

## Chapter 1 User's Guide

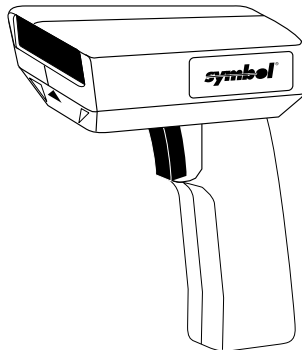
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### Scanning Made Easy

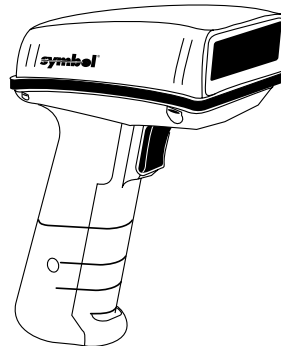
The MX hand-held scanner is based on Symbol's unique "MX" advanced mylar™ technology scan engine. This state-of-the-art technology gives the scanner excellent reliability and consistent outstanding scanning performance. This scanner reads most code symbologies, densities, and colors, produced by a wide range of printing techniques.

It's available in both an LS 2000MX for normal retail and commercial applications, and an LS 3000MX model for more rugged environments.

The MX is compatible with the full range of SYMBOLLINK® and OmniLink™ interface controllers, as well as portable data terminals that support scanners.



LS 2000MX



LS 3000MX

# Set Up

## Unpacking

Remove the MX from its packing and inspect the scanner for evidence of physical damage. If the scanner was damaged in transit, call the *Symbol Support Center* at the telephone number on page 1-9.

**KEEP THE PACKING.** It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

## Connecting the Cable to the Scanner...

### LS 2000MX

- Plug the modular connector into the base of the scanner.

### LS 3000MX

- Slide collar down over cable
- Plug in modular connector
- Slide collar up into keys
- Twist to snap in place

## Connecting the Scanner...

### to a Controller

Plug the 9-pin, D-type connector at the end of the scanner's coil cord into the **SCANNER** port on the interface controller. Refer to the interface controller user documentation for full details.

### to a Portable Data Terminal

Refer to the appropriate operator's guide for set up instructions, including programming the terminal for scanner type.

# Ready, Test, Scan

## 1. Ready

Make sure the scanner is connected to the terminal before you turn on the system.

## 2. Test

Aim the scanner away from you and press the trigger. When you press the trigger, the scanning beam is energized for approximately 3.0 seconds (default).

## 3. Scan

Make sure the symbol you want to scan is within the proper scanning range. (See *MX Decode Zone* on page 1-6.)

Aim and press the trigger.

- The scan beam and red SCAN LED will light for about 3.0 seconds, or until a successful decode.

The scanner has read the symbol when:

- You hear a beep.
- The green DECODE LED lights.

The LED stays green until the next trigger pull, or until power is removed from the scanner.

# Aiming

## Hold at an Angle

Do not hold the scanner directly over the bar code. In this position, light can bounce back into the scanner's exit window and prevent a successful decode.

## Scan the Entire Symbol

- Your scan beam must cross every bar and space on the symbol.
- The larger the symbol, the farther away you should hold the scanner.
- Hold the scanner closer for symbols with bars that are close together.
- A short high-tone beep indicates a good decode.



## What If...

**Nothing happens when you follow the operating instructions.**

### **You Should**

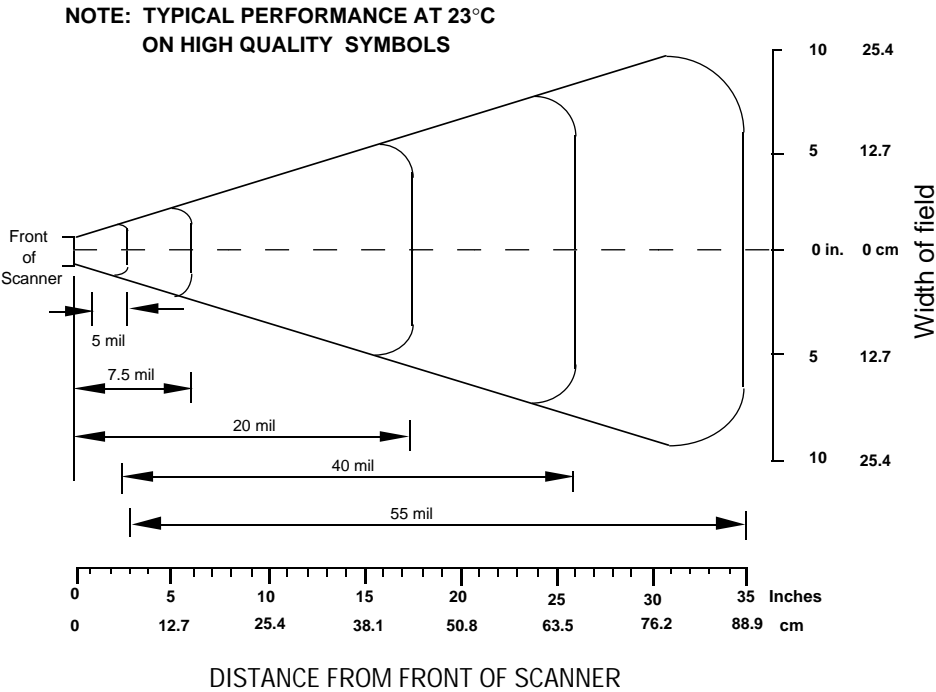
- Check the system power.
- Check for loose cable connections.
- Make sure the controller is programmed to read the type of bar code you want to scan.
- Check the symbol to make sure it is not defaced.
- Try scanning similar symbols of the same code type.
- Check that gas tank is not exhausted.\*
- Be sure you're within the proper scanning range.
- Be sure your terminal is set up to accept a laser scanner.

