

ALTRONIC RESEARCH INC.



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ALTRONIC RESEARCH INC.

SEMICONDUCTOR
MANUFACTURER
INTRODUCTION

**RF TERMINATIONS, TOOL
SIMULATORS**

WWW.Altronic.com

CALL TOLL FREE 1.800.482.LOAD

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SEMICONDUCTOR MANUFACTURER

INTRODUCTION

RF TERMINATIONS, TOOL SIMULATORS

**NO PROBLEM FOUND
SOLUTIONS**

**To critical performance issues involving RF delivery
component**

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PLASMA CHAMBER / TOOL SIMULATORS

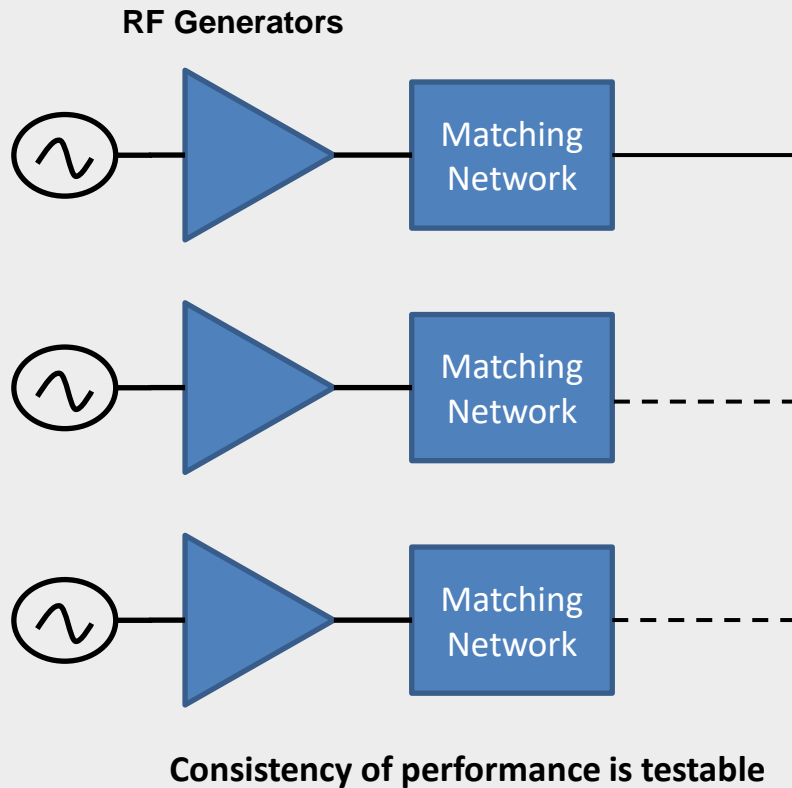
UTILIZING COMPLEX LOADS FOLLOWING SLIDES

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Application use of complex loads

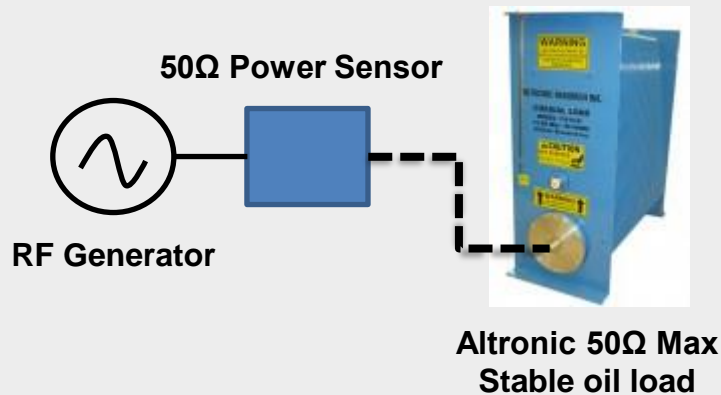
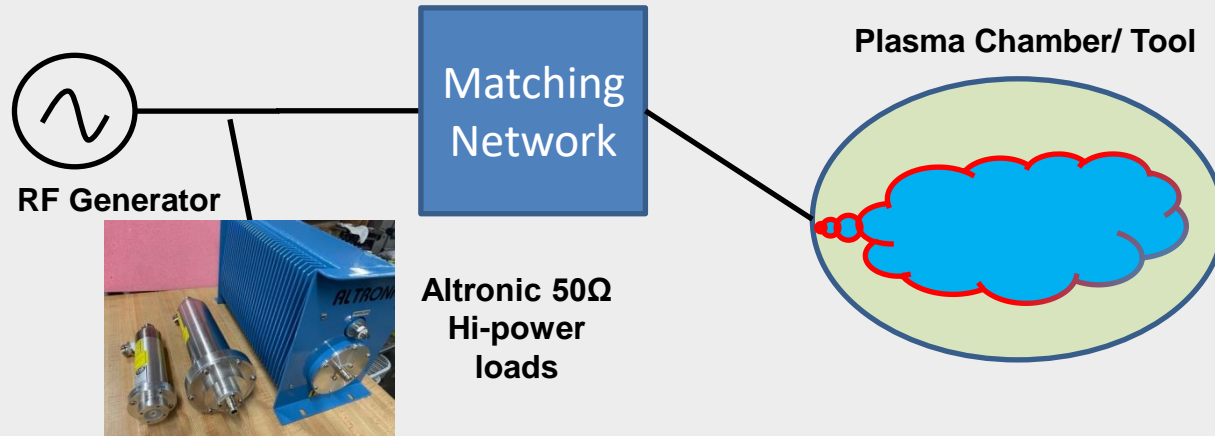


