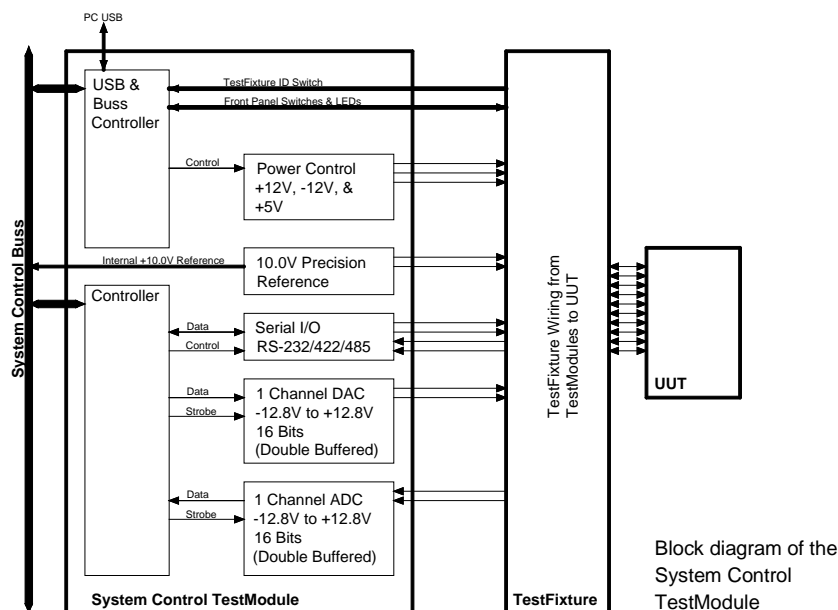
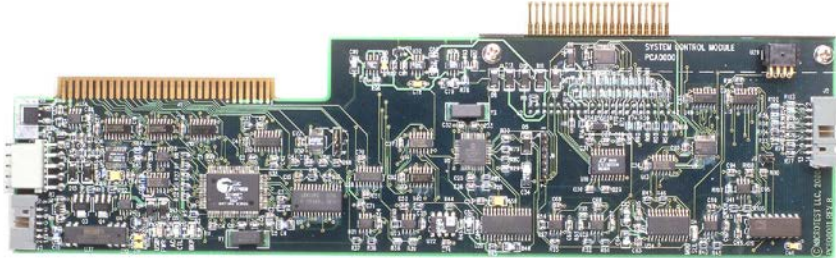


### Measurement Systems

#### Overview

The System Control TestModule is a plug-in controller board that always occupies the first slot in the TestStation.

It manages communications between the PC and the unit under test, provides special purpose test signals, and is used to calibrate all test signals in the Circuit-Traq PRO.



Block diagram of the System Control TestModule

#### Hardware Architecture

The Circuit-Traq PRO Test System has the following hardware configuration:

- A User-supplied PC with a USB port and Automatiq's TestWare software installed
- A TestStation connected to the PC through its USB port; the TestStation has slots to hold up to 20 plug-in TestModules
- A System Control TestModule card in Slot 0 and one or more additional TestModule cards in Slots 1 through 19
- A TestFixture Kit that has been wired by the User to connect test signals from TestStation to the Unit Under Test (UUT)

#### Test Control

In operation, The Circuit-Traq PRO Test System executes a sequence of test commands from a test program that has been written by the User to exercise the UUT.

The System Control TestModule relays test commands from the PC to other TestModules in the TestStation (see diagram on the left). TestModules, in turn, apply test signals to input pins on the UUT and capture the response of the UUT at its outputs. Test results are passed back to the PC so the test program can determine whether or not the UUT meets its performance specifications.

Since the System Control TestModule seamlessly manages communication functions in the Circuit-Traq PRO Test System, these difficult and error-prone tasks become transparent to the user.

#### Control Functions

The System Control TestModule:

- Manages the USB link with the PC
- Controls the flow of test instructions and test data between the PC and the UUT
- Routes test data to and from TestModules over the System Control Bus
- Controls electromechanical components in the TestStation
- Manages system calibration in which all I/O channels can be calibrated automatically to an internal or external voltage standard

#### Test Signals

The System Control TestModule provides the following special purpose test signals:

- A precision voltage reference, +10.0 Volts
- A 16-bit DAC output channel,  $\pm 12.8$  Volts
- A 16-bit ADC input channel,  $\pm 12.8$  Volts
- Serial interface, RS-232/422/485
- +5V @ 500 mA and  $\pm 12V$  @ 500 mA each

Rugged and reliable Pogo pins are used to connect pins on the System Control TestModule to mating pins on the Test Fixture.

