LAUTERBACH
DEVELOPMENT TOOLS

PowerProbe/Port Analyzer Reference Guide

MANUAL

PowerProbe/Port Analyzer Reference Guide

Version 06-Jun-2024

Timing/State Analyzer

Probe.ASYNC — Asynchronous trigger system

Probe.ASYNC.Clock — Defines clock mask

Format: **Probe.ASYNC.Clock** [*<mask>*]

The clock mask is defined. Every input line can be high or low or don't care.

Probe.ASYNC.ClockPOL — Defines data polarity

Format: **Probe.ASYNC.ClockPOL** [*<+|->*]

The clock polarity can be set to true (leading edge) or false (trailing edge).

Probe.ASYNC.Data — Defines data mask

Format: **Probe.ASYNC.Data** [*<mask>*]

The data mask is defined. Every input line can be high or low or don't care.

Probe.ASYNC.DataPOL — Defines data polarity

Format: **Probe.ASYNC.DataPOL** [**+** | **-**]

The data polarity can be set to true or false.

Probe.ASYNC.Mode — Defines data polarity

Format: **Probe.ASYNC.Mode** [*<mode>*]

<mode>:
DATA
CLOCK
SYNC
LONGER
SHORTER
GLITCH
GLITCH+
GLITCH-

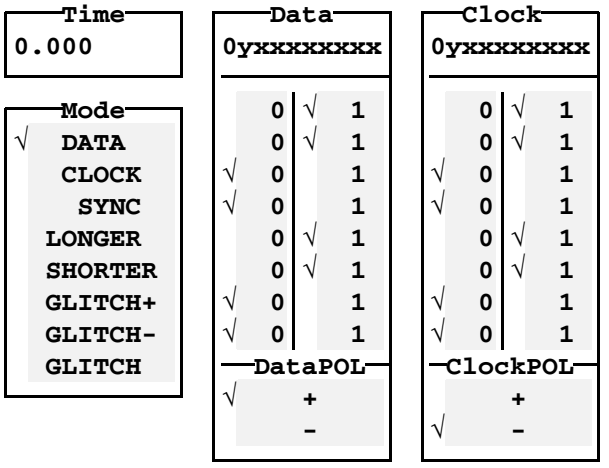
The state display shows all the settings of the trigger probe and the level of the input pins.

DATA	Asynchronous trigger on inputs with data comparator.
CLOCK	Asynchronous trigger on inputs with clock comparator.
SYNC	Synchronous trigger.
LONGER	Pulse width trigger when pulse exceeds time.
SHORTER	Pulse width trigger when pulse width below time limit.
GLITCH	Glitch trigger on both edges.
GLITCH+	Glitch trigger on positive glitch.
GLITCH-	Glitch trigger on negative glitch.

Format: **Probe.ASYNC.state**

Using this command the asynchronous trigger setting of the Power Probe is shown.

```
probe.async.state
```



Probe.ASYNC.Time

Time setting for pulse width trigger

Format: **Probe.ASYNC.Time** [*<time>*]

The time limit for the pulse width detection can be set between 3 ns and 6 ms.

Probe.Break

Stop trace

Format: **Probe.Break**

The trace is stopped and the trace storage is ready for read-out.

Format: **Probe.ComPare** [*<range>*] [*<rec.>*] [*<items>***.** …] [**/***<options>* …]
PORT.ComPare [*<range>*] [*<rec.>*] [*<items>***.** …] [**/***<options>* …]

<options>: **Tolerance** *<count>*
FILE
Back

Compare entries in the trace memory. Only the specified items are compared. If no range is specified, all trace data is compared. Without arguments the search continues to compare the next entries. The option **Back** reverses the direction of the compare command.

If this command is executed from within the **Probe.List/PORT.List** windows, the command will track the window to the found position automatically. The first argument (the range) always corresponds to the trace memory. The second argument corresponds with the trace memory or the file, when the option **FILE** is specified. When external asynchronous data is traced, a jitter in the signal will result in different sampling data. In this case the precision of the compare function may be controlled by the option **Tolerance**. A tolerance value of 3 detects differences only, when they occur in three consecutive trace frames. To exclude entries use the special keyword ".OFF", e.g. "eXt.1.OFF".

```
Probe.LOAD file1
Probe.ComPare, eXt.2 Word.D0_D7 /FILE     ; compare eXt.2 and Word.D0_D7
                                          ; against file (complete trace
                                          ; memory)

Probe.ComPare                             ; compare next entries
```

```
Probe.LOAD file1
Probe.ComPare, ALL eXt.1.OFF /FILE        ; compare all entries without
                                          ; X.1 against file (complete
                                          ; trace memory)

Probe.ComPare                             ; compare next entries
```

Probe.CSELect Select signal for counter

Format: **Probe.CSELect** *<channel>*

The universal counter on the PODBUS system can measure every line of the PowerProbe input. Signals on the external inputs can be measured up to 200 MHz. SOC signals up 50 MHz (Power Probe only).

Format: **Probe.EXPORT** *<file>* [*<signal>* …] [**/Verilog**]
PORT.EXPORT *<file>* [*<signal>* …] [**/Verilog**]

Trace memory contents are stored to a file in VHDL format for usage with simulation tools (VHDL Wait). The default extension should be ".vhd" or ".v"

Probe.FILE Load trace file

Format: **Probe.FILE** *<file>* [**/Config**]
PORT.FILE *<file>*

Load file, that contains trace data. After loading all display commands of the PowerProbe/Port Analyzer can be used for the loaded trace data when the option **FILE** is used.

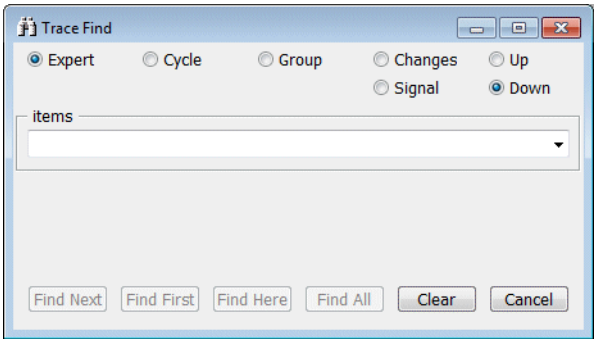
The file contains trace data and PowerProbe configuration information. When the option **Config** is used, the configuration data of the trace file are used to restore the PowerProbe configuration.

```
Probe.SAVE test3                        ; save trace data to file
                                        ; test3

…

Probe.FILE test3                        ; load file test3

Probe.Timing /FILE                      ; display timimg diagram based on
                                        ; the loaded trace data
```

NOTE: See **<trace>.LOAD** and **<trace>.FILE** for additional information.

Format:	**Probe.Find** [*<record>* | *<range>*] [*<items>* …] **PORT.Find** [*<record>* | *<range>*] [*<items>* …]
<option>:	**FILE** **Back**
<items>:	*<line> <value>* | *<range>* | *<mask>* **AT** *<offset>* **OR**
<line>:	**eXt.0** … **63** **Soc.0** … **1023** **Word.***<name>* **Group.***<name>* **SyncClock**

This command searches for entries in the given range which matches the items. Without range the entry is searched in the complete trace memory. Without arguments the search continues to the next entry. The option **Back** reverses the direction of the search command. If executed from within an PowerProbe/Port Analyzer display window the command automatically tracks the window to the found position. The message line on bottom of the screen informs you about the searched area and the record number in which the value was found. If the newest record was reached, searching begins on top of the memory again. Another universal way for searching the occurrence of special items offers the command **WinFind**.




```
Probe.Find (-1000.)--(-700.) my_dbus 20     ; search for data in
                                            ; limited record range

Probe.Find , nmi off at 1 nmi on            ; search for rising edge of
                                            ; the NMI signal
```

```
Probe.Find , w.test 5--44 x.0 0          ; search for different data
                                         ; bytes in complete memory

Probe.Find , w.test 33 at 1 w.test 34    ; search for change on word
                                         ; from 33 to 34

Probe.Find                               ; test search for next
                                         ; occurrence
```

Probe.FindChange — Find entry

Format:	**Probe.FindChange** [*<record>* | *<range>*] [*<items>* …]
<option>:	**FILE** **Back**
<items>:	*<line> <value>* | *<range>* | *<mask>* **AT** *<offset>* **OR**
<line>:	**eXt.0** … **63** **Soc.0** … **1023** **Word.***<name>* **Group.***<name>* **SyncClock**

The option **Back** reverses the direction of the search command.

FILE	Takes trace memory contents loaded by **<trace>.LOAD**.
FlowTrace	The trace works as a program flow trace. This option is usually not required.
BusTrace	The trace works as a bus trace. This option is usually not required.

Format: **Probe.Get** [**%***<format>*] [*<item>* …]
PORT.Get [**%***<format>*] [*<item>* …]

<format>:
Ascii
BINary
Decimal
DEFault
Hex
HighLow
Timing

<item>:
DEFault
ALL
Group.*<group>*
Word.*<name>*
eXt.*<line>*
Soc.*<channel>*

Displays the current state of all input lines. The format of the channel definition is similar to the **Probe.View** command. This command can be executed, while the PowerProbe/Port Analyzer is recording.

```
Probe.get
record  x.0  x.1  x.2  x.3  x.4  x.5  x.6  x.7
direct  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.nmi- x.int0- x.int1- x.int2- x.12 x.13 x.14 x.15
HILO    LOW      LOW      LOW      LOW  LOW  LOW  LOW
x.16 x.17 x.18 x.19 x.20 x.21 x.22 x.23 x.24 x.25
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.26 x.27 x.28 x.29 x.30 x.31 x.32 x.33 x.34 x.35
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.36 x.37 x.38 x.39 x.40 x.41 x.42 x.43 x.44 x.45
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.46 x.47 x.48 x.49 x.50 x.51 x.52 x.53 x.54 x.55
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.56 x.57 x.58 x.59 x.60 x.61 x.62 x.63 trigger
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
```

Displays the state of all lines in hex and HIGH/LOW format.

