



NORD
COMPUTER SYSTEMS

ND 652 VERSATEC CONTROLLER DMA

INTRODUCTION

The Direct Memory Access (DMA) Printer/Plotter controller — ND 652 — interfaces the NORD-10/S computer and the Versatec Printer/Plotter. The controller, once initiated, has the capability of performing a transfer of one line or a specified number of words without any processor intervention. When using a word counter to specify the number of words, transfer of several lines may be initiated. After the controller device registers are initialized, all transfer will take place under supervision of the controller. The processor may be notified by an interrupt when one line or the specified number of characters have been transferred to the Matrix Printer/Plotter.

FEATURES

The plotter may be used in three different modes:

- plot mode
- print mode
- simultaneous print/plot

PRODUCT DESCRIPTION

Data Format

Print and plot data are transferred in word mode (2 bytes) between memory and the controller, and in byte mode between the controller and the Matrix Printer. The controller has a 16 bit (2 byte) buffer for temporary storage of data.

Printing

The print input accepts ASCII format. 7 or 8 level code (data bit 8 is not used).

The character generator in the Matrix Printer contains a Read Only Memory (ROM) in which 64 or 96 characters are stored. Up to 80 characters may be stored in the print buffer for 8 1/2" machines, or 132 characters for 11" machines.

When the buffer is full (1 line of characters) or a control character is received, the line is automatically printed.

Plot Operation

Data consists of 8 bit, binary unweighted bytes. A complete raster scan (a single plotted line) consists of 70 8-bit bytes, totaling 560 bits for 8 1/2" machines, or 128 8-bit bytes, totaling 1.024 bits on 11" machines.

Each dot corresponds to a single bit in the buffer. If a bit is "1" a black dot is plotted at the point corresponding to the bit position in the buffer.

When the last byte is stored in the plotter buffer, a single scan is automatically generated and one row of data points is plotted. A space equal to the horizontal resolution is generated and the Matrix Printer is then ready to receive another scan row of plot data.

When using line mode, the transfer is terminated when one line is transferred from the buffer in memory to the plotter buffer.

When using word mode, the transfer is terminated when the word counter is decremented to zero.

After a transfer, one of the "Remote Control Signals" may be used to empty the plotter buffer (if not full line).

Simultaneous Print/Plot (SPP) Operation

Simultaneous Print/Plot (SPP) Operation is provided to permit direct overlaying of character data generated by the Internal Matrix Character Generator, with plotting data generated on a dot basis. This is an optional feature on Matrix Printers/Plotters.

Normal operation consists of first filling the print buffer. If the buffer is not filled, the line must be terminated by a CR (Carriage Return) code. Mode is changed, and unweighted binary plot data is now loaded into the plot buffer until the plot buffer is full (one line) and a single scan is generated. Note that the writing process is controlled by the plot buffer.

During the scanning process, the print buffer is likewise scanned. The corresponding dot(s) of each character is (are) "ORed" with the plot buffer output, thus overlaying the printed and plotted data.

A printed character for 8 1/2" Matrix Printers consists of 8 scans when using a 64 character set, and 10 scans when using a 96 character set. Likewise, a printed character for 11" Matrix Printers consists of 10 scans when using a 64 character set, or 12 scans when using a 96 character set. New data may be entered into the print buffer after the last scan of the previous line of characters is completed.

SPECIFICATIONS

Connection to Plotter:

The controller is connected by the parallel interface connector, 8 data lines and 12 control lines. The controller may be used for all the types of Versatec Matrix Printers/Plotters.

Maximum cable length: 15 m (50 feet)

Connector type: Cannon DCC-37P, Mating connector Cannon DCC-37S.

Connection to computer:

The interface fits into a standard Norsk Data I/O crate and consists of:

1 board in standard I/O position

3 boards in specially wired positions

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NOTE: Norsk Data reserves the right to change specifications at any time. It is our policy to improve products as new techniques and components become available.