

**Proposed Bulk Cable Specification for IEEE 1394b**  
**Presented at March 1998 Meeting by Al Kelly and Bob Gannon**  
**Posted for review and vote at April 1998 Meeting in Newport Beach**  
**Please refer to separate graph for "rise and fall time"**  
**Max Bassler- Chairman**

Test methodology for 1394 bulk serial bus cable.  
Ref K.3 Signal pair characteristic impedance  
Equipment Tek 11802 differential TDR w/ SD24 sampling  
head

Adapters Tek SIU 800 Static Insulation Unit  
and 2-1' lengths of 50 ohm RG405 terminated  
with a 4 socket computer interface  
Sample 4.5 meter length of cable with one end  
stripped back .5"s

The calibration is checked to 50 ohms +/- 1 ohm. The TDR  
delta delay is adjusted to electrically match the end of the  
adapter. The differential mode characteristic impedance is checked  
by connecting one pair to M1 and M2 with shield foil to ground.  
The entire cable length is display on main trace M1-M2 to display  
any impedance variation in the pair. The window displays  
approximately the first 1.5 ns of the pair closest to the launching  
connector and after the connector mismatch. An average is taken  
using measurement mean and represented with a horizontal cursor set  
in Ro. This test is repeated for both signal pairs.

Signal pair characteristic impedance (common mode)  
Same as above with one pair connected to M1 and ground and the  
other pair connected to M2 and ground. Shields float. The entire  
cable length is display on main trace M1 & M2. The window displays  
first M1 then M2 with the measurement taken same as above.

Ref K.4 Signal pair attenuation  
Equipment Wiltron 610 Network analyzer  
Adapters 2 180 Degree differential pulse splitters  
4 Match pads  
and 4-6" lengths of 50 ohm RG405 terminated  
with a quick release dip socket  
Sample 4.5 meter length of cable with both ends  
stripped back .5"s

The calibration is done from 40 Mhz to 3200 Mhz to the  
end of the match pads. The through line is zeroed to the socket.  
The differential mode attenuation is checked by connecting one end  
of a pair to port 1 and the other end to port 2 with shield foil to  
the minus terminal. The pair is display using S21 in log magnitude  
at 5% smoothing with markers set at 100 Mhz, 200 Mhz, 400 Mhz, 800  
Mhz, 1600 Mhz, 3200 Mhz. This test is repeated for both signal  
pairs.

Ref K.5 Signal pair velocity of propagation (TDR)  
Equipment Tek 11802 differential TDR w/ SD24 sampling  
head

Adapters Tek SIU 800 Static Insulation Unit  
and 2-1' lengths of 50 ohm RG405 terminated  
with a 4 socket computer interface  
Sample 4.5 meter length of cable with one end  
stripped back .5"s

The calibration is checked to 50 ohms +/- 1 ohm. The TDR  
delta delay is adjusted to electrically match the end of the  
adapter. The differential mode propagation delay is checked by  
connecting one pair to M1 and M2 with shield foil to ground. The  
entire cable length is display on main trace M1-M2. The window  
displays the first the launching connector a cursor is set at the  
last rise of the connector mismatch and zeroed the window is then  
moved to the end of the pair and the cursor is set directly before  
the first rise. This test is repeated for both signal pairs.

Ref K.5 Signal pair velocity of propagation (Freq. sweep)  
Equipment Wiltron 610 Network analyzer

Adapters 2 180 Degree differential pulse splitters  
4 Match pads  
and 4-6" lengths of 50 ohm RG405 terminated  
with a quick release dip socket  
Sample 4.5 meter length of cable with both ends  
stripped back .5"s

The calibration is done from 40 Mhz to 3200 Mhz to the  
end of the match pads. The through line is zeroed to the socket.  
The differential mode propagation delay is checked by connecting  
one end of a pair to port 1 and the other end to port 2 with shield  
foil to the minus terminal. The pair is display using S21 in time  
bandpass mode with marker set at the end of the pair directly  
before the first rise. This test is repeated for both signal pairs  
at 100 Mhz, 200 Mhz, 400 Mhz, 800 Mhz, 1600 Mhz, 3200 Mhz.

