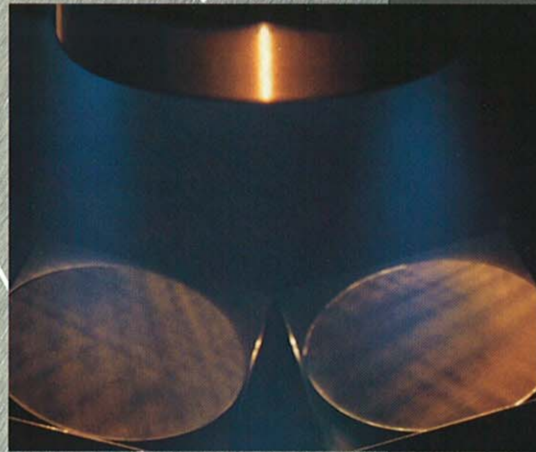
CHA Industries



Superior sputtering

...BY DESIGN!

CHA Industries

SSC-600

Sputter up or sputter down, round cathode, multi-station

SSC-1000

Sputter up or sputter down, round cathode, multi-station

SUPERIOR SPUTTERING SYSTEMS

Covering a broad spectrum of industrial coating applications from auto parts to semiconductors.

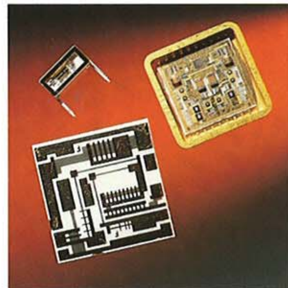
Six basic CHA sputtering systems with a wide range of options cover the spectrum from full computer control to operator control, from production runs to small R&D quantities.

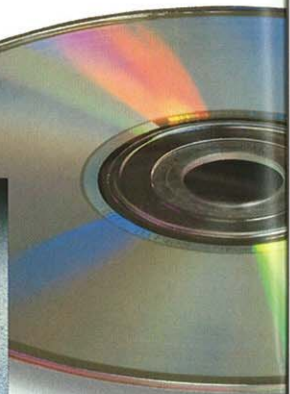
CHA field-proven sputtering systems pay dividends in the long run. They are economical, feature fast loading and unloading, offer broad process flexibility, and accommodate an extensive variety of substrate sizes, shapes, and materials.

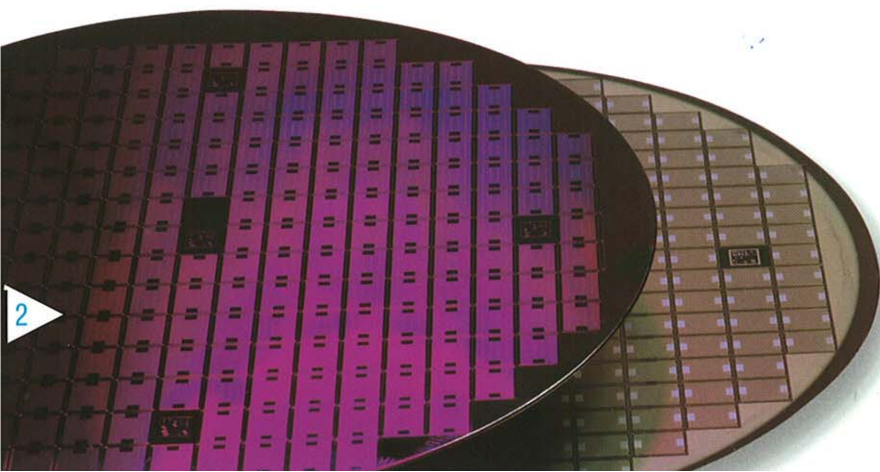
CHA systems utilize moving substrates for consistently high film uniformity, typically less than ±5% across substrate, substrate to substrate, run to run. Cathode-to-substrate spacing is adjustable and all systems incorporate multiple cathode stations which may be utilized for sequential or co-deposition processing.

