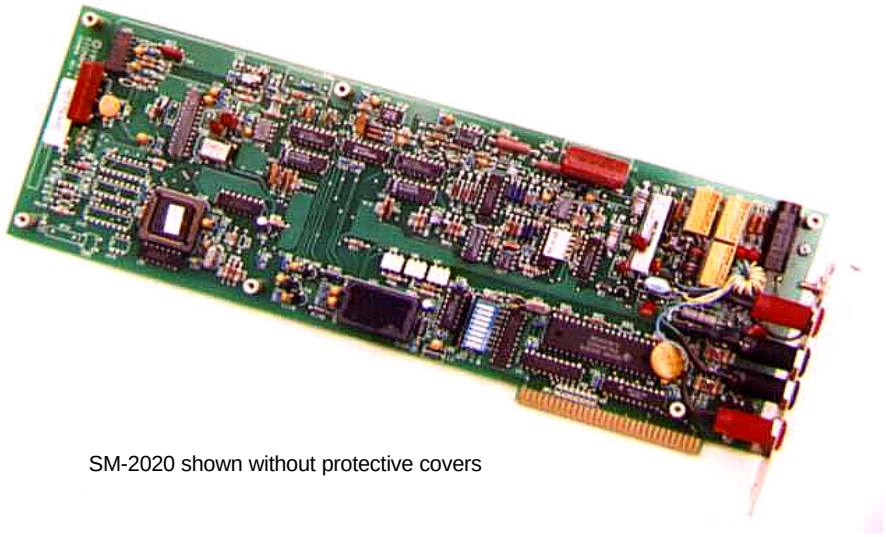
5-1/2 Digit Multimeters

For the PC ISA Bus — SM-2020 Products



SM-2020 shown without protective covers

Description

The SM-2020 is a 5-1/2 digit DMM that plugs into any full length PC ISA bus slot. It has all the functionality and performance of a bench top instrument. The SM-2020CT version adds frequency counting, external triggering and a programmable level trigger.

The PC plug-in design provides the convenience of automated measurement in the smallest possible footprint with no compromise in performance. There is no dealing with unnecessary interconnecting cables or power cables. Signal leads go straight from the SM-2020 in your PC to the device under test or a scanner. It couldn't be more straight forward.

The front panel for the SM-2020 appears on your PC monitor. All of the familiar DMM controls are available on this virtual front panel in either DOS or Windows. You can control the SM-2020 without any programming or configuration using your mouse to manipulate the virtual front panel controls straight out of the box.

Automated applications can be configured with ATEasy, LabWindows, Matlab, TestPoint, Visual Basic or C. To get you started, source code for the virtual front panel (written in Visual Basic) is provided with your SM-2020.

The SM-2020 is controlled with high level commands to its on-board controller. The controller both simplifies programming and minimizes overhead on the PC. This architecture also insures that the SM-2020 will operate efficiently with all operating systems even those with slower real time response.

For safety and accuracy the SM-2020 has a 300V isolation barrier from the PC. The input protection avoids damage from inadvertent out of range events. Accuracy is maintained with state of the art, precision analog components.

Hardware Features

- **Flexible, full featured autoranging DMM**
- **DC & AC Volts & Current, 2-Wire & 4-Wire Ohms**
- **True AC RMS measurements, 10Hz to 100kHz**
- **Measure 1µV to 300 V**
- **Self-calibrating**
- **Up to 1000 samples/sec for SM-2020CT (200 samples/sec for SM-2020)**
- **Optional frequency counter 2 Hz to 300kHz (SM-2020CT)**
- **300V isolation barrier**
- **CE approved**

Software Features

- **Extensive Windows support Win 3.x, Win 95, Win NT**
- **Language support - Visual Basic, MSVisual C++, Quick C, Borland C++**
- **Package support - ATEasy LabWindows, Matlab, TestPoint, VBA & more**

Applications

- **Automated production testing**
- **Laboratory automation**
- **Portable/field test**

Models

SM-2020
Full featured 5-1/2 digit DMM

SM-2020CT
Same as SM-2020 with frequency counter, external level triggering, and 1000 readings/sec. (buffered)