Format:	**Probe.List** [*<items>* …] [**/***<options>*] **PORT.List** [*<items>* …] [**/***<options>*]
<option>:	**FILE** **Track**
<items>:	**%***<format>* *<line>* **DEFault** | **ALL** **TIme.Back** | **TIme.Fore** | **TIme.REF** **TIme.Zero** | **TIme.Trigger** **SyncClock** **SPARE**
<format>:	**Hex** | **Decimal** | **BINary** | **Ascii** **Timing** | **HighLow** **LEN** *<size>* **TimeAuto** | **TimeFixed**
<line>:	**eXt.***<name>* **Soc.***<name>* **Word.***<name>* **Group.***<name>*

If no options are selected, a set of all sampled values appear in the window. By selecting options, specific values can be displayed in any order as defined by the user. It is possible to remove a selection from the list by appending the keyword**.OFF**. The display format of the entries can be changed by format options.

Options:

FILE	Display trace memory contents loaded with **Probe.Load** *<file>*
Track	Track other trace list window (tracks to record number or time)

Formats:

Timing	Display single bits as vertical timing
HighLow	Display single bits as HIGH/LOW value
Hex	Display single bytes in hex values
Decimal	Display single bytes in decimal values
BINary	Display single bytes in binary values
Ascii	Display single bytes as ascii characters
LEN *<size>*	Specify the width of non numeric fields (e.g. symbols)
TimeAuto	The unit of time is selected automatically.
TimeFixed	The displayed unit of time is fixed.

Items:

DEFault	Default selections (see list below)
ALL	Select all recorded data (superset of DEFault)
TIme	Time marker (default Time.Fore)
TIme.Back	Time marker, relative time to previous record
TIme.Fore	Time marker, relative time to next record
TIme.REF	Time marker, relative to reference point
TIme.Trigger	Time marker, relative to trigger point
TIme.Zero	Time marker, relative to global reference
SyncClock	Synchronous clock event
SPARE	Displays an empty block

The message line on top of the screen calculates and displays continuously the current record number, the time difference between the current record and the reference record and the time difference between the current record and the zero reference time.

Because of a limited area in the headline of the list window, the names of the channels may sometimes be cut and only the last characters are visible.

Listing the current trace memory contents can only take place when the PowerProbe status is set to OFF. Otherwise the list window is frozen and displays previous memory contents.

Within the PowerProbe list window, a permanent click on the right mouse button offers additional commands like **WinFind** or **WinPan**.

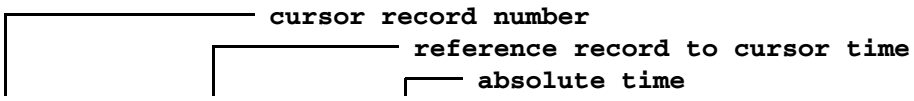
It is possible to print out the trace memory content on the system printer or saving the content in a file in a printable format with the command **PRinTer** and **WinPrint**.

```
Probe.List
```

Display the standard columns.

```
Probe.List /FILE
```

Displays the last, with the command **Probe.LOAD** loaded trace memory contents.




```
+005  C-R:  +600ns        C-Z:  25.324s
```

```
Probe.List xx0 int0 w.test ti.ref
   record|x.0 |int0|st|ti.ref
-00000029|    |    00 -201.130us
-00000028|    |    00 -200.900us
-00000027|    |    00 -200.690us
-00000026|    |    00 -200.460us
-00000025|    |    00   -0.230us
-00000024|    |    00    0.000
-00000023|    |    00    0.220us
-00000022|    |    00    0.440us
-00000021|    |    00    0.660us
-00000020|    |    00    0.880us
-00000019|    |    00  201.120us
-00000018|    |    00  201.340us
-00000017|    |    00  201.560us
-00000016|    |    00  201.780us
-00000015|    |    00  202.000us
-00000014|    |    00  202.220us
-00000013|    |    00  402.450us
-00000012|    |    00  402.680us
-00000011|    |    00  402.890us
-00000010|    |    00  403.120us
-00000009|    |    00  403.330us
-00000008|    |    00  403.560us
-00000007|    |    00  603.790us
```

Each entry is classified as a record and numbered accordingly. Normally the most recent entry is numbered as -1. If a trigger point is available, the trigger point itself is marked with a "T" and its record number is 0.

Format: **Probe.LOAD** *<file>*
PORT.LOAD *<file>*

The command loads the trace memory contents from the specified file and prepares it for display.

The same commands and options for displaying the current memory contents are used to display trace memory contents, except that the additional "/FILE" option must be entered.

For searching an unknown stored trace memory content, use the wild card "*". The system offers an implicit directory window with all files extended with ".tad" E.g. "Probe.Load *". By clicking on the desired filename within the temporary directory window, will substitute the wild card character in the command line.

The default extension of the file name is ".tad".

NOTE: See **<trace>.LOAD** and **<trace>.FILE** for additional information.

Format: **Probe.Mode** *<mode>*
PORT.Mode *<mode>*

<mode>: **Fifo**
Stack

50MHZ
100MHZ
200MHZ
400MHZ
LATCH (Port Analyzer only)

1X32
2X32
4X32
8X32
16X32
32X32
1X16
2X16
4X16
8X16
16X16
32X16
1X8
2X8
4X8
8X8
16X8
32X8

By this command the PowerProbe/Port Analyzer operating modes can be selected.

Fifo If the PowerProbe/Port Analyzer is full, new records overwrite older records. The PowerProbe records always the last cycles before the break.

Stack If the PowerProbe/Port Analyzer is full it stops recording.

The PowerProbe always records the first cycles after starting the trace.

50MHZ
100MHZ
200MHZ
400MHZ
Sample frequency in MHz.
The 50 MHz mode is used for SOC targets with slower speed. 100 MHz is the default mode when using 64 channels. In 200 MHz mode 32 channels are available, in 400 MHz mode only 16 channels can be used.

LATCH	The port analyzer sample 16 channels on the connector of the port analyzer. Additionaly all transients between 2 sample cycles are recorded.
1X32 **2X32** **4X32** **8X32** **16X32** **32X32** **1X16** **2X16** **4X16** **8X16** **16X16** **32X16** **1X8** **2X8** **4X8** **8X8** **16X8** **32X8**	The SOC scanner macrocell can be parameterized with different channel width and number of input signals. The PowerProbe must know this parameters for correct settings. 8X32 means 8 MUX positions with 32 output channels (256 input lines).

See also

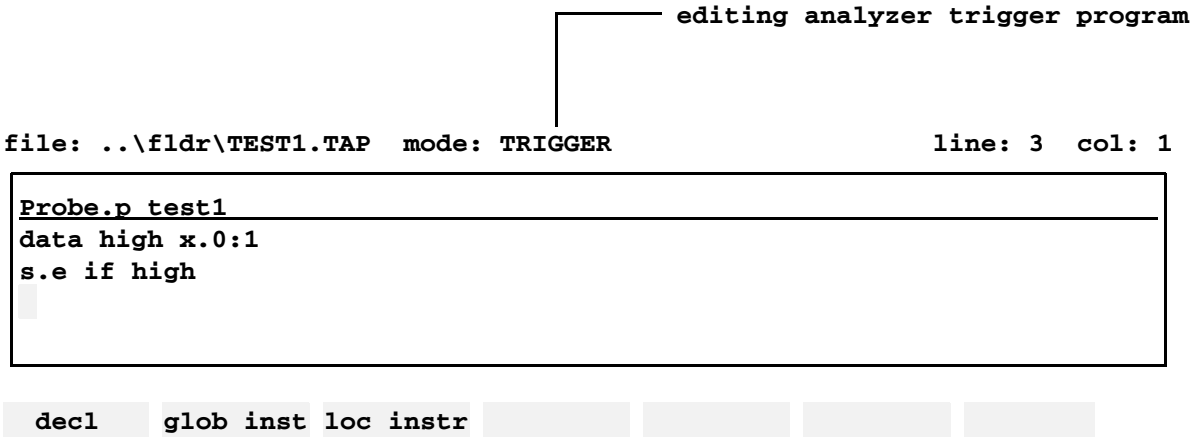
- <trace>.Mode

Probe.Program — Program trigger unit

Format: **Probe.Program** [*<file>*]

This command opens an editor window, which is used for programming the trigger unit. The program entry in the window is guided by softkeys and the online-help system. After successful programming the filename will be displayed in the PowerProbe status window. The default filename is the file currently used by the

trigger unit. The file name default extension is ".tap". This command can be executed by clicking on the trigger program name area in the PowerProbe state window. If the state of the PowerProbe is ARM and this command is executed, the state is switched to OFF before programming the trigger unit automatically.



Format: **Probe.Rate** [**Fix** | **Mux** | **Transient** | *<rate>* | *<resolution>*]

Selects the sampling rate and mode in samples per second.

Transient	Selects transient recording of selected channels.
Mux	Selects multiplexed recording of all channels
Fix	Selects sampling with fixed rates.