**Altronic complex
water load**
 $R \pm jX$

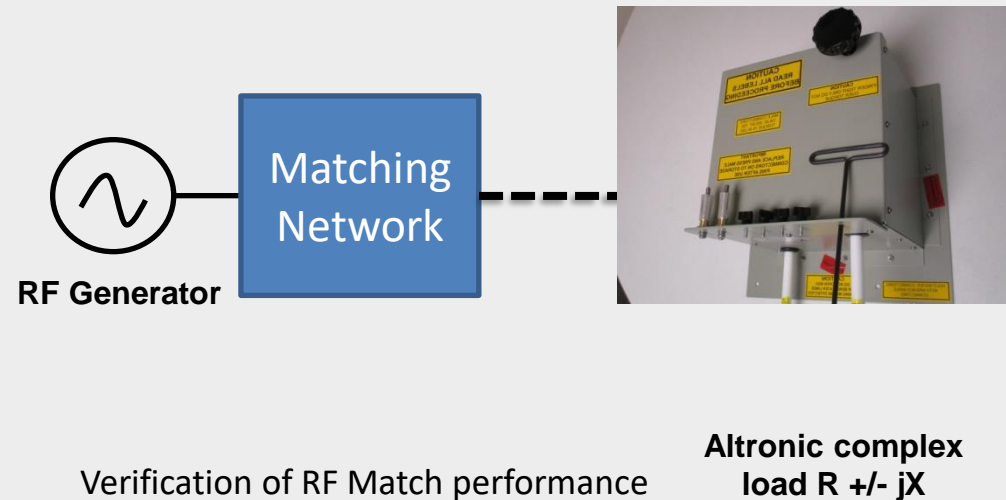
**In other words, they
simulate the same
impedance loading
condition seen by
the Gen/match as in
a plasma chamber
or tool under actual
RF power**

- As a troubleshooting tool to verify performance of RF generators or match boxes performing into realistic loads that simulate the actual process conditions
- As test standards in the field to simulate the impedance of the load presented by the plasma chamber or other process specific variables to the RF generator source or match box in the hardware setup
- Complex load can be utilized as a transferable impedance standard due to its high stability capabilities

Verifying RF power delivery for Semiconductor Equipment



Calibration and verification of RF Generator



Verification of RF Match performance

Independent verification of RF components → Tighter control & faster troubleshooting

Match RX Key Features:

Repeatability $\pm 1\%^*$

Customizable -

- **Customer defined desired load point/s**
 - **Power: 100Watts TO 15kw**
 - **Frequency: 250KHz – 350MHz**
 - **Customer specific mechanical interface**
 - **Water cooled or oil cooled**
- **Portable option available (with self-contained cooling cart)**
 - **Voltages up to > 15 kV peak**
 - **Currents up to 100+ amps RMS with limiting resistor**

