

# REVISIONS

| LTR | DASH NO. | DESCRIPTION           | DATE     | APPROVED           |
|-----|----------|-----------------------|----------|--------------------|
| X1  | 9001     | LTD RLSE PER LRA 0076 | 2 DEC 88 | <i>[Signature]</i> |
| X2  | 9001     | REV PER LRC 0392      | 7 DEC 93 | <i>[Signature]</i> |

RESTRICTED RELEASE

JUN 12 1984

9001

REP 3/78

|           |                 |                                    |  |                    |     |
|-----------|-----------------|------------------------------------|--|--------------------|-----|
| USED ON   | 1st APPLICATION | DWG APPROVAL DATE                  | <div style="font-weight: bold; font-size: 18px; margin-bottom: 5px;">CENTRONICS</div> <div style="font-size: 12px; margin-bottom: 5px;">data computer corp.</div> <div style="font-size: 10px; margin-bottom: 5px;">HUDSON, NEW HAMPSHIRE U.S.A.</div> |                    |     |
| NEXT ASSY |                 | DWN <i>BOUTIN</i> 29 Nov 87        |  |                    |     |
|           |                 | CHK <i>[Signature]</i> 2 DEC 88    |  |                    |     |
|           |                 | DR MGR <i>[Signature]</i> 2 DEC 88 |  |                    |     |
|           |                 | DES ENG <i>[Signature]</i>         |  |                    |     |
|           |                 | TITLE                              | ENGINEERING PRODUCT SPECIFICATION  |                    |     |
|           |                 | STORED ENERGY 18 WIRE              |  |                    |     |
|           |                 | IN-LINE PRINT HEAD                 |  |                    |     |
|           |                 | DWG RELEASE DATE                   | SIZE   | NUMBER             | REV |
|           |                 | ENG PROG MGR                       | A  | 80002195           | X2  |
|           |                 | MFG ENG                            | SCALE  | DO NOT SCALE PRINT |     |
|           |                 | QA                                 | SHEET <u>1</u> OF <u>3</u>   |                    |     |

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# ENGINEERING PRODUCT SPECIFICATION

**CENTRONICS®**

SPEC. NO. 80002195-9001  
REV X2  
DATE November 30, 1983  
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## 1.0 GENERAL DESCRIPTION

This specification defines an 18-wire in-line stored energy dot matrix impact print head assembly. The stored energy print head is a dot matrix impact printing device for the use in the following printers.

- A. Regular high speed dot matrix printer.
- B. High resolution dot matrix printer.
- C. Graphics dot matrix printer.

## 2.0 RELATED DOCUMENTS

- A. CDCC 80001003-9001 Paper Specification
- B. CDCC 80002188-9001 355 Print Quality Specification
- C. CDCC 80002189-9001 355Ribbon Specification
- D. CDCC Engineering Standard 001
- E. CDCC Engineering Standard 014
- F. CDCC Engineering Standard 011

## 3.0 PRINT HEAD CHARACTERISTICS AND PERFORMANCE

### 3.1 PRINT HEAD CHARACTERISTICS

- A. Print Wire Diameter .0138-.0140 inch
- B. Print Wire Column Center-to-Center Separation .0301  $\pm$  .0006 inch
- C. Print Wire Vertical Center-to-Center Separation .0146  $\pm$  .0004 inch
- D. Wire Tip Travel (Free) .025 inch min.
- E. Head to Platen Gap (Head Gap Hg) .013 + .003 inch\*
- F. Dynamic Print Range .006 Inch
- G. Coil Resistance (In free air at 68°F room temp.) 4.1 (REF) ohms
- H. Coil Inductance (in free air at 1000 Hz) .146 (REF) mH
- I. Drive Voltage 36-42 volts
- J. Drive Current 2.0-2.2 amp.
- K. Drive Pulse Width  
Single Actuator Alone 250-280 us  
Individual Actuator in Print Head 300 + 20 us
- L. Drive Scheme Current Limited Pulse

- \*3.1 E 1 Set up without paper or ribbon for typical 1 ply paper. Multi ply paper requires additional gap to maintain print quality and avoid smear and paper jam.
- 2 This represents dynamic print range over which the print head performance (Section 3.2) must be maintained.

