MS Series Encoder Data Structure

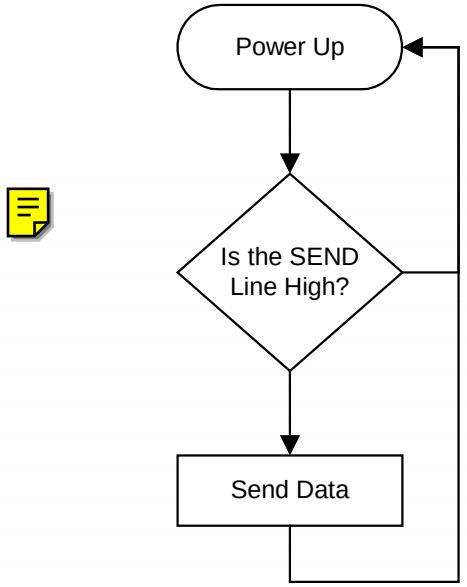
The MS Series encoder is designed to securely register button presses or switch closures over a wireless link for remote control applications. It will turn eight parallel input lines into a secure, encoded serial bit stream output.

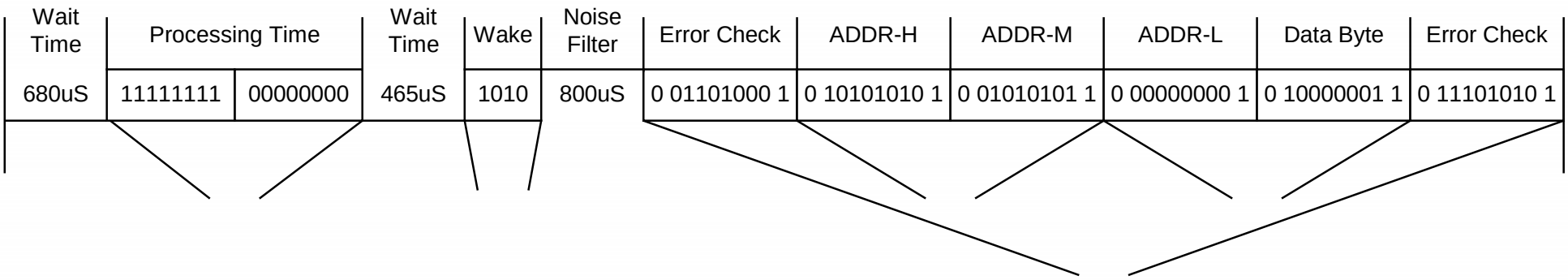
The MS Series algorithm is designed to create a data stream with a 50% duty cycle by using the same number of high bits and low bits. Two wait times reduce this duty cycle to just below 50%.

Logic State Description:
- 1 = HIGH
- 0 = LOW

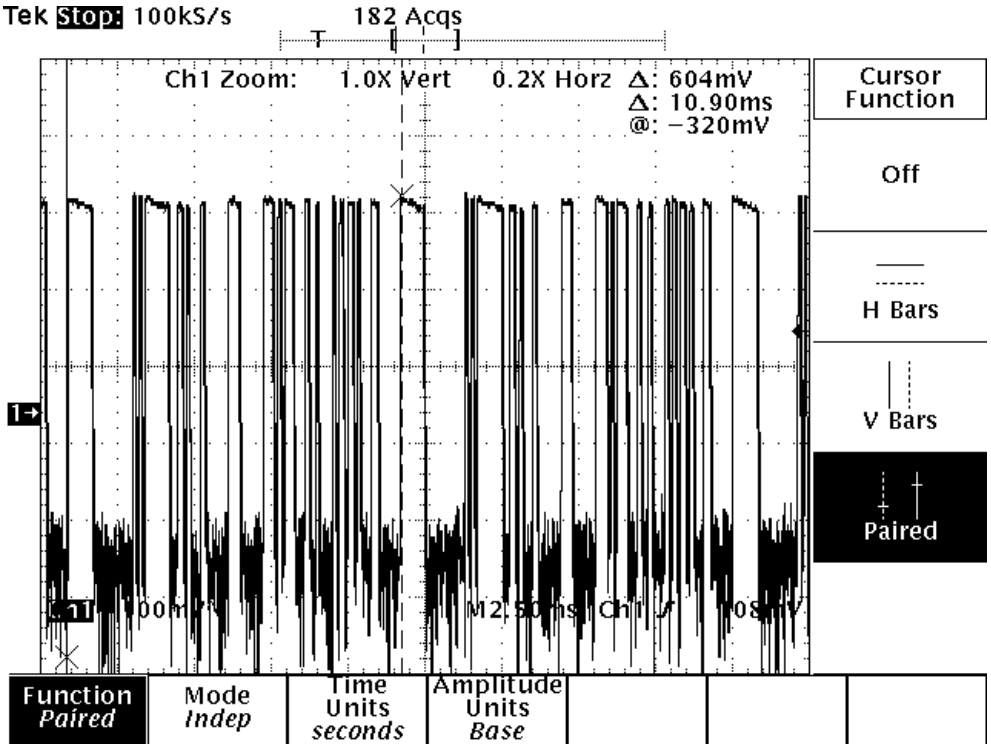
Total bits, including start and stop bits = 80
- Total 1's = 40
- Total 0's = 40