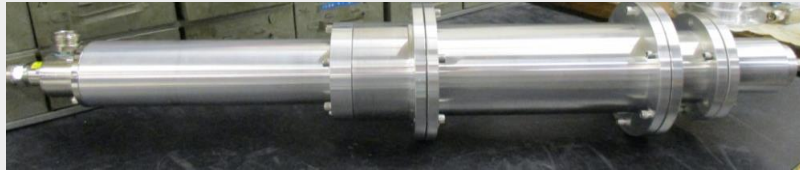


*with real values > 1 ohms

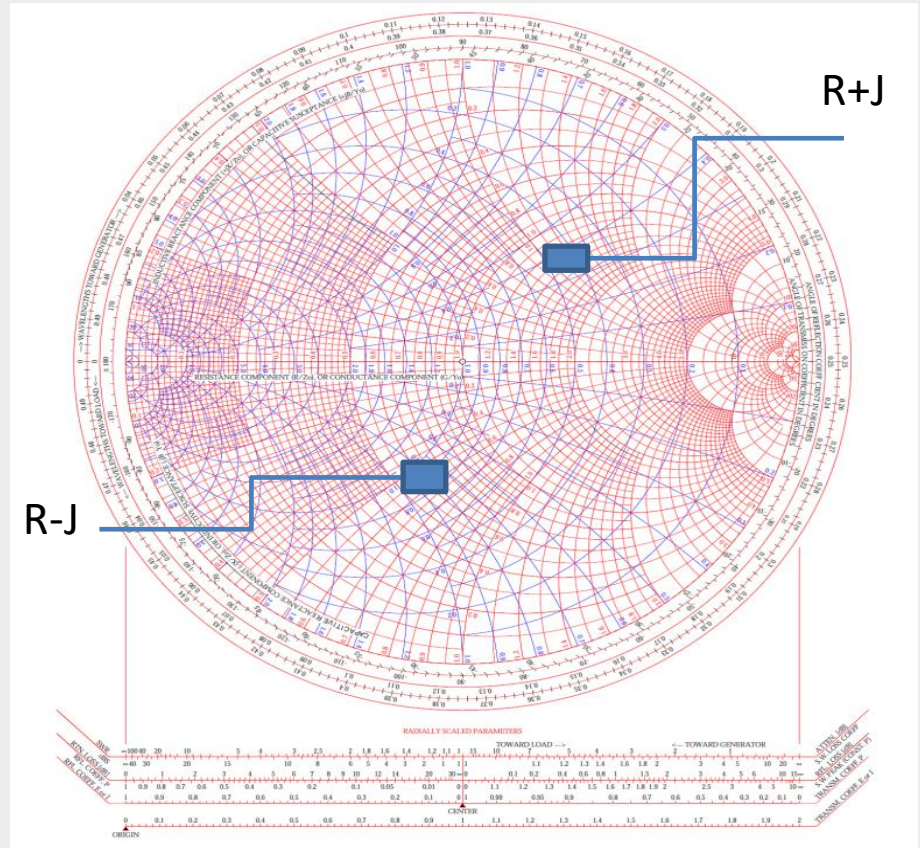
MATCH RX HIGH POWER COMPLEX RF LOAD

SIMULATOR

COMPLEX IMPEDANCE AND
ADMITTANCE COORDINATES



Up to 100 amps rms at 12-15Mhz
CUSTOM DESIGNED INPUTS



ABILITY TO SIMULATE MOST
CHAMBER CONDITIONS



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NO PROBLEM FOUND

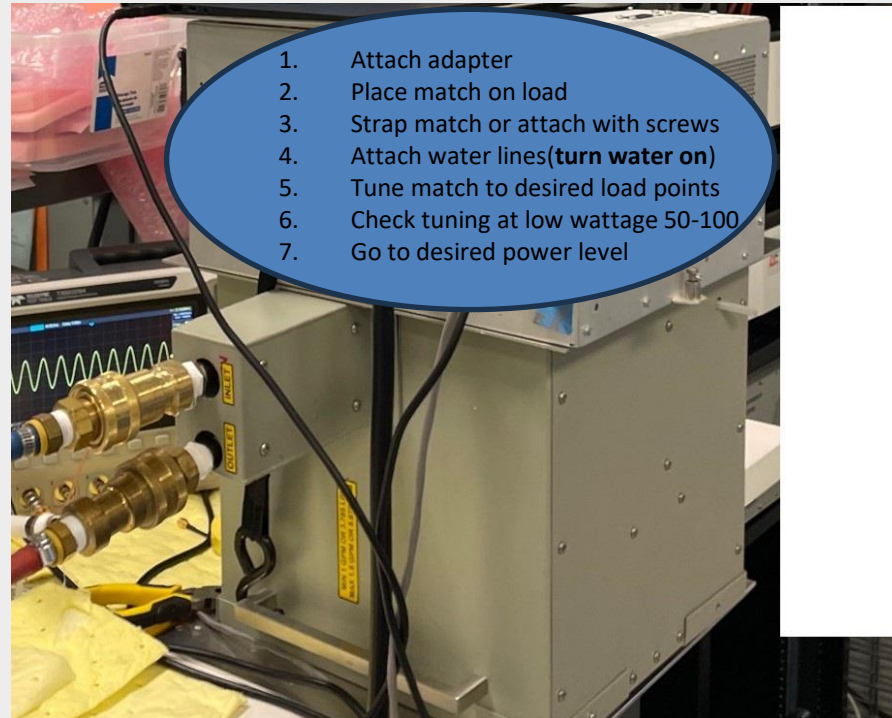
KNOW NOW!! SOLUTION IN JUST A
FEW MINUTES

