

# **Understanding Samtec's Electrical Circuit Simulation Models of Cable Assemblies**

**April 11, 2007  
2:30pm EDT  
Duration: 1 hour**

# What Will Be Covered



- **Samtec Data Rate™ High Speed Cable Assembly Standard Product Offering**
- **Samtec Cable Assembly Model Packaging Methodology**
- **Samtec Cable Assembly Model Kit Contents**
- **Samtec Signal Integrity Support Roadmap concerning Cable Assembly Models**

- **How the Cable Assembly Models are Developed**
  - Reference Samtec Webinar “Cable Assembly Models for SPICE Simulation” (June 29, 2006)
  
- **How to Integrate the Cable Assembly Models into a Circuit Simulation**
  - Reference Samtec Webinar “How to Use Connector SPICE Models” (August 18, 2005)
  - Reference Samtec Webinar “Samtec Connector Models for Electrical Simulation” (November 21, 2003)

# Data Rate™ Cable Assemblies Coax / Twinax Cable

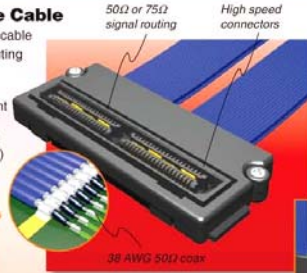


## Cable Assemblies Data Rate Cable Systems



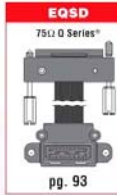
### Coax Data Rate Cable

- 38 AWG ribbon coax cable
- 50Ω & 75Ω signal routing
- 0.5mm, 0.635mm and 0.8mm pitch
- Vertical or edge mount termination to cable
- Ideal for longer cable assemblies (6" to 40")



50Ω or 75Ω signal routing  
High speed connectors

38 AWG 50Ω coax



pg. 93



pgs. 90-92

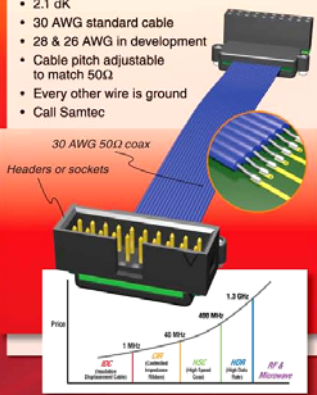


Screw downs available

Coax Data Rate Cable Assemblies Rated @ -3dB Insertion Loss				
SERIES	EQCD	HQCD	MICD	HBCD
PITCH	0.8 mm	0.5 mm	0.635 mm	0.5 mm
MATES	QTE/QSE	QTH/QSH	MIS/MIT	BTH/BSH
12" (304.8mm)	1.42 GHz / 2.82 Gbps	1.16 GHz / 2.32 Gbps	1.22 GHz / 2.44 Gbps	2.40 GHz / 4.80 Gbps
19.68" (0.5m)	900 MHz / 1.80 Gbps	740 MHz / 1.48 Gbps	760 MHz / 1.52 Gbps	1.36 GHz / 2.72 Gbps
39.37" (1m)	480 MHz / 0.96 Gbps	390 MHz / 0.78 Gbps	468 MHz / 0.91 Gbps	663 MHz / 1.13 Gbps

### Application Specific Controlled Impedance Ribbon

- Ideal for applications requiring high performance, but at a lower cost than Data Rate assemblies
- 2.1 dK
- 30 AWG standard cable
- 28 & 26 AWG in development
- Cable pitch adjustable to match 50Ω
- Every other wire is ground
- Call Samtec



30 AWG 50Ω coax  
Headers or sockets



### Board-to-Board Coax Data Rate Cable

- 38 AWG ribbon coax cable
- 50Ω signal routing
- Header or socket termination
- Vertical or edge mount
- .050" (1.27mm), 2mm (.079") and 100" (2.54mm) pitch
- .050" (1.27mm) pitch with high reliability Tiger Eye™ Contact
- 100" (2.54mm) pitch is JTAG (IEEE 1149.1) compatible
- High cable flexing life (> 40,000 cycles)
- Ideal for longer cable assemblies (6" to 40")



pgs. 94-95

38 AWG 50Ω coax

Coax Data Rate Cable Assemblies Rated @ -3dB Insertion Loss		
SERIES	FHSC	THSC
PITCH	1.27 mm	2 mm
MATES	SFM/TFM	SQW/TMMH
10" (254mm)	175 MHz / 0.35 Gbps	175 MHz / 0.35 Gbps
		400 MHz / 0.8 Gbps

Visit [www.samtec.com/cable\\_builder](http://www.samtec.com/cable_builder) for our interactive Cable Builder program!



### Twinax Data Rate Cable

- 30 AWG ribbon twinax cable
- 100Ω Differential Pair signal routing
- Choice of terminations: - Edge card
- High speed connectors on 0.5mm, 0.635mm and 0.8mm pitch
- Locking & Latching options
- Shielded and unshielded versions
- Optional screw downs
- Low skew (pair-to-pair < 10 ps/ft; within a pair < 5ps/ft)
- Superior EMI Performance (FCC Class A)
- Contact [dr@samtec.com](mailto:dr@samtec.com) for custom Signal Integrity specifications



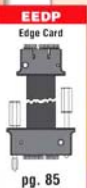
High speed connectors

30 AWG 100Ω twinax



Edge Card

Latching and screw systems available



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Twinax Data Rate Cable Assemblies Rated @ -3dB Insertion Loss				
SERIES	EQDP	HQDP	EEDP	6QDPS
PITCH	0.8 mm	0.5 mm	0.8 mm	0.635 mm
MATES	QTE-DP/QSE-DP	QTH-DP/QSH-DP	HSECB	QMSD-DP/QSS-DP
12" (304.8mm)	4.11 GHz / 8.22 Gbps	2.12 GHz / 4.24 Gbps	N/A	3.72 GHz / 7.44 Gbps
19.68" (0.5m)	3.58 GHz / 7.16 Gbps	1.64 GHz / 3.28 Gbps	2.85 GHz / 5.70 Gbps	1.38 GHz / 2.76 Gbps
39.37" (1m)	1.32 GHz / 2.64 Gbps	1.37 GHz / 2.74 Gbps	1.15 GHz / 2.30 Gbps	1.04 GHz / 2.08 Gbps



