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www.sputteringcomponents.com





Equipment used for thin film PVD, worldwide

Thin Film Solutions

End Blocks and Magnetics designed for specific applications and easily retrofitted.

VACUUM & WATER SEALS

Dual-lip, redundant, tolerate running dry: increases reliability; easily replaced

POWER TRANSFER

Patented brushless design: leaves no carbon brush dust; increases power ratings and transfer reliability

BEARINGS

Exclusive to SCI: eliminate inductive heating; tested to verify years of maintenance-free operation

MOUNTING

Industry standard or non-standard: allows easy installation using existing mounting holes and utility connections; all products can be mounted in any orientation

TARGET ATTACHMENT

Clamp attaches to targets from any vendor: allows for economical sourcing; designed for high load bearing and industry's fastest target change

FILL/DRAIN

Patented system: water completely fills the target for cooler operating temperature/high power; completely drains the target for target changes



DRIVE

Robust inverter duty motor and belt drive: provide many years of trouble-free life

Lowest cost of ownership

Parts are made from durable, anticorrosive materials for a long, trouble-free life.

Designs are simple for quick and easy maintenance by the end user; there is no need to return end blocks to SCI or to stock spare end blocks.

End blocks stay mounted to the system during maintenance.

A custom toolkit makes maintenance easier and prevents damage caused by improper tools.

Instructional maintenance videos are available.

Spare parts are available regionally for fast, economical sourcing.

MAGNETS

High-strength, fully encapsulated: are capable of high deposition rates; magnets are categorized according to gauss level for industry-leading uniformity and target utilization; no aluminum components

TUNING

Fine-thread adjustments measured with a dial caliper: allows for simple magnetic uniformity tuning (on all magnet bars for standard 125 ID targets)

CONSTRUCTION

Robust: ensures a trouble-free life; minimizes process drift to increase yields

ROLLER SYSTEM

Durable and precise multi-rollers: allow magnet bar orientation in any direction for sputter up, sputter down or offangle sputtering; long life and easy to maintain



SC-Series Internal-Mount End Block

The architectural industry-standard size SC-Series internal-mount end block is the best value, highest power, and most reliable end block available on the market today.

Upgrade from other architectural glass rotary end blocks without modifying lids or changing utilities.

Upgrade from planar systems to increase the output and quality of your existing coater.

SCI can provide coater integration support.







Patented SC end block



Outboard support assembly

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MC-Series Internal-Mount End Block

Even with its compact design, the MC-Series internal-mount end block provides both high performance and reliability.

Use in new systems or upgrade from planar systems to increase the output and quality of your existing coater.

SCI can provide coater integration support.







Patented MC end block



Outboard support assembly

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cMC-Series Internal-Mount End Block

The cMC is designed to directly replace the Soleras compact end block or to use in new systems.

Upgrade from planar systems to increase the output and quality of your existing coater.

SCI can provide coater integration support.



Patented cMC end block



Outboard support assembly









CC80-Series Internal-Mount End Block

With its extremely compact package, the CC80 is designed for 80 mm ID targets, making it an excellent choice for small systems or R&D systems.

Use in new systems or upgrade from planar systems to increase the output and quality of your existing coater.

SCI can provide coater integration support.





Patented CC80 end block



Outboard support assembly





TC-Series Internal-Mount End Block

Designed to replace planar cathodes where space is very limited on the ends, the TC-Series internal-mount end block provides performance in a compact package.

The TC end block is the most compact design available for standard 125 mm ID industrial targets but is a two-ended design.

Use to upgrade from planar systems to increase the output and quality of your existing coater.





Patented TC end block set with rotational drive on one end and power/water utilities on the other end





SM-Series External-Mount End Block

The SM is our largest external-mount end block.

External end blocks have a wider substrate coverage than internal models.

To match any system, drive shaft length is customizable, and drive motors can be mounted inward or outward and at any angle around the main housing.

Magnet bar adjustments—to any angle—are made externally. All utilities are external and remain attached during target changes. The water seal cartridge is easily accessed for quick replacement.

Use in new systems or upgrade from planar systems.

SCI can provide coater integration support.



Patented SM end block









MM-Series External-Mount End Block

The MM is our mid-size external-mount end block.

External end blocks have a wider substrate coverage than internal models.

To match any system, drive shaft length is customizable, and drive motors can be mounted inward or outward and at any angle around the main housing.

Magnet bar adjustments—to any angle—are made externally. All utilities are external and remain attached during target changes. The water seal cartridge is easily accessed for quick replacement.

Use in new systems or upgrade from planar systems.

SCI can provide coater integration support.



Patented MM end block









CM-Series External-Mount End Block

The CM is our smallest external-mount end block and is an excellent choice for smaller systems or R&D systems.

There are two designs: one for a 125 mm ID and another for an 80 mm ID target.

External end blocks have a wider substrate coverage than internal models.

To match any system, drive shaft length is customizable, and drive motors can have 360° positioning around the main housing.