TEST MATCH AND GENERATOR IN MINUTES FOR
FUNCTION NOW-NOT WEEKS
SAVING \$\$\$\$ ON DOWNTIME

- SIMPLY ATTACH MATCH TO COMPLEX LOAD
- APPLY POWER, TUNE MATCH AT SET LOAD POINT
- IF CORRECT, **THE PROBLEM IS THE CHAMBER**, RETURN EQUIPMENT TO SERVICE
- IF NOT, TEST GENERATOR INTO ONE OF MANY ALTRONIC 50 OHM LOADS.
IF GOOD. MATCH NEEDS TO BE REPAIRED
- SEE HOW SIMPLE IT IS ON NEXT SLIDE
- IN THE FOLLOWING SLIDES SHOW HOW COMPLEX
LOAD WORKS, WITH ACTUAL VIDEOS OF IT WORKING
UNDER POWER



MATCH RX HIGH POWER COMPLEX RF LOAD SIMULATOR IN ACTION



MATCH TESTING



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MATCH RX

Reference Standard for Verifying RF Equipment



↑
CAPACITIVE
UNITS R-J



←
INDUCTIVE
UNITS R+J

Altronic Research manufactures the Match RX, a customizable high power complex impedance RF Load. Our proprietary (patent pending) design allows fast, stable and accurate testing at high power.