Legal values and the resulting sample times are given in the following table:

Rate	Resolution	Min. sampling time
1000000000.	10 ns	1.2 (2.5) ms
500000000.	20 ns	2.5 (5) ms
25000000.	40 ns	5 (10) ms
10000000.	100 ns	25 (50) ms
5000000.	200 ns	50 (100) ms
2500000.	400 ns	100 (200) ms
1000000.	1 µs	250 (500) ms
500000.	2 µs	500 (1000) ms
400000.	2.5 µs	600 (1.2) s

With a mouse click to the corresponding area in the PowerProbe state window, that command can be executed, too.

```
Probe.rate 1000000.            ; set to 1 MHz sample rate

Probe.rate 1.us                ; same operation, 1 MHz sample rate
```

Probe.ReProgram Program trigger unit

Format: **Probe.ReProgram** [*<file>*]

Programs the trigger unit of the PowerProbe with an existing program. The program should be error free, when using this command. To write an error free program, use the command **Probe.Program**.

NOTE: PowerProbe programming can be done out of a command script. The programming script is enclosed in brackets behind the Probe.Reprogram command.

```
a.rp                                    ; start programming script
(
     start: goto level1 if x.1          ; programming script
     level1: break if x.2 & x.3

)                                       ; end
```

Probe.SELect — Select SOC signal for trace

Format: **Probe.SELect** *<channel>* …

If the PowerProbe works in fixed or transient mode, 32 soc lines can be selected out of max. 1024 lines.

Probe.SIZE — Select buffer size

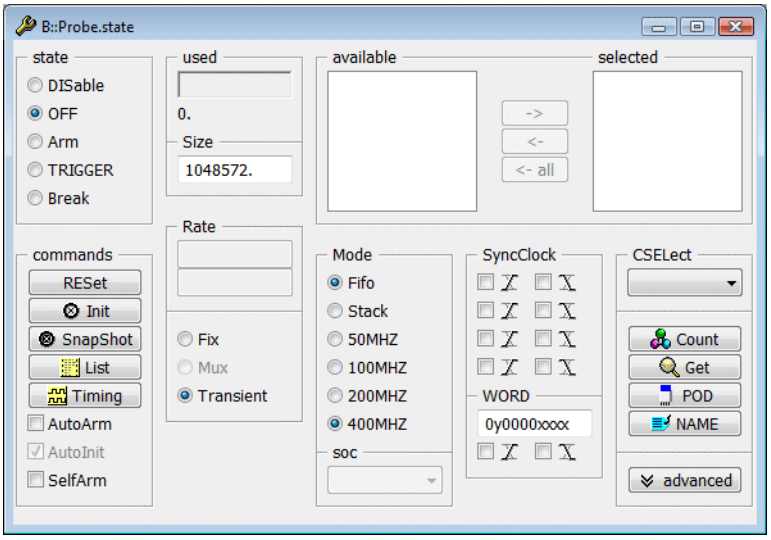
Format: **Probe.SIZE** [*<buffersize>*]
Probe.SIZE [*<buffersize>*]

<buffersize>: **1.** … **262144.**

Trace memory depth can be pre-set to any value between 1 and the max. size of the trace buffer. With a mouse click to the corresponding area in the Probe state window, that command can be executed, too. Smaller buffer sizes result in faster display updates.

Format:	**Probe.state** **PORT.state**

Display or modify the operation options of the PowerProbe/Port Analyzer.



See also

- PROBE.GET()
- PROBE.RECORDS()
- PROBE.REF()
- PROBE.STATE()

Format: **Probe.SyncClock** [*<signal>* [*<mask>*] *<mode>*]

<signal>:
SCLK0
SCLK1
SCLK2
SCLK3
WORD
RESet

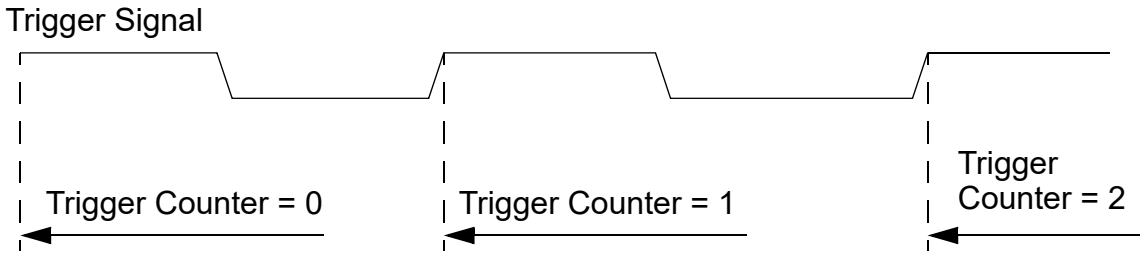
<mode>:
None
Rising
Falling
Both

The synchronous clock signal for the trace can be generated out of 4 inputs. Every input can be selected directly or a input word can be specified for generating a combined trace clock signal.

```
a.sc SCLK0 R     ; rising edge of line 0 is synchr. clock

a.sc word        ; both SCLK0 and SCLK1 must go low, the trailing edge
0yxx00 f         ; valid
```

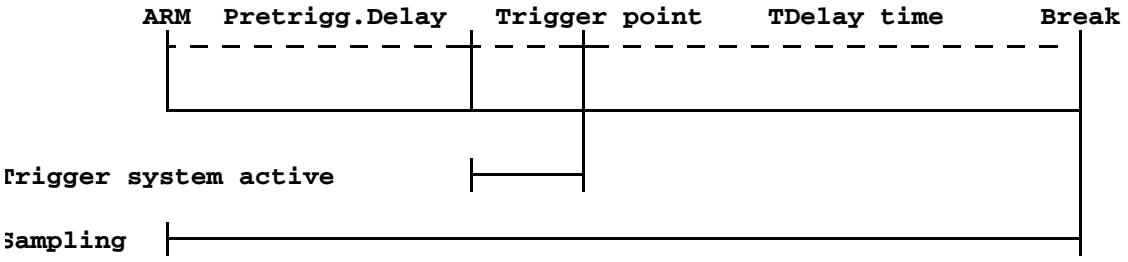
Format:	**Probe.TCount** [*<value>*]
<value>:	**0.** … **16777215.**

The trigger counter value is defined. A counter value zero means that triggering is done immediately when a trigger condition is valid. A value by one triggers on an upcoming trigger event.



Format:	**Probe.TDelay** [*<time>* | *<percent>* | *<cycles>* | **DEFAULT**]
<time>:	**0.** … **400.s**
<percent>:	**0.** … **100%**
<cycles>:	**0.** … **4000000000.**

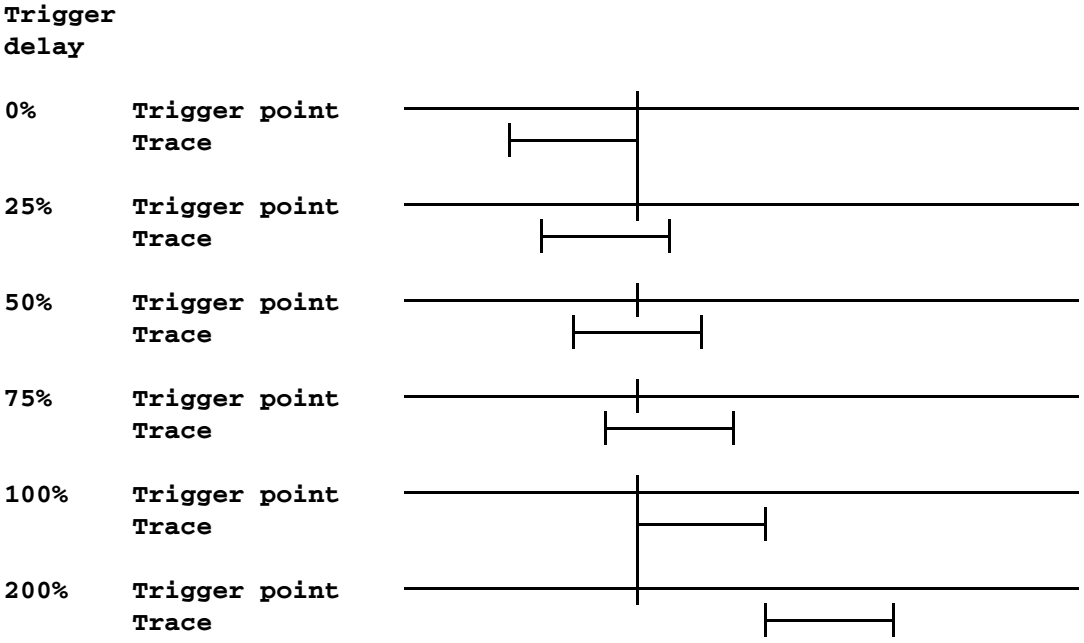
Selects the delay time between trigger point and break of the PowerProbe. The time can be larger than the time for a full sample of the PowerProbe. The trigger delay time may be defined in percent relating to the total trace time.



