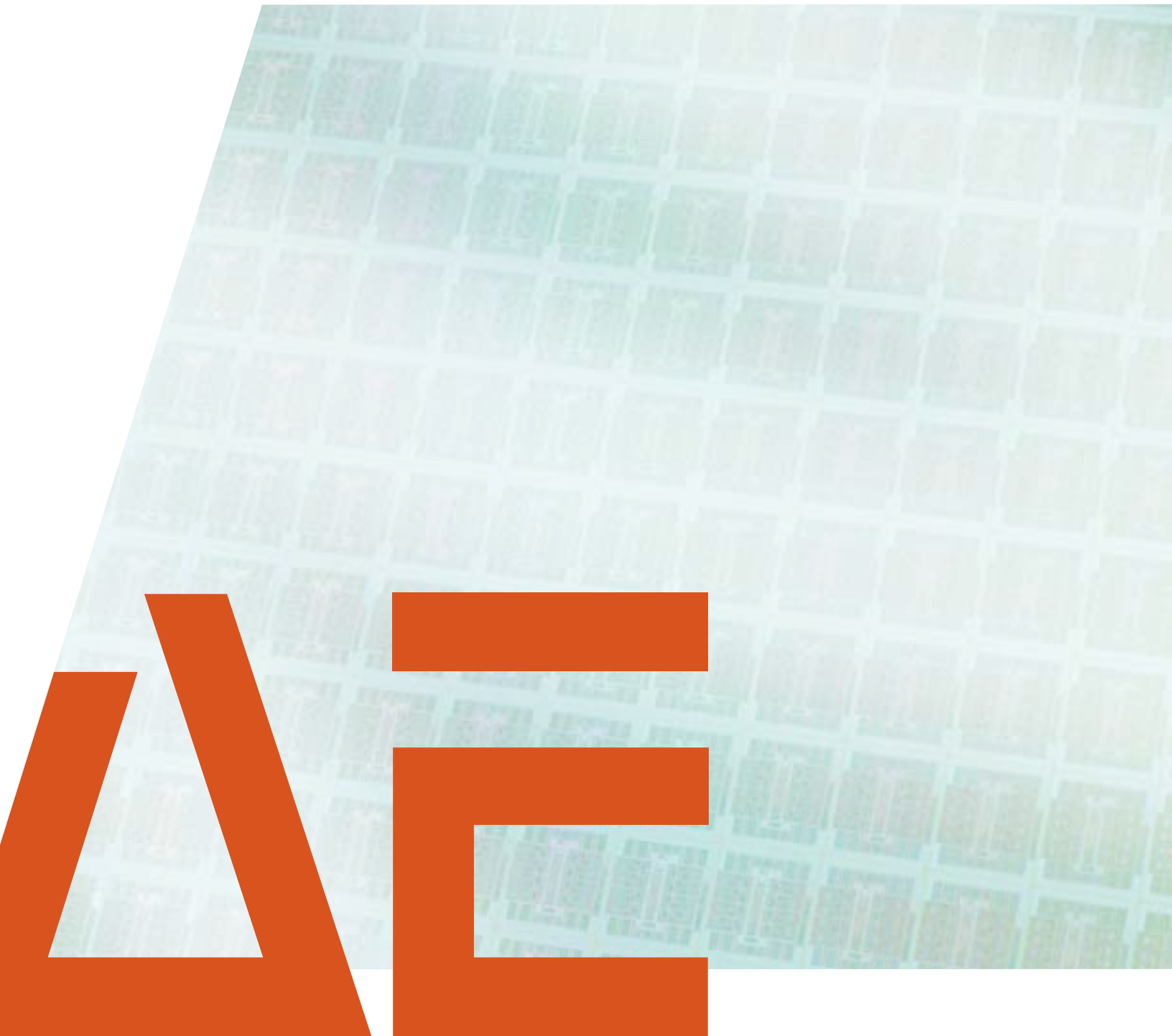




A POWERFUL ADVANTAGE™



NAVIO™ DIGITAL MATCHING NETWORK

The economical choice for quick, accurate,
and repeatable digital impedance matching
in a highly configurable package

NAVIO™ DIGITAL MATCHING NETWORK

Advanced Energy (AE) has extended its digital matching network platform to include simplicity yet high reliability in one of the most affordable matching networks on the market today. Available in multiple power ranges and frequencies, the Navio™ matching network leverages our proven power expertise to precisely match the complex impedance of a plasma to your desired tuning range—quickly, accurately, and repeatably.