MATCH RX HIGH POWER COMPLEX RF LOAD SIMULATOR

Scalable Designs

Bias match



1



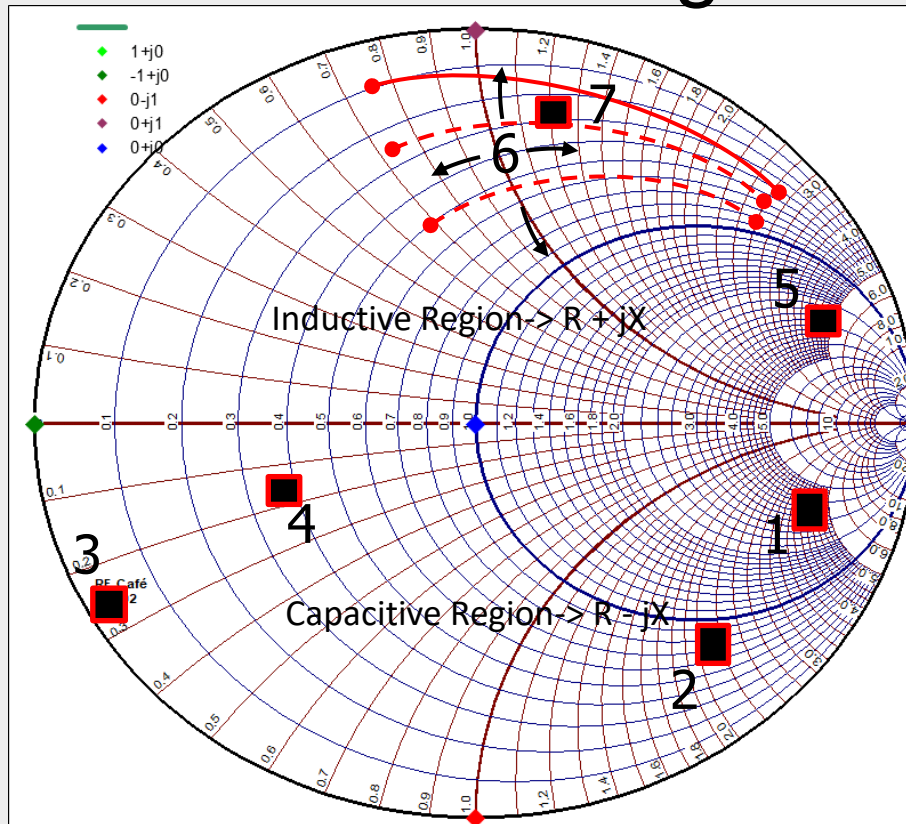
2



3



4



Changeable resistors
from 0 to 50 Ohms



Inductive
source

5



Tunable

6



Hi current

7



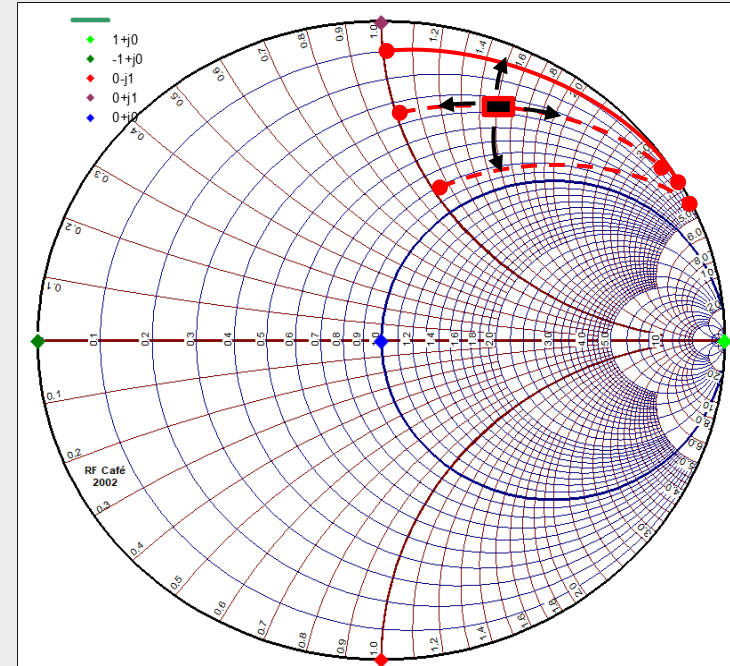
Can access almost any part of Smith chart with hi-power design topologies

MATCH RX HIGH POWER COMPLEX RF VARIABLE LOAD SIMULATOR



30 amps rms at 12-15Mhz
CUSTOM DESIGNED INPUTS

Changeable resistors
From 0 to 50 Ohm

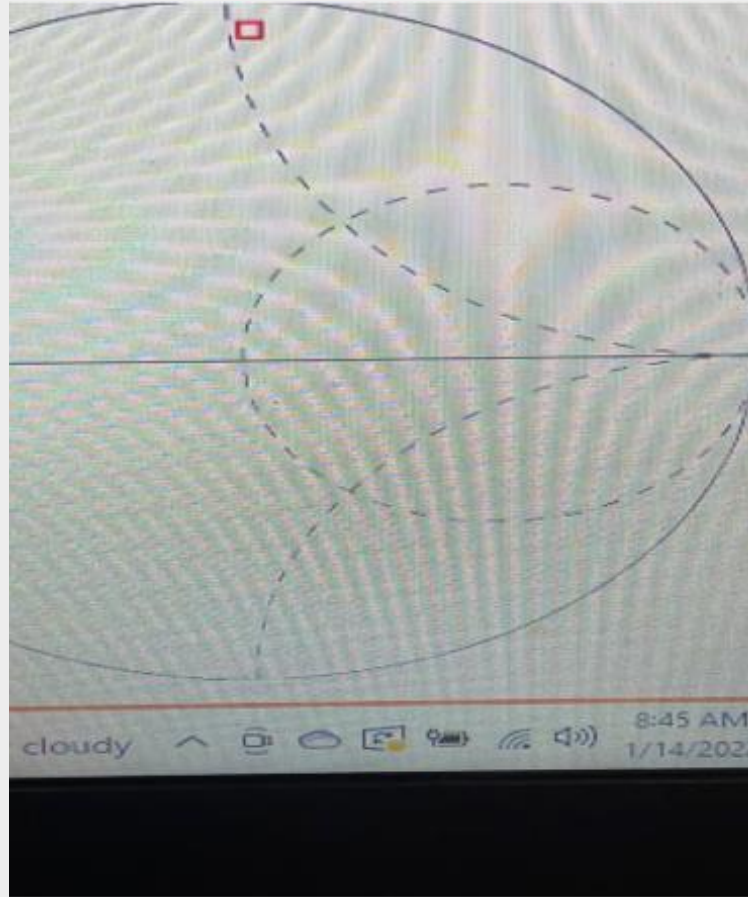


- VARIABLE UNDER POWER
- ABILITY TO SIMULATE MOST CHAMBER CONDITIONS



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LOAD SIMULATOR VARIABLE



Click [LINK](#) obtain video

- Variable allows for quick placement/loading of different impedance point values

