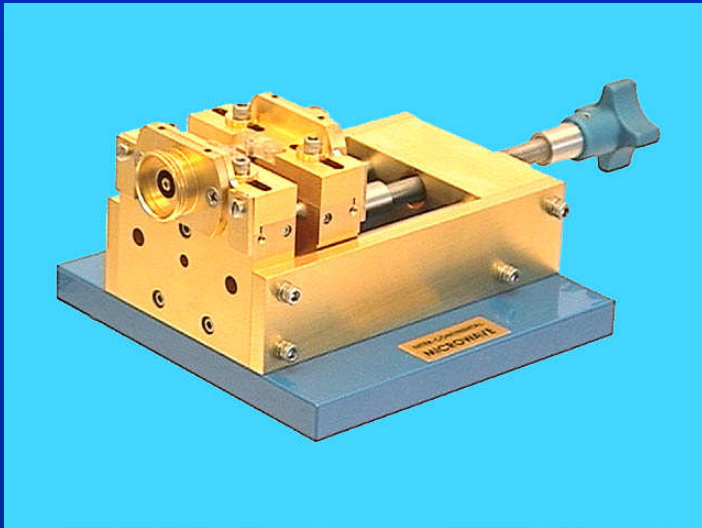




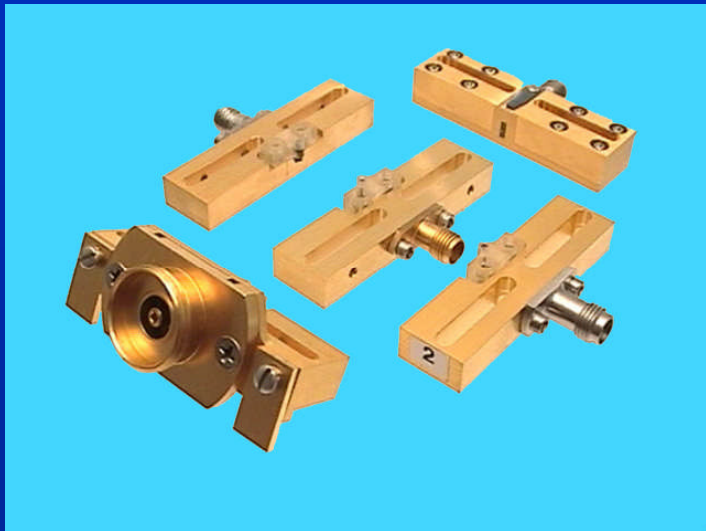
*The World-Wide Authority in the Design & Manufacture of Microwave Test Fixtures*



Adjustable Mainframe  
Test Fixture

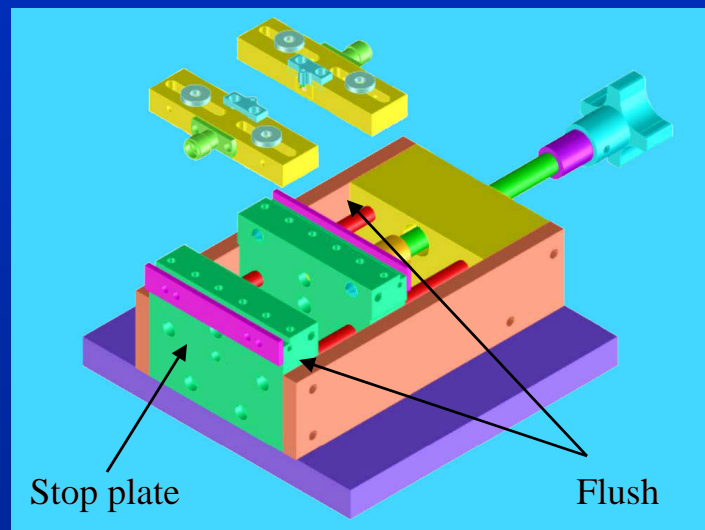
- Test Fixture Mainframe
  - Up to DC – 40 GHz
  - Connector Options:
    - APC-7, APC-3.5, Super-SMA, K, 2.4 mm
  - Interchangeable Transitions
  - RF-in / RF-out offset adjustable
  - Extended length option
  - Full Temp. available (-55 to +125 °C)
  - Ratchet closing mechanism (option)
  - In field spare parts kit
  - In-fixture TRL Calibration Standards

# Transitions for Adjustable Mainframes



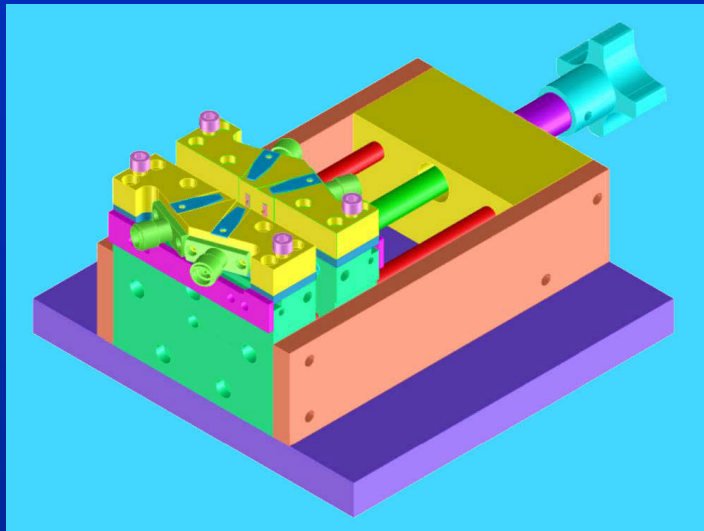
- Transition Assemblies
  - Allows conversion of mainframe to any connector type
  - Available Connectors: APC-7, APC-3.5, Super-SMA, K, 2.4 mm
  - Male or female connectors available
  - Conversion to Full Temp. with Super-SMA Connectors
  - Dual RF launch also available for special insert assemblies
  - Both RF-Launch positions adjustable in x,y and z-axis