Shielded or unshielded

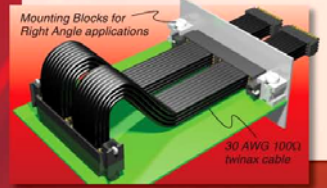
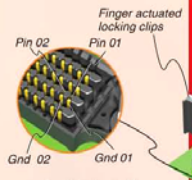
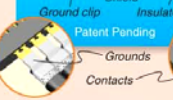
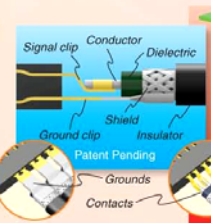


100Ω Q Series™

pgs. 88-89

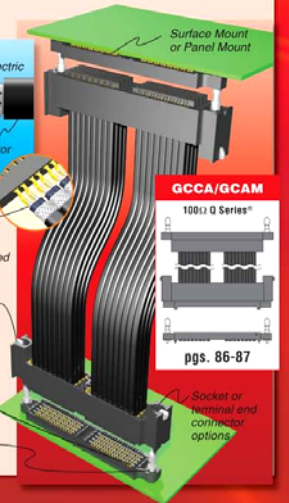
### High Density Cable Assemblies

- 30 AWG 100Ω twinax cable
- Optimizes Signal Integrity with no transition board between cable and contacts
- Surface Mount or Panel Mount orientations
- Socket or terminal end connector options
- 8 pairs per chicklet; 4 chicklets per bank
- Choice of 1 or 2 banks, for a total of 32 or 64 pairs
- Bank holders with Finger Actuated Locking Clips
- Combination Guide Pin/Locking Posts (solders to PCB)
- Mating Surface Mount Terminal (GCAM Series)
- Mounting Blocks for Right Angle applications also available



