



The Quartus Prime Software Debug and Analysis Tool

Debugging Tools: In-System Sources & Probes

Version	Date	Description
0.0	2016	Preliminary version



In-System Sources & Probes (ISSP)

- View status of up to 512 signals during run-time with *probes* (like LEDs) via JTAG
- Drive and toggle the values of up to 512 signals with *sources* (like switches) via JTAG
- Create multiple instances of IP using IP Catalog
Up to 128 instances
- Graphical interface makes it easy to manage large numbers of sources and probes across multiple instances

When to Use Sources & Probes

- No external equipment available or needed
- Logic blocks available for IP instance(s)
- Performing functional debug
- JTAG connection required

Example Uses

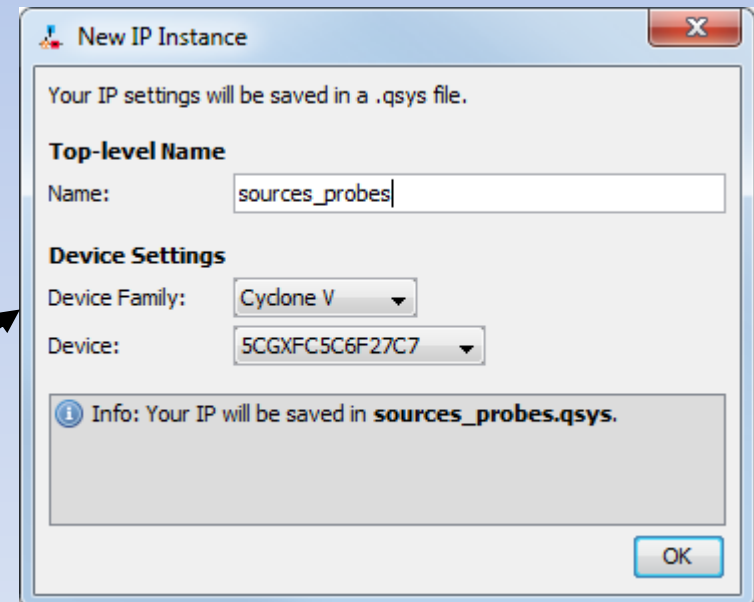
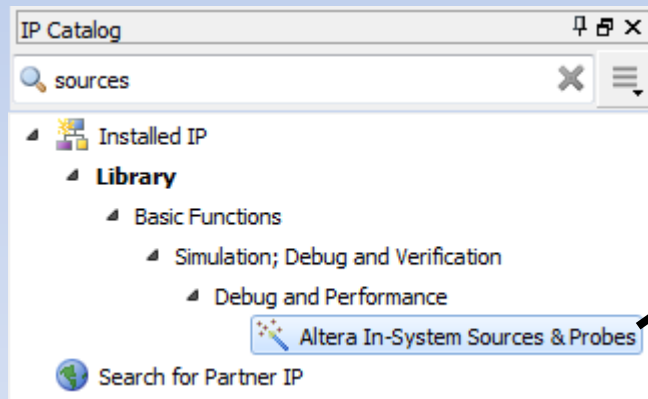
- Virtual push button control of signals in design
- Monitor results of changing design constants
- Extensive Tcl scripting support to create custom automated design control interfaces
- Force trigger conditions for debugging design with the SignalTap II Embedded Logic Analyzer

Using In-System Sources & Probes

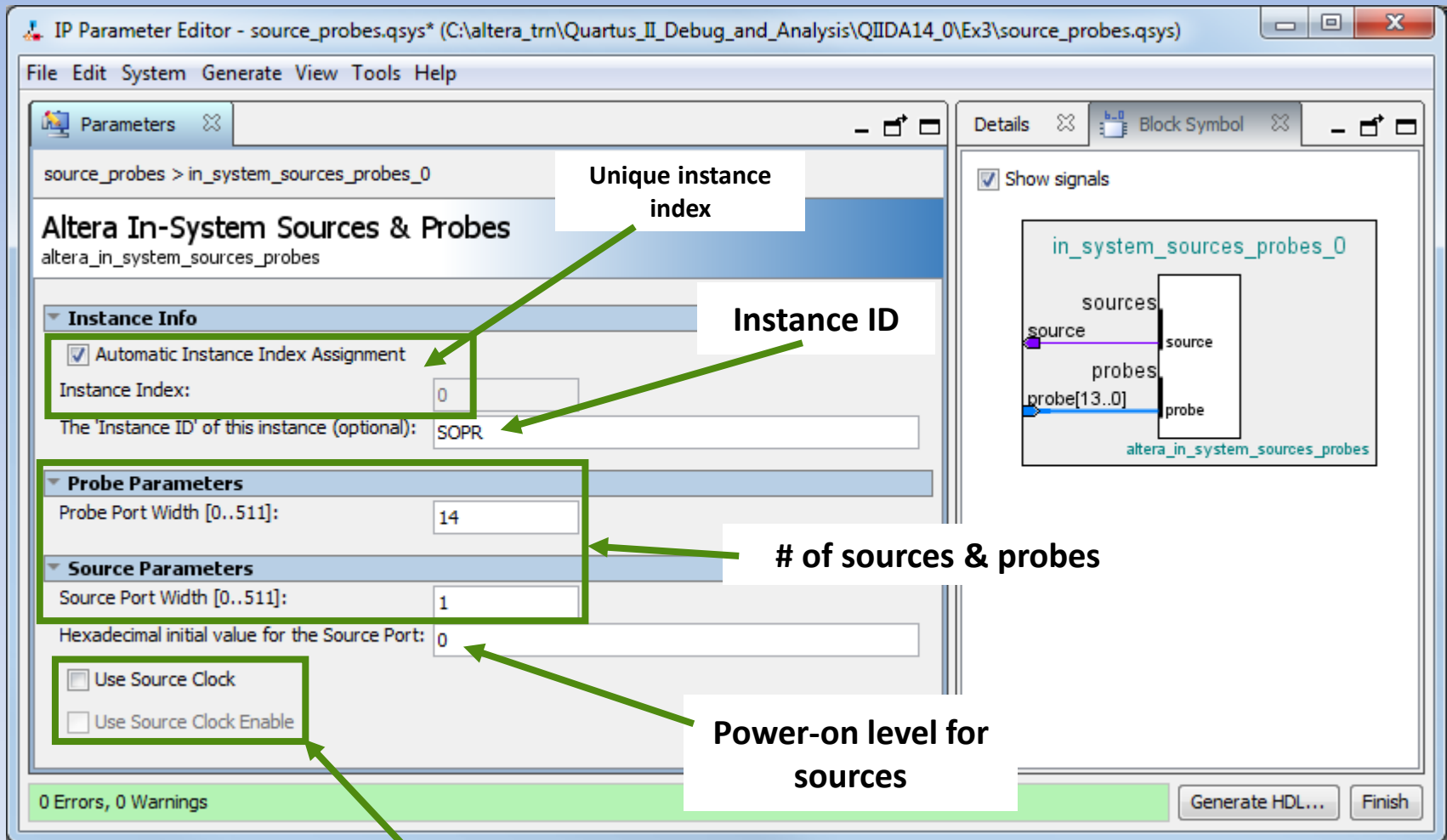
1. Create In-System Sources & Probes IP instance(s) using the IP Parameter Editor
2. Instantiate in design and compile project
3. Program target device(s)
4. Create and use In-System Sources & Probes Editor (.spf file) to control sources and probes