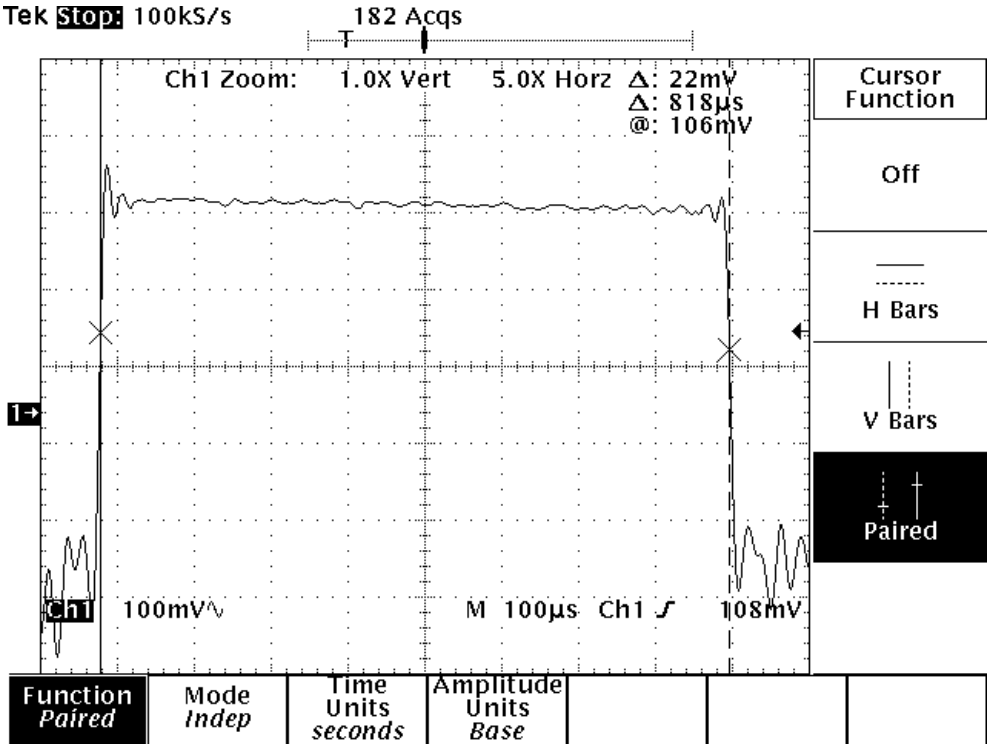
Value for each bit per baud rate:
- 2400bps = 417uS or 1.18% of duty cycle
- 9600bps = 104uS or 1.01% of duty cycle
- 19200bps = 52uS or 0.85% of duty cycle
- 28800bps = 35uS or 0.74% of duty cycle

