0.8mm Free Height (FH) Connector with a preface on general mezzanine connector applications
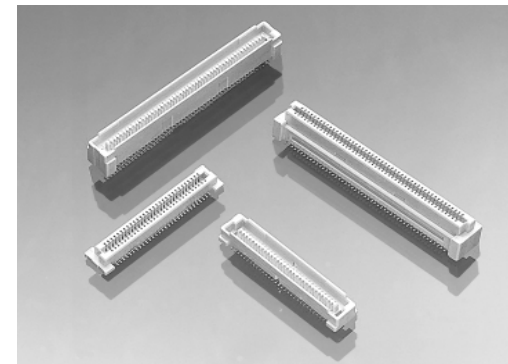
≡E Tyco Electronics

Mezzanine Connector Overview

- Broad product offering
    - Large range of stack heights
    - Large range of contact densities
    - Impedance controlled high speed products

- Products available to meet various application cost/performance needs

- Product Portfolio expanding
    - Lower cost impedance controlled connectors
    - BGA Array style connectors

- Certified Alternative Sources
    - Fully tested for intermateability/interchangeability

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Mezzanine Connector
Typical Applications

Interconnects for small function cards or personality modules which contain chip sets (ASIC's, CPUs, memory modules), function modules, or transceivers.
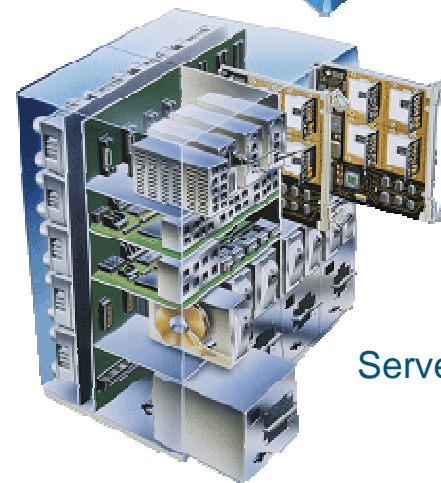
• Servers

• Switches

• Notebooks

• Consumer Electronics

• Base Stations

-Virtually every printed circuit board has a mezzanine connector
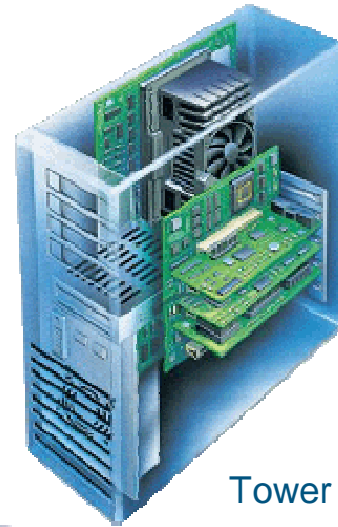
Notebook

Tower Server

Server

Stackable Switch

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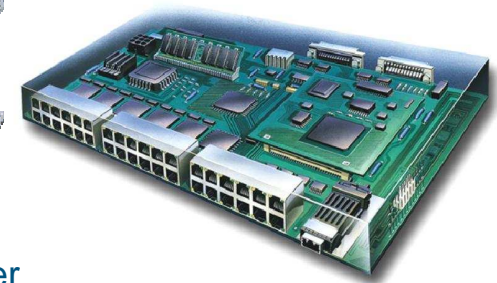
Mezzanine Connector Applications
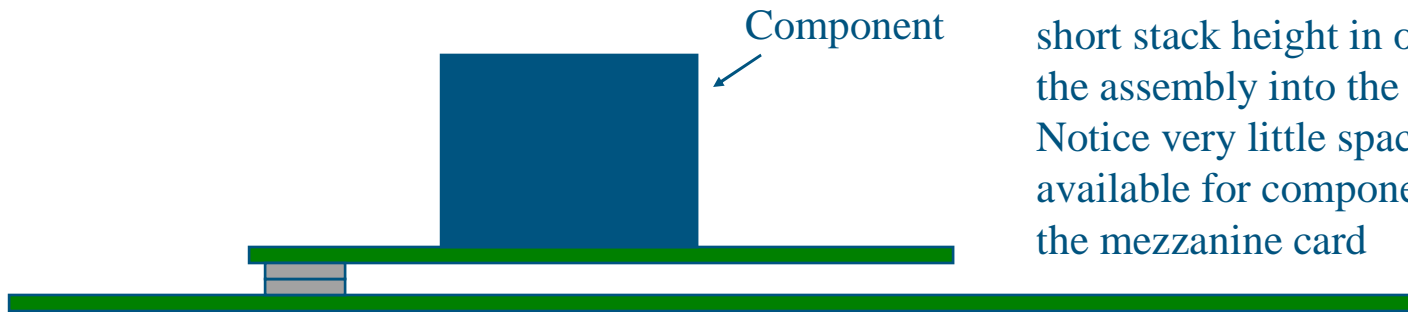
Application
- To increase the functionality of a single card