**Note:** If after performing these checks, the symbol still does not scan, contact your distributor or call *Symbol Support Center*. See page 1-9 for telephone numbers.

\*The gas tank limits the amount of time the laser remains on within a given period. For example, long range scanners have a 37 second gas tank. That means if the laser is on for 37 continuous seconds, or if you accumulate 37 seconds of "on time," the laser will then go into a 35% duty cycle operation. That is, on for 7 seconds, then off for 13 seconds. "On time" is the difference between when the laser is on, and when it is off. In other words, if you turn the laser on for two seconds, off for one second, then on again, you've accumulated one second of "on time." If, however, after turning it on for two seconds, you turn it off for two or more seconds, you have not accumulated any "on time."

For standard range scanners, once the 37 seconds of "on time" have been accumulated, the laser goes into a 50% duty cycle. That is, on for 10 seconds, then off for 10 seconds.

# MX Decode Zone



## Maintenance

Cleaning the exit window is the only maintenance required. A dirty window may affect scanning accuracy.

- Do not allow any abrasive material to touch the window.
- Remove any dirt particles with a damp cloth.
- Wipe the window using a damp cloth, and if necessary, a non-ammonia based detergent.
- Do not spray water or other cleaning liquids directly into the window.

## Factory Service

Before calling, have the model number and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, Support will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

**Note:** Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.



# Symbol Support Center

In the U.S.A., for service information, warranty information or technical assistance call:

## **SYMBOL SUPPORT CENTER**

**1-800-653-5350**

If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

### **Canada**

Mississauga, Ontario  
Canadian Headquarters  
(905) 629-7226

### **Europe**

Wokingham, England  
European Headquarters  
0734-771-222 (Inside UK)  
+44-734-771222 (Outside UK)

### **Asia**

Singapore  
Symbol Technologies Asia, Inc.  
337-6588 (Inside Singapore)  
+65 337-658 (Outside Singapore)

# **Accessories**

## **Required Accessories**

MX scanners are sent as a package with required accessories, listed in the *Product Ordering Guide*. Optional accessories are available at extra cost.

## **Optional Accessories**

Optional accessories, listed in the *Product Ordering Guide*, include various stands and holders, which are supplied at extra cost. Additional units of required accessories may also be purchased at extra cost.

# MX Signal Descriptions

**Table 1-1. MX Signal Descriptions**

Pin	Signal Name	Function
1	Start of Scan	This output synchronizes the decode logic with the scanner. The output is high when the beam sweeps in one direction and low when it sweeps in the opposite direction. This open collector signal is capable of sinking 25 mA. An external pullup resistor may be connected to any voltage up to 20 V. The frequency of scans is 36 scans/sec.
2	Digitized Bar Pattern	Output from the scanner is electrically identical to pin 1, providing a series of pulses with widths proportional to the widths of the bar code being scanned. A low output represents a bar, and a high output represents a space. The frequency of the pulses depends on the density of the symbol being scanned.
3	Decode LED	This input to the scanner controls the green decode indicator LED on the back of the scanner. Applying a voltage of 2.5 V or greater will light the LED. Maximum voltage that can be applied to this input is 15 V, at which time the input will draw about 25 mA. This current decreases as the voltage is lowered. The decode LED can be activated with this input even when the scanner is not operating, providing power is present at pin 9.
4		Not used.
5	Trigger Switch	This output is grounded when the trigger is pulled and floating when the trigger is released. The decode logic uses this switch to signal that the operator wishes to read a bar code.
6	Enable	When the decode logic senses that the trigger has been pulled, this input must be driven high (+2.4 to +14 V into a 10 kilohm load) to power-up the scanner electronics and turn on the laser and scanning motor. As soon as a decode is successfully completed, if no decode occurs after about 1.5 seconds, or when the trigger is released, this input should float or be driven to ground (less than .4 V) to power-down the scanner.
7, 8	Ground	Power supply and signal ground return line.