Benefits

- Improve throughput, increase yield, and reduce production costs
- Choose a standard model or configure a unit that meets your system requirements
- Install and operate with ease

Features

- Quick, accurate, and repeatable impedance matching
- Optimized, off-the-shelf functionality for many applications
- Generous menu of configuration options for more sophisticated processes
- Wide power and frequency ranges
- Virtual Front Panel (VFP) software for real-time process power and impedance measurement and analysis

Choose from a standard offering or a configurable design to meet your specific requirements. Installation is virtually plug-and-play with AE's RF power supplies, and monitoring and control is available with Virtual Front Panel (VFP) software.

Ideally suited to solar PV, flat panel display, industrial, and MEMS manufacturing applications, the Navio matching network provides quick, accurate, and repeatable impedance matching across a defined load range for the most efficient and stable power delivery. The compact, air-cooled unit—available in a standard package or a slim version—offers extreme flexibility with pre-engineered configurability to support most thin-film applications.

Market Applications

- Solar PV
- Industrial
- Flat panel display
- MEMS manufacturing

Capacitively and Inductively Coupled Plasma Process Applications

- PECVD
- Etch/clean
- PVD

Improve Throughput, Increase Yield, and Reduce Production Costs

The Navio matching network automatically tunes the complex impedance of a plasma to 50 Ω or your desired impedance. The digital tuning algorithm and stepper motor drive produce a quicker, more accurate, and repeatable response compared to traditional analog tuning methods—for improved throughput, increased yield, and reduced production costs.

The Navio matching network is fast and highly accurate, designed to always tune to the desired impedance point. Its repeatable response minimizes delivered power deviations between matches and run to run—even under varying operating conditions—for an extremely high level of process stability and uniform deposition.

Choose a Standard Model or Configure a Unit That Meets Your System Specifications

Choosing the right matching network has never been easier. With three decades of power expertise, we've engineered a cost-effective solution with performance advantages that are sure to satisfy. The Navio matching network features off-the-shelf functionality for those looking for a simple solution. Standard units are optimized for applications that have well understood impedances yet require fast, reliable auto-tuning.

For more sophisticated processes, a generous menu of configuration options are available, including:

- Broad power ranges—1 kW, 3 kW, and 5 kW
- Wide input frequencies—13.56 MHz, 27.12 MHz, 40.68 MHz, and 60 MHz
- Multiple RF input and output connector options
- Multiple tuning ranges

Talk to our specialists, and we can advise the most appropriate options for your application.

Multiple Tuning Ranges

Figure 1 highlights the pre-defined tuning ranges available for 13.56 MHz Navio matching networks. If necessary, tuning ranges can be adjusted during your development phase; our field service engineers will work with you to pinpoint the range that's right for your application and quickly reconfigure your unit in the field.