For wide process flexibility and cost-effective operation, sputtering system options include Substrate Heat, Substrate Pre-clean, Ion Beam Etch, RF Etch,

SEMICONDUCTORS ■ CD'S—READ WRITE ■ HYBRID CIRCUITRY ■ DISPLAY DEVICES ■ OPTHALMICS ■ SPACE PARTS







Mag-Drum 1000™

Side sputtering, rectangular cathodes, multi-pallet fixturing with 360° heating

MPS-4 Family of Systems

Sputter sideways, round cathodes, uncommon flexibility

Mark 40 System

Dual process —sputter up or evaporation

Mark 50 System

Dual process —sputter up or evaporation

Substrate Bias (DC or RF), and Source Isolation.

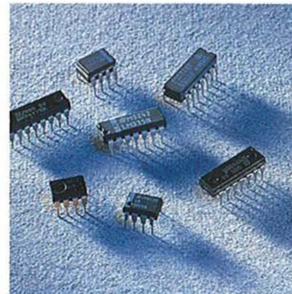
CHA also manufactures a full line of ion-beam sputtering systems and related options.

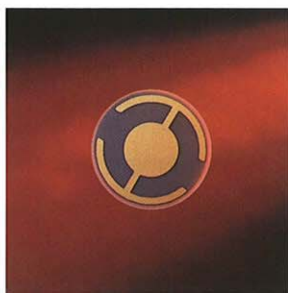
Pumping options include Cryo, Turbo, or Diffusion pump. The user has a choice of gas controls for reactive and non-reactive sputtering. All systems may incorporate a liquid nitrogen pump/trap or refrigeration system for high speed pumping of water vapor and other condensibles.

All systems can be equipped with a computerized control system which provides fully automatic cycling of the system and process plus a real-time visual display of system and process status. Interactive screens display all system and process functions. Windows™-based software makes operation of these systems extremely user friendly. Optional data logging stores system and process information for future reference. Stored process data are easily called up and may be printed as desired.

CHA Sputtering Systems can also be equipped with the CHA Autotech Control System, which may be configured for multi-function manual control or one-button fully automatic control. All system controls—computer and Autotech—incorporate full manual control for process development and maintenance-type functions.

■ PHOTO-OPTICS ■ AERONAUTICS ■ SENSORS ■ LED'S ■ AUTOMOTIVE ■ POWER SOURCES ■ COMMUNICATIONS





CHA Industries

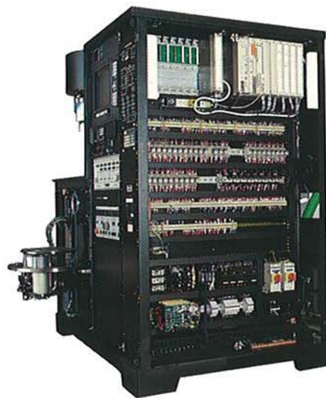
SSC-600

SPUTTERING SYSTEMS

The SSC-600 Sputtering System incorporates upper and lower base plates for sputter up or sputter down operation. Substrates and stations are accessible from the top or bottom of the process chamber. Lower baseplate swings out for access through cabinet doors. Upper baseplate is elevated for substrate access and may be rotated outward for station access.

The SSC-600 is provided with up to four DC or RF round cathodes. System features include a single plane, multi-substrate rotating fixture and a rotating shutter for predeposition and positive thickness cutoff control. The system utilizes 8-inch pumping stack components.

A built-in electronics rack assembly located alongside the chamber access doors contains all system controls. Customer has choice of computer or Autotech control option.