Mounting Blocks for Right Angle applications

30 AWG 100Ω twinax cable

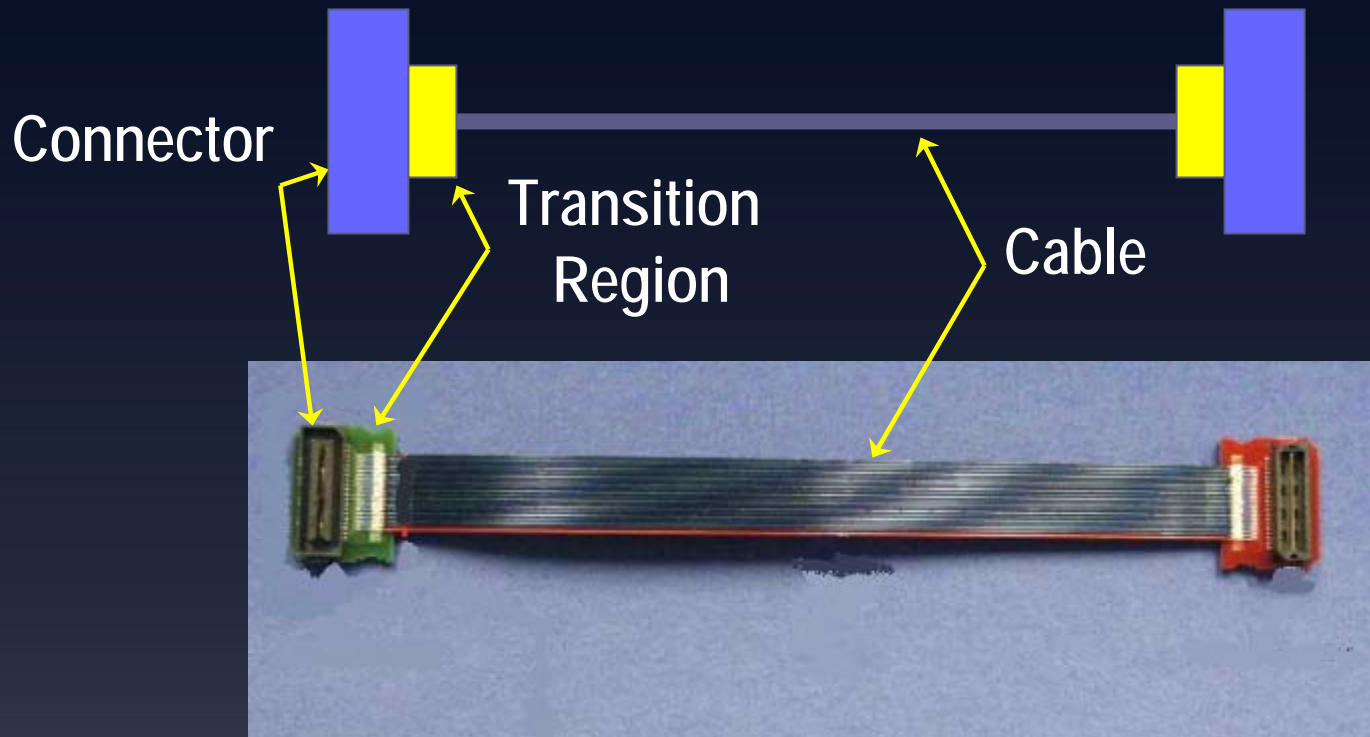


100Ω Q Series™

pgs. 86-87

Socket or terminal end connector options

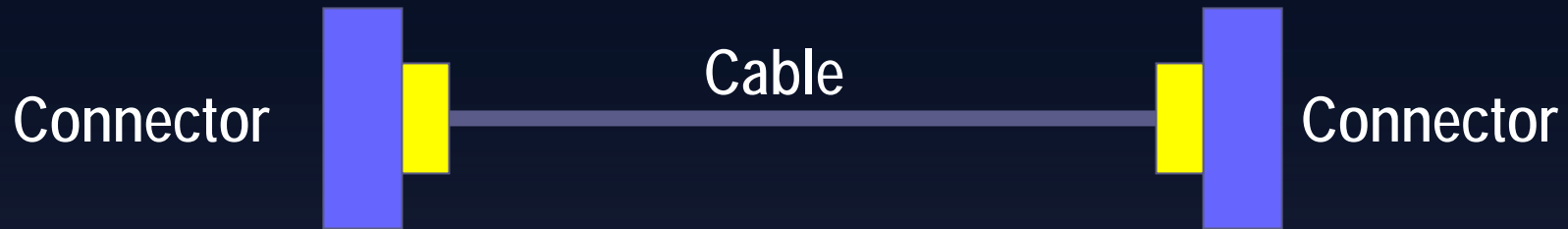
# Data Rate™ Cable Assemblies Functional Breakdown



- The cable assembly does not always have a transition board; however, it will always have a transition area from the cable to the connector.

# Data Rate™ Cable Assemblies

## Standard High Speed Product Offering



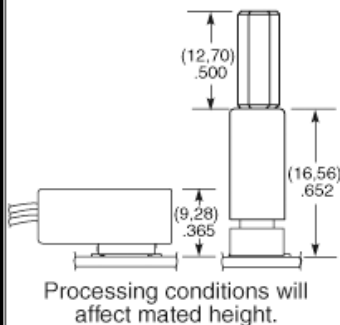
Cable Assembly	Mating Connector Series	Connector Pitch	Cable
HBCD	BTH, BSH	.5mm	38 AWG Coax, 50Ω
HQCD	QTH, QSH	.5mm	38 AWG Coax, 50Ω
6QCD	QMS, QFS	.635mm	38 AWG Coax, 50Ω
MICD	MIT, MIS	.635mm	38 AWG Coax, 50Ω
SQCD	QTS, QSS	.635mm	38 AWG Coax, 50Ω
EQCD	QTE, QSE	.8mm	38 AWG Coax, 50Ω
FHSC	TFM, SFM	1.27mm	38 AWG Coax, 50Ω
THSC	Various Headers & Sockets	2mm	38 AWG Coax, 50Ω
HHSC	Various Headers & Sockets	2.54mm	38 AWG Coax, 50Ω
HQDP	QTH-DP, QSH-DP	.5mm	30 AWG Twinax, 100Ω
6QDP	QMS-DP, QFS-DP	.635mm	30 AWG Twinax, 100Ω
6QDPS	QMSS-DP, QFSS-DP	.635mm	30 AWG Twinax, 100Ω
EEDP	HSEC8, MEC8	.8mm	30 AWG Twinax, 100Ω
EQDP	QTE-DP, QSE-DP	.8mm	30 AWG Twinax, 100Ω

# Data Rate™ Cable Assemblies

## Part Numbering Scheme



### APPLICATIONS



END TO END	L
Surface Mount to Surface Mount	(24,13) .950
Surface Mount to Edge Mount (Terminal)	(21,21) .835
Surface Mount to Edge Mount (Socket)	(20,47) .806
Edge Mount (Terminal) to Edge Mount (Terminal)	(18,29) .720
Edge Mount (Terminal) to Edge Mount (Socket)	(17,55) .691
Edge Mount (Socket) to Edge Mount (Socket)	(16,81) .662

**Note:**  
Verify part number with Samtec's Interactive Cable Builder at [www.samtec.com/cable\\_builder/pitch.asp](http://www.samtec.com/cable_builder/pitch.asp)

**Note:**  
This Series is non-standard, non-returnable.

### TYPE

**HQCD**  
= (0,50mm)  
.0197" pitch

**EQCD**  
= (0,80mm)  
.0315" pitch

### NO. POSITIONS PER ROW

**-030, -060, -090, -120**  
(HQCD Series)

**-020, -040, -060, -080**  
(EQCD Series)

### WIRE LENGTH

**"XX.XX"**  
= Wire Length in Inches  
(152mm) 06.00" to (1m) 40.00" Max.

### END NO. 1

**Specify END ASSEMBLIES from chart**

### END NO. 2

### WIRING OPTION

**-1**  
= Pin 1 to Pin 1

**-2**  
= Pin 1 to Pin 2

**-3**  
= Pin 1 to Second Last Pin

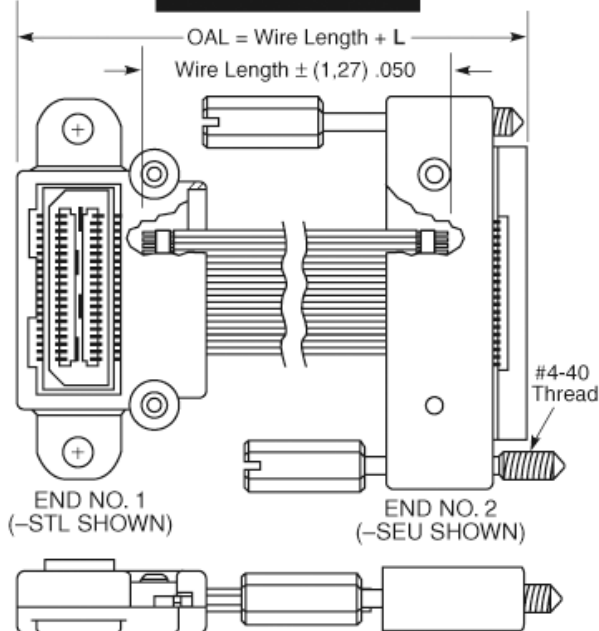
**-4**  
= Pin 1 to Last Pin

### SCREW OPTION

**-F**  
= End No. 1

**-S**  
= End No. 2

**-B**  
= Both Ends



END	SURFACE MOUNT
TTR	Terminal, Top, Notch Right
TTL	Terminal, Top, Notch Left
TBR	Terminal, Bottom, Notch Right
TBL	Terminal, Bottom, Notch Left
STR	Socket, Top, Notch Right
STL	Socket, Top, Notch Left
SBR	Socket, Bottom, Notch Right
SBL	Socket, Bottom, Notch Left