DEFAULT The trigger predelay is max. 10% depth of the selected trace depth

With a mouse click to the corresponding area in the PowerProbe state window this command can be executed too.

```
a.td 10.ms        ; the trigger delay is 10 ms

a.td 50%          ; the trigger point is in the mid of the trace memory

a.td 99%          ; the trigger point is at the beginning to the trace
                  ; memory
```



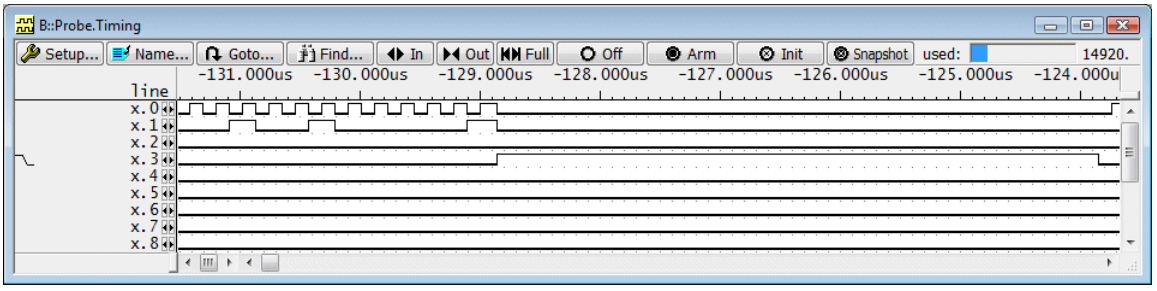
See also

- Trace

Format: **Probe.Timing** [*<format>*] [*<items>* ...] [**/***<options>*]

<format>:
DEFault
LEN *<width>*]
HighLow | Timing
HEX | Decimal | Ascii | Signed | Unsigned
TimeAuto | TimeFixed

<options>:
FILE
BusTrace
RecScale
TimeScale
TimeZero
TimeREF
Track
Track
ZoomTrack



Formats

Ascii	Displays single bytes as ASCII characters
BINary	Displays single bytes in binary values
Decimal	Displays single bytes in decimal values
Hex	Displays single bytes in hex values
HighLow	Displays single bits as 'H' or 'L' character
LEN *<width>*	Specifies the width of non numeric fields (e.g. symbols)
Signed	Displays single bytes signed
TimeAuto	Displays time values in a floating display format (short)

TimeFixed	Displays time values in a fixed point format (long format)
Timing	Displays single bits as vertical timing
Unsigned	Displays single bytes unsigned

Options

FILE	Display the trace contents loaded by the command **Probe.FILE** *<file>*.
BusTrace	(not needed)
RecScale	Display the record numbers a the horizontal axis.
TimeScale	Display the time a the horizontal axis, time relative to the trigger point.
TImeZero	Display the time a the horizontal axis, time relative to the zero point.
TImeREF	Display the time a the horizontal axis, time relative to the reference point.
Track	Display trace section with reference to the cursor position in the foreground window.
ZoomTrack	Display trace section with reference to the cursor position in the foreground window, use the same zooming factor

Examples:

```
Probe.Timing X.1 X.3 X.7

Probe.Timing X.SCK X.MOSI X.MISO X.CS

Probe.Timing X.SCK X.MOSI X.MISO X.CS /RecScale
```

Format: **Probe.TOut** *<channel>* **ON** | **OFF** [**+** | **-**]

<channel>: **A**
B
BusA

Enables or disables the trigger output lines of the PowerProbe.

Probe.TPreDelay Pre-trigger delay

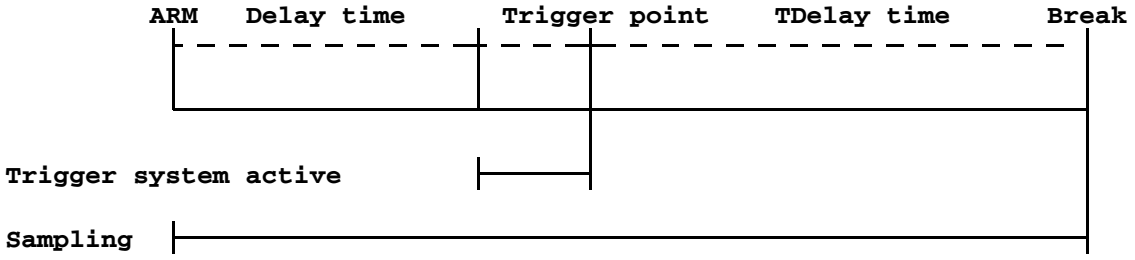
Format: **Probe.TPreDelay** [*<time>* | *<percent>* | **DEFAULT**]

<percent>: **0** … **1000%**

<time>: **0** … **400.s**

<cycles>: **0** … **4000000000.**

Selects a delay time between the start of the recording and the release of the trigger system. This delay is very useful if previous events before a trigger point are of interest. The trigger event is immediately valid after the arming of the PowerProbe. If the PowerProbe is slave to the debugger, usually no delay will be needed.



DEFAULT The trigger predelay is max. 10% of the selected trace depth.

With a mouse click to the corresponding area in the PowerProbe state window that command can be executed, too.

Format:	**Probe.TRIGGER**

The PowerProbe is triggered manually.

Probe.TSELect Select trigger source

Format:	**Probe.TSELect** [*<source>*]
<source>:	**BusA** **TSYNC** **ASYNC** **Program** **PATTERN**

Selects the trigger source for the PowerProbe.

BusA Trigger lines on the trigger bus. This lines may be controlled by the state PowerProbe, by the timing PowerProbe or the pattern generator or debugger. For connection with ICD debuggers it is usually the break signal by the debugger or RISC trace.

TSYNC The ports, selected by the **Probe.TSYNC** command, is used as trigger signal.

ASYNC The ports, selected by the **Probe.ASYNC** command, is used as trigger signal.

Program The ports, selected by the **Probe.Program** command, is used as trigger signal.

PATTERN A signal generated from the pattern generator is used as trigger signal. The command **TRIGGER** inside a Pattern generator program will be used to release such kind of trigger signal. Please refer **PATTERN.Program**.

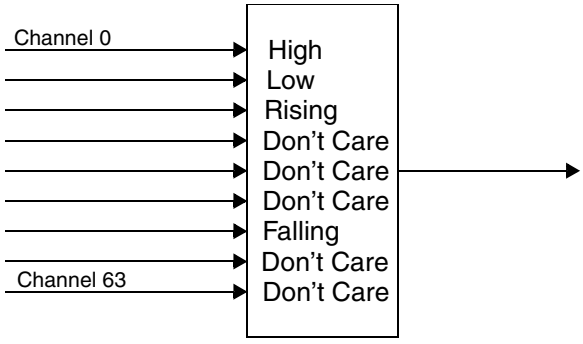
Format: **Probe.TSYNC** *<channel>* [*<mode>*]

Selects a line for the frequency counter and the glitch detector. If the "TSelect" area of the state window "Probe" is active, this line will be used to trigger the PowerProbe.

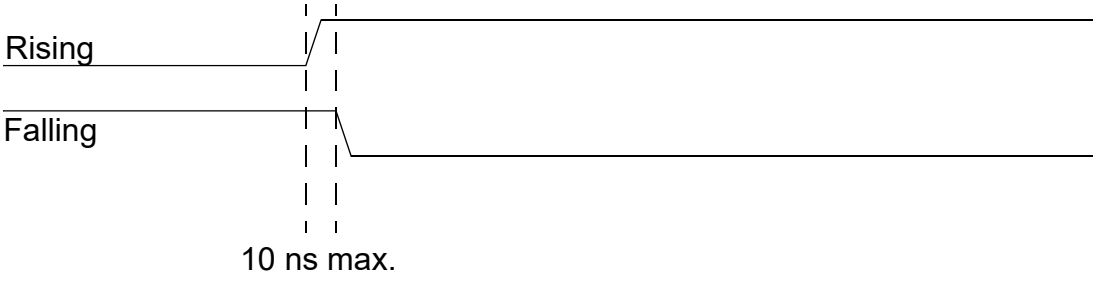
```
NAME.Word Test X.4 X.5 X.6 x.7        ; combine 4 channels to a word

Probe.TSELect.TSYNC ON                ; select simple trigger as trigger
                                      ; source for the PowerProbe

Probe.TSYNC.SELect Word TEST 0x6      ; specify trigger
```

The command resets the values of TPreDelay, TWidth, TCount and TDelay to defaults compared to Probe.TSYNC.SELect. Probe.TSNYNC.SELect doesn't modify values of TPreDelay, TWidth, TCount and TDelay.

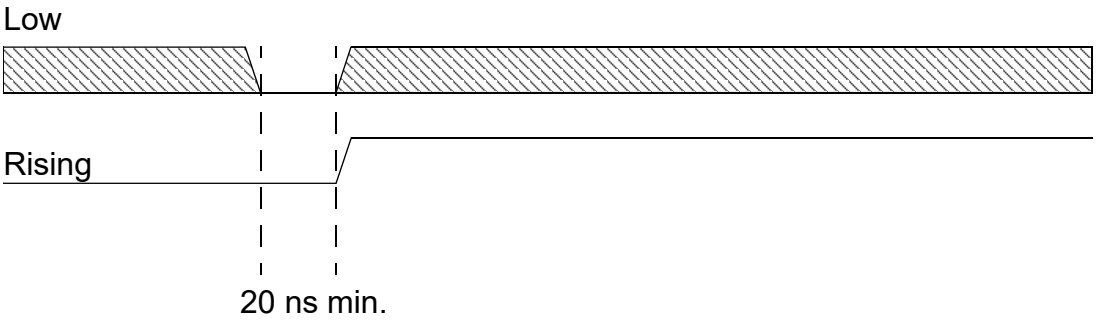
The trigger signal can be generated out of the 32 SOC channels and the 32 external channels. Every signal can be qualified as high, low, rising and falling edge.