### Measurement Systems

#### SPECIFICATIONS

Test Module	System Control TestModule
Part Number	PCA00001 Rev B
Mfg. Code	0
Module Code	1

#### PIN ASSIGNMENTS

The table below gives pin assignments, signal names, and functions for all I/O pins on the System Control TestModule, including range, accuracy, and resolution specifications.

Pin	Name (Note 1)	Function	Range	Accuracy	Resolution	Notes
1	[UUT Ground]					Note 2
2	[UUT Ground]					Note 2
3	[UUT Ref Gnd]					Note 3
4	[+12V]					Note 4
5	[-12V]					Note 4
6	[+5V]					Note 4
7	[+10V_Ref]			±1mV		Note 5
8	[+10V Ref Common]					Note 5
9	[RX+ 422]	[+ Receive]	Note 6	NA	NA	Note 6
10	[RX- 422/232]	[- Receive]	Note 6	NA	NA	Note 6
11	[TX+ 422]	[+ Transmit]	Note 6	NA	NA	Note 6
12	[TX- 422/232]	[- Transmit]	Note 6	NA	NA	Note 6
	Serial Comm	Serial Output				Note 6
		Serial Input				Note 6
		Baud Rate				Note 6
		Serial Bits				Note 6
		Parity				Note 6
		Mode				Note 6
		Duplex				Note 6
		Slew Limiting				Note 6
13	NC					
14	Cal Meas	Voltage Input	-12.8 to 12.8V	±2mV	16 bits	Note 7
15	[Cal Meas Common]					Note 7
16	V Cal	Voltage Output	-12.8 to 12.8V	±2mV	16 bits	Note 8
17	[V Cal Common]					Note 8
18	[ID Sw1]					Note 9
19	[ID Sw2]					Note 9
20	[ID Sw3]					Note 9
21	[ID Sw4]					Note 9
22	[ID Sw5]					Note 9
23	[ID Sw6]					Note 9
24	[ID Sw7]					Note 9
25	[ID Sw8]					Note 9
26	[ID Sw9]					Note 9
27	[ID Sw10]					Note 9
28	[ID Sw11]					Note 9
29	[ID Sw12]					Note 9

### Measurement Systems

Pin	Name (Note 1)	Function	Range	Accuracy	Resolution	Notes
30	[Test Fixture Sw]					Note 10
31	[Pwr Sw]					Note 11
32	[Load Sw]					Note 11
33	[Run/Cont Sw]					Note 11
34	[Halt Sw]					Note 11
35	[Reset Sw]					Note 11
36	[Pwr LED]					Note 11
37	[Load LED]					Note 11
38	[Run/Cont LED]					Note 11
39	[Halt LED]					Note 11
40	[Reset LED]					Note 11
41	[+5V LED]					Note 11
42	[Gnd Sw]					Note 11

### NOTES

- Names in brackets [ ] are not available for programming.
- UUT Grounds are bused together on the TestFixture Interconnect Board. They should be connected to the UUT Ground directly. Use as many wires as necessary to insure minimum line drop.
- All outputs are set and inputs are measured with respect to UUT Ref Gnd. Connect directly to the UUT ground at the UUT to avoid voltage drops in the UUT Ground lead.
- The +12V, -12V, and +5V power supplies provide power for Adapter Board circuits. They are switched off when the system is reset. They should not be used to power the UUT since they are not adjustable, their current limits cannot be set, and their current cannot be measured. All supplies will provide 500mA. These supplies are routed to each of the Adapter Board headers.
- The +10V reference has an initial accuracy of 1mV. It is provided to provide a reference voltage to the Adapter Board circuits. It should be connected to high impedance (>1 Meg) differential circuit along with +10V Ref Com to provide a stable reference voltage. It must not be connected to the UUT since it is not protected. Drawing significant current from the +10V Ref will effect the calibration of the entire TestStation. The +10V Ref and common are routed to each of the Adapter Board headers.
- Serial connections may be programmed to be RS-232, RS-422, or RS-485 connections. To use as RS-232, connect to pins 10 (receive) and 12 (transmit), set the Mode to 0, and set Duplex to 0 (Full Duplex). To use as RS-422, connect to pins 9 & 10 (receive + & -) and 11 & 12 (transmit + & -), set the Mode to 1, and set Duplex to 0 (Full Duplex). To use as RS-485, connect pins 9 and 11 together (transmit/receive +) and pins 10 and 12 together (transmit/receive -), set Mode to 1, and set Duplex to 1 (Half Duplex).