END	EDGE MOUNT
TEU	Terminal, Edge, Notch Up
TED	Terminal, Edge, Notch Down
SEU	Socket, Edge, Notch Up
SED	Socket, Edge, Notch Down

# Data Rate™ Cable Assemblies

## End Option / Wiring Option Compatibility



- Reference = <http://www.samtec.com/ftppub/cpdf/EQCD-XXX-XX.XX-XXX-XXX-X-X-MKT.pdf>

REVISION H

FIRST END OPTION	FIRST END SUB-EQCD - X-XXX-XX-01	WIRING OPTION	FIRST END PIN #	SECOND END PIN #	WIRE #	SECOND END OPTION (SUB-EQCD-X-XXX-XX-XX)															
						-TTR	-TTL	-TBR	-TBL	-STR	-STL	-SBR	-SBL	-TEU	-TED	-SEU	-SED				
-TTR	-T-XXX-01-01	1	1	1	B20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
		2	1	2	B20	-T-XXX-02-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		3	1	N-1	B20	N/A	-T-XXX-01-01	-T-XXX-02-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		4	1	N	B20	N/A	-T-XXX-01-02	-T-XXX-02-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

REVISION H

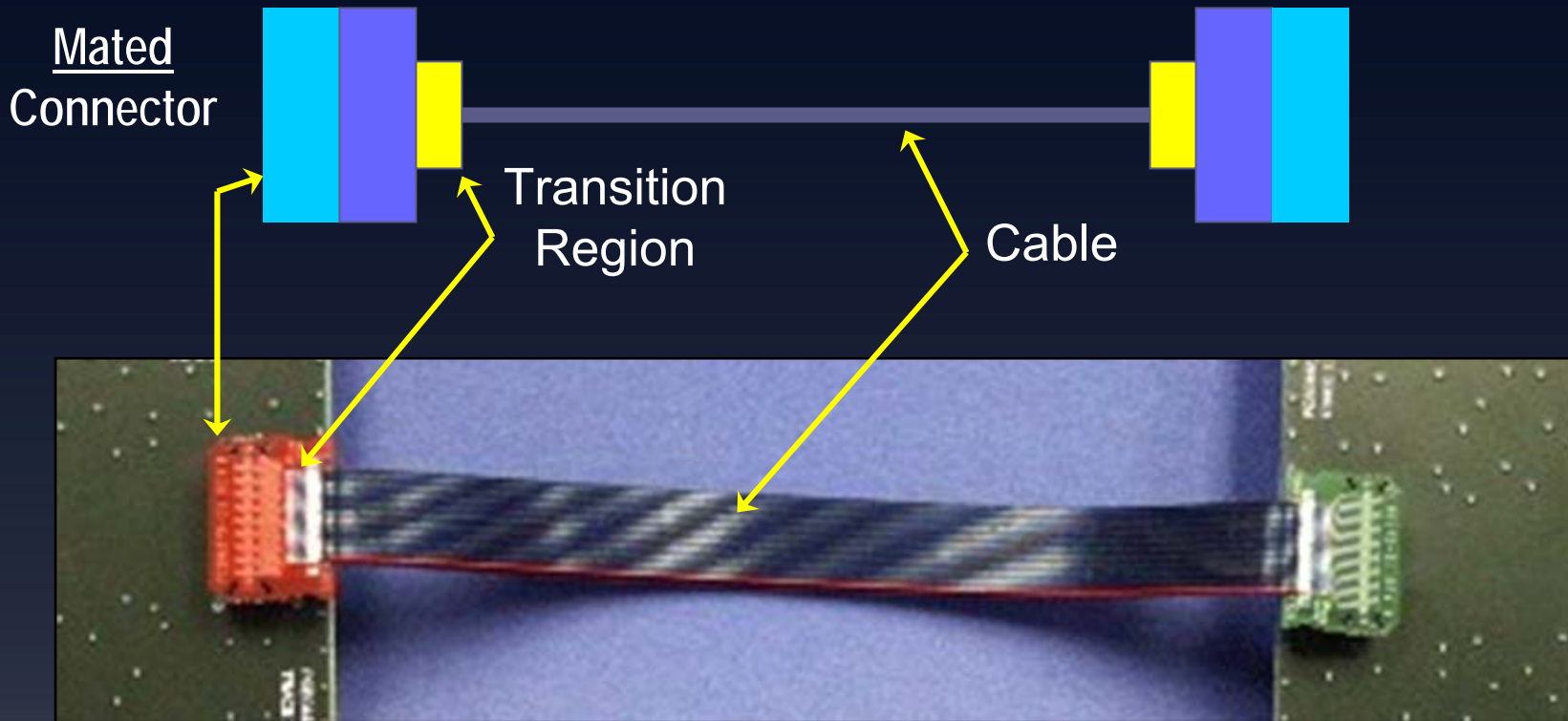
FIGURE 1: WIRE #

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*Example:*  
EQCD Series has 384 unique part numbers!!

