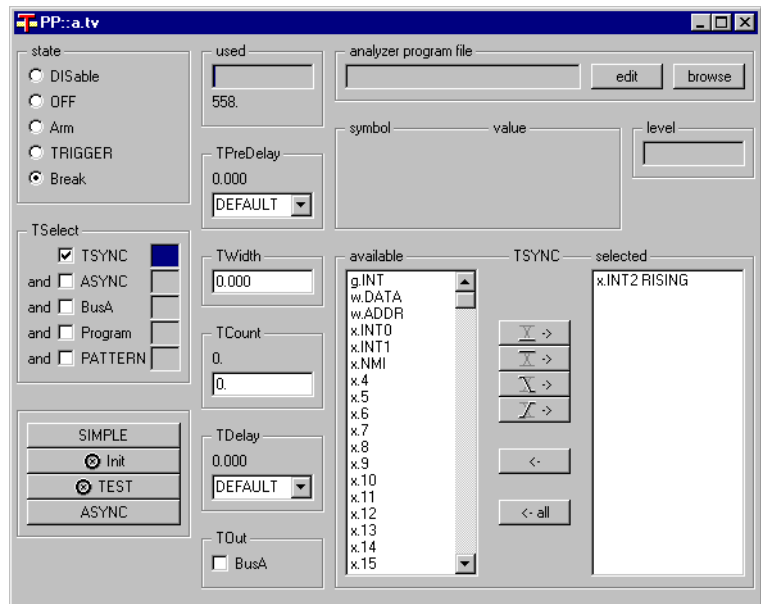
Trigger Delay

The trigger delay can be 0 to 100 s or 0 to 1000% of the trace storage.

- 3 retriggerable 45 bit Counters in trigger system
 - Time window definition

Simple Trigger

Function



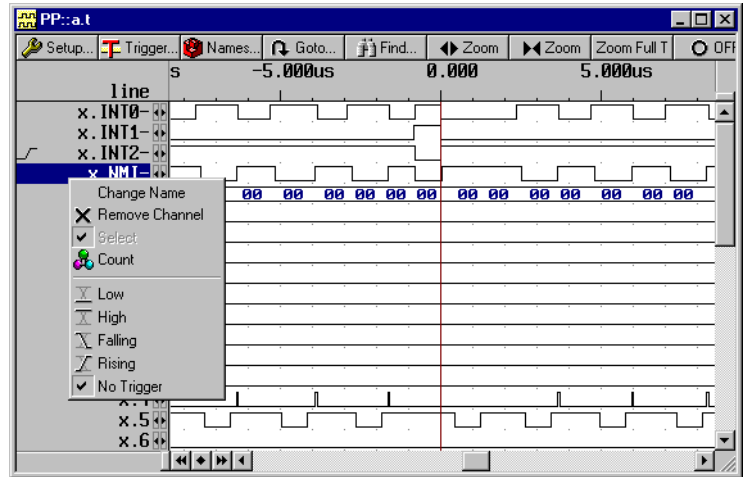
The simple trigger systems brings the easy trigger function of a scope to the logic analyzer. Trigger conditions can be set by mouse without any keyboard interaction.

Trigger Comparator

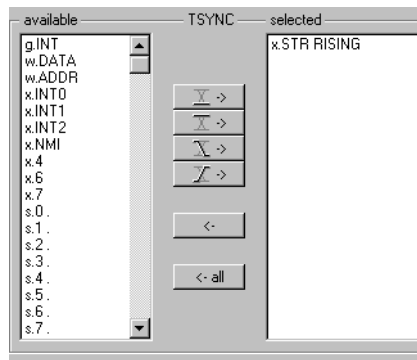
Every input can be used as high, low, rising or falling edge. More than one edge can be combined to generate a valid trigger event.

- Trigger Events
 - Don't care
 - Low
 - High
 - Rising
 - Falling

Direct setting with mouse



Selection Menu



Other Trigger Inputs

- Intertrigger Bus
 - BUS A
- Asynchronous Trigger
- Pattern Generator

Trigger Filters

Trigger Filter

The trigger filter can filter out glitches or runts on the lines. The trigger filter can be set from 0 to 2.5 us.