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### 3.2 PRINT HEAD PERFORMANCE

Impact force and frequency response of "Single Actuator" alone and "Individual Actuator in Print Head" on one ply paper with ribbon against steel platen are specified as follows:

- A. Single Actuator
- |  |                 |                                |
|--|-----------------|--------------------------------|
| Testing Conditions:                        | Head Gap        | .013 inch                      |
|  | Pulse Form      | 2.0 amp x 260/270 us<br>Strobe |
|  | Driving Voltage | 36 volts min.                  |
| 1. Impact Force (to be tested at<br>20 Hz) |                 | 0.5 Kg min.*                   |
| 2. Frequency Response                      |                 | 1.7 KHZ min.                   |
- B. Individual Actuator in Print Head
- |  |                 |                                |
|--|-----------------|--------------------------------|
| Testing Conditions:                        | Head Gap        | .013 inch                      |
|  | Pulse Form      | 2.0 amp x 300/320 us<br>Strobe |
|  | Driving Voltage | 36 volts min.                  |
| 1. Impact Force (to be tested at<br>20 Hz) |                 | 0.5 Kg min.*                   |
| 2. Frequency Response                      |                 | 1.6 KHZ min.                   |
- C. Nominal variation of wire-to-wire  
Flight Time in Print Head 60 us
- D. Print Head Performance - The print head must be capable of performing to the following specifications:
- |   |                |
|---|----------------|
| Head Gap  | .010-.016 inch |
| Driving Voltage   | 36-42 volts    |
| Impact Force - Acceptable print quality darkness of 1 ply<br>paper through 6 ply paper with ribbon. |                |
| Frequency Response  | 1.6 KHZ min.   |
- E. Rated life of each individual  
actuator in head 500 x 10<sup>6</sup> dots
- F. Print Head Life 250 x 10<sup>6</sup> characters
- G. Maximum coil surface temperature for  
satisfied performance (with 20°C  
ambient temperature) 150°C

\*3.2 A1&B1 Force measurements made using 60 KHZ notch filter.

### 4.0 PRINT HEAD OVERALL SIZE AND WEIGHT

- |                 |                  |
|-----------------|------------------|
| A. Overall Size | 2.70 Dia x 3.0 L |
| B. Weight       | 350 gm (12.4 oz) |

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## 5.0 TEST EQUIPMENT OPERATION

To measure output parameters required by this specification, test the print head on the frequency and impact tester provided and maintained by test equipment engineering following approved operating and recording procedures.

## 6.0 SERVICE REQUIREMENTS

The stored energy print head is designed to require no service or maintenance throughout its specified life. The print head will be an operator changeable item that upon failure is replaced by a new head.

## 7.0 ENVIRONMENTAL REQUIREMENTS

### 7.1 OPERATING ENVIRONMENT

The Print Head Assembly must be capable of operating reliably per Centronics Engineering Standard 001, Class B.

### 7.2 STORAGE ENVIRONMENT

The Print Head Assembly must be capable of operating reliably after storage under the following conditions:

- A. Temperature/Humidity per Engineering Standard 001, Paragraph 3.2, Class B.
- B. Altitude - Per Engineering Standard 001, Paragraph 4.2.

### 7.3 THERMAL DESIGN

The Print Head Assembly must operate reliably when the temperature surrounding the solenoids is 200°F (93.3°C).

### 7.4 SHOCK AND VIBRATION

Refer to Centronics Engineering Standard 001, Class B.

## 8.0 RELIABILITY

### 8.1 DEFINITION OF A FAILURE

A failure is any malfunction of mechanical or electrical hardware which prevents full operation of the Print Head mechanism as defined in Section 3.2D.

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## 8.2 MEAN TIME TO FAILURE (MTTF)

The MTTF for the Print Head shall be independent of duty cycle. The MTTF is 500 million dots per actuator. Reliability will be tested per Centronics Engineering Standard 014 at a "B10" Life with 90% confidence.

