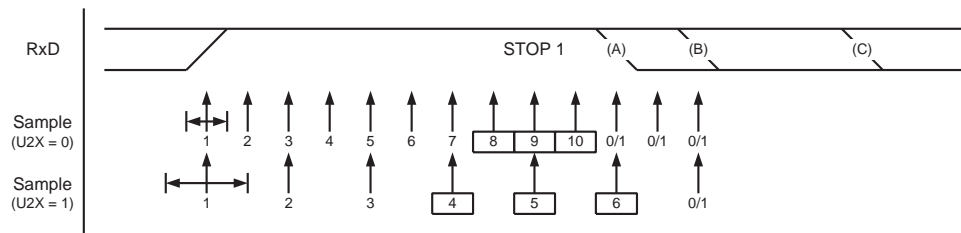


**Figure 17-7.** Stop Bit Sampling and Next Start Bit Sampling



The same majority voting is done to the stop bit as done for the other bits in the frame. If the stop bit is registered to have a logic 0 value, the Frame Error (FEN) Flag will be set.

A new high to low transition indicating the start bit of a new frame can come right after the last of the bits used for majority voting. For Normal Speed mode, the first low level sample can be at point marked (A) in [Figure 17-7](#). For Double Speed mode the first low level must be delayed to (B). (C) marks a stop bit of full length. The early start bit detection influences the operational range of the Receiver.

### 17.8.3 Asynchronous Operational Range

The operational range of the Receiver is dependent on the mismatch between the received bit rate and the internally generated baud rate. If the Transmitter is sending frames at too fast or too slow bit rates, or the internally generated baud rate of the Receiver does not have a similar (see [Table 17-2 on page 193](#)) base frequency, the Receiver will not be able to synchronize the frames to the start bit.

The following equations can be used to calculate the ratio of the incoming data rate and internal receiver baud rate.

$$R_{slow} = \frac{(D+1)S}{S-1+D \cdot S+S_F} \qquad R_{fast} = \frac{(D+2)S}{(D+1)S+S_M}$$

<b>D</b>	Sum of character size and parity size (D = 5 to 10 bit)
<b>S</b>	Samples per bit. S = 16 for Normal Speed mode and S = 8 for Double Speed mode.
<b>S<sub>F</sub></b>	First sample number used for majority voting. S <sub>F</sub> = 8 for normal speed and S <sub>F</sub> = 4 for Double Speed mode.
<b>S<sub>M</sub></b>	Middle sample number used for majority voting. S <sub>M</sub> = 9 for normal speed and S <sub>M</sub> = 5 for Double Speed mode.
<b>R<sub>slow</sub></b>	is the ratio of the slowest incoming data rate that can be accepted in relation to the receiver baud rate. R <sub>fast</sub> is the ratio of the fastest incoming data rate that can be accepted in relation to the receiver baud rate.

[Table 17-2 on page 193](#) and [Table 17-3 on page 193](#) list the maximum receiver baud rate error that can be tolerated. Note that Normal Speed mode has higher toleration of baud rate variations.