Trigger Counter

The trigger count can be defined from 0 to 16 Mio. trigger events

Pretrigger Delay

The pretrigger delay prevents from immediate triggering which generates an nearly empty trace storage. The value can be defined between 0 and 1000% of the trace storage.

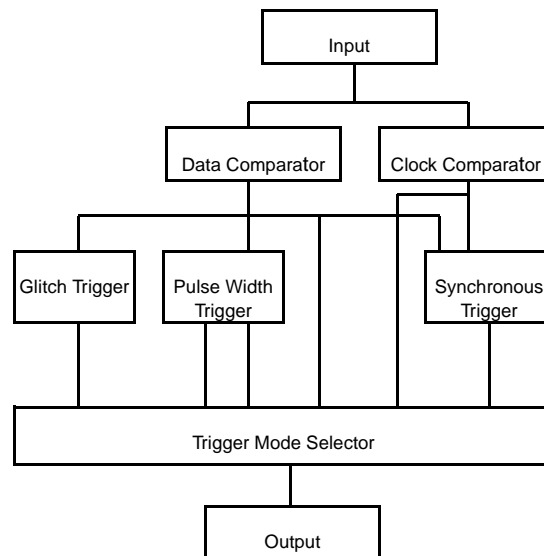
Trigger Delay

The trigger delay can be 0 to 100 s or 0 to 1000% of the trace storage.

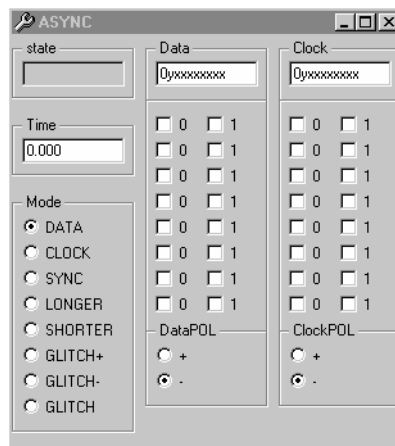
The screenshot shows a configuration dialog box for the Trigger Filter. It contains several fields and controls:

- used:** A text box containing the value 558.
- TPreDelay:** A text box containing 0.000 and a dropdown menu set to DEFAULT.
- TWidth:** A text box containing 0.000.
- TCount:** A text box containing 0.
- TDelay:** A text box containing 0.000 and a dropdown menu set to DEFAULT.
- TOut:** A checkbox labeled BusA, which is currently unchecked.

Asynchronous Trigger System



The asynchronous trigger system can be used to trigger on high-speed events, which are not synchronous to the CPU clock or bus cycle. The trigger reacts on events shorter than 3 ns.



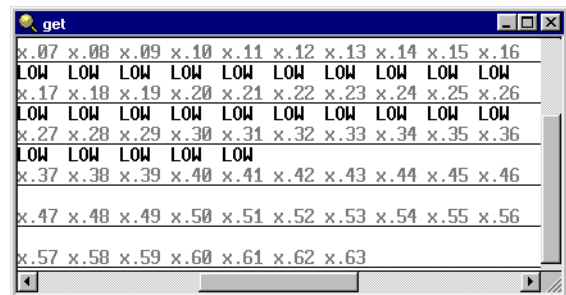
The trigger output can be used to trigger the port analyzer, the emulator or switched to the frequency counter. Events up to 100 MHz can be measured.

