STATE OF NEW JERSEY
DEPARTMENT OF TRANSPORTATION
TRENTON, NEW JERSEY 08625

METRIC SPECIFICATIONS FOR A BAR CODE READER SYSTEM

N.J. Specification No. EBM-BCS Effective Date: July 1, 2001

New Jersey Department of Transportation Specifications for a Bar Code Reader that provides bar code scanning of inventory, tools, and other equipment and supplies.

The purpose of these specifications is to describe the minimum acceptable design and operating requirements for this equipment.

GENERAL - I

This section defines a complete Bar Code Reader System that is functionally equivalent (Hardware and Software) to the following Intermec components which include a Bar Code Scanner - Intermec Model 9445, a Communications Dock - Intermec Model 40D, data collection program -PC-IRL, programming manual, NiCad Battery Charger, and a NiCad battery. The system shall be fully operational and provide accurate bar code scanning, data storage, and transmission to a host computer.

1-1 Basic Design
The bar code reader shall be a hand held self-contained laser scanner with a portable computer in one integrated unit. The unit shall store up to 1 megabyte of information using onboard software and data collection program for program editing and compiling. The transmission of data to host computers, terminals, and modems shall be at speeds up to 19.2 kilobits per second via an RS-232 interface. The display shall be a 4 line by 20 character backlit liquid crystal display (LCD).

1-2 Physical Characteristics

Length:	244 millimeters
Height:	41 millimeters
Width:	84 millimeters
Weight:	675 grams with NiCad battery pack

1-3 Hardware
8 bit, CMOS microprocessor
Real-time clock/calendar

1-4 Software
Data collection program, editor and compiler

1-5 Memory Size
1 megabyte CMOS RAM

1-6 Operating Characteristics

Codes Read:	Autodiscriminates between CODE 39, HIBC, UPC/EAN, Codabar, 2 of 5, Interleaved 2 of 5, CODE 11, CODE 93, Code 128, Code 16K
Data:	RS-232C (Tx, Rx, RTS, CTS, DTR) Half of full duplex ASCII 7 or 8 bit, Selectable parity 300 to 19 200 bits per second
Protocols:	Point-to-point, Polling Mode D, User defined multi-drop XMODEM, User defined XMODEM, CrossBar
Interfaces:	10-pin, long-life (10 000 insertions) RS-232C connector 6-pin modular input device connector Audio jack for headset Power supply jack

1-7 Display

4 lines, 20 characters per line
backlit LCD display

1-8 Keypad

48 alphanumeric and function keys
Complete ASCII 128-character set
8 programmable function keys

1-9 Power Options

Primary Power:	NiCad battery pack, 3 600 coulomb, 20 hours operation with wand or 12 000 1-second scans with diode laser AC power supply.
Backup power:	684 coulomb lithium battery backs RAM and clock while primary power is removed or low, Typical 5-year shelf life.
Charging:	6 hour maximum to charge pack with battery charger, 14 hours to charge pack in the communications dock.

1-10 Environment

Operating:	-20 °C to +50 °C
Storage:	-40 °C to +60 °C
Humidity:	0% to 90% (non-condensing)

1-11 Scanning Performance

Working Distance X Dimension	Min.	Max.
0.19 mm	69.85 mm	158.75 mm
0.25 mm	63.50 mm	209.55 mm
0.50 mm	50.80 mm	304.80 mm
1.02 mm	76.20 mm	457.20 mm

1-12 Optics System

670 nanometers ±10 nanometers visible laser diode

1-13 Ambient Light Immunity

Sunlight: 86 111 lux

Florescent, incandescent,
mercury vapor, and sodium vapor: 4 844 lux

1-14 Regulatory Agency Approvals
UL 478 5th Edition
CSA C22.2 #220-M1986
TUV to IEC 950
CDRH Class II
FCC Part 15 Class B verified
SOR/88-475 Class B verified
FTZ Vfg 1046/1984 Class B verified
VDE 0871/06.78 compliant

COMMUNICATIONS DOCK - II

2-1 Functional Requirements
The communications dock, Trakker 40D, shall act as an interface between the bar code reader and the asynchronous host computer or terminal. The dock shall also provide for unattended overnight data transmission and NiCad battery recharge.

