Timing Analyzer report for atm
Fri Jul 14 19:57:07 2023
Quartus Prime Version 22.1std.1 Build 917 02/14/2023 SC Lite Edition

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```
; Timing Analyzer Summary
+-----
; Quartus Prime Version ; Version 22.1std.1 Build 917 02/14/2023 SC Lite Edition ;
; Timing Analyzer ; Legacy Timing Analyzer
              ; atm
; Revision Name
              ; Cyclone V
; Device Family
              ; 5CSEMA5F31C6
; Device Name
              ; Final
; Timing Models
               ; Combined
; Delay Model
; Rise/Fall Delays ; Enabled
+----+
; Parallel Compilation
+----+
              ; Number
; Processors
 Number detected on machine; 12
; Maximum allowed
             ; 6
                 ; 1.30
; Average used
; Maximum used
                 ; 6
; Usage by Processor
                 ; % Time Used ;
                 ; 100.0%
   Processor 1
  Processor 2
                  ; 6.3%
                 ; 6.2%
  Processor 3
  Processor 4
                 ; 6.0%
                  ; 5.8%
  Processor 5
                  ; 5.8%
   Processor 6
+----+-----
; SDC File List
+----+
; SDC File Path ; Status ; Read at
+-----+
; atm.out.sdc ; OK ; Fri Jul 14 19:17:08 2023 ;
+----+
; Clocks
```

;

```
+-----
; Clock Name ; Type ; Period ; Frequency ; Rise ; Fall ; Duty Cycle ; Divide by
; Multiply by ; Phase ; Offset ; Edge List ; Edge Shift ; Inverted ; Master ;
Source ; Targets ;
+-----
+-----
       ; Base ; 20.000 ; 50.0 MHz ; 0.000 ; 10.000 ;
              ;
; { clk } ;
+-----
--+----+
+----+
; Slow 1100mV 85C Model Fmax Summary
+----+
       ; Restricted Fmax ; Clock Name ; Note ;
+----+
; 50.05 MHz ; 50.05 MHz
               ; Clk
+----+
This panel reports FMAX for every clock in the design, regardless of the
user-specified clock periods. FMAX is only computed for paths where the source and
destination registers or ports are driven by the same clock. Paths of different
clocks, including generated clocks, are ignored. For paths between a clock and its
inversion, FMAX is computed as if the rising and falling edges are scaled along
with FMAX, such that the duty cycle (in terms of a percentage) is maintained.
Altera recommends that you always use clock constraints and other slack reports for
sign-off analysis.
_____
; Timing Closure Recommendations ;
_____
HTML report is unavailable in plain text report export.
+----+
; Slow 1100mV 85C Model Setup Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 0.009 ; 0.000
+----+
```

+-----+

```
; Slow 1100mV 85C Model Hold Summary ;
+----+
; Clock ; Slack ; End Point TNS ;
+----+
; Clk ; 0.363 ; 0.000
+----+
+----+
; Slow 1100mV 85C Model Recovery Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 15.502 ; 0.000
+----+
+----+
; Slow 1100mV 85C Model Removal Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 0.470 ; 0.000
+----+
+----+
; Slow 1100mV 85C Model Minimum Pulse Width Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 9.213 ; 0.000
+----+
_____
; Slow 1100mV 85C Model Metastability Summary ;
______
No synchronizer chains to report.
+----+
; Slow 1100mV OC Model Fmax Summary
+----+
    ; Restricted Fmax ; Clock Name ; Note ;
+----+
; 51.23 MHz ; 51.23 MHz ; Clk ; ;
+----+
```

This panel reports FMAX for every clock in the design, regardless of the user-specified clock periods. FMAX is only computed for paths where the source and

destination registers or ports are driven by the same clock. Paths of different clocks, including generated clocks, are ignored. For paths between a clock and its inversion, FMAX is computed as if the rising and falling edges are scaled along with FMAX, such that the duty cycle (in terms of a percentage) is maintained. Altera recommends that you always use clock constraints and other slack reports for sign-off analysis.

```
+----+
; Slow 1100mV OC Model Setup Summary ;
+----+
; Clock ; Slack ; End Point TNS ;
+----+
; Clk ; 0.240 ; 0.000
+----+
+----+
; Slow 1100mV OC Model Hold Summary ;
+----+
; Clock; Slack; End Point TNS;
+----+
; Clk ; 0.364 ; 0.000
+----+
+----+
; Slow 1100mV 0C Model Recovery Summary ;
+----+
; Clock ; Slack ; End Point TNS ;
+----+
; Clk ; 12.791 ; 0.000
+----+
+----+
; Slow 1100mV OC Model Removal Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 2.980 ; 0.000
+----+
+----+
; Slow 1100mV OC Model Minimum Pulse Width Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 9.283 ; 0.000
```

```
+----+
; Slow 1100mV OC Model Metastability Summary ;
-----
No synchronizer chains to report.
+-----+
; Fast 1100mV 85C Model Setup Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 3.035 ; 0.000
+----+
+----+
; Fast 1100mV 85C Model Hold Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 0.182 ; 0.000
+----+
+----+
; Fast 1100mV 85C Model Recovery Summary ;
+----+
; Clock ; Slack ; End Point TNS
+-----
; Clk ; 14.450 ; 0.000
+----+
; Fast 1100mV 85C Model Removal Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 2.316 ; 0.000
+----+
+----+
; Fast 1100mV 85C Model Minimum Pulse Width Summary ;
+----+
; Clock ; Slack ; End Point TNS
```

+----+

```
; Clk ; 9.102 ; 0.000
+-----
_____
; Fast 1100mV 85C Model Metastability Summary ;
-----
No synchronizer chains to report.
+-----+
; Fast 1100mV OC Model Setup Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 3.266 ; 0.000
+----+
+----+
; Fast 1100mV 0C Model Hold Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 0.171 ; 0.000
+----+
+----+
; Fast 1100mV OC Model Recovery Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 16.315 ; 0.000
+----+
+----+
; Fast 1100mV 0C Model Removal Summary ;
+----+
; Clock ; Slack ; End Point TNS
+----+
; Clk ; 0.659 ; 0.000
+----+
; Fast 1100mV OC Model Minimum Pulse Width Summary ;
+----+
; Clock ; Slack ; End Point TNS
```