Application
- To reduce motherboard complexity and cost. Hard to route ASIC's would be separated from the more commercial motherboard.

Mezzanine Connector –
Stack Height Considerations

Component

Tall components on the mezzanine card often require a short stack height in order to fit the assembly into the final box. Notice very little space is available for components under the mezzanine card
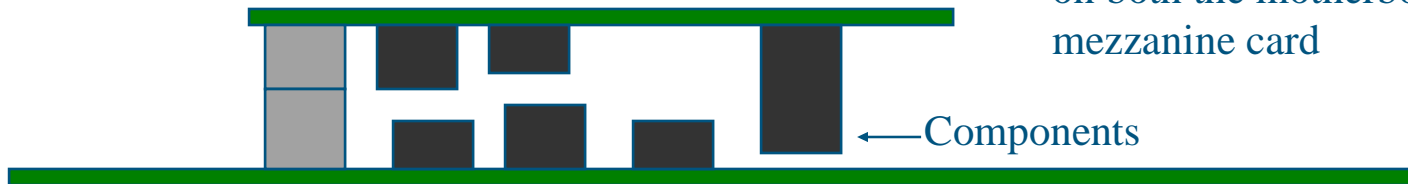
The mezzanine stack height must provide clearance for components on both the motherboard and the mezzanine card

Components

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Mezzanine Connector-Application
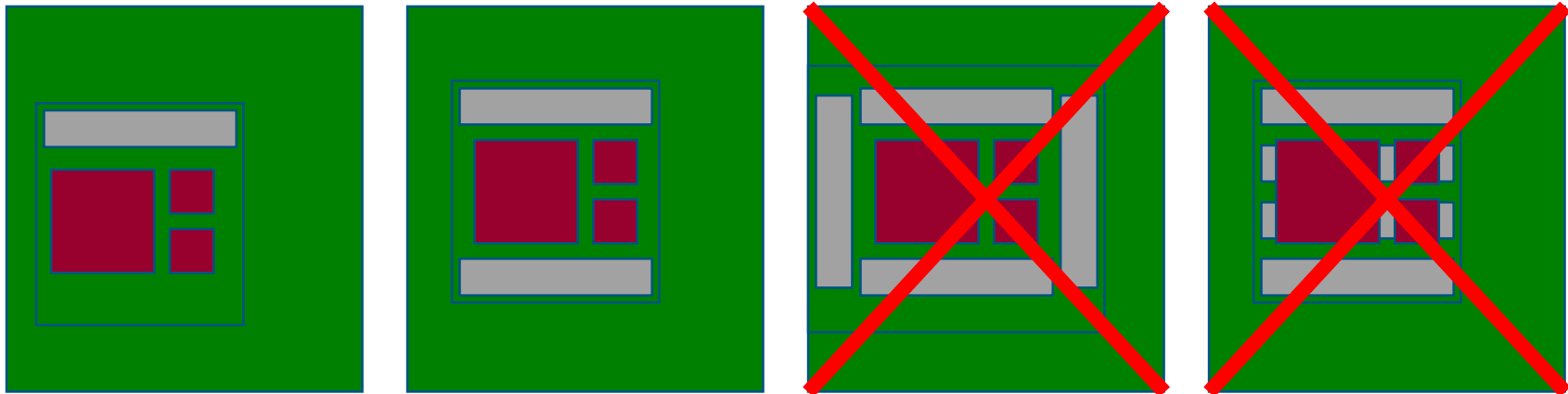
Tolerance considerations are critical to a successful application.