SM-2020 Windows NT® S/W

Signametrics
Precision Instruments for the PC

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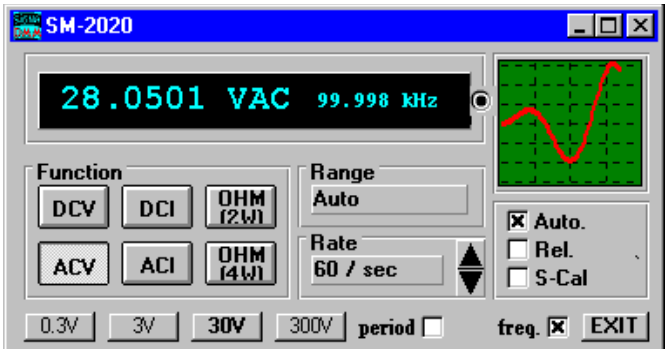
Use The "No Programming" Panel

The Windows control panel software that comes with your SM-2020 allows you to start using your DMM immediately. The control panel provides point and click control over all instrument functions. The input signal value is shown in a display panel as well as in scope trace format. Acquired data sets can be transferred to common spreadsheet and data base applications using Windows DDE. The panel handles many applications without modification. If you want to make changes, the control panel application (written in Visual Basic) is provided.



Packages Simplify Application Development

Data acquisition and ATE packages can be used to configure SM-2020 applications. These packages simplify development of complete applications using either graphical or task list based configuration techniques. SM-2020 driver support is available for ATEasy. LabWindows CVI, TestPoint, and Matlab can be supported using Windows DLLs (16/32 bit).

Language Based Applications

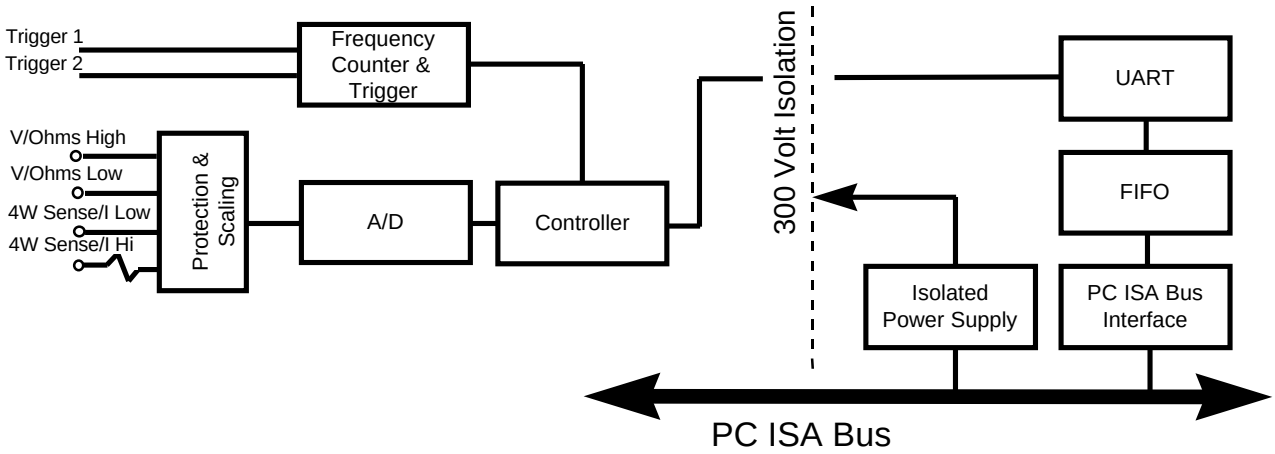
Language based programming allows the highest level flexibility in configuring an application. Drivers are provided with the SM-2020 to support application development in a variety of language and operating system environments. The following table summarizes software availability:

	DOS	Win 3.X	Win 95
Control Panel	X	X	X
MS/Borland C	X		
Visual Basic 3.0		X	X
Visual Basic 4.0			X
16 bit DLL		X	X
32 bit DLL			X
32 bit OCX			X

Drivers for DOS, Windows 3.x and Windows 95 are included with each SM-2020. These drivers implement a total of 46 well documented functions. The .OCX control can be linked to a wide variety of Win 95 applications. It is also a handy tool for off line control of the SM-2020 during development.

Optional 32 bit support SW for Windows NT is available. Call or EMail for a data sheet.