```
+----+
; Clk ; 9.064 ; 0.000
+----+----+----+
; Fast 1100mV OC Model Metastability Summary ;
-----
No synchronizer chains to report.
          -----+
; Multicorner Timing Analysis Summary
; Setup ; Hold ; Recovery ; Removal ; Minimum Pulse Width ;
; Worst-case Slack ; 0.009 ; 0.171 ; 12.791 ; 0.470
                         ; 9.064
        ; 0.009; 0.171; 12.791; 0.470
                         ; 9.064
                    ; 0.0
; Design-wide TNS ; 0.0 ; 0.0 ; 0.0
        ; 0.000 ; 0.000 ; 0.000
                    ; 0.000
                         ; 0.000
; Board Trace Model Assignments
-+----+
      ; I/O Standard ; Near Tline Length ; Near Tline L per Length ; Near
Tline C per Length; Near Series R; Near Differential R; Near Pull-up R; Near
Pull-down R ; Near C ; Far Tline Length ; Far Tline L per Length ; Far Tline C per
Length; Far Series R; Far Pull-up R; Far Pull-down R; Far C; Termination
Voltage ; Far Differential R ; EBD File Name ; EBD Signal Name ; EBD Far-end ;
-+----+
     ; 2.5 V
             ; 0 in
                      ; 0 H/in
; balance[0]
                                  ; 0
                          ; open
                                  ; open
F/in
         ; short
```

```
; open ; 0 in ; 0 H/in ; open ; open ; open ; 0 V ; - ; n/a ; n/a ; n/a ; n/a ; open ; 0 V ; balance[1] ; 2.5 V ; 0 in ; 0 H/in ; open 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ; 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ; open
; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ; 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ; 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ; open
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ; 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; open
                                                                                                                                                                                                                                                                                                                                                                                                         ; open ; open
```

```
; 0 H/in
                                         ; open ; 0 V
; n/a ;
                                            ; 0 F/in
      ; open ; 0 in
                           ,0
;open
.
                ; open
    ; short
                            ; n/a
                ; n/a
; balance[11] ; 2.5 V
                       ; 0 in
                                       ; 0 H/in
                                                            ; 0
                                        ; open
; 0 F/in
                                                            ; open
                 ; short
                ; 0 in
         ; open
                             ; 0 H/in
                                           ; open ; 0 V
   ; short
                ; open
                             ; open
                                       ; n/a ; ; 0 H/in
                ; n/a
                             ; n/a
; balance[12] ; 2.5 V
                       ; 0 in
                                                            ; 0
F/in
                                         ; open
                 ; short
                                                            ; open
         ; open
                ; 0 in
                             ; 0 H/in
                                              ; 0 F/in
                             ; open
   ; short
                ; open
                                           ; open ; 0 V
                                       ; n/a ; ; 0 H/in
                ; n/a
                             ; n/a
; balance[13] ; 2.5 V
                       ; 0 in
                                          ; open
F/in
                 ; short
                                                            ; open
                                              ; 0 F/in
                ; 0 in
                             ; 0 H/in
         ; open
                ; open
                                          ; open ; 0 V
   ; short
                             ; open
                                       ; n/a ; ; 0 H/in
                 ; n/a
                              ; n/a
; balance[14] ; 2.5 V
                                          ; open
                 ; short
                              ; -
                                                            ; open
                             ; 0 H/in
         ; open
                ; 0 in
                                             ; 0 F/in
                                          ; open ; 0 V
                             ; open
   ; short
                ; open
                                       ; n/a ; ; 0 H/in
                ; n/a
                             ; n/a
; balance[15] ; 2.5 V
                       ; 0 in
                                                            ; 0
                                         ; open
                 ; short
                              ; -
                                                            ; open
         ; open
                                            ; 0 F/in
                ; 0 in
                              ; 0 H/in
                                          ; open ; 0 V
   ; short
                ; open
                             ; open
                                       ; n/a ; ; 0 H/in
                ; n/a
                              ; n/a
; accountfound ; 3.3-V LVCMOS ; 0 in
                                          ; open
; 0 F/in
                ; short
                             ; -
                                                             ; open
         ; open
                             ; 0 H/in
                ; 0 in
    ; short
                ; open
                             ; open
                                          ; open ; 0 V
                                       ; n/a ; 0 H/in
                ; n/a
                             ; n/a
; pinfound ; 3.3-V LVCMOS ; 0 in
                                         о н/in
; open
; 0 F/in
                                                            ; open
                ; short
F/in
                             ; 0 H/in
                ; 0 in
         ; open
    ; short
                                          ; open ; 0 V
                ; open
                             ; open
                                       ; open , o , ; ; ; o H/in ; open ; o F/in
                             ; n/a
                ; n/a
; clk_out ; 3.3-V LVCMOS ; 0 in
                                                            ; 0
                 ; short ; -
                                                            ; open
         ; open
                             ; 0 H/in
                ; 0 in
                ; open
                                          ; open ; 0 V
                             ; open
                 ; n/a
                             ; n/a
                                           ; n/a
```

```
; Input Transition Times
+----+
        ; I/O Standard ; 10-90 Rise Time ; 90-10 Fall Time ;
+-----
; clk
        ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; reset
       ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
       ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; enter
; amount_in[0] ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; amount_in[1] ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; amount_in[3] ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
                         ; 2640 ps
; amount_in[2] ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; accNumber[1] ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; accNumber[0] ; 3.3-V LVCMOS ; 2640 ps
     ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; Pin[1]
; Pin[0]
       ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
       ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; dep
       ; 3.3-V LVCMOS ; 2640 ps
; with_d
                         ; 2640 ps
     ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; mini s
; card inserted ; 3.3-V LVCMOS ; 2640 ps
                         ; 2640 ps
; Signal Integrity Metrics (Slow 1100mv Oc Model)
---+
       ; I/O Standard ; Board Delay on Rise ; Board Delay on Fall ; Steady
; Pin
```