More than 1 edge can be combined to a trigger word. To detect a valid combination of edges, the edges must have a max. skew of 10 ns (20 ns in 50 MHz mode).

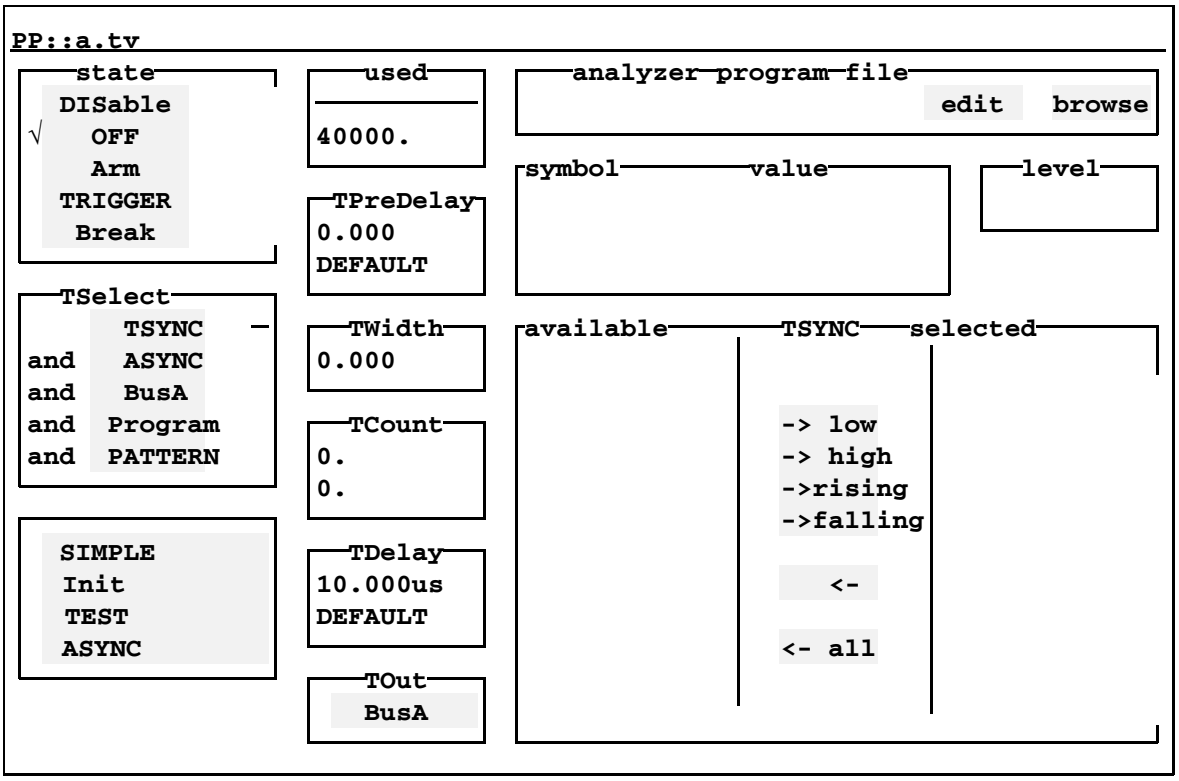


Edges and state signals can be combined. The state signal must be stable 40 ns before the edge. The sampling of the state signal is guaranteed before the edge is detected.


Low
Rising
20 ns min.

Format: **Probe.TView**

The state of the trigger unit and the trigger settings are displayed.



records Displays the actual number of entries in the trace buffer while the recording is running.

used Displays the number of records in the trace buffer in bar-graph waveform. If a trigger event is logged in trace memory, the letter "T" appears in this field additionally.

state Displays current PowerProbe status.

OFF Indicates that trace memory and trigger unit are deactivated and not running. The trace memory contents can be read out.

Arm Indicates that PowerProbe is activated (for sampling and triggering events). A read out is impossible.

break Indicates that the specified trigger event in the trigger unit has been encountered. At the same time, the PowerProbe is in OFF state for read out.

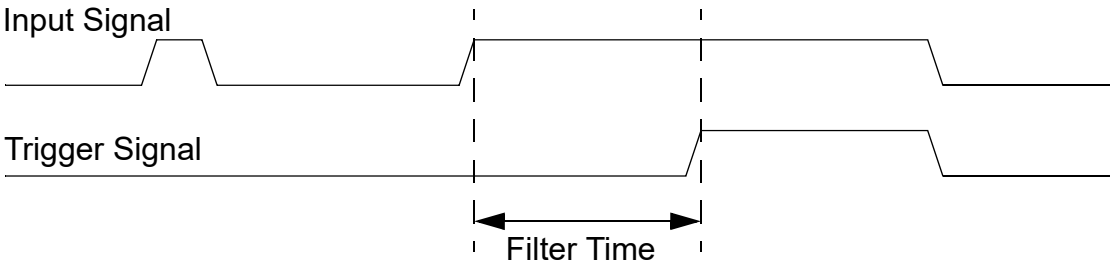
level	Indicates the encountered logical level of the current trigger program.
setup file	Indicates the file name containing the trigger unit program. By clicking on that field will open an editor window for modification.
symbol, flag, counter	Indicates the values and symbolic names of the flags and counters of the trigger unit.

Probe.TWidth — Set trigger filter

Format: **Probe.TWidth** [*<value>*]

<value>: **0** … **2.5us**

The trigger filter time is defined. All trigger events which are shorter than this value are ignored.



Example:

```
a.s x.20 high
a.s x.rxd rising
```

Format: **Probe.View** [*<record>*] [**%***<format>* …] [*<item>***.** …] [**/***<option>*]
PORT.View [*<record>*] [**%***<format>* …] [*<item>***.** …] [**/***<option>*]

<format>:
Ascii
BINary
Decimal
DEFault
Hex
HighLow
Timing

<item>:
DEFault
ALL
TIme.Fore
TIme.Zero
TIme.Trigger
TIme.REF
eXt.*<line>*
Soc.*<line>*
Word.*<name>*
Group.*<name>*

Displays a frame in a more detailed format. The syntax of the channel definitions is the same as for the **Probe.Get** command. Without arguments all channels are displayed.

```
PP::a.v -10.
record  x.0  x.1  x.2  x.3  x.4  x.5  x.6  x.7  x.nmi- x.int0-
-000010 LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW    LOW
x.int1- x.int2- x.12 x.13 x.14 x.15 x.16 x.17 x.18 x.19 x.20
LOW     LOW     LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.21 x.22 x.23 x.24 x.25 x.26 x.27 x.28 x.29 x.30 x.31 x.32
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.33 x.34 x.35 x.36 x.37 x.38 x.39 x.40 x.41 x.42 x.43 x.44
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.45 x.46 x.47 x.48 x.49 x.50 x.51 x.52 x.53 x.54 x.55 x.56
LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW  LOW
x.57 x.58 x.59 x.60 x.61 x.62 x.63 trigger    ti.ref
LOW  LOW  LOW  LOW  LOW  LOW  LOW    -4.900us
ti.zero
   3.286ks
```

Probe.Arm — Arm the trace

See command **<trace>.Arm** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 134).

Probe.AutoArm — Arm automatically

See command **<trace>.AutoArm** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 135).

Probe.AutoInit — Automatic initialization

See command **<trace>.AutoInit** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 140).

Probe.BookMark — Set a bookmark in trace listing

See command **<trace>.BookMark** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 140).

Probe.Chart — Display trace contents graphically

See command **<trace>.Chart** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 144).

Probe.DISable — Disable the trace

See command **<trace>.DISable** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 197).

Probe.DisConfig — Trace disassembler configuration

See command **<trace>.DisConfig** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 198).

Probe.DRAW — Plot trace data against time

See command **<trace>.DRAW** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 201).

Probe.FindAll — Find all specified entries in trace

See command **<trace>.FindAll** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 237).

Probe.GOTO — Move cursor to specified trace record

See command **<trace>.GOTO** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 244).

Probe.Init — Initialize trace

See command **<trace>.Init** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 246).

Probe.ListNesting — Analyze function nesting

See command **<trace>.ListNesting** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 263).

Probe.ListVar — List variable recorded to trace

See command **<trace>.ListVar** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 266).

Probe.OFF — Switch off

See command **<trace>.OFF** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 278).

Probe.PROfileChart — Profile charts

See command **<trace>.PROfileChart** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 283).

Probe.PROTOcol — Protocol analysis

See command **<trace>.PROTOcol** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 339).

Probe.PROTOcol.Chart — Graphic display for user-defined protocol

See command **<trace>.PROTOcol.Chart** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 339).

Probe.PROTOcol.Draw — Graphic display for user-defined protocol

See command **<trace>.PROTOcol.Draw** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 341).

Probe.PROTOcol.EXPORT — Export trace buffer for user-defined protocol

See command **<trace>.PROTOcol.EXPORT** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 342).

Probe.PROTOcol.Find — Find in trace buffer for user-defined protocol

See command **<trace>.PROTOcol.Find** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 343).

Probe.PROTOcol.list — Display trace buffer for user-defined protocol

See command **<trace>.PROTOcol.list** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 344).

Probe.PROTOcol.PROfileChart Profile chart for user-defined protocol

See command **<trace>.PROTOcol.PROfileChart** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 347).

Probe.PROTOcol.PROfileSTATistic Profile chart for user-defined protocol

See command **<trace>.PROTOcol.PROfileSTATistic** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 348).

Probe.PROTOcol.STATistic Display statistics for user-defined protocol

See command **<trace>.PROTOcol.STATistic** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 350).