FIRST END OPTION	FIRST END SUB-EQCD - X-XXX-XX-01	WIRING OPTION	FIRST END PIN #	SECOND END PIN #	WIRE #	SECOND END OPTION (SUB-EQCD-X-XXX-XX-XX)															
						-TTR	-TTL	-TBR	-TBL	-STR	-STL	-SBR	-SBL	-TEU	-TED	-SEU	-SED				
-TTR	-T-XXX-01-01	1	1	1	B20	-T-XXX-02-02	N/A	N/A	N/A	-T-XXX-01-01	N/A	-S-XXX-01-01	-S-XXX-02-01	N/A	N/A	-T-XXX-03-02	-S-XXX-03-01	N/A			
		2	1	2	B20	-T-XXX-02-02	N/A	N/A	-T-XXX-01-01	N/A	-S-XXX-01-02	-S-XXX-02-02	N/A	N/A	-T-XXX-03-01	-S-XXX-03-02	N/A	N/A			
		3	1	N-1	B20	N/A	-T-XXX-01-01	-T-XXX-02-01	N/A	N/A	-S-XXX-02-02	N/A	N/A	-S-XXX-01-02	-T-XXX-03-01	N/A	N/A	-S-XXX-03-02			
		4	1	N	B20	N/A	-T-XXX-01-02	-T-XXX-02-02	N/A	N/A	-S-XXX-02-01	N/A	N/A	-S-XXX-01-01	-T-XXX-03-02	N/A	N/A	-S-XXX-03-01			

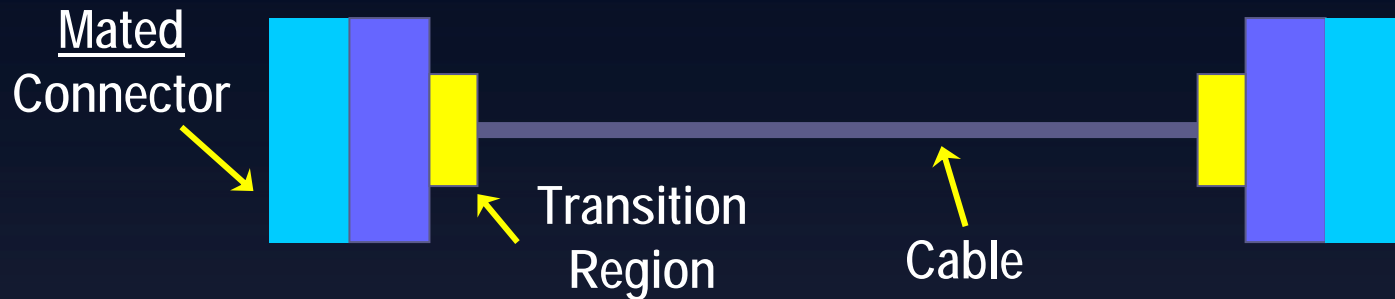
# Cable Assembly Model Packaging Functional Breakdown



- Our models represent the cable assembly mated to the PCB connectors.

# Cable Assembly Model

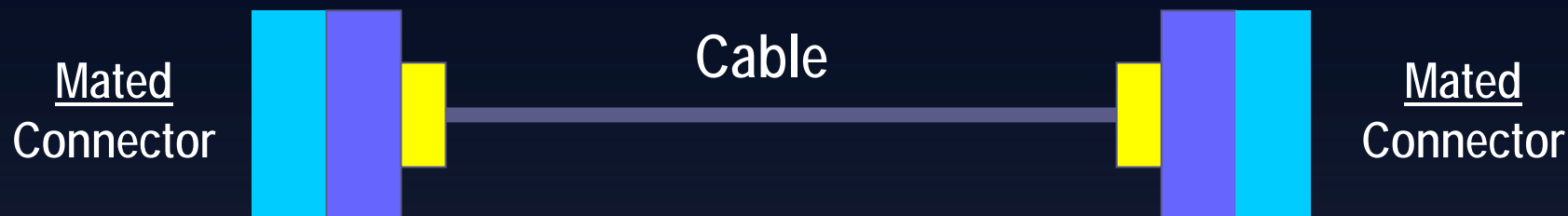
## Packaging Functional Breakdown



- **Mated Connector**
  - Multi Coupled Line Connector Model
  - Model employs vertical mount style connector on the PCB
  - Cable assembly connector may be vertical (-DV) or edge mount (-EM)
  - Model uses mated connector with shortest board-to-board stack available within the product series
- **Connector-to-Cable Transition**
  - Multi Coupled Line Structure
- **Cable**
  - Lossy-Line (RLGC)
  - Length Variable

# Cable Assembly Model Kits

## Standard High Speed Product Offering



Cable Assembly	Mating Connector Series	Connector Pitch	Cable
HBCD	BTH, BSH	.5mm	38 AWG Coax, 50Ω
HQCD	QTH, QSH	.5mm	38 AWG Coax, 50Ω
6QCD	QMS, QFS	.635mm	38 AWG Coax, 50Ω
MICD	MIT, MIS	.635mm	38 AWG Coax, 50Ω
SQCD	QTS, QSS	.635mm	38 AWG Coax, 50Ω
EQCD	QTE, QSE	.8mm	38 AWG Coax, 50Ω
FHSC	TFM, SFM	1.27mm	38 AWG Coax, 50Ω
THSC	Various Headers & Sockets	2mm	38 AWG Coax, 50Ω
HHSC	Various Headers & Sockets	2.54mm	38 AWG Coax, 50Ω
HQDP	QTH-DP, QSH-DP	.5mm	30 AWG Twinax, 100Ω
6QDP	QMS-DP, QFS-DP	.635mm	30 AWG Twinax, 100Ω
6QDPS	QMSS-DP, QFSS-DP	.635mm	30 AWG Twinax, 100Ω
EEDP	HSEC8, MEC8	.8mm	30 AWG Twinax, 100Ω
EQDP	QTE-DP, QSE-DP	.8mm	30 AWG Twinax, 100Ω

