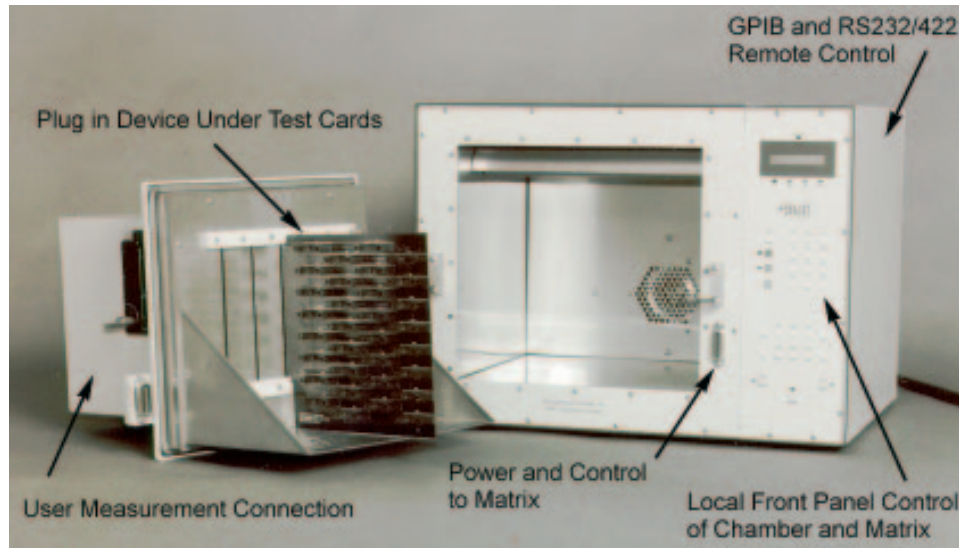Advanced Temperature Testing for Transistors,
Resistors, Capacitors, Inductors, Thermistors,
Diodes or any other 2, 3 or 4-leaded device.

Automated testing of components
Test up to 160 axial devices
Test up to 80 3,4 leaded devices
RS232/422 and IEEEE-488 interfaces
Local or Remote control
-180ºC to +315ºC (+200ºC matrix limit)
Battery-backed memory
Rapid cycling: to 60ºC/min.
Controlled ramping
PID Control
Automatic switching & measurement
Custom fixturing available
2 Year Warranty
30 Day Free Trial

Sun Systems' programmable Switching Matrix provides automatic selection and measurement of multiple devices or components during temperature testing. For example, up to 160 (2-leaded) devices or 80 (3,4 leaded) devices can be tested simultaneously, thus enhancing productivity while providing precise accuracy and superior control.

Sun Systems" advanced controller provides the advantage of full communications and control via the RS232/422 and IEEE-488 interfaces, or local control via the front panel keypad. A wide operating range (-180ºC to +315ºC) and rapid ramping enable a full range of temperature testing for even the most demanding requirements.

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Programmable Controller

Sun Systems' programmable Switching Matrix features the versatile controller incorporated in the advanced EC1x Series Environmental Chambers. Programming the controller to automatically preform multiple segments and component selections for measurement is simplified by a BASIC-like command set consisting of integer variables, nested FOR/NEXT loops, GOSUB subroutine calls and IN/OUT ports. Program debugging is aided with editing and breakpoint capabilities and programs can be up-or downloaded to and from a host computer. Up to 10 programs can be stored in the battery-backed RAM and programs can be called as a subroutine from other programs if required.

Three menu-driven setup modes are available to tailor the controller to virtually any application. The CAL, SDEF and SINT menus respectively, permit calibration of the chamber selections and modification of default parameters, and selection and modification of interrupt configuration parameters. Some of these parameters define the GPIB address, D/A output configuration, alarm function and loudness, baud rate and timeout interrupts.

An expanded I/O interface allows the user to install custom test fixturing and accessories. The provision of analog input and output channels, auxiliary relay control, a user digital parallel port and a high-speed serial link facilitate superior control and monitoring of all aspects of the application.

Matrix Control Logic

An EC Series Environmental Chamber is the basis for the Switching Matrix system. The chamber door is designed to hold up to 5 component boards within the chamber environment and the switching matrix logic is built into the outside of the door. The matrix control boards facilitate the automatic switching and measurement of multiple devices under test. A diagram of the control logic is provided to illustrate a sample board used to test components.