```
State Voh at FPGA Pin; Steady State Vol at FPGA Pin; Voh Max at FPGA Pin; Vol
Min at FPGA Pin ; Ringback Voltage on Rise at FPGA Pin ; Ringback Voltage on Fall
at FPGA Pin ; 10-90 Rise Time at FPGA Pin ; 90-10 Fall Time at FPGA Pin ; Monotonic
Rise at FPGA Pin; Monotonic Fall at FPGA Pin; Steady State Voh at Far-end;
Steady State Vol at Far-end; Voh Max at Far-end; Vol Min at Far-end; Ringback
Voltage on Rise at Far-end; Ringback Voltage on Fall at Far-end; 10-90 Rise Time
at Far-end; 90-10 Fall Time at Far-end; Monotonic Rise at Far-end; Monotonic
Fall at Far-end;
+-----
     ---+
; balance[0]
           ; 2.5 V
                      ; 0 s
                                      ; 0 s
                                                      ; 2.32 V
               ; 3.52e-07 V
                                      ; 2.42 V
                                                      ; -0.0568
٧
         ; 0.173 V
                                     ; 0.113 V
    ; 4.5e-10 s
                          ; 4.35e-10 s
                                                ; No
        ; No
                             ; 2.32 V
                                                   ; 3.52e-07 V
                           ; -0.0568 V
                                          ; 0.173 V
           ; 2.42 V
         ; 0.113 V
                                     ; 4.5e-10 s
                                                          ;
4.35e-10 s
                                        ; No
                    ; No
         ; 2.5 V
                                                      ; 2.32 V
; balance[1]
                                      ; 0 s
               ; 3.52e-07 V
                                      ; 2.42 V
                                                      ; -0.0557
        ; 0.175 V
                                     ; 0.114 V
    ; 4.5e-10 s
                          ; 4.35e-10 s
                                                ; No
                             ; 2.32 V
                                                   ; 3.52e-07 V
        ; No
            ; 2.42 V
                           ; -0.0557 V
                                          ; 0.175 V
         ; 0.114 V
                                     ; 4.5e-10 s
                                        ; No
4.35e-10 s
                    ; No
; balance[2]
           ; 3.3-V LVCMOS ; 0 s
                                      ; 0 s
                                                      ; 3.08 V
               ; 3.5e-07 V
                                      ; 3.14 V
                                                      ; -0.195
                                      ; 0.394 V
٧
         ; 0.158 V
                                                 ; Yes
     ; 4.46e-10 s
                           ; 1.64e-10 s
                              ; 3.08 V
                                                    ; 3.5e-07 V
        ; No
            ; 3.14 V
                                           ; 0.158 V
                            ; -0.195 V
         ; 0.394 V
                                     ; 4.46e-10 s
                                                           ;
1.64e-10 s
                    ; Yes
                                        ; No
         ; 3.3-V LVCMOS ; 0 s
; balance[3]
                                      ; 0 s
                                                      ; 3.08 V
               ; 3.5e-07 V
                                      ; 3.14 V
                                                      ; -0.195
                                      ; 0.394 V
         ; 0.158 V
                           ; 1.64e-10 s
                                                 ; Yes
     ; 4.46e-10 s
                              ; 3.08 V
                                                    ; 3.5e-07 V
        ; No
```

; -0.195 V

; 0.158 V

; 3.14 V

```
; 0.394 V
1.64e-10 s ; Yes
                           ; 4.46e-10 s
                             ; No
; 3.08 V
; -0.153
                                    ; Yes
                                     ; 2.62e-07 V
                      ; -0.153 V ; 0.035 V ; 4.23e-10 s ;
; balance[5] ; 3.3-V LVCMOS ; 0 s
; 2.62e-07 V
                                   ; 3.08 V
; -0.153
                            ; 0 s
                            ; 3.1 V
; 0.31 V
    ; 0.035 V
   ; 4.23e-10 s ; 1.59e-10 s ; Yes ; 3.08 V ; 2.62e-07 V ; 3.1 V ; -0.153 V ; 0.035 V ; 4.23e-10 s ;
1.59e-10 s ; Yes
                              ; No
, 0 S ; 3.08 V
; 3.14 V ; -0.195
; 0.394 V
; balance[7] ; 3.3-V LVCMOS ; 0 s
; 3.5e-07 V
· 0 158 V
; 0 s ; 3.08 V ; -0.195 ; 0.394 V
1.64e-10 s ; Yes
                             ; No
                           ; 0 s ; 3.08 V ; -0.153
```

```
; balance[10] ; 2.5 V ; 0 s ; 0 s ; 2.32 V ; -0.0231 V ; 0.14 V ; 0.089 V ; 4.52e-10 s ; 2.32 V ; -0.0231 V ; 0.089 V ; 2.36 V ; -0.0231 V ; 0.14 V ; 0.089 V ; 4.52e-10 s ; No ; Yes ; 3.07e-07 V ; 4.52e-10 s ; Yes ; 3.07e-07 V ; 4.52e-10 s ; Yes 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; 2.32 V
; 2.36 V
; 0.089 V
; balance[13] ; 2.5 V ; 0 s ; 0 s ; 2.32 V ; 0.201 V ; 0.201 V ; 0.131 V ; 1.53e-10 s ; 2.41 V ; 0.201 V ; 3.6e-07 V ; 2.32 V ; 3.6e-07 V ; 2.41 V ; 1.53e-10 s ; 0.131 V ; 1.53e-10 s ; 0.131 V ; 1.53e-10 s ; 1.53e
                                       ; 2.32 V; 3.52e-07 V; 0 s; 2.42 V; -0.0568; 0.173 V; 4.5e-10 s; 2.42 V; 3.52e-07 V; 2.32 V; 3.52e-07 V; 2.32 V; 3.52e-07 V; 2.42 V; -0.0568 V; 0.113 V; 4.5e-10 s; 0.173 V; 4.5e-10 s; 0.1
          ; balance[14] ; 2.5 V ; 0 s
                                                                                                                                                                                                                                                                                                                                                                                                                          ; 4.5e-10 s
                                                                                                                                ; 0.113 V
```

