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12-19-01

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CAGE CODE: **12522**

APPROVED

12-19-2001

**Part of the M7 Family of
MET Data Entry Products**

Series M76

PC-COMPATIBLE KEYBOARDS

In Ruggedized Enclosures

88-Key with Encoder and
Optional Cursor Control
Optional LED Lighting and
NEMA 4 Sealing

SERIES M76 CODED

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SERIES M76 CODED

A

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PRODUCT LINE SPECIFICATION

SERIES M76

PC-COMPATIBLE KEYBOARDS
In Ruggedized Enclosures

1.0 SCOPE

This Specification Control Document (SCD) describes the detailed characteristics of one of the M7 Family of data entry devices utilizing Molded Elastomer Technology (MET). The products emanating from this SCD are designated as product series M76.

Specifically, the M76 includes a Qwerty keypad, and an optional built-in pressure sensitive or joystick cursor control, installed in a hard elastomer enclosure with threaded inserts. LED lighting of the keyboard is also available as an option. The keyboard has 88 physical keys as to be equivalent to an 87-key PC-compatible keyboard, and two additional keys to control the brightness of the keyboard LEDs. Incorporated into the keyboard is an encoder to translate key strokes into standard PS/2 codes through the commonly used PS/2 connector, and a 32 discrete LED brightness levels adjuster. The cursor control has two control buttons and interfaces through the PS/2 "mouse" port. The keyboard and cursor control are PS/2 compatible. The keyboard with PC/AT adapter is PC/AT compatible. The enclosure was designed for operator comfort and for reliable operation in harsh environments.

Accessory items for this MET data entry product include power supplies for the lighted keyboards and PC/AT keyboard adapter.

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2.0 SERIES M76 PC-COMPATIBLE KEYBOARDS

2.1 Product Features/Options

The PC-Compatible Keyboard is designed to be rugged and durable, yet provide modern styling with adjustable LED brightness and built-in palm rest. It is available in a choice of two enclosure colors. Two types of cursor control are available as an option. Backlighting with green LEDs is available as an option. Also available is the option for sealing to NEMA 4 requirements.

2.2 Keyboard and Cursor Control in Rugged Enclosure

The keyboard and cursor control in a hard elastomer enclosure, along with three cables, are shown in Figures 2.1 and 2.2.

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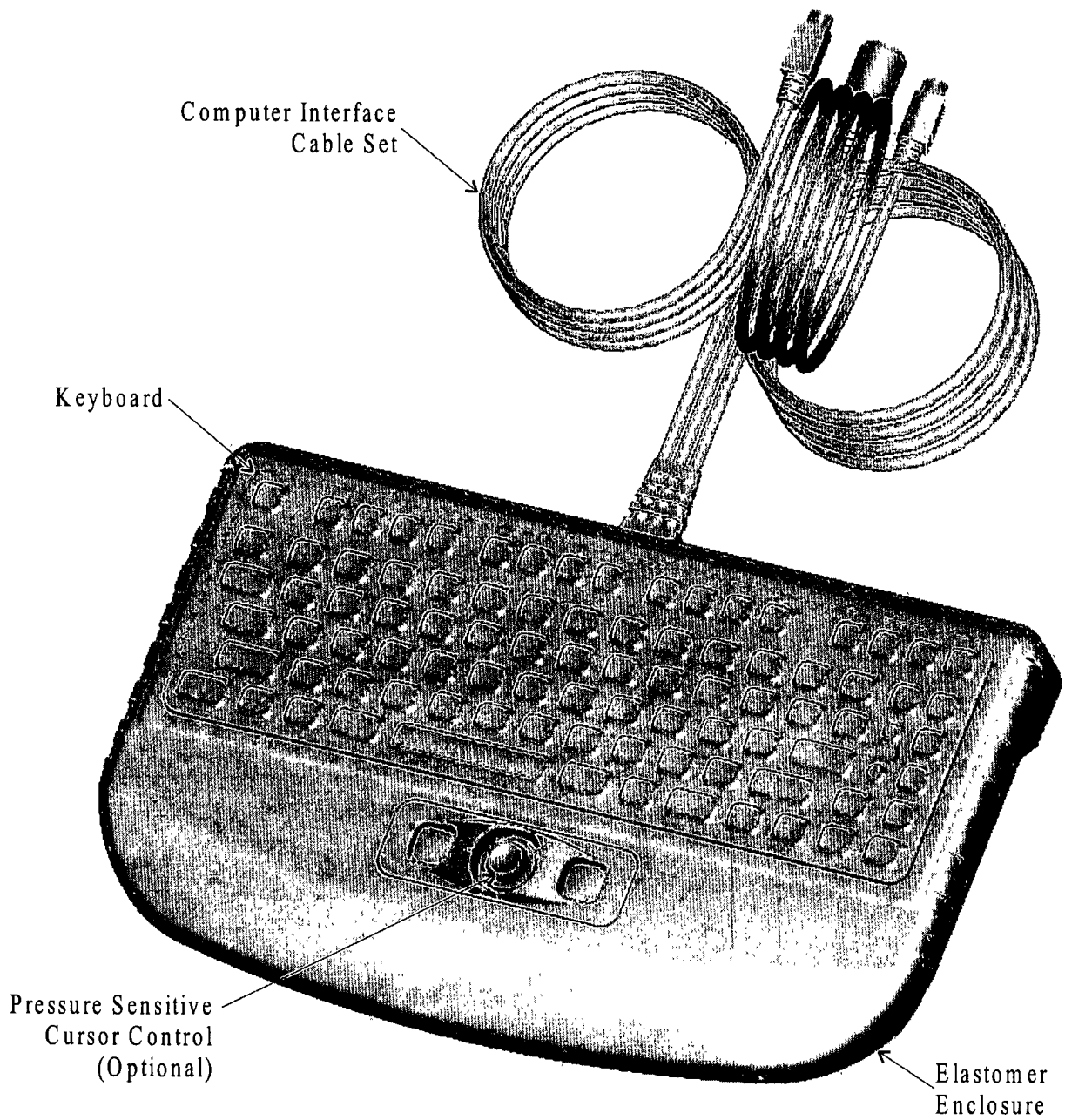