Probe.REF Set reference point for time measurement

See command **<trace>.REF** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 357).

Probe.RESet Reset command

See command **<trace>.RESet** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 357).

Probe.SAVE Save trace for postprocessing in TRACE32

See command **<trace>.SAVE** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 358).

Probe.SelfArm Automatic restart of trace recording

See command **<trace>.SelfArm** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 362).

Probe.SnapShot — Restart trace capturing once

See command **<trace>.SnapShot** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 373).

Probe.TRACK — Set tracking record

See command **<trace>.TRACK** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 502).

Probe.ZERO — Align timestamps of trace and timing analyzers

See command **<trace>.ZERO** in 'General Commands Reference Guide T' (general_ref_t.pdf, page 505).

Counter

The universal counter is used to measure input lines.

See general counter functions.

The PowerProbe logic analyzer has 9 outputs (AUX0...AUX9) which can be programmed to output a certain pattern with a certain timing. The pattern storage can hold 256 frames with data patterns, delay times and control commands. For a detailed introduction, see **"Pattern Generator"** (powerprobe_user.pdf).

PATTERN.Arm — Arm analyzer

Format: **PATTERN.Arm**

The pattern clock is enabled and the pattern sequence is executed. This function doesn't reset the pattern counter.

See also

- PATTERN.Init
- PATTERN.OFF
- PATTERN.state

PATTERN.CEnable — Pattern clock control

Format: **PATTERN.CEnable** *<mode>*

<mode>:
Low
High
ALways

Low Clock Enable on X.25, LOW active

High Clock Enable on X.25, HIGH active

ALways Clock is not qualified

See also

- PATTERN.state

Format: **PATTERN.CMode** *<mode>*

<mode>: **Intern**
Single
Rising
Falling
SYnch

Intern	Use internal 100 MHz clock
Single	Single step function. One clock signal is generated on **PATTERN.Step**.
Rising	Use external clock on X.24 (Rising edge)
Falling	Use external clock on X.24 (Falling edge)
SYnch	Use synchronous clock

See also

- PATTERN.state

PATTERN.GOTO Jump to entry

Format: **PATTERN.GOTO** *<time>*

The command sets the tracking reference to the specified record. All pattern generator windows, which have set the TRACK option, sweep to this reference point.

See also

- PATTERN.List
- PATTERN.state
- PATTERN.Timing

Format: **PATTERN.Init**

The pattern generator is disabled and the pattern counter is set to zero. The first set pattern is used to set up the pattern generator outputs.

See also

- PATTERN.Arm
- PATTERN.state

PATTERN.List Display pattern memory

Format: **PATTERN.List** [*<items>* …] [**/***<options>*]

<options>: **Track**

<items>: **%***<format>*
<line>
DEFault | **ALL**
TIme.Back | **TIme.Fore** | **TIme.REF**
TIme.Zero | **TIme.Trigger**
SPARE

<format>: **Hex** | **Decimal** | **BINary** | **Ascii**
Timing | **HighLow**
LEN *<size>*
TimeAuto | **TimeFixed**

<line>: **Pattern.0** … **Pattern.8**
Word.*<name>*
Group.*<name>*

<pattern>: **STOP** | **WAIT** | **RESTART**
BUSA | **TRIGGER**

If no options are selected, a set of all sampled values appear in the window in an order as defined by the system. By selecting options, specific values can be displayed in any order as defined by the user. It is possible to remove a selection from the list by appending the keyword **.OFF**. The display format of the entries can be changed by format options.

Options:

Track	Track other pattern window

Format:

Hex	Display single bytes in hex values
Decimal	Display single bytes in decimal values
BINary	Display single bytes in binary values
Ascii	Display single bytes as ascii characters
Timing	Display single bits as vertical timing
HighLow	Display single bits as HIGH/LOW value
LEN *<size>*	Specify the width of non numeric fields (e.g. symbols)
TimeAuto	The unit of time is selected automatically.
TimeFixed	The displayed unit of time is fixed.

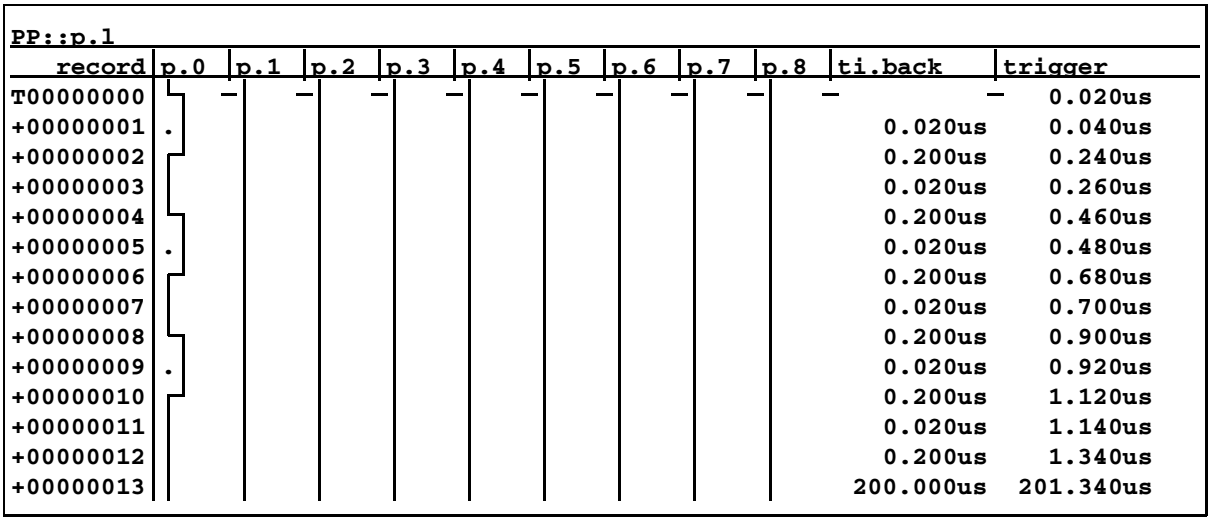
Items:

DEFault	Default selections
TIme	Time marker (default Time.Fore)
TIme.Back	Time marker, relative time to previous record
TIme.Fore	Time marker, relative time to next record
TIme.REF	Time marker, relative to reference point
TIme.Trigger	Time marker, relative to trigger point
TIme.Zero	Time marker, relative to global reference
line	Signal names
pattern	States of the pattern generator and the bus trigger lines
SPARE	Displays an empty block

The message line on top of the screen calculates and displays continuously the current record number, the record distance between the current record and the reference record, the time difference between the current record and the reference record and the time difference between the current record and the first pattern.

Because of a limited area in the headline of the list window, the names of the channels may sometimes be cut and only the last characters are visible.

It is possible to print out the trace pattern memory contents on the system printer or saving the content in a file in a printable format with the command **Printer** and **WinPrint**.



```
PP::p.1
   record |p.0 |p.1 |p.2 |p.3 |p.4 |p.5 |p.6 |p.7 |p.8 |ti.back     |trigger
T00000000 |  ¯ |  ¯ |  ¯ |  ¯ |  ¯ |  ¯ |  ¯ |  ¯ |  ¯ |          ¯ |   0.020us
+00000001 |  . |    |    |    |    |    |    |    |    |    0.020us |   0.040us
+00000002 |  ¬ |    |    |    |    |    |    |    |    |    0.200us |   0.240us
+00000003 |    |    |    |    |    |    |    |    |    |    0.020us |   0.260us
+00000004 |  ¬ |    |    |    |    |    |    |    |    |    0.200us |   0.460us
+00000005 |  . |    |    |    |    |    |    |    |    |    0.020us |   0.480us
+00000006 |  ¬ |    |    |    |    |    |    |    |    |    0.200us |   0.680us
+00000007 |    |    |    |    |    |    |    |    |    |    0.020us |   0.700us
+00000008 |  ¬ |    |    |    |    |    |    |    |    |    0.200us |   0.900us
+00000009 |  . |    |    |    |    |    |    |    |    |    0.020us |   0.920us
+00000010 |  ¬ |    |    |    |    |    |    |    |    |    0.200us |   1.120us
+00000011 |    |    |    |    |    |    |    |    |    |    0.020us |   1.140us
+00000012 |    |    |    |    |    |    |    |    |    |    0.200us |   1.340us
+00000013 |    |    |    |    |    |    |    |    |    |  200.000us | 201.340us
```

```
PP::w.p.l puls1 puls2 ti.fore
 record s1 s2 ti.fore
-******
T000000 |  —|  — 100.000ns
+000001 |  |    100.000ns
+000002 .  |    300.000ns
+000003 |  |  | 100.000ns
+000004 |  .  | 300.000ns
+000005 |  |  | 100.000ns
+000006 |  |    100.000ns
+000007 |  |
```

```
PP::w.p.l puls1 puls2 wait
 record s1 s2 wait
-******
T000000 |  —|  —
+000001 |  |
+000002 .  |
+000003 |  |  |
+000004 |  .  |
+000005 |  |  |
+000006 |  |    wait
+000007 |  |
```

```
PP::w.p.l %hl puls1 puls2
 record uls1 uls2
-******
T000000 LOW —LOW
+000001 HIGH LOW
+000002 HIGH LOW
+000003 LOW  HIGH
+000004 LOW  HIGH
+000005 LOW  LOW
+000006 LOW  LOW
+000007 LOW  LOW
```

```
PP::printer.select ljl

PP::wp.p.l puls1 puls2
```

The pattern generator memory is printed in LASERJET landscape format.