```
4.35e-10 s
                                    ; No
               ; No
; balance[15] ; 2.5 V
                                  ; 0 s
                                                 ; 2.32 V
             ; 3.6e-07 V
                                  ; 2.41 V
                                                 ; -0.0463
        ; 0.201 V
                                  ; 0.131 V
    ; 4.61e-10 s
                        ; 4.53e-10 s
                                            ; No
                                               ; 3.6e-07 V
       ; Yes
                          ; 2.32 V
          ; 2.41 V
                        ; -0.0463 V
                                     ; 0.201 V
        ; 0.131 V
                                 ; 4.61e-10 s
4.53e-10 s
                  ; No
                                     ; Yes
; accountfound ; 3.3-V LVCMOS ; 0 s \,
                                   ; 0 s
                                                 ; 3.08 V
             ; 2.62e-07 V
                                   ; 3.1 V
                                                  ; -0.153
        ; 0.035 V
                                   ; 0.31 V
                         ; 1.59e-10 s
    ; 4.23e-10 s
                                             ; Yes
        ; No
                          ; 3.08 V
                                               ; 2.62e-07 V
                         ; -0.153 V
          ; 3.1 V
                                       ; 0.035 V
        ; 0.31 V
                                  ; 4.23e-10 s
1.59e-10 s
                  ; Yes
                                     ; No
         ; 3.3-V LVCMOS ; 0 s
; pinfound
                                   ; 0 s
                                                 ; 3.08 V
             ; 3.35e-07 V
                                   ; 3.14 V
                                                 ; -0.258
        ; 0.13 V
                                   ; 0.399 V
                                             ; Yes
    ; 4.27e-10 s
                         ; 1.5e-10 s
                                               ; 3.35e-07 V
        ; No
                           ; 3.08 V
           ; 3.14 V
                                       ; 0.13 V
                         ; -0.258 V
                                  ; 4.27e-10 s
        ; 0.399 V
1.5e-10 s
                                     ; No
                  ; Yes
; clk_out
        ; 3.3-V LVCMOS ; 0 s
                                   ; 0 s
                                                 ; 3.08 V
                                   ; 3.14 V
             ; 3.5e-07 V
                                                  ; -0.195
                                   ; 0.394 V
        ; 0.158 V
                        ; 1.64e-10 s
                                             ; Yes
    ; 4.46e-10 s
                                               ; 3.5e-07 V
                          ; 3.08 V
           ; 3.14 V
                         ; -0.195 V
                                       ; 0.158 V
        ; 0.394 V
                                  ; 4.46e-10 s
1.64e-10 s
                  ; Yes
                                     ; No
   -----
------
------
```

```
; Signal Integrity Metrics (Slow 1100mv 85c Model)
+-----
------
---+
; Pin
      ; I/O Standard ; Board Delay on Rise ; Board Delay on Fall ; Steady
State Voh at FPGA Pin; Steady State Vol at FPGA Pin; Voh Max at FPGA Pin; Vol
Min at FPGA Pin ; Ringback Voltage on Rise at FPGA Pin ; Ringback Voltage on Fall
at FPGA Pin ; 10-90 Rise Time at FPGA Pin ; 90-10 Fall Time at FPGA Pin ; Monotonic
Rise at FPGA Pin; Monotonic Fall at FPGA Pin; Steady State Voh at Far-end;
Steady State Vol at Far-end; Voh Max at Far-end; Vol Min at Far-end; Ringback
Voltage on Rise at Far-end; Ringback Voltage on Fall at Far-end; 10-90 Rise Time
at Far-end; 90-10 Fall Time at Far-end; Monotonic Rise at Far-end; Monotonic
Fall at Far-end;
+-----
------
------
 ---+
; balance[0]
      ; 2.5 V
                      ; 0 s
                               ; 2.32 V
                      ; 2.39 V
         ; 3.88e-05 V
                               ; -0.0374
     ; 0.189 V
                     ; 0.158 V
  ; 4.66e-10 s
                            ; No
               ; 4.67e-10 s
    ; Yes
                 ; 2.32 V
                             ; 3.88e-05 V
               ; -0.0374 V
                        ; 0.189 V
      ; 2.39 V
     ; 0.158 V
                     ; 4.66e-10 s
```

```
4.67e-10 s ; No
                                                                                                                                                          ; Yes
                                                                                                                                                                                                                                   ; 2.32 V
; -0.037
; balance[1] ; 2.5 V ; 0 s
                                                                                                                                                ; 0 s
                                                                                                                                                                            ; No
; 3.88e-05 V
; 0.188 V
; 4.67e-10 s
 ; 3.3-V LVCMOS; 0 s ; 3.09 V ; -0.11 V ; 0.031 V ; 0.155 V ; 3.09 V ; 3.32e-05 V ; 3.08 V ; -0.11 V ; 0.155 V ; 3.09 V ; -0.11 V ; 0.031 V ; 0.155 V ; 5.43e-10 s ; 7es 
 ; 0 s ; 3.08 V ; -0.0638
  ; balance[6] ; 3.3-V LVCMOS ; 0 s
; 3.32e-05 V
                                                                                                                                                                         ; 0 s
; 3.09 V
; 0.155 V
                                                                                                                                                                                                                         ; 3.08 V
; -0.11 V
                                           ; 0.031 V
```

```
; 5.43e-10 s ; 3.14e-10 s ; Yes ; 3.08 V ; 3.32e-05 V ; 3.09 V ; -0.11 V ; 0.031 V ; 5.43e-10 s ; Yes ; Yes
; 0 s ; 2.32 V ; -0.0118
```

```
; Dalance[13] ; 2.5 V ; 0 s ; 0 s ; 2.32 V ; 3.96e-05 V ; 2.38 V ; -0.0306 V ; 0.23 V ; 0.206 V ; 14.83e-10 s ; 15.01e-10 s ; 15
; 0.169 V ; 3.08 V
; 3.1 V ; -0.133
  ; 0 s
                                                                                                                                                                                                                                                                   ; Yes
```

```
; 3.08 V
                ; 3.19e-05 V
  ; No
    ; 3.1 V
        ; -0.133 V
              ; 0.025 V
            ; 4.92e-10 s
   ; 0.169 V
                   ;
3.13e-10 s
      ; Yes
             ; No
   ; 3.3-V LVCMOS ; 0 s
; clk_out
            ; 0 s
                 ; 3.08 V
     ; 3.32e-05 V
            ; 3.09 V
                 ; -0.11 V
  ; 0.031 V
            ; 0.155 V
 ; 5.43e-10 s
        ; 3.14e-10 s
               ; Yes
                ; 3.32e-05 V
  ; Yes
         ; 3.08 V
   ; 3.09 V
             ; 0.031 V
        ; -0.11 V
  ; 0.155 V
           ; 5.43e-10 s
                  ;
3.14e-10 s
      ; Yes
             ; Yes
+-----
------
---+
+-----
______
; Signal Integrity Metrics (Fast 1100mv 0c Model)
------
------
------
```

