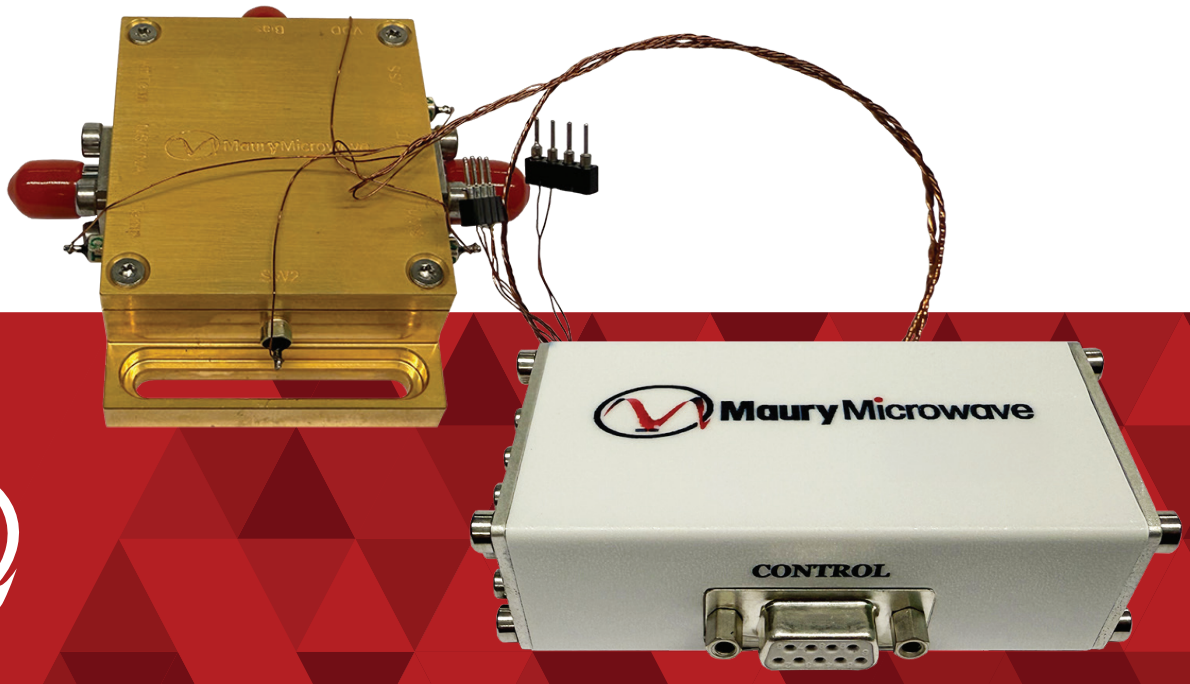
CT-Series Cryogenic Automated Tuners

DATA SHEET / 4T-050G12

MODELS:
CT-2G-18G



Maury Microwave

// NOVEMBER 2024

What is an impedance tuner?

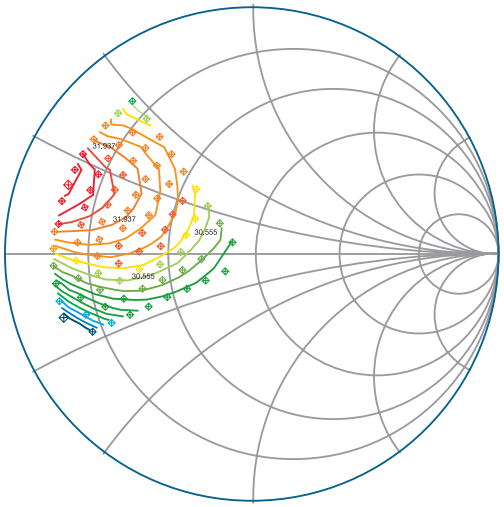
An impedance tuner is used to **present controlled impedances** to a device under test (DUT).

When used on the output of a DUT, the set of measurements is commonly referred to as load pull. When used on the input of a DUT, the set of measurements is commonly referred to as source pull.

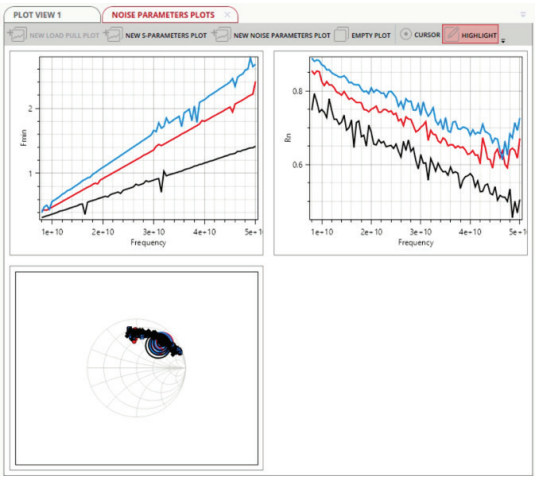
By varying the impedance, it is possible to fully characterize the performance of a DUT and use the data to:

- Verify simulation results of a transistor model (model validation)
- Gather characterization data for model extraction (behavioral model extraction)
- Design amplifier matching networks for optimum performance (amplifier design)
- Ensure a microwave circuit's ability to perform after being exposed to high mismatch conditions (ruggedness test)
- Confirm the stability or performance of a microwave circuit or consumer product under non-ideal VSWR conditions (stability/performance/ conformance/antenna test)

Example of load pull measurements with Output Power (Pout) contours plotted on a Smith Chart.