Note: Mating multiple surface mount mezzanine connectors simultaneously is very difficult due to necessarily small tolerances. Careful consideration needs to given if more than one connector set is to be mated.

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Mezzanine Connector- Application

- Physical space constraints

- Thermal requirements

- System customization such as I/O

- System upgrade capability

- Reduction in entry level system cost

- System test points by means of a cable

Mezzanine Connectors

Questions to consider before making a product selection

1. What range of stack heights will work in the application (min and max)?

2. How much space is available (length and width) for the connector?

3. How many differential pairs are required?

4. What is the minimum rise time of the differential pairs?

5. How many single-ended lines are required? Are any of them high-speed?

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Mezzanine Connectors

Questions to consider before making a product selection-cont'd

6. How many of the single-ended lines are high-speed (<500ps risetime)?

7. Do you need to bring power onto the daughtercard?
   - How many voltages?
   - How many amps for each voltage?

8. What printed circuit board attachment do you prefer?
   - Surface mount, thru-hole solder, press-fit

9. Do you have a contact pitch that you prefer or will any that meet the above suffice?

10. When will product be required?

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Mezzanine Connector-
Market Observations

- Significant growth is expected in applications which require high density and high speed products

- SMT processing with pick & place components is increasingly a cost effective application approach

- The mezzanine market is
  - fragmented with limited standardization
  - limited footprint compatible/intermateable high speed product designs

- A large range of stack heights is required to meet customer needs

- Packaging options important

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# Mezzanine Connector-
Tyco Electronics' Product Portfolio Offers:

- Flexibility
  - Broad offering for various application needs
  - Price/Performance options
  - Packaging options
  - Dual sources for intermateable/interchangeable products

- Performance
  - Offering covers data rates to 15 Gbps

- Experience
  - Providing high speed mezzanine connectors since the early 1990's

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A Partial Selection of the Tyco Electronics Mezzanine Portfolio
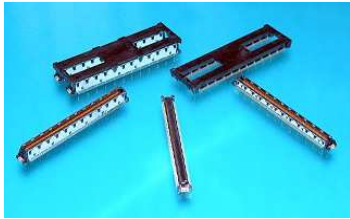
.5mm FH Connector
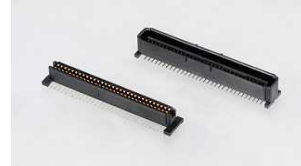
1mm FH (IEEE1386) Connector