```
----+
; Pin
           ; I/O Standard ; Board Delay on Rise ; Board Delay on Fall ; Steady
State Voh at FPGA Pin ; Steady State Vol at FPGA Pin ; Voh Max at FPGA Pin ; Vol
Min at FPGA Pin; Ringback Voltage on Rise at FPGA Pin; Ringback Voltage on Fall
at FPGA Pin ; 10-90 Rise Time at FPGA Pin ; 90-10 Fall Time at FPGA Pin ; Monotonic
Rise at FPGA Pin; Monotonic Fall at FPGA Pin; Steady State Voh at Far-end;
Steady State Vol at Far-end; Voh Max at Far-end; Vol Min at Far-end; Ringback
Voltage on Rise at Far-end; Ringback Voltage on Fall at Far-end; 10-90 Rise Time
at Far-end; 90-10 Fall Time at Far-end; Monotonic Rise at Far-end; Monotonic
Fall at Far-end;
+-----
   ------
------
  ; balance[0]
                                     ; 0 s
          ; 2.5 V
                                                     ; 2.75 V
               ; 4.14e-06 V
                                     ; 2.91 V
                                                     ; -0.119
                                     ; 0.298 V
         ; 0.326 V
     ; 2.74e-10 s
                          ; 2.8e-10 s
                                                ; No
        ; No
                             ; 2.75 V
                                                   ; 4.14e-06 V
            ; 2.91 V
                           ; -0.119 V
                                          ; 0.326 V
                                    ; 2.74e-10 s
         ; 0.298 V
                                                         ;
                                       ; No
2.8e-10 s
                   ; No
                                     ; 0 s
                                                     ; 2.75 V
; balance[1]
           ; 2.5 V
                     ; 0 s
               ; 4.14e-06 V
                                     ; 2.91 V
                                                     ; -0.121
         ; 0.326 V
                                     ; 0.297 V
     ; 2.74e-10 s
                                                ; No
                          ; 2.8e-10 s
                             ; 2.75 V
                                                   ; 4.14e-06 V
        ; No
            ; 2.91 V
                           ; -0.121 V
                                          ; 0.326 V
                                    ; 2.74e-10 s
         ; 0.297 V
                                                         ;
2.8e-10 s
                                       ; No
                   ; No
          ; 3.3-V LVCMOS ; 0 s
; balance[2]
                                     ; 0 s
                                                     ; 3.63 V
               ; 4.94e-06 V
                                     ; 3.69 V
                                                     ; -0.414
         ; 0.134 V
                                     ; 0.585 V
                                                ; Yes
     ; 4.19e-10 s
                          ; 1.53e-10 s
                             ; 3.63 V
                                                   ; 4.94e-06 V
            ; 3.69 V
                           ; -0.414 V
                                          ; 0.134 V
         ; 0.585 V
                                    ; 4.19e-10 s
                                                         ;
1.53e-10 s
                   ; Yes
                                       ; No
          ; 3.3-V LVCMOS ; 0 s
                                     ; 0 s
; balance[3]
                                                     ; 3.63 V
               ; 4.94e-06 V
                                     ; 3.69 V
                                                     ; -0.414
         ; 0.134 V
                                     ; 0.585 V
                                                ; Yes
     ; 4.19e-10 s
                          ; 1.53e-10 s
```

```
; No ; 3.63 V ; 4.94e-06 V ; 3.69 V ; -0.414 V ; 0.134 V ; 0.585 V ; 4.19e-10 s ;
                                   ; No
                                                                                                              ; 4.19e-10 s
                                                                                                                                                ; No
 1.53e-10 s ; Yes :
 ; 3.63 V
; -0.326
                                                                                                                                           ; 0 s
                                                                                                                                            ; 3.64 V
                                , -v.326

, v.4/9 V

; 1.5e-10 s

; 3.63 V

; 3.63 V

; 0.091 V

; 0.479 V

; 3.83e-10 s

; Yes
                                                                                                                                           ; 0 s ; 3.63 V ; -0.326 ; 0.479 V
 ; balance[5] ; 3.3-V LVCMOS ; 0 s
; 3.63e-06 V ; 3.64 V
V ; 0.091 V ; 0.479 V
; 3.83e-10 s ; 1.5e-10 s
; No ; 3.63 V
                                   3e-10 s ; 1.5e-10 s ; Yes
; No ; 3.63 V ; 3.63e-06 V
; 3.64 V ; -0.326 V ; 0.091 V
; 0.479 V ; 3.83e-10 s
                                  ; Yes
                                                                                                                                                 ; No
 1.5e-10 s
; 3.63 V
; 3.69 V
; 0.585 V
                                                                                                                                           ; 3.63 V
; 3.69 V
; 0.585 V
; balance[7] ; 3.3-V LVCMOS ; 0 s ; 0 s ; 3.63 V ; 4.94e-06 V ; 3.69 V ; -0.414 V ; 0.585 V ; 4.19e-10 s ; 1.53e-10 s ; Yes ; 3.63 V ; 4.94e-06 V ; 3.69 V ; -0.414 V ; 0.585 V ; 4.19e-10 s ; 1.53e-10 
 1.53e-10 s ; Yes :
                                                                                                                                                    ; No
; 3.63 V
; 3.69 V
; 0.585 V
```