Many types of component are supported, for example, up to 160 2-leaded axial components and up to 80 3,4-leaded components can be tested on a 5-card configuration. A Kelvin measurement path is provided to the device under test. This standard 9-pin user-port can be used along with several different types of measurement devices specific to your particular applications. The user connects device test equipment to the 9-pin connector provided on the matrix door.
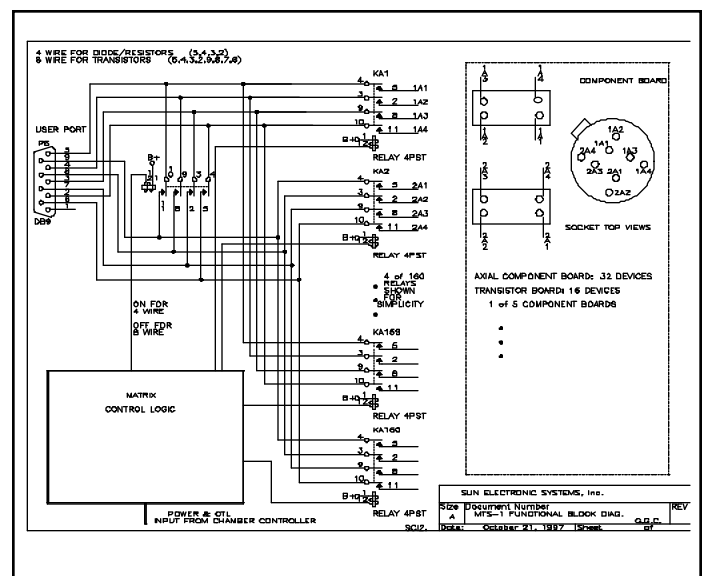
Simplified Equivalent Circuit for Matrix

2 Lead Component Card

3-4 Lead Component Card

Devices under test may be selected automatically or individually by referring to the specific device number which is labeled for each socket on the device card. Thus, particular device(s) may be selected and measured independently if desired. Each device lead is provided with 2 electrically isolated traces and a Kelvin socket connection. Component card design and socket selection can be customized for the user's specific application. Sun Systems' will work with you to identify your testing needs and customize the switching matrix to your specifications.

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Special Commands for Matrix Support

Selection of device under test is facillitated by simple chamber commands which may be issued either locally or remotely. A sample of the selection commands follows:

TO SELECT A 4-WIRE DEVICE FOR MEASUREMENT:

        OUT4:n,m   [n = device number (1 to 32)]

                           [m = board number (1 to 5)]

TO SELECT AN 8 WIRE DEVICE FOR MEASUREMENT:

        OUT5:n,m   [n = device number (1 to 8)]

                           [m = board number (1 to 5)]

Local Control Interfaces

Full control and programmability is provided locally for those desiring a stand-alone test configuration. Sun Systems' powerful controller can be programmed locally via the front panel keypad and 2-line LCD. An average of 100+ control statements can be programmed into battery-backed memory to handle the most challenging applications. The command structure is simple and concise and programming can be performed by persons with little or no programming experience. A sample progarm is shown below, illustrating the use of a subroutine.

Example Local Program for Manual Data Logging

PROGRAM #1:

```
FORI1=0,10      Cycle 10 times
RATE=60         Set rate of change of temperature during ramping
WAIT=0:5:30     Stay at first temperature for 5 minutes, 30 seconds
SET=155         Go to 155 deg. after 5 ½ minutes
GOSUB 2         Go to program #2 as a subroutine again, then
NEXT 11         Loop until done
END
```
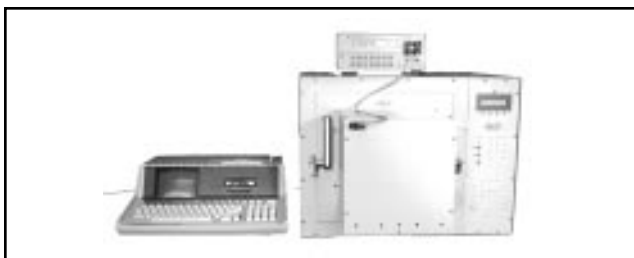
PROGRAM #2

```
FORI3=1,6       I3 will supply board number
FORI2=I,33      I2 will supply device number on board
OUT4:I2,I1      Select each device to be measured
BKPNT I2        Stop and allow operator to take reading
                (press ENTER key on front panel to continue)

NEXT I2
NEXT I3         End of nested loop
END             Return to Program #1
```

Remote Control Interfaces

For a completely automated test system, Sun Systems' has provided a full range of interfaces that can be used to control and monitor temperature testing. A complete talker/listener IEEE-488 interface is available with serial and parallel poll capability. For remote operation over long distances, RS232 and RS422 serial interfaces are provided. With few exceptions, the commands for the local keyboard and RS232/422 and IEEE-488 interfaces are identical.