STRADA Mesa Connector

Fine Mate Connector

.8mm FH Connector
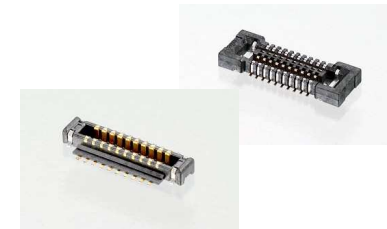
Fine Stack Connector

MICTOR Connector
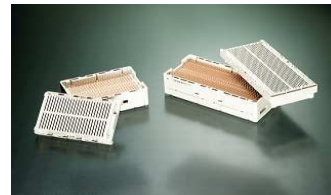
STEP-Z Connector

MICTOR SB Connector

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0.8mm Free Height (FH)
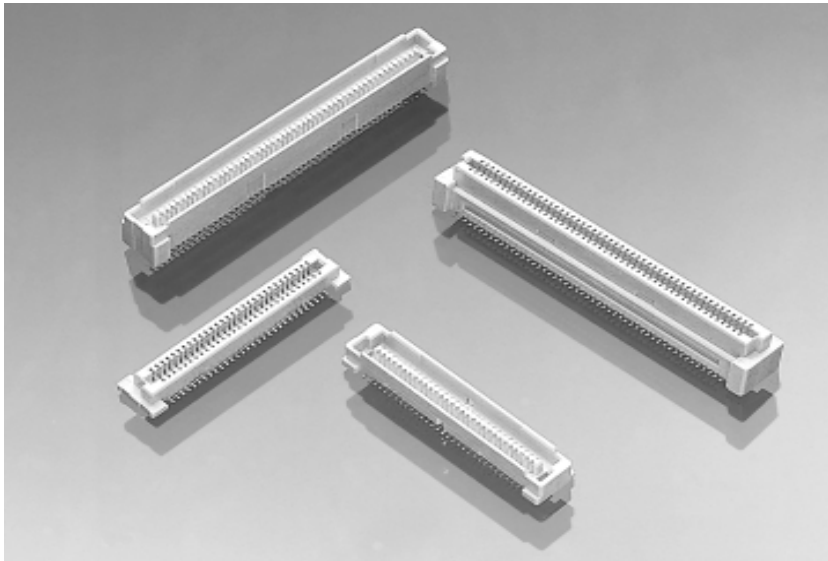
- Our highest volume stacking connector family, with over 5,000 customers.

- Availability
  - 5mm through 20mm stack height
  - 40 through 200 positions
  - 30 Au options have recently been released across the line
  - Packaging in tubes or tape and reel, with or without vacuum pickup caps

