

## HP 1662A Logic Analyzer Notes

For in-depth information, refer to the Agilent 1660A Series User's Reference, available on the course web site and from <http://www.agilent.com> (search for "1660A Series User Reference").

There are 6 main setup/menu buttons on the front of the HP 1662A logic analyzer.

### System

- Use this menu if you want to save (print) waveforms or listings from the analyzer to a floppy disk.

### Config

- Use the Type field to put the logic analyzer into either Timing mode or State mode.
- **Timing Mode:** LA uses an internal clock for sampling the inputs. The CLK lines can be left unconnected.
- **State Mode:** LA uses the CLK line on the pod for sampling the inputs. Typical choices for the CLK input are the /PSEN, /READ, or ALE signals.

### Format

- Use this menu to assign pod and clock channels. This is the screen where you assign channels (configure the logic analyzer to use the particular probes that you're hooking up to your embedded system board). For instance, the 16 channels on one pod might be allocated as follows: 8 for the label DATA, 1 for label /PSEN, 1 for ALE, 1 for /READ, 1 for /WR, and 4 unused. The other pod might have 8-16 channels hooked up as the ADDR bus.
- You can assign labels to a single signal or to groups of signals. For instance, you can have one label called ADDR which identifies address lines A7:A0. You can have another label which identifies data lines D7:D0. Other labels can identify control signals, like ALE, /PSEN, and /READ. This display also shows whether there is activity on any of the signals currently hooked up to any of the channels.
- Each logic analyzer in the lab will typically only have two 16-channel pods hooked up, for a total of 32 signals and 2 clocks. Typically, only one clock line needs to be hooked up for state mode.
- A channel is turned on if an asterisk is in its field and is turned off if there is a period in its field.

### Trigger

- Use this menu to set up the trigger for when the logic analyzer should display captured information. In this menu, you can configure a specific data pattern or specific clock edges at which point the trigger should occur.
- To trigger off of an edge, select the EDGE1 or EDGE2 label, then choose which signal should be used as the edge, and whether to use the rising edge, falling edge, or both edges as the trigger. For example, you can use this mode to trigger on the falling or rising edge of /WR.
- To trigger off of a specific address and/or data value, specify the pattern under 'a' and then set the machine to trigger off of 'a'. For example, to detect whether your ISR is being executed, specify the trigger to look for a bus access at the starting address of your ISR.

### List

- Use this button to display a trace in listing format. This is very useful for state mode analysis and for examining sequences on the bus.

### Waveform

- Use this button to display a trace as a waveform. Relative timing between signal edges can be measured with the markers (turn Markers On).
- Display a multi-signal label as a bus, rather than multiple individual signals. For example, display ADDR or DATA as a bus rather than separate signals ADDR[0], ADDR[1], ...
- If you have fewer than 8 labels visible on your waveform screen, the logic analyzer will automatically display any bus signals in hexadecimal. If you have more than 8 labels active, the logic analyzer won't provide the hex conversion, due to space limitation on the screen. You can change the labels to be displayed by highlighting the label with the rotary knob and then pressing the Select key.
- Adjust the waveform view by changing the sec/Div and Delay fields.
- When using timing mode, set the resolution to 4ns for the most accurate measurements. This is done within the Acq. Control sub-menu.

# HP 1662A Logic Analyzer Example – C501 Bus Cycles

```

0000          4          ORG $0000          Reset vector
0000          5
0000 01 40    6  Start  AJMP CBIT          Jump to code
0002          7
0002          8
0040          9          ORG $0040          Code starts here
0040         10
0040 00      11  CBIT   NOP                Do nothing
0041 B2 91    12          CPL P1.1         Complement port pin P1.1
0043 00      13          NOP                Do nothing
0044 01 00    14          AJMP Start        Jump back to Start
    
```

Analyzer Listing MACHINE 1 Print Run

Markers Off Acquisition Time 18 Mar 2002 19:58:19

Label>	ADDR	DATA	ALE	/READ	/PSEN	
Base>	Hex	Hex	Hex	Hex	Hex	
	6	0044	01	1	0	0
	7	0044	01	1	0	0
	8	0045	00	1	0	0
	9	0046	FF	1	0	0
	10	0046	FF	1	0	0
	11	0000	01	1	0	0
	12	0001	40	1	0	0
	13	0002	FF	1	0	0
	14	0002	FF	1	0	0
	15	0040	00	1	0	0
	16	0041	B2	1	0	0
	17	0041	B2	1	0	0
	18	0042	91	1	0	0
	19	0043	00	1	0	0
	20	0044	01	1	0	0
	21	0044	01	1	0	0

Analyzer Waveform MACHINE 1 Acq. Control Print Run

Accumulate Off Current Sample Period = 4.000 ns Next Sample Period = 4.000 ns

sec/Div 200 ns Delay -1.460 us Markers Off Acquisition Time 18 Mar 2002 20:01:21