Magnet bar adjustments—to any angle—are made externally. All utilities are external and remain attached during target changes. The water seal cartridge is easily accessed for quick replacement.

Use in new systems or upgrade from planar systems.

SCI can provide coater integration support.





Patented CM end block







SWING CATHODES

Swing Cathodes[™]

Swing Cathodes[™] are an external-mount end block with additional, programmable motor that swings the magnet bar from side to side.

Swing Cathodes[™] are designed to coat static substrates, including 3D and display coating.

With swing cathodes, uniformity of $< \pm 1\%$ can be achieved on a static substrate (compared to $> \pm 15\%$ on static substrates when not using swing). Continuously rotating target

Programmable magnet pack swings inside the tube

Model SMS MMS		Power	VA	Maximum Target Length	
SMS MMS				Maximum Target Length	
MMS	0	Up to 200 kW DC or MFAC	1500 V / 450 A	4000 mm	
	0	Up to 100 kW DC or MFAC	1500 V / 225 A	2500 mm	
CMS	0	Up to 20 kW DC or MFAC	1500 V / 50 A	1000 mm	







SWING CATHODES







Swing-DUO™ Software

When used with our exclusive Swing Cathode[™], Swing-DUO[™] (Dynamic Uniformity Optimization) software simulates the combined cathode array uniformity to produce individually optimized magnetic bar motion profiles.*

User friendly with a web-based interface, the software quickly designs coater configurations for optimal deposition uniformity.

Swing-DUO[™] makes uniformity compensation for systemic issues in the form of motion profile changes.

The software prevents uniformity drift over the life of the target by creating multiple CAM tables for different target diameters

- Dwell-based simulation finds the key deposition angles and calculates the amount of time required at each angle.
- Optimizes uniformity for constant power or variable power
- Refines uniformity optimization using actual measured uniformity results
- Outputs a CAM table in angle and time format for simplified servo programming
- Indicates the amount of wasted material not deposited on the substrate as a function of the motion profiles

The software opens from the Sputtering Components website for registered users.

Visit the Sputtering Components website for a demonstration video.

*Used for setup only. Final adjustments are process specific.

Simulated Four Cathode Swing Array

Swing-DUO™ Software

Optimization Results

() SPUTTERING



±0.11% uniformity across the center region 3.74% of output deposited on neighbors

31.72% of output beyond the edge of the substrate

35,46% of output not deposited on the substrate

Cathode Configuration

Simulation Output





TRM-Bar™ mQRM-Bar™ QRM-Bar™

The most versatile rotary magnet system available, Sputtering Components Advanced Magnetics for 125 mm ID targets are designed to provide high quality, uniform coatings for your application.

Three models of magnet bars are available for customizing to your application. They can also be adapted to end blocks from other manufacturers.



Magnet bars

TECHNICAL SPECIFICATIONS					
Model		Maximum Target Diameter	Sputter Angle	Application	
TRM-Bar™	0	160 mm	<u>+</u> 12°	Standard targets, most materials	
mQRM-Bar™	0	170 mm	<u>+</u> 15°	Thicker targets, high material utilization	
QRM-Bar™	0	180 mm	<u>+</u> 21°	Thickest targets, ITO, electrical grade films	





- Small magnet, three-row design
- Narrowest deposition profile minimizes coating loss to shields
- Multiple turn-around design options specific to your application
- Easy change turn-arounds



- Small magnet, four-row design
- Patented staggered turnaround design for better target utilization
- Improved performance and reduced impedance
- Stable plasma impedance over the target life



- Large magnet, four-row design
- Patented staggered turnaround design for better target utilization
- Improved performance
- Best plasma impedance stability over the target life



SRM80-Bar™ TRM80-Bar™

Designed specifically for the CC80-Series internal-mount end block and the CM80-Series external-mount end block, the SRM80-Bar[™] and TRM80-Bar[™] are for use with an 80 mm ID target tube.

Their narrow deposition profile minimizes coating loss to shields.

SRM80-Bar™ Magnetics



TECHNICAL Maximum Target Diameter	SP	ECIFICATIONS 115 mm
Sputter Angle	0	28° (SRM80-Bar™) 19° (TRM80-Bar™)
Application	0	80 mm ID targets, acceptable with most materials

TRM80-Bar™ Magnetics

RAM-Bar[™]

The Remotely Adjustable Magnet Bar lets operators position and fine tune the distance between the magnetics and the target surface from outside the system and during operation to eliminate costly system shutdown.

Compatible with all SCI end blocks for 125 mm ID targets and available with any of the advanced magnetics, the RAM-Bar[™] allows for up to 4 mm vertical difference between adjustment locations for very fine tuning for the most demanding uniformity requirements.

The system has robust industrial communication via Ethernet gateway and fiber optics for control. Multiple magnet bars can be controlled through the coater PLC or using a dedicated computer. The software is easy-to-use and customizable.

Batteries are easily replaceable standard rechargeable Li-ion packs.