Figure 2.1
Keyboard with Integral Pressure Sensitive Cursor Control

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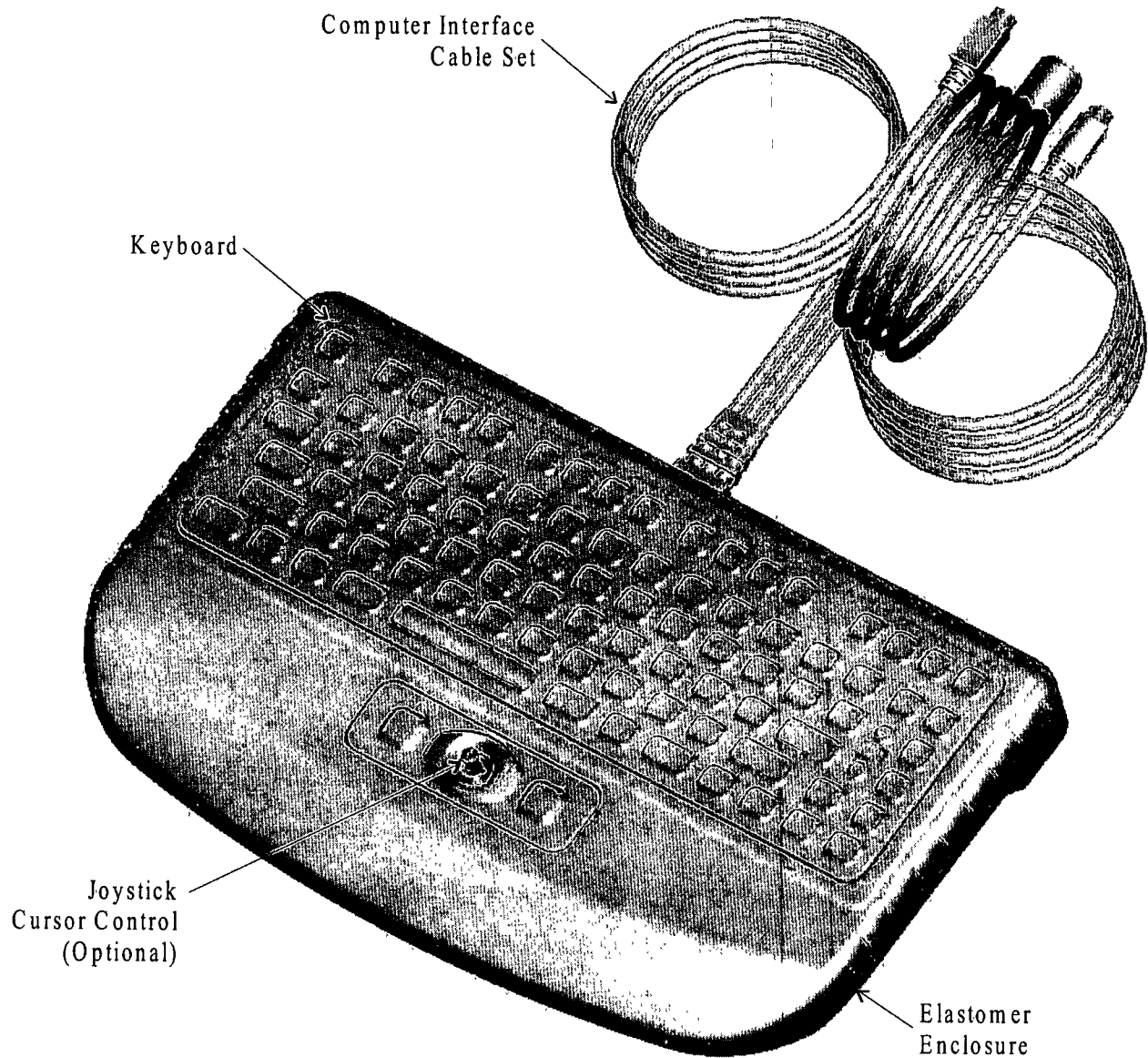


Figure 2.2
Keyboard with Integral Joystick Cursor Control

The keyboard cable is terminated with a male PS/2 keyboard connector to interface to the computer's keyboard I/O connector. The cursor control cable is terminated with a male PS/2 connector for the PS/2 mouse port. The LED power cable is terminated with a five-pin female circular DIN connector for the lighted keyboard power supply. A PS/2 to PC/AT keyboard adapter may be used to connect the keyboard to a computer with a PC/AT connector.

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2.3 Keyboard

The keyboard module used in this product has 88 keys as shown in Figure 2.3 and resides in the keyboard enclosure as shown in Figures 2.1 and 2.2. The keyboard has a built-in encoder that allows the keyboard to be connected directly to an IBM PS/2 port. The keyboard has laser engraved legends. The keyboard is a plug and play device.