= Available Now     
  = Available Q2 2007     
  = Not yet scheduled

# Cable Assembly Model Kits Standard High Speed Product Offering



## How to Obtain Models

- [www.samtec.com?series](http://www.samtec.com?series)
  - ◆ Example: [www.samtec.com?EQCD](http://www.samtec.com?EQCD)
- Click on "Electrical Models"

## If customer needs assistance in finding a cable assembly model

- [SIG@samtec.com](mailto:SIG@samtec.com)

The screenshot shows the Samtec website interface. At the top, there is a navigation bar with links for Contact Us, About Us, Jobs, Help, Call Back, and Home. A tiger mascot is visible on the left. The main content area is titled "SIGNAL INTEGRITY - Technical Specifications - EQCD". A search bar is present on the left. A grid of buttons allows navigation to various sections: Overview, Prints & Footprints, Catalog Pages, 3D Models, Build A Data Rate Cable Assembly, Cable Performance Calculator, Literature, Product Specifications, Testing Standards, High Speed Test Reports, Mechanical Test Reports, Electrical Models, and Application Notes. A red arrow points from the "Electrical Models" button to the "EQCD Series Overview" section. This section includes a description of "Micro High Speed Cable Interfaces - Terminal/Socket", a centerline dimension of 0.8mm (0.0315in), and a list of compatible series: QTE, QSE, QTE-DP, QTE-EM, QTE-DP-EM, QSE-DP, QSE-EM, and QSE-DP-EM. It also features a "Personal Design Center" section with a tiger mascot icon and a "Notes" section with a link to "Mated Cable Heights".

**PRODUCTS**

- MICRO AND BOARD-TO-BOARD
- HIGH SPEED AND RF
- RUGGED
- I/O INTERFACES
- CABLE/WIRE/FLEX
- CUSTOM PRODUCTS

**SERVICES**

- PRODUCT INFORMATION
- APPLICATION INFORMATION
- SIGNAL INTEGRITY SERVICES
- SUDDEN SERVICE
- SERVICE CENTER
- CONNECTOR WIZARD

**EQCD Series Overview**

**Description:**  
Micro High Speed Cable Interfaces - Terminal/Socket

**Centerline:** 0.8mm (0.0315in)

**Mates With:** QTE, QSE, QTE-DP, QTE-EM, QTE-DP-EM, QSE-DP, QSE-EM, QSE-DP-EM.

**Personal Design Center:**  
Use the Project Management Tool in our Personal Design Center to create a project for this product, modify this product or receive pricing and delivery information for this product.

**Notes:**  
Mated Cable Heights  
[http://www.samtec.com/cable\\_assemblies/cable\\_mated\\_heights.pdf](http://www.samtec.com/cable_assemblies/cable_mated_heights.pdf)

Click on the icon to contact our Signal Integrity Group.

**SIGNAL INTEGRITY GROUP**

# Cable Assembly Model Kits Standard High Speed Product Offering



## How to Obtain Models

- Select Model Format
  - ◆ Currently, only HSPICE® available
  - ◆ Working on supporting other formats
- No license agreement required

The screenshot shows the Samtec website interface. At the top, there is a navigation bar with links for Contact Us, About Us, Jobs, Help, Call Back, and Home. Below this is a search bar and a grid of product categories. The 'Electrical Models' category is highlighted, and the 'EQCD Series 1000 mm Cable Length Electrical Models' section is visible. The 'HSPICE' option is selected, and a red arrow points from this option to the 'HSPICE' text in the main content area.

**Signal Integrity- Series Technical Specifications - EQCD**

Overview	Prints & Footprints	Catalog Pages	3D Models	Build A Data Rate Cable Assembly
Cable Performance Calculator	Literature	Product Specifications	Testing Standards	High Speed Test Reports
Mechanical Test Reports	<b>Electrical Models</b>	Application Notes		

**EQCD Series 1000 mm Cable Length Electrical Models**

**HSPICE**  
Multi Line Zip File      EQCD/QXE MultiLine HSpice Model

If you do not find the Samtec product series that you need in the list above, please contact our [Signal Integrity Group](#) to request a new model. Someone from our Signal Integrity Group will be in touch with you to discuss the details.

**Attention Hyperlynx Users** – Samtec can provide single-line and multi-line models for use with ELDO. If your version of HyperLynx does not include ELDO, we may still be able to help you. Please contact the [Signal Integrity Group](#), or use our on-line [electrical models request form](#).

**Attention Cadence SigXplorer Users** -- Cadence has developed an Application Note entitled "Modeling Connectors in ESPICE Format for Use in SigXplorer". The purpose of this Application Note is to describe how you can use single line and multi line SPICE models to model connectors for circuit analysis in SigXplorer. The document can be found on the Cadence website at [http://www.cadence.com/community/allegro/pcb\\_si/tr.aspx?type=Modeling](http://www.cadence.com/community/allegro/pcb_si/tr.aspx?type=Modeling). Samtec's connector models are already available in the Cadence ESPICE format (DML file extension).