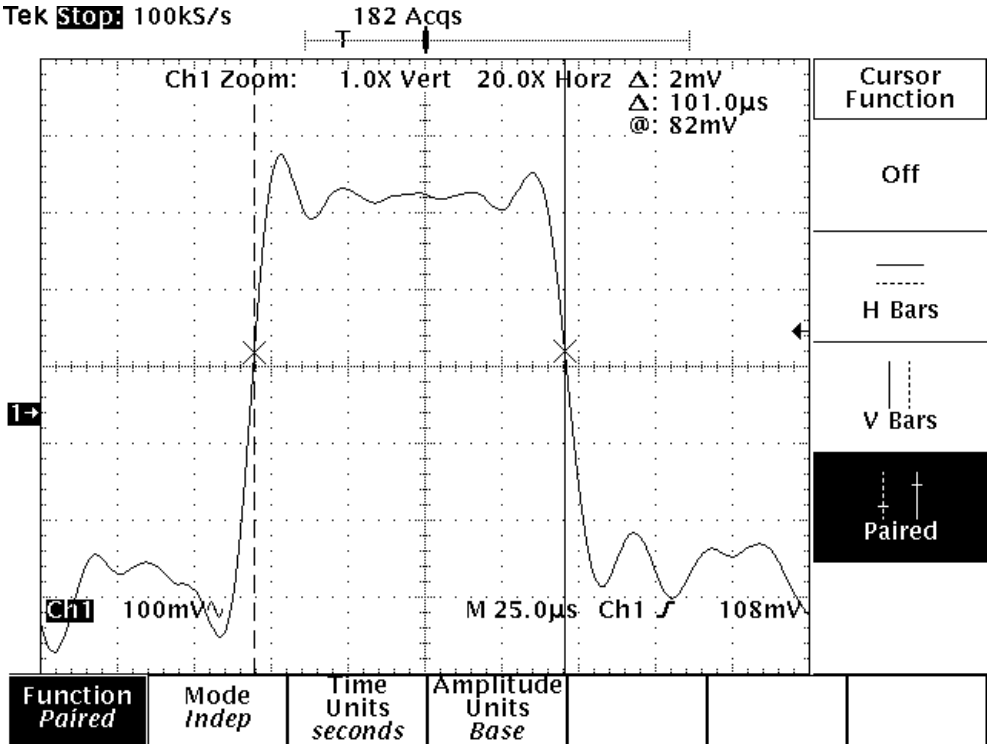


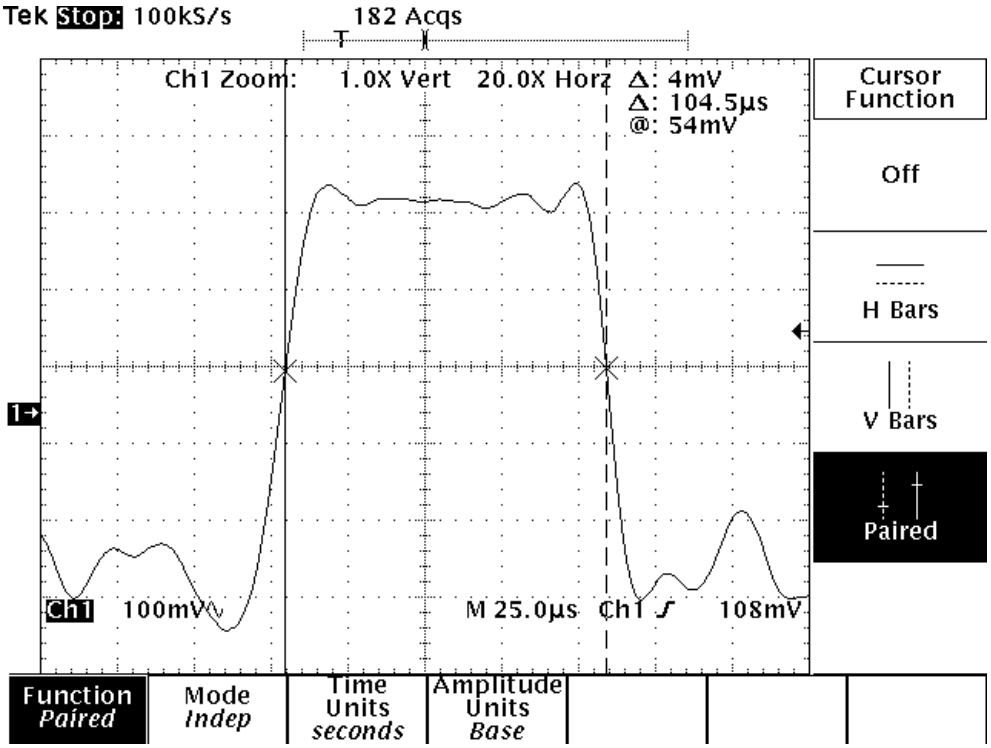


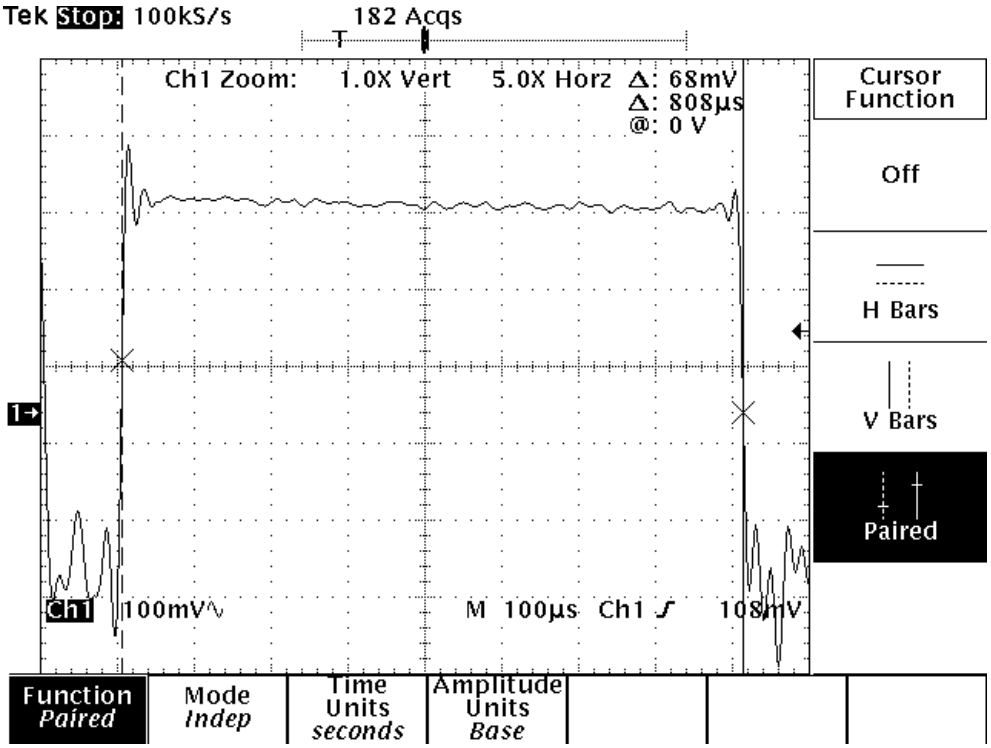
$$\text{Duty Cycle} = \frac{\text{Time High}}{\text{Total Time}} \rightarrow \frac{\text{40 bits + 800uS}}{\text{80 bits + 680uS + 465uS + 800uS}} \rightarrow \frac{\text{(34*104uS) + 800uS}}{\text{(80*104uS) + 1,945uS}} = \frac{\text{4,336uS}}{\text{10,265uS}} = 42.24\%$$

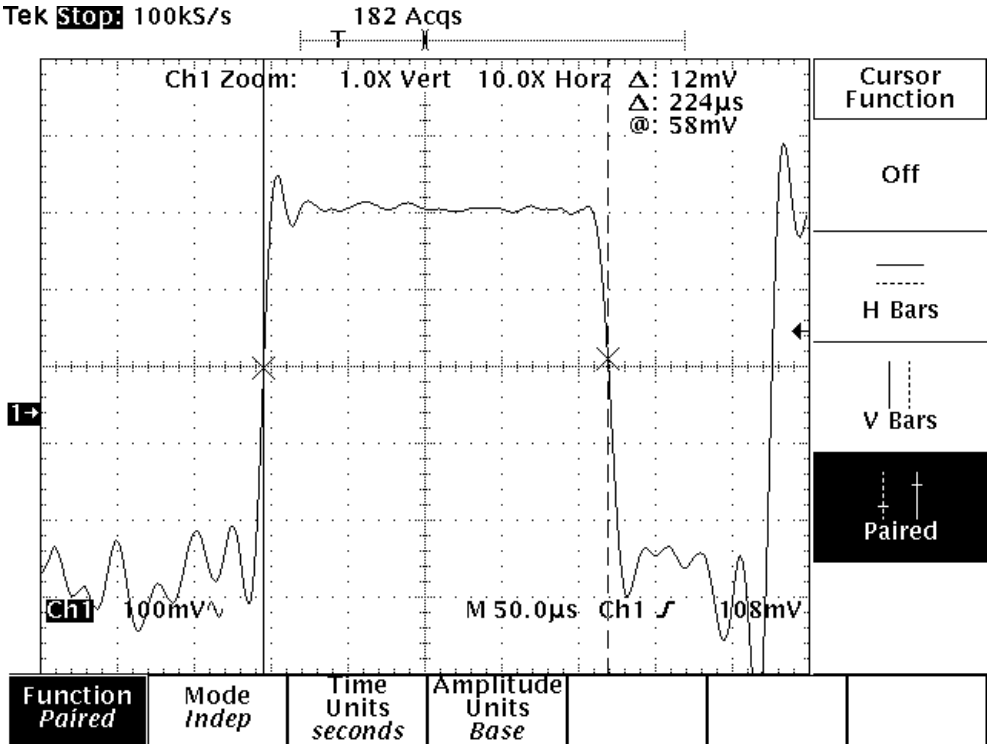

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 0.2X Horz Δ: 604mV
Δ: 10.90ms
@: −320mV
Cursor Function
Off
H Bars
V Bars
Paired
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