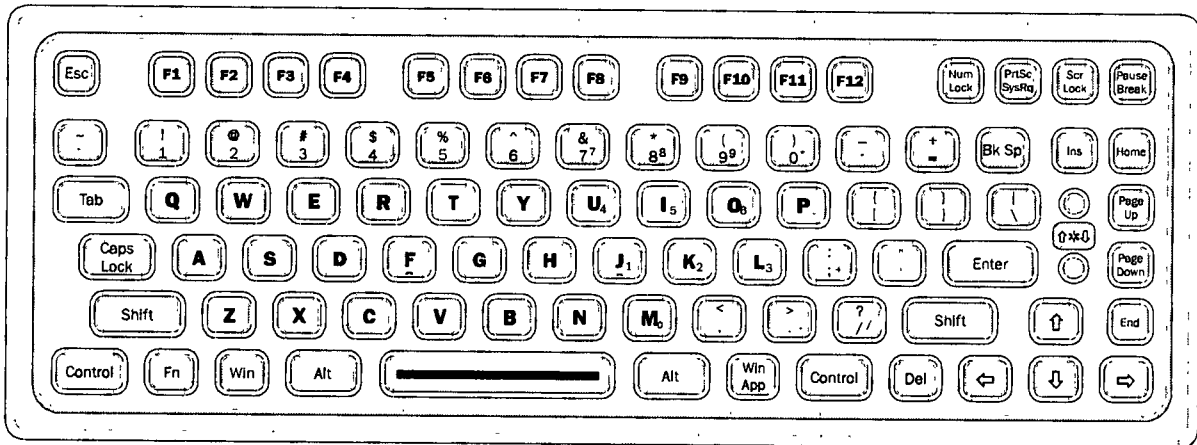


Figure 2.3
Keyboard Keys

2.4 Color

The pressure sensitive cursor control button keys color matches the keyboard keys color. Two keypad colors are available and two cursor control colors are available. Two enclosure colors are available.

2.5 Cursor Control

Two types of cursor controls are available. The first type of cursor control is the pressure sensitive, and the second type is the joystick.

2.5.1 Pressure Sensitive

It is a low profile, pressure sensitive cursor steering button with left and right cursor control buttons, as shown in Figure 2.4 and resides in the keyboard enclosure as shown in Figure 2.1. It is similar in function to a two button mouse. Each button has a plastic keycap without legends.

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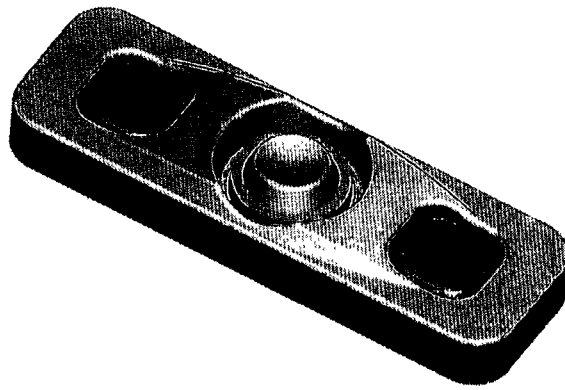


Figure 2.4
Cursor Control

2.5.2 Joystick

The joystick cursor control is a miniature joystick with left and right cursor control buttons, as shown in Figure 2.5 and resides in the keyboard enclosure as shown in Figure 2.2. It is similar in function to a two button mouse, and it is a plug and play device. The joystick lever is a pushbutton that has the same function as a left mouse button.

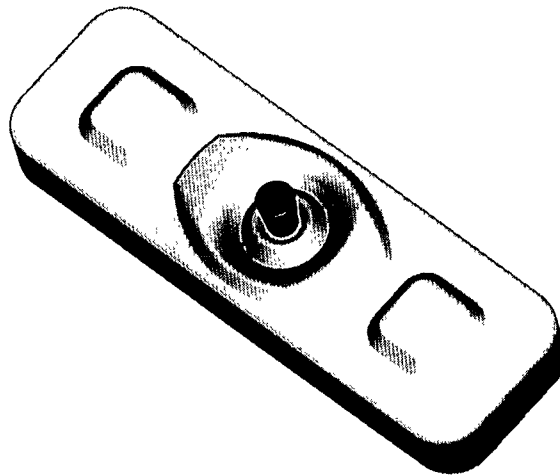


Figure 2.5
Joystick Cursor Control

2.6 Lighting

The brightness of the backlighting and status indicator LEDs is adjusted by the round buttons.

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2.6.1 Backlighting Option

When the option is specified, the lighted keyboard is equipped with green LEDs under each key for background lighting. A cable connector for the LED power source is built into the unit.

2.6.2 Status Indicator

All keyboards are equipped with Num Lock, Caps Lock and Scroll Lock red LED indicators.

2.7 Sealing

When so specified, the enclosed keyboard and cursor control will be sealed to meet NEMA 4 requirements. There is a breather vent on the bottom of the unit for use in equalizing the air pressure inside the sealed unit to that of the surrounding atmosphere. Clean the breather vent periodically with soft tooth brush and clean water as required.