Create Sources & Probes Megafunction

- In-System Sources and Probes IP (altsources_probe) found in IP Catalog
- Select IP name and target device



IP Parameter Editor for ISSP



In-System Sources & Probes Editor (.spf)

The screenshot displays the 'In-System Sources and Probes Editor' window. The title bar indicates the file path: 'C:/altera_trn/Quartus_II_Debug_and_Analysis/QIIDA13_0/Ex3/CycloneIII/top_counter - top_counter - [counter_probes.spf]'. The window is divided into several panels:

- Instance Manager:** Contains settings for 'Probe read interval' (Automatic, 0 samples per second), 'Event log' (Maximum size: 64, Save data to event log checked), and 'Write source data' (Continuously).
- JTAG Chain Configuration:** Shows 'JTAG ready' status, hardware 'USB-Blaster [USB-0]', device '@1: EP3C120/EP4CE115 (0x020)', and file path 'y:/sis/QIIDA13_0/Ex3/CycloneIII/top_counter.sof'.
- Table:** A table with columns: Index, Instance ID, Status, Sources: 1, Probes: 14, and Name. It lists 'SOPR' with an 'Unexpected JTA...' status.
- Waveform Viewer:** A large area showing a digital waveform. The left pane lists sources and probes, with a green box highlighting the 'P[13..7]' to 'P0' range. The right pane shows the corresponding waveform signals, including 'one_seg' and 'ten_seg'.

Annotations on the image include:

- Instance Manager:** A white box highlighting the Instance Manager settings.
- JTAG Chain Configuration:** A white box highlighting the JTAG Chain Configuration panel.
- Probes:** A white box with an arrow pointing to the 'P[13..7]' to 'P0' range in the left pane of the waveform viewer.
- Log (waveform viewer):** A white box with an arrow pointing to the waveform signals in the right pane.
- Source:** A green arrow pointing to the 'SOPR' entry in the table.

Sources & Probes Instance Manager

- Select one or more instances
- Click on command

Continuously read Stop Write source(s) Refresh source data values

Read probe(s)

Number of samples in log

Instance Manager: Ready to acquire

Probe read interval

Current interval: 0 samples per second

☒ Automatic

☐ Manual 1 s

Event log

Maximum size: 64

☒ Save data to event log




Write source data: Continuously

Index	Instance ID	Status	Sources: 1	Probes: 14	Name
0	SOPR	Unexpected JTA...	1	14	sources_probes:sources_probes_inst al...

Write once or continuously

Instance Control and Results

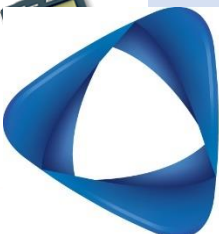
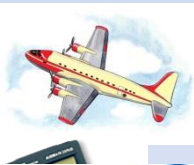
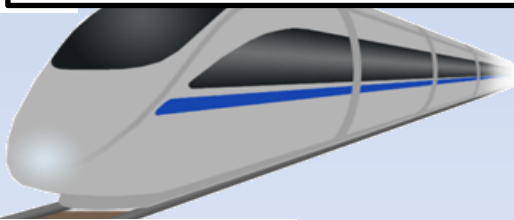
- Right-click multiple selected sources or probes to group and set display format
- Click Data column to change source value
 - **Red** number is value to be written (**Write source** button must be clicked)
 - **Black** number is current value
- Click or right-click in Log to zoom in or out
- Log saved in .spf file

P1			ten_seg[1]	1	
P0			ten_seg[0]	0	
S0			reset_n	1	

Click to change source value/level

More Information

- **Quartus Prime Handbook: “Design Debugging Using In-System Sources and Probes” (Volume 3)**



AGSTU
ARBETE GENOM STUDIER



END