The RAM-Bar[™] has two methods of operation: precision uniformity adjustment and constant plasma impedance. The constant impedance method can reduce process drift and help stabilize the deposition rate throughout the target lifetime.



Remotely Adjustable Magnet Bar (RAM-Bar™)

TECHNICAL SPECIFICATIONS

Backing Tube D 1-4 m Length Maximum Target D 180 mm Diameter **Adjuster Pitch** 305 mm (12 inches) **Maximum Film C** < ±1%

Movement Precision

Uniformity

Application

+/- 250 µm of travel

Optical thin films with tight uniformity requirements



e-Cathode[™] Process Lids

Sputtering Components e-Cathode[™] process lids are a turnkey solution for new or existing coaters. They are available in both digital and analog formats and customized to end user needs.

For easy operation, they feature local and remote control with full safety interlocks. Designed for the application, target-to-substrate distance is determined by the user.

Optional MFC, gas bar and anode integration can be included. The lids feature customized discrete I/O connector and a high voltage quick disconnect to make target changes quick and easy.

With new systems, SCI provides OEM manufacturers complete turnkey solutions, ready to interface with their systems. SCI can provide as much controls integration as desired onboard the e-Cathode[™].

With users needing to add additional cathodes to their system or upgrade their end blocks and magnetics, SCI can provide a plug-andplay solution.

Our e-Cathode[™] clones match current external mechanical and electrical interfaces but use SCI end blocks, magnet bars and control system. SCI offers direct end block bolt-in replacements for most major OEMs.

Lids can be sent to our facility for retrofit, or we will provide the components for field upgrades. Trained technicians are also available to help you with your installation. The upgraded systems remain compatible with existing control systems.



Horizontal e-Cathode™ process lid system



Vertical e-Cathode™ process lid system

FEATURE		DIGITAL E-CATHODE™	ANALOG E-CATHODE™	BASIC E-CATHODE™
Onboard Logic	0	PLC	Relay	None
Interlocks	0	Full	Full	HV only
Control	0	Local (touch screen) Remote (Ethernet, Profibus, DH+)	Local (light, switches) Remote (discrete I/O)	All sensors wired to the connector
Monitoring	0	Real time and advanced parameter	Basic parameter	Real time
Water Flow	0	Flow rate indicator	Flow switch	Customer supplied, external
Water Temperture Option	0	Yes	No	No
Onboard MFC Option	0	Yes	No	No
Differential Pumping Option	0	Yes	Yes	Yes

Gas Manifolds

Available in three models, SCI gas manifolds are segmented for main gas and additional process gases.

They have a robust, simple design and are easily cleaned. Mounting hardware and waste shielding are included.

MODEL		MAXIMUM LENGTH	OUTLET TYPE	FEATURES
Binary (BGMA)	0	4000 mm	Non-replacable, non-adjustable	Highest uniformity (< <u>+</u> 1.2%) Fast reactive sputtering response time
Square Tube (SGMA)	0	4000 mm	Replacable, adjustable	Adjustable uniformity for non-uniform systems
T-Bar (TGMA)	0	1500 mm	Non-replacable, non-adjustable	Compact design: for use when limited space is a factor



envis-ION™ DMPTS

The envis-ION[™] Dual Magnetron

Pre-treatment Source (DMPTS) drives off water vapor and other volatile contaminants from the substrate for improved adhesion and durability while reducing the chance of substrate damage due to lower ion energies.

Compatible with other PVD processes, it has a wide operating pressure and is highly tunable for a wide range of operation

More than 200 hours per campaign means fewer process disruptions. Target change is fast.

Hidden electrodes produce minimal contamination for a long electrode life that results in low cost of ownership.

With flexible mounting options and a compact design, it fits into existing equipment.

- Flange: All utilities exit the back of the source through the flange.
- Cantilever: All utilities exit the end.
- Remote: The utilities are flexible and can exit the back, the end, or travel from the source through flexible bellows.



envis-ION[™] Dual Magnetron Pre-treatment Source (DMPTS)







Excellence Through The Process Cycle

Modeling and Simulation Using COMSOL

Finite element analysis for magnetic modeling, including sputter flux, magnetic interactions and charged particle motion, helps our customers maximize utilization and uniformity.

Molecular and transition flow analysis on SCI gas manifold designs ensures uniform gas distribution.

Thermal and flow simulations for water cooling by calculating the temperature at the water inlet and outlet, and at various points of the target tube, including surface and bonding layers, provide correct water flow parameters.

Mechanical and structural analysis ensures durable but lightweight and cost-effective designs.

Manufacturing

SCI has a complete, vertically-integrated inhouse fabrication shop.

All cathode, magnetics, e-Cathode[™] programming and electronics assembly is completed at our facility in Owatonna, Minnesota USA.

Validation

Functional testing ensures all systems work as designed. Leak checking is done on all end blocks. Seals go through rigorous life tests. Gauss strength plotting checks consistency across magnet bars.