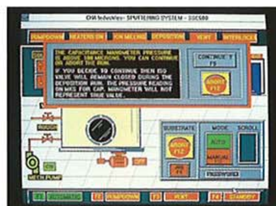
Integrated electronics cabinet shows ease of access

SSC-600 System controls

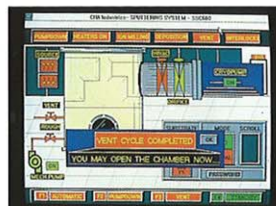
Substrate carrier swings out for loading

Deposition Process Display Screens

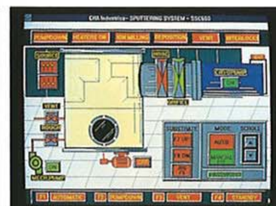
Interlocks and status



Fault screen and troubleshooting guide



Process chamber before pump down



Process chamber after pump down

Run aborted

SSC-1000

SPUTTERING SYSTEMS

The SSC-1000 Sputtering System incorporates upper and lower base plates for sputter up or sputter down operation. Base plates move out of cabinet for substrate loading and station access. System cabinet doors allow for through-the-wall mounting of the system.

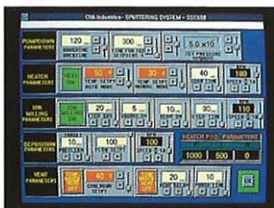
The SSC-1000 is a multi-station system and may be configured with up to four DC or RF round cathodes. System features include a single plane, multi-substrate rotating fixture and a rotating shutter for predeposition and positive thickness cutoff control. The system utilizes 12-inch pumping stack components.

SSC-1000 ready for deposition

Substrate carrier rolls out for loading

Upper cathode/fixture plate swings out for service

Vent cycle



Programming system and process

CHA Industries

Mag-Drum-1000™

SPUTTERING SYSTEMS

Equipped with a vertical rising process chamber, the Mag-Drum 1000 is designed for side sputtering operation with up to three DC or RF rectangular cathodes.

Mag-Drum 1000 sputtering system features include a rotating, multi-pallet fixturing, 360-degree substrate heating (substrates do not pass in and out of the heat zone), and rotating shutter for predeposition and positive thickness cutoff control.

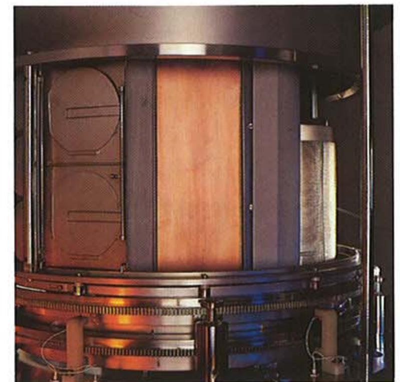
The system utilizes 12-inch pumping stack components and an in-chamber condensible pump provides high speed water vapor pumping at the optimum location. Processes may include RF etch, heat, and DC or RF bias during deposition. Vertically-mounted substrates and cathodes minimize particulate contamination.

A built-in electronics rack assembly located in the front panel contains all systems controls. Customer has choice of computer or Autotech control option.

At half the cost of competing equipment with similar features, the Mag-Drum 1000 can consistently process up to 100 4-inch (100 mm) wafers per hour with high film uniformity.

Mixed substrate sizes may be processed simultaneously (3″ dia. & 4″ dia. shown)

Backside of cathodes and condensible pump



5″ substrates and 6″x 21″ cathode face

MPS-4

FAMILY OF SPUTTERING SYSTEMS

The MPS-4 family incorporates a unique concept in small-to-large sputtering systems. Designed for applications ranging from commercial and laboratory research to volume production, the MPS-4 is an uncommonly flexible system offering a wide range of standard and optional features.

The MPS-4 is designed for side sputtering operation with up to four DC or RF round cathodes. System features 360-degree substrate heating and rotating shutters for predeposition and positive thickness cutoff control.

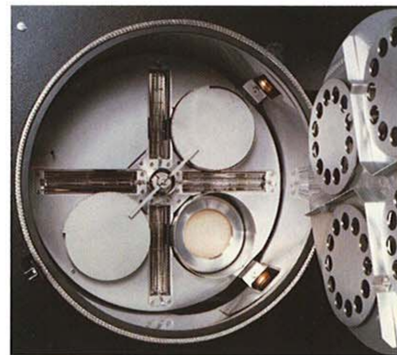
The MPS-4 family incorporates a horizontal-opening process chamber door. Substrates and fixturing are mounted on the door for easy substrate access in the clean room. The substrates are brought out of the machine into the clean room when the chamber door is opened.