# How to Change Transitions



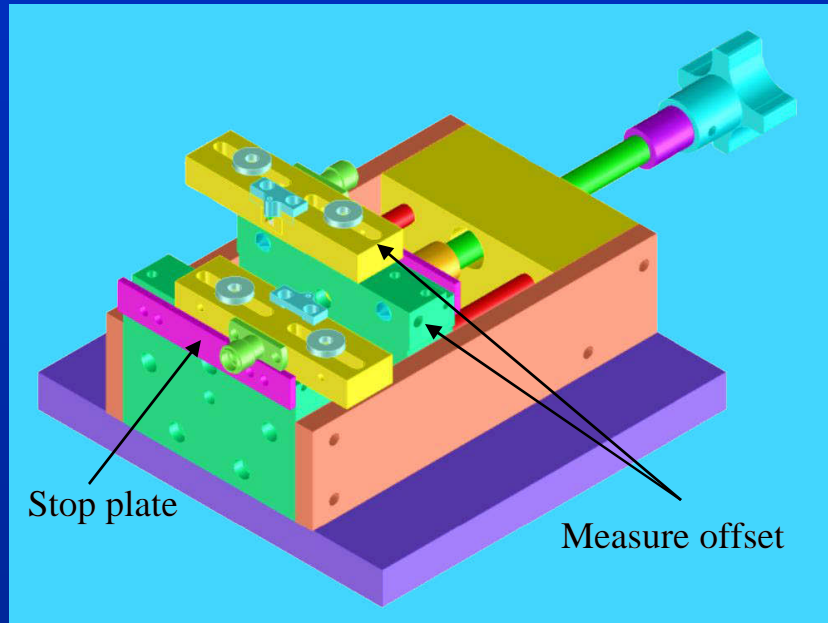
- Mainframe Transition Assemblies
  - Mounted with 2 screws on each side
  - Stop plate for parallel alignment
  - Slot for offset mounting
  - Mount transition ends flush for RF-Pin centering
  - Use shim (not shown) under transition for adjustment in z-axis
  - Use spare transition assemblies for level 1 in-field service

# Multiple RF Inputs



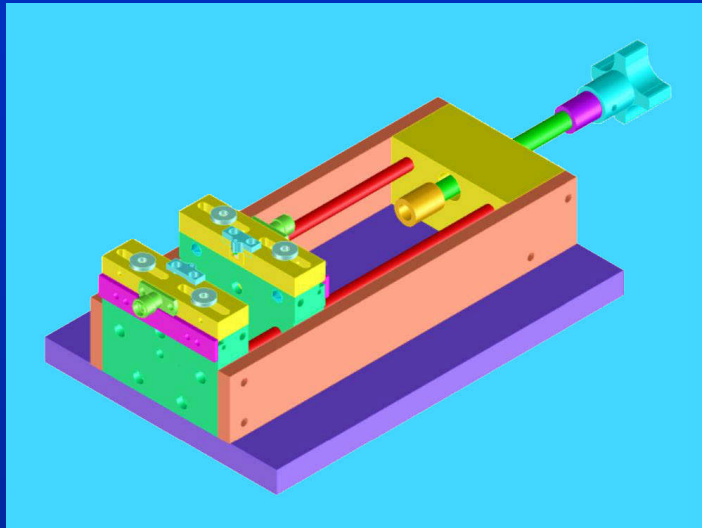
- Custom Transitions
  - Mount onto basic mainframe
  - Up to 4 RF inputs per mainframe
  - Different RF to RF pin spacing can be specified
  - DC – 40 GHz designs available
  - Custom Calibration Kits upon request
  - Contact Factory with your requirements

# Offsetting Input and Output

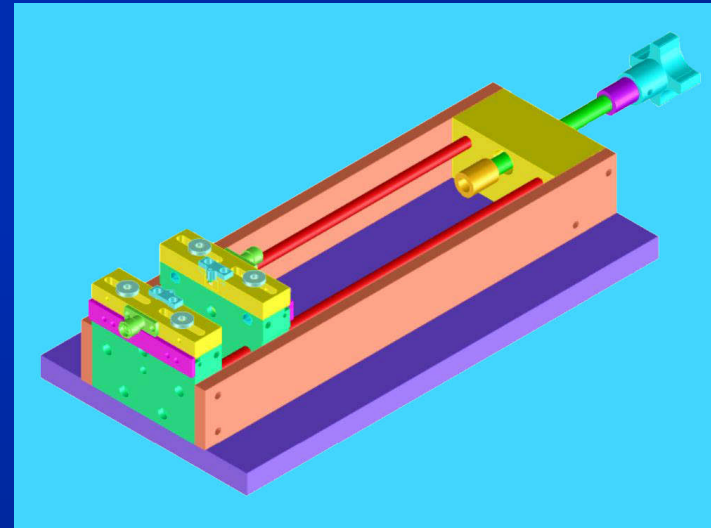


- Transitions offset
  - 0 to 600 mils left or right offset of RF-pins
  - Measure offset from the edges
  - Before fastening push the transition up against the stop plate
  - TRL or TOSL Calibration can be performed with the RF-pins centered and then adjust the offset

