

## **FAST 160 TIMING SPECIFICATION**

U320 WILL USE SKEW COMPENSATION SO WHAT MATTERS IS HOW FAR OFF  
CLOCK AND DATA CAN BE,

AND

THE QUALITY OF THE DATA EYE OPENING.

EXTRAPOLATING THE SAME NUMBERS AS BEFORE ARE NOT MEANINGFUL IF  
SKEW COMPENSATION IS IMPLEMENTED AND WE HAVE NO REAL WAY OF  
MEASURING MOST OF THE NUMBERS.

MOST HIGH SPEED SERIAL BUSES USE EYE MEASUREMENTS TECHNIQUES

OUR COMPLICATION IS RELATING THE DATA EYE OPENING TO THE CLOCK SIGNAL.  
BECAUSE OF THIS WE HAVE TWO JITTER REQUIRMENTS (CLOCK AND DATA), AND  
ALSO DEFINING THE MAXIMUM ALLOWED DEVIATION BETWEEN DATA LINES.

## FAST 160 TIMING SPECIFICATION

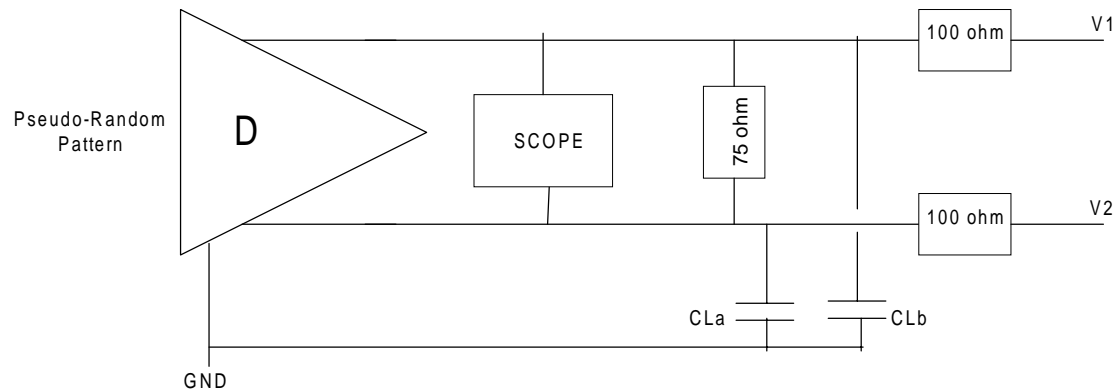
DEFINE ACCEPTABLE TRANSMITTER SIGNAL

1. ALL DATA SIGNAL MUST EXHIBIT PROPER EYE OPENING INTO A TEST CIRCUIT
2. ALL DATA SIGNALS MUST BE SKEWED FROM THE CLOCK SIGNAL BY NO MORE PLUS OR MINUS tbd NS. IN U320 THE CLOCK EDGE AND DATA EDGE ARE ALIGNED.
3. EYE OPENING MET OVER THE COMMON MODE RANGE.

## FAST 160 TIMING SPECIFICATION

PROPOSAL WOULD USE A DEFINED TEST SETUP WITH A TRANSMIT EYE DEFINED WITH A MAX DISPLACEMENT OF THE CLOCK EDGE FROM THE DATA EDGE.

### TRANSMITTER TEST SETUP FOR EYE PATTERN



TEST SETUP SAME AS FIGURE A.7 EXCEPT PSEUDO-RANDOM PATTERN IS USED.

## FAST 160 TIMING SPECIFICATION

### PROPOSED TRANSMITTER CHARACTERISTICS (DATA)

Parameter	U320	Units
Signaling	NRZ	
Nominal Data Rate	160	Mbit/sec
Nominal Baud Rate	160	Mbit/sec
Tolerance	100	ppm
Amplitude (zero to peak)		
Max	800	mv
Min (No Pre-comp)	400	mv
Min (With Pre-Comp)	200	mv
Rise/Fall Time (20-80%)		
Max	1.0	ns
Min	1.5	ns
Differential Skew	250	ps
Maximum Offset From Clock Edge	250	ps

Note :Remove rise/fall times

Differential Skew is assertion to negation mis-match.  
Visible in eye diagram.