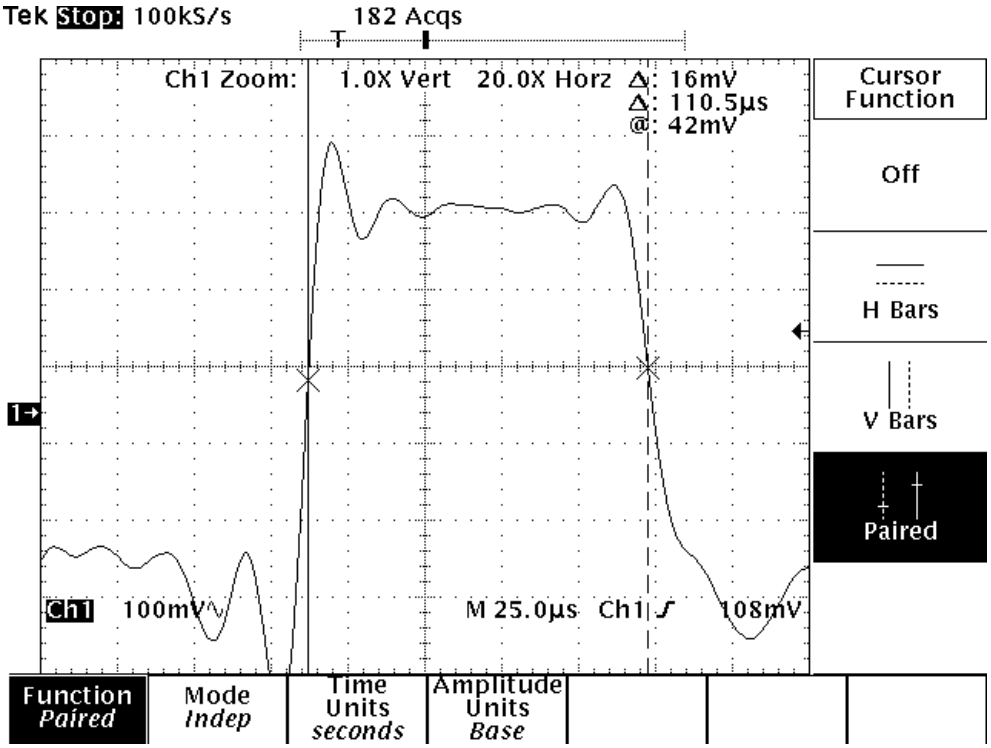

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 5.0X Horz Δ: 22mV
Δ: 818µs
@: 106mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 100µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

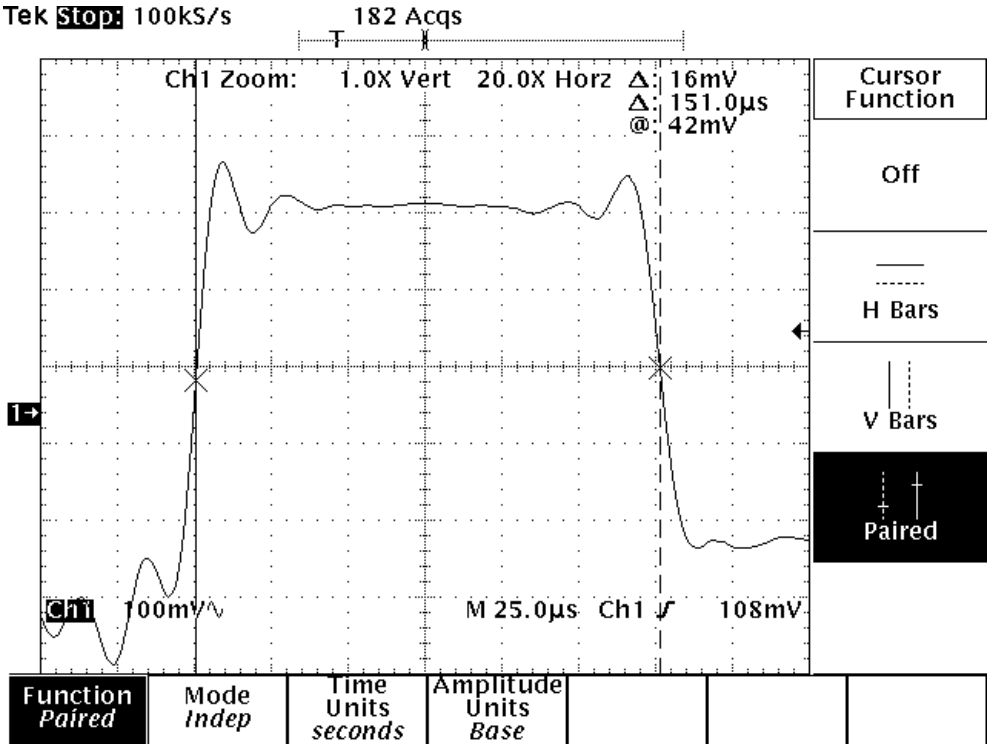

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 2mV
Δ: 101.0µs
@: 82mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ∫ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

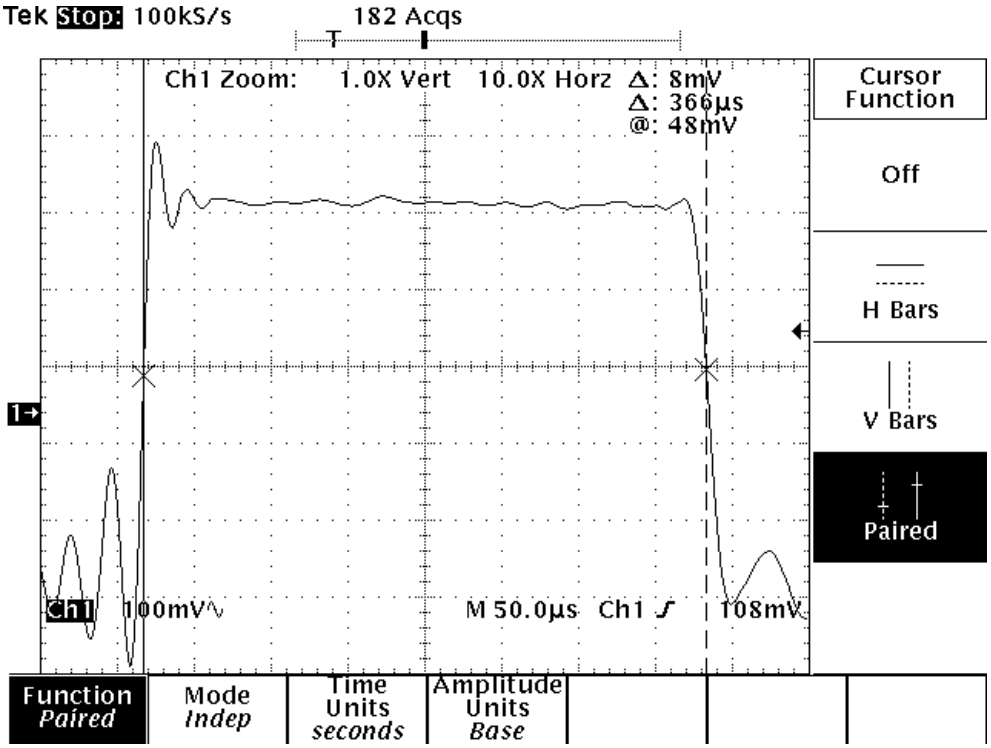

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz
Δ: 4mV
Δ: 104.5µs
@: 54mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