# Stretched Mainframes

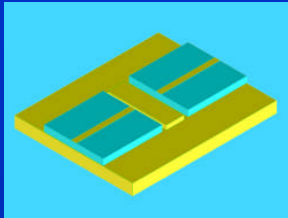


Extended length (+2"), TF-3002-x

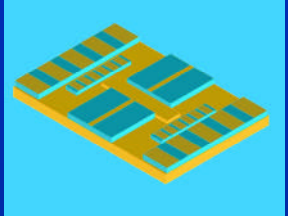


Extended length (+4"), TF-3003

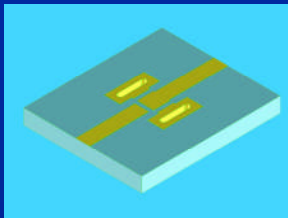
# Universal use of Mainframe



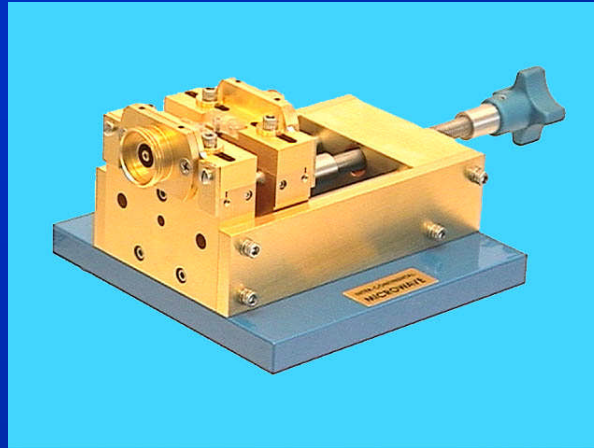
FET Chip Testing



MMIC Chip Testing



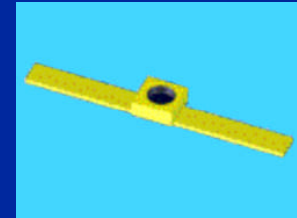
Bipolar Chip Testing



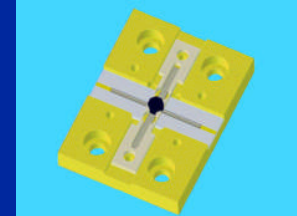
**Adjustable Mainframe**



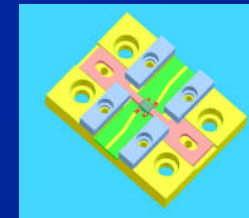
Calibration Standards



Diode Testing



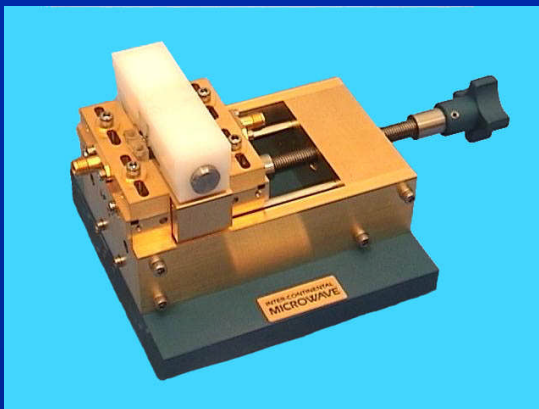
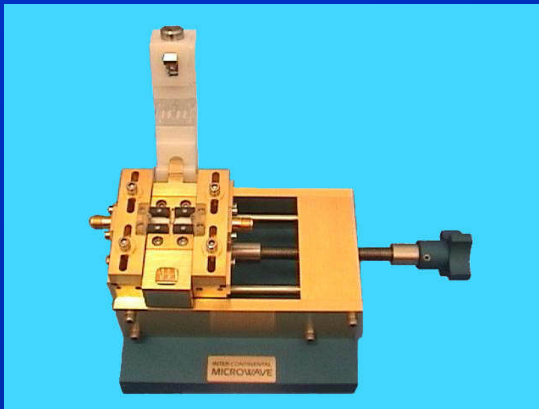
Transistor Testing



SOT & SOD Testing



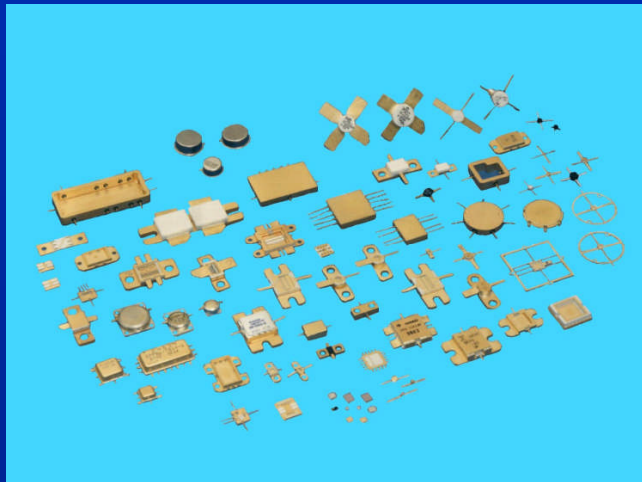
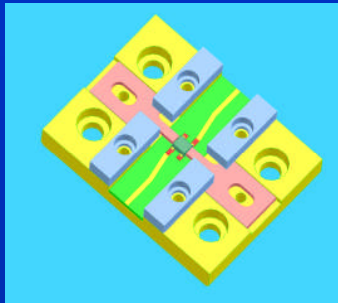
# Mainframe with Midsection



- Midsection Adapters
  - Turning the knob counter-clockwise opens the mainframe
  - The Midsection Adapter is placed between the Transitions
  - Turning the knob clockwise will close the mainframe
  - The Midsection Adapter will be automatically aligned and lifted up under the RF-pins when the Mainframe is closed
  - The Mainframe should be closed real tight for perfect grounding

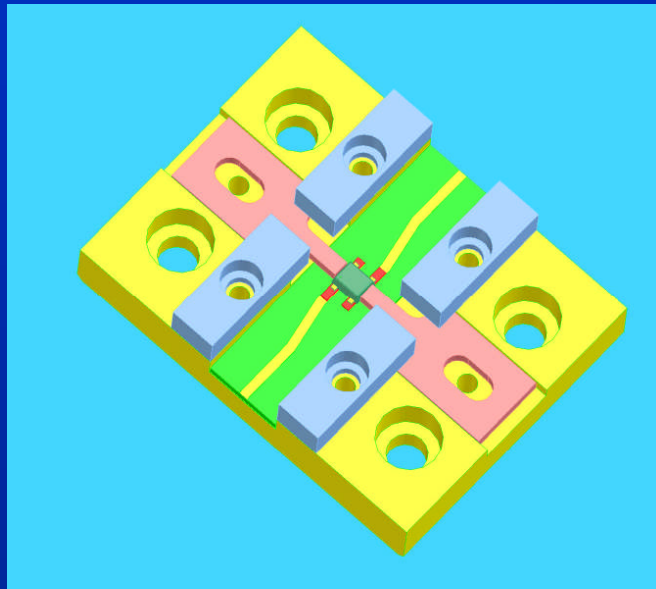


# Low Power Transistors



- Packaged Transistor Measurements
  - Ideal for S-parameter, Noise Figure and Power measurements
  - 10, 15, and 25 mil substrates available
  - De-embedding with TRL/LRM Calibration Standards
  - Measurement Environment Equal to Application Environment
  - Midsections for over 1000 different packages
  - Full Temp. (-55 to +125 °C) as option
  - Custom Midsections available