Example of noise parameters extracted from source pull measurements



Solid-state tuner technology purpose-designed for cryogenic impedance tuning

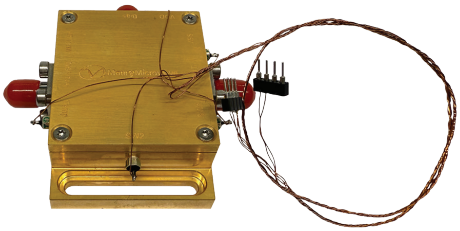
Impedance tuners can take many forms, the most common being electro-mechanical, based on a slabline and RF probe/slug. While offering many advantages, electro-mechanical tuners are not suited for cryogenic measurements as they cannot function within a cryogenic environment (i.e, cryostat, cryogenic probe station) due to their large size, mechanical operation, and the amount of heat created.

While unable to present as many impedances as an electro-mechanical tuner, solid-state tuners provide a good alternative when purpose-designed for cryogenic impedance tuning.

The CT-series cryogenic automated tuners use electronic components rated for use at cryogenic temperatures below 4K* to present electronically varied impedance states to a DUT. At under 80 grams, 60mm x40mm, and consuming less than 0.2mW, is ideally suited for operation inside a cryogenic environment. An integrated temperature sensor ensures the precise temperature inside the tuner is known. An integrated bias tee allows for the optional biasing of the DUT source, while external biasing can be used to bias the load of the DUT.

The CT-series cryogenic automated tuner is driven by an external controller, which connects to the tuner through included wiring, and is USB-controlled via direct SCPI commands.

**Operating temperatures below 4K are possible given sufficient cooling in cryogenic environment.*



CT-Series™ Cryogenic Automated Tuner

Available Models

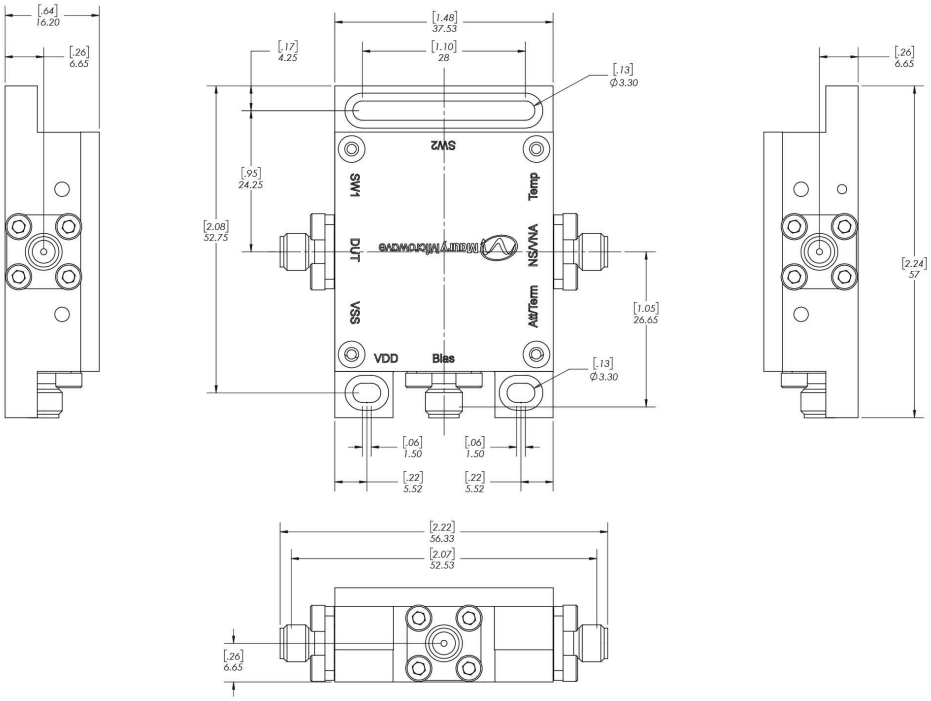
Model	Frequency Range (GHZ)	Impedance States	p1dB (dBm)	Return Loss (dB) typ/min	Insertion Loss (dB) at THRU state	Repeatability (dB)	Integrated Temperatue Sensor	Integrated Bias Tee	Connectors	Weight (g)	Power Consumption (mW)
CT-2G-18G	2-18	4	30	2-4 GHz : 20/15 4-18 GHz: 15/8	2-12 GHz: 3dB typ 12-18 GHz: 9.5dB max	-60	Yes	Max current = 270mA Irms Max voltage = 10V	SMA female	80	0.2

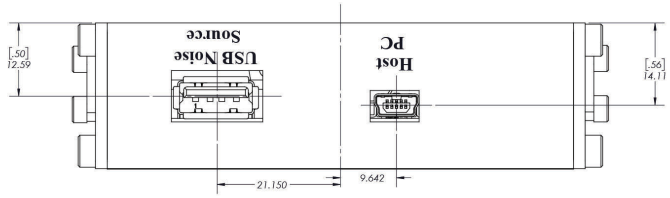
Accessories Provided

Each tuner is provided with:

- Tuner controller
- USB cable (power and communication)
- Operating Manual (stored in tuner memory)

Dimensions


SW2
SW1
Temp
DUT
NS/VNA
VSS
Att/Term
VDD
Bias


USB Noise Source
Host PC
21.150
9.642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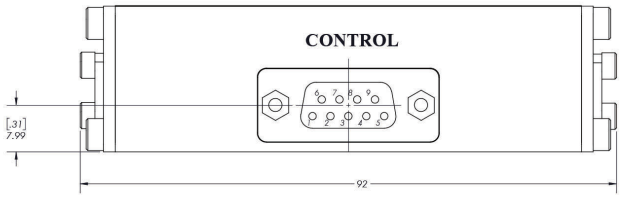
CONTROL
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CONTACT US:
W / maurymw.com
E / maury@maurymw.com
P / +1-909-987-4715
F / +1-909-987-1112
2900 Inland Empire Blvd
Ontario, CA 91764