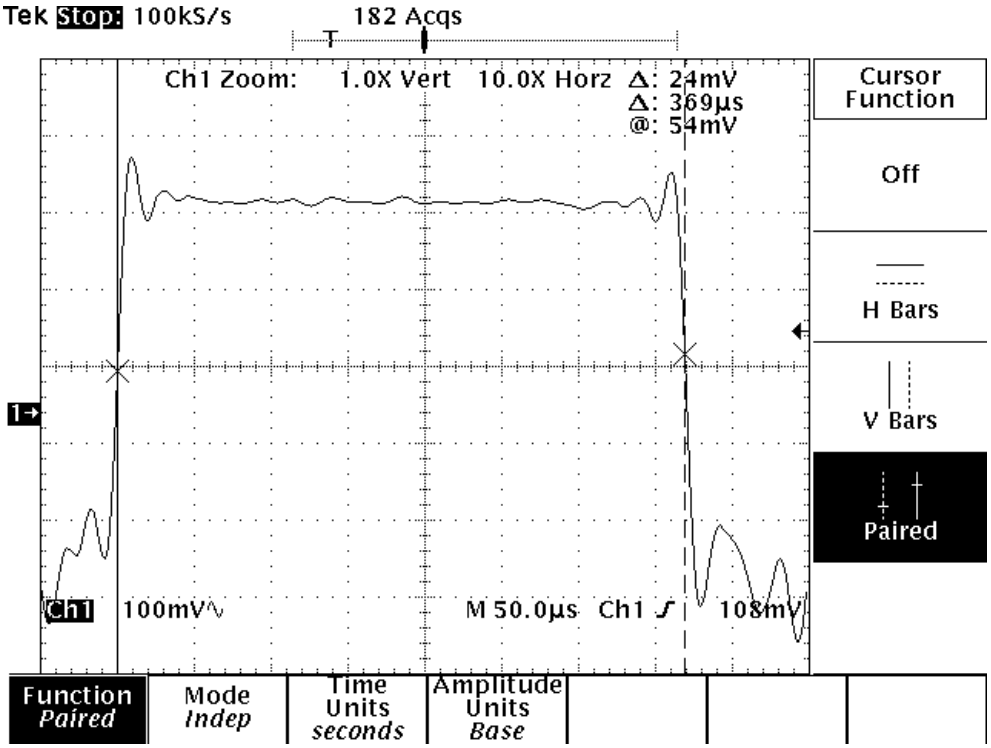

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 5.0X Horz Δ: 68mV
Δ: 808µs
@: 0 V
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 100µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

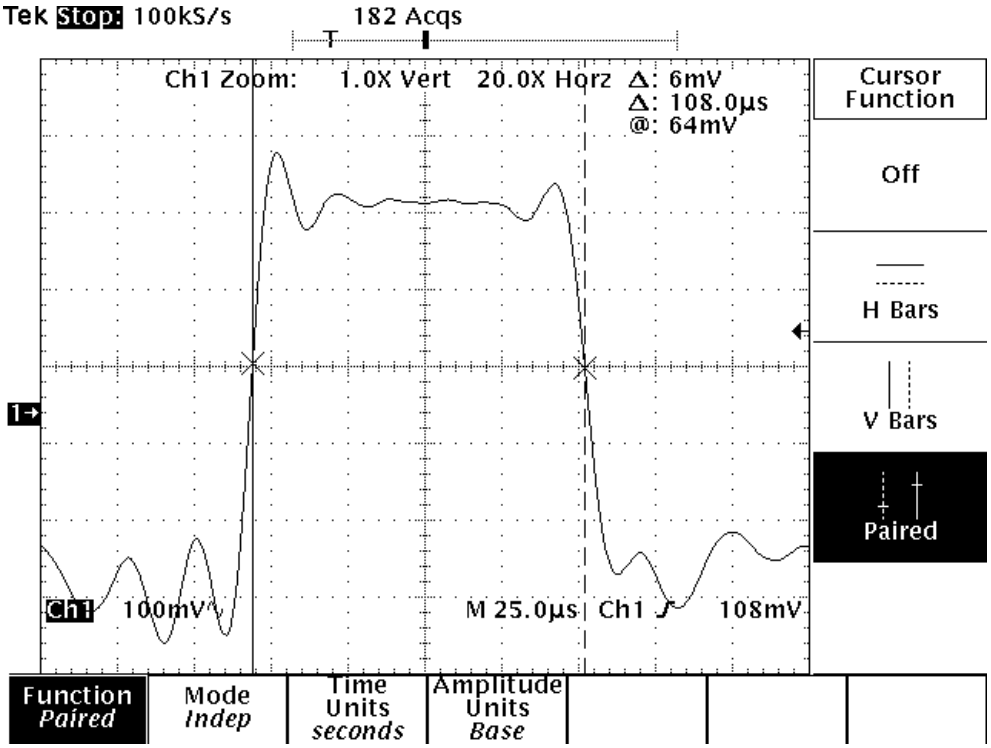

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 10.0X Horz Δ: 12mV
Δ: 224µs
@: 58mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 50.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

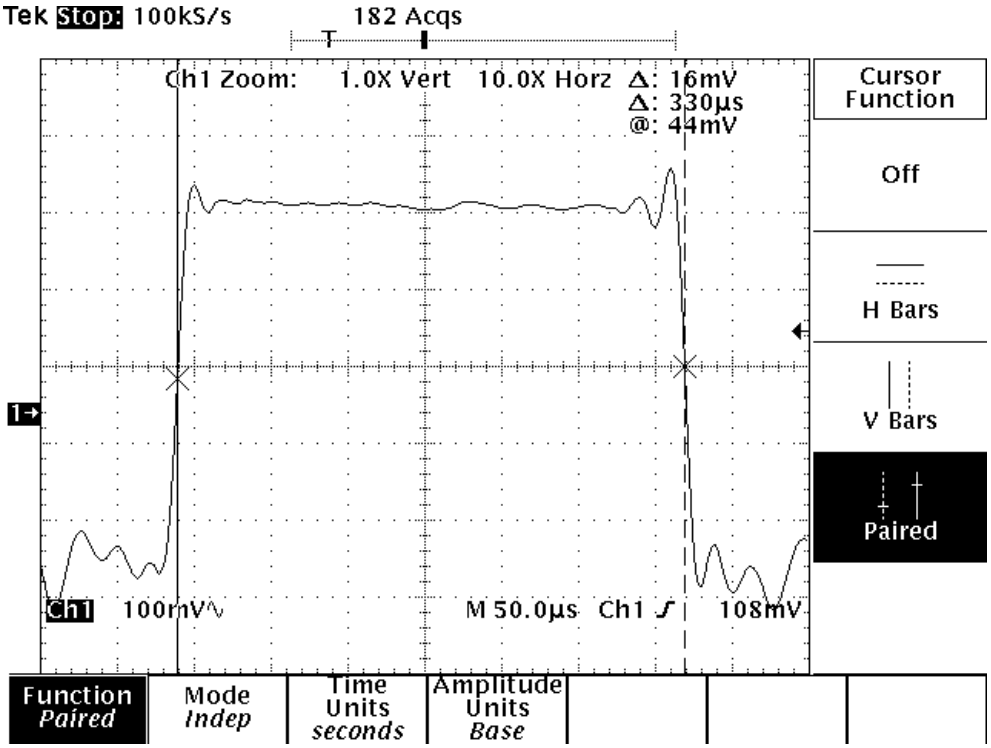

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 16mV
Δ: 110.5µs
@: 42mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