# Insert Assembly



Insert Assembly for Midsection

- Insert Assemblies for Midsection Adapters
  - Insert Assemblies are custom designed to match the DUT
  - The length of the microstrip at the RF input and output is standardized to 330 mils
  - Adjustable Dielectric Guides align the DUT with the RF lines
  - DURA contacts provide long life in the contact areas
  - Different pin connections require different insert assemblies

# Midsection Adapter



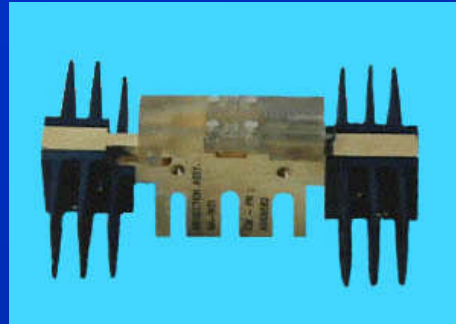
Midsection Adapter with insert

- Midsection Adapter
  - Consists of:
    - Insert Assembly and Midsection Assembly
    - Midsection and Insert have to have the same width
    - Midsection cover assembly is matched to insert and DUT
    - For some devices multiple inserts can fit the same midsection (different pin connections to DUT)

# Midsection with Cooling



With liquid cooling



With air cooling



With air and liquid cooling



TRL and TOSL Calibration Kits

## Medium Power Transistor

- Ideal for S-parameter, Noise Figure and Power measurements

- Fit into all mainframes

10, 15, and 25 mil substrates available

De-embedding with TRL Calibration Standards

Measurement Environment Equal to Application Environment

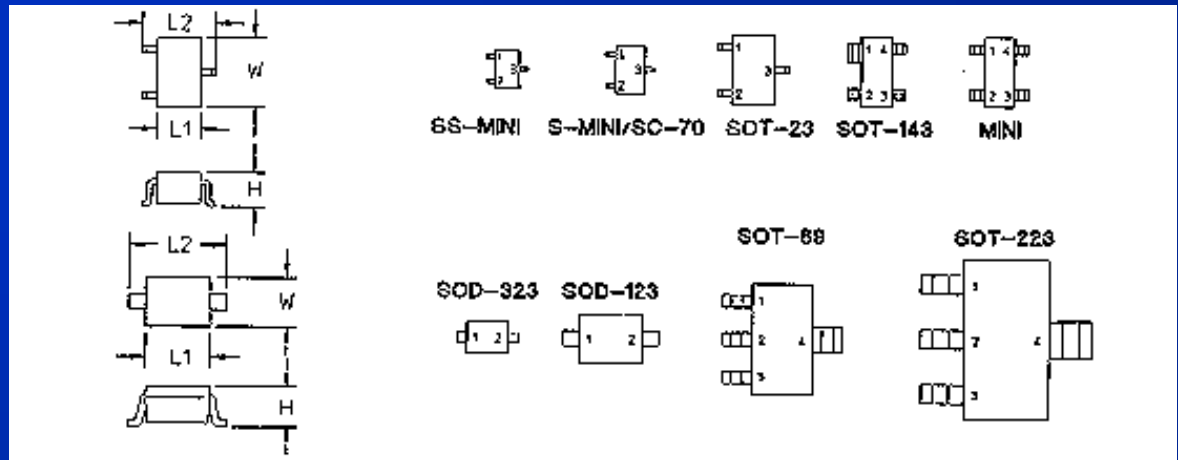
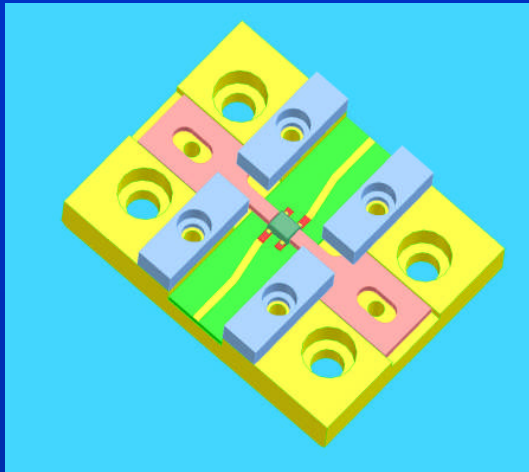
With Air fin or liquid cooling

Full Temp. available

(-55 to +125° C)

Custom Midsections available

# Modern Surface Mount Transistors



- Surface Mount Transistors
  - Midsection Adapters for all packaged SOT & SOD devices
  - Ideal for S-parameter, Noise Figure and Power measurements
  - De-embedding with TRL Calibration Standards

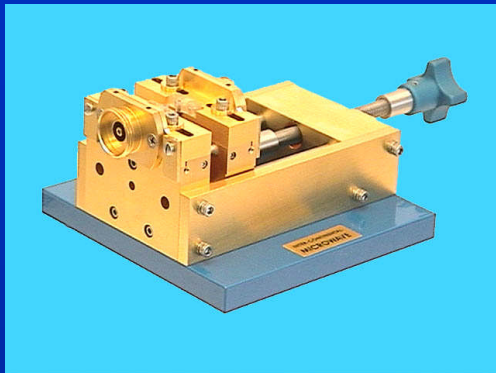
# TRL Calibration for Midsections



Calibration Kit

- TRL Calibration Kit
  - Matched to Inserts using 25 mil alumina and 330 mil long substrates
  - DC – 26.5 GHz
  - All Calibration Coefficients included
  - Includes complete set of Replacement Standards
  - Standards build as matched sets
  - All Standards mounted on Midsection Adapters