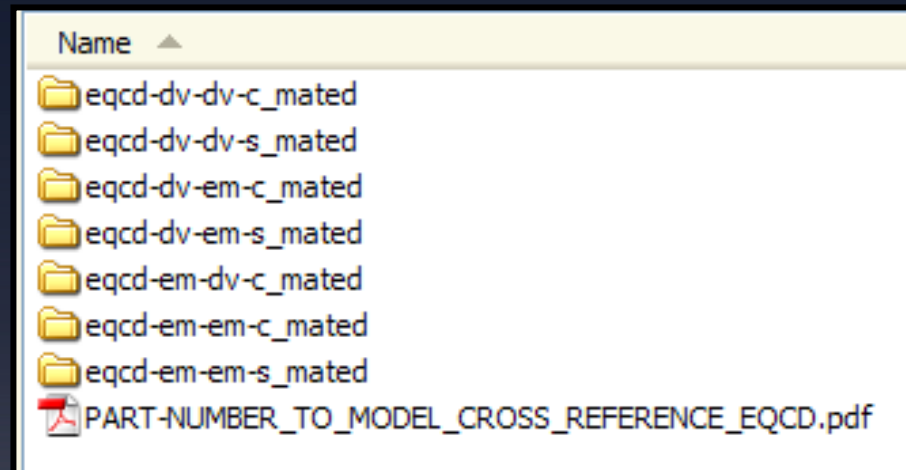
# Cable Assembly Model Kits

## Standard High Speed Product Offering



### ▪ What is Inside the Kit

- Example: HSPICE\_EQCD.zip
- Subfolders for separate configurations
- PDF file contains part number to model cross reference information





# Cable Assembly Model Kits Part Numbering Scheme



**APPLICATIONS**

**TYPE**

**HQCD**  
= (0,50mm)  
.0197" pitch

**EQCD**  
= (0,80mm)  
.0315" pitch

**NO. POSITIONS PER ROW**

**-030, -060, -090, -120**  
(HQCD Series)

**-020, -040, -060, -080**  
(EQCD Series)

**WIRE LENGTH**

**-"XX.XX"**  
= Wire Length in Inches (152mm) 06.00" to (1m) 40.00" Max.

**END NO. 1**

**END NO. 2**

**Specify END ASSEMBLIES from chart**

**WIRING OPTION**

**-1**  
= Pin 1 to Pin 1

**-2**  
= Pin 1 to Pin 2

**-3**  
= Pin 1 to Second Last Pin

**-4**  
= Pin 1 to Last Pin

**SCREW OPTION**

**-F**  
= End No. 1

**-S**  
= End No. 2

**-B**  
= Both Ends

END TO END	L
Surface Mount to Surface Mount	(24,13) .950
Surface Mount to Edge Mount (Terminal)	(21,21) .835
Surface Mount to Edge Mount (Socket)	(20,47) .806
Edge Mount (Terminal) to Edge Mount (Terminal)	(18,29) .720
Edge Mount (Terminal) to Edge Mount (Socket)	(17,55) .691
Edge Mount (Socket) to Edge Mount (Socket)	(16,81) .662

END	SURFACE MOUNT
TTR	Terminal, Top, Notch Right
TTL	Terminal, Top, Notch Left
TBR	Terminal, Bottom, Notch Right
TBL	Terminal, Bottom, Notch Left
STR	Socket, Top, Notch Right
STL	Socket, Top, Notch Left
SBR	Socket, Bottom, Notch Right
SBL	Socket, Bottom, Notch Left

END	EDGE MOUNT
TEU	Terminal, Edge, Notch Up
TED	Terminal, Edge, Notch Down
SEU	Socket, Edge, Notch Up
SED	Socket, Edge, Notch Down

**Note:**  
Verify part number with Samtec's Interactive Cable Builder at [www.samtec.com/cable\\_builder/pitch.asp](http://www.samtec.com/cable_builder/pitch.asp)

**Note:**  
This Series is non-standard, non-returnable.

The end option defines whether a surface mount (vertical -DV) or an edge mount (-EM) type connector is required in the cable assembly.

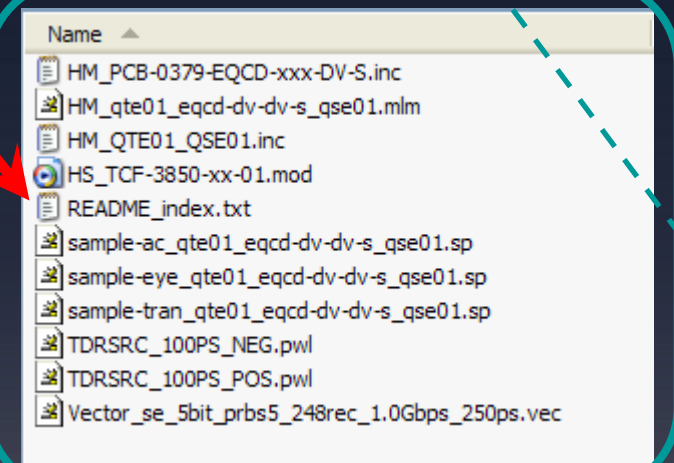
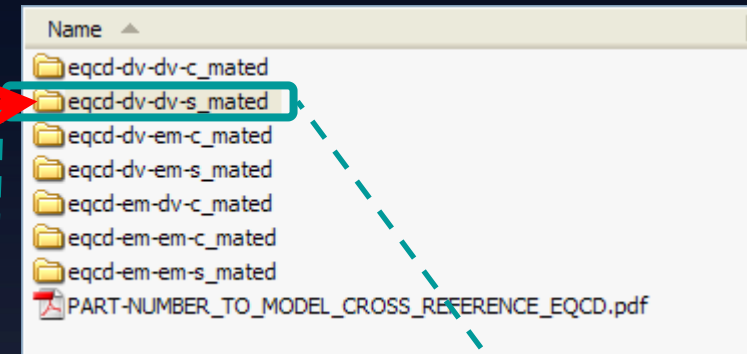
Once end options are defined, wiring option defines use of standard (-S) or crossover (-C) transition in cable assembly.

# Cable Assembly Model Kits

## Overview of Kit Contents

### What is Inside the Kit

- Example: eqcd-dv-dv-s\_mated
- Important to review the README\_index.txt file first!