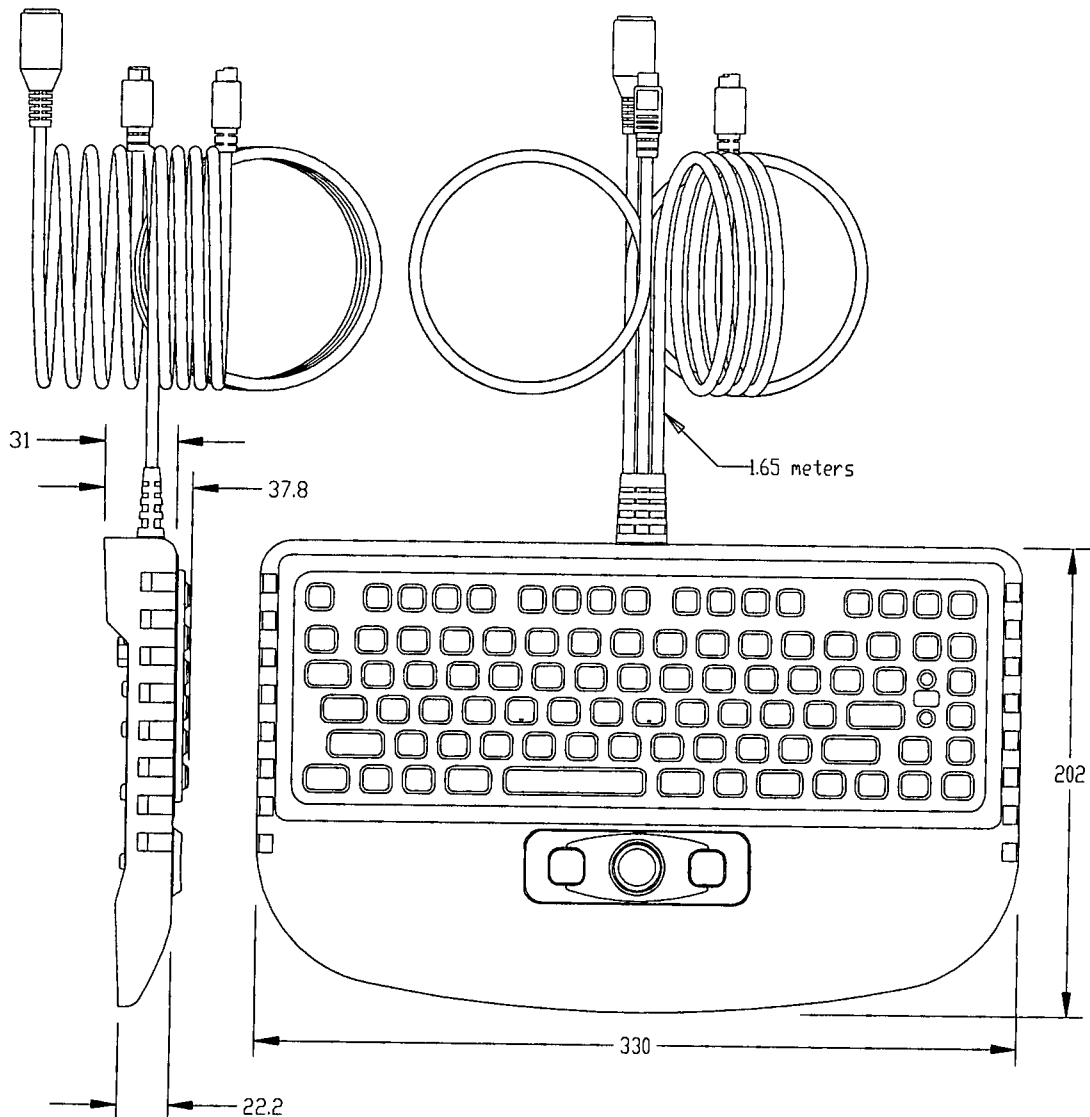
CAGE CODE:	DRAWING NO.	REV.	SHT.
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3.0 REQUIREMENTS

This specification defines the detailed requirements for the M76 keyboard. For all tests specified in this document, the test sample shall be mounted in such a manner as to simulate in-service use unless the specific test method precludes such mounting.