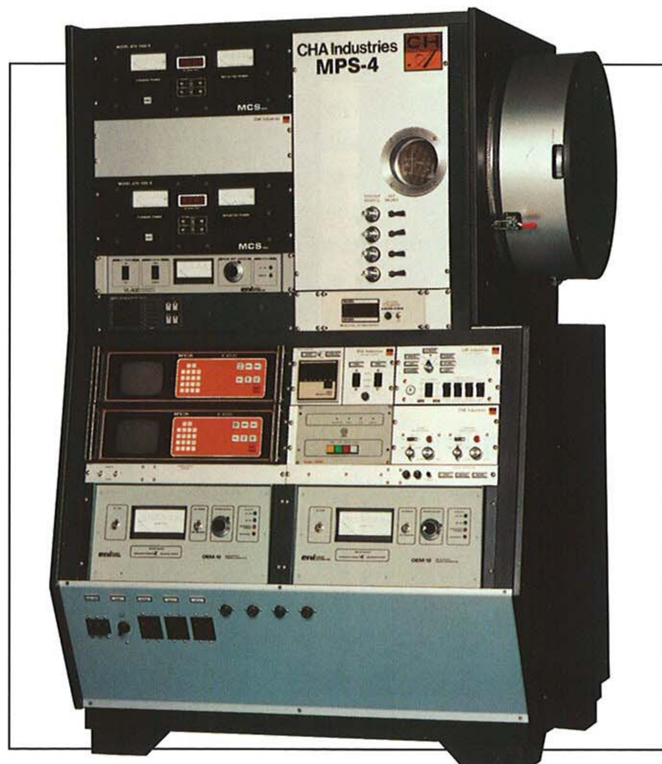
Standard system fixturing consists of a dual drive planetary system. By use of two separately controlled drive motors, the rotation speed of the planets is independent of the orbit speed. The orbit drive motor allows a planet to be stopped in front of or near any cathode while the planet spins on its own axis.

The optional orbital speed controller may be programmed so all areas of the substrate are exposed to the deposition flux for identical time/rate periods.

The cathodes are accessed through the systems door. The compact chamber has only one major seal. The system utilize 8-inch through 12-inch pumping stack components. A single rotating-plate substrate fixture is also available.

A built-in electronics rack assembly located in the upper and lower front panel contains all system controls. Customer has choice of computer or Autotech control option.





CHA Industries

Mark 40

COMBINATION SPUTTERING AND EVAPORATION SYSTEMS

The Mark 40 System is similar in design and operation to the Mark 50 System. The Mark 40 is ideal for moderately sized production runs or R&D quantities.

Mark 40 Systems is equipped with a rear door for through-the-wall clean room installation. Chase-way chamber access is provided from the clean room through the rear door.

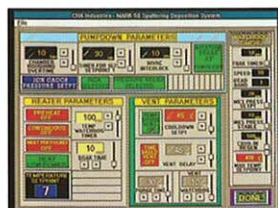
Process engineer entering data

Operator selecting process

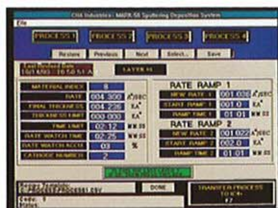
Operator loading lift off substrate carrier

