

Bus Management

To boost fault coverage, onTAP is able to reach across buffers and resistors that lie between JTAG scannable pins and non-JTAG test pins making them, in effect, transparent.

This can even be done when the buffers include direction and enable control pins that are accessible from scannable pins. onTAP will manage these control pins so that test data can flow as required, including bi-directionally.

Consider Figure 1, to the right, in which data bus signals flow freely through three transceivers and where the direction and enable pins are connected to JTAG scan pins.

When ATG is run, onTAP produces an **SVF** file with test patterns that alternate the direction controls, in this case DT/R, so that signals can flow between JTAG devices. Then, using onTAP's **Examine SVF** tool, the test signals appear as follows:

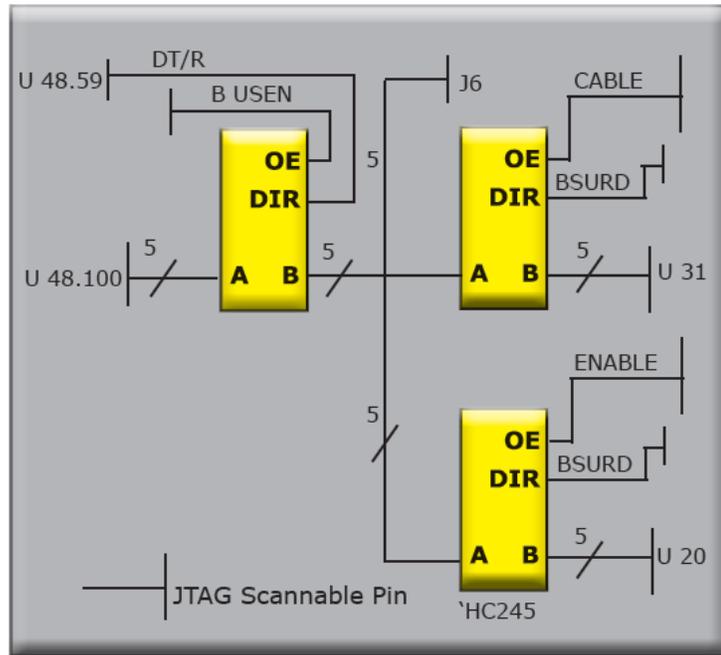


Figure 1. Transceivers separate JTAG parts

DT/R											
U48.59 (bidir)	0	D 1	U 1	U 0	D 0	D 0	D 0	D 0	D 0	D 0	D 0
D A T A 0											
U20.105 (bidir)			D	U							
U31.63 (bidir)	0	D	D	U	U 0	D 1	U 0	D 1	U 0	D 1	U 1
U48.100 (bidir)		D 0	D 1	U	U	D	U	D	U	D	U

Figure 2. Scan-to-scan test signals from JTAG pins through transceivers. 0 and 1 characters represent drive values on one scan, U and D characters represent test values captured at the beginning of the following scan.

```

~
jump from 65HVD10 ipin 6 to opin 1; // pin 1 out = pin 6 in
jump from 65HVD10 ipin 4 to opin 6, enable with 3
~
  
```

Figure 3. Example of pin-mapping statements that model the 65HVD10 differential transceivers in Figure 4

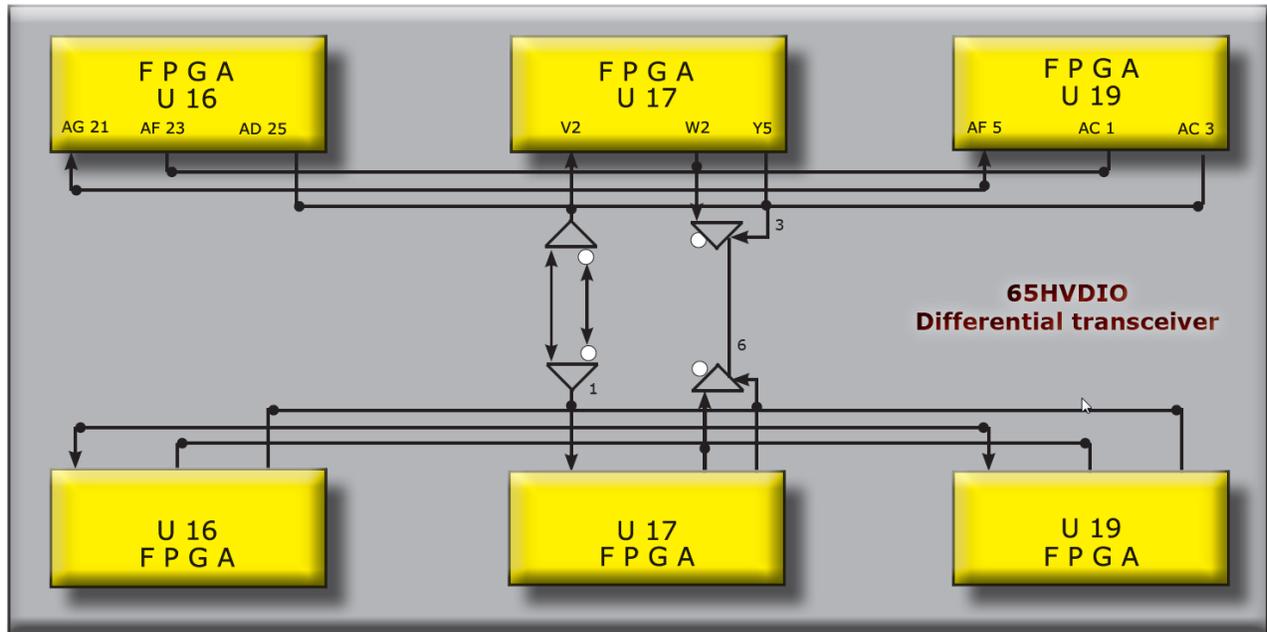


Figure 4. shows a circuit with 65HVD10 differential transceivers connecting pins on six FPGAs. Simple onTAP library statements, as seen in Fig.3, allow onTAP Bus Manager to control the devices and to automatically create test patterns that include the FPGA's pins.

What do I have to do in order to gain the benefits of onTAP's Bus Management?

First, pin-map models (see figure 3) have to be either selected from onTAP's library, which may be accessed on the Jumpers Page using the Tag Transparent Devices button, or created by the user. Project-specific models may be entered in the ProjectPinMaps.txt file in a project folder. Once the models are available and associated with project devices, simply clicking the Connect Thru Transparent Devices button automatically adds all of the jumpers required to develop transparency. To ensure pin controls are correct, the Examine SVF debug tool is available from the Tools menu, which shows the drive/sense values for each JTAG pin at each scan.