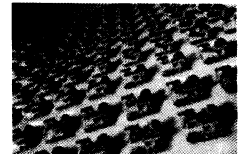# Intermec

### expect MORE™

## What is Smaller Than a Grain of Sand & Redefining Bar Code Scanning?
## MEMS Technology.. brought to you by Intermec

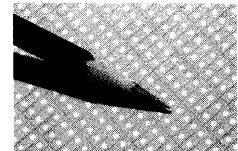### What is MEMS technology?

MEMS is the underlying technology behind antilock brakes and vehicle airbags, and is used in numerous industrial and commercial products, including inkjet printers, projection systems, large-screen and digital televisions, optical networking gear, medical imaging and diagnostic equipment and battlefield displays.



*Intermec's EL10 MEMS scanning engines*

MEMS stands for microelectromechanical systems. MEMS devices combine electronic circuitry with miniaturized mechanical devices, such as sensors, motors or pumps, on a silicon substrate that can be smaller than a grain of sand. The MEMS motors and other components can even be smaller in diameter than a human hair.

Components are assembled on silicon using integrated circuit production techniques, and the MEMS devices that are generated are sometimes called "systems on a chip."



*Mirrors etched onto a sheet of silicon thanks to MEMS technology*

### Where can you find MEMS today?

The industrial world is not a stranger to MEMS. For example, Analog Devices produces and ships more than one million MEMS airbag sensors each week.

Designs and production techniques for the MEMS components are well established because the components are used in mature market segments such as projection systems, consumer electronics and medical imaging.



**Quick Facts About MEMS**
- First commercially available MEMS device introduced in 1991
- Market expected to quadruple to $11B by 2011
- Nearly limitless number of applications, from optics to pharma to RFID
- Invisible to the human eye

### MEMS vs. Traditional Laser Scanners

MEMS scanners are at the beginning of their development cycle, and already offer advantages over traditional laser scanners – a technology that's been used for 30 years.

The two major differences between traditional and MEMS laser scanners are the mirror assembly and scanner size.

| MEMS Laser Scanners | Traditional Laser Scanners |
| --- | --- |
| 500+ Scans/Second | 100 Scans/Second |
| Smaller, Lightweight | Larger, Heavier |
| More Durable | Less Durable |
| Improved Readability | Limited Readability |
| Longer Battery Life | Shorter Battery Life |
| Use Less Power | Use More Power |

### Where is Intermec using MEMS?

Working with Europe's largest organization for applied research and development, the Fraunhofer Institute for Photonic Microsystems, Intermec developed MEMS engines for bar code scanners, the first innovation of its kind. The EL10 is the first bar code scanning product to market with this technology.
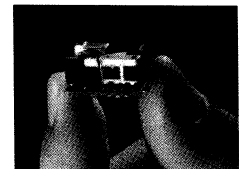


*Intermec's EL10 MEMS scanning engine is the size of a sugar cube*

### How Does a MEMS Bar Code Scanner Work?

Just like traditional laser bar code scanners, MEMS scanners use a mirror to focus and direct a laser light source to scan a bar code symbol. The symbol is decoded with a sensor measuring the amount of light reflected back; the reflected light is converted to a digital signal, and decoded with an algorithm. Traditional laser scanners can't accommodate separate lens and mirrors, but MEMS technology allows scanners to be built with a separate mirror and lens, optimized for reflecting and collecting light, respectively.