## FAST 160 TIMING SPECIFICATION

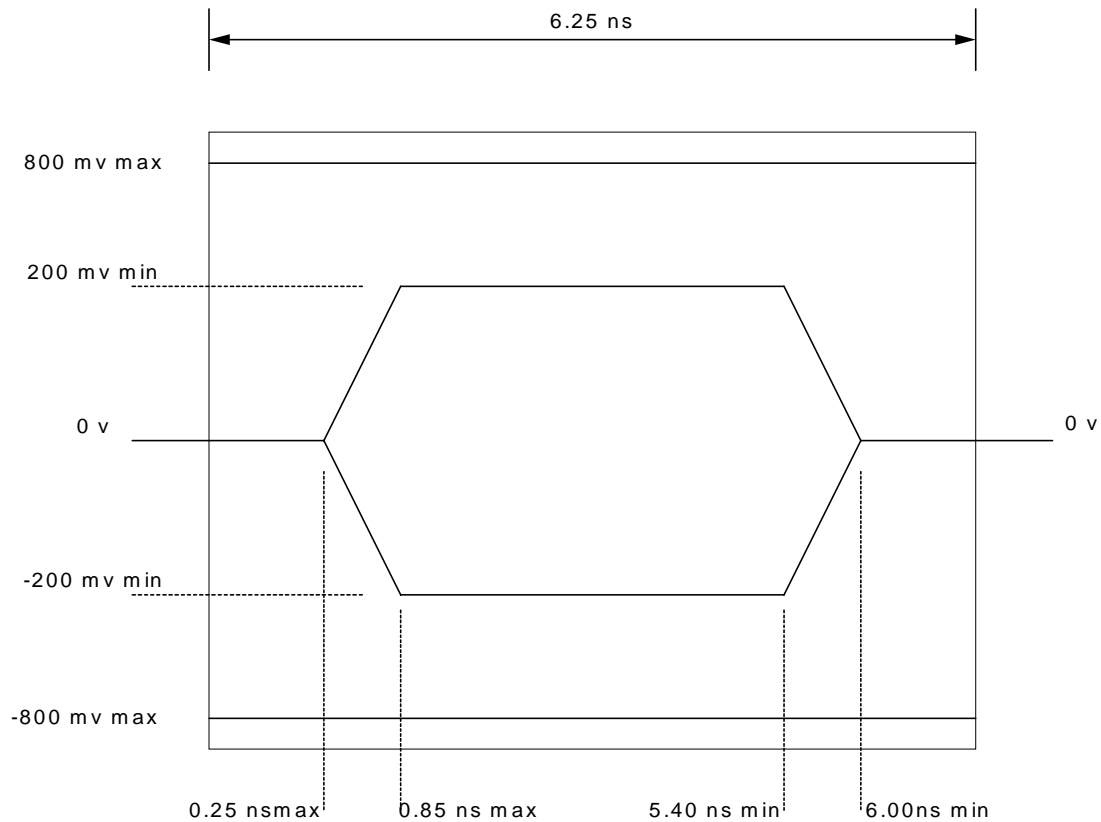
### PROPOSED TRANSMITTER CHARACTERISTICS (CLOCK)

Parameter	U320	Units
Nominal Rate	80	MHz
Jitter (p-p)	250	ps
Tolerance	100	ppm
Amplitude (zero to peak)		
Max	800	mv
Min	400	mv
Max (off)		
Rise/Fall Time (20-80%)		
Max	1.0	ns
Min	1.2	ns
Plus to Minus Skew	250	ps

Remove rise/fall times

NOTE: No Pre-Comp on clock since clock is free running.

# FAST 160 TIMING SPECIFICATION



## PROPOSED VALUES TRANSMITTER

## FAST 160 TIMING SPECIFICATION

### RECEIVER EYE SPECIFICATION

SINCE CLOCK SENT ALIGNED WITH DATA AND RECEIVER WILL DO SKEW COMPENSATION CAN'T REALLY MEASURE SETUP AND HOLD TIME DIRECTLY AT THE RECEIVER INPUT..

REQUIREMENT CAN BE DEFINED AS FOLLOWS:

Required Setup (Hold) < Received Eye Opening - Clock Jitter - Skew Comp Tolerance.

ASSUMPTION IS THE RECEIVER ALIGNS THE CLOCK TO THE CENTER TO ACCURACY OF THE SKEW COMPENSATION CIRCUIT AND THE CLOCK THEN JITTERS ABOUT THIS POINT.