```
; 1.5e-10 s ; Yes ; 3.63e-06 V ; 3.64 V ; -0.326 V ; 0.091 V ; 0.479 V ; 3.83e-10 s ; Yes
; balance[10] ; 2.5 V ; 0 s
                                      ; 0 s ; 2.75 V ; -0.0578
; 3.54e-06 V
V ; 0.303 V
; 2.93e-10 s ; 3.01e-10 s
; No ; 2.75 V
; 0.28 V
                                               ; 2.75 V
; -0.107
; balance[11] ; 2.5 V ; 0 s
                                      ; 0 s
; 2.75 V
; 2.91 V ; -0.121
; 0.297 V
; balance[12] ; 2.5 V ; 0 s
   lance[12] ; 2.5 V ; 0 s , 0 3 , 0 3 , 7 , 121 ; 0.326 V ; 2.91 V ; -0.121 ; 0.297 V ; 2.74e-10 s ; 2.8e-10 s ; No ; 2.75 V ; 4.14e-06 V ; 2.91 V ; 0.326 V ; 0.297 V ; 2.74e-10 s ; 0.326 V ; 0.297 V ; 2.74e-10 s ;
         ; 0.297 V
; No
                                        ; No
2.8e-10 s
                                      ; 0 s ; 2.75 V ; -0.107 ; 0.16 V ; No
; balance[13] ; 2.5 V ; 0 s
3] ; 2.5 v
; 4.25e-06 V
; balance[14] ; 2.5 V ; 0 s ; 4.14e-06 V
                                                   ; 2.75 V
; -0.119
 ; 0.326 V ; 0.298 V
; 2.74e-10 s ; 2.8e-10 s
; No ; 2.75 V
                                                  ; No
                                                  ; 4.14e-06 V
```

```
; 0.326 V
                         ; -0.119 V
           ; 2.91 V
         ; 0.298 V
                                   ; 2.74e-10 s
                  ; No
                                     ; No
2.8e-10 s
                  ; 0 s
                                                   ; 2.75 V
; balance[15] ; 2.5 V
                                    ; 0 s
              ; 4.25e-06 V
                                    ; 2.9 V
                                                   ; -0.107
٧
         ; 0.378 V
                                    ; 0.16 V
                         ; 4.28e-10 s
                                              ; No
    ; 2.87e-10 s
                            ; 2.75 V
                                                 ; 4.25e-06 V
        ; No
           ; 2.9 V
                          ; -0.107 V
                                        ; 0.378 V
                                   ; 2.87e-10 s
         ; 0.16 V
                                                       ;
                  ; No
4.28e-10 s
                                     ; No
; accountfound ; 3.3-V LVCMOS ; 0 s
                                    ; 0 s
                                                   ; 3.63 V
              ; 3.63e-06 V
                                   ; 3.64 V
                                                   ; -0.326
         ; 0.091 V
                                    ; 0.479 V
                                              ; Yes
    ; 3.83e-10 s
                         ; 1.5e-10 s
                                                 ; 3.63e-06 V
        ; No
                            ; 3.63 V
           ; 3.64 V
                          ; -0.326 V
                                        ; 0.091 V
         ; 0.479 V
                                   ; 3.83e-10 s
1.5e-10 s
                  ; Yes
                                     ; No
; pinfound
         ; 3.3-V LVCMOS ; 0 s
                                   ; 0 s
                                                   ; 3.63 V
                                   ; 3.7 V
              ; 4.72e-06 V
                                                   ; -0.49 V
        ; 0.117 V
                                   ; 0.622 V
    ; 3.84e-10 s
                         ; 1.48e-10 s
                                             ; Yes
                           ; 3.63 V
                                                ; 4.72e-06 V
       ; No
           ; 3.7 V
                         ; -0.49 V
                                        ; 0.117 V
        ; 0.622 V
                                  ; 3.84e-10 s
1.48e-10 s
                  ; Yes
                                      ; No
                                    ; 0 s
                                                   ; 3.63 V
; clk_out
        ; 3.3-V LVCMOS ; 0 s
              ; 4.94e-06 V
                                    ; 3.69 V
                                                   ; -0.414
         ; 0.134 V
                                    ; 0.585 V
    ; 4.19e-10 s
                         ; 1.53e-10 s
                                              ; Yes
        ; No
                           ; 3.63 V
                                                 ; 4.94e-06 V
           ; 3.69 V
                          ; -0.414 V
                                        ; 0.134 V
         ; 0.585 V
                                   ; 4.19e-10 s
1.53e-10 s
                  ; Yes
                                      ; No
+-----
---+
```

+		
+		
+	100m; 05 c Modol)	
; Signal Integrity Metrics (Fast 1	100mv 82c Model)	
		;
++		
	-	-
	-	
	-	· · · · · · · · · · · · · · · · · · ·
+	•	•
	•	
++		-+
+		
; Pin ; I/O Standard ; Bo	ard Delay on Rise ; Board	d Delay on Fall ; Steady
State Voh at FPGA Pin; Steady Sta	te Vol at FPGA Pin ; Voh	Max at FPGA Pin ; Vol
Min at FPGA Pin ; Ringback Voltage	on Rise at FPGA Pin ; R	ingback Voltage on Fall
at FPGA Pin ; 10-90 Rise Time at F	PGA Pin ; 90-10 Fall Tim	e at FPGA Pin ; Monotonic
Rise at FPGA Pin ; Monotonic Fall		
Steady State Vol at Far-end; Voh	Max at Far-end ; Vol Min	at Far-end ; Ringback
Voltage on Rise at Far-end; Ringb	-	, ,
at Far-end; 90-10 Fall Time at Fa	•	
Fall at Far-end ;	•	•
++	+	+
+	+	+
	+	
	+	
		+
	•	·
· -		
+		
+		
; balance[0] ; 2.5 V ; 0	s ; 0 s	; 2.75 V
; 0.000242 V	; 2.86	
V ; 0.358 V	; 0.156	
; 3.01e-10 s	; 4.34e-10 s	, No
-		, NO ; 0.000242 V
; No	; 2.75 V	, 0.000242 V