**Table 1-1. MX Signal Descriptions**

Pin	Signal Name	Function
9	Power	This pin is to be connected to the 4.5 to 14 V (4.5 to 14 VDC) power supply. When pin 6 is high, current to operate the scanner is supplied by pin 9 (135 mA @ 5 VDC typ.). When pin 6 is at ground potential, current into pin 9 is less than 50 $\mu$ A. Sufficient power must be available to support dual trigger operation.

# Technical Specifications

**Table 1-2. Technical Specifications**

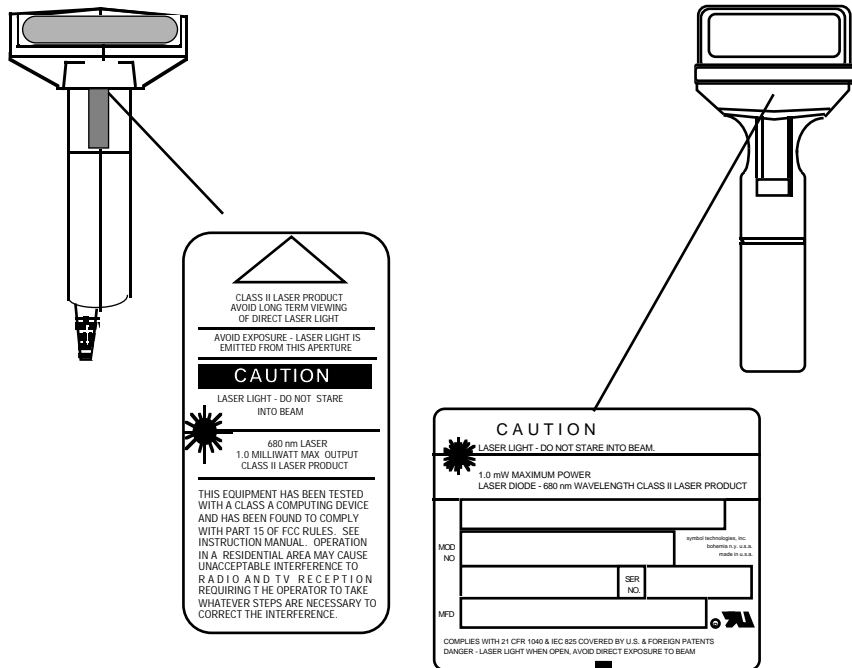
Item	Description	
<b>Power Requirements</b>	4.3 to 14 VDC; 125 mA @ 5 VDC Typical.	
<b>Scan Repetition Rate</b>	36 ( $\pm$ 3) scans/sec (bidirectional)	
<b>Start up Time</b>	<50 msec from scan enable	
<b>Data Acquisition Time</b>	<110 msec from scan enable	
<b>Skew Angle</b>	$\pm$ 65° from normal	
<b>Pitch Angle</b>	$\pm$ 55° L/R of normal	
<b>Decode Depth of Field</b>	Maximum typical working distance is 35 in. (88.9 cm); minimum element width resolution is 5.0 mils	
<b>Print Contrast Minimum</b>	25% absolute dark/light reflectance differential, measured at 675 nm	
<b>Ambient Light Immunity</b>		
<b>Artificial Lighting</b>	450 ft. candles	4845 lux
<b>Sunlight</b>	8000 ft. candle	86112 lux (@8 in. on low density bar codes)
<b>Operating Temperature</b>	32° to 104°F	0° to 40°C
<b>Storage Temperature</b>	-40° to 140°F	-40° to 60°C
<b>Humidity</b>	5% to 95% (non-condensing)	
<b>Durability</b>		
<b>LS 20MX</b>	4-ft. drop to concrete	
<b>LS 30MX</b>	6-ft. drop to concrete	

**Table 1-2. Technical Specifications**

Item	Description	
<b>Dimensions</b>		
<b>LS 2000MX</b>		
<b>Height</b>	5.8 in.	14.7 cm
<b>Length</b>	4.9 in.	12.4 cm
<b>Width</b>	2.6 in.	6.6 cm
<b>LS 3000MX</b>		
<b>Height</b>	6.3 in.	16 cm
<b>Length</b>	5 in.	12.7 cm
<b>Width</b>	2.8 in.	7.1 cm
<b>Laser Classification</b>	CDRH Class II IEC 825 Class 1 IEC 825 Class 2	