- Data
 - Combines 8 Inputs to one trigger signal
 - High, Low, Don't Care for every bit
 - Positive and negative polarity for trigger output
- Clock
 - Same as Data, but 2nd comparator
- SYNC
 - Combination of Data and Trigger event
 - Positive and negative Clock edge
 - True and false data event
- LONGER
 - Pulse width trigger
 - 10ns .. 3 ms
 - Positive and negative pulse
- SHORTER
 - Pulse width trigger
 - 10ns .. 3 ms
 - Positive and negative pulse
- GLITCH+
 - Glitch trigger on positive pulse
 - 2..10ns detection
- GLITCH-
 - Glitch trigger on negative pulse
 - 2..10ns detection

- GLITCH
 - Glitch trigger on positive or negative pulse
 - 2..10ns detection

Activity Display

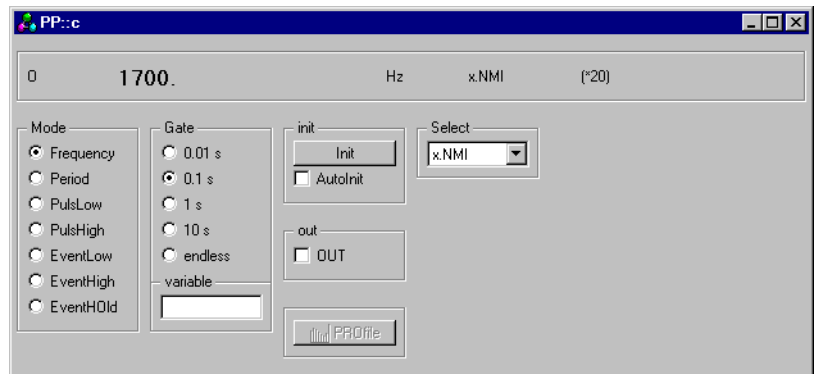
Every port or external line level or pulse activity can be displayed.



Counter System

Every signal can be selected for the universal counter system on the Trace32 FIRE. Event count and pulse width measurement is possible as well

a frequency test on CPU signals. On external inputs up to 100 MHz for input clocks is possible (Frequency only).



Pulse Generator

Rate Generator

- 10 ns .. 40s

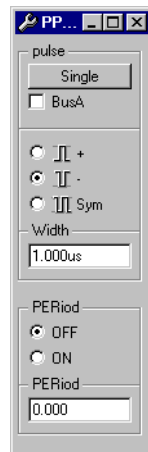
Trigger

- Extern

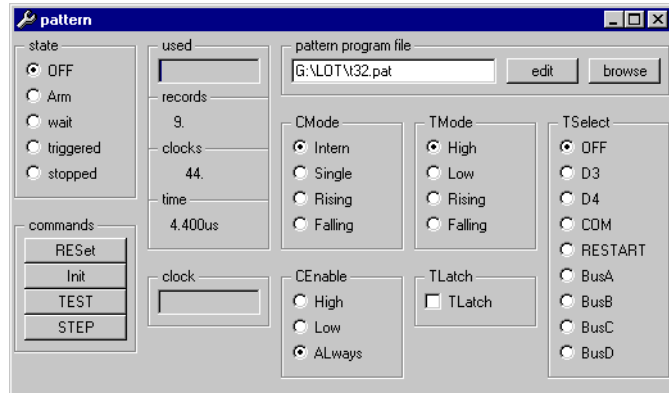
- Analyzer Trigger
- BUS A
- Pattern Generator

Pulse Width

10ns .. 40s



Option Pattern Generator



The pattern generator can supply the 16 channels on the connector C and D.

A output probe has to be used.

Channels

- 9 output lines on AUX0 .. AUX8
- 20 ns cycle time

Trigger

- Trigger latch mode
 - Stores trigger event
- Trigger Input
 - BUS A
 - External 4 Lines
- Trigger mode
 - High
 - Low
 - Rising
 - Falling
- Retrigger function
 - Wait for trigger
- Restart trigger output to BUS
 - BUS A

Clock

- Clock enable input
- External/internal clock
 - 50 MHz internal
 - 0 ...50 MHz external
 - Rising/falling edge
 - Single step
- Clock qualifier
 - High
 - Low
 - Don't care'