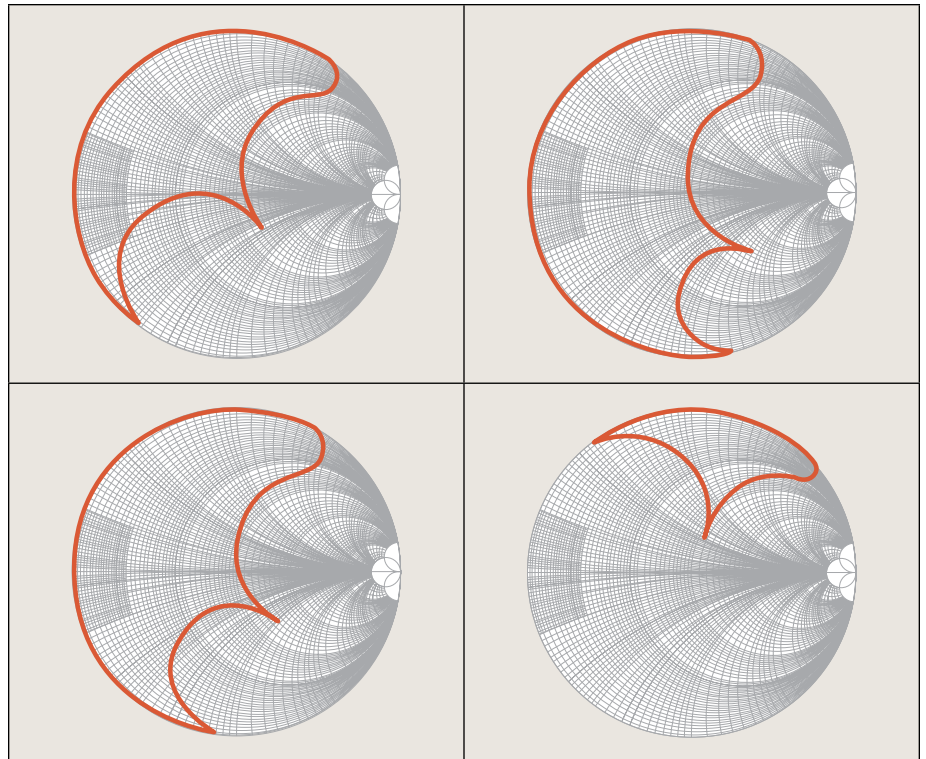


Figure 1. Pre-defined tuning range options for the 13.56 MHz Navio™ matching network. Similar options are available for 27.12 MHz, 40.68 MHz, and 60 MHz models.

Install and Operate with Ease

The Navio matching network can be paired with any RF generator but communicates directly with the Cesar® power supply. Installation is easy, and operation is virtually automatic with no manual configuration required. Microprocessor control through the Virtual Front Panel (VFP) software enables you to monitor and command the system using a personal computer. VFP software also passively monitors many power functions and actively controls tuning parameters, providing intuitive, broad-ranging functionality. It features event monitoring, readbacks, Smith® charting, and password-controlled access.



Summary Specifications

Physical Specifications	Standard	Flat Pack
Dimensions	15.0 cm (H) x 24.5 cm (W) x 37.4 cm (D)	11.2 cm (H) x 30.0 cm (W) x 39.4 cm (D)
	5.9" (H) x 9.6" (W) x 14.7" (D)	4.4" (H) x 11.8" (W) x 15.5" (D)
Weight	6.6 kg (14.5 lb)	7.1 kg (15.6 lb)
Mounting	Mounting holes on bottom, rear, and sides of unit	
Connector and Cable Specifications		
RF Input Connector	Available connectors: C, N, HN, 7-16, LC, SQS	
RF Output Connector	Available connectors:	
	CF 2 3/4" flange mount	
	7-16 (female)	
	B20N with 6 mm threaded stud, 6 mm socket, 6 mm pin, 6 mm tapped hole only (no stud)	
AC Power Input Connector	IEC320	
DC Power Input Connector	9-pin CPC series connector, male (Tyco/Amp PN: 206486-1 or equivalent)	
Communication	RS232, 9-pin, female, subminiature-D	
	Analog, 15-pin, female, subminiature-D	
	PROFIBUS, 9-pin, female, subminiature-D	

Electrical Specifications	
Frequency	13.56 MHz, 27.12 MHz, 40.68 MHz, 60 MHz
Input Power	1 kW, 3 kW, 5 kW
Reflected Power	Depends on input power:
	1 kW units: 4 W or 1% maximum of forward power at 20 W to 1000 W, whichever is greater
	3 kW units: 5 W or 1% maximum of forward power at 30 W to 3000 W, whichever is greater
	5 kW units: 5 W or 1% maximum of forward power at 50 W to 5000 W, whichever is greater
Tuning Time	< 3 sec end-to-end
	< 2 sec from proper pre-set point to matched condition
Tuning Range	Depends on unit frequency and on the tuning coil installed
Settling Time	≤ 1 sec, defined as the time for the matching network to re-establish a return loss ≤ -20 dB when the load reactance is shifted sufficiently to introduce an instantaneous rise in the return loss to -10 dB
Stability	No oscillation of capacitor position for any stable load
DC Bias Scaling	For units with detection of bipolar plasma bias, the output voltage is scaled down 400:1 V/V, with an accuracy of ± 1% full range