```
; 2.86 V ; -0.0805 V ; 0.358 V ; 0.156 V ; 3.01e-10 s ; No ; No ; No
 ; balance[1] ; 2.5 V ; 0 s
                                                                                                                        ; 0 s ; 2.75 V ; -0.0814
                                 ; 2.5 v
; 0.000242 V
, o s ; 3.63 V ; -0.254 ; 0.543 V
 ; balance[2] ; 3.3-V LVCMOS ; 0 s
                                                                                                                           ; 0 s
; 0.000238 V
V ; 0.052 V
; 4.59e-10 s ; 1.96e-10 s
; No ; 3.63 V
; 1.96e-10 s ; Yes ; 3.64 V ; 0.000238 V ; 0.543 V ; 0.000238 V ; 0.543 V ; 0.052 V ; 0.543 V ; 0.543 V ; 0.052 V ; 0.543 V ; 0.543 V ; 0.052 V ; 0.543 V ; 0.543 V ; 0.052 V ; 0.543 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 0.052 V ; 0.543 V ; 0.052 V ; 
                                                                                                                                                             ; 3.63 V
; -0.254
 ; balance[3] ; 3.3-V LVCMOS ; 0 s
                                  ; 3.3-V LVCNOS , 5 - ; 0.000238 V
                                                                                                                            ; 0 s
                                                                                                                             ; 3.64 V
            ; 0.052 V
; 4.59e-10 s
; No
; 3.63 V
; 3.64 V
; 0.543 V
                                                                                                                          ; 0.543 V
                                                                                                                            ; Yes
; 0.000238 V
; 0.052 V
; 4.59e-10 s ;
                                                                                                                                                              ; Yes
; 0.543 V
1.96e-10 s ; Yes
                                                                                                                               ; No
; 3.63 V
; 3.64 V
; 0.425 V
                                                                                                                                                            ; Yes
                                                                                                                                                               ; 0.000184 V
                                                                                                                        , v.u19 V
; 4.44e-10 s
: No
; 0 s ; 3.63 V ; -0.19 V ; 0.425 V ; Yes
 1.91e-10 s ; Yes ;
                                                                                                                               ; No
 ; balance[6] ; 3.3-V LVCMOS ; 0 s
                                                                                                                      ; 0 s ; 3.63 V
```

```
; 0.000238 V ; 3.64 V ; -0.254 V ; 0.543 V ; 4.59e-10 s ; 1.96e-10 s ; 74.59e-10 s ; 3.64 V ; -0.254 V ; 0.000238 V ; 3.64 V ; -0.254 V ; 0.052 V ; 0.543 V ; 0.543 V ; 4.59e-10 s ; 1.96e-10 s ; No ; No ;
 ; 3.63 V
; 3.64 V
; 0.543 V
  ; 0.543 V
1.96e-10 s ; Yes
                                                                                                                                                                                                                               ; No
  ; balance[10] ; 2.5 V ; 0 s ; 0.000213 V ; 0.119 V ; 0.119 V ; 2.75 V ; 0.000213 V ; 0.119 V ; 0.119 V ; 2.75 V ; 0.000213 V ; 0.119 V ; 2.75 V ; 0.000213 V ; 0.119 V ; 2.79 V ; 0.000213 V ; 0.119 V ; 2.79 V ; 0.129 V ; 0.139 
   ; balance[11] ; 2.5 V ; 0 s ; 0.000247 V ; 0.85 V ; -0.0711 V ; 0.204 V ; 0.85 V ; -0.0711 S ; No ; 2.75 V ; 0.000247 V ; 2.85 V ; -0.0711 V ; 0.204 V
```

```
; 0.181 V
4.49e-10 s ; No
                                                   ; 4.55e-10 s
                                                     ; No
; 0 s ; 2.75 V ; -0.0814 ; 0.156 V ; No
                                                                      ; 0.000242 V
; 2.75 V
; -0.0711
; No

; balance[14] ; 2.5 V ; 0 s ; 0.86 V ; -0.0805

V ; 0.358 V ; 0.156 V ; 0.000242 V ; 0.156 V

; 3.01e-10 s ; 4.34e-10 s ; No

; No ; 2.75 V ; 0.000242 V

; 2.86 V ; -0.0805 V ; 0.358 V

; 0.156 V ; 3.01e-10 s ; No

; 4.34e-10 s ; No ; No
, 0 S ; 2.75 V ; 2.85 V ; -0.0711 ; 0.181 V
; accountfound; 3.3-V LVCMOS; 0 s ; 0.000184 V ; 3.64 V ; -0.19 V ; 0.019 V ; 0.425 V ; 4.44e-10 s ; 1.91e-10 s ; Yes ; 0.000184 V ; 0.425 V ; 0.019 V ; 0.425 V ; 0.425 V ; 1.91e-10 s ; No ; 0.425 V ; 4.44e-10 s ; No ; No ; No ;
                                                    ; 0 s ; 3.63 V ; -0.316
; pinfound ; 3.3-V LVCMOS ; 0 s
; 0.000229 V
```

```
V
                         ; 0.53 V
      ; 0.041 V
   ; 4.29e-10 s
                  ; 1.87e-10 s
                                 ; Yes
                                   ; 0.000229 V
      ; No
                   ; 3.63 V
        ; 3.65 V
                             ; 0.041 V
                  ; -0.316 V
      ; 0.53 V
                         ; 4.29e-10 s
1.87e-10 s
             ; Yes
                           ; No
      ; 3.3-V LVCMOS ; 0 s
; clk_out
                         ; 0 s
                                    ; 3.63 V
                         ; 3.64 V
          ; 0.000238 V
                                    ; -0.254
                         ; 0.543 V
      ; 0.052 V
   ; 4.59e-10 s
                  ; 1.96e-10 s
                                 ; Yes
                    ; 3.63 V
                                   ; 0.000238 V
      ; No
        ; 3.64 V
                  ; -0.254 V
                             ; 0.052 V
                         ; 4.59e-10 s
      ; 0.543 V
                                       ;
1.96e-10 s
             ; Yes
                           ; No
+-----
------
-----
------
------
+-----
; Setup Transfers
+----+
; From Clock ; To Clock ; RR Paths ; FR Paths ; RF Paths ; FF Paths ;
+----+
; Clk ; Clk ; 123719 ; 1 ; 0 ; 0 ; +-----+
     ; Clk
Entries labeled "false path" only account for clock-to-clock false paths and not
path-based false paths. As a result, actual path counts may be lower than reported.
+-----
; Hold Transfers
+----+
; From Clock; To Clock; RR Paths; FR Paths; RF Paths; FF Paths;
+----+
           ; 123719 ; 1
                     ; 0
      ; Clk
+----+
Entries labeled "false path" only account for clock-to-clock false paths and not
path-based false paths. As a result, actual path counts may be lower than reported.
```

+----+