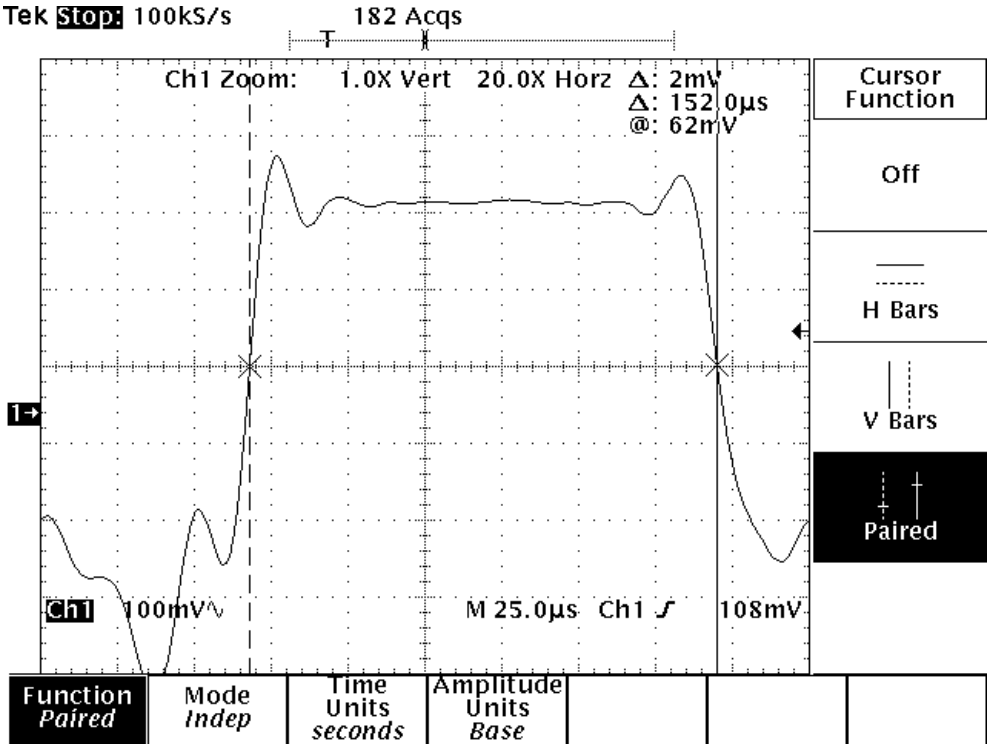

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 16mV
Δ: 151.0µs
@: 42mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

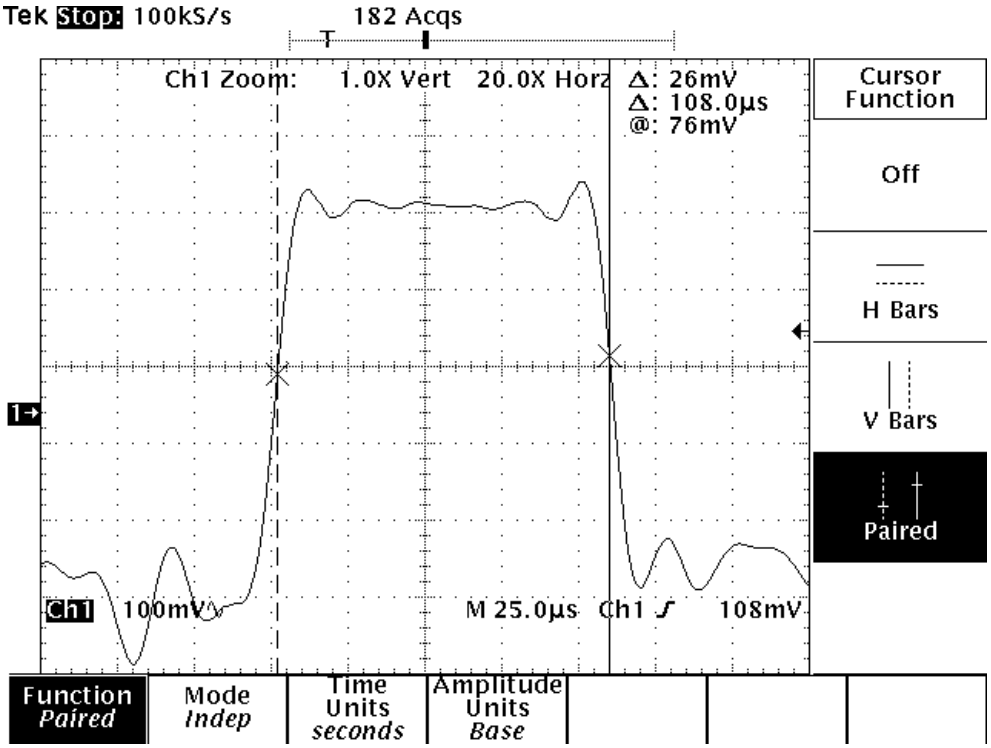

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 10.0X Horz Δ: 8mV
Δ: 366µs
@: 48mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 50.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