Dimensional Drawings

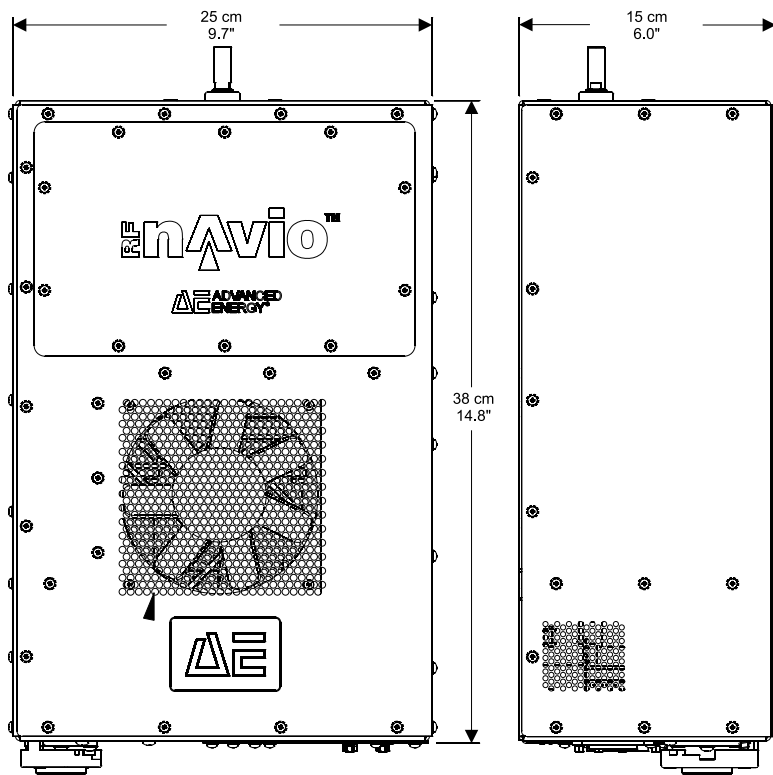


Figure 2: Navio™ standard dimensions

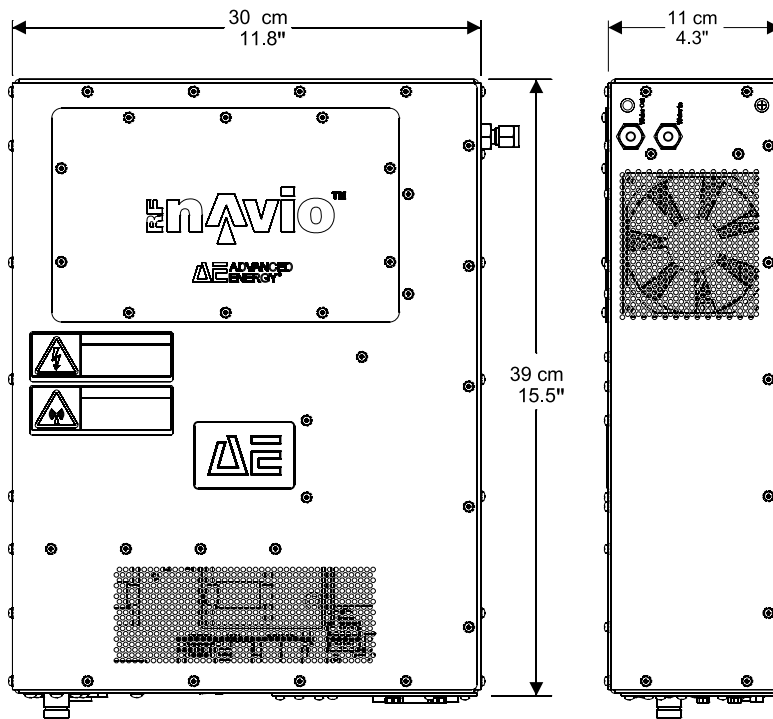


Figure 3: Navio™ flat pack dimensions

Contact AE

The simple, reliable, high-value Navio matching network from AE offers efficient and stable power delivery at a price you can't afford to overlook. For the ideal RF matching solution for your application, contact us today at +1.970.221-0108 or visit us online at www.advanced-energy.com/en/sales_support.html.



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