Custom test fixturing and accessories are supported via the expanded I/O interface. Analog input and output channels, auxiliary relay control, a user digital parallel port and a high-speed serial link support a variety of test configurations for individual testing requirements.

```
                 Example IBM PC Control Program
 10 DIM T(40), W(40)
 20 OPEN "CHAMBER" AS #1
 30 OPEN "DVM" AS #2
 40 PRINT #2,"H4T1"          Initialize DVM 4 wire ohms
 50 INPUT "NUMBER OF TEMPERATURE POINTS?",N
 60 FOR K=1 TO N
 70 INPUT "SET TEMPERATURE";K;"?",T(K)
 80 INPUT "TIME AT TEMPERATURE",W(K)
 90 NEXT K
100 PRINT #1, "HON"          Enable chamber heating
110 PRINT #1, "CON"          Enable chamber cooling
120 FOR K=1 TO N
130 PRING #1,"WAIT=";W(K)    Set chamber wait at temp times
140 PRINT #1,"SET=";T(K)     Set chamber temperatures
150 S=SPOLL(#1)              S=serial poll of chamber
160 PRINT "WAITING FOR CHAMBER TIME AT TEMP"
170 IF S=0 THEN GO TO 150
180 PRINT "_____"
190 FOR I=1 TO 5
200 FOR J=1 TO 32
210 PRINT #1,"OUT4:",J;",",I  Select device for measurement
220 INPUT #2,A               Get DVM reading of component
230 PRINT "BOARD #";I;" DEVICE #";J;"RESISTANCE=";A
240 NEXT J
250 NEXT I
260 NEXT K
270 STOP
280 END
```

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Reliable Heating and Cooling

Sun Systems' Switching Matrix provides reliable temperature testing for high-volume testing of components. Devices under test are subjected to either heated or cooled air circulating through the interior of the chamber. Air is extracted from the rear of the test area and, behind a baffle, is directed upwards over resistance heaters, where heating may take place and past the coolant expectorant nozzle where coolant may be mixed with the circulating air, rapidly heating or cooling the air to the desired temperature. A wide temperature testing range, -180°C to +315°C and very fast ramping rates enable testing under a variety of conditions. Optimum accuracy and stability are ensured by the use of Proportional, Integral and Derivative (PID) control algorithms for both heating and cooling.

Safety

Sun Systems' environmental chambers incorporate several safety features to protect your devices under test. Software upper and lower temperature limits provide for normal over and under temperature limit conditions. In the event of failures, the controller detects open or shorted probe conditions and the microprocessor is continuously monitored by the use of a watch-dog timer. In addition, each chamber is equipped with an adjustable thermostat which disables the heating circuits when the temperature in the chamber exceeds the user-adjustable preset temperature of the thermostat.

Features

Heat/Cool Rate of Change:	Up to 1°C/sec
Cooling Options:	LCO_2 or LN_2 (easily interchangable)
Power Options:	100/115 VAC, 50/60 Hz (Single Phase)
	208/220 VAC, 50/60 Hz (Single Phase,3/4
Wire)	
	240 VAC, 50 Hz (Single Phase, 3Wire)
Temperature Setpoint Range:	-184°C to +315°C
Temperature Ramping Rate Control:	Locally Controlled from 0.01°C/min up to the specified heat/cool rate of change
Programmable Set Temps & Times:	Limited only by available program memory Typically 100+ segments
Absolute Error:	±0.25°C
Temperature Resolution:	±0.25°C
Additional I/O Capability:	4 Channels of Analog I/O
	16 Bit Address/8 Bit Data Parallel Port
	56 KBit Auxiliary High Speed Serial Port
	IEEE-488 to RS232/RS422 Transparent Mode
	5 Auxiliary Outputs/8 Auxiliary Inputs
Safety Features:	Adjustable Over TEmperature Thermostat Software Upper and Lower Temperature Limits
Convenience Features:	Heat/Cool Enable/Disable Switches
	Battery-backed memory for programs
	Remote Interrupt Operation
	Default Conditions for Alarms & Interface
	Time of day clock

Sun Systems' manufactures a full line of environmental chambers and temperature and process controllers. We feature dedicated customer service and technical support and all our products are available for a thirty-day free trial and are backed by a two year warranty.

Call us for your temperature testing needs!

Data subject to change

07/02

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