3.1 Dimensions

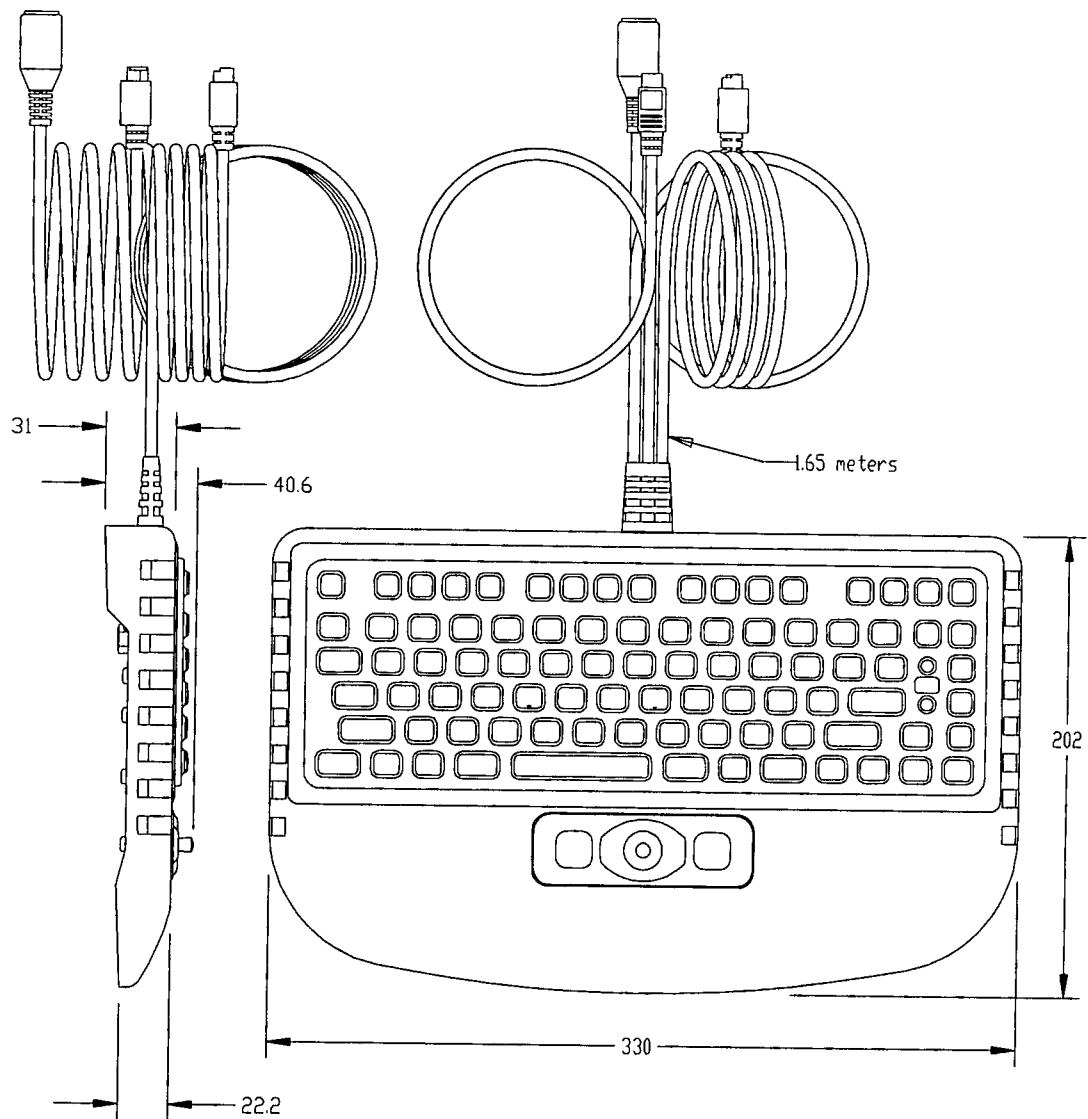
The keyboard outline dimensions are shown in Figures 3.1 and 3.2.



DIMENSIONS ARE IN MILLIMETERS

Figure 3.1
Keyboard with Pressure Sensitive Cursor Control Outline Dimensions

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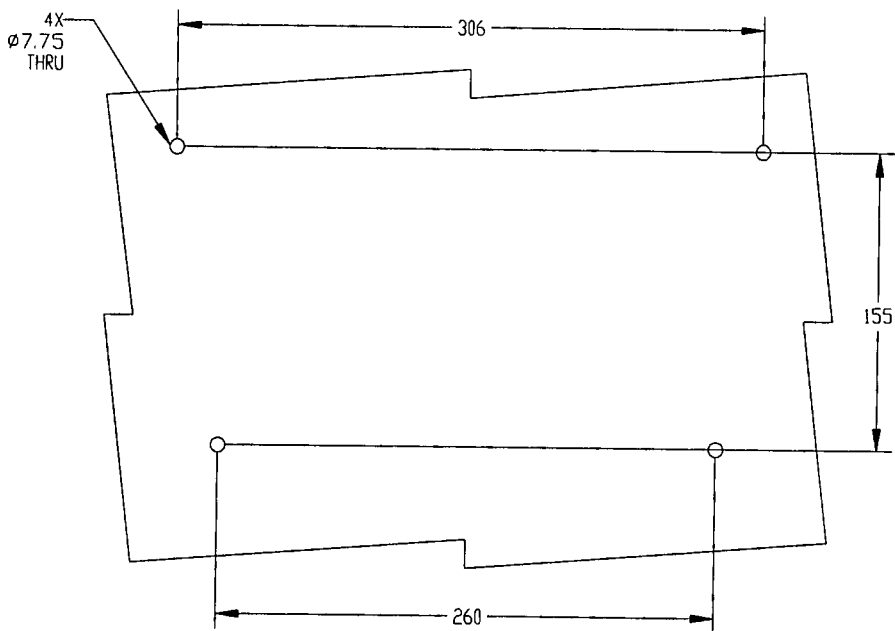
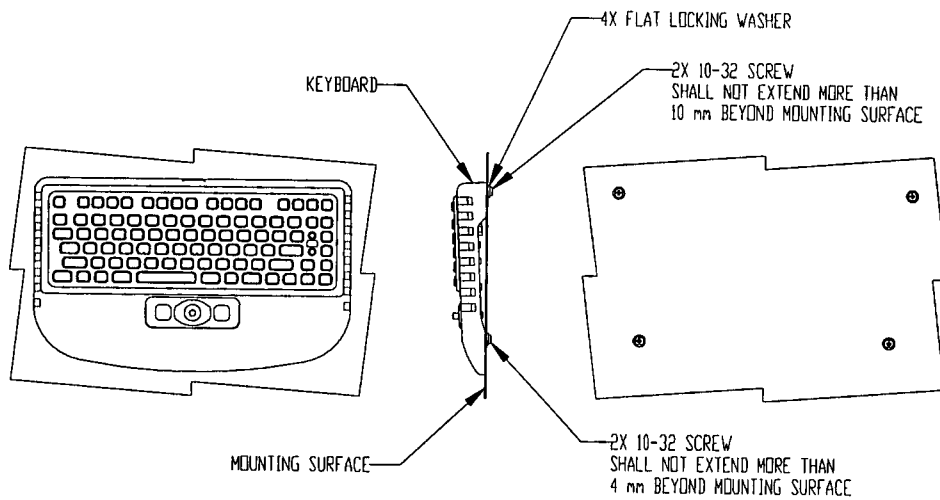
DIMENSIONS ARE IN MILLIMETERS