# Packaged Transistor Test Solution



Mainframe



Calibration Kit

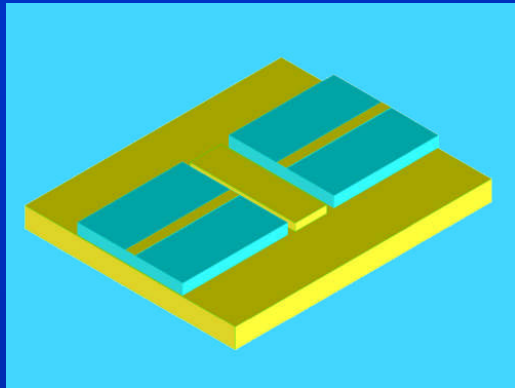


Midsection Adapter

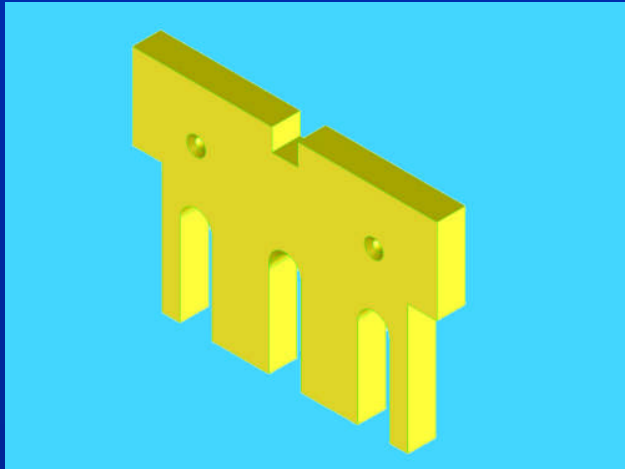
Includes Adjustable Mainframe, TRL  
Calibration Standards and Midsection Adapter



# FET Measurements at Chip Level



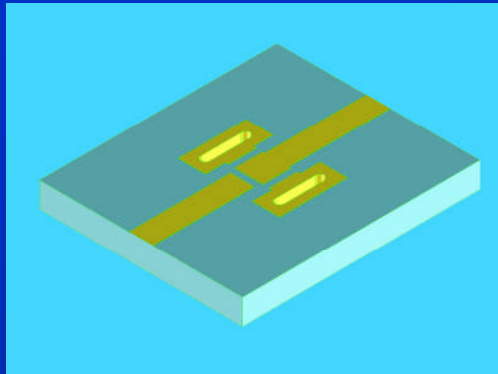
FET Carrier Assembly



FET Midsection

- FET Carrier Assemblies
  - Ideal for S-parameter measurements
  - De-embedding with TRL Calibration Standards
  - Measurement Environment Equal to Application Environment
  - 10 and 15 mil substrates for DC – 40 GHz  
25 mil substrates for DC – 25 GHz
  - Customer to specify dimensions
  - Use ICM Product Note B6137208 and B0137209 FET Carrier Assembly Data Input Form

# Bipolar Chip Measurements



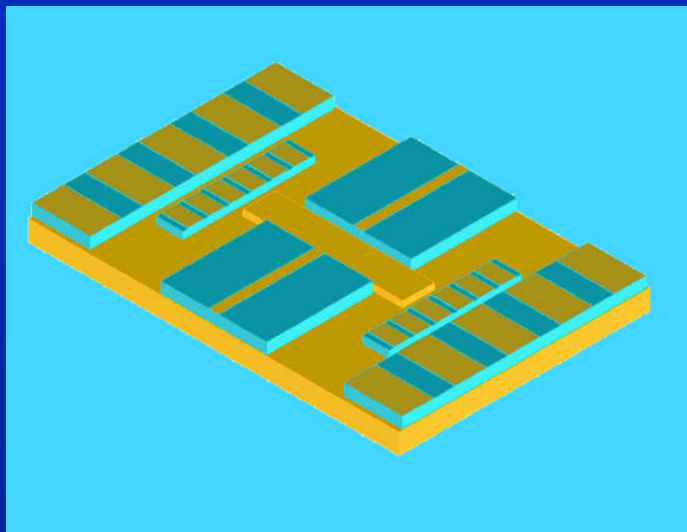
Bipolar Chip Substrate



Bipolar Midsection

- Bipolar Substrates
  - Ideal for S-parameter measurements
  - De-embedding with TRL Calibration Standards
  - Measurement Environment equal to Application environment
  - 10 and 15 mil substrates for DC – 40 GHz
  - 25 mil substrates for DC – 26.5 GHz
  - Use ICM Product Note B6137210

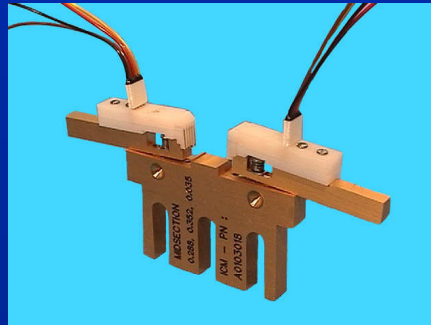
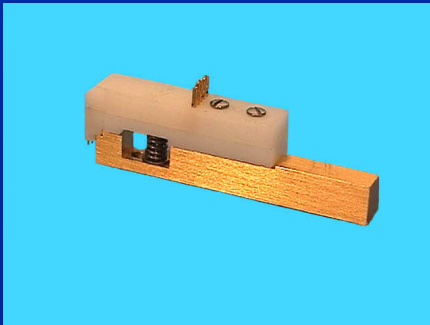
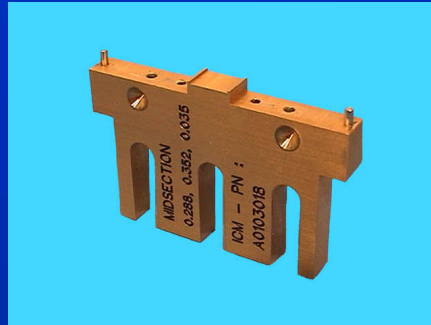
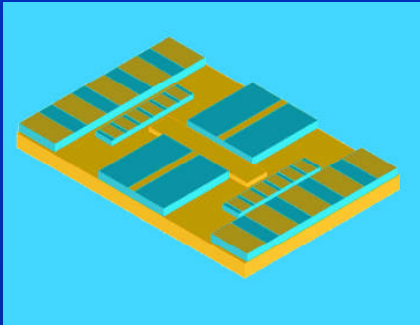
# MMIC Carrier Assemblies