Serial Output – Send serial data out through the Serial Comm port. A maximum of 64 bytes of data can be sent. Clear the Serial Input buffer before starting to transmit. If Half Duplex is set, clear the Serial Input buffer after completion of transmission.

Note: The Serial Output is not buffered and held until a CLOCK command. It is sent immediately.

Serial Input – Get data received through the Serial Comm port. A maximum of 64 bytes of data can be received. The Serial Input buffer is cleared at the beginning of the Serial Output transmission. If Half Duplex is selected, the buffer is also cleared after the end of transmission. Note: The Serial Input is not loaded with the CLOCK command. When it is read, the current buffer contents are returned.

Control Parameters: The following control parameters control both the Serial Output and the Serial Input operation.

Serial Baud Rate – Specify the baud rate in bits per second (baud). The minimum rate is 1200 Baud and the maximum is 115,200 Baud. Rate error at standard rates (1200, 2400, 9600, 19200, 38400, 57600 and 115200) is less than 2%. Errors at nonstandard rates may be larger.

Serial Bits – Specify the number of serial bits including parity.

- 0 for 8 bits
- 1 for 9 bits (the 9th bit must be parity)

Parity – Specify the parity.

- 0 for no parity
- 1 for Even Parity
- 2 for Odd Parity
- 3 for always one (two stop bits)

Mode – Specify the physical interface mode.

- 0 for RS-232
- 1 for RS-422 or RS-485

Duplex – Specify half or full duplex.

- 0 for Full Duplex
- 1 for Half Duplex (output on only while transmitting)

### Measurement Systems

Slew Rate – Specify slew rate limiting. This allows slow transmission on improperly terminated lines.

0 for No Slew Rate Limiting

1 for Slew Rate Limiting to 150kbaud (RS-422/485 only)

Note: Full loopback (receiving while transmitting) requires version 1.0.1 of the System Control TestModule firmware.

7. Input impedance 1 Meg or greater. Inputs are designed to withstand continuous application of any voltage between -15V and +15V and normal ESD discharges without damage.

For highest accuracy, Cal Meas Common should be connected to the analog ground at the UUT.

8. Output can only provide a high impedance reference voltage. The output impedance is 100 ohms. The short circuit current must be limited to 30mA. Output will withstand normal ESD discharges without damage. For highest accuracy, V Cal Common should be connected to analog ground at the UUT.

9. The ID Switch pins are connected to the ID Switch on the TestFixture Interconnect Board. They cannot be used for anything else. Set the TestFixture ID code on the ID Switch. Do not use 0.

**PINOUTS** Names in brackets [ ] are not available for programming.

#### J0

[UUT Ground]	1	2	[UUT Ground]
[UUT Ref Gnd]	3	4	[+12V]
[-12V]	5	6	[+5V]
[+10V Ref]	7	8	[+10V Ref Common]
[RX+ 422]	9	10	[RX- 422/232]
[TX+ 422]	11	12	[TX- 422/232]
NC	13	14	Cal Meas
[Cal Meas Common]	15	16	.V Cal
[V Cal Common]	17	18	[ID Sw1]
[ID Sw2]	19	20	[ID Sw3]
[ID Sw4]	21	22	[ID Sw5]
[ID Sw6]	23	24	[ID Sw7]
[ID Sw8]	25	26	[ID Sw9]
[ID Sw10]	27	28	[ID Sw11]
[ID Sw12]	29	30	[Test Fixture Sw]
[Pwr Sw]	31	32	[Load Sw]
[Run/Cont Sw]	33	34	[Halt Sw]
[Reset Sw]	35	36	[Pwr LED]
[Load LED]	37	38	[Run/Cont LED]
[Halt LED]	39	40	[Reset LED]
[+5V LED]	41	42	[Gnd Sw]
NC	43	44	NC
NC	45	46	NC
NC	47	48	NC
NC	49	50	NC
NC	51	52	NC
NC	53	54	NC
NC	55	56	NC
NC	57	58	NC
NC	59	60	NC

#### HEADER 30x2 MODULE 0

#### ORDERING INFORMATION

Part Number: PCA00001

Price: \$1,295.00

Availability: Stock

Note: Only one System Control TestModule (provided) may be installed in an Circuit-Traq PRO Test System

Automatiq Measurement Systems LLC  
797 Gatehouse Lane  
Columbus OH 43235 USA  
Voice 800-346-3938 614-431-2667  
www.AutomatiqSystems.com

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