0.8mm Free Height Connector Cross-Section

Receptacle Contacts
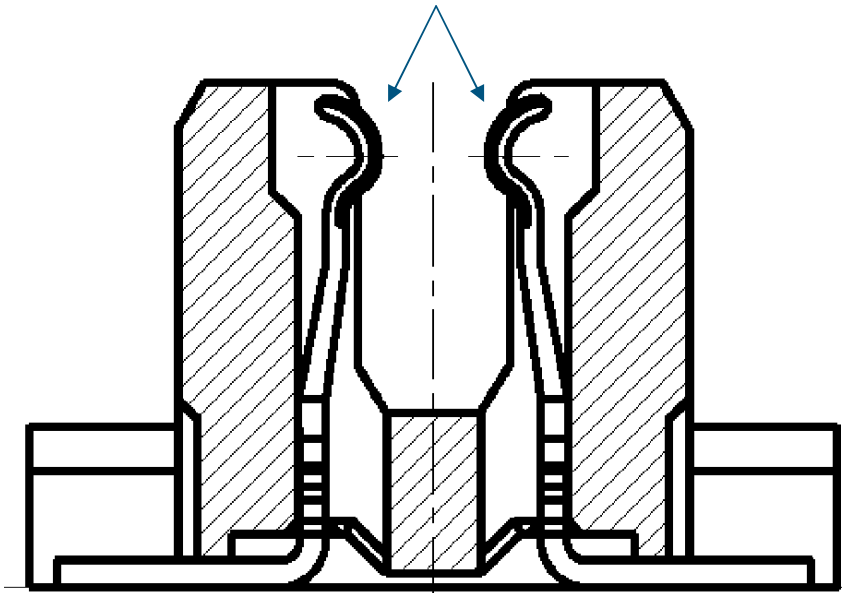
Plug Contacts

Receptacle Cross-Section
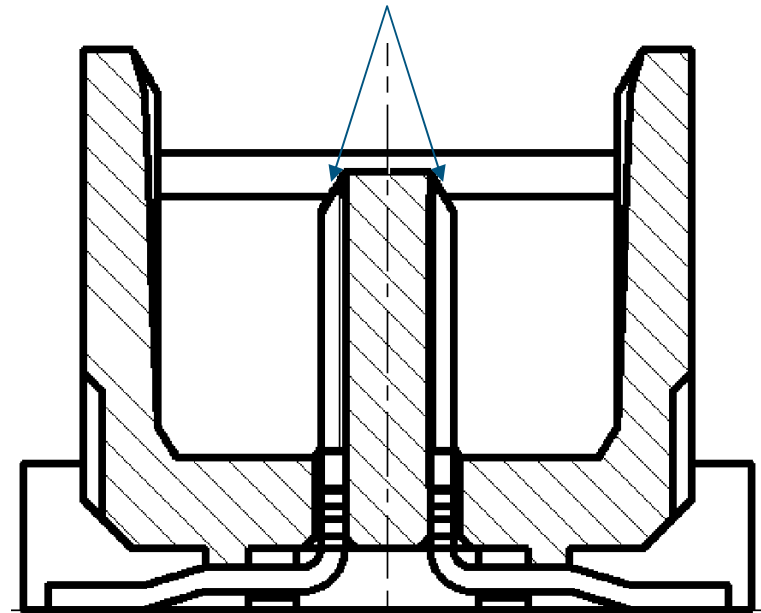
Plug Cross-Section

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0.8mm FH Stack Heights

- How to achieve a final mated stack height using 0.8mm FH

    – Four heights are available for both the Plug and Receptacles, which when mated achieve 16 different stack heights. The term "Height" is a product attribute without a physical dimension, and is often referred to as simply "H".

    – Use the formula below to calculate a mated stack height:
        – [(Rcpt H + Plug H) – 5] = Mated Stack Height in mm's
        – For example: [(13H Rcpt + 6H Plug) – 5] =
                        [(13 + 6) – 5] = 14mm Mated Stack Height

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0.8mm FH Connector Stack Heights

	5H Plug	**6H Plug**	**7H Plug**	**8H Plug**

5H Rcpt

P/N 5177984- / Plug / Receptacle / 5.0 / P/N 5177983-

P/N 5179029- / Plug / Receptacle / 6.0 / P/N 5177983-

P/N 5179030- / Plug / Receptacle / 7.0 / P/N 5177983-

P/N 5179031- / Plug / Receptacle / 8.0 / P/N 5177983-

9H Rcpt

P/N 5177984- / Plug / Receptacle / 9.0 / P/N 5-5179009-

P/N 5179029- / Plug / Receptacle / 10.0 / P/N 5-5179009-

P/N 5179030- / Plug / Receptacle / 11.0 / P/N 5-5179009-

P/N 5179031- / Plug / Receptacle / 12.0 / P/N 5-5179009-

Representative Drawing Numbers shown

[(Rcpt H + Plug H) − 5] = Mated Stack Height in mm's

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0.8mm FH Connector Stack Heights cont'd

