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

METRIC SPECIFICATIONS FOR RS232 DIAL-UP MODEMS (LOW SPEED)

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

New Jersey Department of Transportation Specifications for low speed RS232 for operation on the switched telephone network.

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

MODEM SPECIFICATION - I

1-1 Standards

The modem shall be an external RS232 based Hayes Compatible dial-up modem and shall provide full duplex operation using a standard telephone company 2-wire dial-up line. The modem shall meet or exceed V.22 bis (2 400 bits per second) standards.

1-2 AT Command Set

The modem must support a full implementation of the AT Command set as implemented in the Hayes Optima 2400. This command set shall include the following options:

A. ATS0=XAuto-Answer-Number of Rings

B. AT&VListing of Modem Settings

C. AT&W0Ability to store modem configuration in permanent memory

D. AT&CXControl of External Carrier Detect

E. AT&DXControl of External DSR Signal

1-3 Dumb Modem Setting

The modem shall have a hard switch which will allow the unit to operate in "dumb mode". This capability disables the AT command set and is useful for devices that are designed for operation with dedicated service. In "dumb mode", the modem will not respond to any command sequences and will return no result codes. However, all RS232 signals, such as Carrier Detect, Clear to Send, shall be functional.

1-4 RS232 Port

The modem shall be configured with a DB-25 Female connector configured for DCE operation.

1-5 Modular Phone Cord

The modem shall have a 2-wire modular phone jack and be supplied complete with a 2 meter minimum modular phone cord for connection to the public switched network.

1-6 Baud Rates

The modem shall support 300, 1 200, and 2 400 baud rates. The modem shall support originate, manual, permanent auto answer, or controlled auto answer operating modes (S0= Parameter).

1-7 Transmission Impedance

The modem shall have a line impedance of 600 ohms ±10% transformer coupled and transient protected. The transmitter output level shall be 0 to -12 dBm programmable, with an external programming resistor.

1-8 Carrier Detect Sensitivity

The carrier detect sensitivity shall be -50 dBm ±4 dB. An auto disconnect function shall be provided if carrier detect is lost for a parameter set in S9 and S10.

1-9 Front Panel Indicators

The front panel of the modem enclosure shall contain at least eight diagnostic LEDs. These indicators shall include modem ready, terminal ready, off-hook, high speed, modem check, receive data, transmit data, and modem test.

1-10 Power On/Off

A power on/off switch shall be mounted on the chassis.

1-11 Environment

The dial-up modem may be housed in outdoor NEMA 3R enclosures within minimal environmental protection. The modem must operate in the temperature range of -20 °C to +60 °C and over a relative humidity of 0 to 95 percent non-condensing. The Supplier must supply certification by an independent technical laboratory confirming that the equipment complies with these environmental specifications.

1-12 Electrical Power

The modems must operate on standard 120 volts AC electrical service. The equipment shall operate over a voltage range of 105 to 125 volts AC at 60 hertz. External units

must be supplied with an internal or external power supply. The power supply must be equipped with a minimum of a 2 meter power cord terminating in a standard 2 or 3 prong line plug. Maximum power requirements must not exceed 200 watts for each modem.

TESTING - II

All equipment defined in this specification shall be subject to factory testing as subsequently described. The factory test shall demonstrate or provide confirmation that all of the equipment operates over the specified environmental range for each component. In addition, the test shall verify that the dial-up modems are capable of reliably transferring data (BER of 10 X -5 over a perfect connection) at both extremes of the temperature specifications. Certification shall be supplied or testing shall be conducted to verify that the modem implements all portions of the Hayes command protocol specified. The test shall utilize simulated or real telephone lines, complete with dial tone.

The supplier shall be responsible for submitting a test plan which has been designed to exercise and monitor the equipment for the purpose of determining compliance with the specifications.

INSTRUCTIONS AND GUARANTEES - III

3-1 One set of complete schematics and operations/maintenance manuals of for the modem and power supply shall be supplied with each ten assemblies furnished. Maintenance manuals shall include complete sub-component parts listing. Complete operations and protocol manuals shall also be provided with each assembly.

3-2 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.

3-3 All components shall carry a two-year guarantee from the date of acceptance against any imperfections in workmanship or materials.

3-4 The manufacturer agrees upon the request of the Manager, Office of ITS Engineering to deliver to the Office, a sample of each assembly to be supplied in compliance with these specifications for inspection and test before acceptance. After completion of the test, the sample shall be returned.

3-5 The supplier shall furnish any and all equipment which they deem necessary for safe and reliable field operation of the modems as part of the quoted price for the specified equipment.

3-6 All components furnished under this specification must be current production equipment and of recent manufacturer, identical models of which are in field operation in not less than 500 locations in the United States or Canada. Untried or prototype units shall not be considered for acceptance.

3-7 All major components shall be identified with a metal plate containing the serial number with a bar code identification.

3-8 Any repairs made by a manufacturer or representative shall be documented and returned with units when warranty repaired. This documentation shall include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number. All warranty repairs must be completed within thirty days of delivery of the equipment to the designated repair depot.