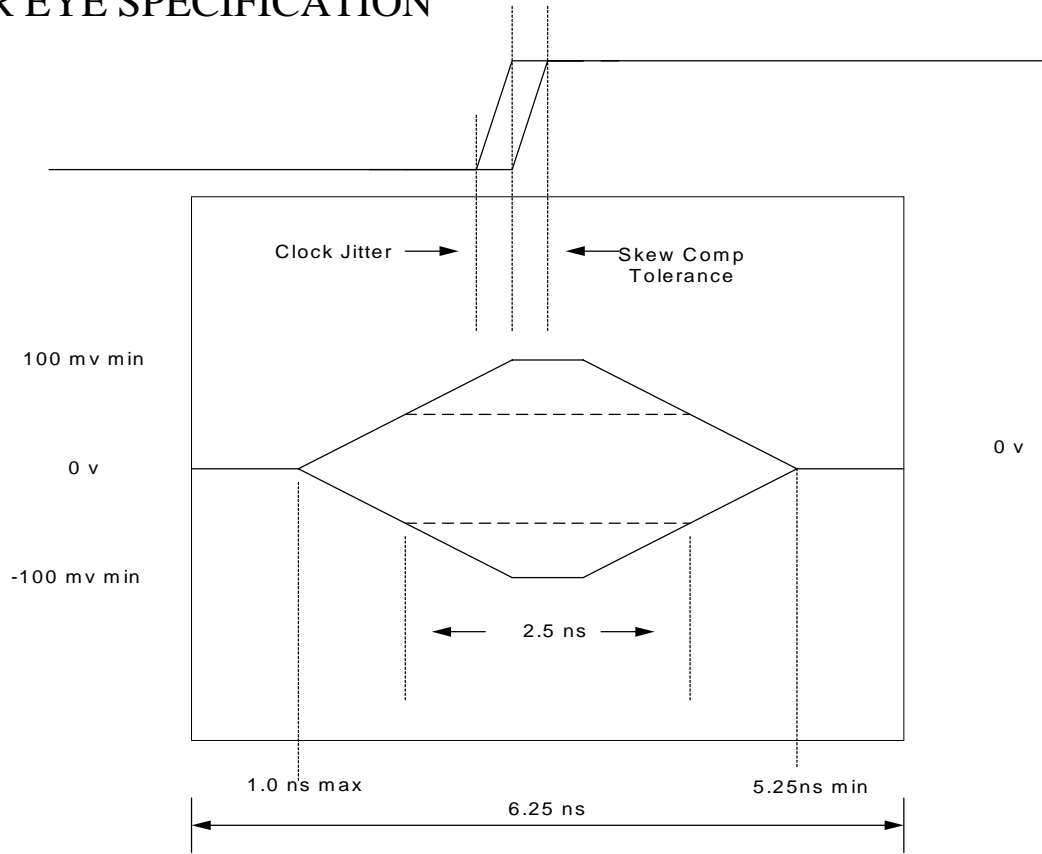
Received Eye Opening == Width of eye at threshold specification point of the receiver (in ns)

Clock Jitter == Peak to Peak Jitter of the clock strobe (in ns) at zero crossing.

Skew Comp Tolerance == Resolution accuracy of the skew compensation circuit (in ns).