5H Plug   6H Plug   7H Plug   8H Plug

P/N 5177984-   P/N 5179029-   P/N 5179030-   P/N 5179031-

13H Rcpt

Plug / Receptacle   Plug / Receptacle   Plug / Receptacle   Plug / Receptacle

13.0   14.0   15.0   15.0

P/N 5-5179010-   P/N 5-5179010-   P/N 5-5179010-   P/N 5-5179010-

P/N 5177984-   P/N 5179029-   P/N 5179030-   P/N 5179031-

17H Rcpt

Plug / Receptacle   Plug / Receptacle   Plug / Receptacle   Plug / Receptacle

17.0   18.0   19.0   20.0

P/N 1735480-   P/N 1735480-   P/N 1735480-   P/N 1735480-

Representative Drawing Numbers shown   [(Rcpt H + Plug H) – 5] = Mated Stack Height in mm's
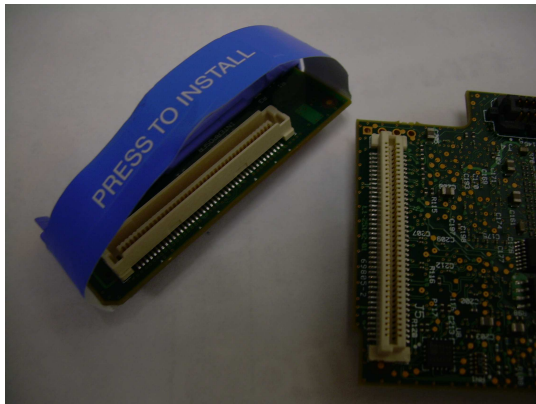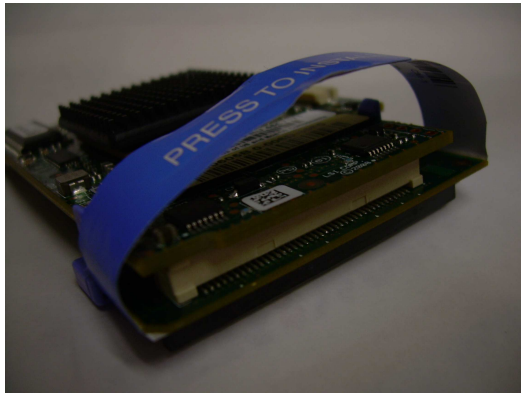
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Photo of All Stack Heights Tooled for 0.8mm FH Connector

0.8mm Free Height Connector
Typical Application Photos

- Photos courtesy of TEC customers

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# Electrical Performance Goes Beyond the Connector

- Signal Integrity support
  - Knowledge and expertise at many levels
    - Connector, Footprint, System
  - Modeling
  - Simulation
  - Testing
- Working with silicon developers

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Circuit and Design (SI) Overview

- Modeling
  - Connectors
  - Cables
  - Printed circuit boards
  - Systems

- Testing (2 labs)
  - Passive
  - Active
  - EMI

- Standards Support
- Models for customers
- Test boards for customers
- Customer design support

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Modeling Tools

- Component Modeling
  - **ANSOFT 2D** Field solver – (time domain) modeling–
    Connectors/Footprints
  - ANSOFT Q3D Field solver – (time domain) modeling –
    Connectors/Footprints
  - ADS/MOMENTUM – (frequency domain) modeling –
  - **HFSS – (frequency domain)** modeling –
    Connectors/Footprints
  - CST MICROWAVE STUDIO modeling –
    Connectors/Footprints
  - Transmission Lines
- System Modeling
  - **ADS** – (frequency domain) modeling
  - MATLAB – (frequency domain) modeling
  - HSPICE – (time domain) modeling
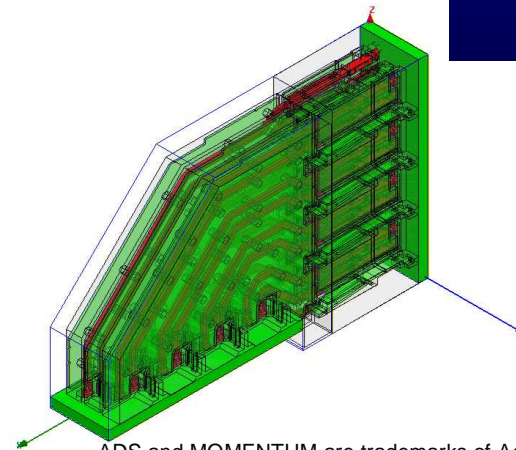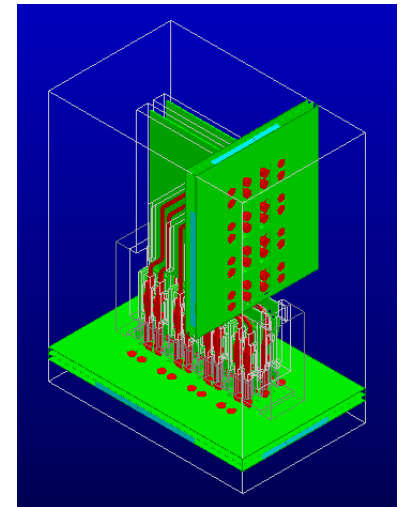
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