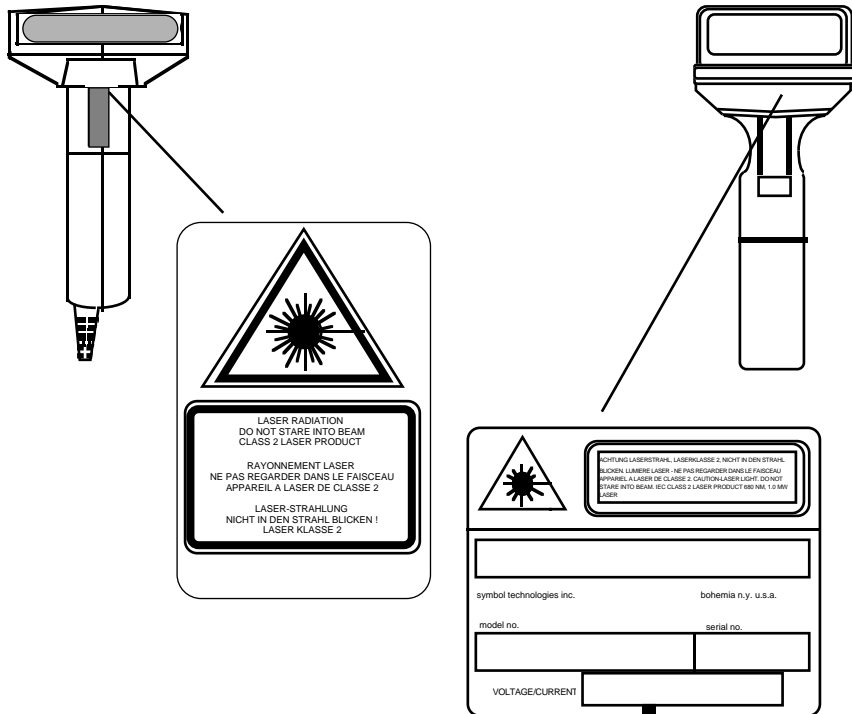
## Scanner Labeling

MX scanners use a low-power, visible laser. As with any very bright light source, such as the sun, the user should avoid staring directly into the light beam. Momentary exposure to a CDRH Class II laser is not known to be harmful. Required safety label as it appears on the scanner.



*Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous visible light exposure.*

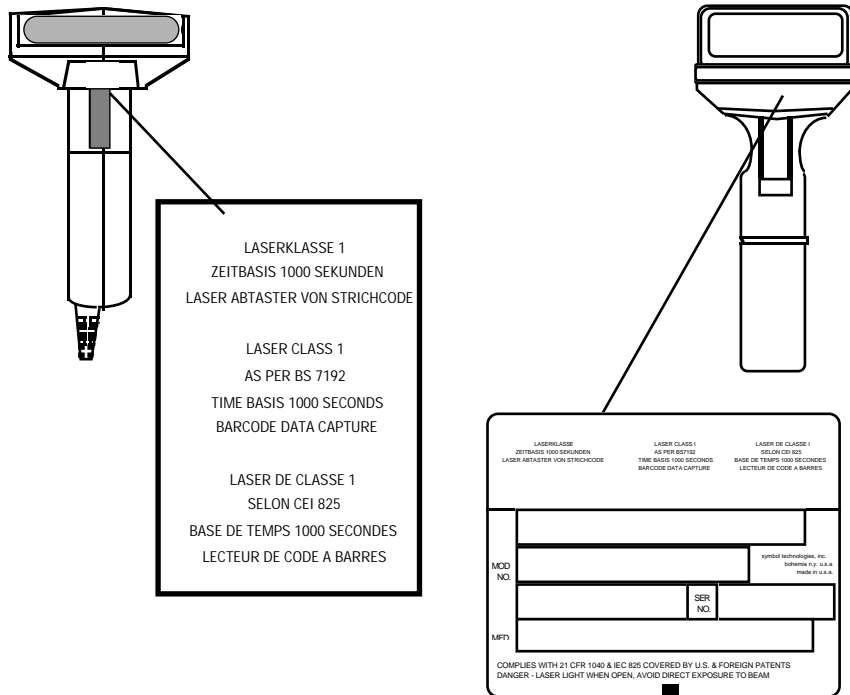
MX scanners use a low-power, visible laser. As with any very bright light source, such as the sun, the user should avoid staring directly into the light beam. Momentary exposure to a IEC 825 Class 2, or BS4803 Class 1 laser is not known to be harmful. Required safety label as it appears on the scanner.



*Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous visible light exposure.*



MX scanners use a low-power, visible laser. The scanner is designed for laser safety according to IEC 825 Class 1. Class 1 laser products are inherently safe. Exposure to the laser beam will cause no harm to your eyes or skin. A safety label such as the following is attached to the scanner.



*Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous visible light exposure.*