

CABLE TEST METHODS

Cable sample for all testing: 10'1", separate wires for 1/2" both ends, strip 1/4" of each wire for connection.

UNBALANCED

BALANCED

Characteristic Impedance

TDR

Tektronix TDR, Terminate end with pot, set pot for min reflection, disconnect and read resistance of pot.
Typical Configuration;
Parallel: GSG
Grnd Plane: GSG_g
Shielded: GSG with shield grounded.

Same as Unbalanced, except insert a balun at driven end.
Typical Configuration;
Parallel: SS
Grnd Plane: SS with shield floating
Shielded: SS with shield floating.

Calculated

.999 times Propagation Delay (in nano seconds per foot), divide by Capacitance (in pico farads per foot). With Capacitance and Propagation Delay measured in unbalanced mode.
Typical Configuration;
Parallel: GSG
Grnd Plane: GSG_g
Shielded: GSG with shield grounded.

Same as Unbalanced, with Capacitance and Propagation Delay measured in balanced mode.
Typical configuration;
Parallel: SS
Grnd Plane: SS with shield floating.
Shielded: SS with shield present but floating.

Propagation Delay

Network Analyzer, short far end of 10' cable, locate null (occurs at 1/2 wave length increments) divide into 1 = total transit time. Note: could evaluate multiple wavelengths to determine frequency response of dielectric.
Typical configuration;
Parallel: GSG
Grnd Plane: GSG_g
Shielded: GSG with shield grounded.

Same method as Unbalanced.
Typical configuration;
Parallel: SG
Grnd Plane: GS with shield floating.
Shielded: SG with shield floating.

Capacitance

HP digital LCR meter, 4 terminal, measured at 1 MHz.
Typical configuration:
Parallel: GSG
Grnd Plane: GSG_g
Shielded: GSG with shield grounded.

Same equipment and sample as unbalanced.

Typical configuration;
Parallel: SS
Grnd Plane: SS with shield floating.
Shielded: SS with shield floating.

Inductance

Measurement techniques are too inaccurate. Inductance values are calculated; Square-Characteristic Impedance, times Capacitance (in μF per ft.) = Inductance (in μH per ft.)

Typical Configuration;
Parallel: GSG
Grnd Plane: GSG_g
Shielded: GSG with shield grounded.

Calculated same as Unbalanced.

Typical Configuration:
Parallel: SS
Grnd Plane: SS with shield floating.
Shielded: SS with shield floating.

Pulse Crosstalk

Improved fixtures, new equipment. Pulse $T_r = 2.5$ nanoseconds, 5 V., 10-20 nsec width, Rep rate = 10 MHz,
Typical Configuration;
Parallel: GSGSG
Grnd Plane: GSGSG_g
Shielded: GSGSG with shield grounded.

balanced procedure/fixture to be developed.

Typical Configuration;
Parallel: SSSS
Grnd Plane: SSSS with shield grounded.
Shielded: SSSS with shield grounded.

Network Analyzer Crosstalk

1 MHz to 400 MHz