A. Interface The communications dock's 25-pin host connector provides RS-232 and RS-422 connection to host computers. The communications dock's auxiliary terminal connector provides in-line communication between a host computer and CRT terminal, utilizing existing RS-232 or RS-422 lines. The configuration of the dock for RS-232, RS-422, or multi-drop shall be accomplished by DIP switch settings.

B. Display The communication dock's power and transmission LEDs show the status of data exchanges and polls. One LED shall indicate correct placement of the bar code reader in the dock. The other LEDs shall indicate the transmission and reception of data with the host.

C. Battery Charger The communications dock shall charge the NiCad battery in the bar code scanner at a slow overnight rate of 14 hours.

2-2 Physical Characteristics
Length: 140 millimeters
Height: 69 millimeters
Width: 108 millimeters
Weight: 0.28 kilogram

2-3 Environment
Operating: 0 °C to +50 °C
Storage: -20 °C to +70 °C
Humidity: 10% to 90% relative humidity

2-4 Regulatory Agency Approvals
UL 478 5th Edition

CSA C22.2 #154-M1983
FCC Class A Docket 20780 Pt. 15, Sub Paragraph J

DATA COLLECTION PROGRAMMING LANGUAGE- III

3-1 Functional Description
The data collection programming language, PC-IRL, shall have data editing capability to check input for proper format, shall have built in communication routines to easily transmit results directly to a host or through the data collection network, flexible operator prompting for instant feedback, and data formatting and manipulation capability. The data collection programming language shall be easy to learn, simple to use, and capable of developing complex bar code data collection applications.

3-2 The programming language shall operate on standard MSDOS computers equipped with 640 kilobytes of main memory.

NiCad BATTERY CHARGER - IV

4-1 Functional Description
The NiCad battery charger, Model 40Z, allows an extra NiCad battery to be charged outside of the communications dock. The charger shall charge either a standard NiCad or high capacity NiCad in approximately 6 hours. Status lights indicate when a battery is charging and when fully charged.

4-2 Physical Characteristics

Length:	112 millimeters
Width:	127 millimeters
Height:	97 millimeters
Weight:	0.25 kilogram

4-3 Power
120 volts AC, 50/60 hertz

4-4 Environmental

Operating:	10 °C to 40 °C
Storage:	-20 °C to +70 °C

4-5 Regulatory Agency Approvals
UL 478 5th Ed.
CSA C22.2 #154-M1983

TRAINING - V

5-1 Prior to the acceptance of the equipment, training shall be provided for the Department's engineering, maintenance and operations staff, at a facility provided by the Department. The training shall include all material and manuals required for each participant.

5-2 Maintenance training of all components shall be provided for a minimum of 16 hours for at least 5 personnel with an electronics background. The training shall include

operation instructions, theory of operation, circuit description, field adjustments, preventive maintenance procedures, troubleshooting, interpretation of results, and repair of all components.

5-3 Engineering/Operations training shall be provided for a minimum of 8 hours for at least 20 engineering and operations personnel. The training shall include a complete demonstration of the operation, capabilities of the equipment, and a demonstration of the use of the complete system.

INSTRUCTIONS AND GUARANTEES - VI

6-1 A set of use, maintenance and repair manuals for all components included in this specification shall be included with the furnished equipment.

6-2 No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.

6-3 All major components shall be identified with a metal plate containing the serial number and a bar code identification.

6-4 All supplied equipment shall carry a two-year warranty, from the date of project acceptance by the State, to be free of defects. The supplier shall fully test the equipment prior to delivery and within the warranty period. The installer shall be fully responsible for the installation of defect equipment and for the replacement of any equipment found to be defective due to improper construction or improper installation for two years after the State's equipment.