MATCH RX HIGH POWER COMPLEX RF LOAD

SIMULATOR

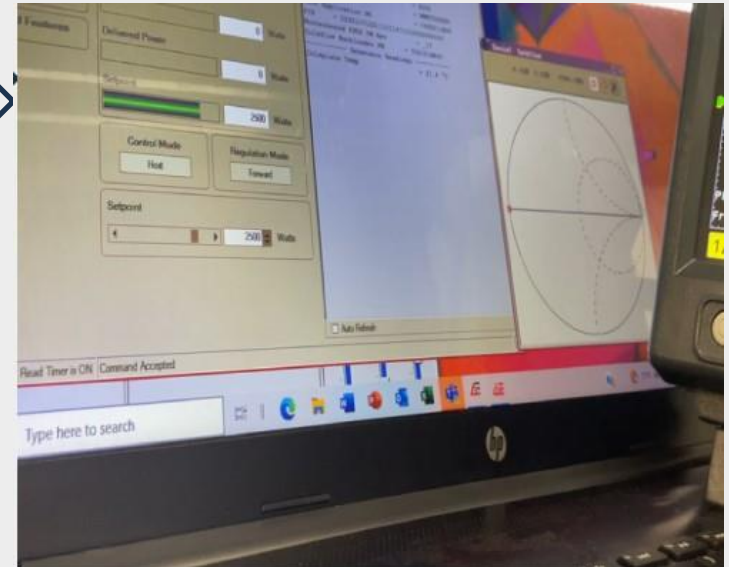
NEW

ULTRASTABLE

**NORMALIZED IMPEDANCE AND
ADMITTANCE COORDINATES**

0 TO 2500 WATTS TEST INSTANT ON EXAMPLE

ONLY MOVEMENT IS MATCH AND GENERATOR TUNING AT BEGINNIG



Click [Here](#) to obtain video

- High Power 90 amps RMS and 125 peak at 12-15Mhz
- CUSTOM DESIGNED INPUTS
- OPTION FOR CHANGEABLE RESISTORS
- 10-minute setup to test