Block Diagram



Specifications SM-2020 and SM-2020CT

DC Voltage

± (% of reading + Number of counts)

Range	Full Scale 5 1/2 Digits	Resolution	One Year Accuracy 18°C to 28°C
300 mV	300.000 mV	1 uV	0.024 + 6
3 V	3.00000 V	10 uV	0.010 + 4
30 V	30.0000 V	100 uV	0.022 + 5
300 V	300.000 V	1 mV	0.018 + 5

Resistance, 2-wire and 4-wire

± (% of reading + Number of counts)

Range	Full Scale 5 1/2 Digits	Resolution	One Year Accuracy 18°C to 28°C
300 Ω	300.000 Ω	.001 Ω	0.030 + 6
3 kΩ	3.00000 kΩ	.01 Ω	0.029 + 4
30 kΩ	30.0000 kΩ	.1 Ω	0.029 + 5
300 kΩ	300.000 kΩ	1 Ω	0.029 + 5
3 MΩ	3.00000 MΩ	10 Ω	0.190 + 10
30 MΩ	30.0000 MΩ	100 Ω	0.650 + 10

AC Voltage, True RMS

± (% of reading + Number of counts)

Range	Frequency	One Year Accuracy 18°C to 28°C
300 mV	10 Hz - 20 Hz	2.5 + 400
	20 Hz - 45 Hz	1.0 + 400
	45 Hz - 1 kHz	0.3 + 300
	1 kHz - 10 kHz	0.4 + 350
	10 kHz - 50 kHz	2.0 + 400
	50 kHz - 100 kHz	4.0 + 500
3 V - 250 V	10 Hz - 20 Hz	2.5 + 300
	20 Hz - 45 Hz	1.0 + 300
	45 Hz - 1 kHz	0.1 + 275
	1 kHz - 10 kHz	0.3 + 275
	10 kHz - 50 kHz	1.0 + 300
	50 kHz - 100 kHz	4.0 + 500

DC Current

± (% of reading + Number of counts)

Range	Full Scale 5 1/2 Digits	Resolution	One Year Accuracy 18°C to 28°C
3 mA	3.00000 mA	10 nA	0.070 + 8
30 mA	30.0000 mA	100 nA	0.090 + 15
300 mA	300.000 mA	1 uA	0.090 + 15

Specifications SM-2020 and SM-2020CT- continued

AC Current, True RMS

± (% of reading + Number of counts)

Range	Frequency	One Year Accuracy 18°C to 28°C
3 mA	10 Hz - 20 Hz	2.2 + 400
	20 Hz - 45 Hz	0.8 + 400
	45 Hz - 1 kHz	0.7 + 300
	1 kHz - 10 kHz	0.8 + 400
30-300 mA	10 Hz - 20 Hz	2.0 + 300
	20 Hz - 45 Hz	0.8 + 300
	45 Hz - 1 kHz	0.7 + 300
	1 kHz - 10 kHz	0.8 + 400

SM-2020CT Specifications

The SM-2020CT is identical to the SM-2020 with the addition of a frequency and period counter, an isolated external H/W trigger, signal level triggering capability, and an internal 64 reading buffer capable of acquisition rates up to 1000 samples/sec.

Frequency Measurement 2 Hz to 300 kHz (Voltage inputs), 2 Hz to 30 kHz (Current inputs), 100 ppm uncertainty

External Hardware Trigger ±3 V to ±15 V input voltage levels to activate, optically isolated from PC and DMM inputs

Other Specifications

Reading Rate 1 to 200 readings/sec (0.1 to 20 rps for 4WΩ),
for SM-2020CT up to 1000 samples/sec to buffer
Isolation 300 VDC, 250 VAC from Earth Ground
Temperature Range 0°C to 50°C, operating
Power +5 volts, 300 mA maximum
Size 13 1/8" x 4 1/2" (1 full length ISA slot)

Warranty

Signametrics products are warranted for a period of one year from date of delivery against defects in material or workmanship. Returned product will either be repaired or replaced at ***Signametrics'*** option.

Company Background - Signametrics Corporation

Signametrics Corporation manufactures precision instruments for the PC environment. The Company's products are aimed at applications requiring a combination of a high quality instrument with the PC's ability to automate applications. ***Signametrics*** products plug in to the PC ISA bus to offer cost effective, compact solutions for a wide range of automated test and measurement requirements.

The ***Signametrics*** design team has many years of experience designing bench top instruments. The result is a family of PC instruments that maintain accuracy and performance even in the PC's electrically noisy environment. ***Signametrics*** instruments are designed to sustain, without damage, the inevitable over voltage events that occur with bench top instruments. Attention to reliability in the design phase results in instruments that typically demonstrate 50,000 hour MTBF in operation.

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