See also

- PATTERN.GOTO
- PATTERN.REF
- PATTERN.state
- PATTERN.Timing

Format: **PATTERN.OFF**

The pattern generator is stopped. The pattern counter is not changed. Rearming will start the pattern generator again from this point.

See also

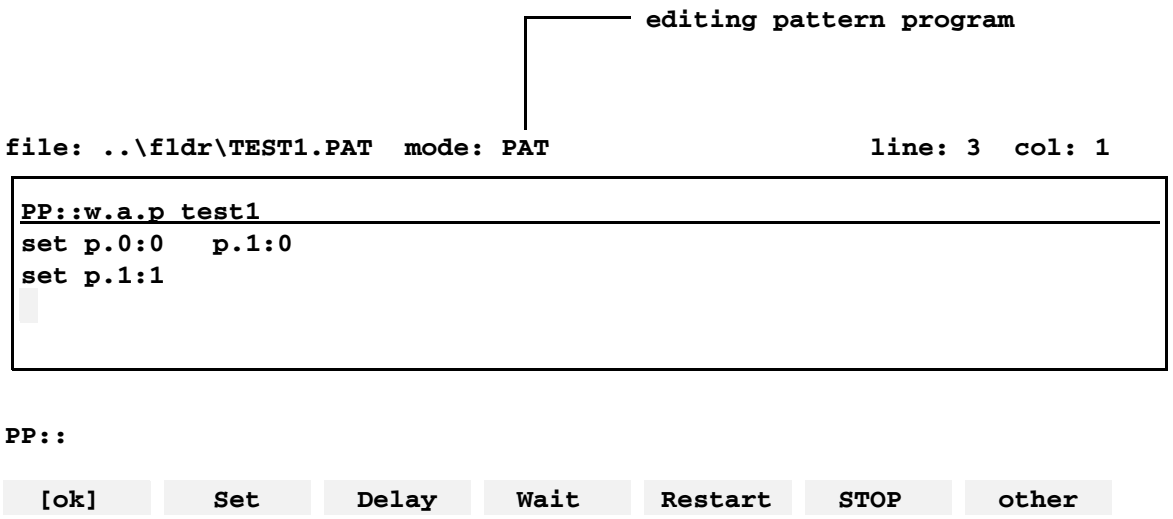
- PATTERN.Arm
- PATTERN.state

PATTERN.Program Program pattern generator

Format: **PATTERN.Program** [*<file>*]

This command opens an editor window, which is used for programming the pattern generator. After successful programming the filename will be displayed in the pattern generator state window. The default filename is the file currently used by the pattern generator. The file name default extension is ".pat". This command can be executed by clicking on the pattern program name area in the pattern state window. If the pattern generator is in ARMed mode, the state is switched to OFF before programming the pattern generator.

Set	Defines the state of the pattern generator output lines. A string is interpreted as multiple patterns. A mask is used to change only some bits in the sequence. All bit positions with don't care bits don't change the previous bits.
DEFAULT	Defines the default setup for Delay, Wait or NONE
WAIT	Wait for trigger event
DELAY	Repeat previous state
RESTART	The pattern sequence starts again with the first line
STOP	The pattern sequence stops here. It can be started by the commands **INIT** and **ARM** (or **TEST**) only.
REPEAT	Repeat function. The next line or the next block will be repeated n times. Repeat functions may be nested.
( )	The block brackets are used to mark blocks for the repeat function.
Trigger	Send a trigger over the podbus, or trigger the analyzer trace.



See also

- PATTERN.ReProgram
- PATTERN.state

PATTERN.REF — Set reference point

Format: **PATTERN.REF** *<time>*

Determines the reference point from which the time differences will be calculated. In the message line the value C-R (cursor minus reference) is displayed continuously. The reference point default is always the latest record in the trace memory.

See also

- PATTERN.List
- PATTERN.state
- PATTERN.Timing

PATTERN.ReProgram — Program pattern generator

Format: **PATTERN.ReProgram** [*<file>*]

Programs the pattern generator with an existing program sequence. The program should be error free, when using this command. To write an error free program, use the command **PATTERN.Program**.

NOTE: Pattern programming can be done out of a command script. The programming script is enclosed in brackets behind the **PATTERN.Reprogram** command.

```
p.rp                                    ; start programming script
(
     set 0                              ; programming script
     wait
     set p.0:1
     delay 10.us
     set p.0:0
     restart
)                                       ; end
```

See also

- PATTERN.Program
- PATTERN.state

PATTERN.RESet — Reset pattern generator

Format:	**PATTERN.RESet**

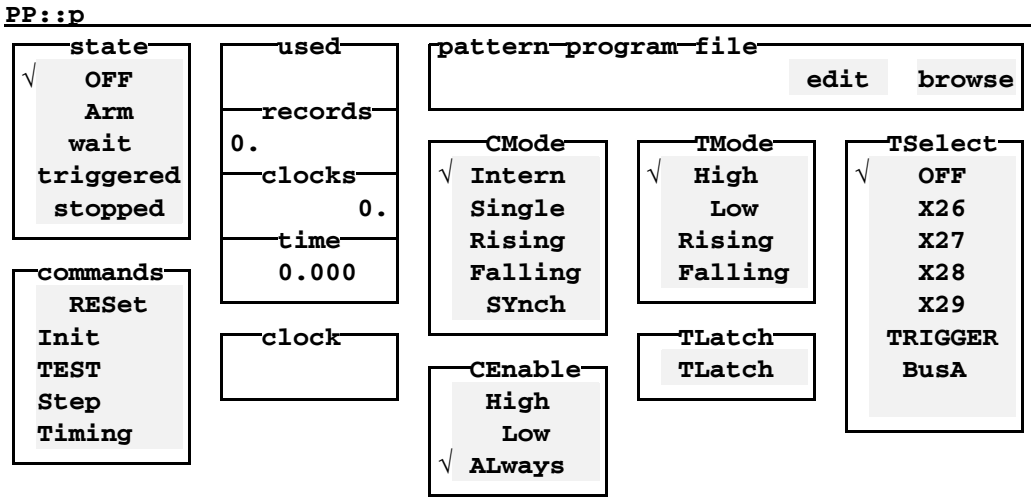
All functions of the pattern are reset to its default settings. The pattern memory is cleared.

See also

- PATTERN.state

Format: **PATTERN.state**

Display or modify operation options of the pattern generator (PAT). This is the most important window for controlling the PAT. This window shows the number of traced records, the actual value of the counters and the current option settings.



records	Displays the total number of entries in the pattern memory.
clocks	Displays the total pattern cycle length.
time	Displays the sequence length if a constant clock is used (default 100 MHz)
clock	Input clock display
OFF	Indicates that the pattern generator is switched off.
Arm	Indicates that pattern generator is activated.
wait	The pattern generator is waiting for a trigger event.
triggered	A trigger event is detected.
stopped	The pattern sequence is executed and a STOP instruction is reached.
program file	Indicates the file name containing the pattern definition. Clicking on that field will open an editor window for modification.

See also

- PATTERN.Arm
- PATTERN.CEnable
- PATTERN.CMode
- PATTERN.GOTO
- PATTERN.Init
- PATTERN.List
- PATTERN.OFF
- PATTERN.Program
- PATTERN.REF
- PATTERN.ReProgram
- PATTERN.RESet
- PATTERN.Step
- PATTERN.TEST
- PATTERN.Timing
- PATTERN.TLatch
- PATTERN.TMode
- PATTERN.TSELect

PATTERN.Step — Single step function

Format: **PATTERN.Step**

The pattern generator must run in single clock mode. On every execution of the **PATTERN.Step** command one clock cycle is generated.

See also

- PATTERN.state

PATTERN.TEST — Run pattern generator

Format: **PATTERN.TEST**

The pattern generator is initialized and armed.

```
p.rp file1                      ; program pattern generator
p.test                          ; run pattern sequence
```

See also

- PATTERN.state

Format:	**PATTERN.Timing** [*<items>* …] [**/***<options>*]
<options>:	**Track** **TimeREF** **TimeZero**
<items>:	**%***<format>* *<line>* **DEFault** | **ALL**
<format>:	**Hex** | **Decimal** | **BINary** | **Ascii** **Timing** | **HighLow** **LEN** *<size>* **TimeAuto** | **TimeFixed**
<line>:	**Pattern.0** … **Pattern.8** **Word.***<name>* **Group.***<name>*
<pattern>:	**STOP** | **WAIT** | **RESTART** **BUSA** | **TRIGGER**

If no options are selected, a set of all sampled values appear in the window in an order as defined by the system. By selecting options, specific values can be displayed in any order as defined by the user. It is possible to remove a selection from the list by appending the keyword **.OFF**. The display format of the entries can be changed by format options.