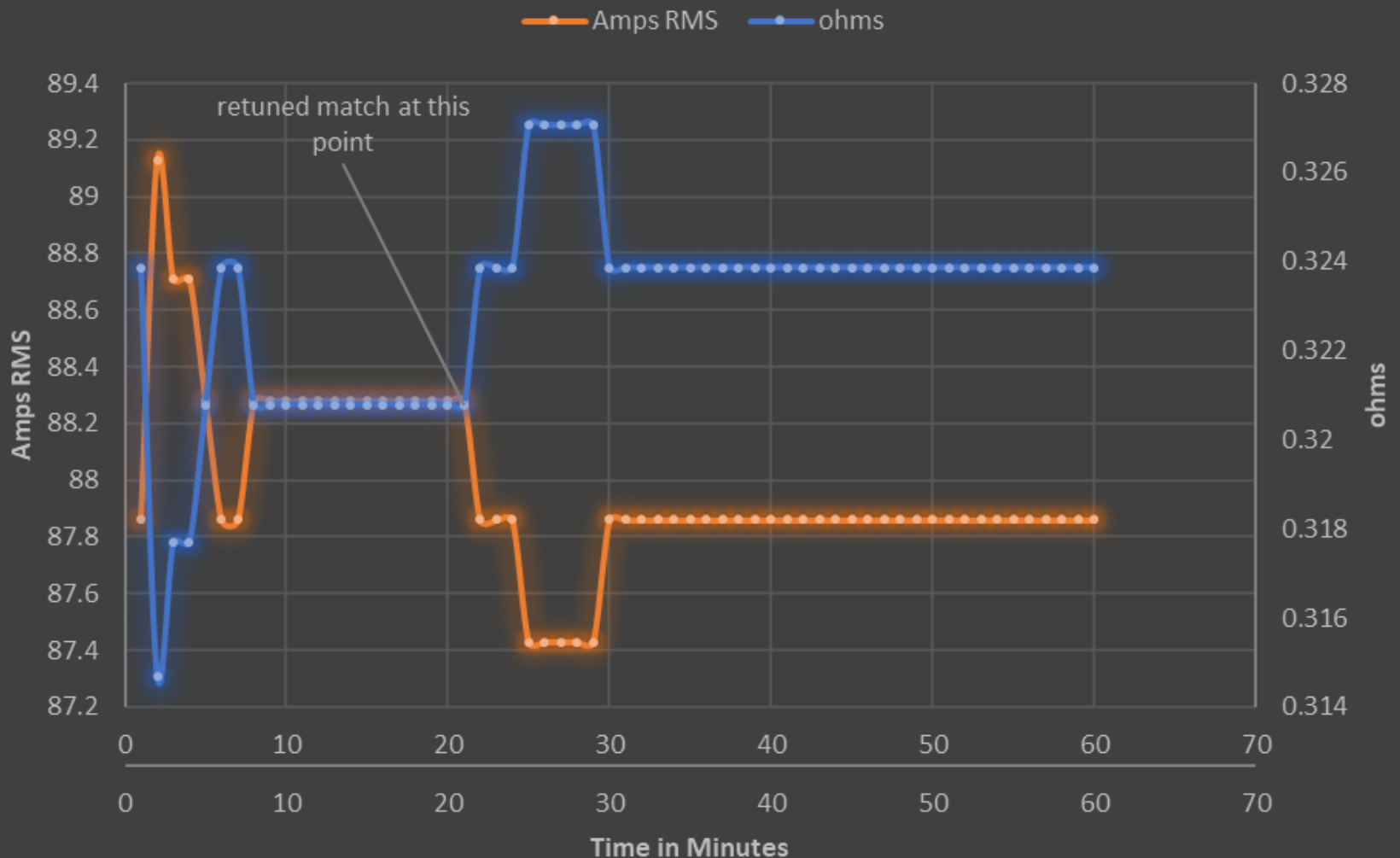
**ABILITY TO SIMULATE MOST
CHAMBER CONDITIONS**



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Complex Load Test @ 2500 watts



- Max transient of load value at 2 minutes after instantaneous application of power is 1.93%
- Max transient after re-tuning of match at 5 to 8 minutes is .98%
- Keep in mind transient variations are shared between the generator, matchbox, and load

1200MS 30 dB ATTENUATOR

NEW



ALTRONIC RESEARCH INC.

MODEL 1200 SERIES HIGH POWER STABLE ATTENUATOR



NEW!



2.5 Kw & 5kw Oil-Cooled RF Attenuator

Altronic Research has introduced its Oil Cooled RF Attenuators, which share the same high level of reliability that Altronic's dummy loads are famous for worldwide. These 120025 RF Power Attenuators are an essential and dependable accessory for reducing power levels and VSWR, isolating components under test, conducting harmonic signal analysis, and serving as comparison standards. The upcoming models, ranging from 1kw to 10kw, will also be built to the same high standards as other Altronic models. Compared to previous options, these attenuators provide superior RF characteristics and stability under full power. This is due to the use of Power Films Systems' low TRC proprietary resistors and higher power dielectric oil. The Model 1200 series RF Power Attenuators are an indispensable and trustworthy accessory for a wide range of applications.