Figure 3.2
Keyboard with Joystick Cursor Control Outline Dimensions

3.1.1 Keyboard Mounting

Figure 3.3 depicts the recommended hole pattern for mounting a keyboard on a flat surface. The keyboard has four 10-32 thread inserts with six full thread minimum in each insert. Four 10-32 thread screws and four flat locking washers are required to mount a keyboard.

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DIMENSIONS ARE IN MILLIMETERS.

Figure 3.3
Recommended Hole Pattern for Mounting a Keyboard

3.1.2 Mounting Torque

The recommended torque to be applied to each screw when panel mounting the keyboard is 0.68 Nm (6 lbf in).

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3.2 Interface Connections

The connections to the keyboard and cursor control are through PS/2 connectors. A label that identifies the functionality of the connector at the end of the cable is attached to each cable. Users must provide their own strain relief for severe vibration requirements.

3.2.1 Keyboard Connection

The connection from the keyboard is through a standard male PS/2 connector. The mating connector should be female PS/2 port. Figure 3.4 shows the pin numbers, and Table 3.1 shows the function of each pin.

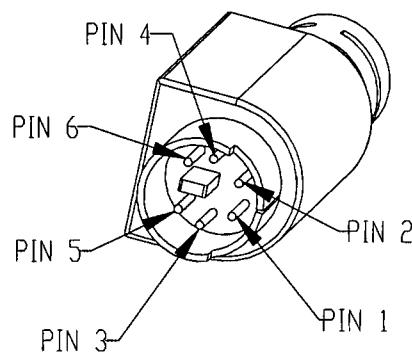


Figure 3.4
Keyboard Pin Number

Table 3.1
Keyboard Pin Number and Function

Pin Number	Function
1	Keyboard Data
2	N/C
3	GND
4	+5 VDC
5	Keyboard Clock
6	N/C

3.2.2 Cursor Control Connection

The connection from the cursor control is through a standard male PS/2 connector as shown in Figure 3.5. Figure 3.5 also shows the pin numbers of cursor control cable connector, and Table 3.2 shows the function of each cursor control pin.

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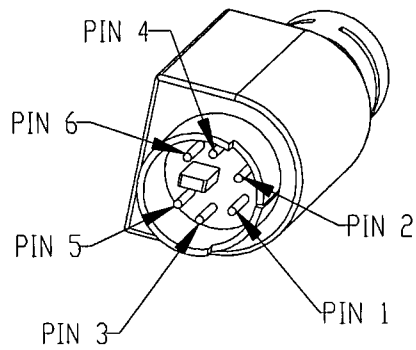


Figure 3.5
Cursor Control Cable Connector Pin Numbers

Table 3.2
Cursor Control Pin Number and Function

Pin Number	Function
1	Cursor Control Data
2	N/C
3	GND
4	+5 VDC
5	Cursor Control Clock
6	N/C

3.2.3 LED Electrical Connection and Power Requirements

The lighting power connection to the keyboard and cursor control LEDs is through a cable terminated with a standard female five-pin circular DIN. The mating connector from a power source should be a male five-pin circular DIN.

Power requirements to light the keyboard without cursor control are 1.9 A at 2.1 VDC for a total power requirement of 3.99 W, and the power requirements to light the keyboard with cursor control are 1.94 A at 2.1 VDC for a total power requirement of 4.07 W. This requirement is satisfied by using either one of two AC adapters with constant current power supplies as describe in section 4.2.1.

Figure 3.6 shows the pin numbers of a keyboard and cursor control lighting connector, and Table 3.3 shows the function of each pin.

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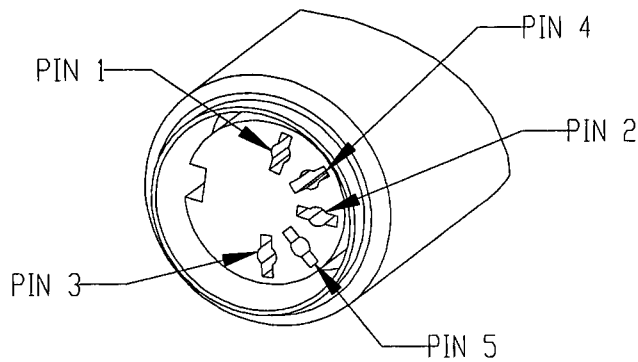


Figure 3.6

Keyboard Lighting Connector Pin Number

Table 3.3


Keyboard Lighting Connector Pin Number and Function

Pin Number	Function
1	DC Common
2	No Connection
3	+2.1 VDC
4	DC Common
5	+2.1 VDC


3.3 LED Brightness

The LEDs brightness is set at 50% level when the computer is booted. The time required to increase the brightness from 50% to 100% (full brightness, On) is about 1.5 seconds, and the time required to decrease (dim) the brightness from 50% to 0% (minimum brightness, Off) is also about 1.5 seconds.