```
; Recovery Transfers
+-----
; From Clock ; To Clock ; RR Paths ; FR Paths ; RF Paths ; FF Paths ;
+----+
; Clk ; Clk ; 115 ; 0 ; 0 ; 0 ;
+----+
Entries labeled "false path" only account for clock-to-clock false paths and not
path-based false paths. As a result, actual path counts may be lower than reported.
+----+
; Removal Transfers
+----+
; From Clock ; To Clock ; RR Paths ; FR Paths ; RF Paths ; FF Paths ;
+----+
    ; Clk ; 115 ; 0 ; 0 ; 0
+----+
Entries labeled "false path" only account for clock-to-clock false paths and not
path-based false paths. As a result, actual path counts may be lower than reported.
; Report TCCS ;
No dedicated SERDES Transmitter circuitry present in device or used in design
; Report RSKM ;
_____
No non-DPA dedicated SERDES Receiver circuitry present in device or used in design
+----+
; Unconstrained Paths Summary
+----+
               ; Setup ; Hold ;
+----+
; Illegal Clocks
; Unconstrained Clocks
                ; 0 ; 0 ;
; Unconstrained Output Ports ; 0 ; 0 ;
; Unconstrained Output Port Paths ; 0 ; 0 ;
+----+
+----+
; Clock Status Summary ;
+----+
```

```
; Target ; Clock ; Type ; Status
+----+
; clk ; Clk ; Base ; Constrained ;
+----+
+----+
; Timing Analyzer Messages ;
+----+
Info: Running Quartus Prime Timing Analyzer
   Info: Version 22.1std.1 Build 917 02/14/2023 SC Lite Edition
   Info: Processing started: Fri Jul 14 19:17:07 2023
Info: Command: quartus sta atm -c atm
Info: qsta_default_script.tcl version: #1
Warning (18236): Number of processors has not been specified which may cause
overloading on shared machines. Set the global assignment NUM PARALLEL PROCESSORS
in your QSF to an appropriate value for best performance.
Info (20030): Parallel compilation is enabled and will use 6 of the 6 processors
detected
Info (21077): Low junction temperature is 0 degrees C
Info (21077): High junction temperature is 85 degrees C
Info (332104): Reading SDC File: 'atm.out.sdc'
Info (332152): The following assignments are ignored by the
derive clock uncertainty command
Info: Found TIMING ANALYZER REPORT SCRIPT INCLUDE DEFAULT ANALYSIS = ON
Info: Analyzing Slow 1100mV 85C Model
Info (332146): Worst-case setup slack is 0.009
                      End Point TNS Clock
   Info (332119):
                Slack
   Info (332119): 0.009
                               0.000 Clk
Info (332146): Worst-case hold slack is 0.363
   Info (332119):
                0.363
                               0.000 Clk
Info (332146): Worst-case recovery slack is 15.502
   Info (332119):
                Slack End Point TNS Clock
   Info (332119):
               15.502
                               0.000 Clk
Info (332146): Worst-case removal slack is 0.470
   Info (332119): Slack End Point TNS Clock
   Info (332119):
                0.470
                               0.000 Clk
Info (332146): Worst-case minimum pulse width slack is 9.213
   0.000 Clk
   Info (332119):
                9.213
Info: Analyzing Slow 1100mV OC Model
Info (334003): Started post-fitting delay annotation
Info (334004): Delay annotation completed successfully
```

```
Info (332152): The following assignments are ignored by the
derive clock uncertainty command
Info (332146): Worst-case setup slack is 0.240
  Info (332119): 0.240
                       0.000 Clk
Info (332146): Worst-case hold slack is 0.364
  Info (332119):
           0.364
                      0.000 Clk
Info (332146): Worst-case recovery slack is 12.791
  Info (332119): 12.791 0.000 Clk
Info (332146): Worst-case removal slack is 2.980
  Info (332119): 2.980
                      0.000 Clk
Info (332146): Worst-case minimum pulse width slack is 9.283
  Info (332119):
           9.283
                      0.000 Clk
Info: Analyzing Fast 1100mV 85C Model
Info (334003): Started post-fitting delay annotation
Info (334004): Delay annotation completed successfully
Info (332152): The following assignments are ignored by the
derive clock uncertainty command
Info (332146): Worst-case setup slack is 3.035
  Info (332119):
            Slack End Point TNS Clock
  0.000 Clk
  Info (332119): 3.035
Info (332146): Worst-case hold slack is 0.182
  Info (332119): Slack End Point TNS Clock
  0.182 0.000 Clk
  Info (332119):
Info (332146): Worst-case recovery slack is 14.450
  Info (332119): 14.450
                       0.000 Clk
Info (332146): Worst-case removal slack is 2.316
  Info (332119): 2.316 0.000 Clk
Info (332146): Worst-case minimum pulse width slack is 9.102
  Info (332119):
            9.102
                      0.000 Clk
Info: Analyzing Fast 1100mV 0C Model
Info (332152): The following assignments are ignored by the
derive_clock_uncertainty command
```

```
Info (332146): Worst-case setup slack is 3.266
  Info (332119): Slack End Point TNS Clock
  3.266
  Info (332119):
                            0.000 Clk
Info (332146): Worst-case hold slack is 0.171
  Info (332119):
             Slack End Point TNS Clock
  Info (332119): 0.171 0.000 Clk
Info (332146): Worst-case recovery slack is 16.315
  Info (332119): Slack End Point TNS Clock
  Info (332119): 16.315
                            0.000 Clk
Info (332146): Worst-case removal slack is 0.659
  Info (332119): 0.659
                            0.000 Clk
Info (332146): Worst-case minimum pulse width slack is 9.064
  Info (332119): Slack End Point TNS Clock
  Info (332119):
               9.064
                            0.000 Clk
Info (332101): Design is fully constrained for setup requirements
Info (332101): Design is fully constrained for hold requirements
Info: Quartus Prime Timing Analyzer was successful. 0 errors, 1 warning
  Info: Peak virtual memory: 5183 megabytes
  Info: Processing ended: Fri Jul 14 19:17:11 2023
  Info: Elapsed time: 00:00:04
  Info: Total CPU time (on all processors): 00:00:03
```