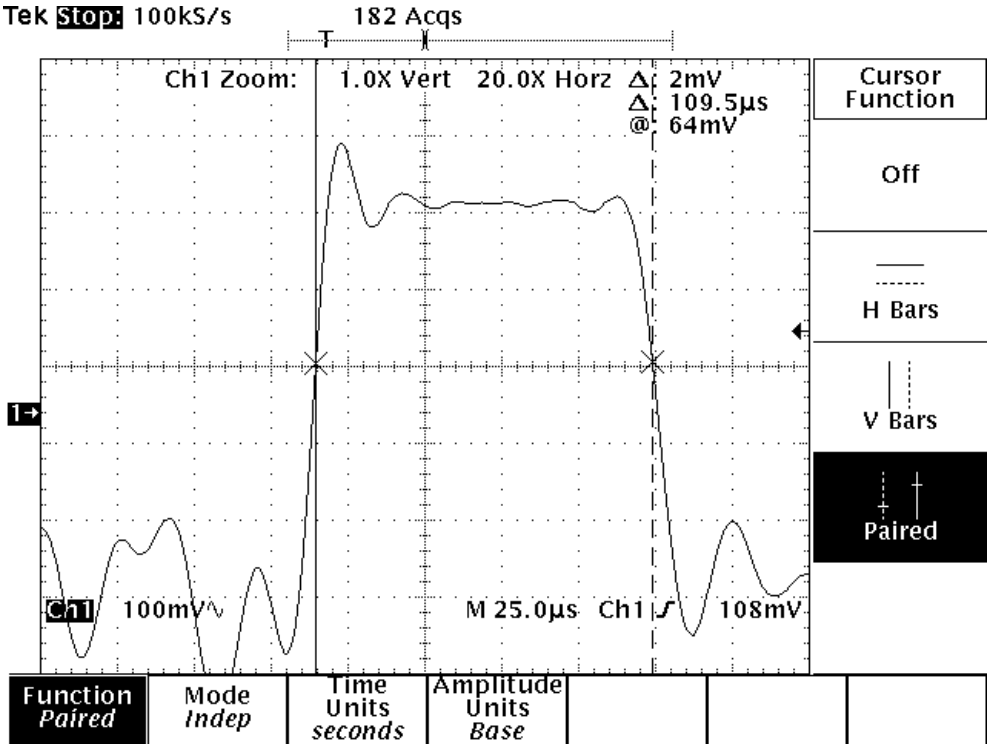

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 10.0X Horz Δ: 24mV
Δ: 369µs
@: 54mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 50.0µs Ch1 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

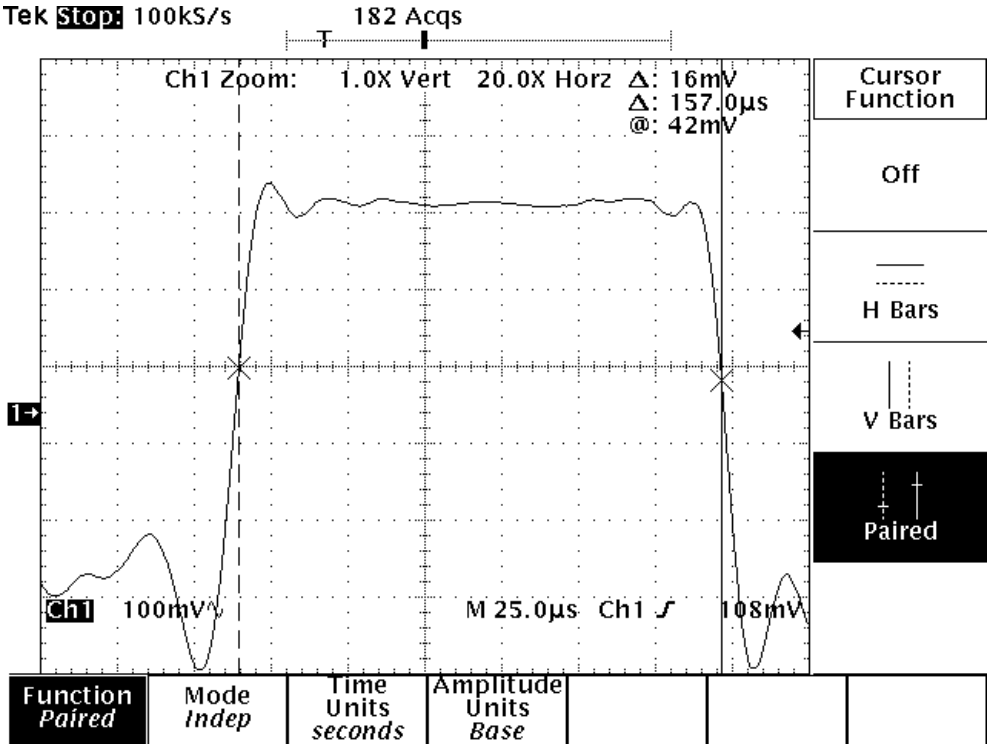

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 6mV
Δ: 108.0µs
@: 64mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

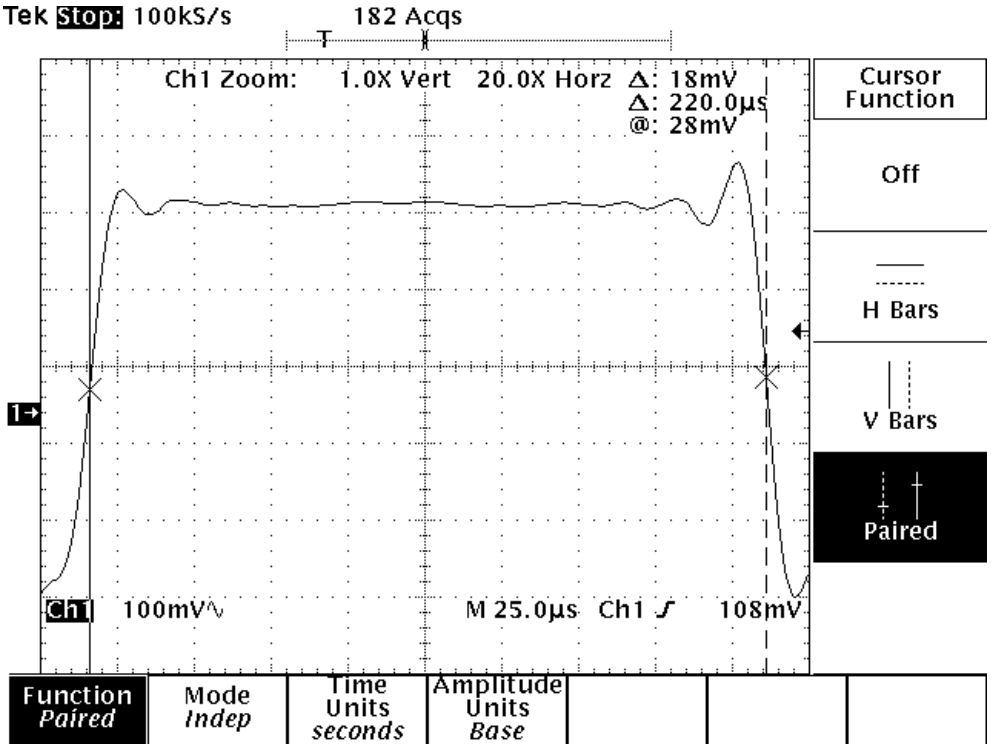

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 10.0X Horz Δ: 16mV
Δ: 330µs
@: 44mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 50.0µs Ch1 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

