# LM-0800 Barcode Reader



| Types of Barcodes | Visible Diode Laser | Rotating Polygon Mirror |
|---|---|---|
| Scanning Algorithm | Barcode Detection | Barcode Recognition |
| Photodetector | Computer Integration | |

The development of the barcode reader principle goes back to 1948 when Bernard Silver, a graduate student at Drexel Institute of Technology in Philadelphia overheard a conversation between the president of the local food chain and one of the deans. The president asks to research on a system which can automatically read product information during checkout. Silver told his friend Norman Joseph Woodland about the request, and they started working on a variety of systems. The basic idea was to use an optical device which responds to light/dark transition of the a code. Although the idea was born in 1948 it took another 26 years before barcodes became commercially successful for automate supermarket checkout systems. The very first scanning of the now ubiquitous Universal Product Code (UPC) barcode was on a pack of Wrigley Company chewing gum in June 1974. The breakthrough became only possible due to the invention of the laser, especially the Helium Neon laser emitting a visible and continuous red beam. The use of laser light with optical and mechanical scanner made it possible to read the bar code under nearly all directions of observation which is written on an object. Another key component for the success of the barcode reader has been the upcoming computer. Once the scanned information is present as a modulated electronic signal, it has to be decoded, stored and displayed. After the successful and useful implementation in supermarkets the idea of barcode identification was used for postal application, tagging of patients in medical treatments, luggage tagging in air transportation and a lot more. This experiment makes use of a modified regular cash desk scanner to introduce this exciting technology. All major components are made accessible like the rotating polygon mirror, beam distribution mirror and receiver optics. The analogue optical signal is tapped and made available via BNC jacks to be displayed on an oscilloscope. A set of different enlarged barcodes are used to track the chain from the analogue to the digital signal conversion. By means of a set of black beam blocker the beam bender mirror are blinded to obtain only one scanning line to facilitate the interpretation of the optical signal. The scanner is connected via its USB bus to a computer where the received code is encoded and displayed. The software uses an attached database to identify already known scanned object or store newly scanned ones. A variety of own barcodes can be created and if required printed to own labels.

By using an own created EAN 8 bar code symbol card with the label "00000000" the signals of the bar code scanner are stored on the oscilloscope as shown in Fig. 2.47. For this purpose the raw signals of the scanner which are accessible at the rear of the scanner via BNC jacks are connected to the oscilloscope. The lower trace (yellow) shows the analog photodetector signal and the upper one (turquoise) shows the digital converted analog signal. On top of the Fig. 2.47 the corresponding bar code is shown. It can be seen that besides the desired signal other peaks exists, which are originating from the edges of the bar code label. To determine the beginning and end of the bar code start and stop signals provided by the barcode.

## LM-0800 Barcode Reader consisting of:

| Item | Code | Qty. | Description | Details page |
|---|---|---|---|---|
| 1 | CA-0050 | 1 | Set of tools and connection cable | 127 (9) |
| 2 | CA-0450 | 2 | BNC connection cable 1 m | 130 (28) |
| 3 | ES-0400 | 1 | Barcode scanner software | |
| 4 | OM-1000 | 1 | Barcode scanner | 117 (47) |
| 5 | OM-1010 | 1 | Configuration bar code symbol cards | 117 (48) |
| 6 | OM-1020 | 1 | Barcode sample cards | 117 (49) |
| 7 | OM-1030 | 1 | Set of beam blocker cards | 117 (50) |
| 8 | UM-LM08 | 1 | Manual Barcode Reader | |
| | Required Option (order separately) | | | |
| 9 | CA-0120 | 1 | Tablet PC Windows | 128 (15) |
| 10 | CA-0200 | 1 | Oscilloscope 100 MHz digital, two channel | 128 (19) |



Fig. 2.47: EAN8 code with label "00000000"

Once such a signal appears, the evaluation electronic starts to look for the further signal and if the encoding fits into a defined frame including the stop signal, the content of the reading buffer is transferred to the USB bus.