MMIC Carrier Assembly

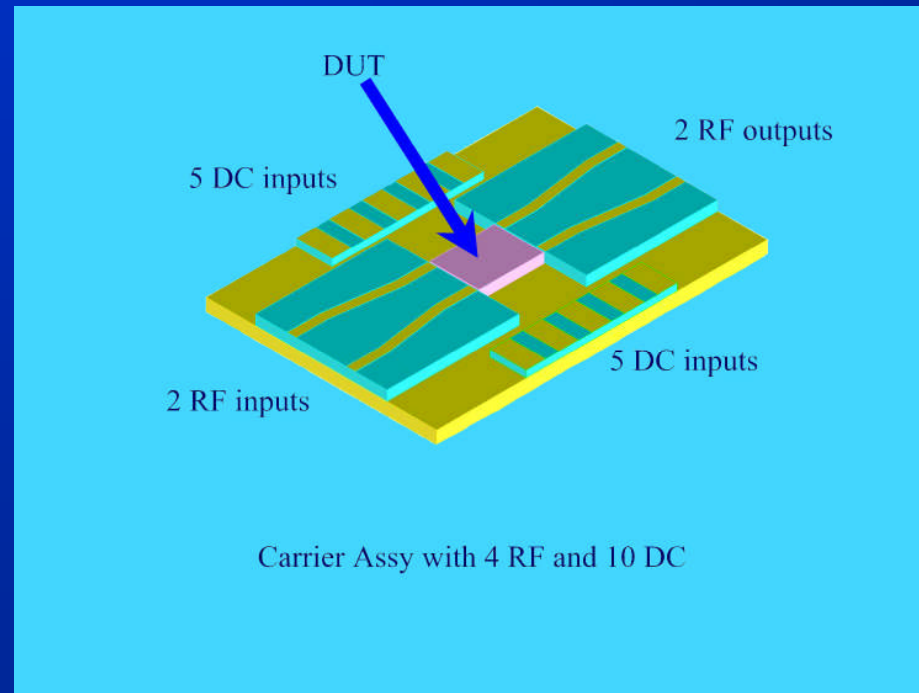
- MMIC Carrier Assemblies
  - Ideal for S-parameter measurements
  - De-embedding with TRL Calibration Standards
  - Measurement Environment Equal to Application Environment
  - 10 and 15 mil substrates for DC – 40 GHz
  - 25 mil substrates for DC – 25 GHz
  - Customer to specify dimensions
  - Use ICM Product Note B6137206 and B0137207 MMIC Carrier Assembly Data Input Form

# MMIC Chip Measurements

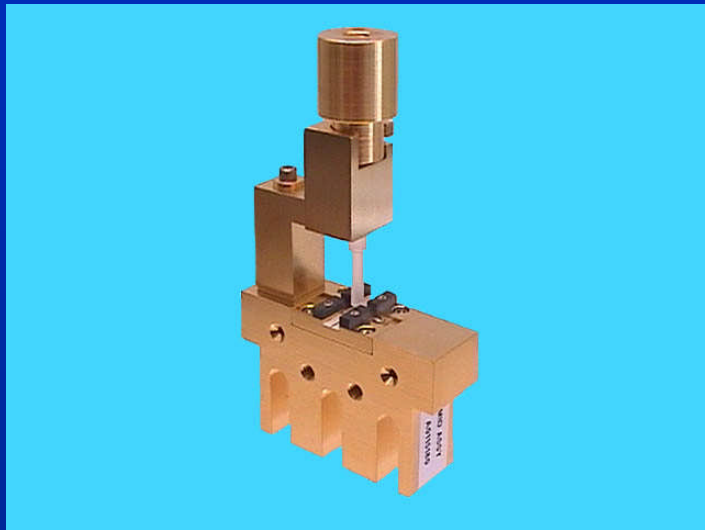


- MMIC Measurements Setup
  - MMIC Carrier Assembly made to fit DUT
  - 10 and 15 mil substrates for DC – 40 GHz; 25 mil substrates for DC – 26.5 GHz
  - MMIC Midsection to fit Carrier Assembly Width
  - Uses 2 ea DC Probe Assemblies
  - Uses 2 ea DC Cable Assemblies
  - DC Probe Assemblies can be moved to other size midsections
  - Use ICM product Note B6137206 and MMIC carrier assy. Data Input Form B0137207

# Custom MMIC Carrier Assembly Example

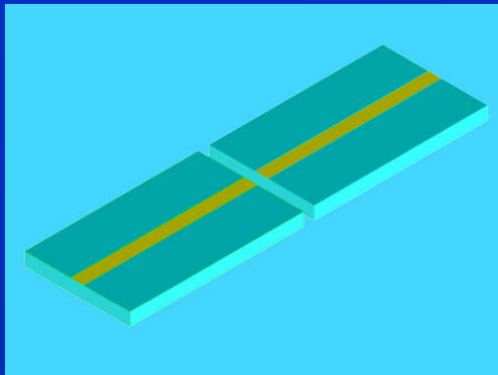


## Other Mainframe Applications

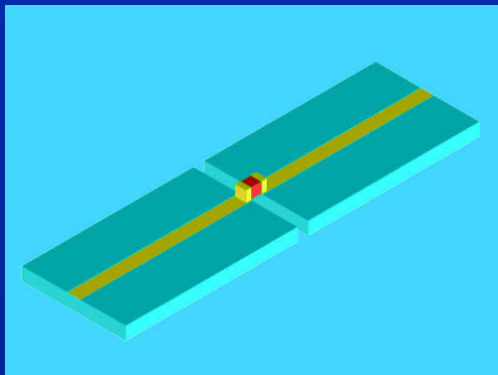


- Capacitor and Inductor Measurements
  - For Surface Mount Devices (SMD)
  - All popular sizes can be tested
  - 3 Measurement Configurations
    - Series Thru
    - Shunt Thru
    - Shunt to Ground
  - All Mainframe can be used
  - TRL Calibration Standards available
  - All Tests non-destructive (no soldering)