3.3.1 Increasing LED Brightness

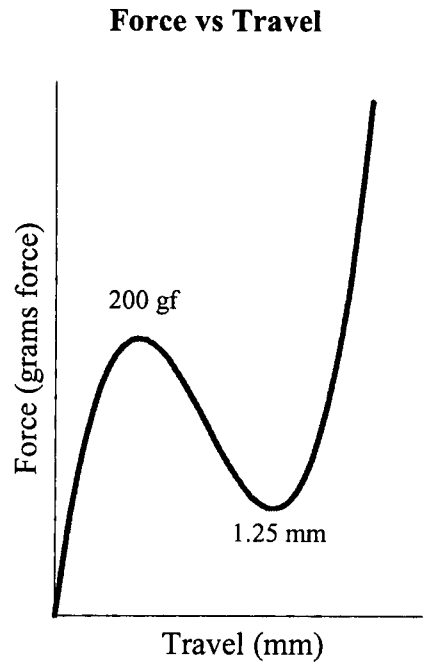
The LED brightness is increased by pressing the round button above the  indicator.

3.3.2 Decreasing LED Brightness

The LED brightness is decreased by pressing the round button below the  indicator.

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3.5.3 Force Travel Curve



Nominal Key Travel 1.25 mm (.050 in).
Nominal Actuation Force 200 grams force (7.05 ounces force).

3.5.4 Joystick

Operation Lever Angle 27° maximum from vertical position.
Nominal Lever Operation Force 612 grams force (21.6 ounces force).

3.6 Environmental Requirements

The keyboard is designed to meet the following requirements.

3.6.1 Temperature Range

The operating and storage temperature range of the Series M76 product line shall be as shown in Tables 3.5.

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Table 3.5
Keyboard with Cursor Control Temperature Range

Condition	° Celsius	° Fahrenheit
Operating	-20 to 60	-4 to 140
Storage	-20 to 60	-4 to 140

3.6.2 Thermal Shock

Thermal Shock Test: -30 °C (-22 °F) for ½ hour,
 +75 °C (167 °F) for ½ hour
 for 5 cycles with recovery time and temperature
 of 5 minutes at 25 °C (77 °F).

3.6.3 Vibration

Vibration Test: 15 G peak or .06 inches double amplitude, 10 to 2000 Hz.

The entire frequency range of 10 to 2000 Hz and return to 10 Hz shall be traversed in 60 minutes. This cycle shall be performed once in each of three mutually perpendicular directions (total of 3 times), so that the motion shall be applied for a total period of approximately 3 hours.

3.6.4 Shock

Three shocks shall be applied in each direction of the three mutually perpendicular axes of the keyboard (total of 9 shocks). Each shock pulse shall have 100 G peak value, 11 ms duration, half-sine waveform and 12.3 ft/s velocity change.

3.6.5 Moisture Resistance

Moisture Resistance Test: With the relative humidity between 90 and 98%
 cycle between 65 °C (149 °F) and 25 °C (77 °F)
 for 10 cycles (240 hours), following the 10-day cycle
 profile of MIL-STD-202, method 106.

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3.6.6 NEMA 4 Option

When the option is specified, the keyboard shall be subjected to a stream of water from a hose that has a 25.4 mm (1 in) nozzle and delivers at least 246 liters (65 gallons) per minute. The water shall be directed at all joints from all angles from a distance of 3.05 to 3.65 meters (10 to 12 feet) for a minimum of 5 minutes.

3.6.7 Salt Spray

No functional damage will result from a test wherein the data entry product shall be sprayed with a 5% salt and water solution at 35 °C (95 °F) for 96 hours.

3.6.8 Sand and Dust

The data entry product shall be exposed to the three dust tests in succession. The dust shall be fine sand, and shall pass through a 140-mesh screen. The dust concentration shall be 0.3 grams (0.01 oz) per cubic foot. For each test, the dust shall be mixed with different air velocity, temperature and relative humidity as described in Table 3.6. Also specified is the duration of each test.

Table 3.6
Air Characteristic and Test Duration

Dust Test #	Velocity (ft/minute)	Temperature (°C)	Relative Humidity %	Test Duration (hours)
1	1750	23	< 22	6
2	300	63	< 10	16
3	1750	63	< 10	6

3.6.9 EMI/RFI Shielding

Keyboard shall meet requirements of FCC Level A.

3.6.10 Legend Chemical Resistance

The legend shall be insecticide, glass cleaner, and hand cream resistant. Two tests shall be performed to test the legend chemical resistance.

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Test one requires that the legend shall be coated with each chemical, allowed to dry, and rubbed 25 times under a load of 500 grams per square centimeter (7.1 psi).

Test two requires that the legend shall be coated with each chemical, allowed to dry, wiped away, and left for 60 hours at 60 °C (140 °F) and 95% RH.

The legend shall be readable after completion of the tests.

3.6.11 Legend Wear

Two tests shall be performed to test the legend wear.

Test one requires that a rubber eraser shall be dragged across the legend under a 500 gram (17.6 oz) load for 1,000 cycles at a rate of 30 cycles per minute.

Test two requires that a rubber eraser shall be dragged across the legend under a 1,000 gram (35.3 oz) load for 500 cycles at a rate of 30 cycles per minute.

After testing, the characters and symbols shall remain readable.