Adjustable angle planetary provides superior uniformity and step coverage

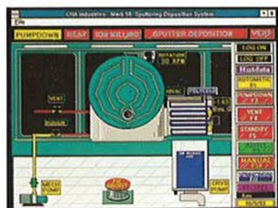
Deposition Process Display Screens



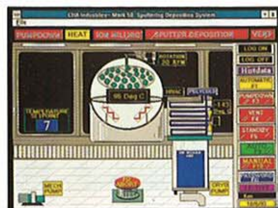
Pump down parameters



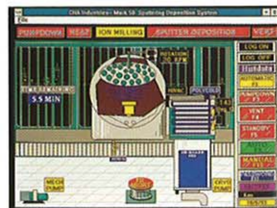
Process parameters



Pump down



Heat deposition



Ion beam milling

Mark 50

COMBINATION SPUTTERING AND EVAPORATION SYSTEMS

For sputtering with single or multiple cathodes.

For combination sputtering and evaporation processing, our Mark 50 systems are the best of both worlds. They are equally productive in both sputtering and evaporation processing.

Both sputtering and evaporation may be accomplished in the same run (i.e., sputter a barrier metal [TiW] and overcoat with evaporated aluminum).

Mark 50 Systems have become an industry standard in high vacuum deposition systems. Their simplicity in design, ease of operation, and unmatched reliability make them an excellent choice for a wide range of production applications.

These flexible systems are designed for sputter up operation with up to four DC or RF round cathodes. The Mark 50 System handles virtually any type of source—RF and DC sputtering, electron beam, ion beam, resistance, and RF induction.

The Mark 50 is equipped with a unique, slide-down process chamber door at the front of the unit. A built-in electronic rack assembly located alongside the chamber door contains all system controls for computer or Autotech operation.

Systems are also equipped with a rear door for through-the-wall clean room installation so maintenance can be performed outside the clean room.

Mark 50 System features include the full range of CHA's renowned fixturing systems, 360-degree substrate heating, ion beam pre-clean and assist and rotating shutters for predeposition and positive thickness cutoff control. The system utilizes 16-inch pumping stack components.

Mark 50 with 3 cathodes and ion beam gun

Ion beam sputtering system

Sputter deposition

Data logging

Pop-up fault

CHA Industries

SUPERIOR SPUTTERING FEATURES

	SSC-600	SSC-1000
Sputter up		
Sputter Down	■	■
Sputter Side		
Dual, Sputtering & evaporation		
Rectangular cathodes, RF or DC		
Round cathodes, RF or DC	Up to 4	Up to 4
Co-deposit	■	■
Bias, RF or DC	■	■
Substrate heating, 360°C, multi-element		
Substrate heating, station	■	■
Sputter etching	■	■
Ion beam pre-clean/etch	■	■
Cathode to substrate spacing, adjustable	■	■
Moving substrates	■	■
Fixturing Rotating Disk	STD	STD
Fixturing Rotating Dome		
Fixturing Flat Planetary 3 or 4	OPT	OPT
Fixturing Dome Planetary 3 or 6		
Fixturing Adjustable angle planet		
Fixturing Vertical Drum with pallets		
Shutter(s)	Rotating disk, flag	Rotating disk, flag
Film uniformity*		
Ultimate vacuum	■	■
System 10^{-9} Torr	■	■
Chamber 10^{-8} Torr	■	■
Process chamber	14″ x 19.5″ D	14″ x 28″ D
Pumping—cryo, turbo, or diffusion	■	■
Mechanical pump min. CFM	■	■
Molecular sieve trap	■	■
High vacuum valve, vertical seal	8″	12″
Foreline/roughing valves, vertical seal	3″	3″
Cold trap LN_2, pump trap		
LN_2 level control	■	■
Ionization gauge control	■	■
Gas controls	■	■
Cathode observation port(s)	■	■
RGA port	■	■
Water	2 GPM	3 GPM
Air	90-125 psig	90-125 psig
Footprint	64.25″W x 44.625″D x 71.625″H	68″W x 54″D x 72″H