Programming



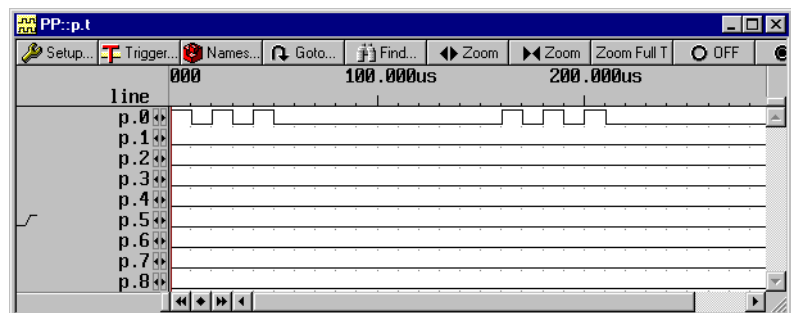
```

PP::P.P
Save Save As... Save+Close Quit+Close Save+Comp Compile Save+Test Test
standby p.0:0
repeat 2
(
  repeat 3
  (
    set p.0:1
    delay 10.us
    set p.0:0
    delay 10.us
  )
  delay 100.us
)
wait|
restart
[ok] Set Delay Wait Restart STOP other previous
  
```

The programming of the pattern generator is done by a text window. Macros can be used for repeating the same sequence several times.

- Pattern Definition
 - Stand-by
 - Set
 - Repeat
 - ()
 - Delay
 - Wait
 - Restart
 - Stop

Pattern Display



The defined pattern sequence can be displayed as a data listing or a timing diagram.

Order Information

Module Description

| OrderNo Code | Text |
|---|--|
| LA-7930 ICD-PP | ICD PowerProbe State-Timing Analyzer 128K ICD State-Timing Analyzer, 64 Channels 100 MHz, 32 Channels 200 MHz, 16 Channel 400 MHz, Transient Recording, 128 KFrames, 48 Bit Time-Stamp, Trigger Filter, Trigger Delay, etc. Requires PODBUS-Interface, No SOC-CON Support |
| LA-7931 ICD-PP-256K | ICD PowerProbe State-Timing Analyzer 256K ICD State-Timing Analyzer, 64 Channels 100 MHz, 32 Channels 200 MHz, 16 Channels 400 MHz, Transient Recording, 256 KFrames, 48 Bit Time-Stamp, Complex Trigger, 8 Trigger Events, 4 Trigger Levels, 3 Counters (45 bit), Trigger Filter, Trigger Delay, etc., 50 MHz Pattern Generator (9 bit), Requires PODBUS-Interface, Option for SOC Trace |
| LA-7932 ICD-PP- SOCCON | Adapter for SOC-CON FLEX Adapter cable for SOC-CON, for tracing internal nodes in FPGAs and ASICs one flex extension for Mictor 38pin connector for target connection included |
| LA-7933 ICD-PP- EXCALIBUR | Adapter EXCALIBUR / SOC-CON Converter EXCALIBUR (200 pin) to SOCCON (MICTOR) |
| LA-7649 CONV-MIC38- 2,54MM | Converter Mictor38 to 2,54mm Connector Converter from Mictor 38 to 2,54 mm Connector |

Detailed Order Information

| Order No. | Code | Text |
|--------------|-----------------------|---|
| LA-7930 | ICD-PP | ICD PowerProbe State-Timing Analyzer 128K |
| LA-7931 | ICD-PP-256K | ICD PowerProbe State-Timing Analyzer 256K |
| LA-7932 | ICD-PP-SOCCON | Adapter for SOC-CON FLEX |
| LA-7933 | ICD-PP- EXCALIBUR | Adapter EXCALIBUR / SOC-CON |
| LA-7649 | CONV-MIC38- 2,54MM | Converter Mictor38 to 2,54mm Connector |

| Order No. | Code | Text |
|---------------------------|----------------|----------------------------|
| Additional Options | | |
| LA-6470 | CLIPSET | Clip Set (Cable and Clips) |
| LA-1370 | MICTOR-FLEXEXT | Mictor Flex Extension |

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