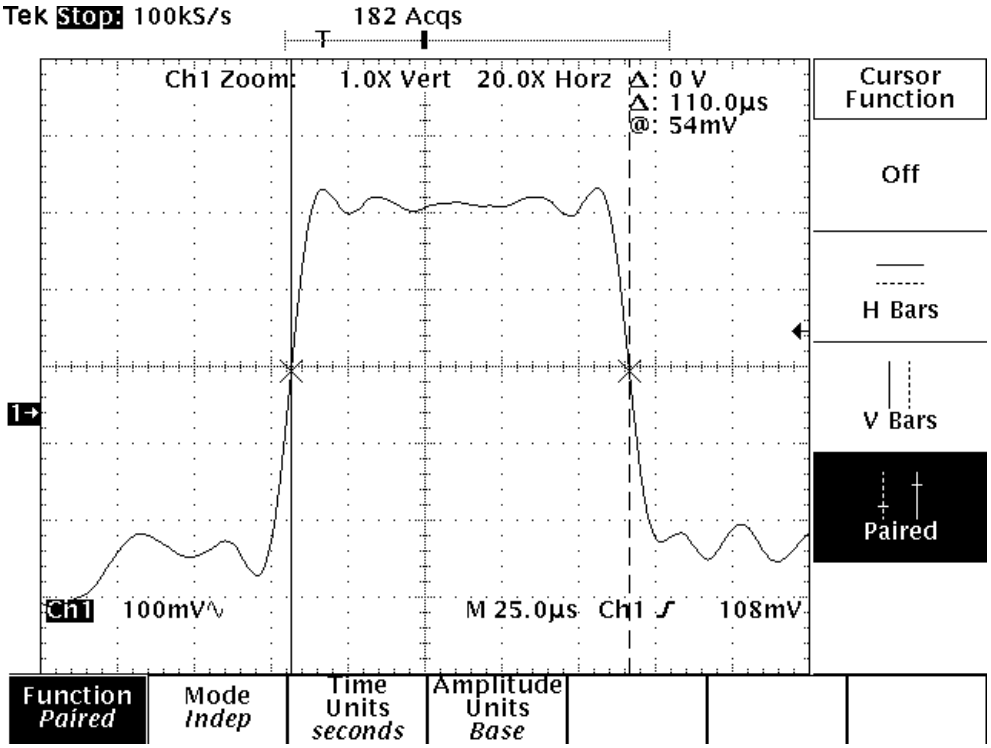

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 2mV
Δ: 152.0µs
@: 62mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

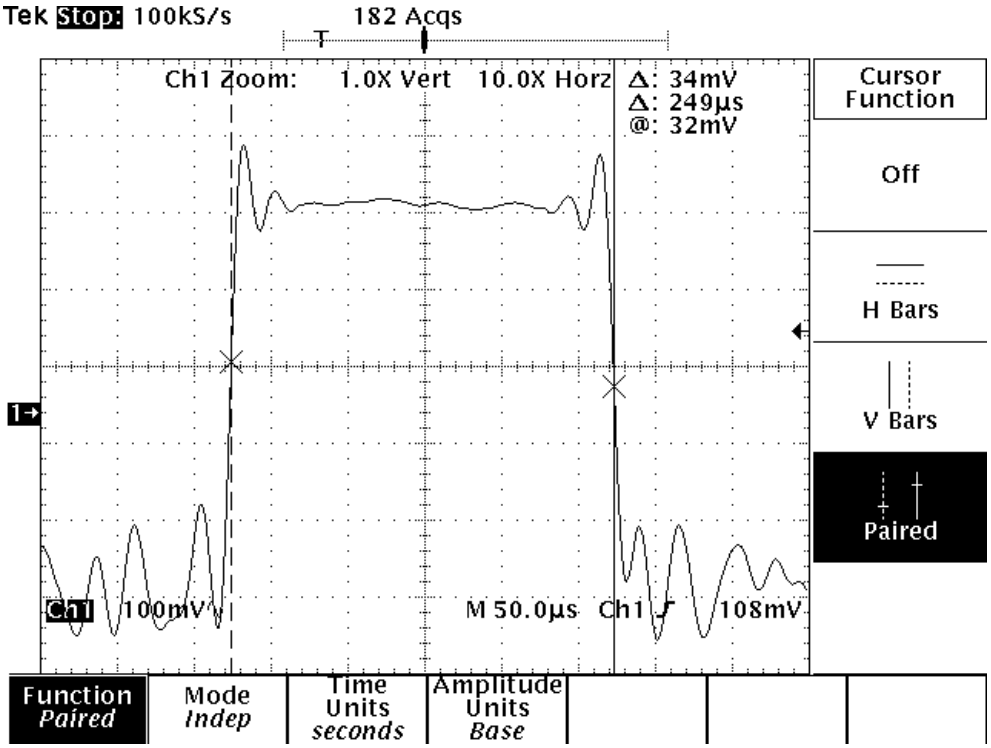

Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz
Δ: 26mV
Δ: 108.0µs
@: 76mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base


Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom:
1.0X Vert
20.0X Horz
Δ: 2mV
Δ: 109.5µs
@: 64mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base


Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 16mV
Δ: 157.0µs
@: 42mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base


Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz Δ: 18mV
Δ: 220.0µs
@: 28mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base


Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 20.0X Horz
Δ: 0 V
Δ: 110.0µs
@: 54mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 25.0µs Ch1 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base


Tek Stop: 100kS/s
182 Acqs
Ch1 Zoom: 1.0X Vert 10.0X Horz
Δ: 34mV
Δ: 249µs
@: 32mV
Cursor Function
Off
H Bars
V Bars
Paired
Ch1 100mV
M 50.0µs Ch1 ƒ 108mV
Function Paired
Mode Indep
Time Units seconds
Amplitude Units Base

Pulse Number	Length of pulse (uS)
1	818
2	101
3	104.5
4	808
5	224
6	110.5
7	151
8	366
9	369
10	108
11	330
12	152
13	108
14	109.5
15	157
16	220
17	110
18	249
Total on-time	4595.5 uS

4595.5 uS S / 10900 uS = 42.16 %