Options:

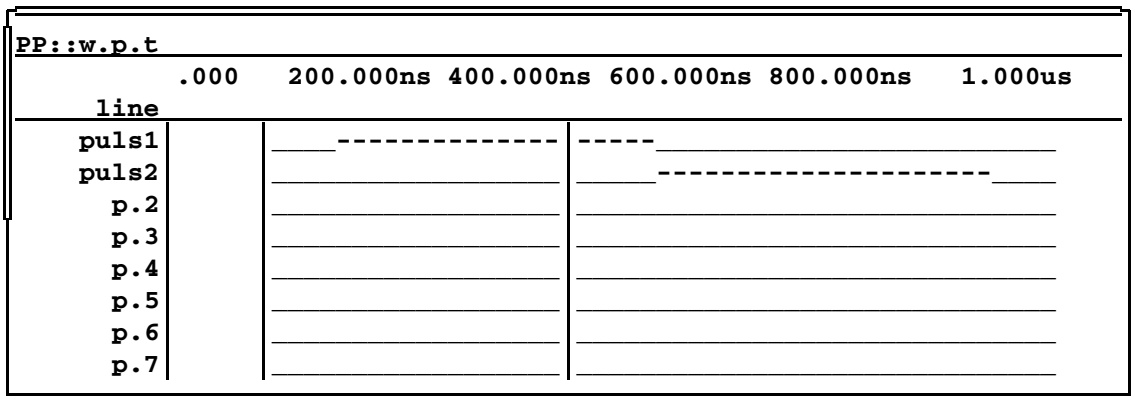
Track	Track other pattern window
TimeREF	Scale time relative to reference point
TimeZero	Scale time relative to global reference

Items:

DEFault	Default selections
<line>	Output channel lines P.0..P.8 or user given names

The message line on top of the screen calculates and displays continuously the time differences between the current record and the trigger record, the current record and the zero record and the time difference between the current record and the reference record.

```
C-Z:-395.468ns  C-R: 387.500ns     -782.968ns--397.031ns    2.500ns/dot
```



If the cursor is in the window, the menu line shows different options.

See also

- PATTERN.GOTO
- PATTERN.List
- PATTERN.REF
- PATTERN.state

PATTERN.TLatch — Trigger latch

Format: **PATTERN.TLatch** [**ON** | **OFF**]

OFF — The trigger event is detected only, if the pattern generator waits for a trigger event.

ON — The trigger event is recognized at every time and is stored until the next 'Wait for Trigger' state is reached.

See also

- PATTERN.TMode
- PATTERN.state

Format:	**PATTERN.TMode** *<mode>*
<mode>:	**Low** **High** **Rising** **Falling**

Low	Trigger on low level
High	Trigger on high level
Rising	Trigger on rising edge
Falling	Trigger on falling edge

See also

- PATTERN.TLatch
- PATTERN.state

Format: **PATTERN.TSELect** *<signal>*

<signal>:
X.26
X.27
X.28
X.29
BusA
RESTART
TRIGGER
OFF

X.26..X.29	Input signal
BusA	Trigger on trigger podbus event
TRIGGER	Trigger from analyzer complex trigger module
OFF	Switch off TSelect

See also

- PATTERN.state

PORT.SET — Set port value

Format: **Port.Select** *<port>* **Low** | **High**

Sets value '0' or '1' on port *<port>.*

Example:

```
Port.SET p.0 High
```

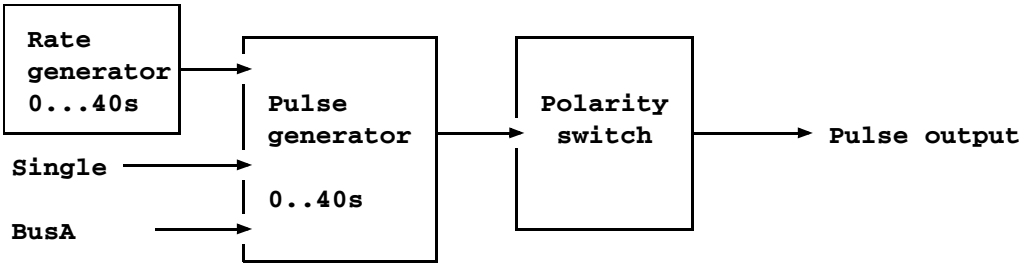
PORT.SLAVE — Select slave mode

Format: **PORT.SLAVE**

The trace memory of the port analyzer is used as extension to the state analyzer unit. All other setups of the port analyzer are not valid.

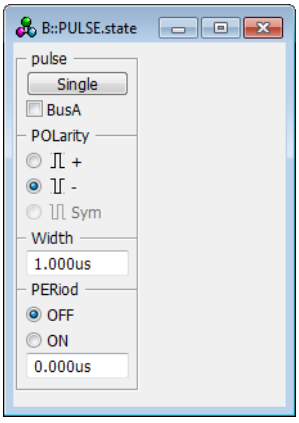
PULSE Pulse generator

The pulse generator is an independent system for generating short pulses or static signals, like used for stimulation in the target system or to reset the target hardware. The output pin of the generator is placed on TOUT5. The triggering may occur periodically, manually by the keyboard, or by the trigger unit of the analyzer. If no pulse generation is needed, the output line will be set to high or low by selecting the polarity of the pulse.



Pulse Generatoron PowerProbe

For configuration, use the TRACE32 command line, a PRACTICE script (*.cmm), or the **PULSE.state** window.



See also

- PULSE.BusA
- PULSE.PERiod
- PULSE.POLarity
- PULSE.Pulse
- PULSE.RESet
- PULSE.Single
- PULSE.state
- PULSE.Width

Format: **PULSE.BusA ON** | **OFF**

The pulse generator can be triggered by the common trigger line BUSA. This line can be stimulated by trace analyzers like PowerTrace or debugger systems.

```
pulse.busa on                   ; pulse generator trigger on BusA
```

See also

- PULSE
- PULSE.state

PULSE.PERiod Cycle duration

Format: **PULSE.PERiod** *<width>* | **ON** | **OFF**

<width>: **20.ns** … **40.s**

```
pulse.per off                   ; set pulse generator to single pulse mode

pulse.per on                    ; set pulse generator to periodic pulse
                                ; mode

pulse.per 1.ms                  ; activate periodic mode, cycle duration
                                ; is 1 ms (1 kHz)
```

See also

- PULSE.Pulse
- PULSE
- PULSE.Single
- PULSE.state
- PULSE.Width

Format: **PULSE.POLarity** *<polarity>*

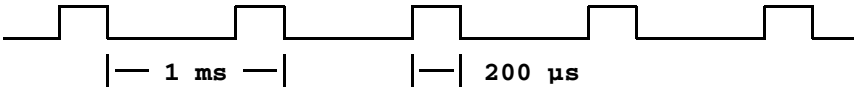
<polarity>: **+** | **-** | **Sym**

Example 1:

```
; Single pulse, active low
PULSE.Width      1.ms
PULSE.POLarity   -
PULSE.PERiod     OFF
PULSE.Single
```

Example 2:

```
; Periodic pulses, active high
PULSE.Width      200.us
PULSE.PERiod     1.ms
PULSE.POLarity   +
```



Example 3:

```
PULSE.PERiod OFF                ; switch off periodic pulses
PULSE.POLarity -                ; set output to high level (while there is
                                ; no low level pulse)
…

PULSE.POLarity +                ; set output to low level (while there is
                                ; no high active pulse)
```

See also

- PULSE
- PULSE.state

Format: **PULSE.Pulse** [*<width>*] [*<period>*] [*<polarity>*] (deprecated)

For PULSE.Pulse *<width>* **use PULSE.Width instead.**
For PULSE.Pulse *<period>* **use PULSE.PERiod instead.**
For PULSE.Pulse *<polarity>* **use PULSE.POLarity instead.**

<width>: **0.01us** … **40.s**

<period>: **0.02us** … **40.s** | **ON** | **OFF**

<polarity>: **+** | **-** | **Sym**

See also

- PULSE.PERiod
- PULSE
- PULSE.Single
- PULSE.state
- PULSE.Width

PULSE.RESet Reset command

Format: **PULSE.RESet**

See also

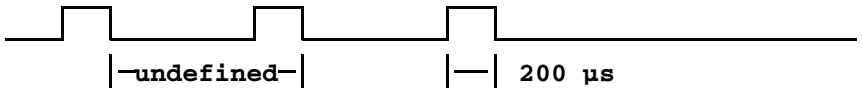
- PULSE
- PULSE.state

Format:	**PULSE.Single** [<*count*>]
<*count*>:	**1** …

Releasing more than one single pulse occurs under software control, i.e. the time between two pulses is not constant.

```
pulse.s                         ; Release single pulse

pulse.s 3.                      ; Release threefold pulse
```

```
Puls.Width 200.us
Puls.Single 3.
```

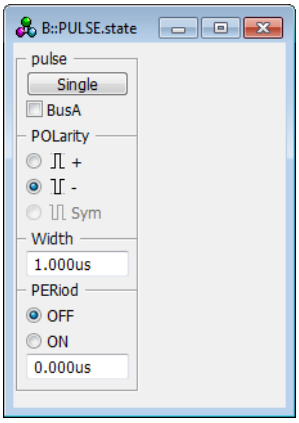


See also

- PULSE
- PULSE.PERiod
- PULSE.Pulse
- PULSE.state
- PULSE.Width

Format: **PULSE.state**

Displays the state of the pulse generator.



A For descriptions of the commands in the **PULSE.state** window, please refer to the **PULSE.*** commands in this chapter.
Example: For information about the **BusA** check box, see **PULSE.BusA**.

See also

- PULSE
- PULSE.BusA
- PULSE.PERiod
- PULSE.POLarity
- PULSE.Pulse
- PULSE.RESet
- PULSE.Single
- PULSE.Width

PULSE.Width Pulse width

Format: **PULSE.Width** *<width>*

<width>: **0.4us** … **40.s**

```
pulse.width 20.u                ; Set pulse width to 20 µs

pulse.w 5.ms                    ; Set pulse width to 5 ms
```

See also

- PULSE
- PULSE.PERiod
- PULSE.Pulse
- PULSE.Single
- PULSE.state

Format: **RESet**