SPECIFICATIONS

POWER RATING (RMS) (CONTINUOUS DUTY)	1 KW+	1.5 KW+	2.5 KW	5 KW	10 KW+
FREQUENCY RANGE	DC to 1 GHz	DC to 1 GHz	DC to 1 GHz	DC to 1 GHz	DC to 1 GHz
ATTENUATION VALUE	30 dB	30 dB	30 dB	30 dB	30 dB
ACCURACY	+/- .5 dB	+/- .5 dB	+/- .5 dB	+/- .5 dB	+/- .5 dB
IMPEDANCE	50 Ω nominal	50 Ω nominal	50 Ω nominal	50 Ω nominal	50 Ω nominal
VSWR**	< 1.1:1 to 500 MHz	< 1.1:1 to 500 MHz	< 1.1:1 to 500 MHz	< 1.1:1 to 500 MHz	< 1.1:1 to 500 MHz
AC POWER REQUIRED	N/A	N/A	N/A	115-240VAC 60Hz (50 Hz available)	115-240VAC 60Hz (50 Hz available)
INPUT CONNECTORS*	QC interface, Stub QC	QC interface, Stub QC	QC interface, 1-5/8"EIA, 3-1/8"EIA	QC interface, 1-5/8"EIA, 3-1/8"EIA	QC interface, 1-5/8"EIA, 3-1/8"EIA
OUTPUT CONNECTORS	QC interface	QC interface	QC interface	QC interface	QC interface
NOMINAL DIMENSIONS (INCL. CONNECTIONS)	17" x 8" x 10 1/2" (43.5 x 21 x 27cm)	14 1/2" x 7 1/2" x 18" (36.5 x 18.5 x 46cm)	22" x 7 1/2" x 18" (56.7 x 18.5 x 46cm)	31" x 10" x 28" (78.6 x 25.4 x 71.4cm)	32" x 10" x 34 1/2" (80.5 x 25.4 x 88cm)
NOMINAL WT.	33 lbs. (15 kg.)	49 lbs. (22 kg.)	62 lbs. (28 kg.)	150 lbs. (68 kg.)	174 lbs. (79 kg.)
AMBIENT TEMP RANGE	-40 C to +45 C	-40 C to +45 C	-40 C to +45 C	-40 C to +45 C	-40 C to +45 C

* Power/frequency combination is limited with QC depending on connector type

** Measured with type N connector +Coming soon
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BY
ALTRONIC RESEARCH

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RF TERMINATION

FULL LINE OF WATER, AIR AND OIL DUMMY LOADS

From 250 watts to 1.5 megawatts

1100 MS



The 1100 MS (Maximum Stability) Oil Load Series has been specifically designed for the Semiconductor and ISM industry of operation at 13.56 MHz.

FROM 1KW TO 20KW

6400 Series



The 6400 Series air dielectric coaxial loads The 6400 Series was designed to operate using static or forced air while exhibiting stable RF characteristics can be optimized to from dc to 100mhz

9700 Series Water loads

Workhorse of the world for rf terminations 250 watts to 200kW

S Series



A stable, near reflection-less load is a key component in any Semiconductor or ISM industry test setup seeking to characterize a device or system with the greatest possible repeatability and accuracy. The new 9700 S Series water loads have been specifically designed to address these goals with a guaranteed Max VSWR of ≤ 1.05 and upper frequency response of 100 MHz



Including mismatch Loads and single package 2/1 loads 25 ohm

Our **Water-Cooled Dummy Load** Series are extraordinary water terminations for 50-ohm coaxial transmission line systems that exhibit excellent and stable RF characteristics during their full range of operating power. The rugged, precision design of the Water-Cooled Series provides reliability, serviceability, convenience, and **economy** well suited for today's modern RF application.

FAST DELIVERIES ON MOST MODELS

LOADS AVAILABLE NOW

NO MORE WAITING



PRIVATELY OWNED AMERICAN COMPANY
BASED IN ARKANSAS
US SOURCED COMPONENTS

INHOUSE

- RF ENGINEERING
- CNC MACHINING
- SHEETMETAL FORMING
- RESISTOR MANUFACTURING
- CAD DESIGN
- R&D
- LARGE INVENTORY
- METAL FINISHING

Short LEAD TIMES

for standard models SHIP 4/6 WEEKS



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OTHER PRODUCTS



INTEGRATED
CALIBRATION
COOLING CART



LOAD CARTS
WITH OVERHEAT
ALARMS



MATCH AND LOAD
PROTECTION FLOW
SWITCH



OPTI-CAL® DIGITAL CALORIMETRY



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ALTRONIC RESEARCH INC.

SEMI TOOL END USER

INTRODUCTION

OUR CUTTING EDGE: SERVICE

Altronic Research Inc. is a leader and pioneer in Research and Design and Development. We listen to our customers and undertake specialized and custom designs to satisfy their needs. We consider each requirement a special opportunity to serve our customers and present them with a reliable and dependable product.

- Provide a real solution for NO PROBLEM FOUND!!
To critical performance issues in involving RF delivery components.
- Working with your team to solve issue
- On site service if needed
- Small company ethics with fast service when things happen

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ALTRONIC RESEARCH INC.

Performance By Design



Manufacturers of Omegaline

RF Coaxial Load Resistors

Since 1967

altronic.com

- BROADCAST
- SEMICONDUCTOR INDUSTRY
- MEDICAL INDUSTRY
- HIGH ENERGY PHYSICS
- CUSTOM DESIGN LOADS



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