# FAST 160 TIMING SPECIFICATION

## RECEIVER EYE SPECIFICATION

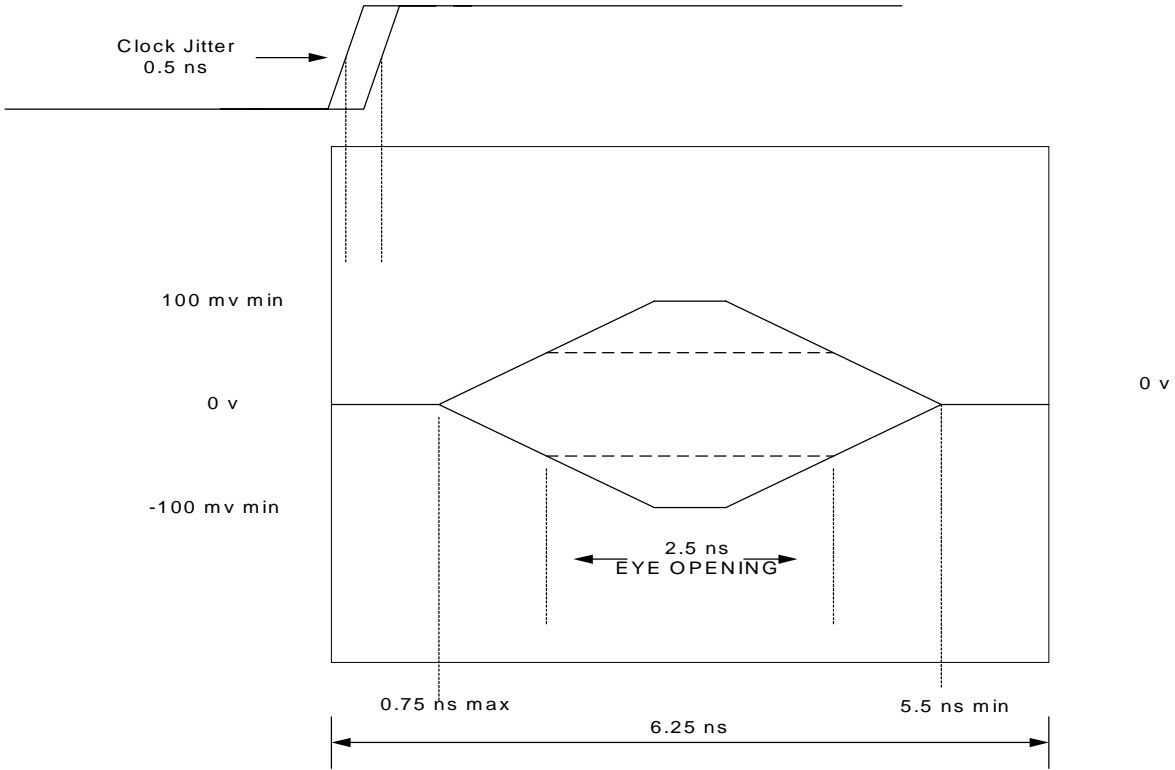


ABOVE CANNOT BE MEASURED SINCE CLOCK EDGE IN PHASE WITH DATA AT CONNECTOR.



# FAST 160 TIMING SPECIFICATION

## RECEIVER EYE SPECIFICATION



SETUP REQUIRED < EYE OPENING - JITTER - SKEW COMP TOLERANCE  
 EXAMPLE: 1 ns < 2.5 ns - 0.5 ns - 0.3ns = 1.7 ns

## FAST 160 TIMING SPECIFICATION

### PROPOSED RECEIVER CHARACTERISTICS (DATA)

Parameter	U320	Units
Signaling	NRZ	
Nominal Data Rate	160	Mbit/sec
Nominal Baud Rate	160	Mbit/sec
Tolerance	100	ppm
Maximum Differential Sensitivity	30	mv
Minimum Setup Time	0.75	ns
Minimum Hold Time	0.75	ns
Rise/Fall Time *		
Max	1.0	ns
Min	4.0	ns
Differential Skew	5%	UI

\*Rise/Fall time measured from 80% of maximum non asserted state to 80% of maximum asserted state.

## FAST 160 TIMING SPECIFICATION

### PROPOSED RECEIVER CLOCK SIGNAL SPECIFICATIONS

Parameter	U320	Units
Nominal Rate	80	MHz
Jitter	800	ps
Tolerance	100	ppm
Amplitude (0-Peak)		
Max	800	mv
Min	100	mv
Rise/Fall Time *		
Max	1.0	ns
Min	4.0	ns
Plus to Minus Skew	250	ps

\*Rise/Fall time measured from 80% of maximum non asserted state to 80% of maximum asserted state.

## **FAST 160 TIMING SPECIFICATION**

NEED FURTHER DATA TO DEFINE LEVELS.

1. SET UP TEST CIRCUIT PER FIGURE A7 TO DETERMINE DRIVER EYE LIMITS.
2. TEST RECEIVER EYE LEVELS UNDER LONG, SHORT AND LOADED CABLE CONFIGURATIONS.
3. MEASURE LIMITS OF RECEIVER EYE JITTER UNDER LONG, SHORT, AND LOADED CABLE CONFIGURATIONS.
4. REVIEW AT NEXT MEETING.