** Fixture dependent*

	Mag-Drum 1000™	MPS-4	Mark 40	Mark 50
1			■	■
2				
3	■	■		
4			■	■
5	Up to 3			
6		Up to 4	Up to 4	Up to 4
7	■	■	■	■
8	■	■	■	■
9	■	■	■	■
10				
11	■	■	■	■
12	■	■	■	■
13	■	■	■	■
14	■	■	■	■
15		OPT	OPT	OPT
16			OPT	OPT
17		STD	OPT	OPT
18			STD	STD
19			STD	STD
20	■	■	■	■
21	Rotating disk	Rotating disk, flag, half drum	Flag	Flag
22	±5%	±5%	±5%	±5%
23	■	■	■	■
24	■	■	■	■
25	■	■	■	■
26	24″ x 32″ D	16″ x 19″D, 16″ x 26″D, 16″ x 32″D	26″ x 26″D	26″ x 26″D
27	■	■	■	■
28	■	■	■	■
29	■	■	■	■
30	8″-12″	8″	16″	16″
31	3″	3″	3″	3″
32	4.5″ L	2.5″ L	25″ L	25″ L
33	■	■	■	■
34	■	■	■	■
35	■	■	■	■
36	■	■	■	■
37	■	■	■	■
38	2 GPM	2 GPM	3 GPM	3 GPM
39	90-125 psig	90-125 psig	85-125 psig	85-125 psig
40	45.75″W x 47.25″D x 95″H (Bell Jar up)	41.5″W x 36.25″D x 66″H	76″W x 55″D x 78.5″H (with ISO source add 21″)	81.5″W x 55″D x 78.5″H (with ISO source add 21″)

CHA Industries

CHA Industries has been serving domestic and international semiconductor manufacturing and precision coating industries for over 40 years. Our dedication to quality, reinforced by comprehensive testing at all steps in the manufacturing cycle, ensures that all product performance standards are consistently met.

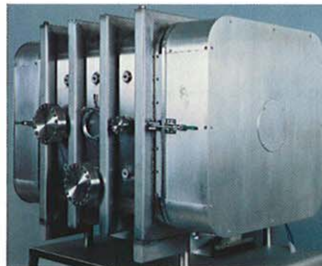
CHA first added sputtering technology to our line of deposition and coating systems in 1968. Options were made available at that time permitting the use of CHA High Vacuum Deposition Systems for sputtering as well as evaporation processing. Since that time, we have developed and refined our sputtering capability, resulting in a wide range of dedicated and multi-purpose systems.

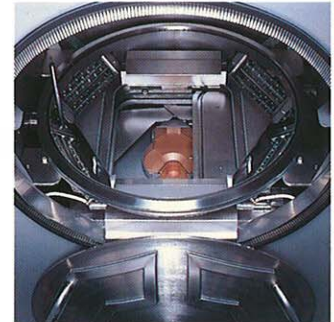
Applications Engineering

CHA's expert staff of application engineering specialists assist customers in the selection of the right equipment for their needs. Customers can draw freely on CHA's many years of experience working with a wide variety of installations around the world.

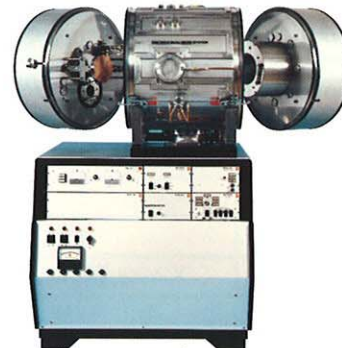
Other CHA Products

- High vacuum deposition system
- box coaters
- electron beam power supplies
- deposition system fixturing and accessories





Mark 40 and Mark 50 with load lock chamber



Dual gun ion beam sputter deposition system

Whether your interest is in high volume production, single prototypes, or anything in between, you'll find the sputtering system that will fit your present—and future—needs at CHA.

Call **510-683-8554**

Quality sputtering systems since 1968

CHA Industries

4201 Business Center Drive
Fremont, CA 94538
Fax: 510-683-3848

© Copyright 1994 CHA Industries 1/96 5M Printed in U.S.A.