# Series-Thru Capacitors and Inductor Measurements



Series-Thru Substrate

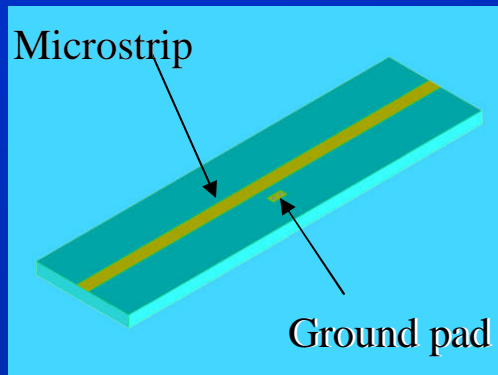


Series-Thru Substrates with DUT

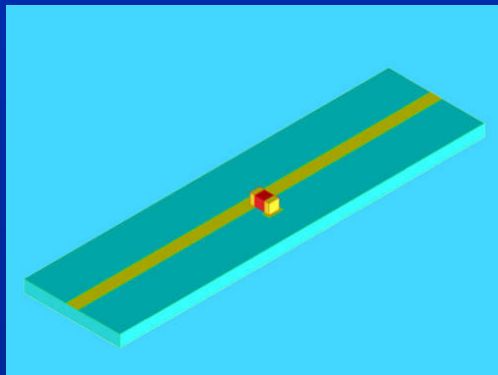
- Measured in Series with a 50 Ohm microstrip Line
  - Features:
    - Calibration establishes reference planes at end of substrate where the DUT makes contact
    - Substrates available with different microstrip width for smaller and larger components
    - Non-destructive clampdown of DUT
    - DURA contacts for long contact life
    - See our website for available sizes



# Shunt-Thru Capacitors and Inductor Measurements



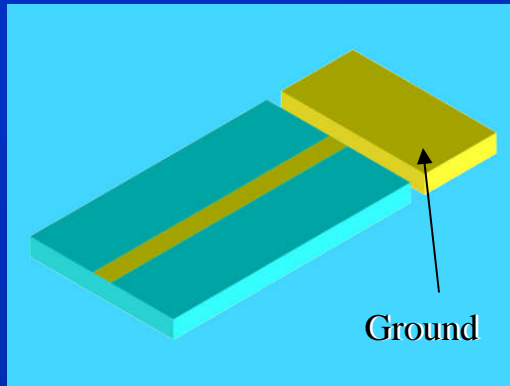
Thru line with ground pad



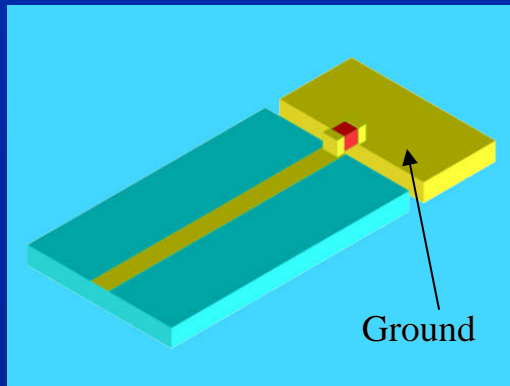
Shunt-Thru Substrate with DUT

- Measured in Shunt with a 50 Ohm microstrip Line
  - Features:
    - Calibration establishes reference planes at + and – 50 mils from the center of the substrate
    - DUT is placed between the microstrip line and ground
    - Substrates available with different gaps between microstrip and ground pad for smaller and larger components
    - Non-destructive clampdown of DUT
    - DURA contacts for long contact life
    - See our website for available sizes

# Shunt-to-Ground Capacitors and Inductor Measurements



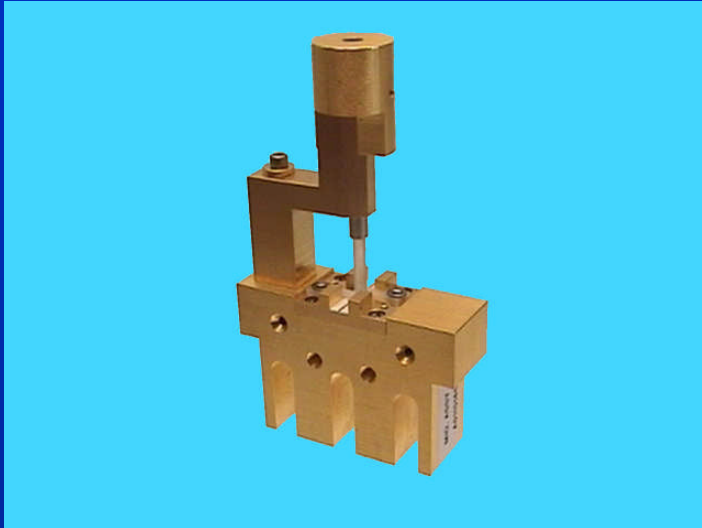
Microstrip with ground pad



Microstrip with DUT to ground

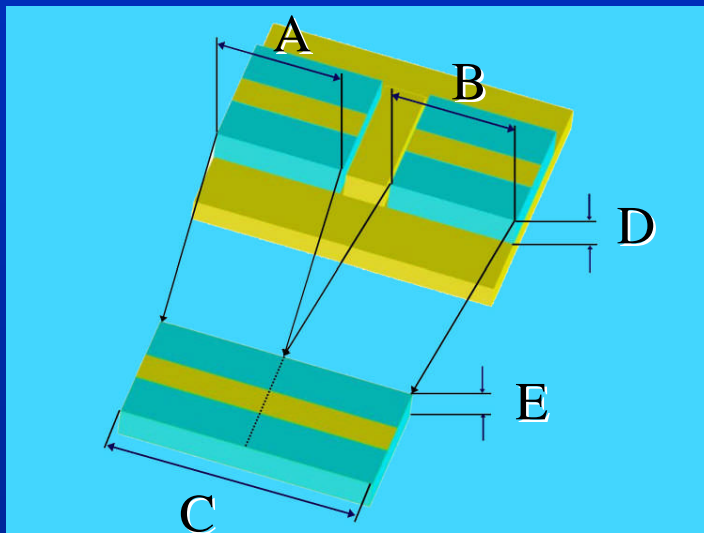
- Measured with a 50 Ohm microstrip  
Line to ground
  - Features:
    - Calibration establishes reference planes at the end of the substrate
    - DUT is placed between the microstrip line and ground
    - Substrates available with different gaps between microstrip and ground pad for smaller and larger components
    - Non-destructive clampdown of DUT
    - DURA contacts for long contact life
    - See our website for available sizes