## 8.3 MAINTAINABILITY

Maintainability requirements are as follows:

- A. Spare parts - The design must allow for availability of spare heads for a period of five (5) years from the date of sale of each mechanism.

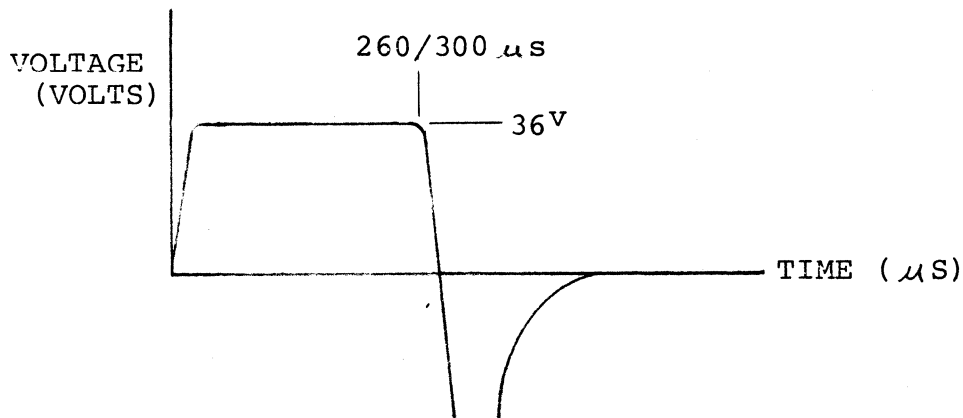
## 9.0 SAFETY

Print Head Assembly must meet the safety standards of Centronics Engineering Standard 011.

## 10.0 OPERATING PROFILES (Reference Only 10.1 Through 10.6)

The following profiles show the results of varying one or more conditions while holding the remaining conditions per Section 3. They should be used as a guide depending on driver characteristics, magnetic and tolerance conditions.

### 10.1 VOLTAGE PROFILE



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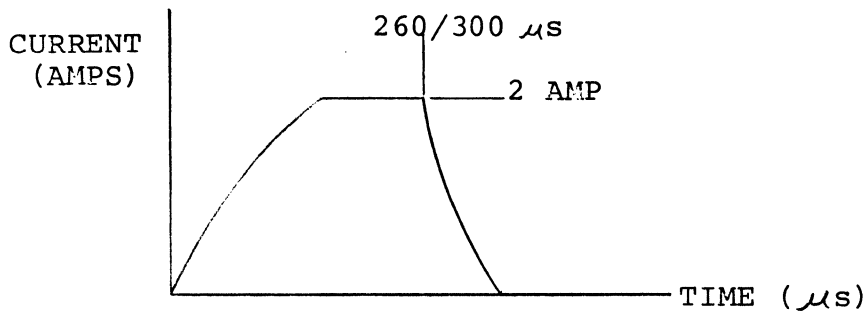
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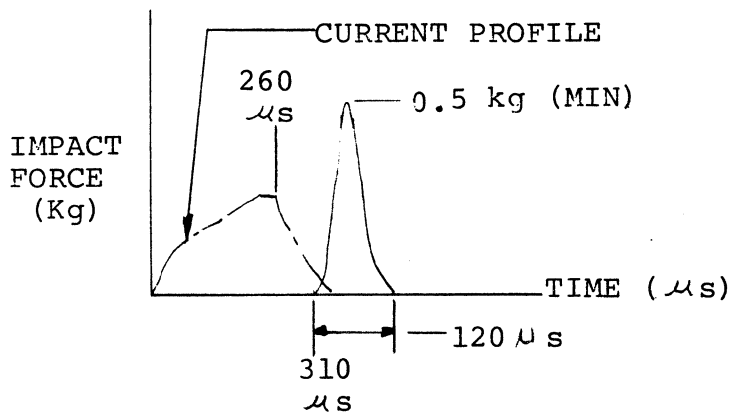
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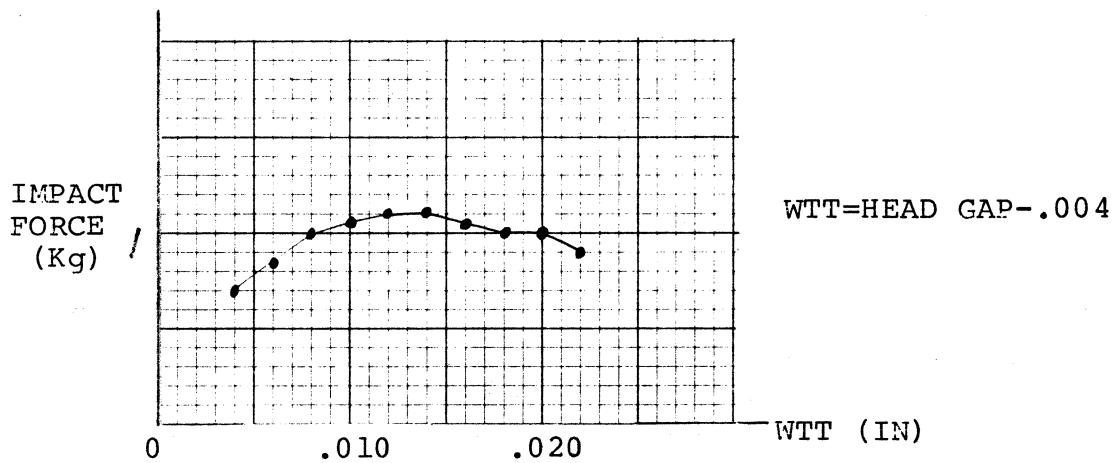
### 10.2 CURRENT PROFILE