# Cable Assembly Model Kits

## Overview of Kit Contents



- README\_index.txt

```
README_index.txt
*****
SAMPLE CIRCUITS                                DESCRIPTION
-----
sample-ac_qte01_eqcd-dv-dv-s_qse01.sp         Sample circuit file which performs an AC analysis and outputs
a 4 port Touchstone file; can be used to analyze parameters like
insertion loss, return loss, crosstalk in the frequency domain

sample-eye_qte01_eqcd-dv-dv-s_qse01.sp        Sample circuit file which performs a multi-aggressor eye pattern
analysis using a SPICE vector file of a PRBS bit stream.

sample-tran_qte01_eqcd-dv-dv-s_qse01.sp       Sample circuit file which performs a TRANSIENT analysis;
can be used to analyze impedance, prop delay, crosstalk
in the time domain

MATED CABLE ASSEMBLY MODEL                     DESCRIPTION
-----
HM_qte01_eqcd-dv-dv-s_qse01.mln              Multi-line model of mated cable assembly.

!!! NOTE: USER CAN DEFINE LENGTH OF CABLE ASSEMBLY. DEFAULT ASSY LENGTH IS 39.37 INCHES (1 METER), BUT CAN BE CHANGED
TO DEFINE LENGTH, OPEN THE FILE IN TEXT EDITOR AND FIND THE FOLLOWING AT THE TOP:

* Specify length of cable assembly in inches
.param assy_length_inch = 39.37

SUPPORTING MODEL FILES                         DESCRIPTION
-----
HM_QTE01_QSE01.inc                            Model of mated QTE/QSE 5mm connector
HM_PCB-0379-EQCD-xxx-DU-S.inc                 Model of Connector-to-Cable transition board
HS_TCF-3850-xx-01.mod                         Model of 38 AWG ribbonized coax cable

STIMULUS FILES                                 DESCRIPTION
-----
TDRSRC_100PS_NEG.pw1                          Piece-wise linear file of TDR pulse (0 to -0.25V; Trise=100ps 10%-90%)
TDRSRC_100PS_POS.pw1                          Piece-wise linear file of TDR pulse (0 to 0.25V; Trise=100ps 10%-90%)
Vector_se_5bit_prbs5_248rec_1.0Gbps_250ps.vec  Digital vector file - PRBS, 1.0 Gbps, Trise=250ps
```



# Cable Assembly Model Kits

## Overview of Kit Contents



### ▪ **Sample Circuits**

- HSPICE® “decks” setup for AC, Transient, and Eye Diagram Analyses
- Presumes user has experience using HSPICE®
- For assistance in integrating model into your circuit:
  - ◆ Contact Samtec Signal Integrity Group – [SIG@samtec.com](mailto:SIG@samtec.com)
  - ◆ Review Samtec Webinar “How To Use Connector SPICE Models” (August 18, 2005)
    - <http://www.connectorwizard.com/communication/webinar/recording.aspx?id=15>

### ▪ **Supporting Model Files**

- Should not be modified in any way

# Cable Assembly Model Kits Support Roadmap



- **“Fill the holes” within Samtec Data Rate™ Cable Assembly High Speed Product Offering**
- **Support Translation to Other Simulation Programs**
  - ELDO (HyperLynx GHz)
  - DML ESPICE (Cadence Allegro SigXplorer)
  - ADS (Agilent)
  - PSpice Library (OrCAD Capture)
- **High Speed Flex Assemblies**

## ▪ Samtec Web Tools

- Data Rate™ Cable Assembly Product Overview
  - ◆ [http://www.samtec.com/high\\_speed\\_connectors/2006/SI\\_C2B.asp?m=CWF#DR](http://www.samtec.com/high_speed_connectors/2006/SI_C2B.asp?m=CWF#DR)
- Build a Cable Assembly
  - ◆ Unique interactive program creates valid Samtec part numbers for cable assemblies based on desired specifications and options
  - ◆ Currently available for Data Rate™, RF, and combination Data Rate™ and RF Cable Assemblies
  - ◆ High Speed I/O Cable Assemblies are in the works
  - ◆ [http://www.samtec.com/cable\\_builder/Cable\\_choice.aspx](http://www.samtec.com/cable_builder/Cable_choice.aspx)
- Cable Performance Calculator
  - ◆ <http://www.samtec.com/hsc/calculator/index.asp>

- **Samtec Technical Papers**

- EQCD High Data Rate Cable Assembly Spice Model Validation Report
  - ♦ [http://connectorwizard.com/reference/articles/pdfs/validation-report-SPICE\\_eqcd-dv-dv\\_web.pdf](http://connectorwizard.com/reference/articles/pdfs/validation-report-SPICE_eqcd-dv-dv_web.pdf)

## ▪ Samtec Webinars

- “Cable Assembly Models for SPICE Simulation” (June 29, 2006)
  - ♦ [http://connectorwizard.com/reference/articles/pdfs/Cable\\_Assy\\_Webinar\\_Customer\\_rev2.pdf](http://connectorwizard.com/reference/articles/pdfs/Cable_Assy_Webinar_Customer_rev2.pdf)
- “How To Use Connector SPICE Models” (August 18, 2005)
  - ♦ <http://connectorwizard.com/reference/articles/pdfs/ConnectorSpiceModels081105Customers.pdf>

## ▪ Samtec Webinars

- “Designing High Speed Cable Assemblies” (March 16, 2005)
  - ♦ <http://connectorwizard.com/reference/articles/pdfs/Designing%20With%20High%20Speed%20High%20Density%20Cable%20Assemblies%200305.pdf>
- “Samtec Connector Models for Electrical Simulation” (November 21, 2003)
  - ♦ [http://connectorwizard.com/reference/articles/pdfs/conn\\_models\\_elect\\_sim\\_CKimble.pdf](http://connectorwizard.com/reference/articles/pdfs/conn_models_elect_sim_CKimble.pdf)

# Thank You and Questions



- For additional questions regarding the information contained in today's presentation, please contact our Signal Integrity Group at [sig@samtec.com](mailto:sig@samtec.com)
- For a copy of today's presentation, please contact us at: [ewebinar@samtec.com](mailto:ewebinar@samtec.com)