Rise & Fall Time

Equipment Tek 11801 differential TDR w/ SD24 sampling head

HP 8133A Pulse generator

Adapters 2 each 2-6" lengths of 50 ohm RG402 terminated with DB9F connectors

Sample 4.5 meter length of cable with both ends stripped back .5"s

The calibration is checked to 50 ohms +/- 1 ohm. The TDR delta delay is adjusted to electrically match the end of the adapter. The pulse generator is set at 600 mv amplitude, 0.0 volts offset, 500 Mhz frequency, 31 ns pulse width, Square mode. The trigger output of the pulse generator is connected to the TDR. The eye is checked by connecting one end of the pair to output 2 of pulse generator and the other end of pair to M1 & M2 with shield foil grounded. The first square wave is displayed in color graduated mode on the main trace M1-M2. Set the vertical size to fill all ten gradicule. Set the vertical cursors to first the 20% and 80% rise points then the same fall points. The test is repeated for both pairs at 1000 Mhz, 2000 Mhz and 3000 Mhz.

Shield Isolation static (Insulation resistance)

Equipment Quad Tech 1865 IR Tester

Adapters 2 Standard Banana to clip hookup wires

Sample 4.5 meter length of cable with one end stripped back .5"s

The calibration is done to zero the meter. The insulation resistance is checked by three measurements wire to wire and individual wire to shield. The measurement is taken at 500 volts for 1 minute. This test is repeated for both signal pairs.  
END

1.0GHZ skew Shield grounded

# REFERENCE TO RISE & FALL TIME

11801B DIGITAL SAMPLING OSCILLOSCOPE  
date: 5-MAR-98 time: 10:42:40

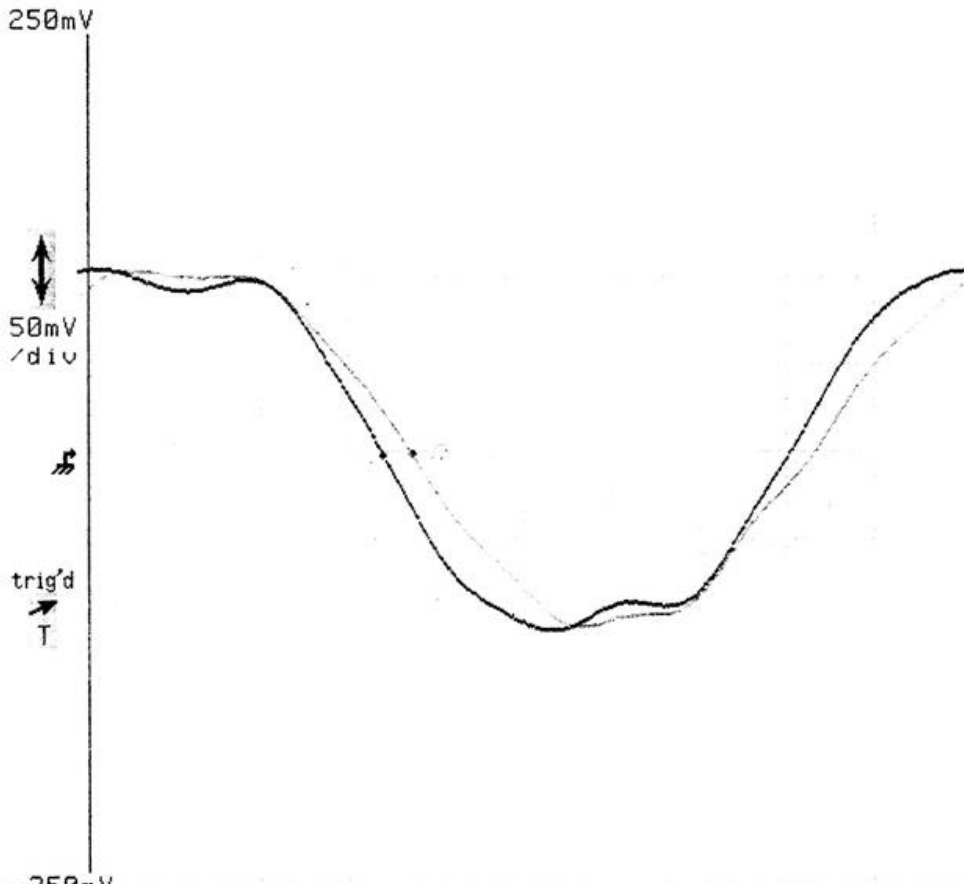
Tek



Cursors

Window FFTmag

Def Tra



24.61ns		100ps/div		25.61ns	
Cursor				Cursor 1	
Type	v1 -1.4766mV			24.95000ns	
Split	v2 -835.94μV			Cursor 2	
Dots	Δv 640.63μV			24.98400ns	
Exit	Set	t1 24.950ns	t1/2 12.475ns	Remove/Clr	
	Zero	t2 24.984ns	t2/2 12.492ns	Trace 1	
		Δt 34.001ps	Δt/2 17.001ps	Avg(M1)	
		1/Δt 29.411GHz		Main	