### 10.3 IMPACT FORCE PROFILE



### 10.4 IMPACT FORCE vs WTT (WIRE TIP TRAVEL) PROFILE



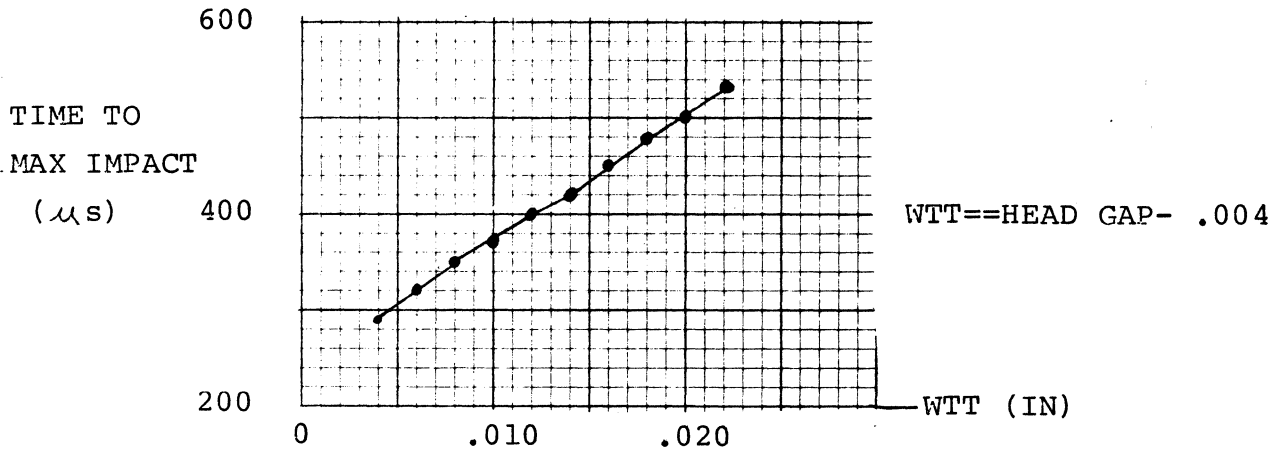
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### 10.5 TIME TO IMPACT vs WTT PROFILE



### 10.6 FREQUENCY RESPONSE VS WTT PROFILE