# Non-destructive Beam Lead Testing



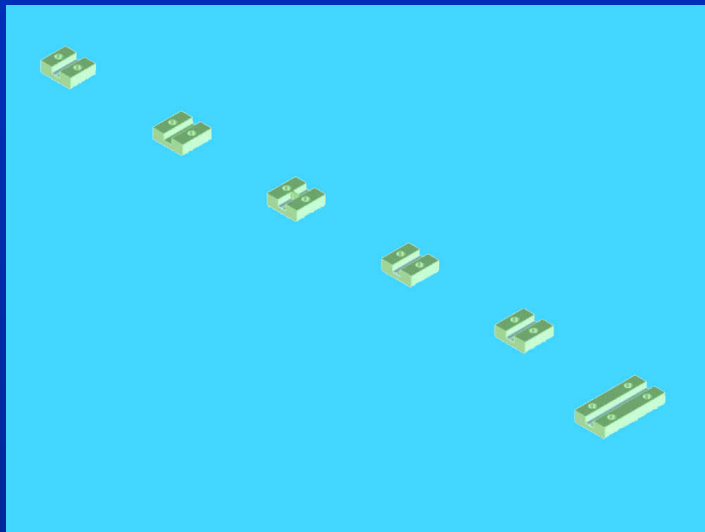
- Beam Lead Diode Testing
  - Non-destructive RF Measurement
  - DC - 40 GHz
  - Low insertion loss (1 dB typ.)
  - High Return loss (20 dB typ.)
  - Thru Standard for Calibration included
  - Ideal for Pin Diodes, SRD's, etc.
  - Midsection Style for mainframes or stand alone
  - TRL Calibration Standards for de-embedding (S-parameters)

# Calibration Standards



- THRU Standard Length
  - Length of THRU Standard is related to the carrier assembly
  - Length A and Length B = THRU Standard Length C
  - Substrate Materials have to be the same
  - Thickness of substrate has to be the same ( $E = D$ )
  - Reference planes at center of THRU Standard
  - Reference planes on Carrier Assembly at inside edge of substrates

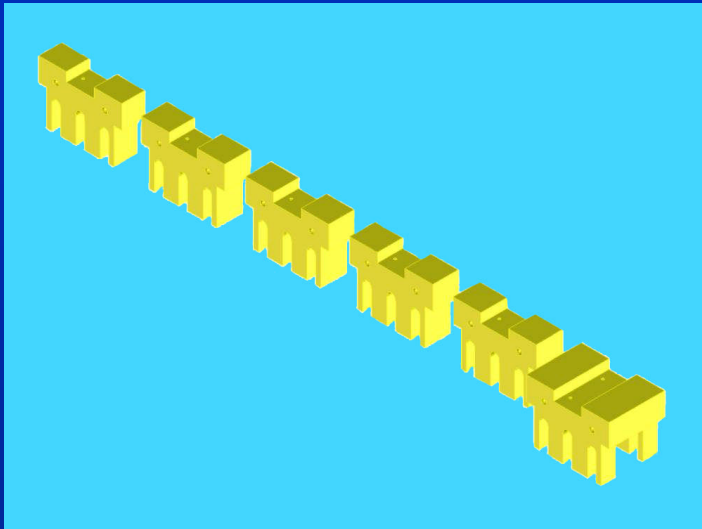
# TRL Standards are "Matched Sets"



Matched set of Calibration Kit Inserts

- Matched sets
  - TRL Standards are manufactured as matched sets
  - Requires to use same mask
  - Requires to be manufactured from same substrate
  - Tested as Matched Sets
  - To achieve the best calibration Accuracy the standards should only be used as matched sets
  - Replacement Standards are available as Matched Sets only

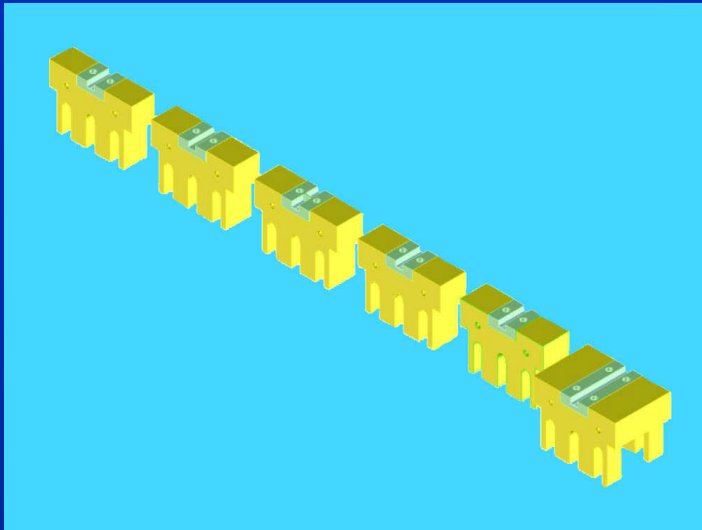
# Calibration Adapters



Calibration Adapters

- Calibration Adapters
  - Calibration Kits for Mainframes have the standards mounted on Calibration Adapters
  - The Calibration Adapters match the width of the Calibration Inserts
  - The Calibration Adapter align the Calibration Standards automatically when inserted into the Mainframe

# TRL Calibration Standards



Calibration Adapters with  
Calibration Inserts

- Adapters and Inserts
  - The Calibration Inserts are mounted onto the Calibration Adapters
  - The Insert have to be flush with the Adapter when mounted
  - Each Calibration Kit is completely assembled when shipped
  - A set of Replacement Standards is included with every Mainframe Calibration Kit



# ICMTRL Calibration Standards



Calibration Kits

- TRL Calibration Standards
  - Microstrip in-fixture standards
  - DC – 40 GHz
  - For Adjustable Mainframe Fixtures
  - 10, 15, 20, 25, and 50 mil alumina substrate thickness available
  - Replacement Standards Kits
  - Many soft board material Calibration Kits available
  - All Calibration coefficients supplied
  - Custom Calibration Kits on request