3.6.12 Legend Adhesion

A one mm grid pattern shall be cut on the legend. An adhesive tape shall be applied to the surface, and rapidly peeled away.

After testing, the characters and symbols shall remain readable.

3.6.13 Finger Print Resistance

Two tests are required to test the fingerprint resistance. Test one requires that the legend shall be coated with a synthetic finger print solution, and left at 60 °C (140 °F) and 95% RH for 240 hours.

Test two requires that the legend shall be dipped in a synthetic fingerprint solution and rubbed 50 times with a cotton applicator saturated with synthetic fingerprint solution under a load of 500 grams per square centimeter (7.1 psi).

After testing, the characters and symbols shall remain readable.

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3.7 Material Requirement

3.7.1 Corrosion Resistance

All metal parts shall be corrosion-resistant material, or shall be suitably protected to resist corrosion.

3.7.2 Fungus

The data entry product shall be constructed of fungus inert materials.

3.7.3 Finish

Exterior surfaces should have an orange peel textured finish.

3.7.4 Terminal Plating

Printed switch board shall be plated with .00005 inches (0.0013 mm) thick 99% gold (130-200 Knoop hardness).

3.8 Other Requirements

3.8.1 Marking

Data entry product package shall be legibly marked as follows:

- a) StacoSwitch name and logo (optional).
- b) StacoSwitch Manufacturer's Cage Code Identification No. 12522.
- c) StacoSwitch Part Number.
- d) Manufacturing Date Code.
- e) Breather Vent (when applicable).

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3.8.2 Workmanship

Products shall be manufactured in such a manner as to be uniform in quality and free from cracked or displaced parts, sharp edges, burrs and other defects that would be detrimental to their serviceability or performance.

3.8.3 Quality

This keyboard shall be inspected and tested as necessary to substantiate product conformance to drawings and specifications. Inspection and test records shall be documented and shall be available for review.

3.8.4 Changes In Specification

Specifications defined herein are accurate at the time of release and publication of this document. StacoSwitch reserves the right to make changes without prior notice.

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4.0 PART NUMBER INFORMATION

This section contains the information necessary to order each of the standard and optional features of the Series M76 keyboard products described in this specification. Accessories are covered in Section 4.2.

4.1 M76 Keyboards, Enclosed, 88 Keys

<div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> M76 X X X X </div>	<p>Code</p> <p>1 Black A</p> <p>2 Gray A</p> <p>6 Black B</p> <p>0 Unlighted</p> <p>1 Lighted</p> <p>0 Unsealed</p> <p>1 Sealed to NEMA 4</p> <p>0 88 Keys w/ PS/2 Encoder (No Cursor Control)</p> <p>1 88 Keys w/ PS/2 Encoder and Pressure Sensitive Cursor Control</p> <p>A 88 Keys w/ PS/2 Encoder and Joystick Cursor Control</p> <p>Keyboard, Enclosed</p>
--	--

Table 4.1 gives the definition of the color combination codes.

Table 4.1
Color Combination Codes

Color Combination Code	Enclosure	Keyboard	Cursor Control (optional)
Black A	Black	Gray	Gray
Gray A	Gray	Black	Black
Black B	Black	Black	Black






Table 4.2 gives the relationship between color description and Pantone number. Other colors are available by special order.

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Table 4.2
Color Description

Color	Pantone Number
Black	Pantone # 433 U
Gray	Pantone # Cool Gray 9 U

Typical data entry part number is M761116. This is an 88 key keyboard and pressure sensitive cursor control in an enclosure, which is sealed and lighted. The keyboard, cursor control and enclosure colors are black.

M76	1	1	1	6		Code
					Color Combination	6 Black B
					Lighting	1 Lighted
					Sealing	1 Sealed
					Type Detail	1 88 Keys w/ PS/2 Encoder and Pressure Sensitive Cursor Control
					Type M76	Keyboard, Enclosed

4.2 Accessories

4.2.1 Power Supply

Two power supplies are available for customer convenience to light the keyboard. The power supplies convert 110 VAC to 2.1 VDC with a constant current rating of 2.65 A. The power supply has a five-pin DIN female connector that mates with the keyboard lighting connector. The power supplies are available in two configurations. One is a wall mount version, and the second one is table mount version.

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4.2.1.1 Wall Mount Power Supply

The part number of the wall mount power supply is 15256. The wall mount power supply plugs directly into an AC power source and provides the power output through a six foot long cord with a connector that mates with the keyboard lighting connector. The power supply dimension is 81 x 55 x 49 mm (L x W x H) or approximately 3.2 x 2.2 x 1.9 inches. The wall mount power supply weighs approximately 306 gm (10.8 oz). The AC adapter converts 120 VAC, 47 to 63 Hz to 2.1 VDC, 2.65 A, constant current.

4.2.1.2 Desktop Power Supply

The desktop power supply part number is 15259, and it has two cords. One cord is approximately 2 m (6 ft) long and has a plug that plugs into an AC power source. The second cord is approximately the same length and has a five-pin male connector that mates with the keyboard lighting connector. The power supply dimension is TBD x TBD x TBD mm (L x W x H) or approximately TBD x TBD x TBD inches. The desktop power supply weighs approximately TBD gm (TBD oz).

4.2.2 PC/AT Keyboard Adapter

The PC/AT keyboard adapter allows the keyboard to be connected to a PC/AT connector. The adapter weighs approximately 18.5 gm (0.66 oz). Part Number is 15260.

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